CERTIFICATION TEST REPORT

Report Number. : 4790748041-E3V3

Applicant	:	SAMSUNG ELECTRONICS CO., LTD. 129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI, GYEONGGI-DO, 16677, KOREA
Model	:	SC-55D, SCG22
FCC ID	:	A3LSMF946JPN
EUT Description	:	GSM/WCDMA/LTE 5G NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax, NFC, WPT and UWB
Test Standard(s)	:	FCC CFR47 PART 24 SUBPART E

Date Of Issue:
2023-07-10

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
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IAS ACCREDITED
Testing Laboratory
TL-637

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	2023-06-30	Initial issue	Yeonghwan Hong
V2	2023-07-06	Updated to address TCB's question	Yeonghwan Hong
V3	2023-07-10	Updated to address TCB's question	Yeonghwan Hong

UL KOREA LTD. Suwon Laboratory FORM ID: FCC_24(05)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

TABLE OF CONTENTS

UL KOREA LTD. Suwon Laboratory FORM ID: FCC_24(05)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

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, WPT and UWB.
MODEL NUMBER:	SC-55D, SCG22
SERIAL NUMBER:	R3CW408V07D, R3CW408V0NP (CONDUCTED); R3CW408V7JJ, R3CW408VA8J (RADIATED);
DATE TESTED:	2023-05-23 - 2023-06-23;

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:

Yeonghwan Hong
Suwon Lab Engineer
UL KOREA LTD.

2. TEST METHODOLOGY

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

1. FCC CFR 47 Part 2.
2. FCC CFR 47 Part 24.
3. ANSI TIA-603-E, 2016
4. ANSI C63.26, 2015
5. KDB 971168 D01 Power Meas License Digital Systems v03r01

3. FACILITIES AND ACCREDITATION

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

218 Maeyeong-ro
☒ 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.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

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.

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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/ax, NFC, WPT and UWB. This test report addresses the WWAN operational Mode.

Representative model	Difference	Derivative model
		SCG22
SC-55D	Hardware	Same as SC-55D.
	Software	Supported WWAN Band is different.

Thus, SC-55D was set for final test.

5.2. MAXIMUM OUTPUT POWER

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

GSM

FCC Part 24						
Band	Frequency Range [MHz]	Modulation	Conducted		Radiated (ANT B)	
			Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
GSM1900	1850.00 ~ 1910.00	GSM	**29.65**	**922.57**	**27.43**	553.35
		EGPRS	25.42	348.34	23.05	201.84

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LTE Band 2

FCC Part 24							
Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation	Conducted		Radiated	
				Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 2	1860.00 ~1900.00	20	QPSK	24.34	271.64	**23.77**	**238.23**
			16QAM	23.77	238.23	23.09	203.70
			64QAM	22.81	190.99		
	1857.50 ~ 1902.50	15	QPSK	24.36	272.90	23.46	221.82
			16QAM	23.63	230.67	22.51	178.24
			64QAM	22.81	190.99		
	1855.00 ~ 1905.00	10	QPSK	24.62	289.73	23.46	221.82
			16QAM	23.86	243.22	22.72	187.07
			64QAM	22.77	189.23		
	1852.50 ~ 1907.50	5	QPSK	24.62	289.73	23.46	221.82
			16QAM	23.98	250.03	22.72	187.07
			64QAM	22.99	199.07		
	1851.50 ~ 1908.50	3	QPSK	**24.64**	**291.07**	23.58	228.03
			16QAM	23.88	244.34	22.73	187.50
			64QAM	22.72	187.07		
	1850.70 ~ 1909.30	1.4	QPSK	24.55	285.10	23.38	217.77
			16QAM	23.72	235.50	22.33	171.00
			64QAM	22.89	194.54		

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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)	Peak Gain (dBi)
GSM1900 / LTE Band 2 1850 - 1910 MHz	-2.4 (ANT B)

5.4. WORST-CASE ORIENTATION

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

- GSM GPRS/EGPRS

For LTE Band2 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 and 64QAM modulations. However, the out of band emissions and spurious radiation were only performed on bandwidth and RB offset(with RB size 1) with the highest power in QPSK.

- Conducted Spurious Emission

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

- Radiated Spurious Emission

Highest EIRP setting for each bands				
LTE Band	**Frequency (MHz)**	**Bandwidth (MHz)**	**RB size**	**RB offset**
2	1860.0	20	1	0
	1880.0		1	0
	1900.0		1	0

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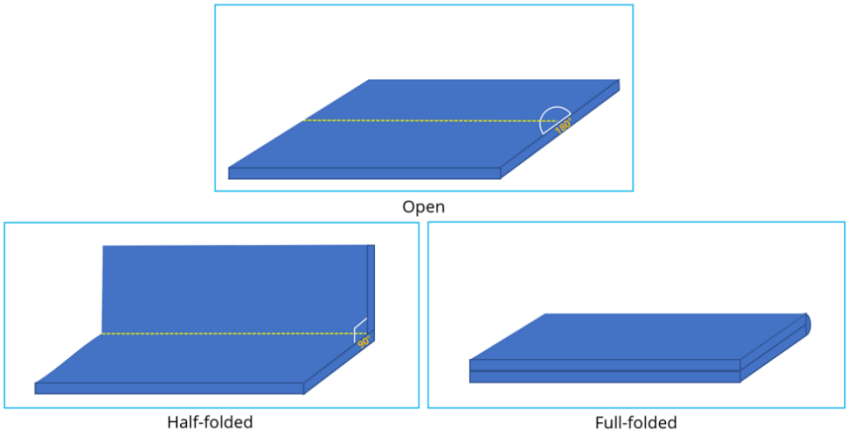
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

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	B	Open	-	-	-	Open	-
LTE B2	B	Full-folded	-	-	-	Open	-

Note : For EIRP testing, the EUT didn't attached with travel adapter. But radiated spurious testing, the EUT attached with travel adapter for the worst case condition. The EUT is continuously communicated with the call box during the tests.

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

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacture**	**Model**	**Serial Number**	**FCC ID**
Charger	SAMSUNG	EP-TA800	R37N9QP4SL9DK3	N/A
Data Cable	SAMSUNG	WBR0062M	GH39-02112A	N/A

I/O CABLE

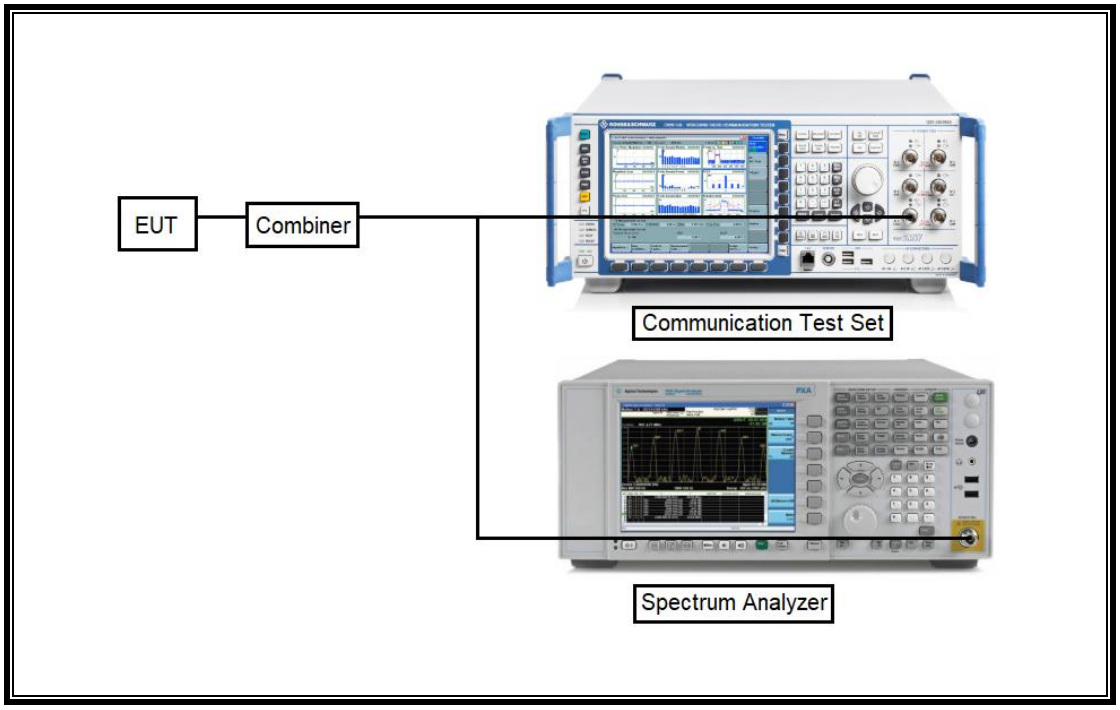
I/O Cable List						
Cable No.	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	DC Power	1	C Type	Shielded	1.0 m	N/A

TEST SETUP

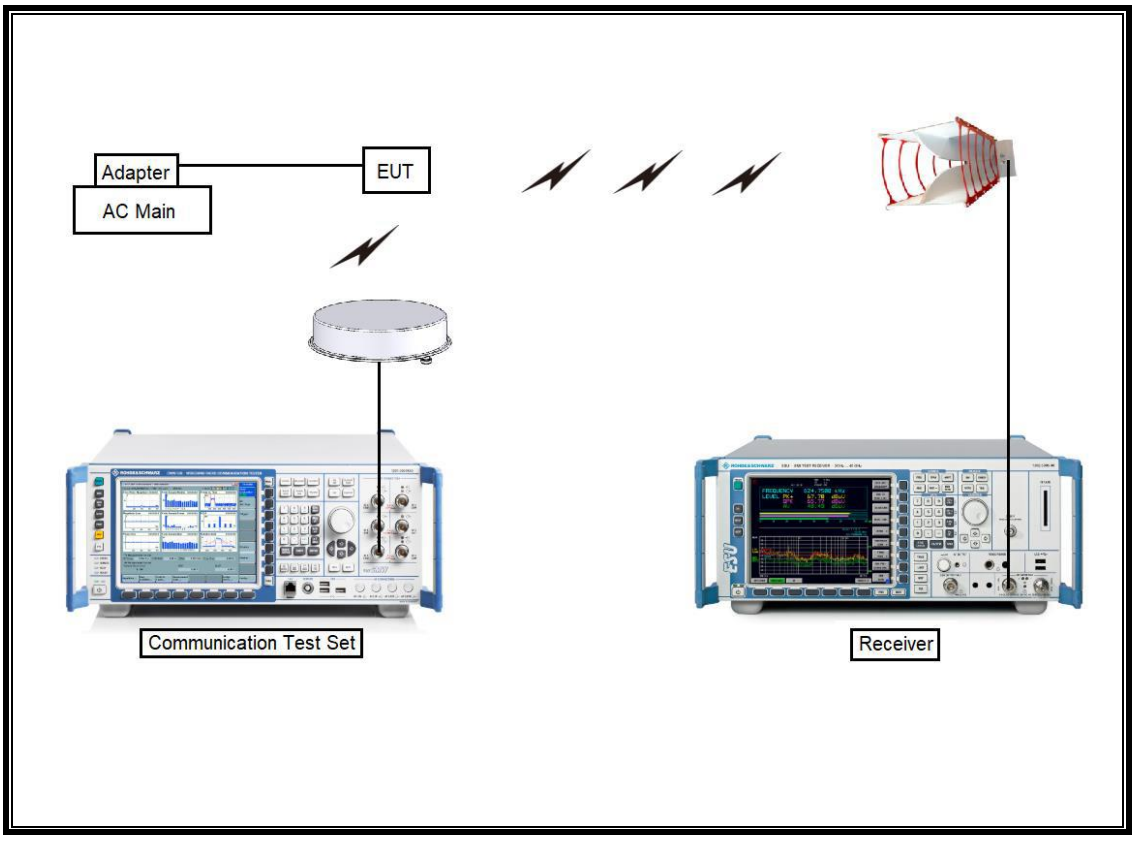
The EUT is continuously communicated with the call box during the tests.

UL KOREA LTD. Suwon Laboratory FORM ID: FCC_24(05)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)



SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)



6. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment List				
Description	**Manufacturer**	**Model**	**S/N**	**Cal Due**
Antenna, Tuned Dipole 400~1000 MHz	ETS	3121D DB4	00164753	2025-01-17
Directional Antenna	Cobham	FPA3-0.8-6.0R/1329	110367-0003	N/A
Directional Antenna	Cobham	FPA3-0.8-6.0R/1329	80108-0004	N/A
Antenna, Horn, 40 GHz	ETS	3116C	00168645	2023-10-13
Preamplifier	ETS	3115-PA	00167475	2023-08-04
Preamplifier	ETS	3116C-PA	00168841	2023-08-04
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	750	2024-08-15
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	845	2024-08-15
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749	2024-08-15
Antenna, Horn, 18 GHz	ETS	3115	00161451	2024-08-21
Antenna, Horn, 18 GHz	ETS	3117	00168717	2024-08-21
Communications Test Set	R&S	CMW500	169796	2024-01-05
DC Power Supply	Agilent / HP	E3640A	MY54226395	2023-08-02
Preamplifier, 1000 MHz	Sonoma	310N	341282	2023-08-02
Preamplifier, 1000 MHz	Sonoma	310N	351741	2023-08-02
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	2029169	2023-08-01
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1896138	2023-08-01
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	2023-08-03
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54490312	2023-08-01
Spectrum Analyzer, 44 GHz	KEYSIGHT	N9030B	MY60070693	2024-01-09
EMI Test Receive, 40 GHz	R&S	ESU40	100439	2023-08-02
EMI Test Receive, 40 GHz	R&S	ESU40	100457	2023-07-29
High Pass Filter 1.2GHz	Micro-Tronics	HPM50108-02	G005	2023-08-01
High Pass Filter 1.2GHz	Micro-Tronics	HPM50108-02	G006	2023-08-01
High Pass Filter 2.8GHz	Micro-Tronics	HPM50111-02	010	2023-08-01
High Pass Filter 2.8GHz	Micro-Tronics	HPM50111-02	011	2023-08-01
High Pass Filter 4GHz	Micro-Tronics	HPM50118-02	G001	2023-08-01
High Pass Filter 4GHz	Micro-Tronics	HPM50118-02	G002	2023-08-01
Attenuator	PASTERNACK	PE7087-10	A009	2023-08-03
Attenuator	PASTERNACK	PE7087-10	A001	2023-08-03
Attenuator	PASTERNACK	PE7087-10	A008	2023-08-03
Attenuator	PASTERNACK	PE7004-10	2	2023-08-01
Attenuator	PASTERNACK	PE7395-10	A011	2023-08-03
Antenna, Loop, 9kHz-30MHz	R&S	HFH2-Z2	100418	2023-10-06
Temperature Chamber	ESPEC	SH-642	93001109	2023-08-01
Power Splitter	MINI-CIRCUITS	WA1534	UL003	2024-01-09
Power Splitter	MINI-CIRCUITS	WA1534	UL004	2024-01-09
UXM 5G Wireless Test Platform	KEYSIGHT	E7515B	MY57510655	2024-01-09
UXM 5G Wireless Test Platform	KEYSIGHT	E7515B	MY58010202	2024-01-27
UXM 5G Wireless Test Platform	KEYSIGHT	E7515B	MY58460570	2023-12-08

UL Software			
Description	**Manufacturer**	**Model**	**Version**
Antenna port test software	UL	CLT	Ver 3.4
Radiated software	UL	UL EMC	Ver 9.5
Antenna port test software (5G NR FR1)	UL	UL iM	Ver 1.06

7. SUMMARY TABLE

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

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

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.

RESULTS

See the following pages.

8.1.1. CONDUCTED AVERAGE OUTPUT POWER

GSM

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Pmax Maximum Average Power (dBm)			
					Measured		Tune-up Limit	
					Burst Pwr	Frame Pwr	Burst Pwr	Frame Pwr
GSM (Voice)	CS1	1	512	1850.20	29.59	20.56	30.5	21.5
			661	1880.00	29.65	20.62		
			810	1909.80	29.06	20.03		
GPRS (GMSK)	CS1	1	512	1850.20	29.58	20.55	30.5	21.5
			661	1880.00	29.63	20.60		
			810	1909.80	29.02	19.99		
		2	512	1850.20	27.25	21.23	29.0	23.0
			661	1880.00	28.68	22.66		
			810	1909.80	27.54	21.52		
		3	512	1850.20	26.78	22.52	27.5	**23.2**
			661	1880.00	26.77	22.51		
			810	1909.80	25.24	20.98		
		4	512	1850.20	24.51	21.50	25.5	22.5
			661	1880.00	24.56	21.55		
			810	1909.80	23.96	20.95		
EGPRS (8PSK)	MCS5	1	512	1850.20	25.37	16.34	27.0	18.0
			661	1880.00	25.42	16.39		
			810	1909.80	24.92	15.89		
		2	512	1850.20	24.29	18.27	25.0	19.0
			661	1880.00	24.24	18.22		
			810	1909.80	23.69	17.67		
		3	512	1850.20	22.22	17.96	23.0	18.7
			661	1880.00	22.21	17.95		
			810	1909.80	21.60	17.34		
		4	512	1850.20	21.34	18.33	22.0	19.0
			661	1880.00	21.27	18.26		
			810	1909.80	20.70	17.69		

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

LTE Band 2

BW (MHz)	Mode	RB Allocation	RB offset	Pmax 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	24.34	24.23	23.87	0.0	25.0
		1	49	24.32	24.09	23.83	0.0	25.0
		1	99	24.16	24.02	23.72	0.0	25.0
		50	0	23.40	23.11	22.94	1.0	24.0
		50	24	23.42	23.10	22.93	1.0	24.0
		50	50	23.28	22.98	22.80	1.0	24.0
		100	0	23.32	23.08	22.93	1.0	24.0
	16QAM	1	0	23.65	23.56	23.06	1.0	24.0
		1	49	23.70	23.77	23.05	1.0	24.0
		1	99	23.49	23.42	22.87	1.0	24.0
		50	0	22.41	22.14	21.94	2.0	23.0
		50	24	22.42	22.10	21.94	2.0	23.0
		50	50	22.29	22.02	21.79	2.0	23.0
		100	0	22.30	22.08	21.91	2.0	23.0
	64QAM	1	0	22.74	22.37	22.17	2.0	23.0
		1	49	22.81	22.36	22.23	2.0	23.0
		1	99	22.66	22.14	21.97	2.0	23.0
		50	0	21.41	21.15	20.96	3.0	22.0
		50	24	21.43	21.11	20.93	3.0	22.0
		50	50	21.30	21.02	20.78	3.0	22.0
		100	0	21.33	21.11	20.92	3.0	22.0
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	24.36	23.98	23.85	0.0	25.0
		1	37	24.32	23.92	23.83	0.0	25.0
		1	74	24.31	23.82	23.73	0.0	25.0
		36	0	23.50	23.16	22.87	1.0	24.0
		36	20	23.40	23.16	22.86	1.0	24.0
		36	39	23.38	23.05	22.74	1.0	24.0
		75	0	23.40	23.16	22.85	1.0	24.0
	16QAM	1	0	23.62	23.58	23.23	1.0	24.0
		1	37	23.59	23.63	23.14	1.0	24.0
		1	74	23.57	23.37	23.05	1.0	24.0
		36	0	22.48	22.15	21.86	2.0	23.0
		36	20	22.37	22.07	21.84	2.0	23.0
		36	39	22.34	22.00	21.73	2.0	23.0
		75	0	22.35	22.09	21.84	2.0	23.0
	64QAM	1	0	22.60	22.36	22.07	2.0	23.0
		1	37	22.81	22.25	22.27	2.0	23.0
		1	74	22.72	22.23	22.07	2.0	23.0
		36	0	21.45	21.13	20.84	3.0	22.0
		36	20	21.38	21.12	20.82	3.0	22.0
		36	39	21.36	21.02	20.74	3.0	22.0
		75	0	21.38	21.12	20.81	3.0	22.0

UL KOREA LTD. Suwon Laboratory FORM ID: FCC_24(05)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

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	24.56	24.17	23.90	0.0	25.0
		1	25	24.62	24.20	23.88	0.0	25.0
		1	49	24.51	24.08	23.81	0.0	25.0
		25	0	23.52	23.14	22.85	1.0	24.0
		25	12	23.44	23.16	22.89	1.0	24.0
		25	25	23.41	23.03	22.83	1.0	24.0
		50	0	22.93	22.62	22.35	1.0	24.0
	16QAM	1	0	23.82	23.32	23.15	1.0	24.0
		1	25	23.86	23.33	23.13	1.0	24.0
		1	49	23.71	23.26	23.07	1.0	24.0
		25	0	22.51	22.12	21.88	2.0	23.0
		25	12	22.45	22.09	21.88	2.0	23.0
		25	25	22.42	22.01	21.82	2.0	23.0
		50	0	22.42	22.11	21.82	2.0	23.0
	64QAM	1	0	22.70	22.48	22.12	2.0	23.0
		1	25	22.77	22.50	22.07	2.0	23.0
		1	49	22.71	22.50	22.07	2.0	23.0
		25	0	21.56	21.19	20.92	3.0	22.0
		25	12	21.51	21.21	20.92	3.0	22.0
		25	25	21.47	21.10	20.86	3.0	22.0
		50	0	21.47	21.19	20.88	3.0	22.0
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	24.55	24.12	23.81	0.0	25.0
		1	12	24.62	24.20	23.84	0.0	25.0
		1	24	24.54	24.11	23.75	0.0	25.0
		12	0	23.51	23.13	22.81	1.0	24.0
		12	7	23.53	23.17	22.81	1.0	24.0
		12	13	23.53	23.06	22.78	1.0	24.0
		25	0	23.50	23.10	22.83	1.0	24.0
	16QAM	1	0	23.91	23.46	23.14	1.0	24.0
		1	12	23.67	23.46	23.23	1.0	24.0
		1	24	23.98	23.43	23.13	1.0	24.0
		12	0	22.62	22.15	21.94	2.0	23.0
		12	7	22.66	22.15	21.97	2.0	23.0
		12	13	22.63	22.06	21.95	2.0	23.0
		25	0	22.53	22.11	21.83	2.0	23.0
	64QAM	1	0	22.87	22.42	22.04	2.0	23.0
		1	12	22.99	22.41	22.09	2.0	23.0
		1	24	22.88	22.34	21.95	2.0	23.0
		12	0	21.64	21.18	20.83	3.0	22.0
		12	7	21.67	21.20	20.86	3.0	22.0
		12	13	21.65	21.09	20.84	3.0	22.0
		25	0	21.54	21.18	20.82	3.0	22.0

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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	24.57	24.16	23.77	0.0	25.0
		1	8	24.64	24.20	23.86	0.0	25.0
		1	14	24.53	24.09	23.75	0.0	25.0
		8	0	23.57	23.17	22.80	1.0	24.0
		8	4	23.60	23.22	22.86	1.0	24.0
		8	7	23.60	23.11	22.86	1.0	24.0
		15	0	23.50	23.14	22.79	1.0	24.0
	16QAM	1	0	23.88	23.44	23.18	1.0	24.0
		1	8	23.87	23.50	23.19	1.0	24.0
		1	14	23.76	23.35	23.16	1.0	24.0
		8	0	22.55	22.19	21.85	2.0	23.0
		8	4	22.62	22.21	21.90	2.0	23.0
		8	7	22.60	22.09	21.88	2.0	23.0
		15	0	22.56	22.11	21.80	2.0	23.0
	64QAM	1	0	22.65	22.49	21.98	2.0	23.0
		1	8	22.72	22.52	22.12	2.0	23.0
		1	14	22.59	22.35	22.05	2.0	23.0
		8	0	21.53	21.13	20.91	3.0	22.0
		8	4	21.56	21.20	20.91	3.0	22.0
		8	7	21.55	21.09	20.90	3.0	22.0
		15	0	21.56	21.18	20.82	3.0	22.0

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	24.54	24.15	23.78	0.0	25.0
		1	3	24.55	24.16	23.83	0.0	25.0
		1	5	24.51	24.13	23.78	0.0	25.0
		3	0	24.49	24.13	23.73	0.0	25.0
		3	1	24.51	24.12	23.75	0.0	25.0
		3	3	24.51	24.11	23.76	0.0	25.0
		6	0	23.57	23.16	22.79	1.0	24.0
	16QAM	1	0	23.69	23.44	23.11	1.0	24.0
		1	3	23.72	23.47	23.10	1.0	24.0
		1	5	23.69	23.43	23.07	1.0	24.0
		3	0	23.61	23.22	22.90	1.0	24.0
		3	1	23.63	23.23	22.89	1.0	24.0
		3	3	23.59	23.21	22.89	1.0	24.0
		6	0	22.57	22.07	21.87	2.0	23.0
	64QAM	1	0	22.89	22.34	22.05	2.0	23.0
		1	3	22.89	22.37	22.11	2.0	23.0
		1	5	22.83	22.28	22.09	2.0	23.0
		3	0	22.68	22.25	21.87	2.0	23.0
		3	1	22.69	22.25	21.87	2.0	23.0
		3	3	22.67	22.29	21.88	2.0	23.0
		6	0	21.59	21.24	20.92	3.0	22.0

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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 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.

RESULTS

See the following pages.

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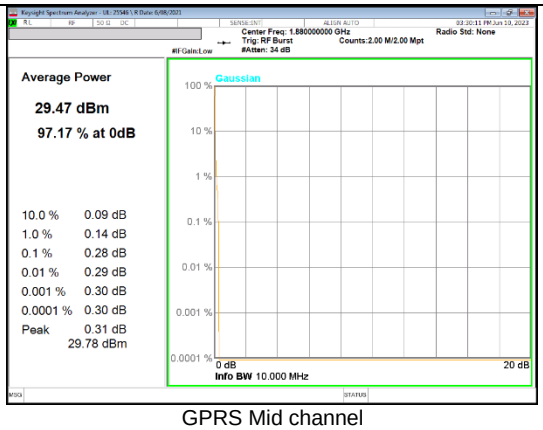
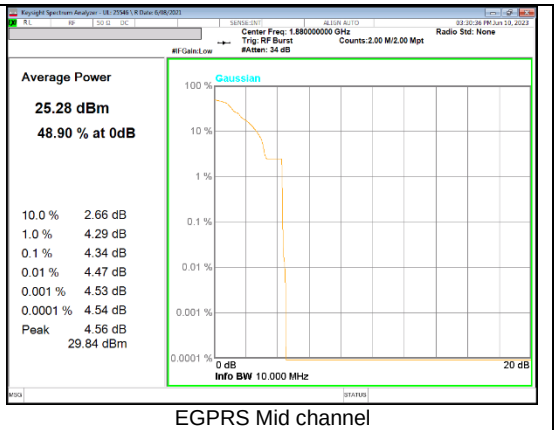
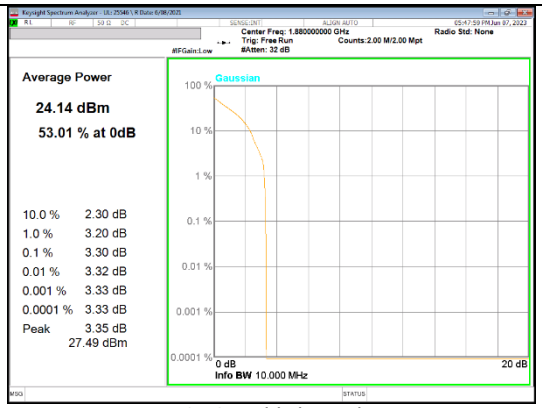
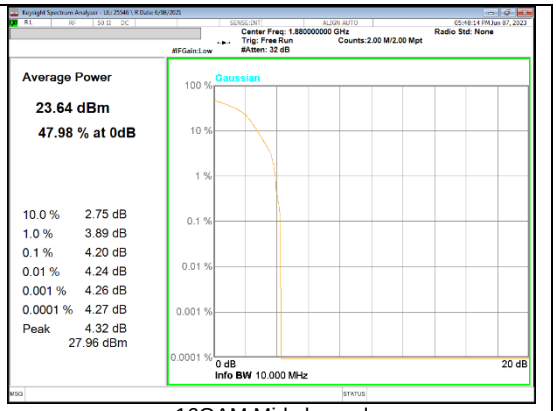
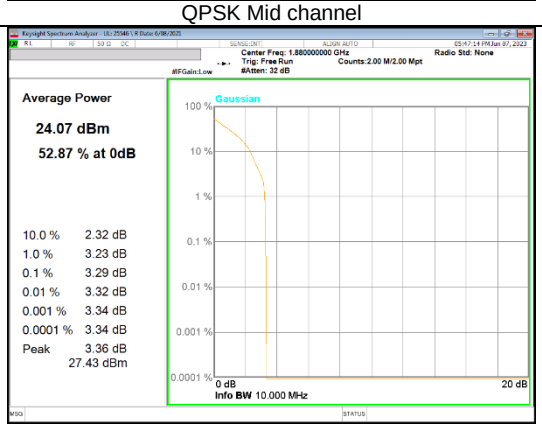
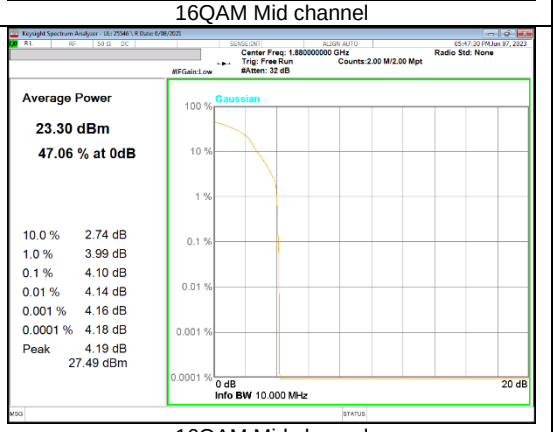
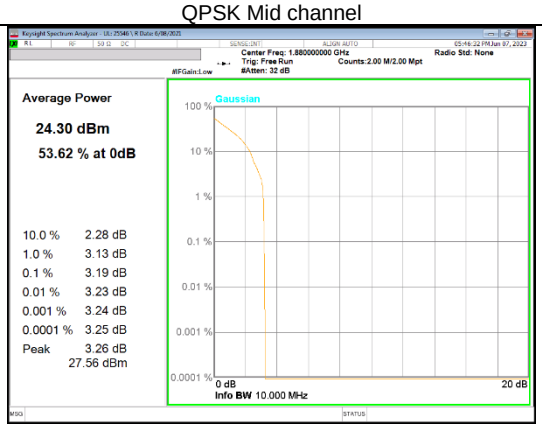
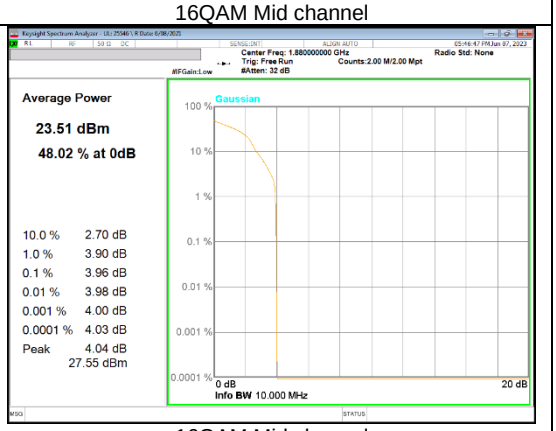
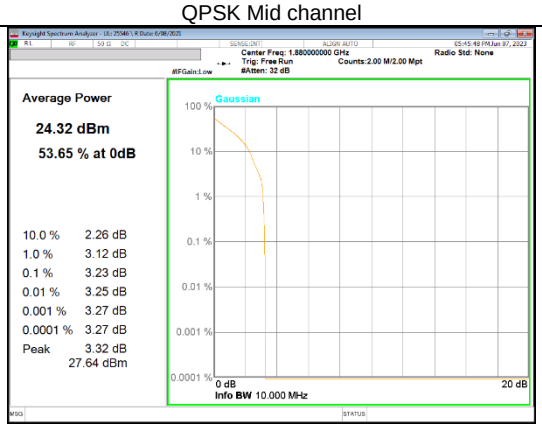
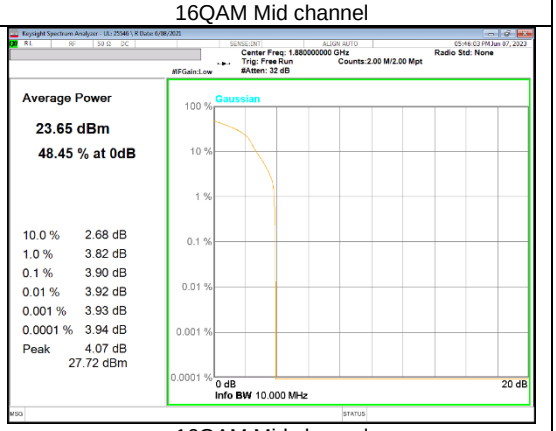
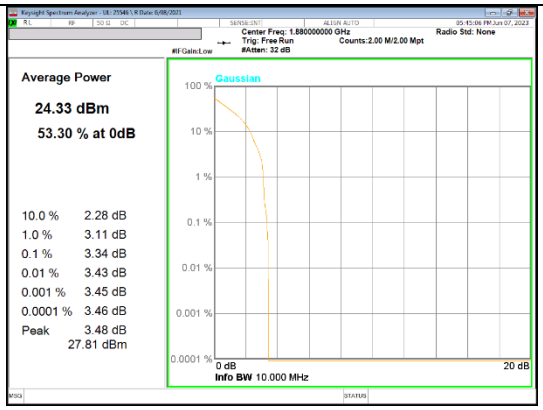
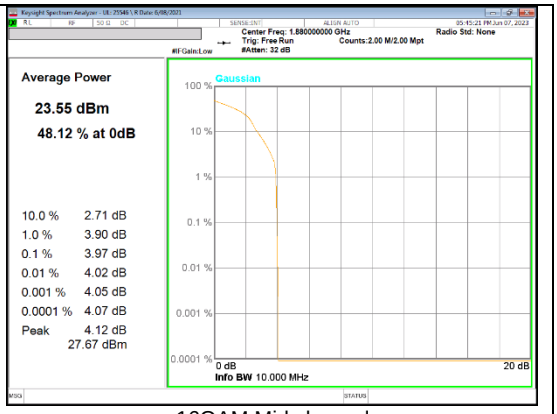
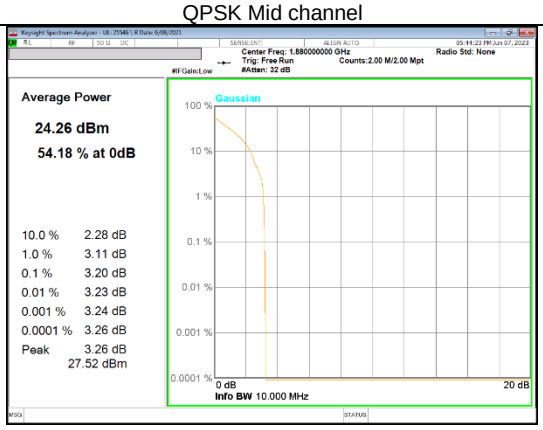
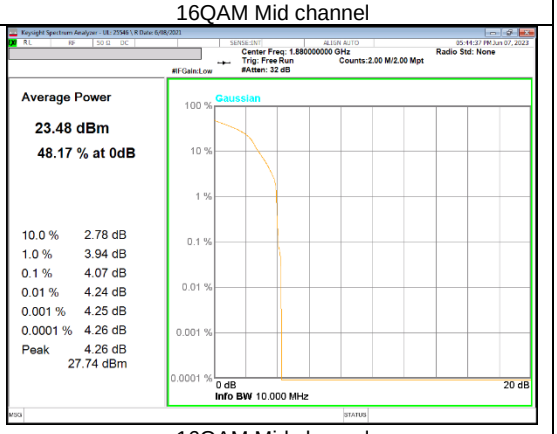
8.2.1. CONDUCTED PEAK TO AVERAGE RESULT

GSM

GSM 1900	 GPRS Mid channel	 EGPRS Mid channel

LTE Band 2

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

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

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	246.860	315.500
	EGPRS		235.630	307.400

- LTE Band 2

Band	BW	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
LTE B2	20M	QPSK	1880.00	17.922	19.510
		16QAM		17.925	19.770
	15M	QPSK		13.439	14.840
		16QAM		13.468	14.730
	10M	QPSK		8.966	10.050
		16QAM		8.980	9.967
	5M	QPSK		4.491	5.078
		16QAM		4.502	5.116
	3M	QPSK		2.696	3.034
		16QAM		2.696	3.058
	1.4M	QPSK		1.088	1.342
		16QAM		1.093	1.390

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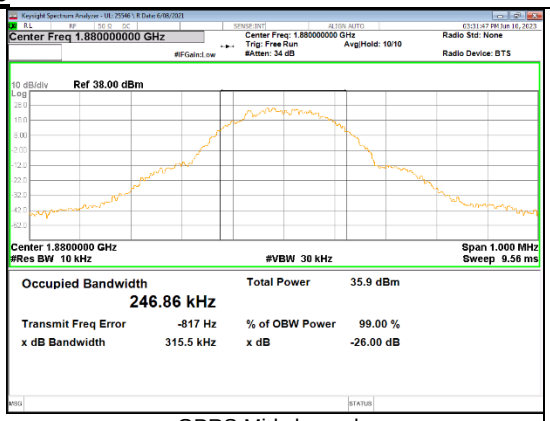
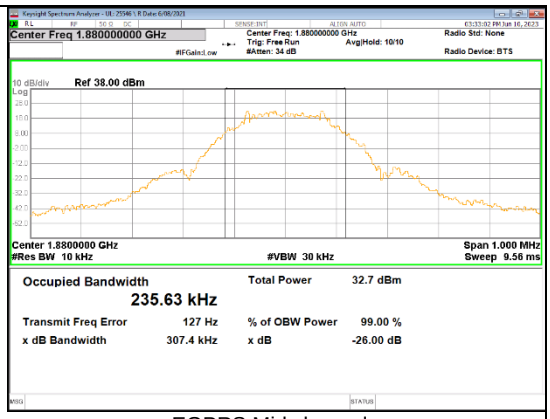
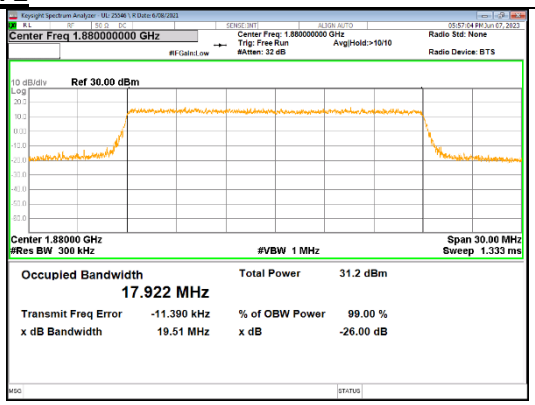
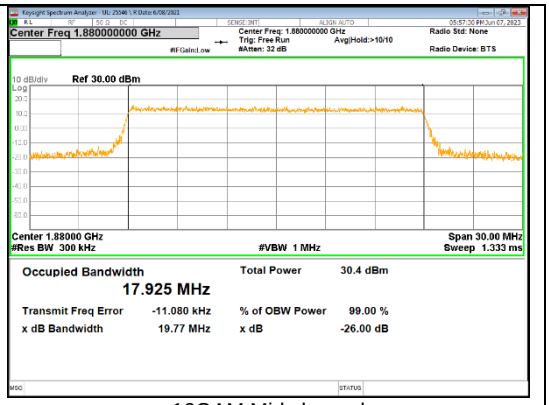
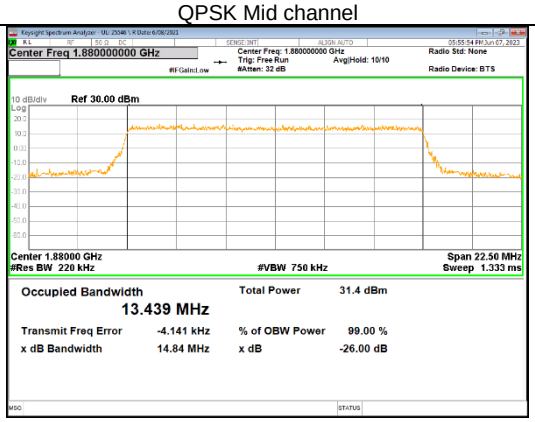
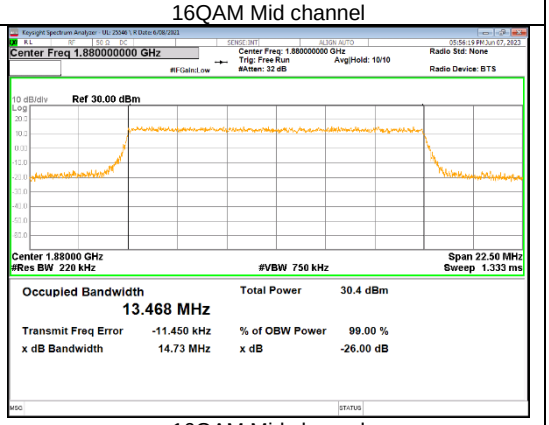
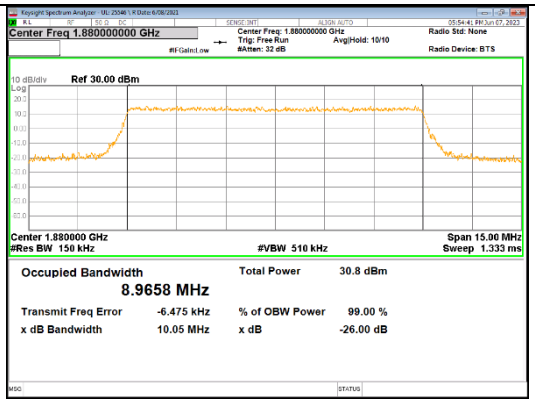
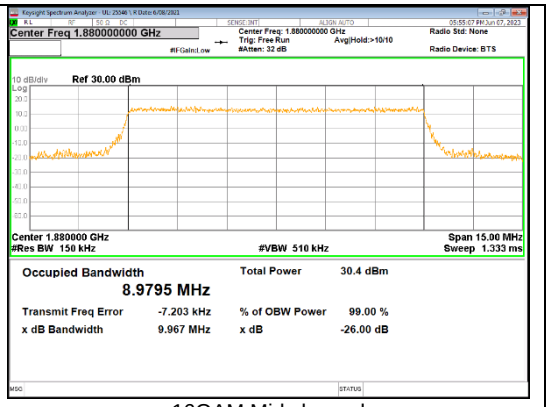
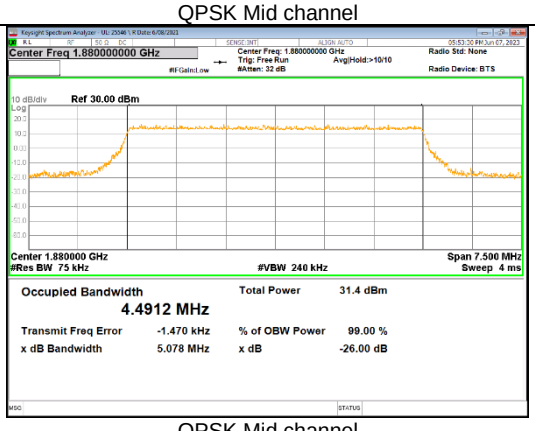
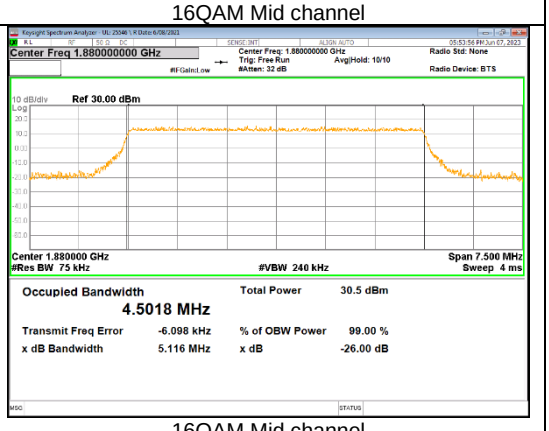
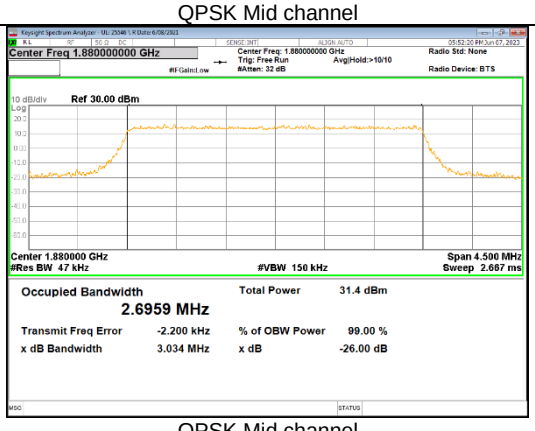
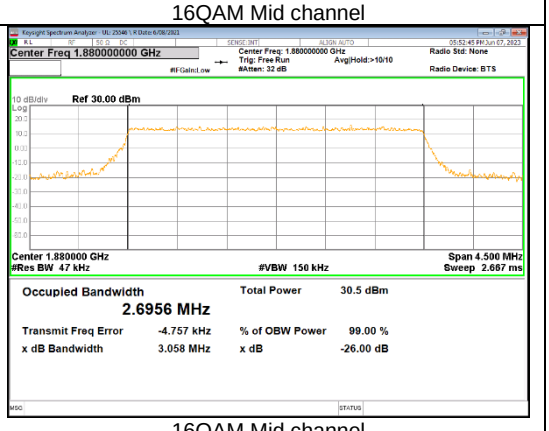
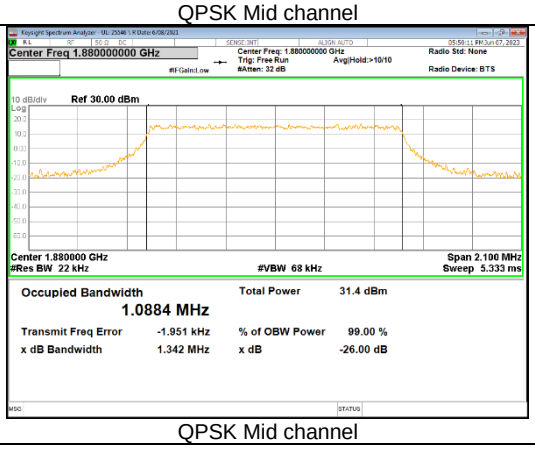
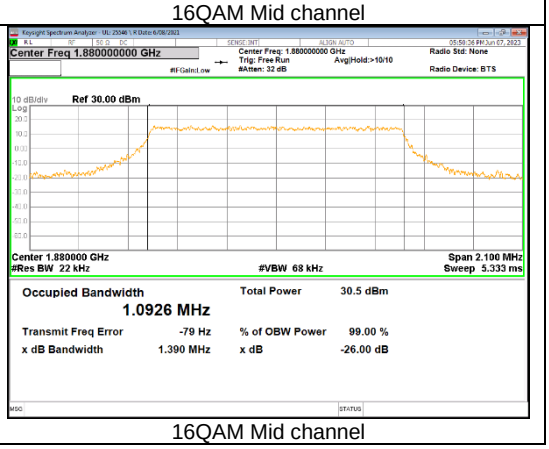
8.3.1. OCCUPIED BANDWIDTH RESULTS

GSM 1900

GSM 1900	 GPRS Mid channel	 EGPRS Mid channel

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

8.4. BAND EDGE EMISSIONS

RULE PART(S)

FCC: §24.238

LIMITS

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

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v03r01
The transmitter output was connected to either CMW500 Test Set or E7515B Test set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

GSM

a) Set the RBW = 1 - 5% of OBW(GSM1900 – 9.1KHz)
b) Set VBW ≥ 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);

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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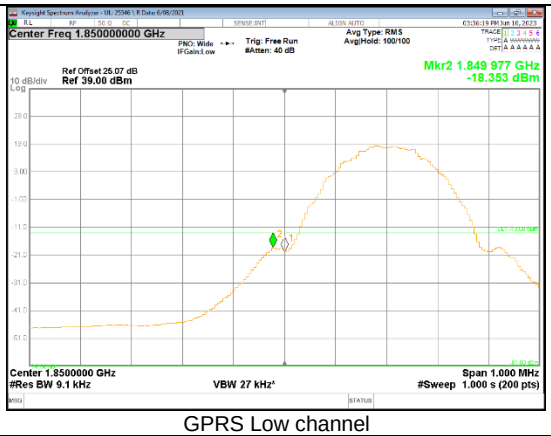
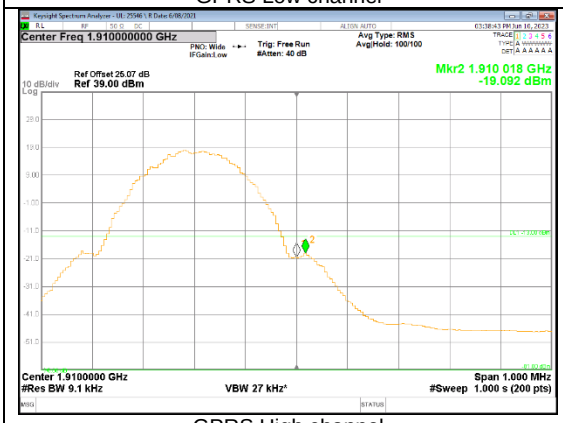
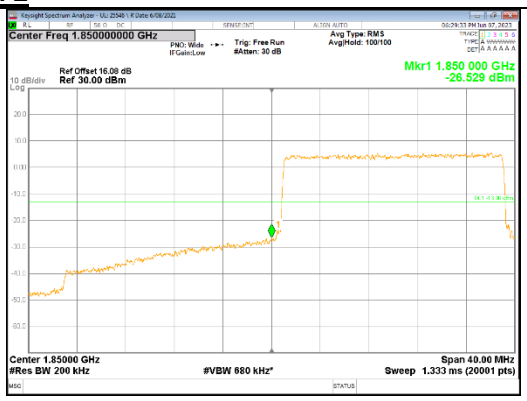
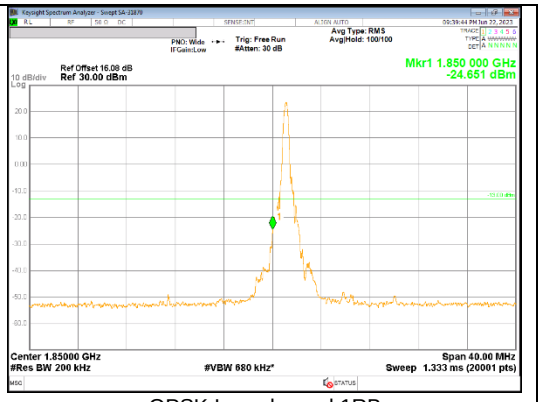
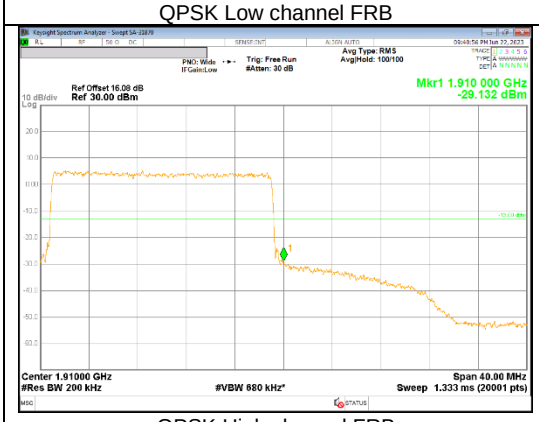
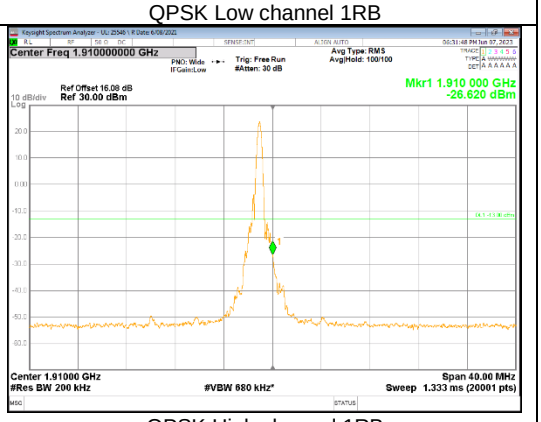
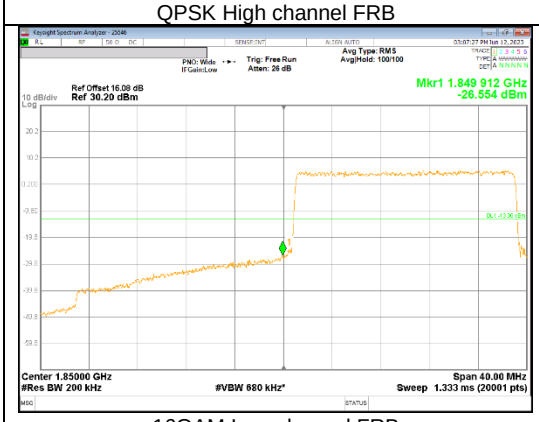
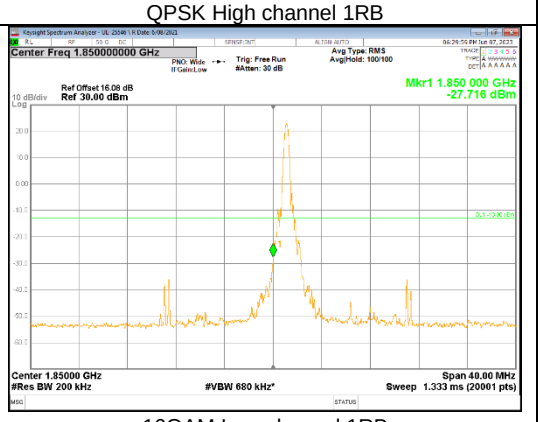
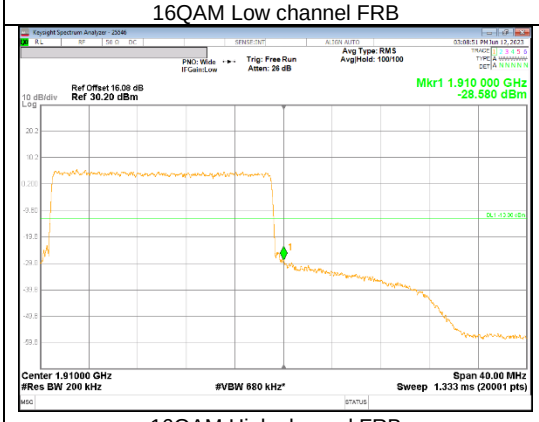
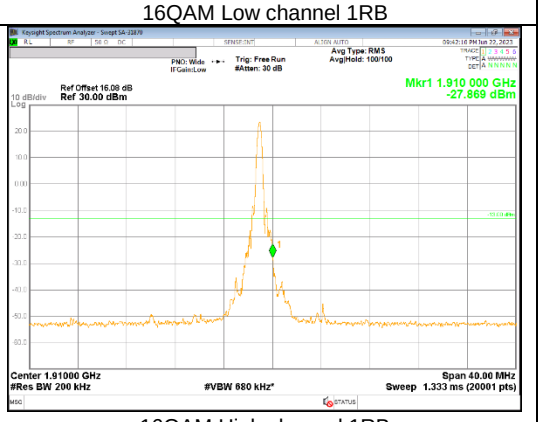
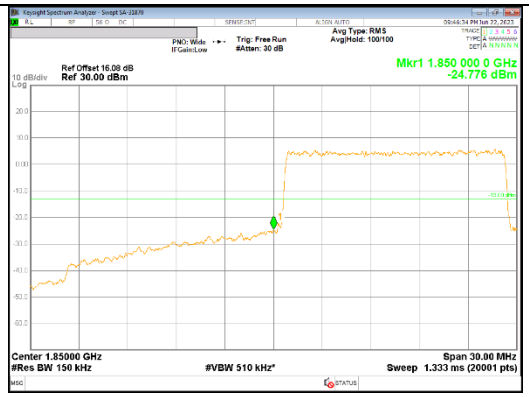
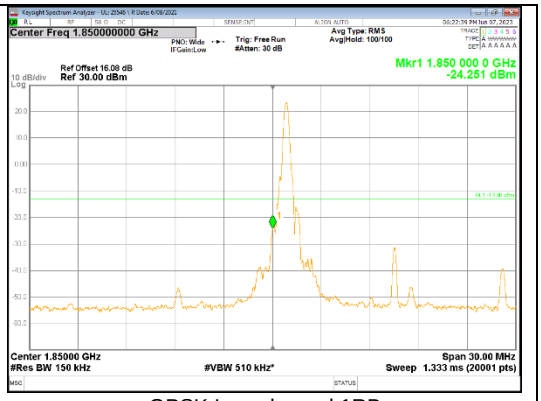
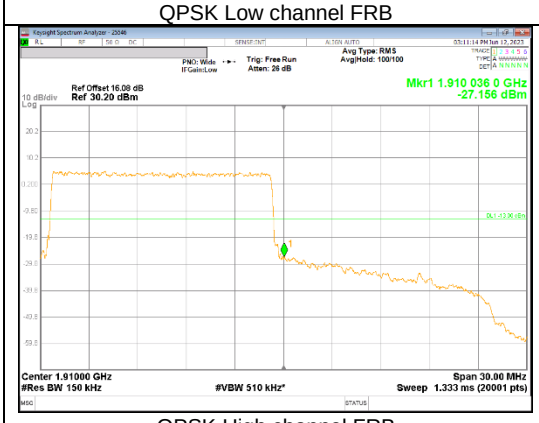
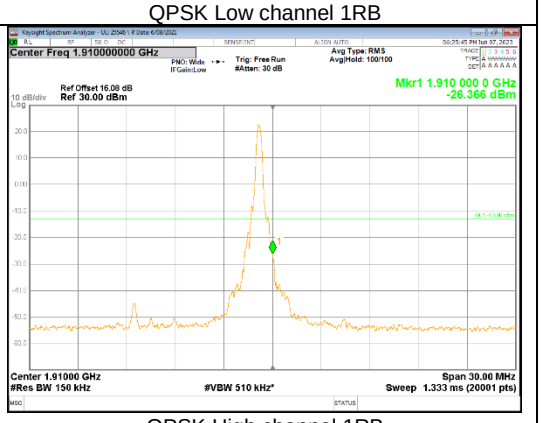
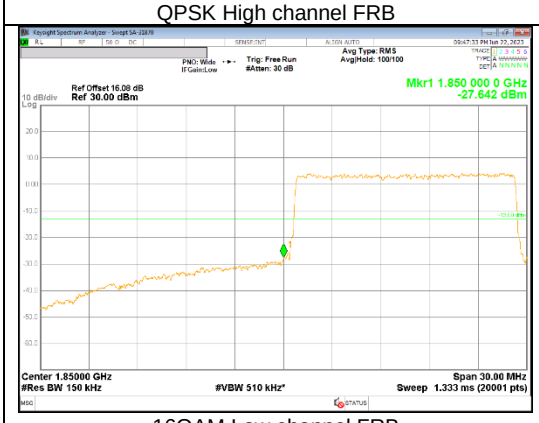
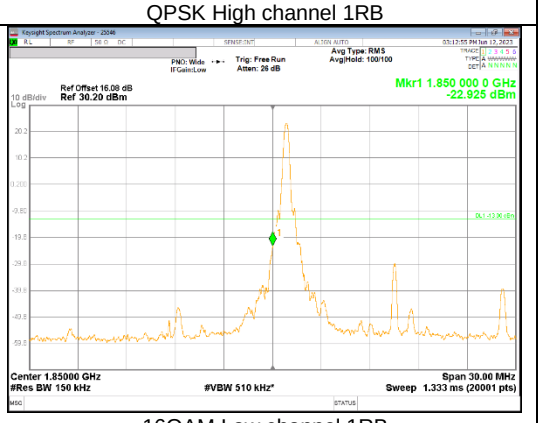
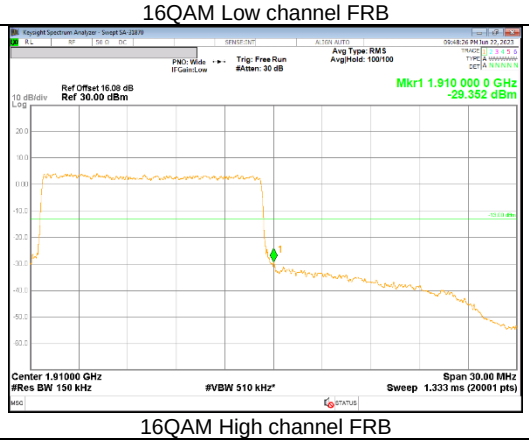
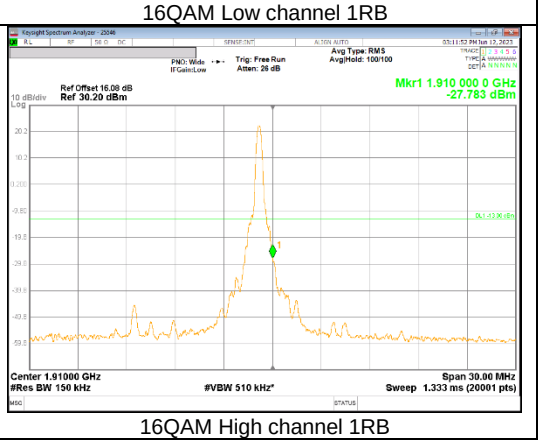
8.4.1. BAND EDGE RESULT

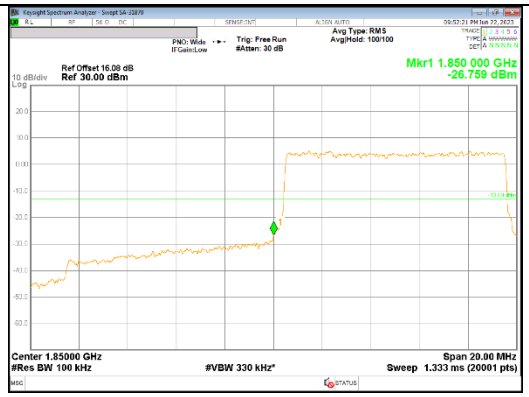
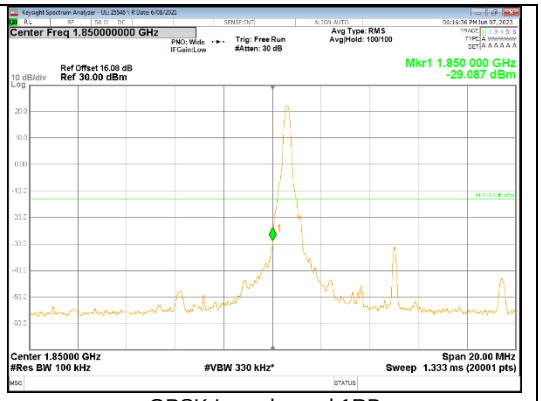
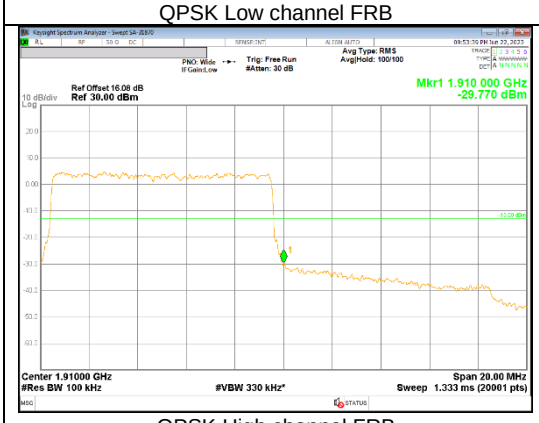
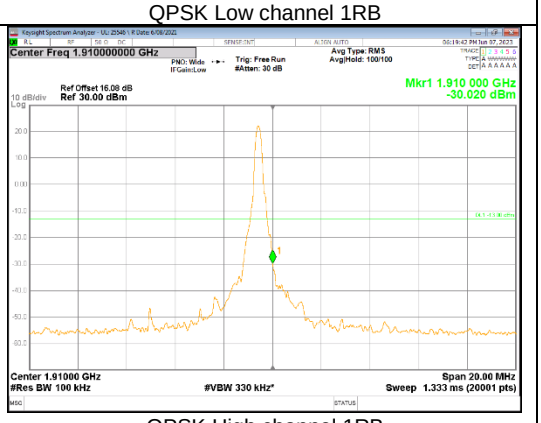
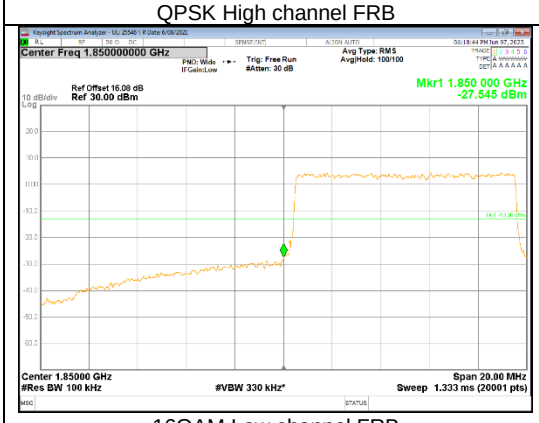
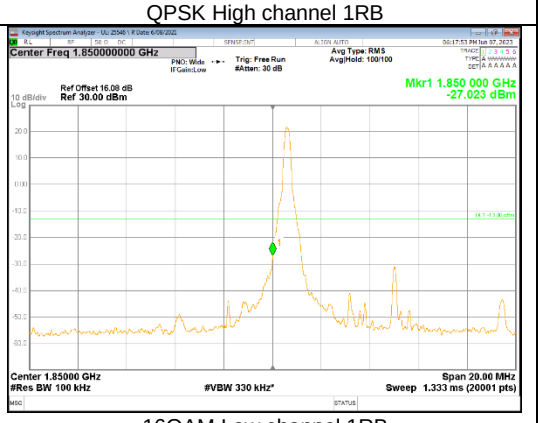
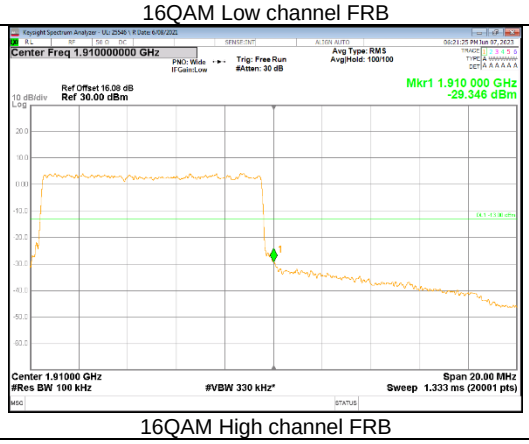
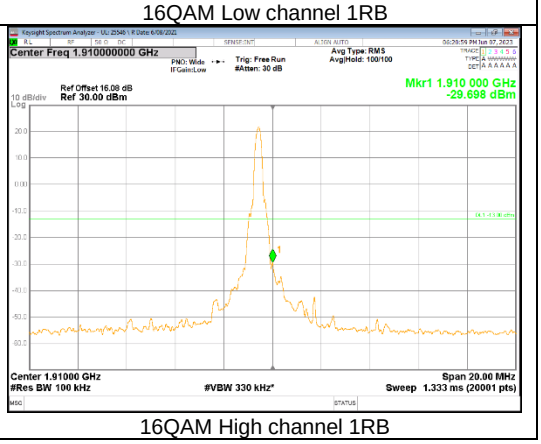
GSM

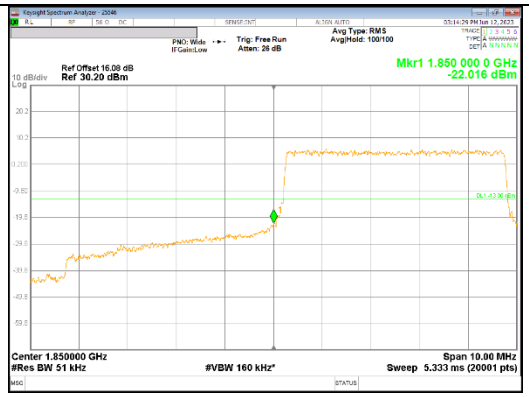
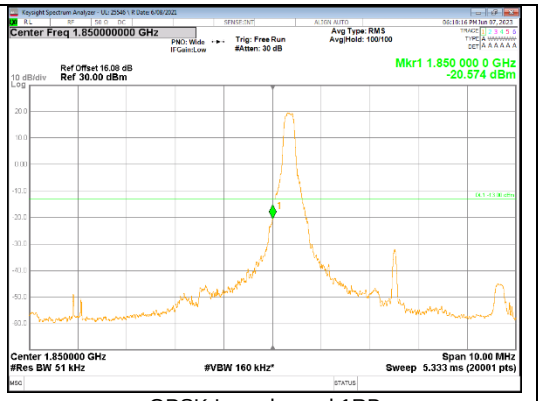
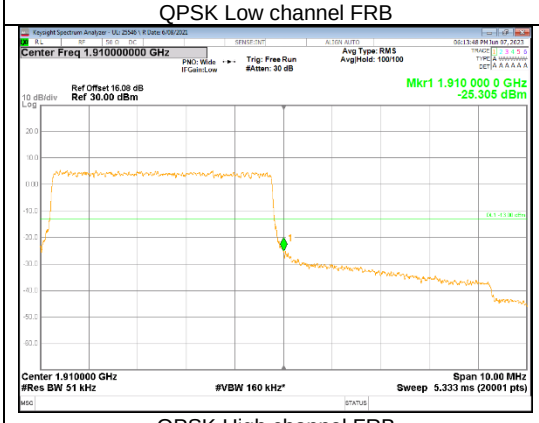
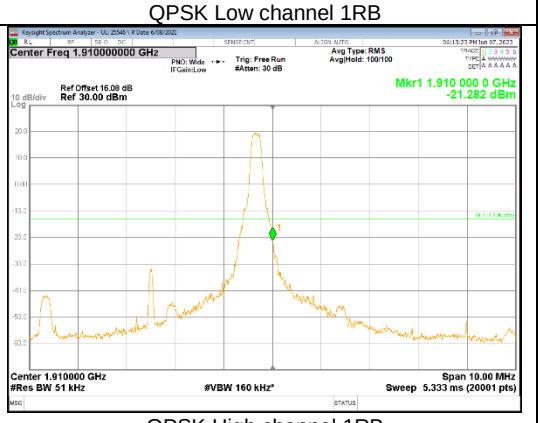
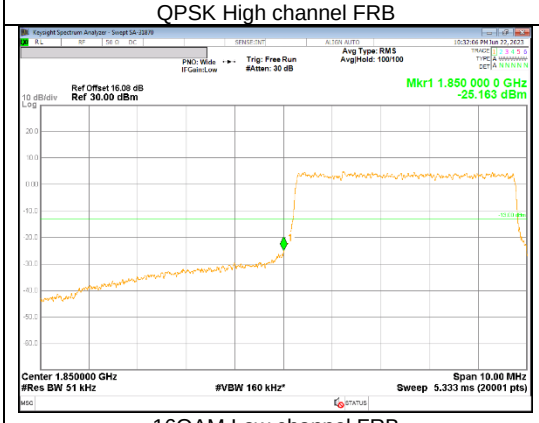
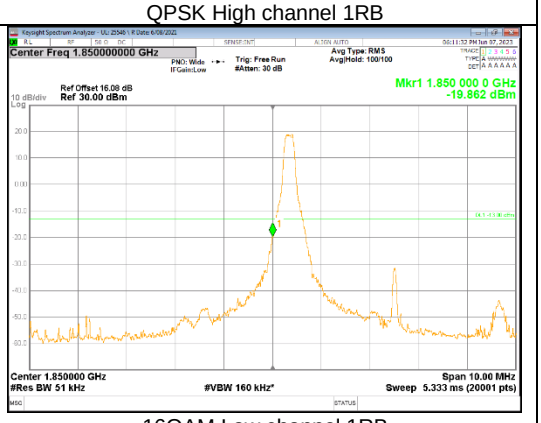
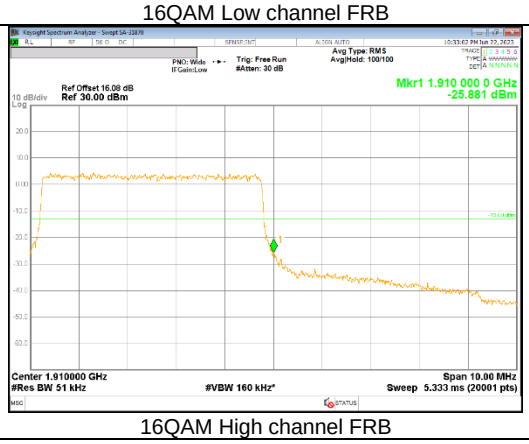
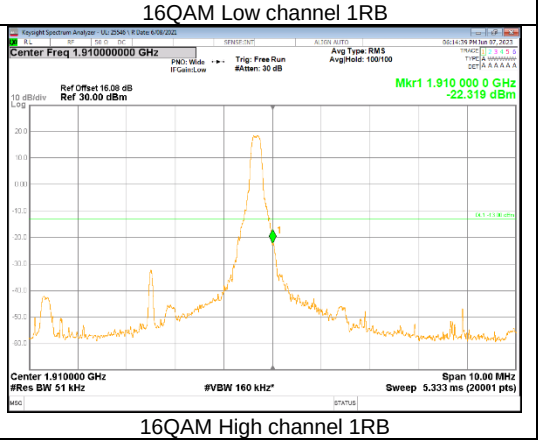
GSM 1900	 GPRS Low channel	 EGPRS Low channel
	 GPRS High channel	 EGPRS High channel

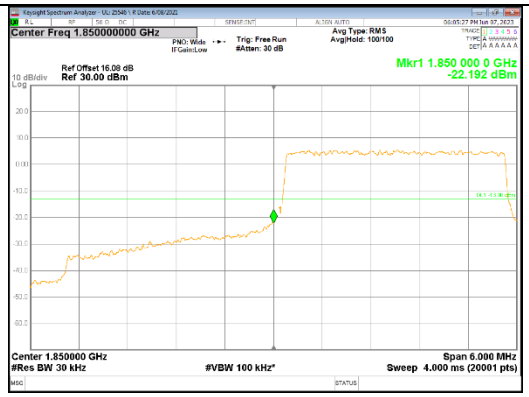
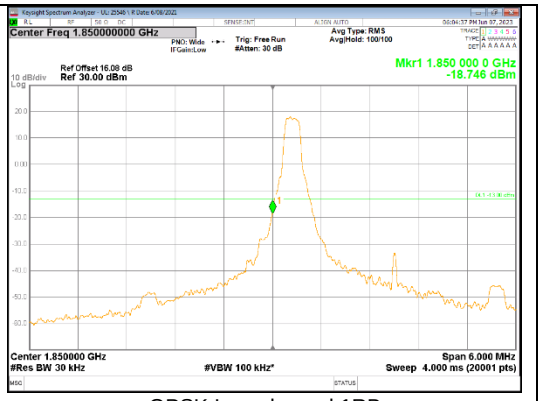
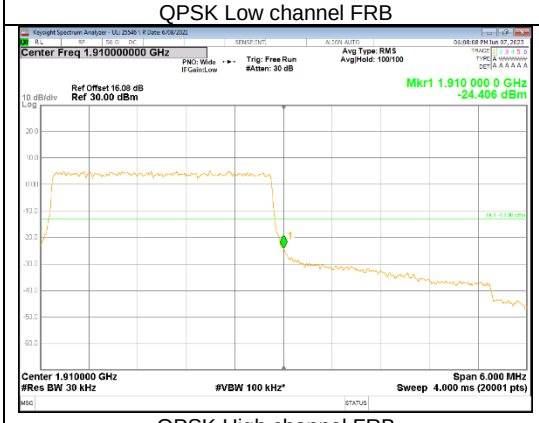
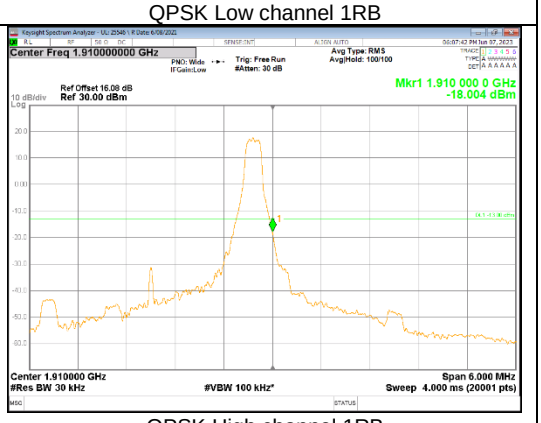
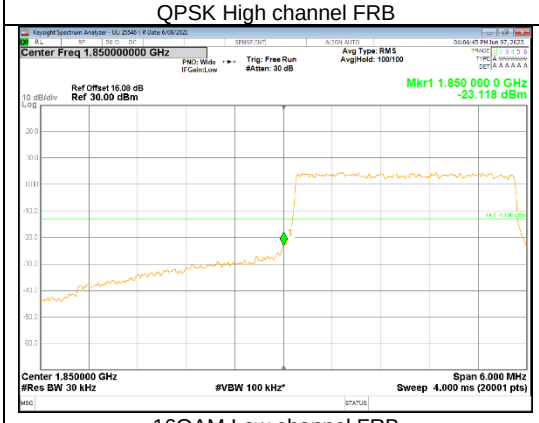
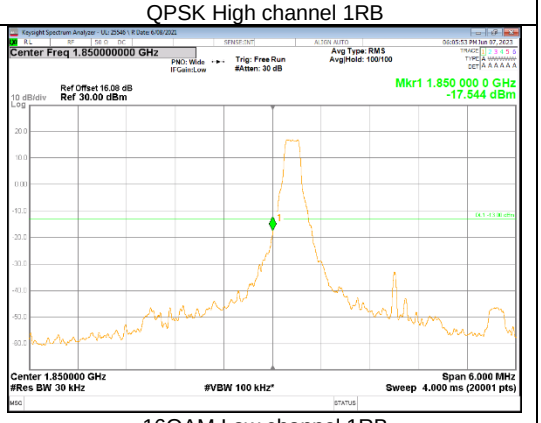
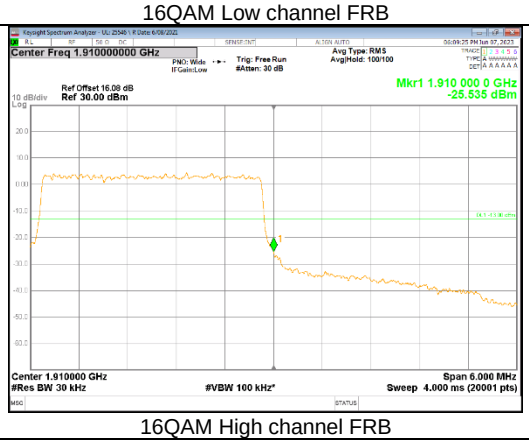
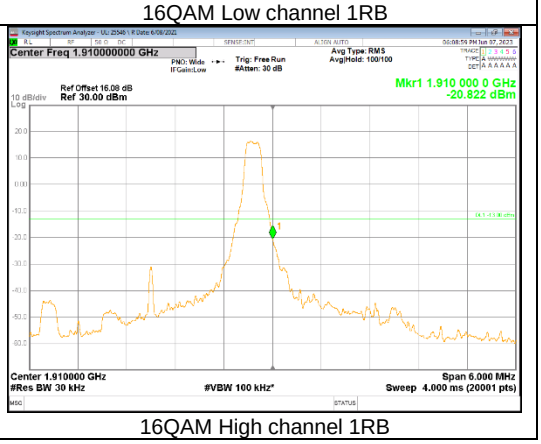
LTE Band 2

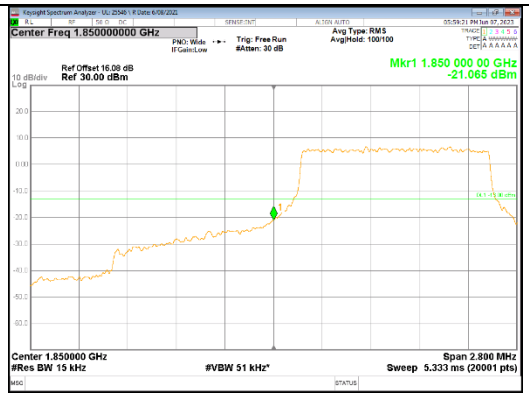
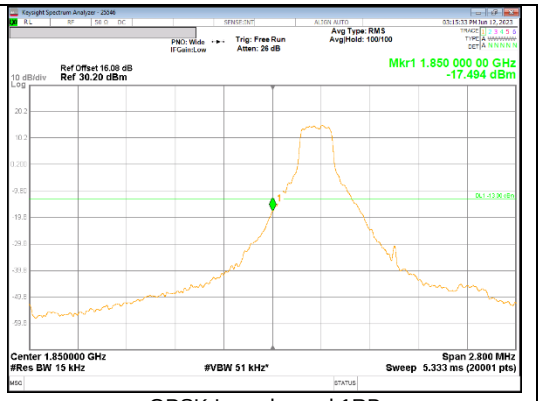
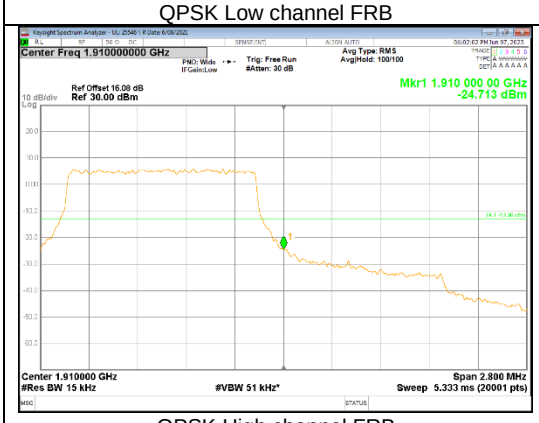
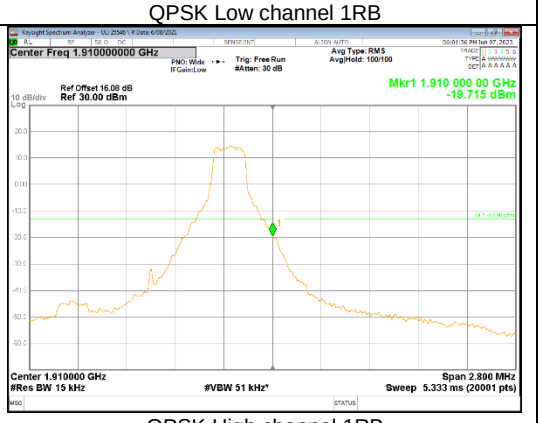
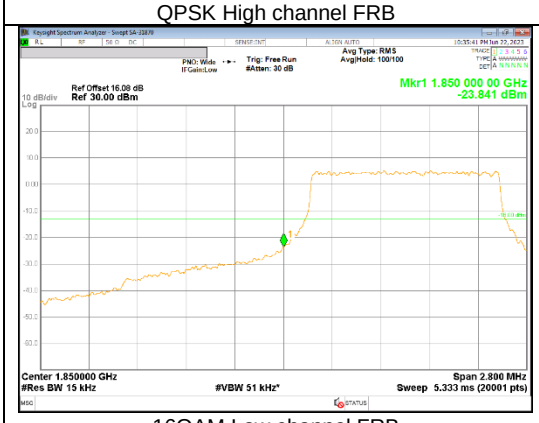
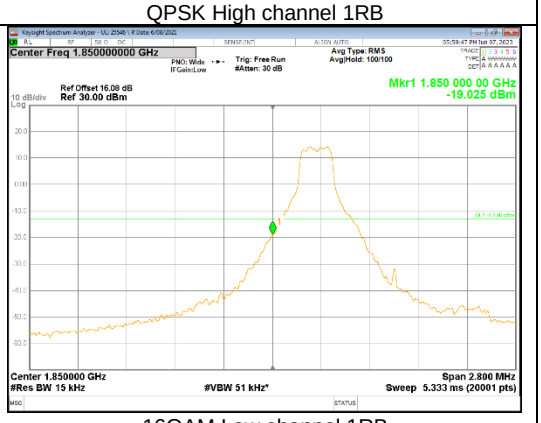
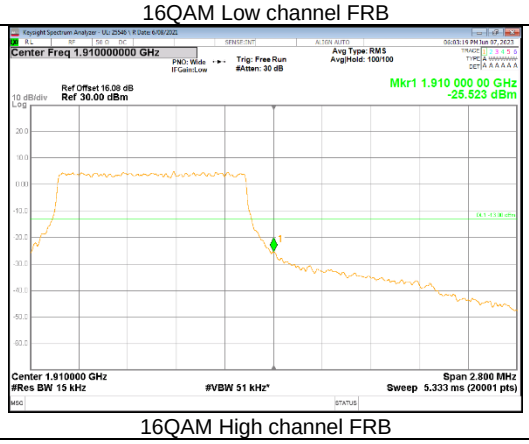
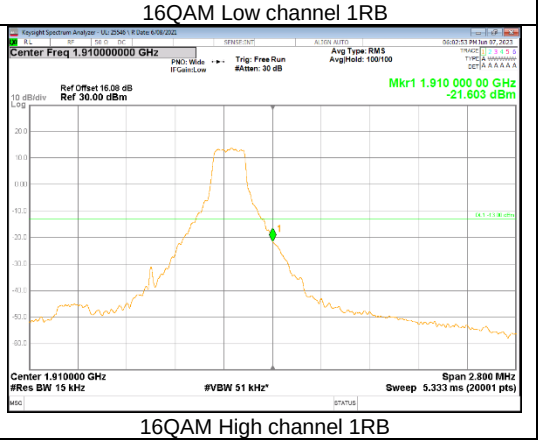
20MHz	 QPSK Low channel FRB	 QPSK Low channel 1RB
	 QPSK High channel FRB	 QPSK High channel 1RB
	 16QAM Low channel FRB	 16QAM Low channel 1RB
	 16QAM High channel FRB	 16QAM High channel 1RB

15MHz	 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

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

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

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

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

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 = 100 kHz for emission below 1 GHz and 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

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

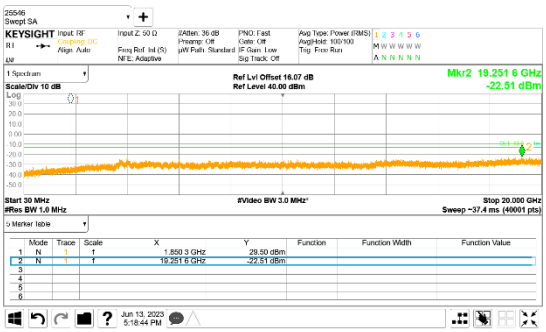
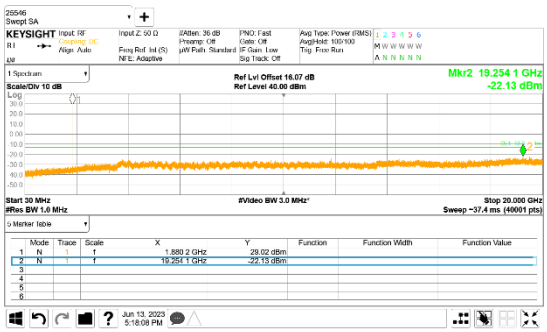
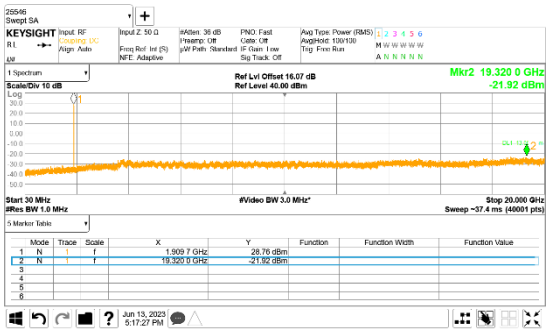
RESULTS

See the following pages.

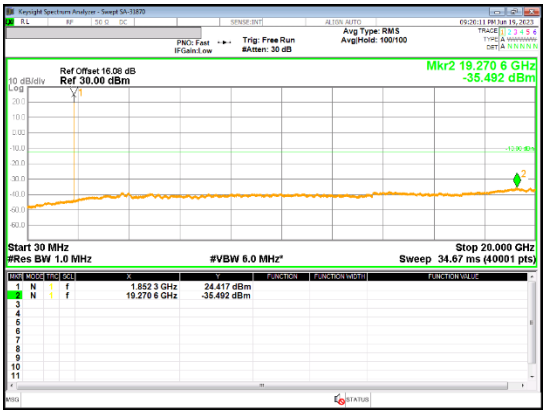
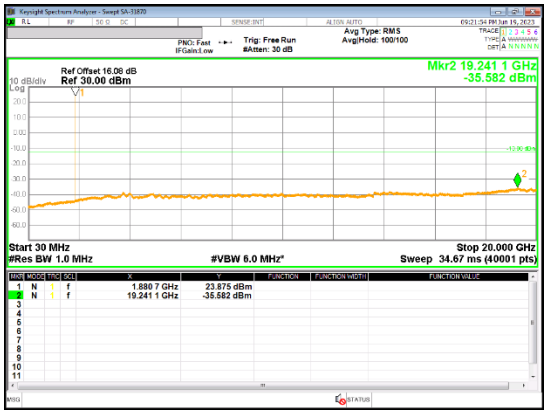
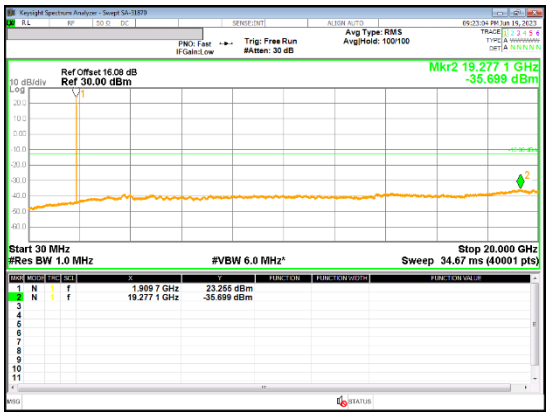
UL KOREA LTD. Suwon Laboratory FORM ID: FCC_24(05)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

8.5.1. OUT OF BAND EMISSIONS RESULT

GSM 1900

GPRS	 Low channel	 Mid channel
	 High channel	

LTE Band 2

3 MHz QPSK	 Low channel	 Mid channel
	 High channel	

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 section 9.1.1 OBW results)

RESULTS

See the following pages.

8.6.1. FREQUENCY STABILITY RESULTS

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

Test Date	2023-06-08
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 (20ºC)		1850.0777	1909.9233		
Extreme (50ºC)		1850.0777	1909.9234	35.6	0.019
Extreme (40ºC)		1850.0777	1909.9234	35.6	0.019
Extreme (30ºC)		1850.0777	1909.9234	36.0	0.019
Extreme (10ºC)	Normal	1850.0777	1909.9234	35.1	0.019
Extreme (0ºC)		1850.0777	1909.9234	37.3	0.020
Extreme (-10ºC)		1850.0777	1909.9234	33.7	0.018
Extreme (-20ºC)		1850.0777	1909.9234	36.4	0.019
Extreme (-30ºC)		1850.0777	1909.9234	35.3	0.019
20ºC	15%	1850.0777	1909.9234	32.7	0.017
	-15%	1850.0777	1909.9234	33.5	0.018
	End Point	1850.0777	1909.9234	31.5	0.017

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

Test Date	2023-06-08
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 (20ºC)		1849.7300	1909.8465		
Extreme (50ºC)		1849.7300	1909.8465	38.4	0.020
Extreme (40ºC)		1849.7300	1909.8465	40.2	0.021
Extreme (30ºC)		1849.7300	1909.8465	39.9	0.021
Extreme (10ºC)	Normal	1849.7300	1909.8465	38.5	0.020
Extreme (0ºC)		1849.7300	1909.8465	38.7	0.021
Extreme (-10ºC)		1849.7300	1909.8465	39.1	0.021
Extreme (-20ºC)		1849.7300	1909.8465	39.9	0.021
Extreme (-30ºC)		1849.7300	1909.8465	38.8	0.021
20ºC	15%	1849.7300	1909.8465	33.6	0.018
	-15%	1849.7300	1909.8465	33.8	0.018
	End Point	1849.7300	1909.8465	32.9	0.018

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.

UL KOREA LTD. Suwon Laboratory FORM ID: FCC_24(05)
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

9.1.1. EIRP Results

GSM

Band	Mode	f (MHz)	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	EIRP (mW)	Limit (dBm)	Delta (dB)
GSM 1900	GPRS	1850.20	22.07	H	4.48	9.52	27.11	514.04	33.00	-5.89
		1880.00	21.79	H	4.52	9.29	26.56	452.90	33.00	-6.44
		1909.80	22.99	H	4.55	9.00	27.43	553.35	33.00	-5.57
	EGPRS	1850.20	17.28	H	4.48	9.52	22.32	170.61	33.00	-10.68
		1880.00	16.84	H	4.52	9.29	21.61	144.88	33.00	-11.39
		1909.80	18.61	H	4.55	9.00	23.05	201.84	33.00	-9.95

LTE Band 2

BW (MHz)	Modulation	f (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	17.97	H	4.49	9.45	22.92	195.88	33.00	-10.08	1/0
		1880.00	18.40	H	4.52	9.29	23.17	207.49	33.00	-9.83	1/0
		1900.00	19.18	H	4.54	9.13	23.77	238.23	33.00	-9.23	1/0
	16-QAM	1860.00	16.61	H	4.49	9.45	21.56	143.22	33.00	-11.44	1/49
		1880.00	17.34	H	4.52	9.29	22.11	162.55	33.00	-10.89	1/49
		1900.00	18.50	H	4.54	9.13	23.09	203.70	33.00	-9.91	1/0
15	QPSK	1857.50	18.14	H	4.49	9.47	23.11	204.64	33.00	-9.89	1/0
		1880.00	17.62	H	4.52	9.29	22.39	173.38	33.00	-10.61	1/0
		1902.50	18.90	H	4.54	9.10	23.46	221.82	33.00	-9.54	1/0
	16-QAM	1857.50	16.95	H	4.49	9.47	21.92	155.60	33.00	-11.08	1/0
		1880.00	16.38	H	4.52	9.29	21.15	130.32	33.00	-11.85	1/37
		1902.50	17.95	H	4.54	9.10	22.51	178.24	33.00	-10.49	1/0
10	QPSK	1855.00	17.87	H	4.49	9.48	22.86	193.20	33.00	-10.14	1/25
		1880.00	17.93	H	4.52	9.29	22.70	186.21	33.00	-10.30	1/25
		1905.00	19.18	H	4.55	9.06	23.69	233.88	33.00	-9.31	1/0
	16-QAM	1855.00	16.80	H	4.49	9.48	21.79	151.01	33.00	-11.21	1/25
		1880.00	16.77	H	4.52	9.29	21.54	142.56	33.00	-11.46	1/25
		1905.00	18.09	H	4.55	9.06	22.60	181.97	33.00	-10.40	1/0
5	QPSK	1852.50	18.02	H	4.49	9.50	23.04	201.37	33.00	-9.96	1/12
		1880.00	17.99	H	4.52	9.29	22.76	188.80	33.00	-10.24	1/12
		1907.50	18.98	H	4.55	9.03	23.46	221.82	33.00	-9.54	1/12
	16-QAM	1852.50	16.53	H	4.49	9.50	21.55	142.89	33.00	-11.45	1/24
		1880.00	17.08	H	4.52	9.29	21.85	153.11	33.00	-11.15	1/24
		1907.50	18.24	H	4.55	9.03	22.72	187.07	33.00	-10.28	1/24
3	QPSK	1851.50	17.92	H	4.49	9.51	22.94	196.79	33.00	-10.06	1/8
		1880.00	18.31	H	4.52	9.29	23.08	203.24	33.00	-9.92	1/8
		1908.50	19.11	H	4.55	9.02	23.58	228.03	33.00	-9.42	1/8
	16-QAM	1851.50	16.58	H	4.49	9.51	21.60	144.54	33.00	-11.40	1/0
		1880.00	17.32	H	4.52	9.29	22.09	161.81	33.00	-10.91	1/8
		1908.50	18.26	H	4.55	9.02	22.73	187.50	33.00	-10.27	1/8
1.4	QPSK	1850.70	17.98	H	4.48	9.52	23.01	199.99	33.00	-9.99	1/3
		1880.00	18.10	H	4.52	9.29	22.87	193.64	33.00	-10.13	1/3
		1909.30	18.93	H	4.55	9.00	23.38	217.77	33.00	-9.62	1/3
	16-QAM	1850.70	17.13	H	4.48	9.52	22.16	164.44	33.00	-10.84	1/3
		1880.00	17.01	H	4.52	9.29	21.78	150.66	33.00	-11.22	1/3
		1909.30	17.88	H	4.55	9.00	22.33	171.00	33.00	-10.67	1/0

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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 = 100 kHz for emission below 1 GHz and 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

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 PLOTS

GSM1900 (ANT B)

GPRS

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

Company:	Samsung
Project #:	4790841160
Date:	2023-06-20
Test Engineer:	25910
Configuration:	EUT / AC Adapter, Y-Position, Open
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	-8.0	V	3.0	42.1	1.0	-49.1	-13.0	-36.1	
5550.60	-5.0	V	3.0	42.9	1.0	-46.9	-13.0	-33.9	
7400.80	-2.4	V	3.0	42.5	1.0	-43.9	-13.0	-30.9	
3700.40	-8.5	H	3.0	42.1	1.0	-49.5	-13.0	-36.5	
5550.60	-5.2	H	3.0	42.9	1.0	-47.1	-13.0	-34.1	
7400.80	-2.8	H	3.0	42.5	1.0	-44.3	-13.0	-31.3	
Mid Ch, 1880MHz									
3760.00	-7.4	V	3.0	42.1	1.0	-48.4	-13.0	-35.4	
5640.00	-4.3	V	3.0	42.9	1.0	-46.2	-13.0	-33.2	
7520.00	-2.6	V	3.0	42.4	1.0	-44.1	-13.0	-31.1	
3760.00	-8.2	H	3.0	42.1	1.0	-49.3	-13.0	-36.3	
5640.00	-4.7	H	3.0	42.9	1.0	-46.6	-13.0	-33.6	
7520.00	-1.5	H	3.0	42.4	1.0	-43.0	-13.0	-30.0	
High Ch, 1909.8MHz									
3819.60	-6.8	V	3.0	42.1	1.0	-47.9	-13.0	-34.9	
5729.40	-4.3	V	3.0	42.9	1.0	-46.3	-13.0	-33.3	
7639.20	-2.1	V	3.0	42.4	1.0	-43.5	-13.0	-30.5	
3819.60	-6.2	H	3.0	42.1	1.0	-47.3	-13.0	-34.3	
5729.40	-4.6	H	3.0	42.9	1.0	-46.6	-13.0	-33.6	
7639.20	1.0	H	3.0	42.4	1.0	-40.4	-13.0	-27.4	

LTE Band 2 (ANT B)

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

Company:	Samsung
Project #:	4790841160
Date:	2023-06-19
Test Engineer:	24542
Configuration:	EUT / AC Adapter, Y-Position, Open
Location:	Chamber 1
Mode:	LTE_QPSK Band 2 Harmonics, 20MHz Bandwidth
Test Votage:	AC 120 V, 60 Hz

20 MHz

QPSK

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	-9.1	V	3.0	46.0	1.0	-54.1	-13.0	-41.1	
5580.00	-7.0	V	3.0	45.7	1.0	-51.7	-13.0	-38.7	
7440.00	-3.3	V	3.0	45.5	1.0	-47.8	-13.0	-34.8	
3720.00	-9.0	H	3.0	46.0	1.0	-54.0	-13.0	-41.0	
5580.00	-6.6	H	3.0	45.7	1.0	-51.4	-13.0	-38.4	
7440.00	-2.7	H	3.0	45.5	1.0	-47.2	-13.0	-34.2	
Mid Ch, 1880MHz									
3760.00	-9.0	V	3.0	46.0	1.0	-54.0	-13.0	-41.0	
5640.00	0.0	V	3.0	45.7	1.0	-44.7	-13.0	-31.7	
7520.00	-3.5	V	3.0	45.5	1.0	-48.1	-13.0	-35.1	
3760.00	-9.0	H	3.0	46.0	1.0	-54.0	-13.0	-41.0	
5640.00	-6.6	H	3.0	45.7	1.0	-51.3	-13.0	-38.3	
7520.00	-2.7	H	3.0	45.5	1.0	-47.3	-13.0	-34.3	
High Ch, 1900MHz									
3800.00	-9.2	V	3.0	45.9	1.0	-54.1	-13.0	-41.1	
5700.00	-6.5	V	3.0	45.6	1.0	-51.1	-13.0	-38.1	
7600.00	-3.4	V	3.0	45.6	1.0	-48.0	-13.0	-35.0	
3800.00	-8.8	H	3.0	45.9	1.0	-53.7	-13.0	-40.7	
5700.00	-6.6	H	3.0	45.6	1.0	-51.3	-13.0	-38.3	
7600.00	-3.3	H	3.0	45.6	1.0	-47.9	-13.0	-34.9	

END OF REPORT