CERTIFICATION TEST REPORT

Report Number. : 4791377016-E3V1

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

Model : SM-A166M/DS, SM-A166M

FCC ID : A3LSMA166M

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

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

Date Of Issue:
2024-08-16

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IAS ACCREDITED
Testing Laboratory
TL-637

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	2024-08-16	Initial issue	Yeonhee Lim

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	SAMSUNG ELECTRONICS CO., LTD.
EUT DESCRIPTION:	GSM/WCDMA/LTE/5G NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac, and NFC.
MODEL NUMBER:	SM-A166M/DS, SM-A166M
SERIAL NUMBER:	R3CX50MNKZM, R93X70005LL (CONDUCTED); R93X70005SY, R93X70005BB, R93X700029E (RADIATED);
DATE TESTED:	2024-07-03 - 2024-08-16;

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:

Seokhwan Hong
Suwon Lab Engineer
UL KOREA LTD.

Tested By:

Yeonhee Lim
Suwon Lab Engineer
UL KOREA LTD.

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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
☒ Chamber 1(3m semi-anechoic chamber)
☒ Chamber 2(3m semi-anechoic chamber)
☐ Chamber 3(3m semi-anechoic chamber)
☒ Chamber 4(3m Full-anechoic chamber)
☐ 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.

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4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

EIRP = SG reading with EUT worst orientation (dBm) – cable loss(between the SG and substitution antenna) + 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	2.79 dB
Radiated Disturbance, 9 kHz to 30 MHz	1.69 dB
Radiated Disturbance, 30 MHz to 1 GHz	4.07 dB
Radiated Disturbance, 1 GHz to 18 GHz	4.99 dB
Radiated Disturbance, Above 18 GHz	5.96 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 Clause 4.3.3 in IEC Guide 115:2023.

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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, and NFC. This test report addresses the WWAN operational mode.

Representative model	Difference	Derivative model
		SM-A166M
SM-A166M/DS	Hardware	SIM tray is single SIM
	Software	Dual SIM not supported

The model SM-A166M/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:
Radiated samples were tested to a higher power than conducted resulting in radiated EIRP greater than conducted measurements.

GSM

FCC Part 24							
Band	ANT	Frequency Range [MHz]	Modulation	Conducted		Radiated	
				Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
GSM 1900	A	1850.20 ~ 1909.80	GPRS	**29.34**	**859.01**	**29.04**	801.68
			EGPRS	25.75	375.84	26.20	416.87

WCDMA

FCC Part 24							
Band	ANT	Frequency Range [MHz]	Modulation	Conducted		Radiated	
				Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 2	A	1852.40 ~ 1907.60	Rel. 99	**22.78**	**189.67**	**22.64**	183.65
			HSDPA	**22.78**	**189.67**	22.54	179.47

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LTE Band 2

FCC Part 24								
Band	ANT	Frequency Range [MHz]	BandWidth [MHz]	Modulation	Conducted		Radiated	
					Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 2	A	1860.00 ~ 1900.00	20	QPSK	22.98	198.61	**22.45**	**175.79**
				16QAM	22.26	168.27	21.62	145.21
				64QAM	21.29	134.59		
				256QAM	18.36	68.55		
		1857.50 ~ 1902.50	15	QPSK	23.07	202.77	22.32	170.61
				16QAM	22.17	164.82	21.34	136.14
				64QAM	21.31	135.21		
				256QAM	18.26	66.99		
		1855.00 ~ 1905.00	10	QPSK	23.26	211.84	22.19	165.58
				16QAM	22.17	164.82	21.25	133.35
				64QAM	21.25	133.35		
				256QAM	18.41	69.34		
		1852.50 ~ 1907.50	5	QPSK	23.13	205.59	22.33	171.00
				16QAM	22.34	171.40	21.43	139.00
				64QAM	21.76	149.97		
				256QAM	18.24	66.68		
		1851.50 ~ 1908.50	3	QPSK	**23.33**	**215.28**	22.23	167.11
				16QAM	22.28	169.04	21.35	136.46
				64QAM	21.23	132.74		
				256QAM	18.63	72.95		
		1850.70 ~ 1909.30	1.4	QPSK	23.29	213.30	22.21	166.34
				16QAM	22.36	172.19	21.41	138.36
				64QAM	21.21	132.13		
				256QAM	18.33	68.08		

FCC Part 24								
Band	ANT	Frequency Range [MHz]	BandWidth [MHz]	Modulation	Conducted		Radiated	
					Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 2	B	1860.0 ~ 1900.0	20	QPSK	22.46	176.20	15.64	36.64
				16QAM	21.99	158.12	15.09	32.28
				64QAM	20.71	117.76		
				256QAM	17.88	61.38		
		1857.5 ~ 1902.5	15	QPSK	22.63	183.23	15.89	38.82
				16QAM	21.87	153.82	15.05	31.99
				64QAM	21.12	129.42		
				256QAM	17.84	60.81		
		1855.0 ~ 1905.0	10	QPSK	22.58	181.13	15.87	38.64
				16QAM	21.83	152.41	15.03	31.84
				64QAM	20.65	116.14		
				256QAM	18.12	64.86		
		1852.5 ~ 1907.5	5	QPSK	22.58	181.13	**15.98**	**39.63**
				16QAM	21.95	156.68	15.00	31.62
				64QAM	20.91	123.31		
				256QAM	17.85	60.95		
		1851.5 ~ 1908.5	3	QPSK	22.61	182.39	15.89	38.82
				16QAM	21.92	155.60	15.24	33.42
				64QAM	20.74	118.58		
				256QAM	17.82	60.53		
		1850.7 ~ 1909.3	1.4	QPSK	**22.69**	**185.78**	15.95	39.36
				16QAM	22.04	159.96	15.22	33.27
				64QAM	21.32	135.52		
				256QAM	17.95	62.37		

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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)
GSM1900 / WCDMA Band2 / LTE Band 2 1850 - 1910 MHz	A	3.14
	B	-3.91

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5.4. WORST-CASE ORIENTATION

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

- GSM GPRS/EGPRS
  The worst-case scenario for all measurements is based on the average conducted output power measurement investigation results. Output power measurements were measured on GPRS and EGPRS modulations. It was found GPRS results were worst case.

- UMTS REL 99/HSDPA
  The worst-case scenario for all measurements is based on the average conducted output power measurement investigation results. Output power measurements were measured on REL 99 and HSDPA modulations. It was found REL 99 results were worst case.

- LTE Band 2
  The worst-case scenario for all measurements is based on the average conducted output power measurement investigation results. Output power measurements were measured on QPSK, 16QAM, 64QAM and 256QAM modulations. It was found QPSK and 16QAM results were worst case.

- It was tested for all rf ports and, 'Main ANT' conducted test power is the same or higher than 'Sub ANT', so we reported with 'Main ANT'.
- So the test case is as below.

Band	Main ANT	Tune up Limit (dBm)	Sub ANT	Tune up Limit (dBm)
LTE B2	**A**	**24.0**	B	24.0

Test Item	Test case antenna & port
Conducted output power	All
RF port test	All (Worst case reported)
EIRP	All
Radiated Spurious Emissions	All

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- Conducted Spurious Emission

Highest conducted output power setting for each bands					
LTE Band	**ANT**	**Frequency (MHz)**	**Bandwidth (MHz)**	**RB size**	**RB offset**
2	A	1851.50	3	1	8
		1880.00		1	8
		1908.50		1	8

- Radiated Spurious Emission

Highest EIRP setting for each bands					
LTE Band	**ANT**	**Frequency (MHz)**	**Bandwidth (MHz)**	**RB size**	**RB offset**
2	A	1860.00	20	1	49
		1880.00		1	0
		1900.00		1	0
	B	1852.50	5	1	0
		1880.00		1	12
		1907.50		1	0

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**	**EIRP**			**RSE**		
		X	**Y**	**Z**	**X**	**Y**	**Z**
GSM 1900	A	O	-	-	-	-	O
WCDMA B2	A	O	-	-	O	-	-
LTE B2	A	O	-	-	O	-	-
	B	-	O	-	-	-	O

Note1 : 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.

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5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacture**	**Model**	**Serial Number**	**FCC ID**
Charger	SAMSUNG	EP-TA800	R37TC7A00JBDKA	N/A
Data Cable	SAMSUNG	EP-DN980	GH39-02115A	N/A

I/O CABLE

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

TEST SETUP

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

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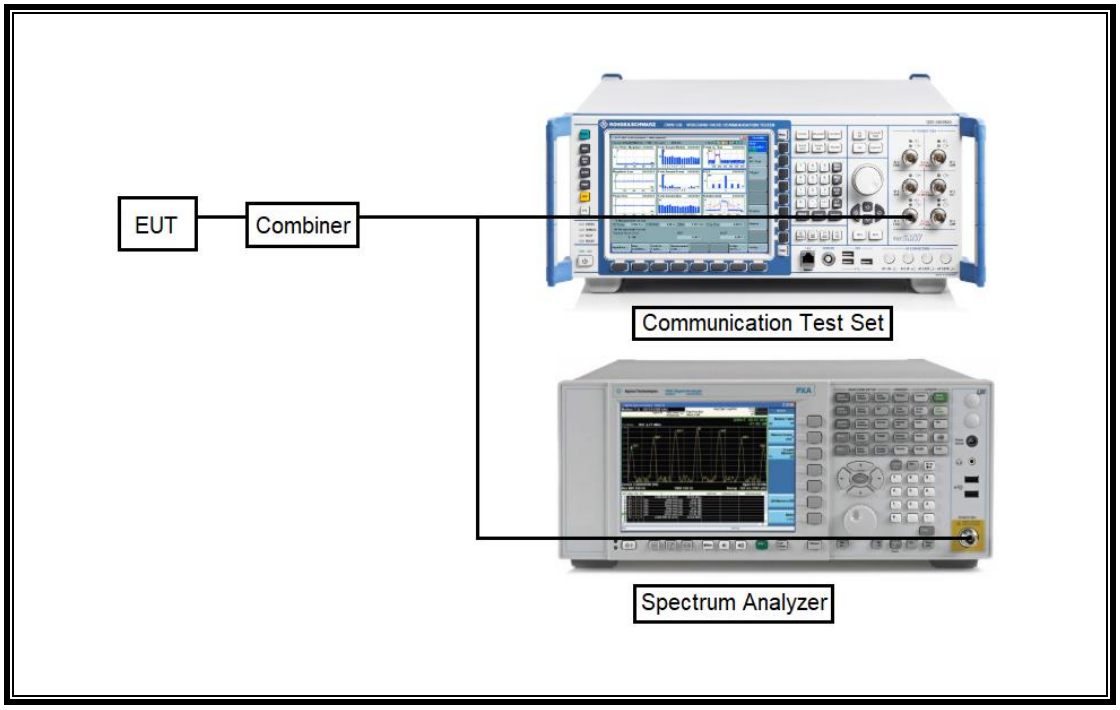
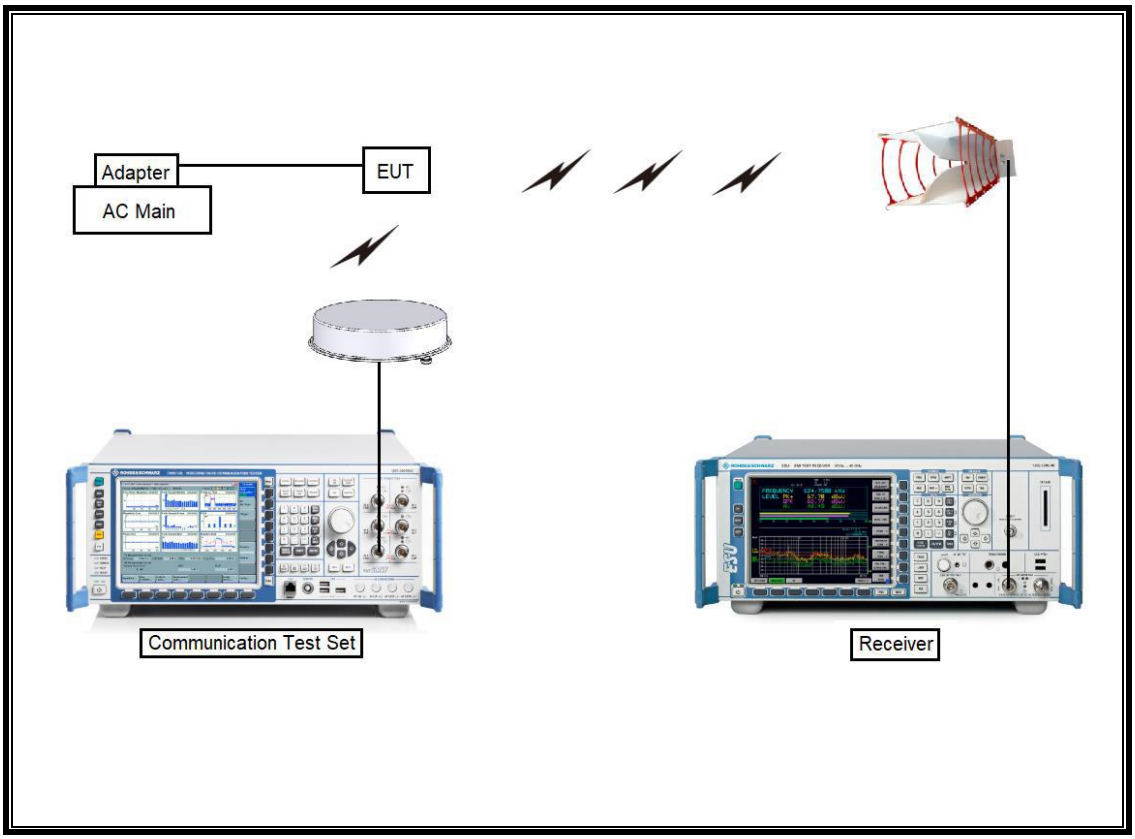
SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)



SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)



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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 DB-4	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	2026-07-23
Antenna, Horn, 40 GHz	ETS	3116C	00168645	2025-10-06
Preamplifier	ETS	3116C-PA	00168841	2025-07-25
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB 9163	750	2026-07-30
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB 9163	845	2026-07-30
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB 9163	749	2026-08-12
Antenna, Horn, 18 GHz	ETS	3115	00167211	2026-07-17
Antenna, Horn, 18 GHz	ETS	3115	00161451	2026-07-17
Antenna, Horn, 18 GHz	ETS	3117	00168724	2026-07-17
Antenna, Horn, 18 GHz	ETS	3117	00168717	2026-07-17
Communications Test Set	R&S	CMW500	169797	2025-07-23
DC Power Supply	Agilent / HP	E3640A	MY54226395	2025-07-24
Preamplifier, 1000 MHz	Sonoma	310N	341282	2025-07-22
Preamplifier, 1000 MHz	Sonoma	310N	370599	2025-07-22
Preamplifier, 1000 MHz	Sonoma	310N	351741	2025-07-22
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	2029169	2025-07-23
Preamplifier, 18 GHz	B&Z Technologies, LLC	BZR-01001800-231040-182020	28451	2025-07-22
Preamplifier, 18 GHz	B&Z Technologies, LLC	BZR-01001800-231040-181515	23576	2025-07-25
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	2025-07-24
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54490312	2025-01-03
Spectrum Analyzer, 44 GHz	KEYSIGHT	N9030B	MY57143717	2025-07-23
EMI Test Receive, 40 GHz	R&S	ESU40	100439	2025-07-23
EMI Test Receive, 40 GHz	R&S	ESU40	100457	2025-07-22
High Pass Filter 1.2GHz	Micro-Tronics	HPM50108-02	G005	2025-07-23
High Pass Filter 1.2GHz	Micro-Tronics	HPM50108-02	G006	2025-07-23
High Pass Filter 2.8GHz	Micro-Tronics	HPM50111-02	010	2025-07-23
High Pass Filter 2.8GHz	Micro-Tronics	HPM50111-02	011	2025-07-23
High Pass Filter 4GHz	Micro-Tronics	HPM50118-02	G001	2025-07-23
High Pass Filter 4GHz	Micro-Tronics	HPM50118-02	G002	2025-07-23
Attenuator	PASTERNACK	PE7087-10	A009	2025-07-23
Attenuator	PASTERNACK	PE7087-10	A001	2025-07-23
Attenuator	PASTERNACK	PE7087-10	A008	2025-07-23
Attenuator	PASTERNACK	PE7004-10	2	2025-07-23
Attenuator	PASTERNACK	PE7395-10	A011	2025-07-25
Antenna, Loop, 9kHz-30MHz	R&S	HFH2-Z2	100418	2025-09-07
Temperature Chamber	ESPEC	SH-642	93001109	2025-07-23
Power Splitter	MINI-CIRCUITS	WA1534	UL003	2025-01-03
Power Splitter	MINI-CIRCUITS	WA1534	UL004	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	

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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
24.238(a)	Conducted Band Edge / Conducted Spurious Emission	-13 dBm		Pass
24.235	Frequency Stability	2.5 ppm		Pass
24.232(c)	Effective Isotropic Radiated Power	33 dBm	Radiated	Pass
24.238(a)	Radiated Spurious Emission	-13 dBm		Pass

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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 CMW500 Test Set and configured to operate at maximum power.

RESULTS

See the following pages.

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8.1.1. CONDUCTED AVERAGE OUTPUT POWER

GSM

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	29.20	20.01	31.5	22.5
			29.34	20.15		
			29.21	20.02		
GPRS (GMSK)	CS1	1	29.18	19.99	31.5	22.5
			29.25	20.06		
			29.09	19.90		
		2	26.59	20.41	28.0	22.0
			26.96	20.78		
			26.88	20.70		
		3	25.09	20.67	26.5	22.2
			25.54	21.12		
			25.49	21.07		
		4	23.97	20.80	25.5	22.5
			24.43	21.26		
			24.39	21.22		
EGPRS (8PSK)	MCS5	1	25.10	15.91	26.5	17.5
			25.29	16.10		
			25.75	16.56		
		2	22.71	16.53	24.0	18.0
			22.99	16.81		
			23.19	17.01		
		3	21.87	17.45	22.5	18.2
			22.01	17.59		
			22.26	17.84		
		4	20.55	17.38	21.0	18.0
			20.82	17.65		
			20.67	17.50		

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WCDMA B2

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	22.31	N/A	24.0
		9400	1880.0	22.53		
		9538	1907.6	**22.78**		
HSDPA	Subtest 1	9262	1852.4	22.32	0	23.0
		9400	1880.0	22.57		
		9538	1907.6	**22.78**		
	Subtest 2	9262	1852.4	22.02	0	23.0
		9400	1880.0	22.34		
		9538	1907.6	22.52		
	Subtest 3	9262	1852.4	21.58	0.5	22.5
		9400	1880.0	21.83		
		9538	1907.6	22.01		
	Subtest 4	9262	1852.4	21.12	0.5	22.5
		9400	1880.0	21.40		
		9538	1907.6	21.55		
HSUPA	Subtest 1	9262	1852.4	21.52	0	23.0
		9400	1880.0	21.65		
		9538	1907.6	21.89		
	Subtest 2	9262	1852.4	19.11	2	21.0
		9400	1880.0	19.49		
		9538	1907.6	19.63		
	Subtest 3	9262	1852.4	21.46	1	22.0
		9400	1880.0	21.67		
		9538	1907.6	21.88		
	Subtest 4	9262	1852.4	19.64	2	21.0
		9400	1880.0	19.91		
		9538	1907.6	20.07		
	Subtest 5	9262	1852.4	22.54	0	23.0
		9400	1880.0	22.71		
		9538	1907.6	22.74		
DC-HSDPA	Subtest 1	9262	1852.4	22.33	0	23.0
		9400	1880.0	22.64		
		9538	1907.6	22.54		
	Subtest 2	9262	1852.4	22.05	0	23.0
		9400	1880.0	22.49		
		9538	1907.6	22.23		
	Subtest 3	9262	1852.4	21.15	0.5	22.5
		9400	1880.0	21.54		
		9538	1907.6	21.29		
	Subtest 4	9262	1852.4	21.15	0.5	22.5
		9400	1880.0	21.54		
		9538	1907.6	21.30		

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LTE Band 2 (ANT A)

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				Measured Pwr (dBm)			MPR	Tune-up Limit
				18700	18900	19100		
				1860.00 MHz	1880.00 MHz	1900.00 MHz		
20 MHz	QPSK	1	0	22.93	22.98	22.96	0.0	24.0
		1	49	22.96	22.74	22.83	0.0	24.0
		1	99	22.88	22.91	22.91	0.0	24.0
		50	0	21.92	21.96	21.95	1.0	23.0
		50	24	21.90	21.92	21.94	1.0	23.0
		50	50	21.87	21.92	21.94	1.0	23.0
		100	0	21.89	21.96	21.96	1.0	23.0
	16QAM	1	0	22.26	21.99	22.19	1.0	23.0
		1	49	22.18	22.06	22.10	1.0	23.0
		1	99	22.16	22.03	22.12	1.0	23.0
		50	0	20.92	20.94	20.96	2.0	22.0
		50	24	20.90	20.94	20.94	2.0	22.0
		50	50	20.89	20.95	20.95	2.0	22.0
		100	0	20.90	20.95	20.96	2.0	22.0
	64QAM	1	0	21.09	21.05	21.29	2.0	22.0
		1	49	20.95	20.95	20.97	2.0	22.0
		1	99	21.00	21.07	21.22	2.0	22.0
		50	0	19.99	20.06	20.08	3.0	21.0
		50	24	19.97	20.05	20.05	3.0	21.0
		50	50	19.94	20.03	20.05	3.0	21.0
		100	0	19.93	20.02	20.01	3.0	21.0
	256QAM	1	0	18.08	18.34	18.16	5.0	19.0
		1	49	18.27	18.36	18.28	5.0	19.0
		1	99	18.03	18.34	18.12	5.0	19.0
		50	0	17.97	18.02	18.06	5.0	19.0
		50	24	17.96	18.00	18.06	5.0	19.0
		50	50	17.95	18.02	18.02	5.0	19.0
		100	0	17.97	17.99	18.07	5.0	19.0
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				18675	18900	19125		
				1857.50 MHz	1880.00 MHz	1902.50 MHz		
15 MHz	QPSK	1	0	22.88	22.95	22.89	0.0	24.0
		1	37	23.07	23.06	22.99	0.0	24.0
		1	74	22.82	22.95	22.86	0.0	24.0
		36	0	21.91	21.99	21.91	1.0	23.0
		36	20	21.88	21.99	21.91	1.0	23.0
		36	39	21.88	21.98	21.90	1.0	23.0
		75	0	21.91	22.02	21.93	1.0	23.0
	16QAM	1	0	21.89	22.07	21.85	1.0	23.0
		1	37	22.02	22.17	22.08	1.0	23.0
		1	74	21.80	22.03	21.84	1.0	23.0
		36	0	20.87	20.95	20.90	2.0	22.0
		36	20	20.85	20.95	20.91	2.0	22.0
		36	39	20.85	20.95	20.89	2.0	22.0
		75	0	20.85	20.99	20.90	2.0	22.0
	64QAM	1	0	20.84	21.14	21.09	2.0	22.0
		1	37	20.74	21.31	21.28	2.0	22.0
		1	74	20.81	21.11	21.03	2.0	22.0
		36	0	19.84	20.02	19.97	3.0	21.0
		36	20	19.80	20.00	19.99	3.0	21.0
		36	39	19.78	20.00	19.97	3.0	21.0
		75	0	19.87	20.00	19.93	3.0	21.0
	256QAM	1	0	17.78	18.14	17.89	5.0	19.0
		1	37	17.94	18.26	18.02	5.0	19.0
		1	74	17.74	18.15	17.85	5.0	19.0
		36	0	17.87	18.02	17.91	5.0	19.0
		36	20	17.85	18.01	17.91	5.0	19.0
		36	39	17.85	17.99	17.90	5.0	19.0
		75	0	17.86	17.99	17.88	5.0	19.0

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BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				18650	18900	19150		
				1855.00 MHz	1880.00 MHz	1905.00 MHz		
10 MHz	QPSK	1	0	22.84	22.96	23.03	0.0	24.0
		1	25	22.92	22.88	23.26	0.0	24.0
		1	49	22.82	22.96	23.02	0.0	24.0
		25	0	21.83	21.93	22.01	1.0	23.0
		25	12	21.83	21.92	22.02	1.0	23.0
		25	25	21.79	21.93	22.01	1.0	23.0
		50	0	21.82	21.93	22.01	1.0	23.0
	16QAM	1	0	21.89	22.09	22.03	1.0	23.0
		1	25	22.02	22.17	21.99	1.0	23.0
		1	49	21.78	22.08	21.94	1.0	23.0
		25	0	20.86	20.94	21.08	2.0	22.0
		25	12	20.85	20.94	21.06	2.0	22.0
		25	25	20.84	20.93	21.03	2.0	22.0
		50	0	20.85	20.93	21.02	2.0	22.0
	64QAM	1	0	20.84	21.16	21.10	2.0	22.0
		1	25	20.95	21.25	20.96	2.0	22.0
		1	49	20.78	21.18	21.13	2.0	22.0
		25	0	19.88	19.99	20.16	3.0	21.0
		25	12	19.88	19.98	20.15	3.0	21.0
		25	25	19.85	19.97	20.12	3.0	21.0
		50	0	19.83	19.97	20.10	3.0	21.0
	256QAM	1	0	18.02	18.18	18.07	5.0	19.0
		1	25	18.19	18.41	18.28	5.0	19.0
		1	49	18.00	18.14	18.06	5.0	19.0
		25	0	17.94	18.02	18.14	5.0	19.0
		25	12	17.92	18.01	18.14	5.0	19.0
		25	25	17.88	18.01	18.09	5.0	19.0
		50	0	17.85	17.99	18.10	5.0	19.0

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				18625	18900	19175		
				1852.50 MHz	1880.00 MHz	1907.50 MHz		
5 MHz	QPSK	1	0	22.74	22.88	23.09	0.0	24.0
		1	12	22.83	23.13	23.07	0.0	24.0
		1	24	22.75	22.90	23.11	0.0	24.0
		12	0	21.76	21.88	22.13	1.0	23.0
		12	7	21.77	21.88	22.13	1.0	23.0
		12	13	21.74	21.87	22.13	1.0	23.0
		25	0	21.77	21.86	22.13	1.0	23.0
	16QAM	1	0	21.95	22.11	22.17	1.0	23.0
		1	12	21.98	22.19	22.34	1.0	23.0
		1	24	21.95	22.09	22.15	1.0	23.0
		12	0	20.76	20.92	21.16	2.0	22.0
		12	7	20.75	20.93	21.14	2.0	22.0
		12	13	20.75	20.90	21.13	2.0	22.0
		25	0	20.81	20.88	21.11	2.0	22.0
	64QAM	1	0	21.76	21.14	21.38	2.0	22.0
		1	12	20.86	21.14	21.37	2.0	22.0
		1	24	20.88	21.16	21.40	2.0	22.0
		12	0	20.76	20.96	20.11	3.0	21.0
		12	7	20.78	20.97	20.09	3.0	21.0
		12	13	20.77	20.98	20.08	3.0	21.0
		25	0	19.85	19.96	20.26	3.0	21.0
	256QAM	1	0	17.93	18.09	18.23	5.0	19.0
		1	12	17.93	18.12	18.22	5.0	19.0
		1	24	17.91	18.14	18.22	5.0	19.0
		12	0	17.92	18.01	18.20	5.0	19.0
		12	7	17.93	18.00	18.20	5.0	19.0
		12	13	17.91	18.00	18.19	5.0	19.0
		25	0	17.86	17.97	18.24	5.0	19.0

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BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				18615	18900	19185		
				1851.50 MHz	1880.00 MHz	1908.50 MHz		
3 MHz	QPSK	1	0	22.87	22.87	23.18	0.0	24.0
		1	8	23.01	23.02	**23.33**	0.0	24.0
		1	14	22.88	22.86	23.19	0.0	24.0
		8	0	21.90	21.96	22.19	1.0	23.0
		8	4	21.82	21.95	22.13	1.0	23.0
		8	7	21.86	21.94	22.15	1.0	23.0
		15	0	21.84	21.92	22.17	1.0	23.0
	16QAM	1	0	21.99	22.10	22.12	1.0	23.0
		1	8	22.13	22.28	22.26	1.0	23.0
		1	14	21.93	22.11	22.06	1.0	23.0
		8	0	20.86	21.00	21.11	2.0	22.0
		8	4	20.84	20.98	21.09	2.0	22.0
		8	7	20.84	20.98	21.11	2.0	22.0
		15	0	20.79	20.93	21.14	2.0	22.0
	64QAM	1	0	21.10	20.92	21.04	2.0	22.0
		1	8	21.23	21.09	21.17	2.0	22.0
		1	14	21.12	20.94	21.00	2.0	22.0
		8	0	19.94	19.96	20.25	3.0	21.0
		8	4	19.90	19.93	20.23	3.0	21.0
		8	7	19.89	19.90	20.17	3.0	21.0
		15	0	19.81	20.02	20.20	3.0	21.0
	256QAM	1	0	18.10	18.17	18.44	5.0	19.0
		1	8	18.19	18.31	18.63	5.0	19.0
		1	14	18.05	18.15	18.43	5.0	19.0
		8	0	17.90	18.00	18.31	5.0	19.0
		8	4	17.88	17.98	18.26	5.0	19.0
		8	7	17.89	18.02	18.28	5.0	19.0
		15	0	17.88	18.07	18.27	5.0	19.0

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				18607	18900	19193		
				1850.70 MHz	1880.00 MHz	1909.30 MHz		
1.4 MHz	QPSK	1	0	22.88	22.93	23.13	0.0	24.0
		1	3	22.89	22.82	23.29	0.0	24.0
		1	5	22.86	22.94	23.16	0.0	24.0
		3	0	22.76	22.91	23.17	1.0	23.0
		3	1	22.76	22.82	23.08	1.0	23.0
		3	3	22.81	22.80	23.07	1.0	23.0
		6	0	21.83	21.91	22.15	1.0	23.0
	16QAM	1	0	21.95	21.88	22.30	1.0	23.0
		1	3	22.10	21.91	22.36	1.0	23.0
		1	5	21.99	21.92	22.32	1.0	23.0
		3	0	21.91	21.88	22.07	2.0	22.0
		3	1	21.87	21.89	21.97	2.0	22.0
		3	3	21.89	21.88	21.98	2.0	22.0
		6	0	20.88	20.92	21.09	2.0	22.0
	64QAM	1	0	20.95	20.98	21.01	2.0	22.0
		1	3	21.21	20.72	21.17	2.0	22.0
		1	5	20.92	20.92	21.05	2.0	22.0
		3	0	20.97	20.98	21.01	3.0	21.0
		3	1	20.94	20.93	20.94	3.0	21.0
		3	3	20.93	20.96	20.99	3.0	21.0
		6	0	19.74	19.96	20.09	3.0	21.0
	256QAM	1	0	17.84	18.16	18.32	5.0	19.0
		1	3	17.98	18.33	18.32	5.0	19.0
		1	5	17.82	18.18	18.30	5.0	19.0
		3	0	17.77	17.94	18.18	5.0	19.0
		3	1	17.78	17.85	18.16	5.0	19.0
		3	3	17.71	17.86	18.10	5.0	19.0
		6	0	17.73	17.88	18.10	5.0	19.0

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LTE Band 2 (ANT B)

BW (MHz)	Mode	RB Allocation	RB offset	Maximum Average Power (dBm)				
				Measured Pwr (dBm)			MPR	Tune-up Limit
				18700	18900	19100		
				1860.00 MHz	1880.00 MHz	1900.00 MHz		
20 MHz	QPSK	1	0	22.46	21.91	22.30	0.0	24.0
		1	49	22.35	21.79	22.19	0.0	24.0
		1	99	22.30	21.81	22.01	0.0	24.0
		50	0	21.64	21.01	21.02	1.0	23.0
		50	24	21.60	21.03	21.04	1.0	23.0
		50	50	21.53	20.91	20.96	1.0	23.0
		100	0	21.57	20.97	21.03	1.0	23.0
	16QAM	1	0	21.99	21.27	21.43	1.0	23.0
		1	49	21.69	21.12	20.72	1.0	23.0
		1	99	21.89	21.30	20.98	1.0	23.0
		50	0	20.66	20.05	20.06	2.0	22.0
		50	24	20.59	20.06	20.02	2.0	22.0
		50	50	20.42	20.06	20.05	2.0	22.0
		100	0	20.58	20.11	20.16	2.0	22.0
	64QAM	1	0	20.71	20.04	20.19	2.0	22.0
		1	49	20.53	20.02	19.51	2.0	22.0
		1	99	20.60	20.12	20.19	2.0	22.0
		50	0	19.46	19.17	19.10	3.0	21.0
		50	24	19.44	19.09	19.15	3.0	21.0
		50	50	19.46	19.06	19.02	3.0	21.0
		100	0	19.55	19.06	19.11	3.0	21.0
	256QAM	1	0	17.88	16.95	17.36	5.0	19.0
		1	49	17.30	17.37	16.74	5.0	19.0
		1	99	17.42	17.08	17.02	5.0	19.0
		50	0	17.55	17.07	17.08	5.0	19.0
		50	24	17.53	17.14	17.09	5.0	19.0
		50	50	17.38	17.09	16.98	5.0	19.0
		100	0	17.48	17.09	17.20	5.0	19.0
BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				18675	18900	19125		
				1857.50 MHz	1880.00 MHz	1902.50 MHz		
15 MHz	QPSK	1	0	22.63	22.42	22.13	0.0	24.0
		1	37	22.53	22.25	21.98	0.0	24.0
		1	74	22.34	22.24	22.09	0.0	24.0
		36	0	21.60	21.40	21.27	1.0	23.0
		36	20	21.59	21.37	21.23	1.0	23.0
		36	39	21.51	21.36	21.21	1.0	23.0
		75	0	21.56	21.45	21.12	1.0	23.0
	16QAM	1	0	21.73	21.49	21.06	1.0	23.0
		1	37	21.87	21.39	21.15	1.0	23.0
		1	74	21.15	21.46	21.28	1.0	23.0
		36	0	20.54	20.34	20.23	2.0	22.0
		36	20	20.48	20.45	20.13	2.0	22.0
		36	39	20.46	20.33	20.16	2.0	22.0
		75	0	20.52	20.29	20.21	2.0	22.0
	64QAM	1	0	20.79	20.54	19.92	2.0	22.0
		1	37	21.12	19.84	20.39	2.0	22.0
		1	74	20.79	20.47	20.36	2.0	22.0
		36	0	19.44	19.45	19.16	3.0	21.0
		36	20	19.49	19.28	19.25	3.0	21.0
		36	39	19.37	19.36	19.16	3.0	21.0
		75	0	19.54	19.33	19.13	3.0	21.0
	256QAM	1	0	17.62	17.76	17.21	5.0	19.0
		1	37	17.11	17.18	17.05	5.0	19.0
		1	74	17.84	17.36	17.12	5.0	19.0
		36	0	17.83	17.35	17.17	5.0	19.0
		36	20	17.76	17.41	17.13	5.0	19.0
		36	39	17.72	17.38	17.16	5.0	19.0
		75	0	17.76	17.39	17.23	5.0	19.0

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BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				18650	18900	19150		
				1855.00 MHz	1880.00 MHz	1905.00 MHz		
10 MHz	QPSK	1	0	22.58	22.41	22.38	0.0	24.0
		1	25	22.32	22.38	22.36	0.0	24.0
		1	49	22.41	22.47	22.36	0.0	24.0
		25	0	21.57	21.56	21.45	1.0	23.0
		25	12	21.49	21.51	21.42	1.0	23.0
		25	25	21.49	21.47	21.49	1.0	23.0
		50	0	21.60	21.45	21.54	1.0	23.0
	16QAM	1	0	21.54	21.28	21.44	1.0	23.0
		1	25	21.44	21.60	21.38	1.0	23.0
		1	49	21.28	21.83	21.55	1.0	23.0
		25	0	20.60	20.59	20.50	2.0	22.0
		25	12	20.39	20.52	20.49	2.0	22.0
		25	25	20.57	20.48	20.35	2.0	22.0
		50	0	20.54	20.55	20.45	2.0	22.0
	64QAM	1	0	20.61	20.63	20.41	2.0	22.0
		1	25	20.63	20.65	20.16	2.0	22.0
		1	49	20.46	20.36	20.12	2.0	22.0
		25	0	19.53	19.49	19.53	3.0	21.0
		25	12	19.49	19.45	19.58	3.0	21.0
		25	25	19.52	19.50	19.47	3.0	21.0
		50	0	19.49	19.52	19.48	3.0	21.0
	256QAM	1	0	17.75	17.88	17.87	5.0	19.0
		1	25	18.12	17.28	17.27	5.0	19.0
		1	49	17.41	17.67	17.29	5.0	19.0
		25	0	17.54	17.36	17.53	5.0	19.0
		25	12	17.48	17.27	17.46	5.0	19.0
		25	25	17.48	17.23	17.49	5.0	19.0
		50	0	17.42	17.22	17.42	5.0	19.0

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				18625	18900	19175		
				1852.50 MHz	1880.00 MHz	1907.50 MHz		
5 MHz	QPSK	1	0	22.17	22.54	22.53	0.0	24.0
		1	12	22.08	22.58	22.35	0.0	24.0
		1	24	22.11	22.49	22.36	0.0	24.0
		12	0	21.25	21.56	21.45	1.0	23.0
		12	7	21.22	21.53	21.42	1.0	23.0
		12	13	21.19	21.51	21.45	1.0	23.0
		25	0	21.20	21.59	21.50	1.0	23.0
	16QAM	1	0	21.39	21.74	21.55	1.0	23.0
		1	12	21.12	21.95	21.61	1.0	23.0
		1	24	21.16	21.69	21.20	1.0	23.0
		12	0	20.33	20.49	20.46	2.0	22.0
		12	7	20.15	20.33	20.48	2.0	22.0
		12	13	20.25	20.44	20.33	2.0	22.0
		25	0	20.27	20.58	20.52	2.0	22.0
	64QAM	1	0	20.21	20.91	20.46	2.0	22.0
		1	12	20.37	20.51	20.39	2.0	22.0
		1	24	20.27	20.66	20.43	2.0	22.0
		12	0	19.30	19.53	19.33	3.0	21.0
		12	7	19.17	19.54	19.39	3.0	21.0
		12	13	19.11	19.48	19.36	3.0	21.0
		25	0	19.14	19.54	19.43	3.0	21.0
	256QAM	1	0	17.72	17.71	17.47	5.0	19.0
		1	12	17.80	17.39	17.43	5.0	19.0
		1	24	17.74	17.71	17.57	5.0	19.0
		12	0	17.72	17.52	17.45	5.0	19.0
		12	7	17.83	17.42	17.53	5.0	19.0
		12	13	17.78	17.41	17.50	5.0	19.0
		25	0	17.85	17.43	17.53	5.0	19.0

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BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				18615	18900	19185		
				1851.50 MHz	1880.00 MHz	1908.50 MHz		
3 MHz	QPSK	1	0	22.46	22.45	22.61	0.0	24.0
		1	8	22.42	22.42	22.52	0.0	24.0
		1	14	22.53	22.49	22.59	0.0	24.0
		8	0	21.49	21.45	21.62	1.0	23.0
		8	4	21.43	21.48	21.55	1.0	23.0
		8	7	21.53	21.54	21.63	1.0	23.0
		15	0	21.54	21.48	21.65	1.0	23.0
	16QAM	1	0	21.77	21.57	21.76	1.0	23.0
		1	8	21.85	21.41	21.85	1.0	23.0
		1	14	21.62	21.23	21.92	1.0	23.0
		8	0	20.59	20.65	20.59	2.0	22.0
		8	4	20.50	20.46	20.65	2.0	22.0
		8	7	20.40	20.55	20.69	2.0	22.0
		15	0	20.43	20.46	20.72	2.0	22.0
	64QAM	1	0	20.55	20.57	20.72	2.0	22.0
		1	8	20.41	20.55	20.74	2.0	22.0
		1	14	20.23	20.51	20.68	2.0	22.0
		8	0	19.60	19.45	19.63	3.0	21.0
		8	4	19.54	19.46	19.52	3.0	21.0
		8	7	19.40	19.41	19.52	3.0	21.0
		15	0	19.41	19.30	19.62	3.0	21.0
	256QAM	1	0	17.76	17.57	17.82	5.0	19.0
		1	8	17.34	17.12	17.44	5.0	19.0
		1	14	17.56	17.81	17.57	5.0	19.0
		8	0	17.53	17.65	17.64	5.0	19.0
		8	4	17.41	17.35	17.55	5.0	19.0
		8	7	17.40	17.59	17.58	5.0	19.0
		15	0	17.41	17.52	17.57	5.0	19.0

BW (MHz)	Mode	RB Allocation	RB offset	Measured Pwr (dBm)			MPR	Tune-up Limit
				18607	18900	19193		
				1850.70 MHz	1880.00 MHz	1909.30 MHz		
1.4 MHz	QPSK	1	0	22.66	22.43	22.38	0.0	24.0
		1	3	**22.69**	22.36	22.37	0.0	24.0
		1	5	22.61	22.39	22.52	0.0	24.0
		3	0	22.68	22.43	22.61	1.0	23.0
		3	1	22.68	22.39	22.45	1.0	23.0
		3	3	22.63	22.32	22.50	1.0	23.0
		6	0	21.72	21.37	21.62	1.0	23.0
	16QAM	1	0	21.83	21.94	21.71	1.0	23.0
		1	3	22.04	21.56	21.82	1.0	23.0
		1	5	21.94	21.42	21.70	1.0	23.0
		3	0	21.71	21.55	21.73	2.0	22.0
		3	1	21.88	21.49	21.63	2.0	22.0
		3	3	21.68	21.32	21.53	2.0	22.0
		6	0	20.78	20.35	20.63	2.0	22.0
	64QAM	1	0	20.84	20.44	20.54	2.0	22.0
		1	3	21.32	20.53	21.03	2.0	22.0
		1	5	20.63	20.57	20.80	2.0	22.0
		3	0	20.68	20.65	20.49	3.0	21.0
		3	1	20.64	20.65	20.33	3.0	21.0
		3	3	20.45	20.37	20.41	3.0	21.0
		6	0	19.71	19.48	19.50	3.0	21.0
	256QAM	1	0	17.68	17.46	17.95	5.0	19.0
		1	3	17.87	17.49	17.65	5.0	19.0
		1	5	17.80	17.51	17.62	5.0	19.0
		3	0	17.88	17.35	17.71	5.0	19.0
		3	1	17.93	17.90	17.52	5.0	19.0
		3	3	17.82	17.30	17.55	5.0	19.0
		6	0	17.55	17.58	17.61	5.0	19.0

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8.2. PEAK TO AVERAGE RATIO

Test Procedure

Per KDB 971168 D01 Power Meas License Digital Systems v03r01;

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

Test Spec

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

RESULTS

See the following pages.

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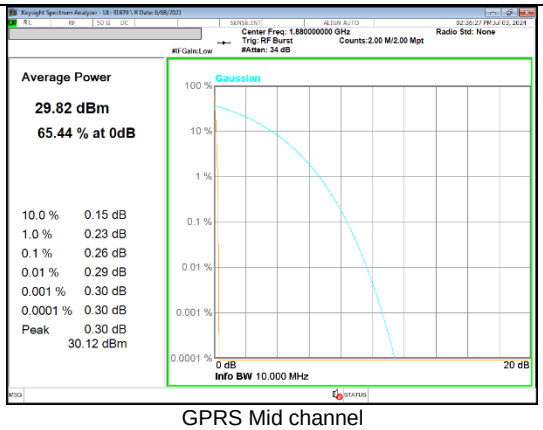
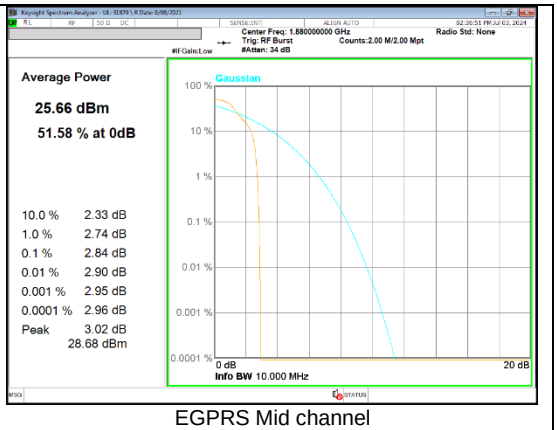
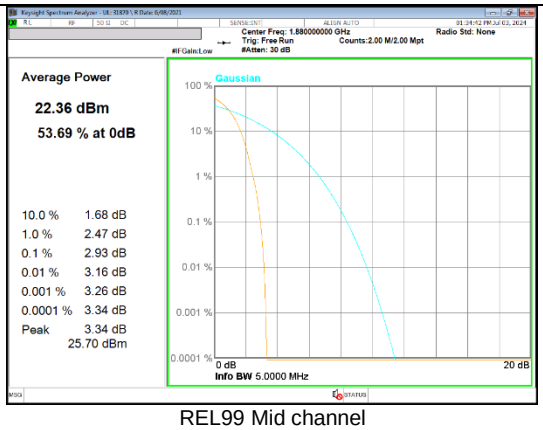
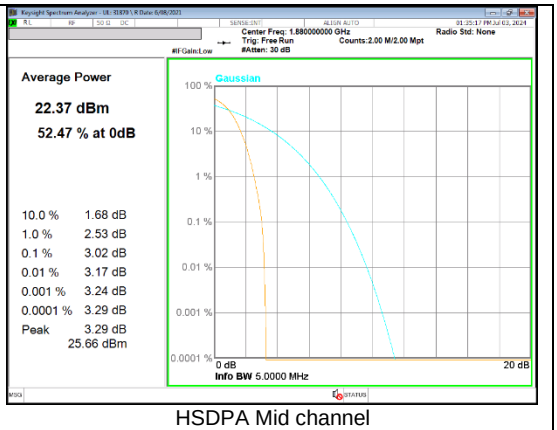
8.2.1. CONDUCTED PEAK TO AVERAGE RESULT

GSM

GSM 1900	 GPRS Mid channel	 EGPRS Mid channel

WCDMA

Band 2	 REL99 Mid channel	 HSDPA Mid channel

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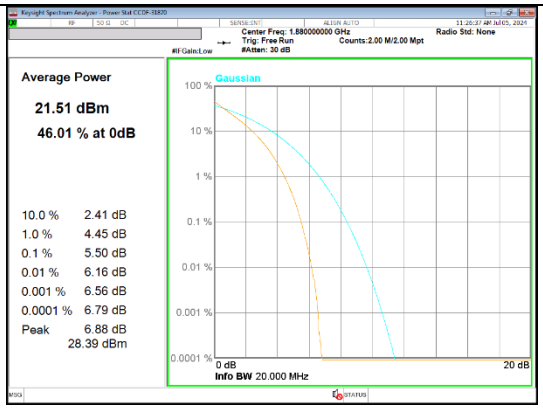
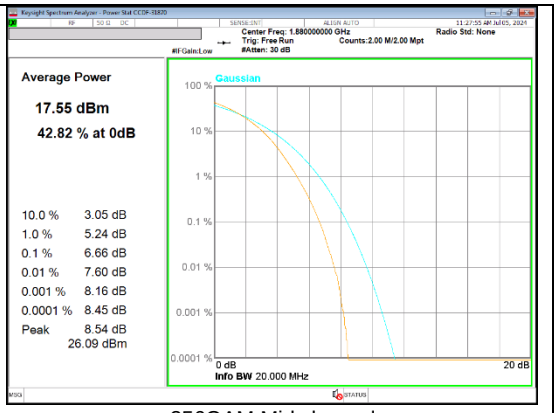
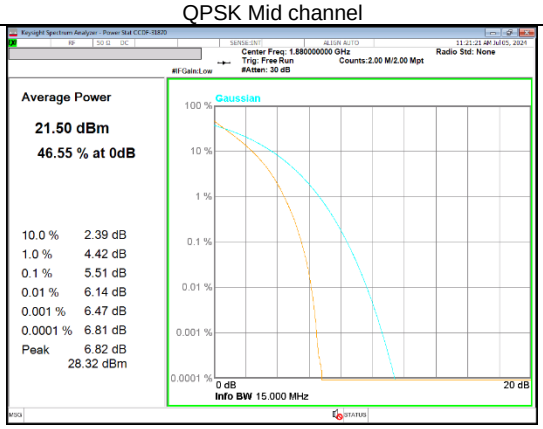
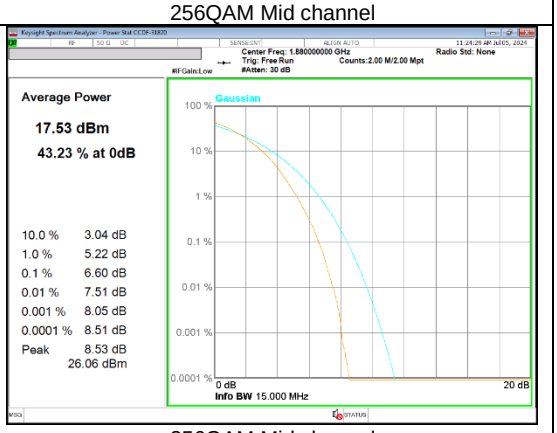
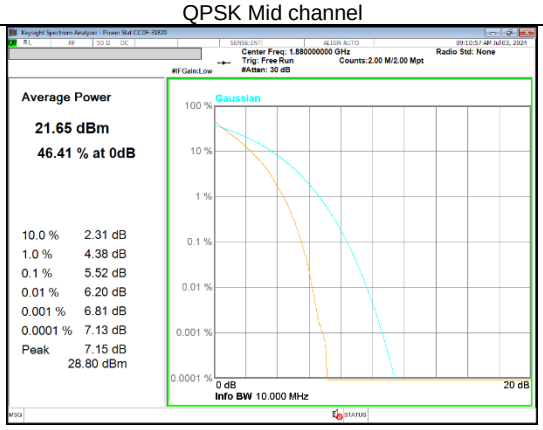
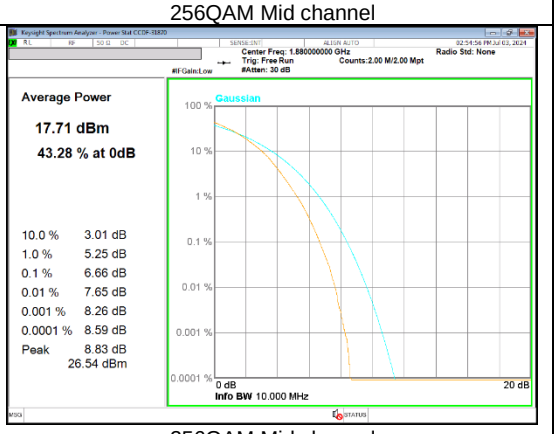
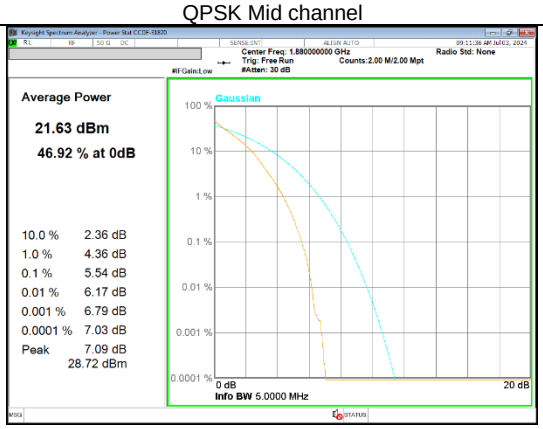
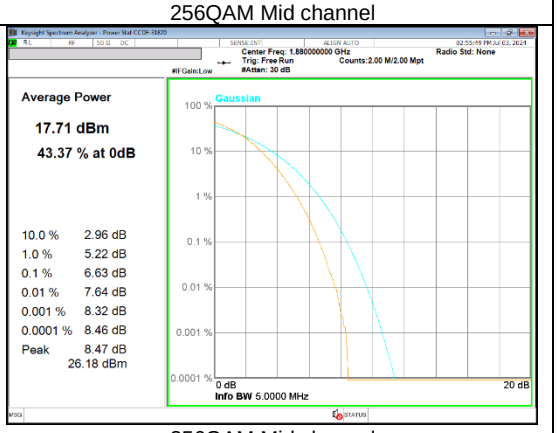
LTE Band 2

20 MHz	 QPSK Mid channel	 256QAM Mid channel
15 MHz	 QPSK Mid channel	 256QAM Mid channel
10 MHz	 QPSK Mid channel	 256QAM Mid channel
5 MHz	 QPSK Mid channel	 256QAM Mid channel

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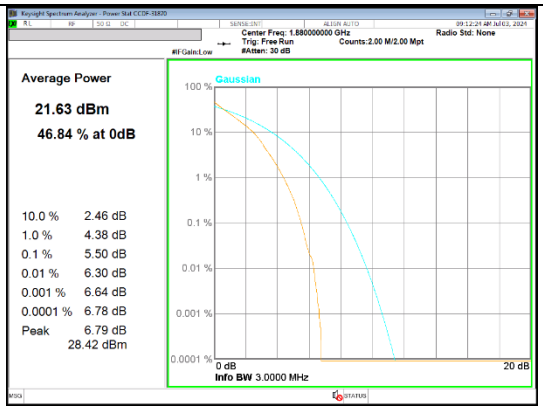
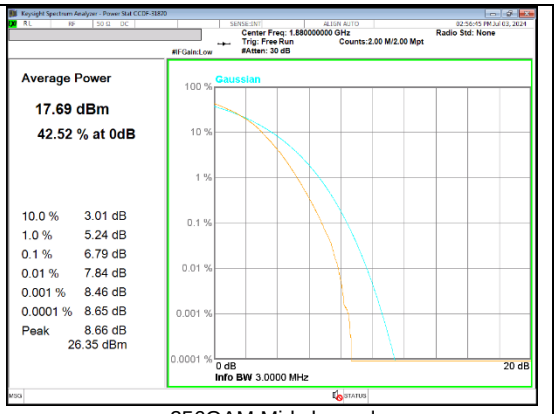
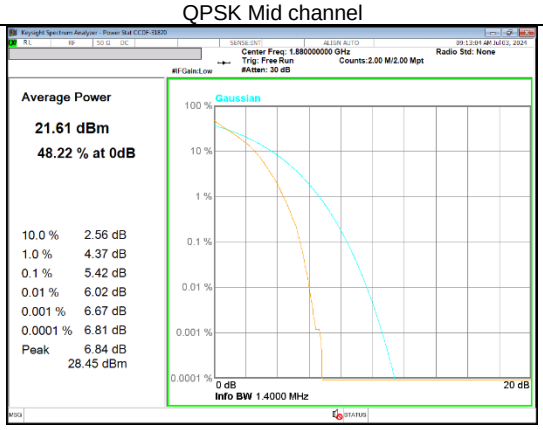
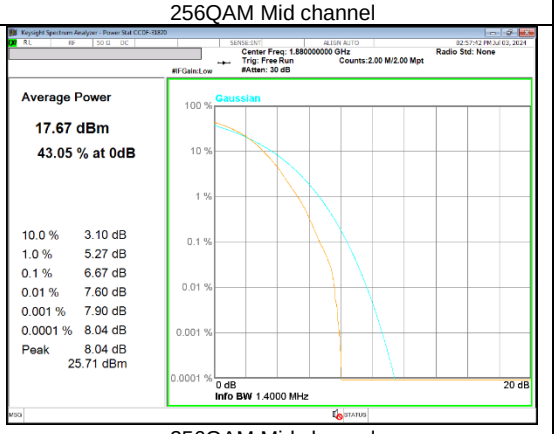
3 MHz	 QPSK Mid channel	 256QAM Mid channel
1.4 MHz	 QPSK Mid channel	 256QAM Mid channel

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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.

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- **GSM**

Band	Modulation	f [MHz]	99% BW (kHz)	-26dB BW (kHz)
1900	GPRS	1880.00	241.53	309.3
	EGPRS		252.69	316.8

- **WCDMA**

Band	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
B2	Rel.99	1880.00	4.165	4.721
	HSDPA		4.170	4.727

- **LTE Band 2**

Band	BW	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
LTE B2	20M	QPSK	1880.00	17.899	19.500
		16QAM		17.912	19.910
	15M	QPSK		13.445	15.170
		16QAM		13.413	15.000
	10M	QPSK		8.969	10.340
		16QAM		8.978	10.200
	5M	QPSK		4.494	5.269
		16QAM		4.493	5.301
	3M	QPSK		2.699	3.066
		16QAM		2.703	3.081
	1.4M	QPSK		1.089	1.309
		16QAM		1.088	1.294

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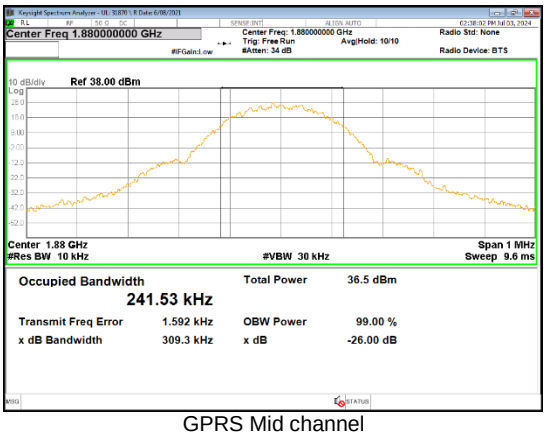
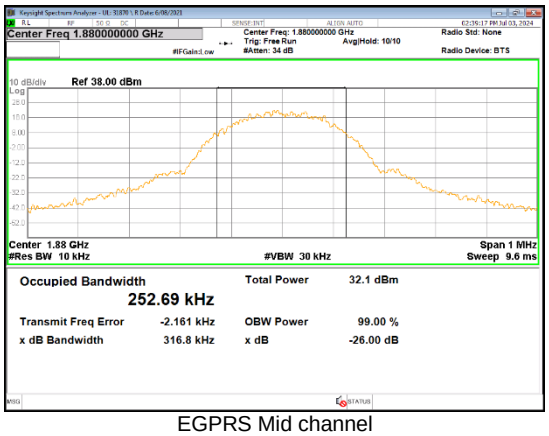
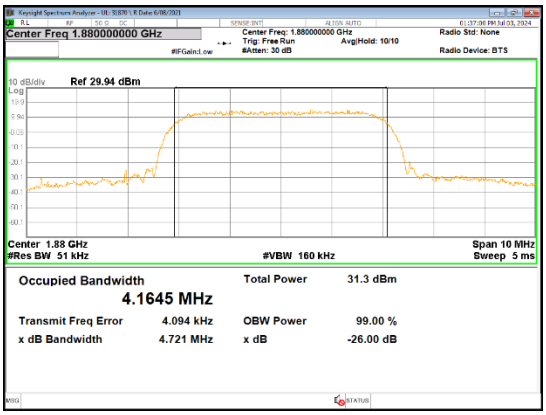
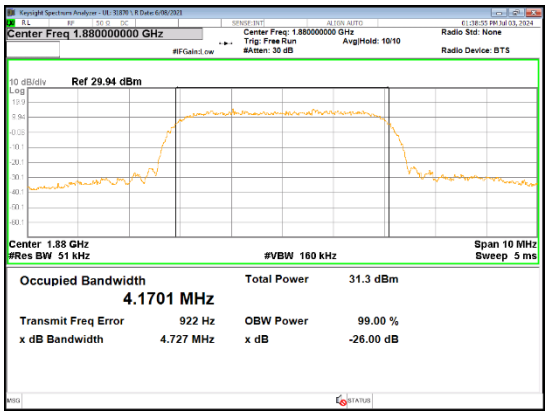
8.3.1. OCCUPIED BANDWIDTH RESULT

GSM 1900

GSM 1900	 GPRS Mid channel	 EGPRS Mid channel

WCDMA Band 2

Band 2	 REL99 Mid channel	 HSDPA Mid channel

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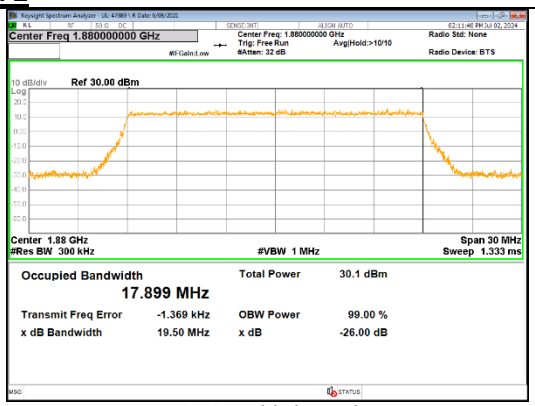
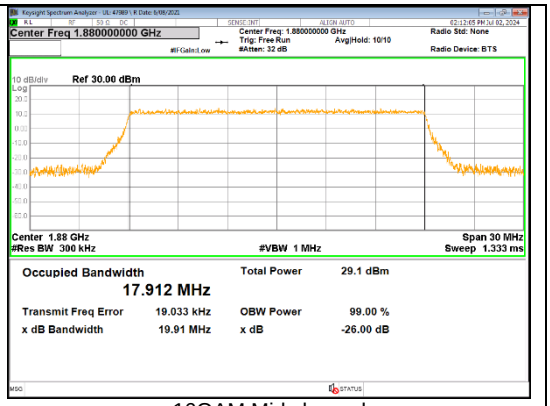
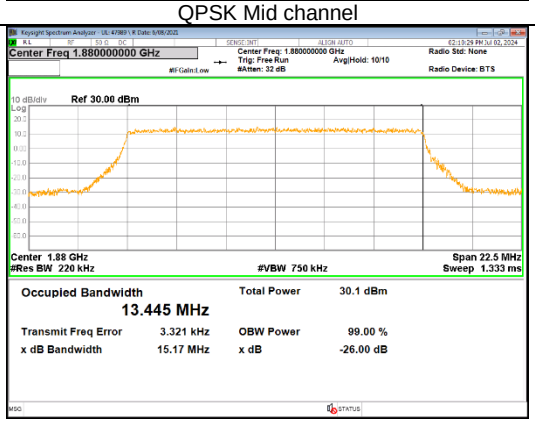
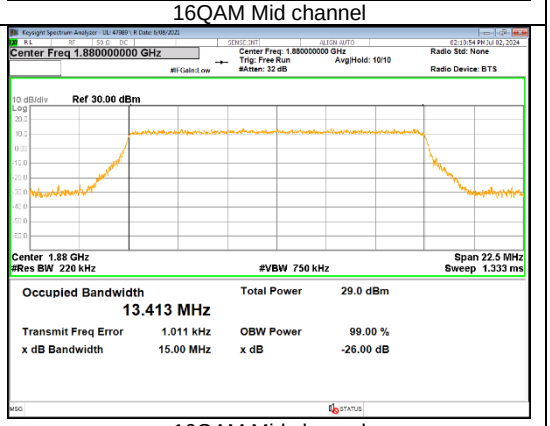
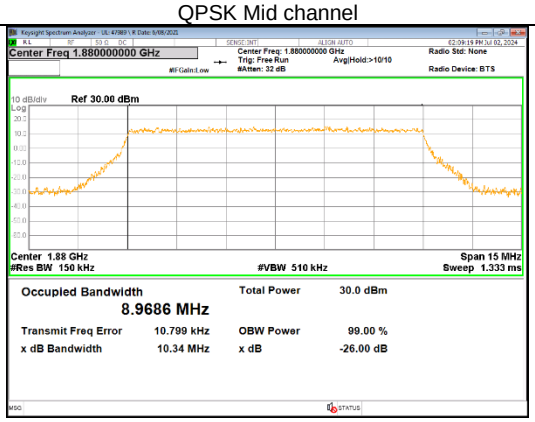
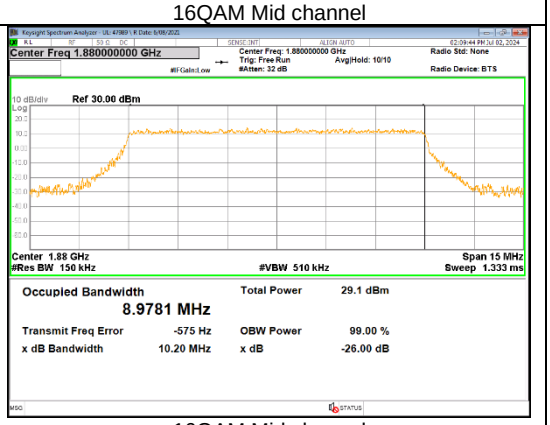
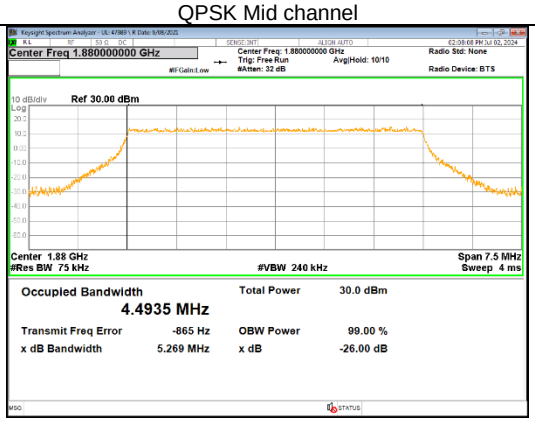
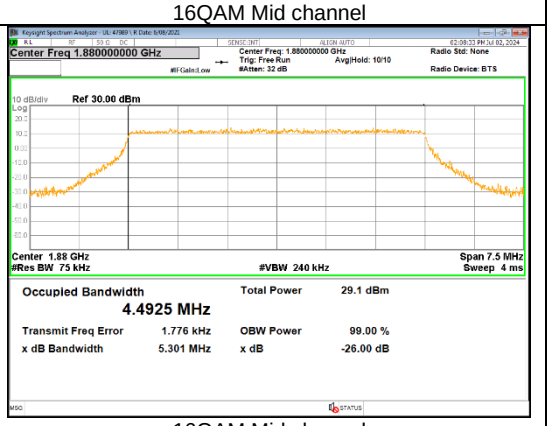
LTE Band 2

20MHz	 QPSK Mid channel	 16QAM Mid channel
15MHz	 QPSK Mid channel	 16QAM Mid channel
10MHz	 QPSK Mid channel	 16QAM Mid channel
5MHz	 QPSK Mid channel	 16QAM Mid channel

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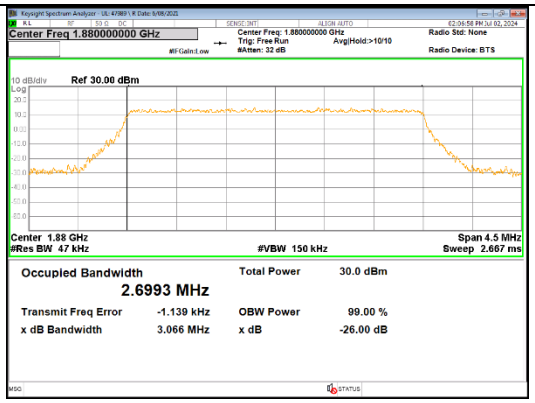
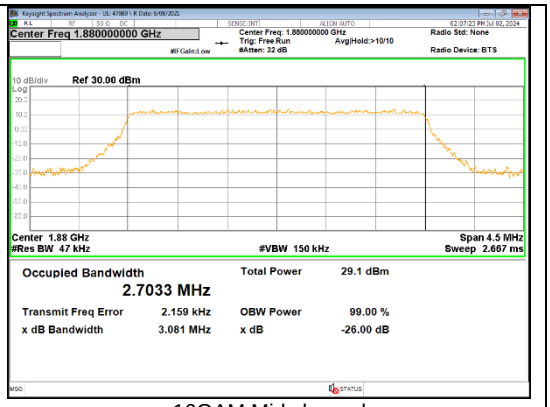
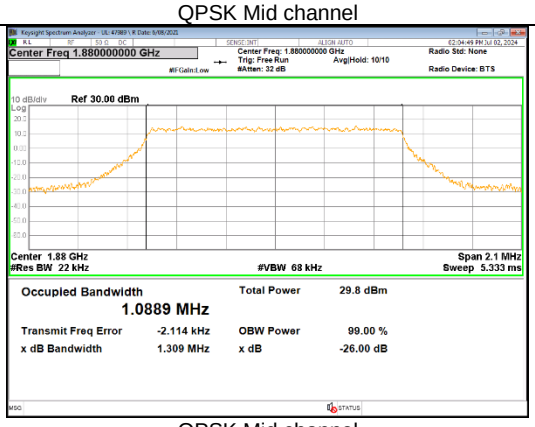
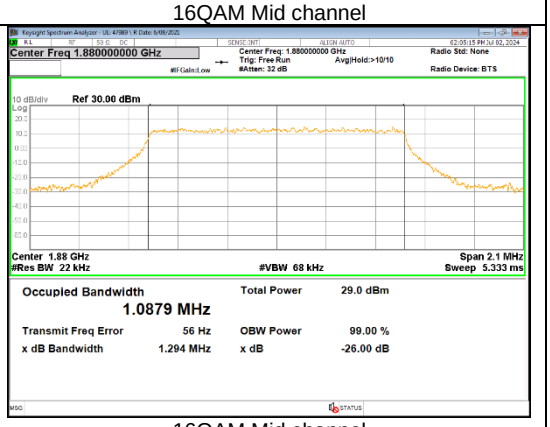
3MHz	 QPSK Mid channel	 16QAM Mid channel
1.4MHz	 QPSK Mid channel	 16QAM Mid channel

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8.4. BAND EDGE EMISSIONS

RULE PART

FCC: §24.238

LIMITS

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

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v03r01
The transmitter output was connected to CMW500 Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

GSM

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

WCDMA/LTE

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

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NOTE1

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

NOTE2

For Band-Edge extended:

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

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

RESULTS

See the following pages.

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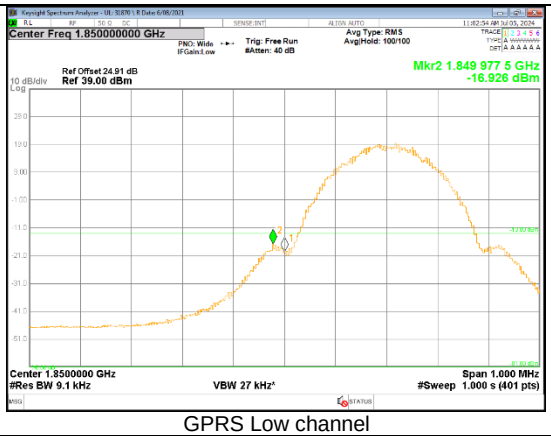
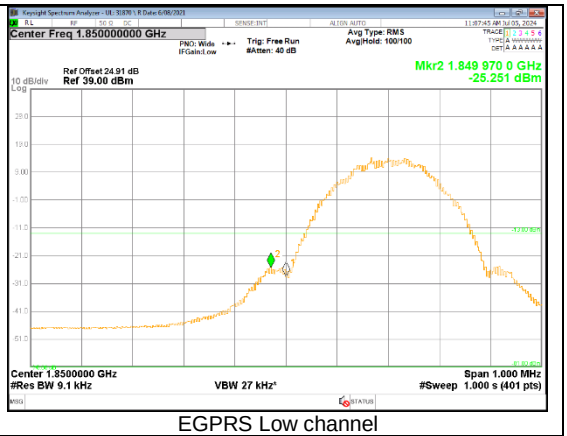
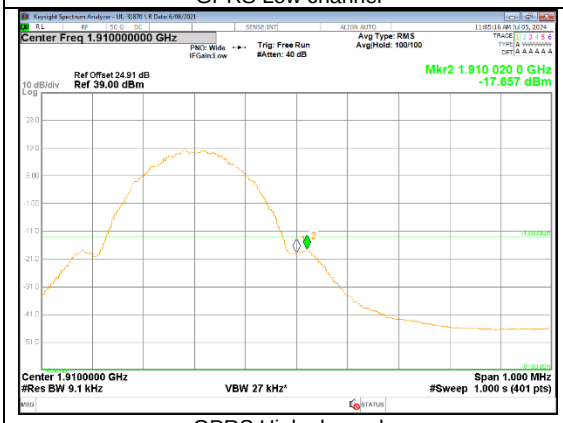
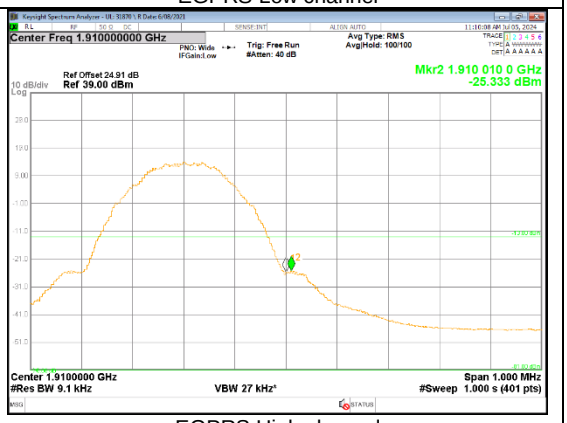
8.4.1. BAND EDGE RESULT

GSM

GSM 1900	 GPRS Low channel	 EGPRS Low channel
	 GPRS High channel	 EGPRS High channel

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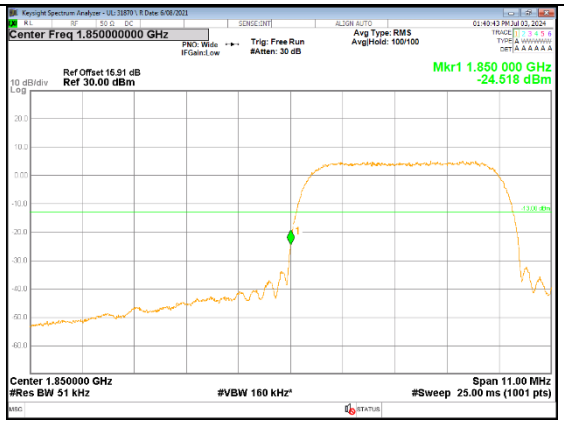
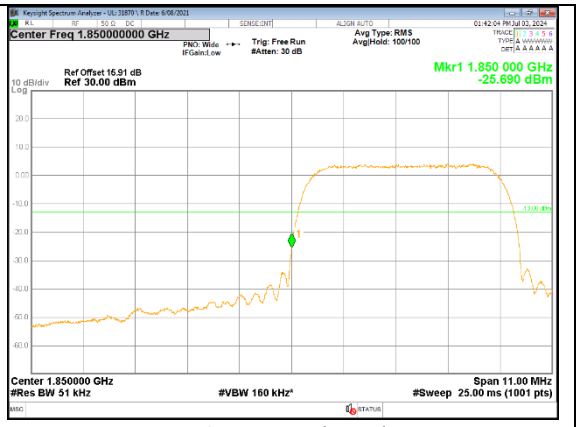
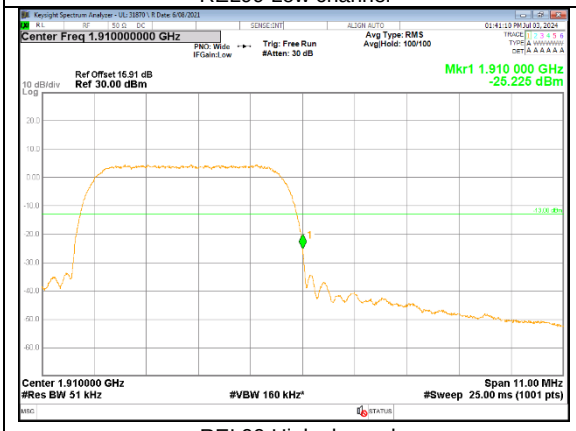
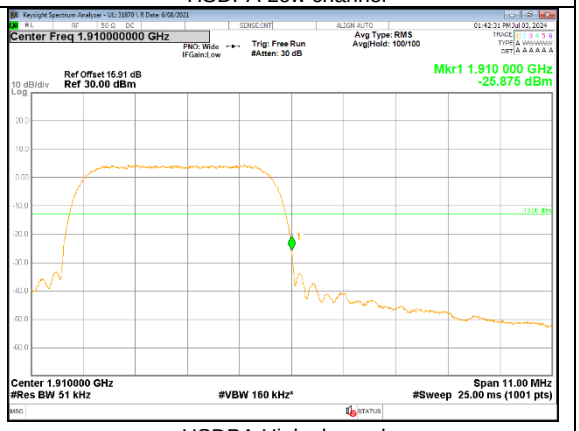
WCDMA

Band 2	 REL99 Low channel	 HSDPA Low channel
	 REL99 High channel	 HSDPA High channel

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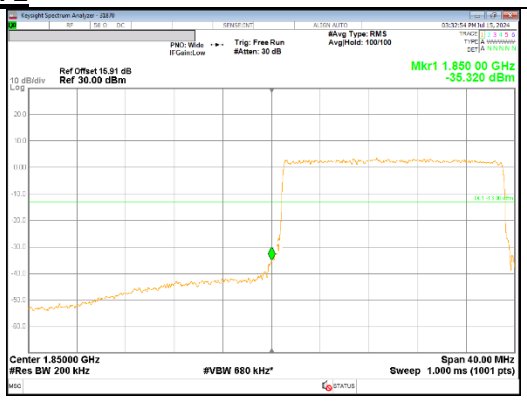
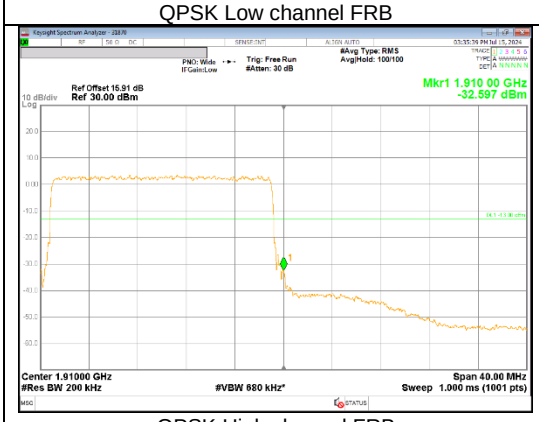
LTE Band 2

20MHz

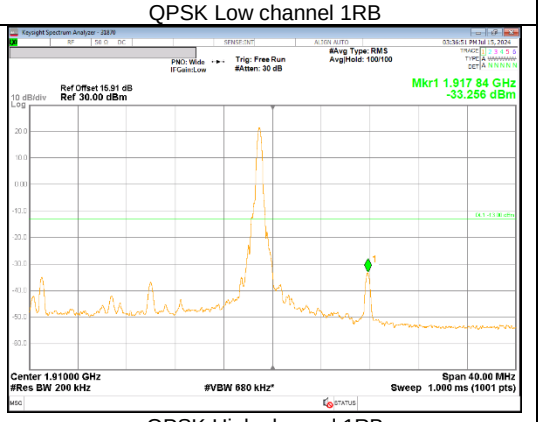


QPSK Low channel FRB

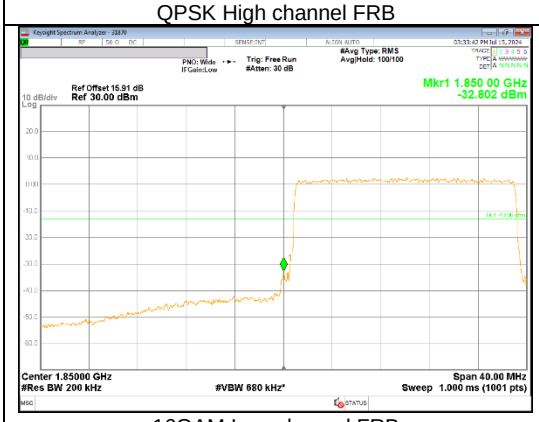
QPSK Low channel 1RB



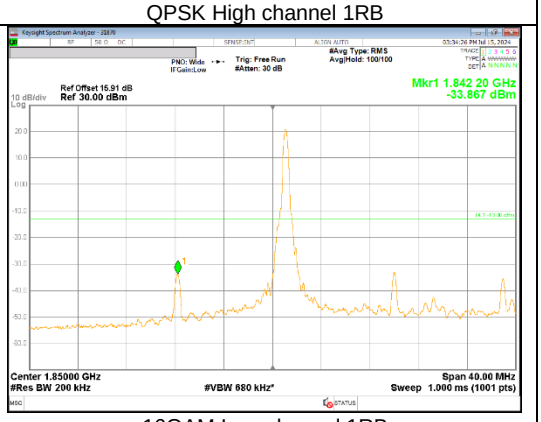
QPSK High channel FRB



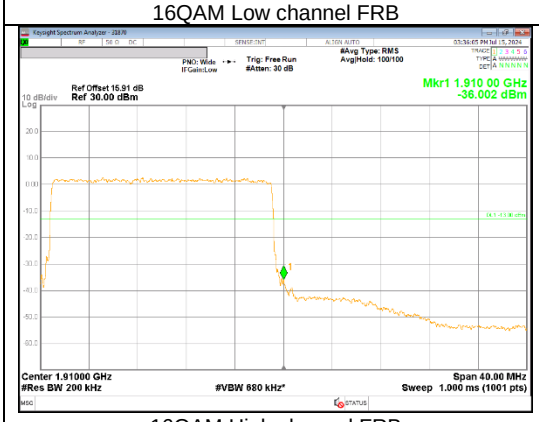
QPSK High channel 1RB



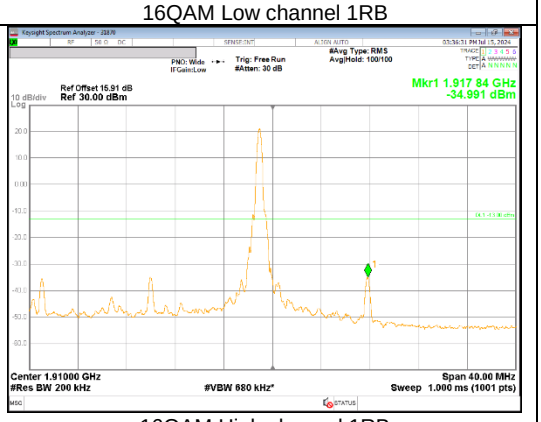
16QAM Low channel FRB



16QAM Low channel 1RB



16QAM High channel FRB



16QAM High channel 1RB

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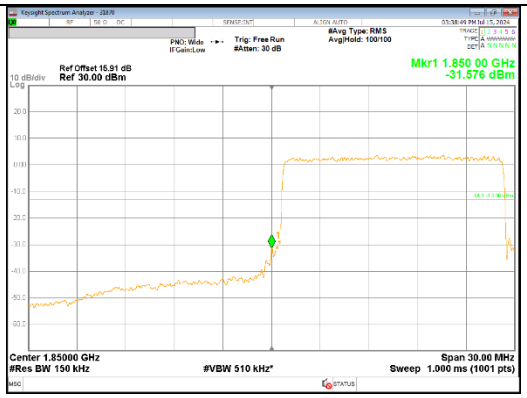
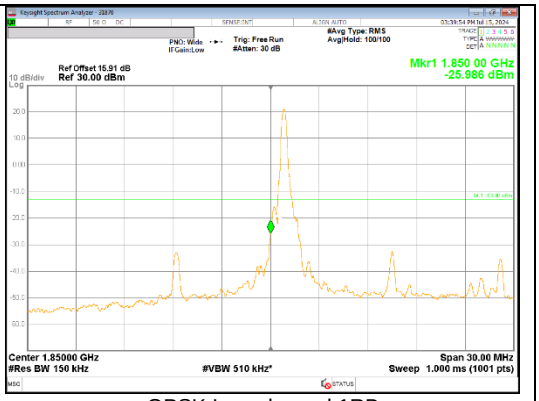
15MHz



QPSK Low channel FRB



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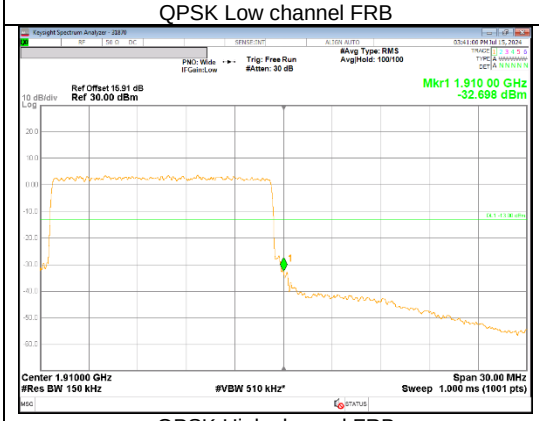
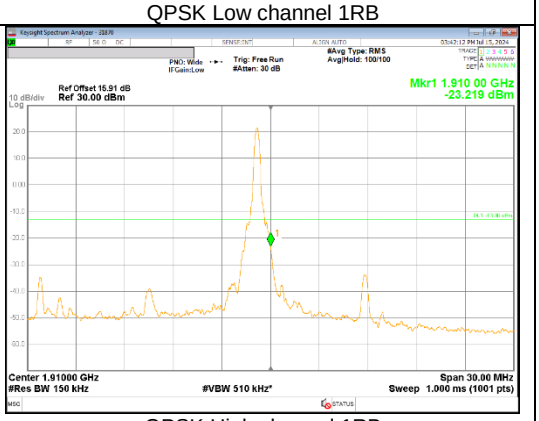
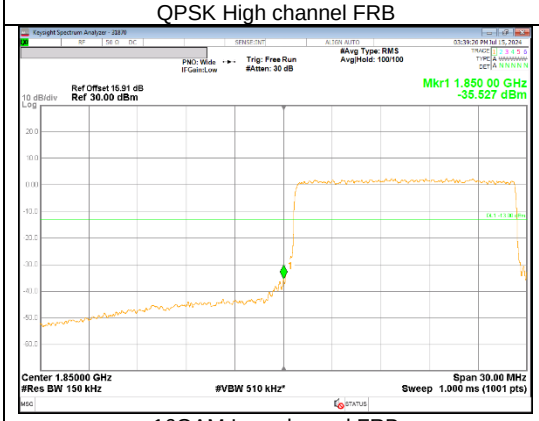


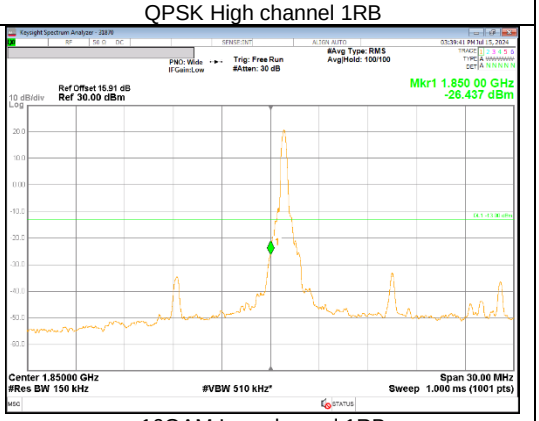
QPSK High channel FRB



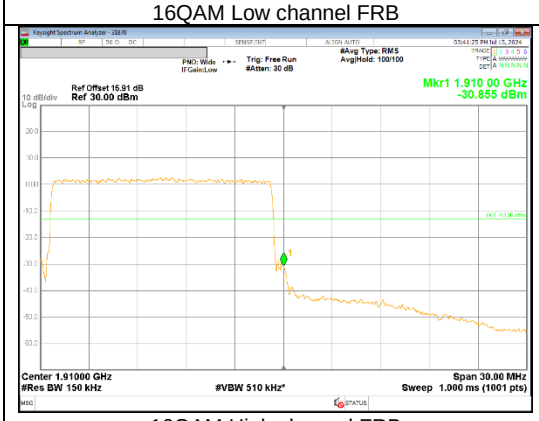
QPSK High channel 1RB



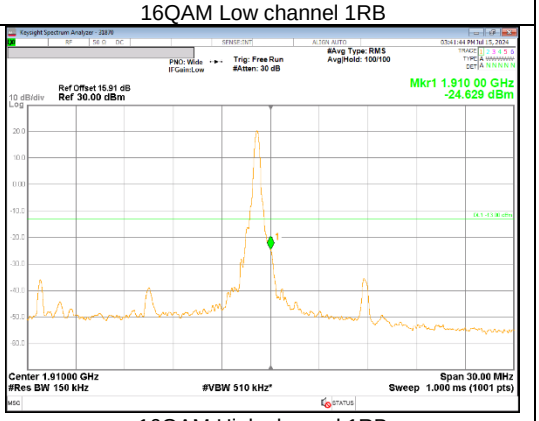
16QAM Low channel FRB



16QAM Low channel 1RB



16QAM High channel FRB



16QAM High channel 1RB

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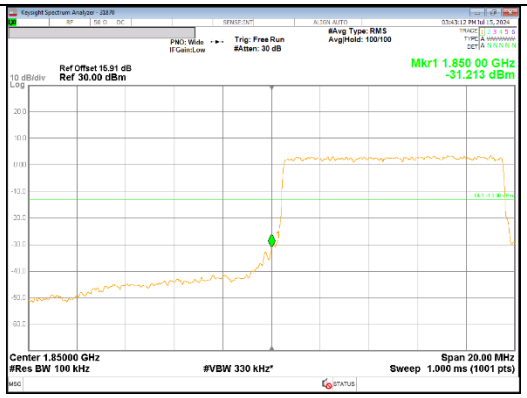
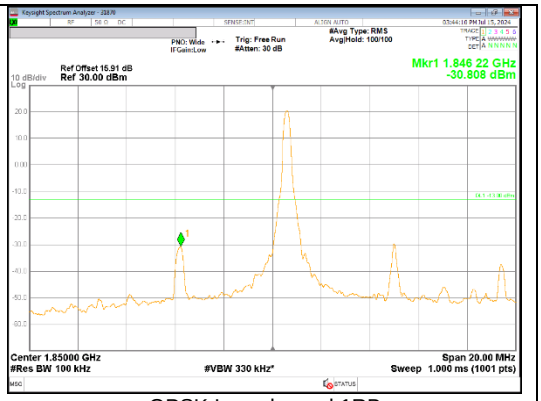
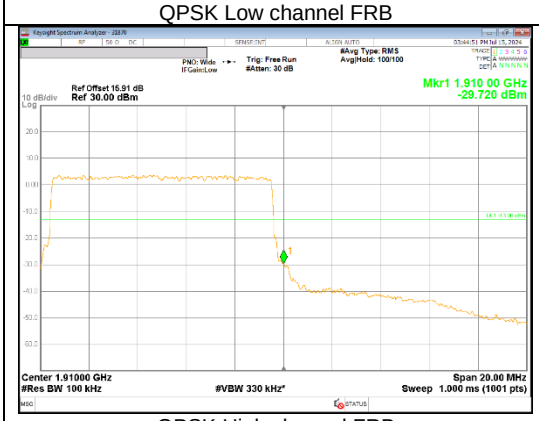
10MHz



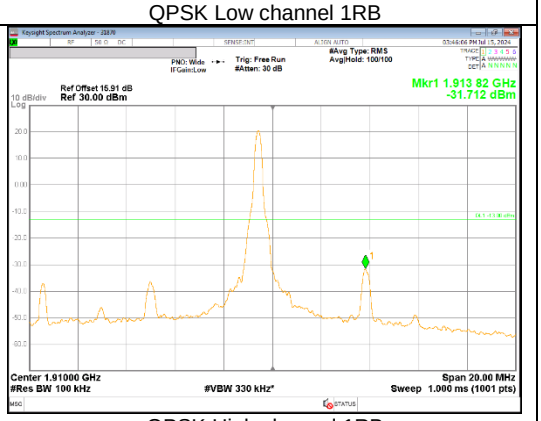
QPSK Low channel FRB



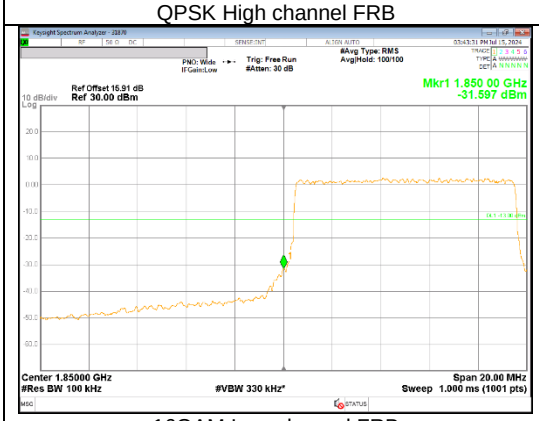
QPSK Low channel 1RB



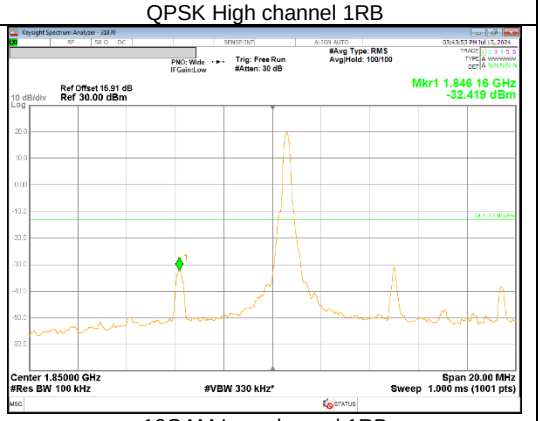
QPSK High channel FRB



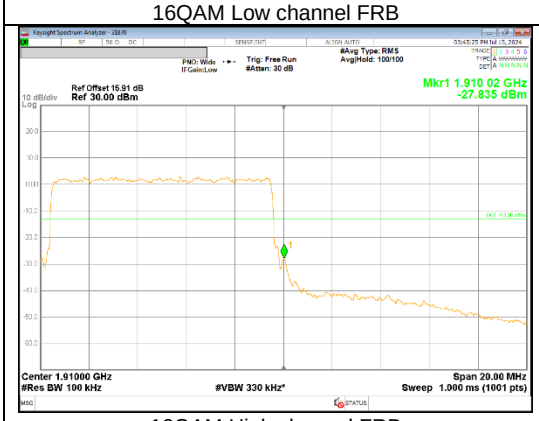
QPSK High channel 1RB



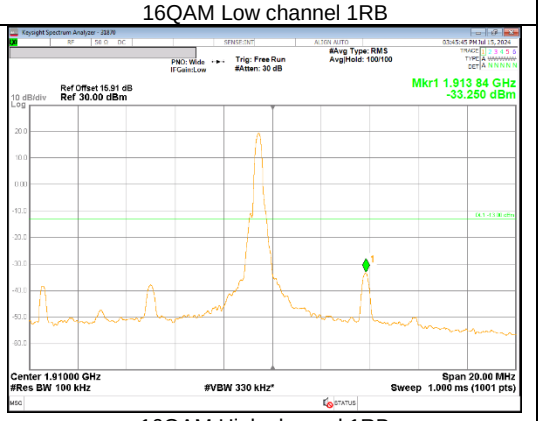
16QAM Low channel FRB



16QAM Low channel 1RB



16QAM High channel FRB



16QAM High channel 1RB

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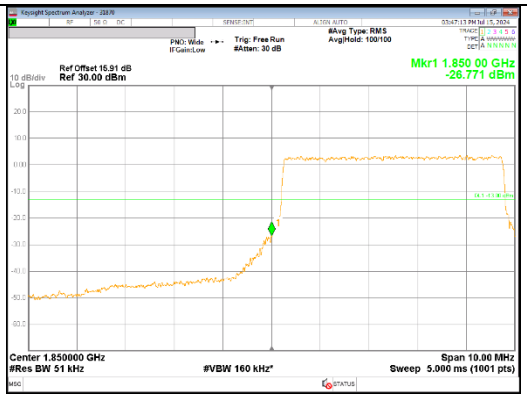
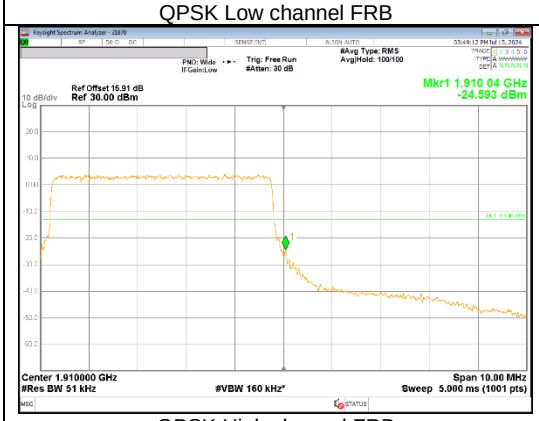
5MHz

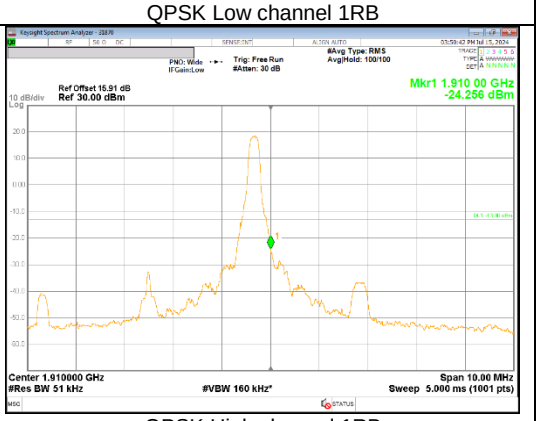


QPSK Low channel FRB

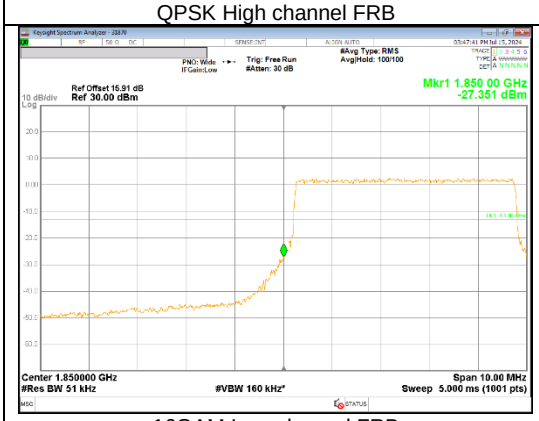
QPSK Low channel 1RB



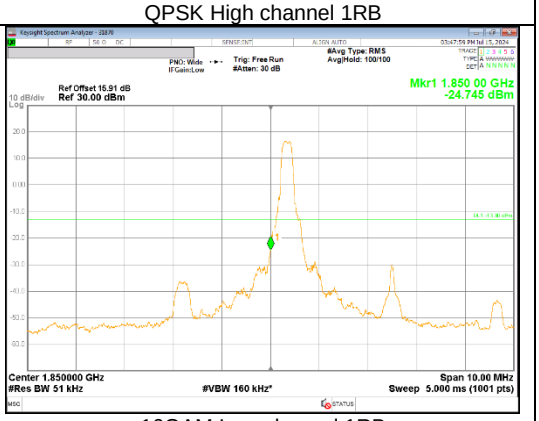
QPSK High channel FRB



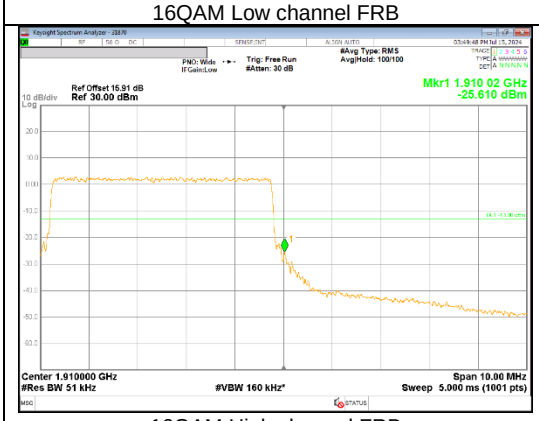
QPSK High channel 1RB



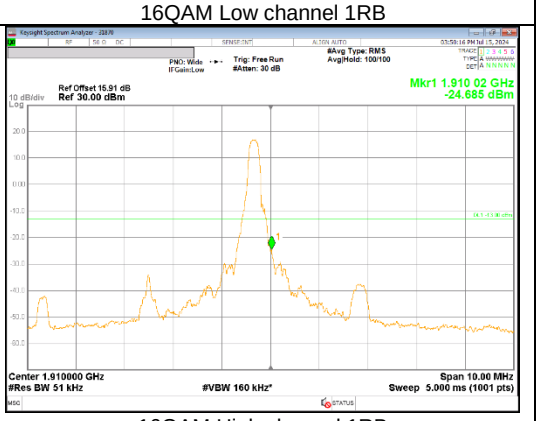
16QAM Low channel FRB



16QAM Low channel 1RB



16QAM High channel FRB



16QAM High channel 1RB

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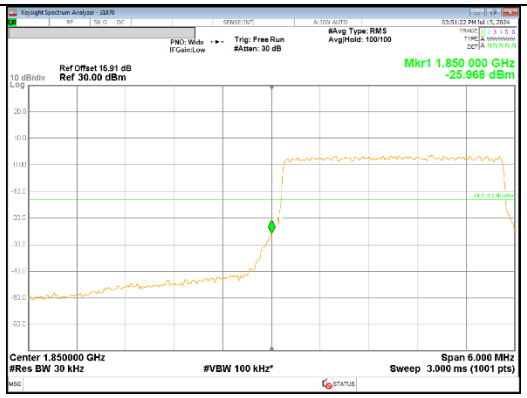
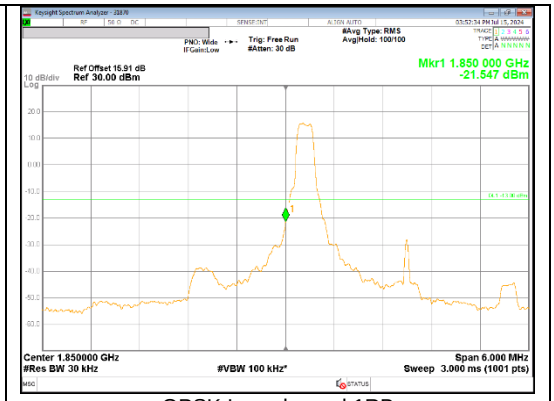
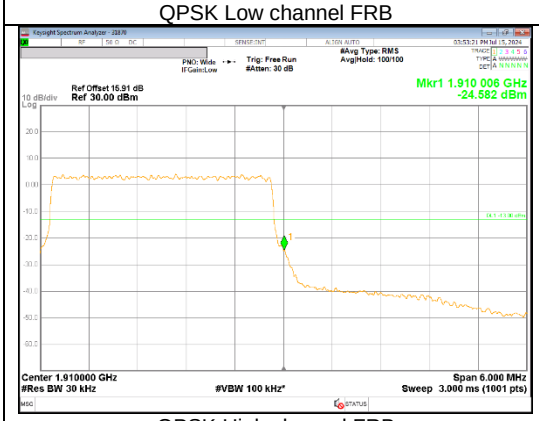
3MHz



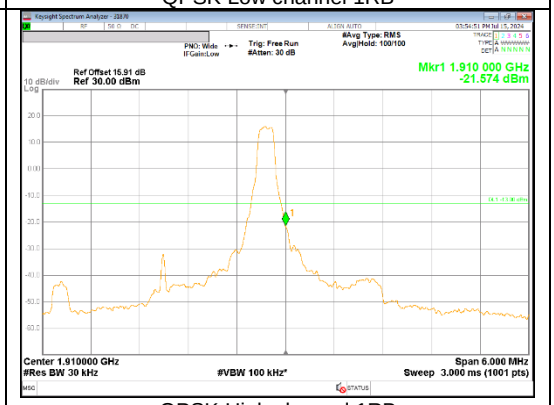
QPSK Low channel FRB



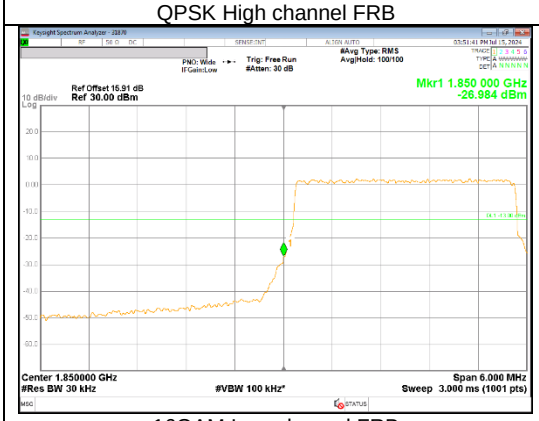
QPSK Low channel 1RB



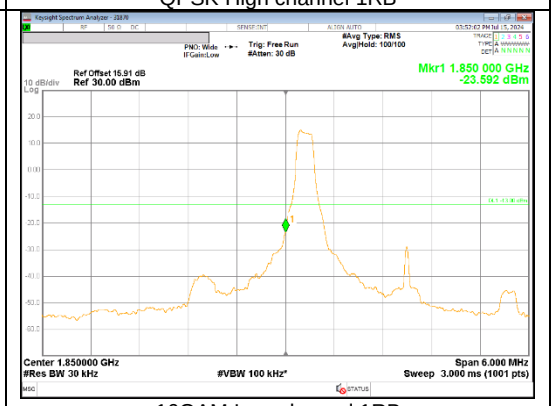
QPSK High channel FRB



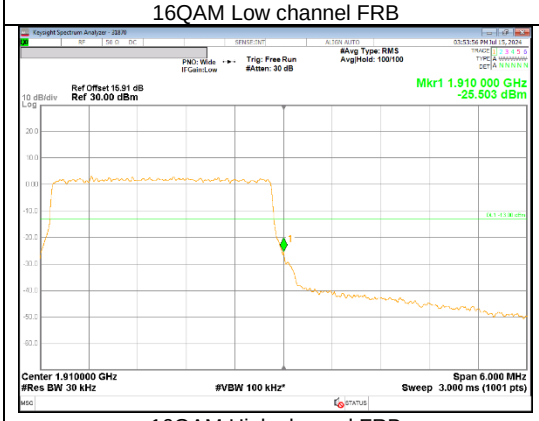
QPSK High channel 1RB



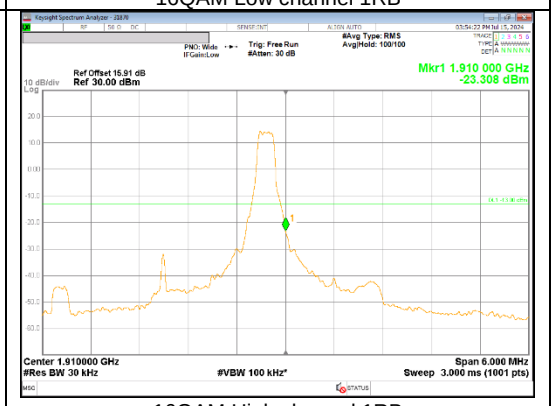
16QAM Low channel FRB



16QAM Low channel 1RB



16QAM High channel FRB



16QAM High channel 1RB

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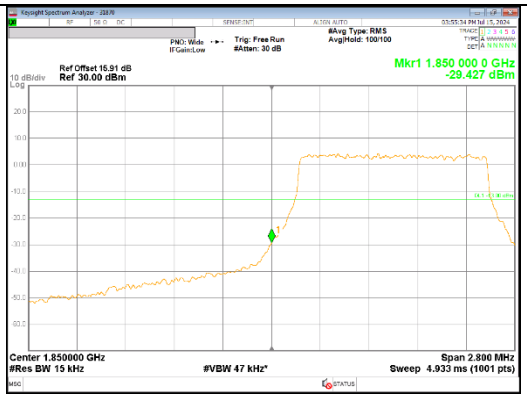
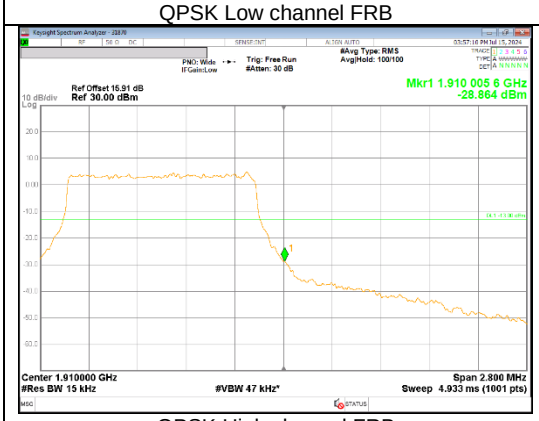
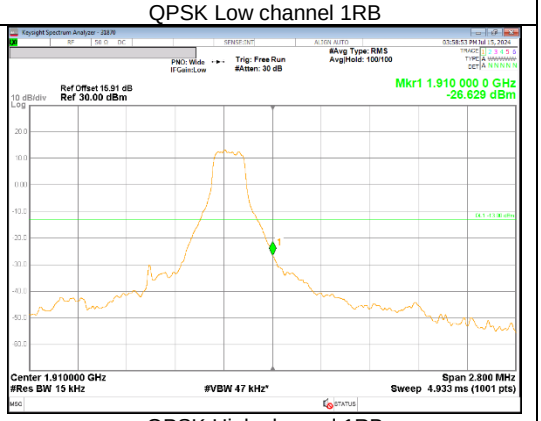
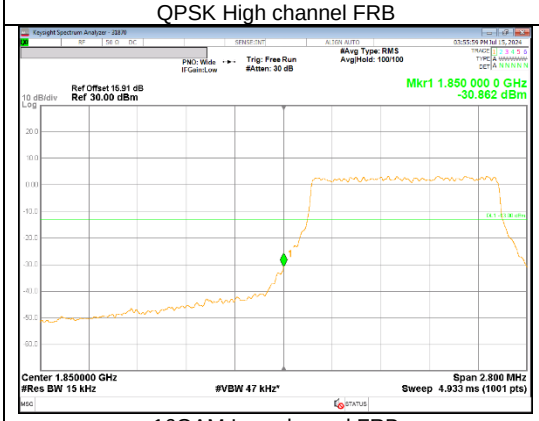
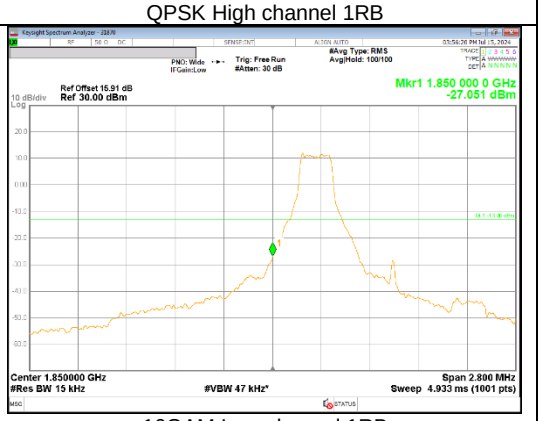
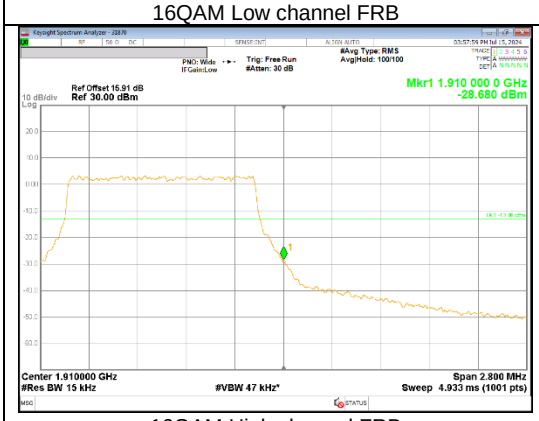
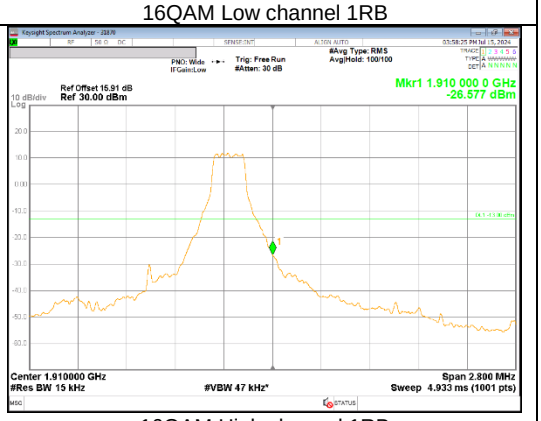
1.4MHz	 QPSK Low channel FRB	 QPSK Low channel 1RB
	 QPSK High channel FRB	 QPSK High channel 1RB
	 16QAM Low channel FRB	 16QAM Low channel 1RB
	 16QAM High channel FRB	 16QAM High channel 1RB

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8.5. CONDUCTED SPURIOUS EMISSIONS

RULE PART(S)

FCC: §2.1051, §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 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 = 1 MHz for emissions above 1 GHz

(Tests were performed 1MHz [Worst case], to sweep 1 time for all frequency range)

b) Set VBW ≥ 3 × RBW;

c) Set span ≥ 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), Max hold(GSM);

NOTE1

GSM : It was tested at GPRS as worst case (the highst output power and density).
UMTS: It was tested at REL 99 as worst case (the highst output power and density).
LTE: It was tested at 1RB QPSK as worst case (the highst output power and density).

NOTE2

Please refer to section 5.4 for bandwidth and RB setting about LTE bands.

RESULTS

See the following pages.

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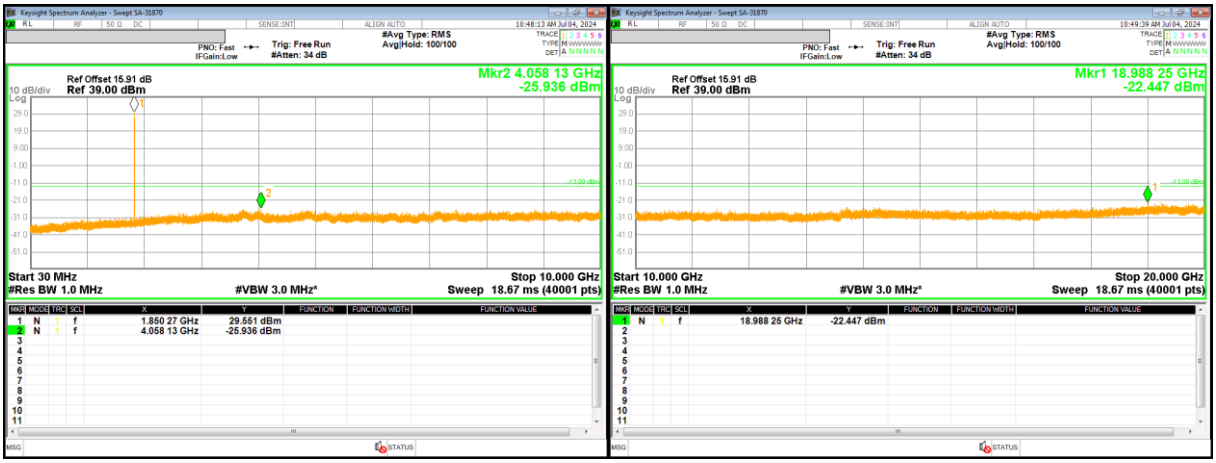
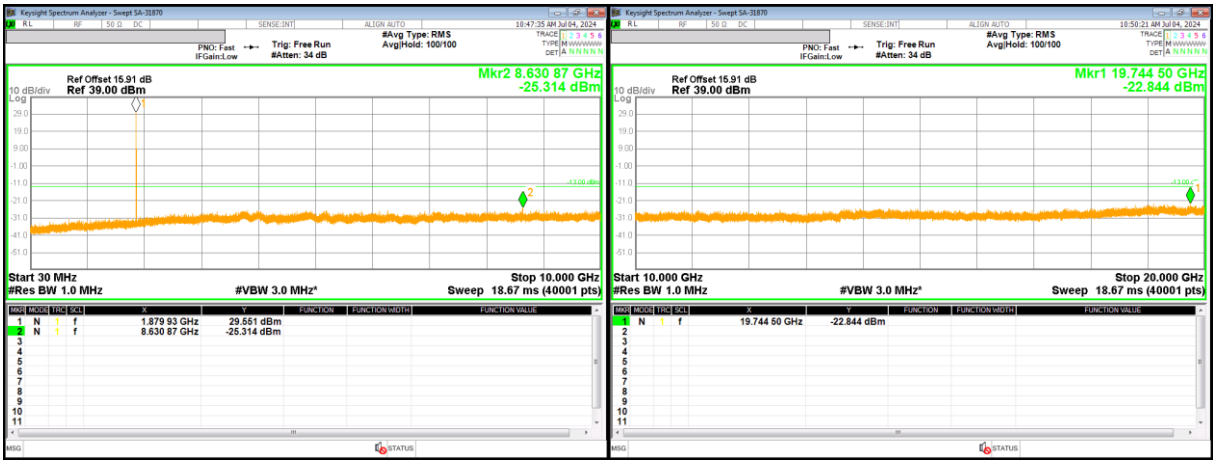
8.5.1. OUT OF BAND EMISSIONS RESULT

GSM 1900

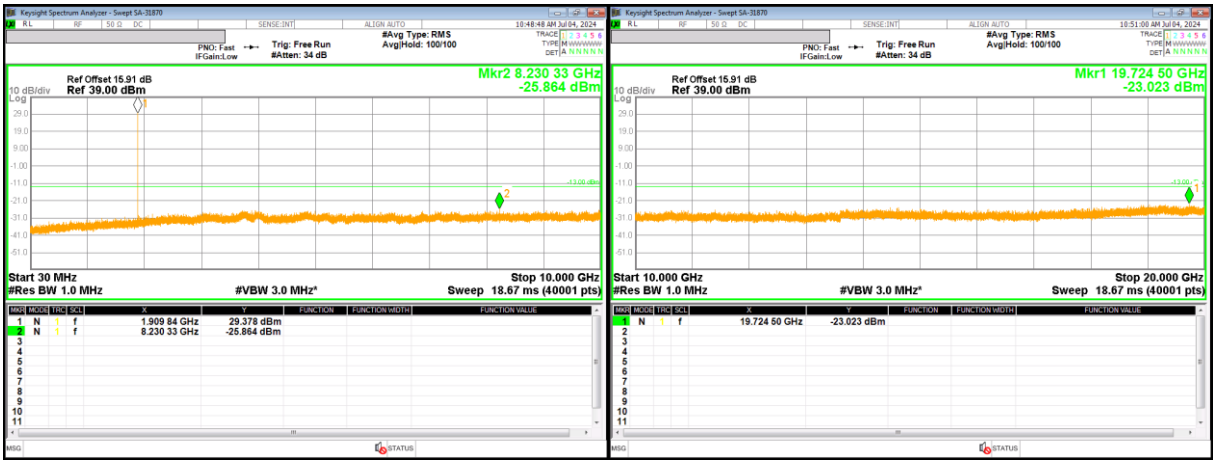
GPRS



Low channel



Mid channel



High channel

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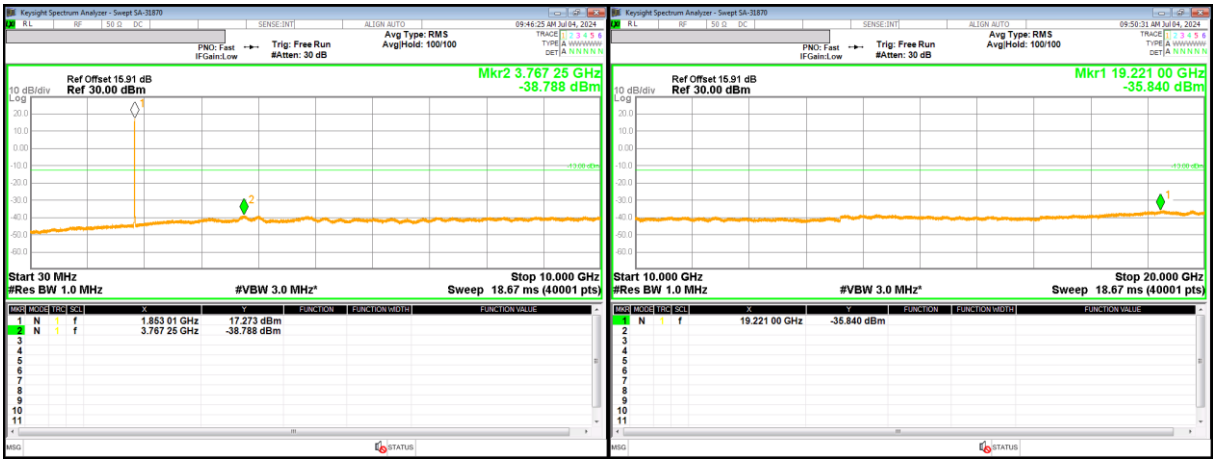
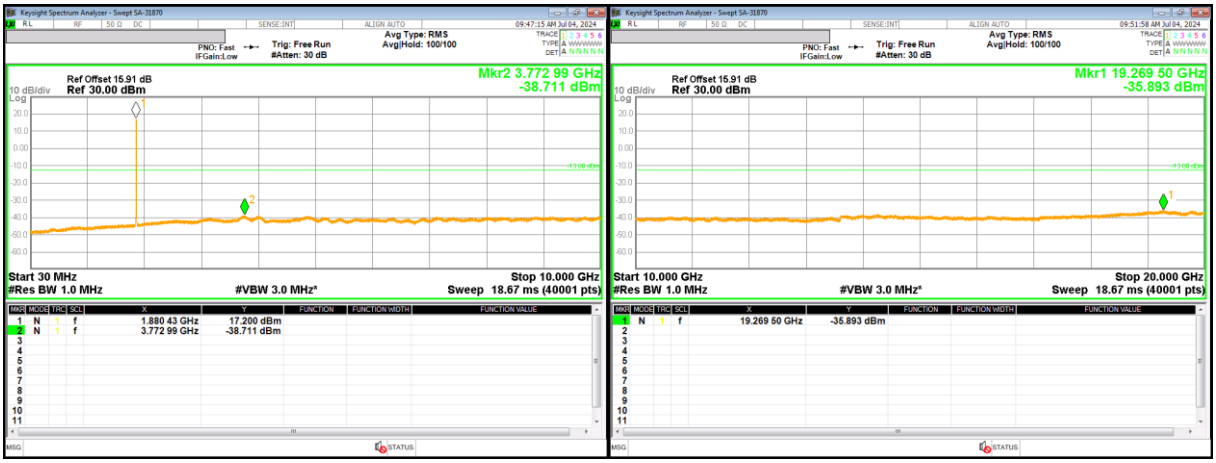
WCDMA Band 2

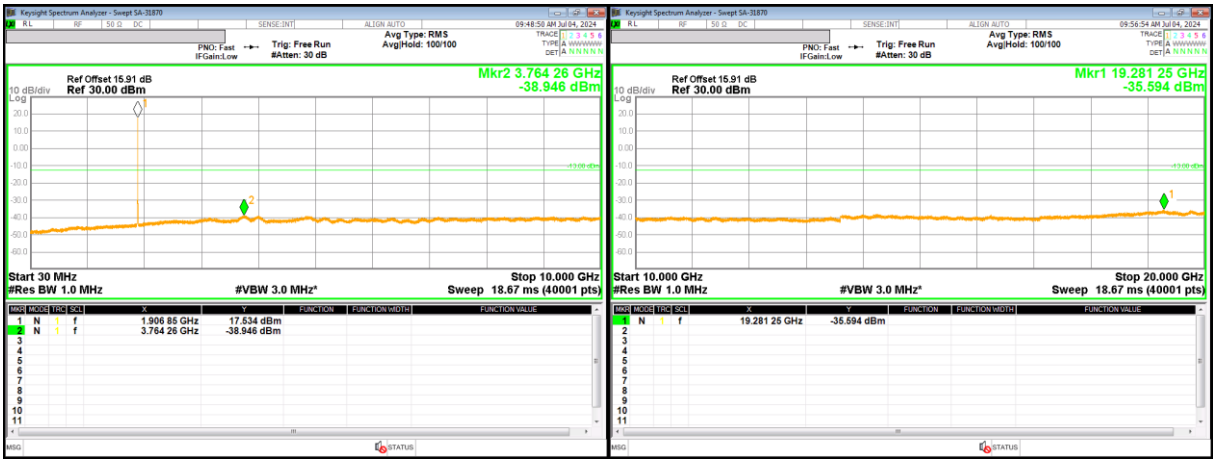
REL99



Low channel



Mid channel



High channel

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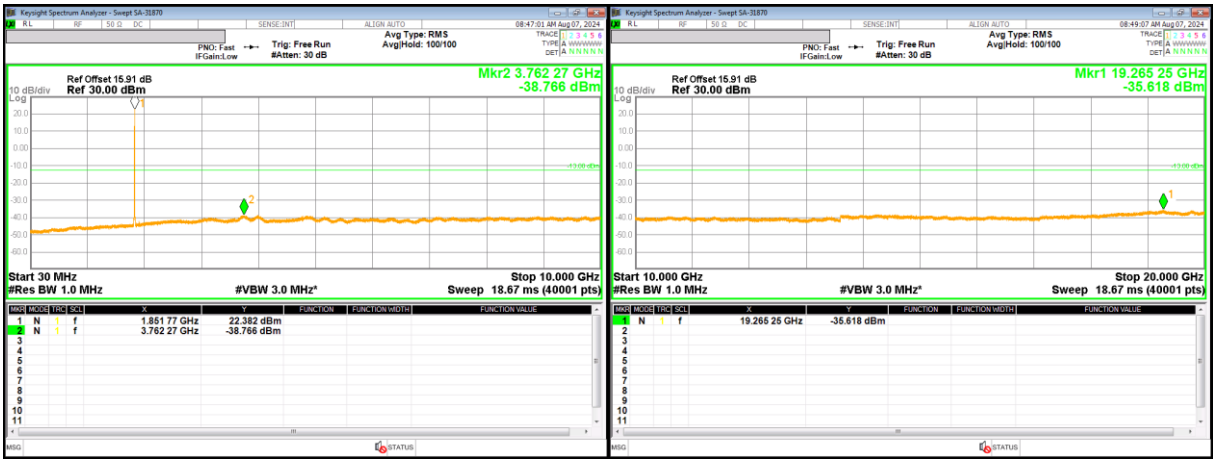
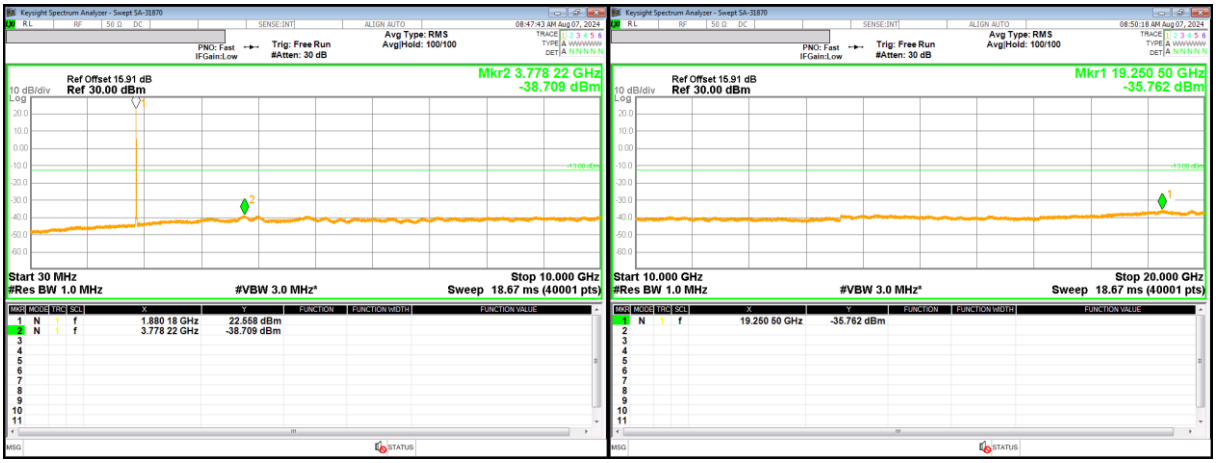
LTE Band 2

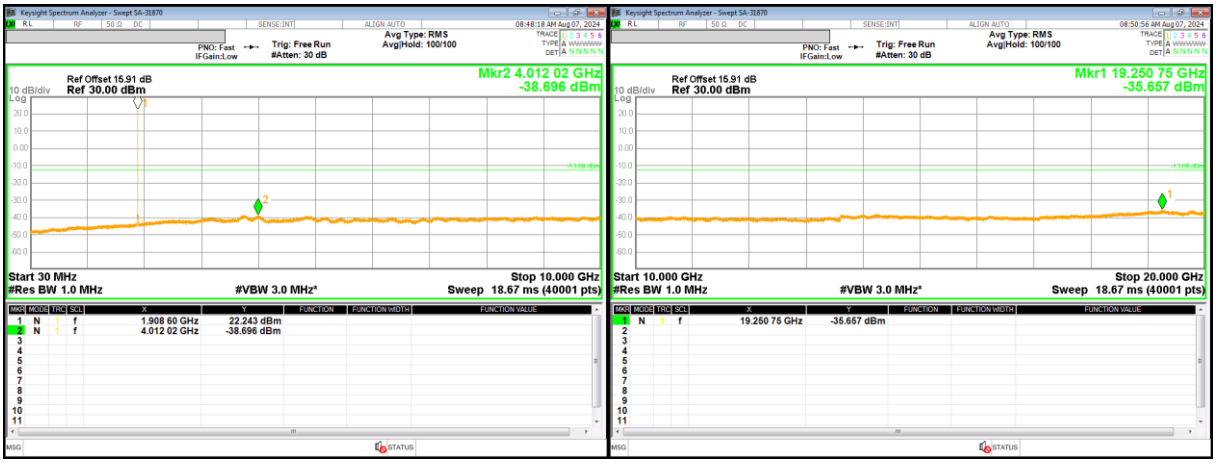
3MHz QPSK



Low channel



Mid channel



High channel

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8.6. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §24.235

LIMITS

§24.235
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

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 OBW results)

RESULTS

See the following pages.

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8.6.1. FREQUENCY STABILITY RESULT

GSM 1900, Channel 512/810, Frequency 1850.0/1910.0 MHz
(Lowest Frequency:GPRS / Highest Frequency: EGPRS)

Test Date	2024-07-03
Test Engineer	47989

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1850.0769	1909.9275		
Extreme (50C)		1850.0769	1909.9276	18.6	0.010
Extreme (40C)		1850.0769	1909.9276	17.3	0.009
Extreme (30C)		1850.0769	1909.9276	15.7	0.008
Extreme (10C)		1850.0769	1909.9275	14.1	0.008
Extreme (0C)		1850.0769	1909.9275	12.5	0.007
Extreme (-10C)		1850.0769	1909.9276	16.5	0.009
Extreme (-20C)		1850.0769	1909.9276	20.8	0.011
Extreme (-30C)		1850.0769	1909.9276	21.5	0.011
20C	15%	1850.0769	1909.9276	25.0	0.013
	-15%	1850.0769	1909.9276	21.2	0.011
	End Point	1850.0769	1909.9275	10.2	0.005

WCDMA Band 2 (Lowest Frequency: HSDPA / Highest Frequency: REL99)

Test Date	2024-07-04
Test Engineer	47989

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1850.3147	1909.6922		
Extreme (50C)		1850.3147	1909.6922	6.8	0.004
Extreme (40C)		1850.3147	1909.6922	3.6	0.002
Extreme (30C)		1850.3147	1909.6922	3.2	0.002
Extreme (10C)		1850.3147	1909.6922	3.7	0.002
Extreme (0C)		1850.3147	1909.6922	3.4	0.002
Extreme (-10C)		1850.3147	1909.6922	2.2	0.001
Extreme (-20C)		1850.3147	1909.6922	1.7	0.001
Extreme (-30C)		1850.3147	1909.6922	4.5	0.002
20C	15%	1850.3147	1909.6921	-4.1	-0.002
	-15%	1850.3147	1909.6921	-3.5	-0.002
	End Point	1850.3147	1909.6921	-5.8	-0.003

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LTE Band 2 (Lowest Frequency: QPSK / Highest Frequency: 16QAM)

Test Date	2024-07-09
Test Engineer	47989

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ End of OBW	F high @ End of OBW		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1850.1562	1909.8435		
Extreme (50C)		1850.1562	1909.8435	6.3	0.003
Extreme (40C)		1850.1562	1909.8435	5.8	0.003
Extreme (30C)		1850.1562	1909.8435	3.6	0.002
Extreme (10C)		1850.1562	1909.8435	2.1	0.001
Extreme (0C)		1850.1562	1909.8435	1.8	0.001
Extreme (-10C)		1850.1562	1909.8435	3.7	0.002
Extreme (-20C)		1850.1562	1909.8435	5.2	0.003
Extreme (-30C)		1850.1562	1909.8435	7.2	0.004
20C	15%	1850.1562	1909.8435	1.2	0.001
	-15%	1850.1562	1909.8435	0.9	0.000
	End Point	1850.1562	1909.8435	2.2	0.001

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9. RADIATED RESULTS

9.1. RADIATED POWER (EIRP)

RULE PART(S)

FCC: §2.1046, §24.232

LIMITS

24.232(c)

Mobile/portable stations are limited to 2 watts e.i.r.p. peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

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 ≥ OBW;
b) Set VBW ≥ 3 × RBW;
c) Set span ≥ 2 x OBW;
d) Sweep time = auto couple or 1 second;
e) Detector = rms;
f) Ensure that the number of measurement points ≥ span/RBW;
g) Trace Mode = max hold(GSM,WCDMA), average(LTE);

TEST RESULTS

See the following pages.

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9.1.1. EIRP RESULT

GSM

Band	Mode	Frequency (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	Limit (dBm)	Delta (dB)
GSM 1900	GPRS	1850.20	23.04	H	4.48	9.52	28.08	642.69	33.00	-4.92
		1880.00	23.91	H	4.52	9.29	28.67	736.21	33.00	-4.33
		1909.80	24.59	H	4.55	9.00	29.04	801.68	33.00	-3.96
	EGPRS	1850.20	19.79	H	4.48	9.52	24.83	304.09	33.00	-8.17
		1880.00	20.51	H	4.52	9.29	25.27	336.51	33.00	-7.73
		1909.80	21.75	H	4.55	9.00	26.20	416.87	33.00	-6.80

WCDMA Band 2

Band	Mode	Frequency (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	Limit (dBm)	Delta (dB)
Band 2	REL99	1852.40	17.63	H	4.49	9.51	22.64	183.65	33.00	-10.36
		1880.00	17.56	H	4.52	9.29	22.32	170.61	33.00	-10.68
		1907.60	18.03	H	4.55	9.03	22.51	178.24	33.00	-10.49
	HSDPA	1852.40	17.63	H	4.49	9.51	22.54	179.47	33.00	-10.36
		1880.00	17.63	H	4.52	9.29	22.39	173.38	33.00	-10.61
		1907.60	18.16	H	4.55	9.03	22.54	179.47	33.00	-10.36

LTE Band 2 (ANT A)

BW (MHz)	Modulation	Frequency (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	Limit (dBm)	Delta (dB)	RB
20	QPSK	1860.00	17.26	H	4.49	9.45	22.21	166.34	33.00	-10.79	1/49
		1880.00	17.24	H	4.52	9.29	22.01	158.85	33.00	-10.99	1/0
		1900.00	17.86	H	4.54	9.13	22.45	175.79	33.00	-10.55	1/0
	16-QAM	1860.00	16.17	H	4.49	9.45	21.13	129.72	33.00	-11.87	1/0
		1880.00	16.46	H	4.52	9.29	21.23	132.74	33.00	-11.77	1/49
		1900.00	17.03	H	4.54	9.13	21.62	145.21	33.00	-11.38	1/0
15	QPSK	1857.50	17.34	H	4.49	9.47	22.32	170.61	33.00	-10.68	1/37
		1880.00	17.33	H	4.52	9.29	22.09	161.81	33.00	-10.91	1/37
		1902.50	17.60	H	4.54	9.10	22.16	164.44	33.00	-10.84	1/37
	16-QAM	1857.50	16.37	H	4.49	9.47	21.34	136.14	33.00	-11.66	1/37
		1880.00	16.38	H	4.52	9.29	21.15	130.32	33.00	-11.85	1/37
		1902.50	16.75	H	4.54	9.10	21.30	134.90	33.00	-11.70	1/37
10	QPSK	1855.00	17.19	H	4.49	9.48	22.19	165.58	33.00	-10.81	1/25
		1880.00	17.16	H	4.52	9.29	21.92	155.60	33.00	-11.08	1/0
		1905.00	17.51	H	4.55	9.06	22.02	159.22	33.00	-10.98	1/25
	16-QAM	1855.00	16.25	H	4.49	9.48	21.25	133.35	33.00	-11.75	1/25
		1880.00	16.28	H	4.52	9.29	21.04	127.06	33.00	-11.96	1/25
		1905.00	16.72	H	4.55	9.06	21.24	133.05	33.00	-11.76	1/0
5	QPSK	1852.50	17.13	H	4.49	9.50	22.15	164.06	33.00	-10.85	1/12
		1880.00	17.57	H	4.52	9.29	22.33	171.00	33.00	-10.67	1/12
		1907.50	17.47	H	4.55	9.03	21.95	156.68	33.00	-11.05	1/24
	16-QAM	1852.50	16.15	H	4.49	9.50	21.17	130.92	33.00	-11.83	1/12
		1880.00	16.67	H	4.52	9.29	21.43	139.00	33.00	-11.57	1/12
		1907.50	16.60	H	4.55	9.03	21.08	128.23	33.00	-11.92	1/12
3	QPSK	1851.50	17.11	H	4.49	9.51	22.14	163.68	33.00	-10.86	1/8
		1880.00	17.47	H	4.52	9.29	22.23	167.11	33.00	-10.77	1/8
		1908.50	17.69	H	4.55	9.02	22.16	164.44	33.00	-10.84	1/8
	16-QAM	1851.50	16.18	H	4.49	9.51	21.21	132.13	33.00	-11.79	1/8
		1880.00	16.59	H	4.52	9.29	21.35	136.46	33.00	-11.65	1/8
		1908.50	16.71	H	4.55	9.02	21.18	131.22	33.00	-11.82	1/8
1.4	QPSK	1850.70	17.01	H	4.48	9.52	22.04	159.96	33.00	-10.96	1/3
		1880.00	17.44	H	4.52	9.29	22.21	166.34	33.00	-10.79	1/5
		1909.30	17.45	H	4.55	9.00	21.91	155.24	33.00	-11.09	1/3
	16-QAM	1850.70	16.22	H	4.48	9.52	21.25	133.35	33.00	-11.75	1/3
		1880.00	16.64	H	4.52	9.29	21.41	138.36	33.00	-11.59	1/5
		1909.30	16.50	H	4.55	9.00	20.96	124.74	33.00	-12.04	1/3

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LTE Band 2 (ANT B)

BW (MHz)	Modulation	Frequency (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	Limit (dBm)	Delta (dB)	RB
20	QPSK	1860.00	10.69	H	4.49	9.45	15.64	36.64	33.00	-17.36	1/0
		1880.00	10.54	H	4.52	9.29	15.31	33.96	33.00	-17.69	1/0
		1900.00	10.74	H	4.54	9.13	15.33	34.12	33.00	-17.67	1/0
	16-QAM	1860.00	10.14	H	4.49	9.45	15.09	32.28	33.00	-17.91	1/0
		1880.00	8.39	H	4.52	9.29	13.16	20.70	33.00	-19.84	1/99
		1900.00	10.27	H	4.54	9.13	14.86	30.62	33.00	-18.14	1/0
15	QPSK	1857.50	10.92	H	4.49	9.47	15.89	38.82	33.00	-17.11	1/0
		1880.00	11.05	H	4.52	9.29	15.82	38.19	33.00	-17.18	1/0
		1902.50	10.65	H	4.54	9.10	15.21	33.19	33.00	-17.79	1/0
	16-QAM	1857.50	10.08	H	4.49	9.47	15.05	31.99	33.00	-17.95	1/37
		1880.00	8.58	H	4.52	9.29	13.35	21.63	33.00	-19.65	1/0
		1902.50	10.20	H	4.54	9.10	14.76	29.92	33.00	-18.24	1/74
10	QPSK	1855.00	10.85	H	4.49	9.48	15.84	38.37	33.00	-17.16	1/0
		1880.00	11.10	H	4.52	9.29	15.87	38.64	33.00	-17.13	1/49
		1905.00	10.95	H	4.55	9.06	15.46	35.16	33.00	-17.54	1/0
	16-QAM	1855.00	9.73	H	4.49	9.48	14.72	29.65	33.00	-18.28	1/0
		1880.00	8.92	H	4.52	9.29	13.69	23.39	33.00	-19.31	1/49
		1905.00	10.52	H	4.55	9.06	15.03	31.84	33.00	-17.97	1/49
5	QPSK	1852.50	10.45	H	4.49	9.50	15.47	35.24	33.00	-17.53	1/0
		1880.00	11.21	H	4.52	9.29	15.98	39.63	33.00	-17.02	1/12
		1907.50	11.04	H	4.55	9.03	15.52	35.65	33.00	-17.48	1/0
	16-QAM	1852.50	9.59	H	4.49	9.50	14.61	28.91	33.00	-18.39	1/0
		1880.00	9.04	H	4.52	9.29	13.81	24.04	33.00	-19.19	1/12
		1907.50	10.52	H	4.55	9.03	15.00	31.62	33.00	-18.00	1/12
3	QPSK	1851.50	10.78	H	4.49	9.51	15.80	38.02	33.00	-17.20	1/14
		1880.00	11.12	H	4.52	9.29	15.89	38.82	33.00	-17.11	1/14
		1908.50	11.06	H	4.55	9.02	15.53	35.73	33.00	-17.47	1/0
	16-QAM	1851.50	10.02	H	4.49	9.51	15.04	31.92	33.00	-17.96	1/8
		1880.00	8.66	H	4.52	9.29	13.43	22.03	33.00	-19.57	1/0
		1908.50	10.77	H	4.55	9.02	15.24	33.42	33.00	-17.76	1/14
1.4	QPSK	1850.70	10.92	H	4.48	9.52	15.95	39.36	33.00	-17.05	1/0
		1880.00	11.06	H	4.52	9.29	15.83	38.28	33.00	-17.17	1/0
		1909.30	11.03	H	4.55	9.00	15.48	35.32	33.00	-17.52	1/5
	16-QAM	1850.70	10.19	H	4.48	9.52	15.22	33.27	33.00	-17.78	1/3
		1880.00	9.03	H	4.52	9.29	13.80	23.99	33.00	-19.20	1/0
		1909.30	10.64	H	4.55	9.00	15.09	32.28	33.00	-17.91	1/3

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9.2. RADIATIED SPURIOUS EMISSION

RULE PART(S)

FCC: §2.1053, §24.238

LIMIT

24.238(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 = 1 MHz for emissions above 1 GHz
b) Set VBW ≥ 3 × RBW;
c) Set span ≥ 1.5 times the OBW;
d) Sweep time = auto couple;
e) Detector = rms;
f) Ensure that the number of measurement points ≥ span/RBW;
g) Trace Mode = average(WCDMA, LTE), Maxhold(GSM);

NOTE1

GSM : It was tested at GPRS as worst case (the highst output power and density).
UMTS: It was tested at REL 99 as worst case (the highst output power and density).
LTE: It was tested at 1RB QPSK as worst case (the highst output power and density).

NOTE2

Please refer to section 5.4 for bandwidth and RB setting about LTE bands.

RESULTS

See the following pages.

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9.2.1. SPURIOUS RADIATION RESULT

GSM1900

GPRS

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 4791377016
Date: 2024-08-02
Test Engineer: 27089
Configuration: EUT / AC Adapter, Z-Position
Location: Chamber 2
Mode: GPRS 1900 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
Low Ch, 1850.2MHz									
3700.40	-8.1	V	3.0	43.1	1.0	-50.2	-13.0	-37.2	
5550.60	-3.8	V	3.0	43.4	1.0	-46.2	-13.0	-33.2	
7400.80	-2.8	V	3.0	43.0	1.0	-44.9	-13.0	-31.9	
3700.40	-7.9	H	3.0	43.1	1.0	-50.0	-13.0	-37.0	
5550.60	-4.9	H	3.0	43.4	1.0	-47.3	-13.0	-34.3	
7400.80	-3.6	H	3.0	43.0	1.0	-45.6	-13.0	-32.6	
Mid Ch, 1880MHz									
3760.00	-7.5	V	3.0	43.1	1.0	-49.6	-13.0	-36.6	
5640.00	-3.7	V	3.0	43.4	1.0	-46.2	-13.0	-33.2	
7520.00	-2.8	V	3.0	42.9	1.0	-44.8	-13.0	-31.8	
3760.00	-8.1	H	3.0	43.1	1.0	-50.2	-13.0	-37.2	
5640.00	-4.4	H	3.0	43.4	1.0	-46.9	-13.0	-33.9	
7520.00	-3.5	H	3.0	42.9	1.0	-45.5	-13.0	-32.5	
High Ch, 1909.8MHz									
3819.60	-7.6	V	3.0	43.1	1.0	-49.7	-13.0	-36.7	
5729.40	-4.1	V	3.0	43.4	1.0	-46.5	-13.0	-33.5	
7639.20	-2.6	V	3.0	42.9	1.0	-44.5	-13.0	-31.5	
3819.60	-8.1	H	3.0	43.1	1.0	-50.2	-13.0	-37.2	
5729.40	-5.3	H	3.0	43.4	1.0	-47.8	-13.0	-34.8	
7639.20	-3.7	H	3.0	42.9	1.0	-45.6	-13.0	-32.6	

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WCDMA Band 2

REL99

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 4791377016
Date: 2024-08-01
Test Engineer: 27089
Configuration: EUT / AC Adapter, X-Position
Location: Chamber 2
Mode: Rel99 Band 2 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
Low Ch, 1852.4MHz									
3704.80	-10.8	V	3.0	43.1	1.0	-52.8	-13.0	-39.8	
5557.20	-8.0	V	3.0	43.4	1.0	-50.4	-13.0	-37.4	
7409.60	-5.5	V	3.0	43.0	1.0	-47.5	-13.0	-34.5	
3704.80	-10.5	H	3.0	43.1	1.0	-52.5	-13.0	-39.5	
5557.20	-8.2	H	3.0	43.4	1.0	-50.6	-13.0	-37.6	
7409.60	-5.7	H	3.0	43.0	1.0	-47.7	-13.0	-34.7	
Mid Ch, 1880MHz									
3760.00	-10.8	V	3.0	43.1	1.0	-52.9	-13.0	-39.9	
5640.00	-7.7	V	3.0	43.4	1.0	-50.1	-13.0	-37.1	
7520.00	-5.7	V	3.0	42.9	1.0	-47.6	-13.0	-34.6	
3760.00	-11.0	H	3.0	43.1	1.0	-53.1	-13.0	-40.1	
5640.00	-7.9	H	3.0	43.4	1.0	-50.3	-13.0	-37.3	
7520.00	-6.3	H	3.0	42.9	1.0	-48.2	-13.0	-35.2	
High Ch, 1907.6MHz									
3815.20	-10.6	V	3.0	43.1	1.0	-52.7	-13.0	-39.7	
5722.80	-7.8	V	3.0	43.4	1.0	-50.3	-13.0	-37.3	
7630.40	-5.5	V	3.0	42.9	1.0	-47.3	-13.0	-34.3	
3815.20	-10.9	H	3.0	43.1	1.0	-53.0	-13.0	-40.0	
5722.80	-8.1	H	3.0	43.4	1.0	-50.6	-13.0	-37.6	
7630.40	-5.8	H	3.0	42.9	1.0	-47.7	-13.0	-34.7	

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LTE Band 2

20 MHz

QPSK

ANT A

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 4791377016
Date: 2024-08-02
Test Engineer: 27089
Configuration: EUT / AC Adapter, X-Position
Location: Chamber 2
Mode: LTE_QPSK Band 2 Harmonics, 20MHz Bandwidth
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
Low Ch, 1860MHz									
3720.00	-10.6	V	3.0	43.1	1.0	-52.7	-13.0	-39.7	
5580.00	-7.9	V	3.0	43.4	1.0	-50.3	-13.0	-37.3	
7440.00	-5.6	V	3.0	43.0	1.0	-47.6	-13.0	-34.6	
3720.00	-10.9	H	3.0	43.1	1.0	-52.9	-13.0	-39.9	
5580.00	-8.1	H	3.0	43.4	1.0	-50.5	-13.0	-37.5	
7440.00	-6.2	H	3.0	43.0	1.0	-48.2	-13.0	-35.2	
Mid Ch, 1880MHz									
3760.00	-10.7	V	3.0	43.1	1.0	-52.8	-13.0	-39.8	
5640.00	-7.6	V	3.0	43.4	1.0	-50.1	-13.0	-37.1	
7520.00	-5.7	V	3.0	42.9	1.0	-47.6	-13.0	-34.6	
3760.00	-11.0	H	3.0	43.1	1.0	-53.1	-13.0	-40.1	
5640.00	-7.9	H	3.0	43.4	1.0	-50.3	-13.0	-37.3	
7520.00	-6.3	H	3.0	42.9	1.0	-48.2	-13.0	-35.2	
High Ch, 1900MHz									
3800.00	-10.7	V	3.0	43.1	1.0	-52.8	-13.0	-39.8	
5700.00	-7.9	V	3.0	43.4	1.0	-50.3	-13.0	-37.3	
7600.00	-5.5	V	3.0	42.9	1.0	-47.4	-13.0	-34.4	
3800.00	-11.0	H	3.0	43.1	1.0	-53.1	-13.0	-40.1	
5700.00	-8.2	H	3.0	43.4	1.0	-50.6	-13.0	-37.6	
7600.00	-6.1	H	3.0	42.9	1.0	-48.0	-13.0	-35.0	

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218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
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5 MHz

QPSK

ANT B

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 4791377016
Date: 2024-08-14
Test Engineer: 26087
Configuration: EUT / Z-Position, AC Adapter
Location: Chamber 1
Mode: LTE_QPSK Band 2 Harmonics, 5MHz Bandwidth
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
Low Ch, 1852.5MHz									
3705.00	-8.8	V	3.0	44.1	1.0	-51.9	-13.0	-38.9	
5557.50	-2.7	V	3.0	45.0	1.0	-46.6	-13.0	-33.6	
7410.00	-3.4	V	3.0	45.0	1.0	-47.4	-13.0	-34.4	
3705.00	-8.6	H	3.0	44.1	1.0	-51.7	-13.0	-38.7	
5557.50	-2.8	H	3.0	45.0	1.0	-46.8	-13.0	-33.8	
7410.00	-3.3	H	3.0	45.0	1.0	-47.3	-13.0	-34.3	
Mid Ch, 1880MHz									
3760.00	-8.6	V	3.0	44.1	1.0	-51.7	-13.0	-38.7	
5640.00	-3.9	V	3.0	45.0	1.0	-47.9	-13.0	-34.9	
7520.00	-3.3	V	3.0	44.9	1.0	-47.3	-13.0	-34.3	
3760.00	-8.5	H	3.0	44.1	1.0	-51.6	-13.0	-38.6	
5640.00	-3.9	H	3.0	45.0	1.0	-47.9	-13.0	-34.9	
7520.00	-3.3	H	3.0	44.9	1.0	-47.3	-13.0	-34.3	
High Ch, 1907.5MHz									
3815.00	-8.6	V	3.0	44.2	1.0	-51.8	-13.0	-38.8	
5722.50	-5.5	V	3.0	45.0	1.0	-49.5	-13.0	-36.5	
7630.00	-2.9	V	3.0	44.9	1.0	-46.8	-13.0	-33.8	
3815.00	-8.3	H	3.0	44.2	1.0	-51.4	-13.0	-38.4	
5722.50	-5.2	H	3.0	45.0	1.0	-49.3	-13.0	-36.3	
7630.00	-2.9	H	3.0	44.9	1.0	-46.8	-13.0	-33.8	

END OF REPORT

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