CERTIFICATION TEST REPORT

Report Number. : 4789754174-E9V1

Applicant	:	SAMSUNG ELECTRONICS CO., LTD. 129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI, GYEONGGI-DO, 16677, KOREA
Model	:	SCG09, SC-51B
FCC ID	:	A3LSMG991JPN
EUT Description	:	GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax, WPT and NFC
Test Standard(s)	:	FCC CFR47 PART 27 SUBPART M

Date Of Issue:
February 08, 2021

Prepared by:
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Suwon Test Site: UL Korea, Ltd. Suwon Laboratory
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IAS ACCREDITED
Testing Laboratory
TL-637

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	02/08/21	Initial issue	Sungeun Lee

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	SAMSUNG ELECTRONICS CO., LTD.
EUT DESCRIPTION:	GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax WPT and NFC
MODEL NUMBER:	SCG09, SC-51B
SERIAL NUMBER:	R3CNA0ASKBD (CONDUCTED); R3CNA0ASKHP (RADIATED);
DATE TESTED:	JAN 11, 2021 – JAN 22, 2021;

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 27 M	Pass

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.

8/
Approved & Released For
UL Korea, Ltd. By:

Junwhan Lee
Suwon Lab Engineer
UL Korea, Ltd.

Tested By:

Sungeun Lee
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 27.
3. ANSI TIA-603-E, 2016
4. ANSI C63.26, 2015
5. KDB 971168 D01 Power Meas License Digital Systems v03r01
6. KDB 412172 D01 Determing 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
☐ Chamber 2
☐ Chamber 3

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)

ERP = PSA reading with EUT worst orientation (dBm) + Path loss (dB) – cable loss(between the SG and substitution antenna)

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

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.01 dB
Radiated Disturbance, 30 MHz to 1 GHz	4.26 dB
Radiated Disturbance, 1 GHz to 18 GHz	5.90 dB
Radiated Disturbance, Above 18 GHz	5.49 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 1, Clause 4.4.2 in IEC Guide 115:2007.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax, WPT and NFC.
This test report addresses the WWAN Uplink Carrier Aggregation operational mode.
This report covers the Samsung models SCG09 and SC-51B.
SCG09 and SC-51B have the same hardware. Supported band and protocol are different depending on software settings.

5.2. MAXIMUM OUTPUT POWER

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

LTE Band 41C (Uplink CA)

Part 27	
EIRP Limit (dBm)	33.00
Antenna Gain (dBi)	-6.20

Bandwidth (MHz)	Frequency Range (MHz)	Modulation	Output Power			
			Conducted Average Power (dBm)	EIRP Average Power		Margin
				dBm	mW	
5+20	2496 - 2690	QPSK	24.32	18.12	64.86	-14.88
		16QAM	23.58	17.38	54.70	-15.62
20+5		QPSK	24.42	18.22	66.37	-14.78
		16QAM	23.98	17.78	59.98	-15.22
10+15		QPSK	24.32	18.12	64.86	-14.88
		16QAM	23.70	17.50	56.23	-15.50
15+10		QPSK	24.41	18.21	66.22	-14.79
		16QAM	23.59	17.39	54.83	-15.61
10+20		QPSK	24.31	18.11	64.71	-14.89
		16QAM	23.64	17.44	55.46	-15.56
20+10		QPSK	24.29	18.09	64.42	-14.91
		16QAM	23.86	17.66	58.34	-15.34
15+15		QPSK	24.10	17.90	61.66	-15.10
		16QAM	23.53	17.33	54.08	-15.67
15+20		QPSK	24.45	18.25	66.83	-14.75
		16QAM	23.65	17.45	55.59	-15.55
20+15		QPSK	24.61	18.41	69.34	-14.59
		16QAM	24.38	18.18	65.77	-14.82
20+20		QPSK	24.31	18.11	64.71	-14.89
		16QAM	23.69	17.49	56.10	-15.51

Note. The worst-case scenario for all measurements is based on the average conducted output power measurement investigation results It was found that QPSK and 16QAM results were worst case. Only 16QAM and 64QAM power data are listed.

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5.3. DESCRIPTION OF AVAILABLE ANTENNAS

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

Frequency (MHz)	Peak Gain (dBi)
LTE Band 41 2496 ~ 2690 MHz	-6.20

5.4. WORST-CASE ORIENTATION

For all LTE Bands, the worst-case scenario for all measurements is based on the average conducted output power measurement investigation results. Output power measurements were measured on QPSK, 16QAM and 64QAM modulations. It was found that QPSK and 16QAM results were worst case. All testing was performed using QPSK and 16QAM modulations to represent the worst case. However, the out of band emissions and spurious radiation were only performed on bandwidth and RB offset(with RB size 1) with the highest conducted power in QPSK.

Highest power setting for each bands					
LTE Band	**Component Carrier**	**Frequency (MHz)**	**Bandwidth (MHz)**	**RB size**	**RB offset**
41 (Uplink CA)	PCC	2506.0	20	1	99
	SCC	2523.1	15	1	0

- Radiated spurious emissions
For LTE CA_41C, the spurious emissions was investigated in three orthogonal orientations X, Y and Y it was determined that Y orientation was worst-case orientation.

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

5.5. DESCRIPTION OF TEST SETUP

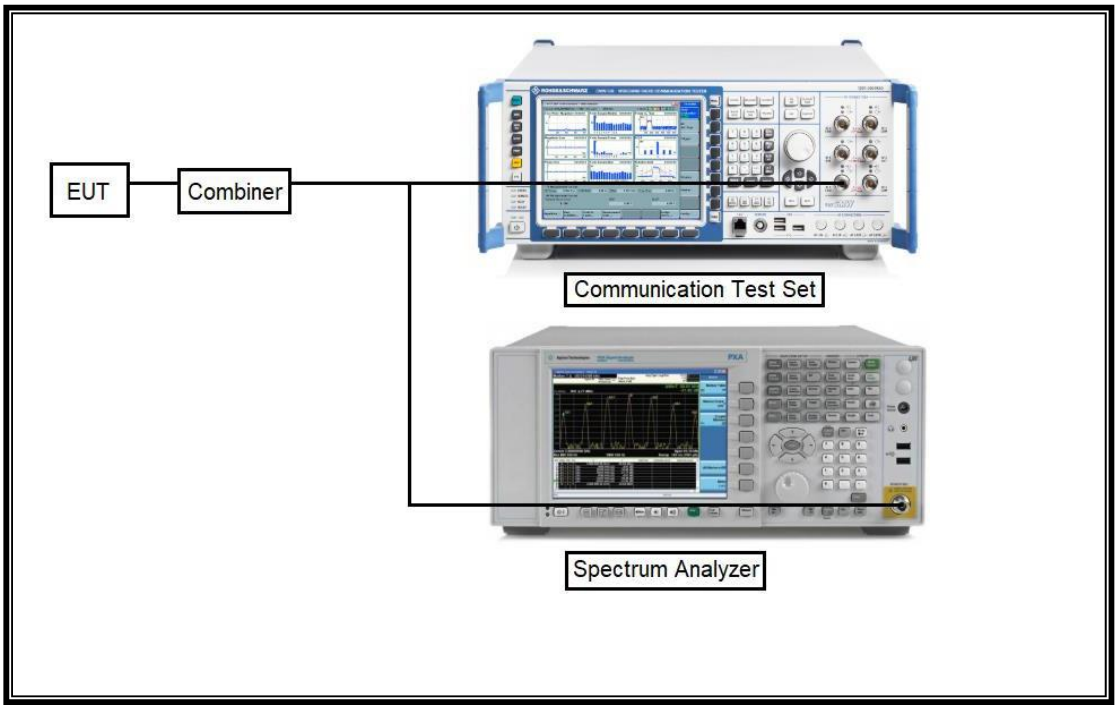
SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Charger	SAMSUNG	EP-TA800	N/A	N/A
Data Cable	SAMSUNG	EP-DN980BBE	N/A	N/A

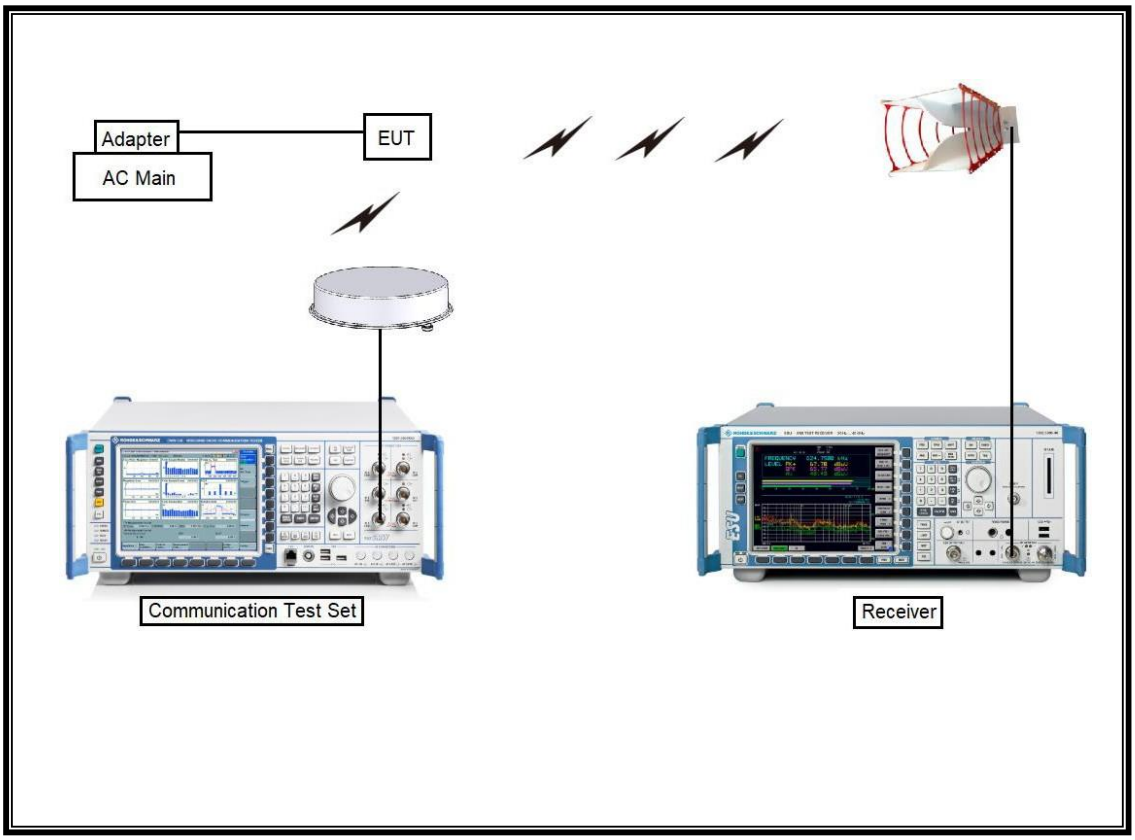
I/O CABLE

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	1.0m	N/A

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	01-31-21
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	08-04-22
Preamplifier	ETS	3116C-PA	00168841	08-06-21
Antenna, Horn, 40 GHz	ETS	3116C	00168645	10-02-21
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	750	08-19-22
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	845	08-13-22
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749	08-13-22
Antenna, Horn, 18 GHz	ETS	3115	00167211	07-27-22
Antenna, Horn, 18 GHz	ETS	3115	00161451	08-15-22
Antenna, Horn, 18 GHz	ETS	3117	00168724	07-27-22
Antenna, Horn, 18 GHz	ETS	3117	00168717	08-15-22
Communications Test Set	R&S	CMW500	115331	08-03-21
DC Power Supply	Agilent / HP	E3640A	MY54226395	08-05-21
Preamplifier, 1000 MHz	Sonoma	310N	341282	08-03-21
Preamplifier, 1000 MHz	Sonoma	310N	370599	08-06-21
Preamplifier, 1000 MHz	Sonoma	310N	351741	08-03-21
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1876511	08-03-21
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	2029169	08-04-21
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1896138	08-03-21
Spectrum Analyzer	Agilent	N9030A	MY54170614	08-05-21
EMI Test Receive, 40 GHz	R&S	ESU40	100439	08-03-21
EMI Test Receive, 40 GHz	R&S	ESU40	100457	08-03-21
Direcitonal Antenna	Cobham	FPA3-0.8-6.0R/1329	80108-0004	N/A
High Pass Filter 1.2GHz	Micro-Tronics	HPM50108-02	G005	08-05-21
High Pass Filter 1.2GHz	Micro-Tronics	HPM50108-02	G006	08-05-21
High Pass Filter 2.8GHz	Micro-Tronics	HPM50111-02	010	08-05-21
High Pass Filter 2.8GHz	Micro-Tronics	HPM50111-02	011	08-05-21
High Pass Filter 4GHz	Micro-Tronics	HPM50118-02	G001	08-05-21
High Pass Filter 4GHz	Micro-Tronics	HPM50118-02	G002	08-05-21
Attenuator	PASTERNACK	PE7087-10	A009	08-05-21
Attenuator	PASTERNACK	PE7087-10	A001	08-03-21
Attenuator	PASTERNACK	PE7087-10	A008	08-03-21
Attenuator	PASTERNACK	PE7004-10	2	08-04-21
Attenuator	PASTERNACK	PE7395-10	A011	08-05-21
Antenna, Loop, 9kHz-30MHz	R&S	HFH2-Z2	100418	10-02-21
Temperature Chamber	ESPEC	SH-642	93001109	08-04-21
Power Splitter	MINI-CIRCUITS	WA1534	UL001	02-05-21
Power Splitter	MINI-CIRCUITS	WA1534	UL002	02-05-21
UL Software				
Description	**Manufacturer**	**Model**	**Version**	
Antenna port test software	UL	CLT	Ver 2.5	

7. SUMMARY TABLE

FCC Part Section	Test Description	Test Limit	Test Condition	Test Result
2.1049	Occupied Band width (99%)	N/A	Conducted	Pass
27.53(m)	Conducted Spurious Emission	-25 dBm		Pass
27.53(m)	Emission mask	Section 9.2.2		Pass
2.1046	Conducted output power	N/A		Pass
27.50(h)(2)	Equivalent Isotropic Radiated Power	33dBm	Radiated	Pass
27.53 (m)	Radiated Spurious Emission	-25dBm		Pass

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8. LIMITS AND CONDUCTED RESULTS

8.1. RF OUTPUT POWER VERIFICATION (CONDUCTED AND EIRP)

RULE PART(S)

FCC: §2.1046, §27.50

EIRP LIMIT

FCC: §27.50(h)

(h) The following power limits shall apply in the BRS and EBS:
(2) Mobile and other user stations. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

TEST PROCEDURE

TIA-603-E Clause 2.2.17
KDB 971168 Section 5.6

ERP/EIRP = PMeas + GT − LC
where: ERP/EIRP = effective or equivalent radiated power, respectively (expressed in the same units as PMeas, typically dBW or dBm);
PMeas = measured transmitter output power or PSD, in dBm or dBW;
GT = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);
LC = signal attenuation in the connecting cable between the transmitter and antenna, in dB.2

RESULTS

EUT includes different power levels for head use configuration and body use configuration and the below tables contain the highest of all configurations average conducted and ERP/EIRP output powers as follows:

OUTPUT POWER FOR LTE BAND 41C (5 MHz + 20 MHz)

Antenna Gain (dBi)	-6.20							
Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB	PCC RB	SCC1 RB	SCC1 RB	Conducted Average Power (dBm)	
			Size	Offset	Size	Offset	QPSK	16QAM
5MHz / 20MHz	2499.3	2511.0	1	24	1	0	24.32	23.54
			1	0	1	99	15.94	15.36
			25	0	100	0	22.21	21.24
	2583.8	2595.5	1	24	1	0	24.19	23.54
			1	0	1	99	15.76	15.22
			25	0	100	0	21.90	20.93
	2668.3	2680.0	1	24	1	0	24.10	23.58
			1	0	1	99	15.72	15.26
			25	0	100	0	21.82	20.90

OUTPUT POWER FOR LTE BAND 41C (20 MHz + 5 MHz)

Antenna Gain (dBi)	-6.20							
Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB	PCC RB	SCC1 RB	SCC1 RB	Conducted Average Power (dBm)	
			Size	Offset	Size	Offset	QPSK	16QAM
20MHz / 5MHz	2506.0	2517.7	1	99	1	0	24.20	23.60
			1	0	1	24	16.05	15.58
			100	0	25	0	22.31	21.33
	2590.5	2602.2	1	99	1	0	24.25	23.98
			1	0	1	24	16.10	15.37
			100	0	25	0	22.26	21.23
	2675.0	2686.7	1	99	1	0	24.42	23.91
			1	0	1	24	15.91	15.13
			100	0	25	0	22.11	21.16

OUTPUT POWER FOR LTE BAND 41C (10 MHz + 15 MHz)

Antenna Gain (dBi)	-6.20							
Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB	PCC RB	SCC1 RB	SCC1 RB	Conducted Average Power (dBm)	
			Size	Offset	Size	Offset	QPSK	16QAM
10MHz / 15MHz	2501.3	2513.3	1	49	1	0	24.32	23.70
			1	0	1	74	15.83	15.47
			50	0	75	0	22.28	21.30
	2585.9	2597.9	1	49	1	0	24.19	23.54
			1	0	1	74	15.92	15.35
			50	0	75	0	22.06	21.10
	2670.5	2682.5	1	49	1	0	24.16	23.51
			1	0	1	74	15.59	15.35
			50	0	75	0	21.93	21.00

OUTPUT POWER FOR LTE BAND 41C (15 MHz + 10 MHz)

Antenna Gain (dBi)	-6.20							
Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB	PCC RB	SCC1 RB	SCC1 RB	Conducted Average (dBm)	
			Size	Offset	Size	Offset	QPSK	16QAM
15MHz / 10MHz	2503.5	2515.5	1	74	1	0	24.41	23.42
			1	0	1	49	15.88	15.41
			75	0	50	0	22.29	21.34
	2588.1	2600.1	1	74	1	0	24.27	23.59
			1	0	1	49	15.80	15.16
			75	0	50	0	22.19	21.25
	2672.7	2684.7	1	74	1	0	24.33	23.55
			1	0	1	49	16.06	15.59
			75	0	50	0	22.11	21.19

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OUTPUT POWER FOR LTE BAND 41C (10 MHz + 20 MHz)

Antenna Gain (dBi)	-6.20							
Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB	PCC RB	SCC1 RB	SCC1 RB	Conducted Average Power (dBm)	
			Size	Offset	Size	Offset	QPSK	16QAM
10MHz / 20MHz	2501.5	2515.9	1	49	1	0	24.31	23.64
			1	0	1	99	15.42	15.02
			50	0	100	0	22.23	21.22
	2583.60	2598.00	1	49	1	0	24.22	23.58
			1	0	1	99	15.59	15.16
			50	0	100	0	21.97	20.98
	2665.6	2680.0	1	49	1	0	24.12	23.48
			1	0	1	99	15.63	15.12
			50	0	100	0	21.87	20.93

OUTPUT POWER FOR LTE BAND 41C (20 MHz + 10 MHz)

Antenna Gain (dBi)	-6.20							
Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB	PCC RB	SCC1 RB	SCC1 RB	Conducted Average Power (dBm)	
			Size	Offset	Size	Offset	QPSK	16QAM
20MHz / 10MHz	2506.0	2520.4	1	99	1	0	24.25	23.65
			1	0	1	49	15.69	15.46
			100	0	50	0	22.34	21.38
	2588.1	2602.5	1	99	1	0	24.21	23.86
			1	0	1	49	15.71	15.41
			100	0	50	0	22.22	21.27
	2670.1	2684.5	1	99	1	0	24.29	23.71
			1	0	1	49	15.79	15.34
			100	0	50	0	22.09	21.16

OUTPUT POWER FOR LTE BAND 41C (15 MHz + 15 MHz)

Antenna Gain (dBi)	-6.20							
Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB	PCC RB	SCC1 RB	SCC1 RB	Conducted Average Power (dBm)	
			Size	Offset	Size	Offset	QPSK	16QAM
15MHz / 15MHz	2503.5	2518.5	1	74	1	0	23.87	23.33
			1	0	1	74	15.72	15.04
			75	0	75	0	23.02	22.20
	2585.5	2600.5	1	74	1	0	24.06	23.48
			1	0	1	74	15.81	15.22
			75	0	75	0	22.01	21.07
	2667.5	2682.5	1	74	1	0	24.10	23.53
			1	0	1	74	15.84	15.26
			75	0	75	0	21.91	21.03

OUTPUT POWER FOR LTE BAND 41C (15 MHz + 20 MHz)

Antenna Gain (dBi)	-6.20							
Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB	PCC RB	SCC1 RB	SCC1 RB	Conducted Average (dBm)	
			Size	Offset	Size	Offset	QPSK	16QAM
15MHz / 20MHz	2503.8	2520.9	1	74	1	0	24.34	23.65
			1	0	1	99	15.72	15.47
			75	0	100	0	22.11	21.22
	2583.3	2600.4	1	74	1	0	24.45	23.62
			1	0	1	99	15.98	15.11
			75	0	100	0	21.96	21.03
	2662.9	2680.0	1	74	1	0	24.14	23.47
			1	0	1	99	15.70	15.15
			75	0	100	0	21.92	20.90

OUTPUT POWER FOR LTE BAND 41C (20 MHz + 15 MHz)

Antenna Gain (dBi)	-6.20							
Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB	PCC RB	SCC1 RB	SCC1 RB	Conducted Average Power (dBm)	
			Size	Offset	Size	Offset	QPSK	16QAM
20MHz / 15MHz	2506.0	2523.1	1	99	1	0	24.61	24.38
			1	0	1	74	15.81	15.31
			100	0	75	0	24.28	24.04
	2585.6	2602.7	1	99	1	0	24.51	24.24
			1	0	1	74	15.38	15.09
			100	0	75	0	24.30	24.13
	2665.1	2682.2	1	99	1	0	24.57	24.02
			1	0	1	74	16.05	15.48
			100	0	75	0	24.02	23.61

OUTPUT POWER FOR LTE BAND 41C (20 MHz + 20 MHz)

Antenna Gain (dBi)	-6.20							
Bandwidth	PCC Frequency (MHz)	SCC1 Frequency (MHz)	PCC RB	PCC RB	SCC1 RB	SCC1 RB	Conducted Average Power (dBm)	
			Size	Offset	Size	Offset	QPSK	16QAM
20MHz/ 20MHz	2506.0	2525.8	1	99	1	0	24.21	23.69
			1	0	1	99	16.10	15.42
			100	0	100	0	22.22	21.23
	2583.1	2602.9	1	99	1	0	24.31	23.56
			1	0	1	99	15.60	15.09
			100	0	100	0	22.02	21.06
	2660.2	2680.0	1	99	1	0	24.12	23.55
			1	0	1	99	15.82	15.03
			100	0	100	0	21.93	20.94

8.2. 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 the middle channel in each band. The -26dB bandwidth was also measured and recorded.

(KDB 971168 D01 Power Meas License Digital Systems v03r01)

RESULTS

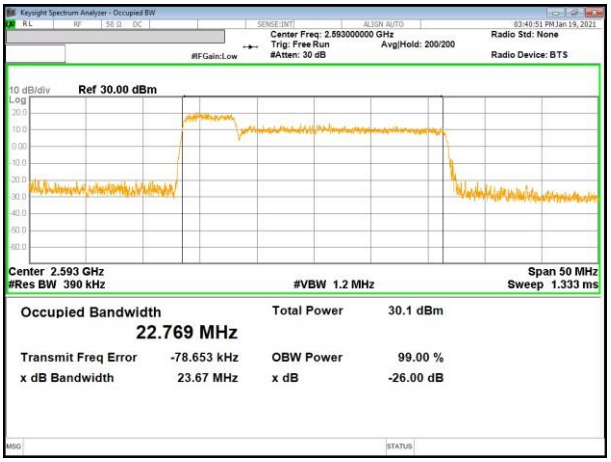
See the following pages.

- LTE Band 41

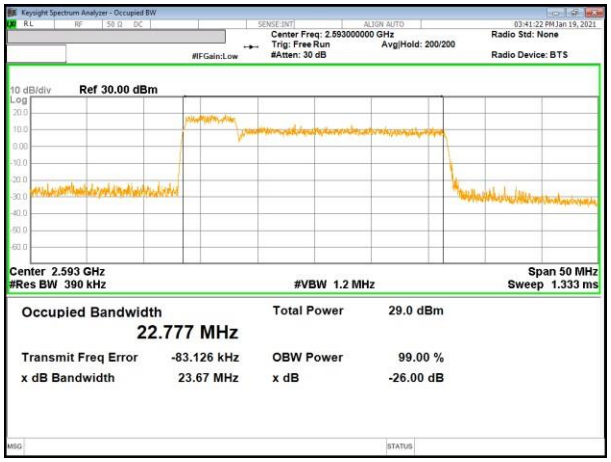
Band	BW (MHz)	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
LTE B41 Uplink CA	5+20	QPSK	2593.0	22.769	23.670
		16QAM		22.777	23.670
	20+5	QPSK	2593.0	22.832	24.060
		16QAM		22.823	23.800
	10+15	QPSK	2593.0	23.129	24.140
		16QAM		23.005	24.140
	15+10	QPSK	2593.0	23.055	24.320
		16QAM		23.100	24.290
	10+20	QPSK	2593.0	27.660	28.850
		16QAM		27.672	28.840
	20+10	QPSK	2593.0	27.687	29.000
		16QAM		27.758	29.080
	15+15	QPSK	2593.0	28.284	29.590
		16QAM		28.276	29.710
	15+20	QPSK	2593.0	32.568	34.090
		16QAM		32.555	34.000
	20+15	QPSK	2593.0	32.533	34.110
		16QAM		32.624	34.250
	20+20	QPSK	2593.0	37.513	39.370
		16QAM		37.477	39.270

8.2.1. OCCUPIED BANDWIDTH RESULTS

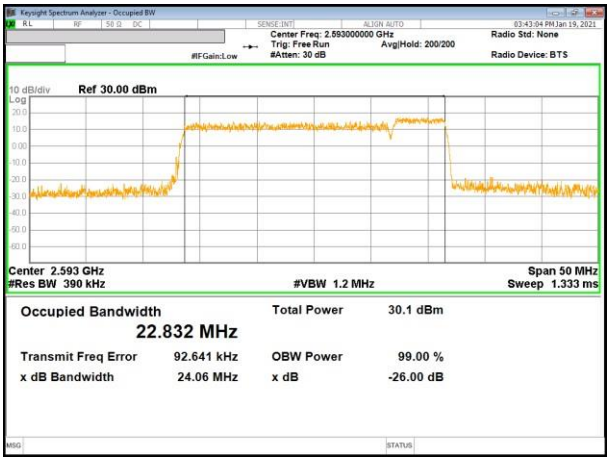
LTE Band 41C (UL CA)



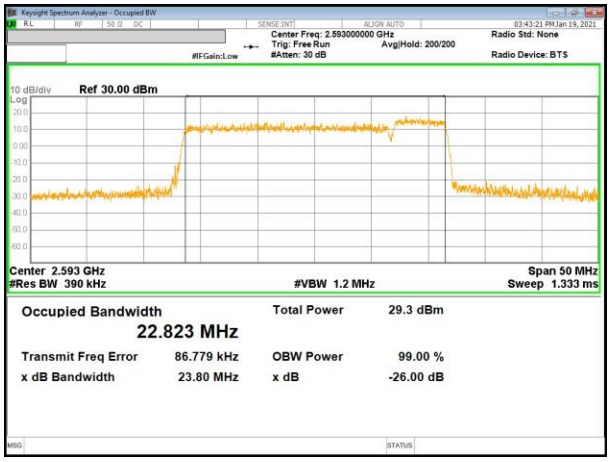
LTE B41 5MHz + 20MHz QPSK RB25-0 + RB100-0



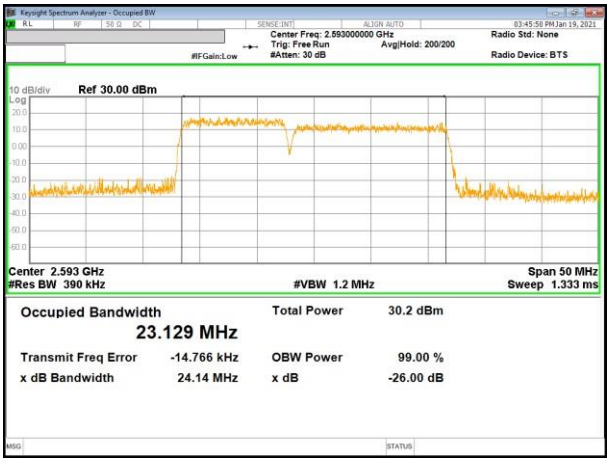
LTE B41 5MHz + 20MHz 16QAM RB25-0 + RB100-0



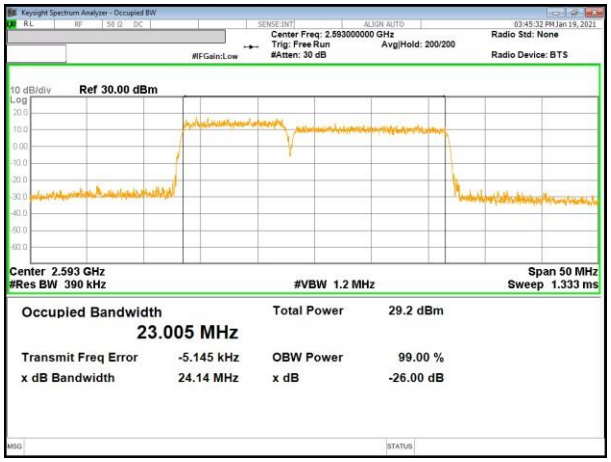
LTE B41 20MHz + 5MHz QPSK RB100-0 + RB25-0



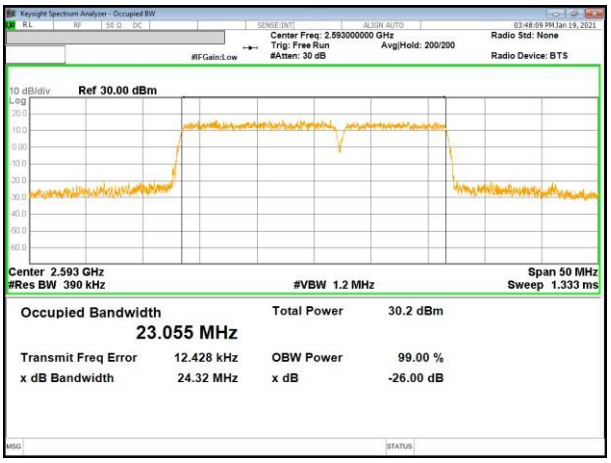
LTE B41 20MHz + 5MHz 16QAM RB100-0 + RB25-0



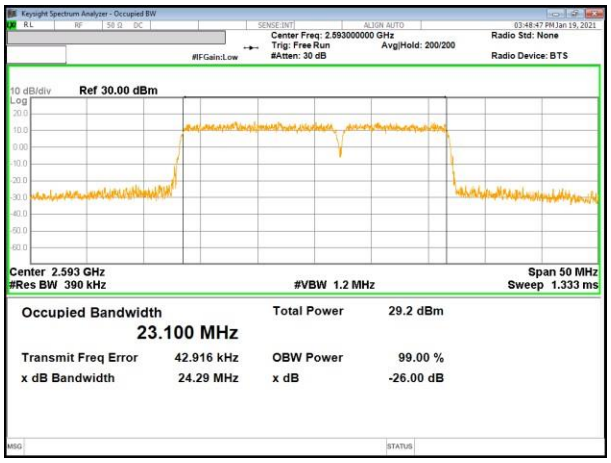
LTE B41 10MHz + 15MHz QPSK RB50-0 + RB75-0



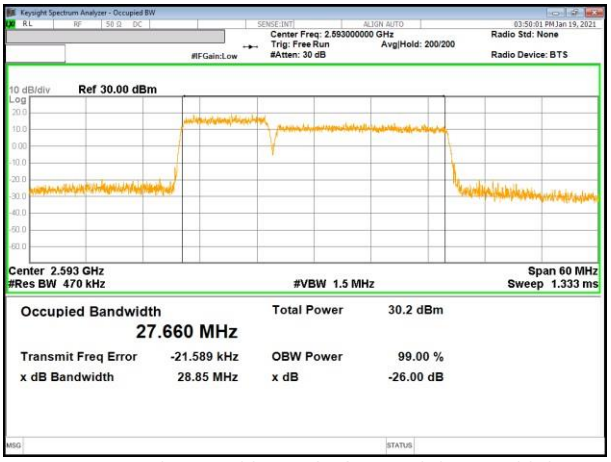
LTE B41 10MHz + 15MHz 16QMA RB50-0 + RB75-0



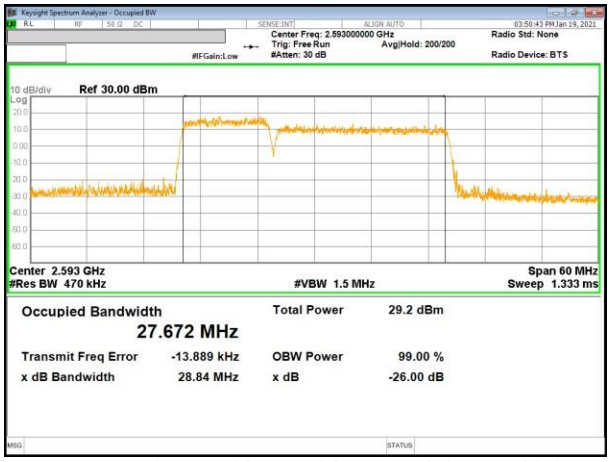
LTE B41 15MHz + 10MHz QPSK RB75-0 + RB50-0



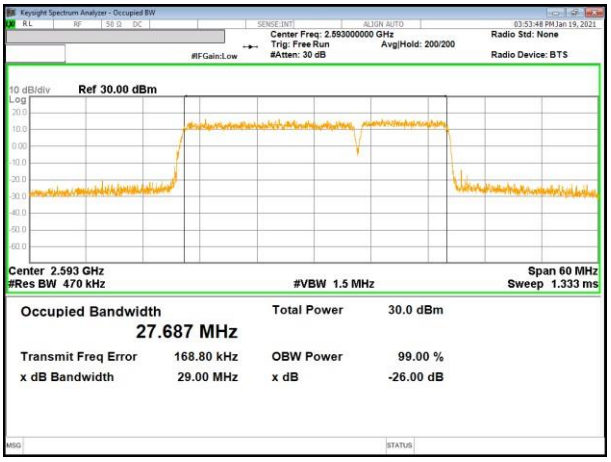
LTE B41 15MHz + 10MHz 16QAM RB75-0 + RB50-0



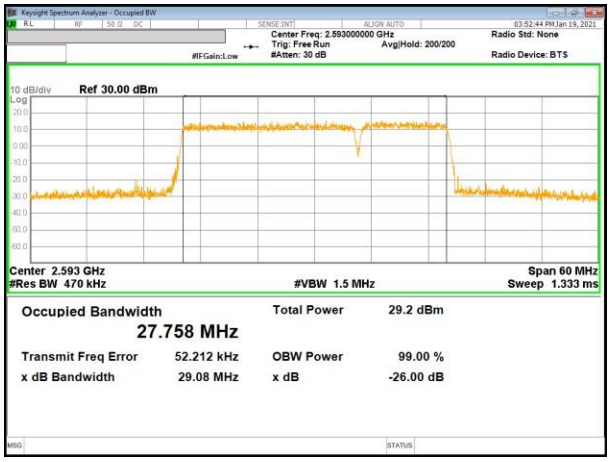
LTE B41 10MHz + 20MHz QPSK RB50-0 + RB100-0



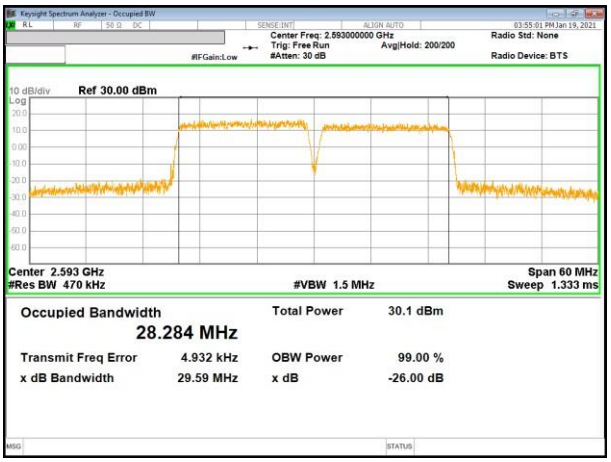
LTE B41 10MHz + 20MHz 16QAM RB50-0 + RB100-0



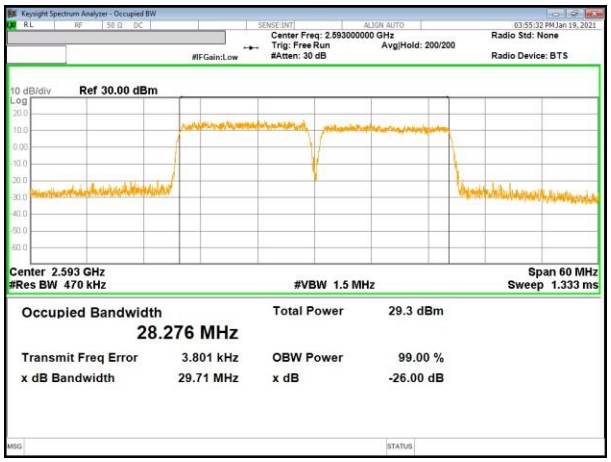
LTE B41 20MHz + 10MHz QPSK RB100-0 + RB50-0



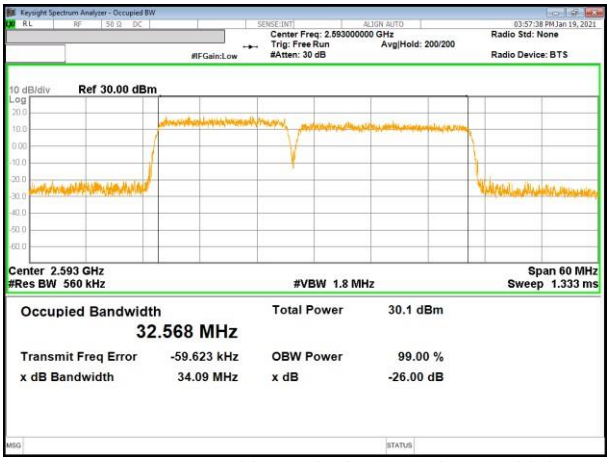
LTE B41 20MHz + 10MHz 16QAM RB100-0 + RB50-0



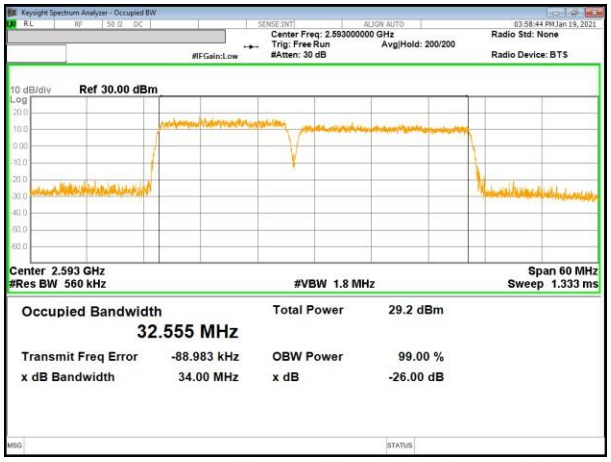
LTE B41 15MHz + 15MHz QPSK RB75-0 + RB75-0



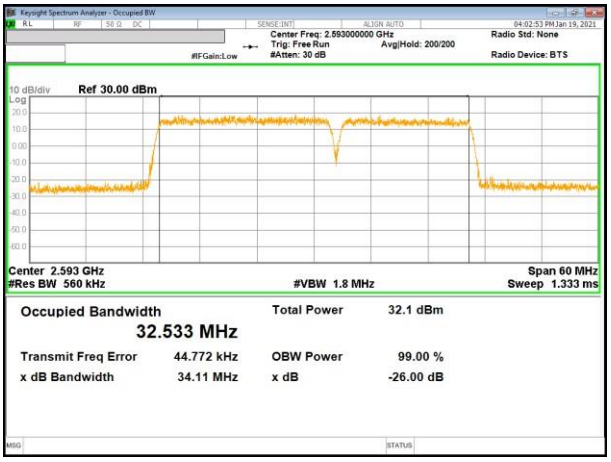
LTE B41 15MHz + 15MHz 16QAM RB75-0 + RB75-0



LTE B41 15MHz + 20MHz QPSK RB75-0 + RB100-0

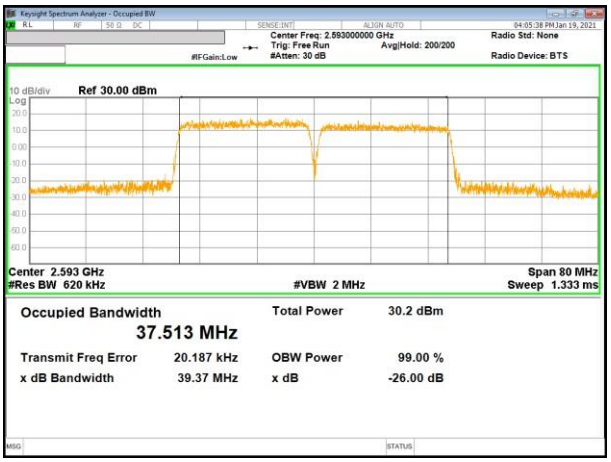


LTE B41 15MHz + 20MHz 16QAM RB75-0 + RB100-0

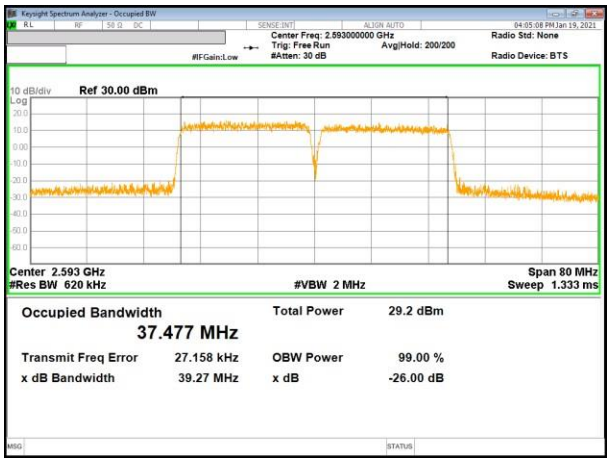


LTE B41 20MHz + 15MHz QPSK RB100-0 + RB75-0

LTE B41 20MHz + 15MHz 16QAM RB100-0 + RB75-0



LTE B41 20MHz + 20MHz QPSK RB100-0 + RB100-0



LTE B41 20MHz + 20MHz 16QAM RB100-0 + RB100-0

8.3. EMISSION MASK

RULE PART(S)

FCC: §27. 53

LIMITS

(m) (4) For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v03r01
The transmitter output was connected to a 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.

RESULTS

See the following pages.

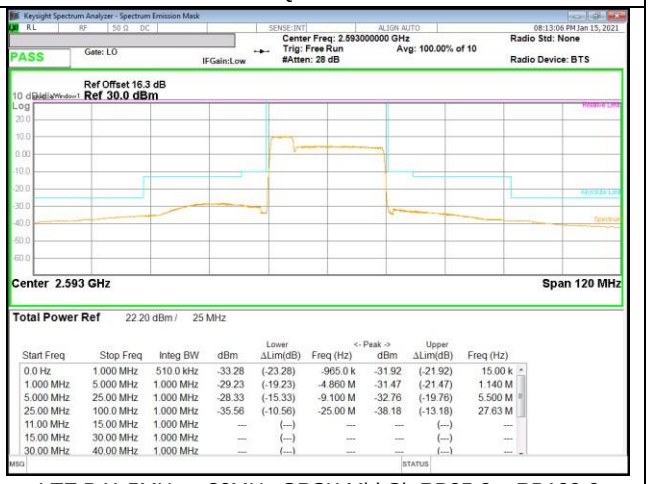
8.3.1. EMISSION MASK RESULT

LTE Band 41C(UL CA)

LTE B41 5MHz + 20MHz QPSK Low Ch RB1-0 + RB1-99

LTE B41 5MHz + 20MHz QPSK Low Ch RB25-0 + RB100-0

LTE B41 5MHz + 20MHz QPSK Mid Ch RB1-0 + RB1-99



LTE B41 5MHz + 20MHz QPSK Mid Ch RB25-0 + RB100-0

LTE B41 5MHz + 20MHz QPSK High Ch RB1-0 + RB1-99

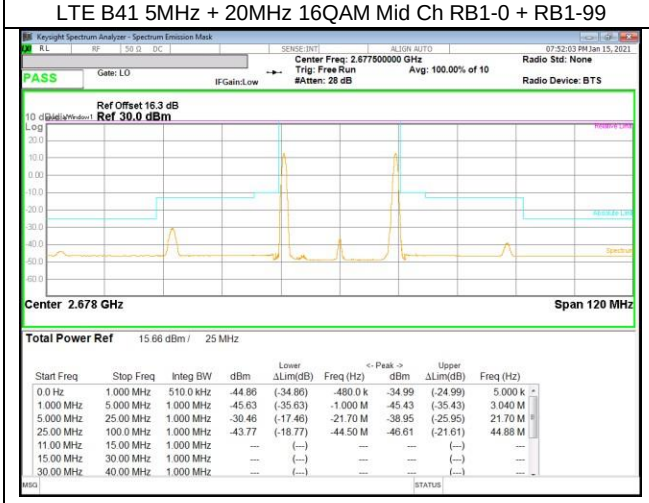
LTE B41 5MHz + 20MHz QPSK High Ch RB25-0 + RB100-0

LTE B41 5MHz + 20MHz 16QAM Low Ch RB1-0 + RB1-99

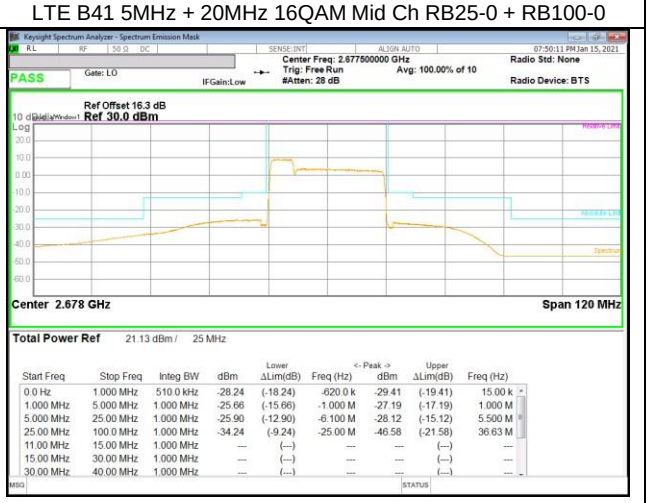
LTE B41 5MHz + 20MHz 16QAM Low Ch RB25-0 + RB100-0

LTE B41 5MHz + 20MHz 16QAM Mid Ch RB1-0 + RB1-99

LTE B41 5MHz + 20MHz 16QAM Mid Ch RB25-0 + RB100-0



LTE B41 5MHz + 20MHz 16QAM High Ch RB1-0 + RB1-99



LTE B41 5MHz + 20MHz 16QAM High Ch RB25-0 + RB100-0

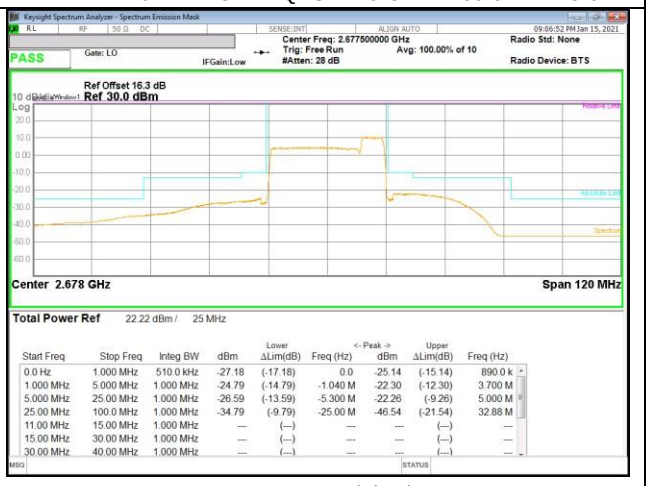
LTE B41 20MHz + 5MHz QPSK Low Ch RB1-0 + RB1-24

LTE B41 20MHz + 5MHz QPSK Low Ch RB100-0 + RB25-0

LTE B41 20MHz + 5MHz QPSK Mid Ch RB1-0 + RB1-24

LTE B41 20MHz + 5MHz QPSK Mid Ch RB100-0 + RB25-0

LTE B41 20MHz + 5MHz QPSK High Ch RB1-0 + RB1-24



LTE B41 20MHz + 5MHz QPSK High Ch RB100-0 + RB25-0

LTE B41 20MHz + 5MHz 16QAM Low Ch RB1-0 + RB1-24

LTE B41 20MHz + 5MHz 16QAM Low Ch RB100-0 + RB25-0

LTE B41 20MHz + 5MHz 16QAM Mid Ch RB1-0 + RB1-24

LTE B41 20MHz + 5MHz 16QAM Mid Ch RB100-0 + RB25-0

LTE B41 20MHz + 5MHz 16QAM High Ch RB1-0 + RB1-24

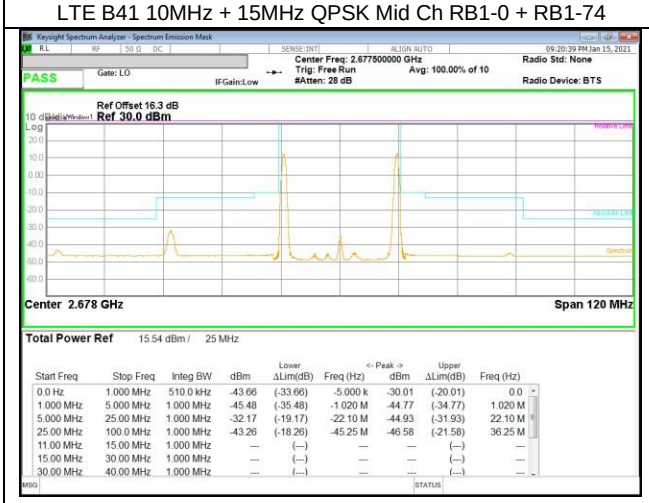
LTE B41 20MHz + 5MHz 16QAM High Ch RB100-0 + RB25-0

LTE B41 10MHz + 15MHz QPSK Low Ch RB1-0 + RB1-74

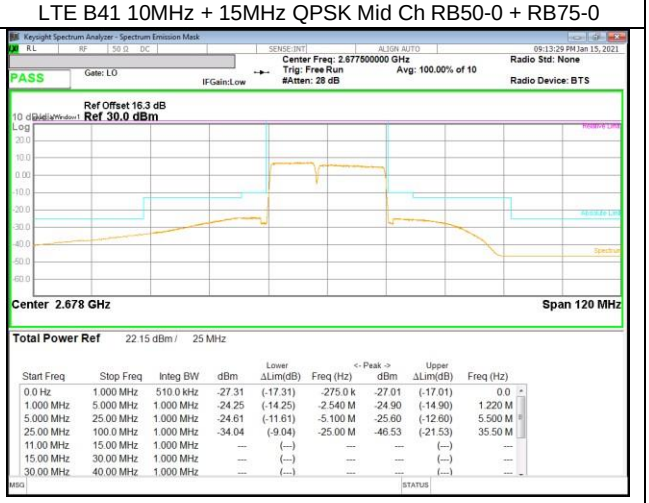
LTE B41 10MHz + 15MHz QPSK Low Ch RB50-0 + RB75-0

LTE B41 10MHz + 15MHz QPSK Mid Ch RB1-0 + RB1-74

LTE B41 10MHz + 15MHz QPSK Mid Ch RB50-0 + RB75-0



LTE B41 10MHz + 15MHz QPSK High Ch RB1-0 + RB1-74



LTE B41 10MHz + 15MHz QPSK High Ch RB50-0 + RB75-0

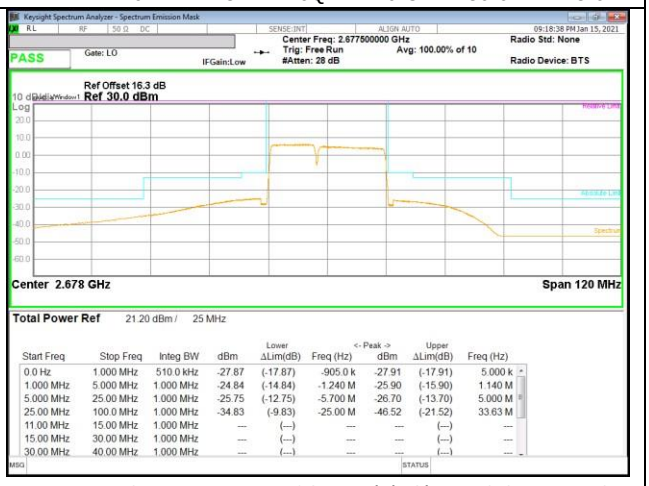
LTE B41 10MHz + 15MHz 16QAM Low Ch RB1-0 + RB1-74

LTE B41 10MHz + 15MHz 16QAM Low Ch RB50-0 + RB75-0

LTE B41 10MHz + 15MHz 16QAM Mid Ch RB1-0 + RB1-74

LTE B41 10MHz + 15MHz 16QAM Mid Ch RB50-0 + RB75-0

LTE B41 10MHz + 15MHz 16QAM High Ch RB1-0 + RB1-74



LTE B41 10MHz + 15MHz 16QAM High Ch RB50-0 + RB75-0

LTE B41 15MHz + 10MHz QPSK Low Ch RB1-0 + RB1-49

Start Freq	Stop Freq	Integ BW	dBm	Lower ΔLim(dB)	Lower Freq (Hz)	<- Peak -> dBm	Upper ΔLim(dB)	Upper Freq (Hz)
0.0 Hz	1.000 MHz	510.0 kHz	-29.64	(-16.64)	0.0	---	(---)	---
1.000 MHz	5.500 MHz	1.000 MHz	-45.03	(-32.03)	-1.023 M	---	(---)	---
5.500 MHz	100.0 MHz	1.000 MHz	-44.69	(-19.69)	-22.04 M	---	(---)	---
0.0 Hz	1.000 MHz	510.0 kHz	---	(---)	---	-43.37	(-33.37)	5.000 k
1.000 MHz	5.000 MHz	1.000 MHz	---	(---)	---	-45.54	(-35.54)	1.060 M
5.000 MHz	25.00 MHz	1.000 MHz	---	(---)	---	-30.47	(-17.47)	21.90 M
25.00 MHz	100.0 MHz	1.000 MHz	---	(---)	---	-43.24	(-18.24)	44.88 M

LTE B41 15MHz + 10MHz QPSK Low Ch RB75-0 + RB50-0

Start Freq	Stop Freq	Integ BW	dBm	Lower ΔLim(dB)	Lower Freq (Hz)	<- Peak -> dBm	Upper ΔLim(dB)	Upper Freq (Hz)
0.0 Hz	1.000 MHz	510.0 kHz	-29.74	(-16.74)	-10.00 k	---	(---)	---
1.000 MHz	5.500 MHz	1.000 MHz	-29.88	(-16.88)	-1.000 M	---	(---)	---
5.500 MHz	100.0 MHz	1.000 MHz	-31.05	(-6.05)	-5.500 M	---	(---)	---
0.0 Hz	1.000 MHz	510.0 kHz	---	(---)	---	-31.12	(-21.12)	480.0 k
1.000 MHz	5.000 MHz	1.000 MHz	---	(---)	---	-28.47	(-18.47)	1.900 M
5.000 MHz	25.00 MHz	1.000 MHz	---	(---)	---	-29.21	(-16.21)	5.400 M
25.00 MHz	100.0 MHz	1.000 MHz	---	(---)	---	-34.73	(-9.73)	25.00 M

LTE B41 15MHz + 10MHz QPSK Mid Ch RB1-0 + RB1-49

Start Freq	Stop Freq	Integ BW	dBm	Lower ΔLim(dB)	Lower Freq (Hz)	<- Peak -> dBm	Upper ΔLim(dB)	Upper Freq (Hz)
0.0 Hz	1.000 MHz	510.0 kHz	-35.64	(-25.64)	-25.00 k	-41.44	(-31.44)	10.00 k
1.000 MHz	5.000 MHz	1.000 MHz	-45.11	(-35.11)	-1.020 M	-45.34	(-35.34)	1.060 M
5.000 MHz	25.00 MHz	1.000 MHz	-25.27	(-12.27)	-22.10 M	-26.50	(-13.50)	22.10 M
25.00 MHz	100.0 MHz	1.000 MHz	-42.33	(-17.33)	-45.25 M	-38.73	(-13.73)	45.25 M
11.00 MHz	15.00 MHz	1.000 MHz	---	(---)	---	---	(---)	---
15.00 MHz	30.00 MHz	1.000 MHz	---	(---)	---	---	(---)	---
30.00 MHz	40.00 MHz	1.000 MHz	---	(---)	---	---	(---)	---

LTE B41 15MHz + 10MHz QPSK Mid Ch RB75-0 + RB50-0

Start Freq	Stop Freq	Integ BW	dBm	Lower ΔLim(dB)	Lower Freq (Hz)	<- Peak -> dBm	Upper ΔLim(dB)	Upper Freq (Hz)
0.0 Hz	1.000 MHz	510.0 kHz	-29.73	(-19.73)	0.0	-28.96	(-18.96)	535.0 k
1.000 MHz	5.000 MHz	1.000 MHz	-28.48	(-18.48)	-1.520 M	-27.93	(-17.93)	1.100 M
5.000 MHz	25.00 MHz	1.000 MHz	-29.31	(-16.31)	-5.100 M	-28.71	(-15.71)	5.000 M
25.00 MHz	100.0 MHz	1.000 MHz	-35.86	(-10.86)	-25.00 M	-36.70	(-11.70)	25.00 M
11.00 MHz	15.00 MHz	1.000 MHz	---	(---)	---	---	(---)	---
15.00 MHz	30.00 MHz	1.000 MHz	---	(---)	---	---	(---)	---
30.00 MHz	40.00 MHz	1.000 MHz	---	(---)	---	---	(---)	---

LTE B41 15MHz + 10MHz QPSK High Ch RB1-0 + RB1-49

Start Freq	Stop Freq	Integ BW	dBm	Lower ΔLim(dB)	Lower Freq (Hz)	<- Peak -> dBm	Upper ΔLim(dB)	Upper Freq (Hz)
0.0 Hz	1.000 MHz	510.0 kHz	-39.18	(-29.18)	-5.000 k	-39.30	(-29.30)	5.000 k
1.000 MHz	5.000 MHz	1.000 MHz	-45.24	(-35.24)	-1.020 M	-45.64	(-35.64)	1.100 M
5.000 MHz	25.00 MHz	1.000 MHz	-32.97	(-19.97)	-22.10 M	-44.30	(-31.30)	22.10 M
25.00 MHz	100.0 MHz	1.000 MHz	-43.59	(-18.59)	-44.88 M	-46.40	(-21.40)	29.88 M
11.00 MHz	15.00 MHz	1.000 MHz	---	(---)	---	---	(---)	---
15.00 MHz	30.00 MHz	1.000 MHz	---	(---)	---	---	(---)	---
30.00 MHz	40.00 MHz	1.000 MHz	---	(---)	---	---	(---)	---

LTE B41 15MHz + 10MHz QPSK High Ch RB75-0 + RB50-0

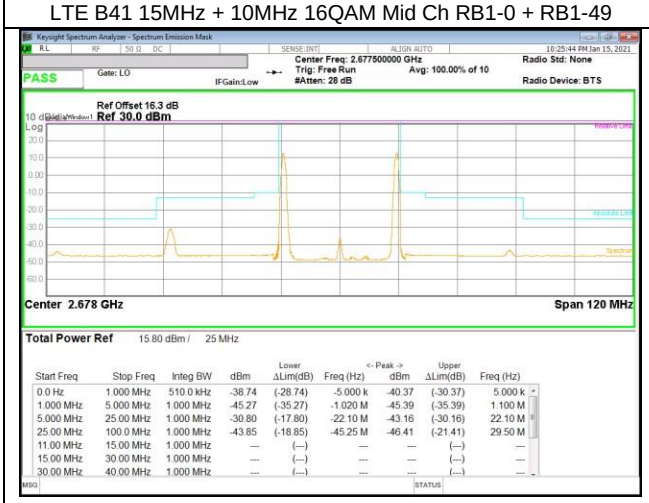
Start Freq	Stop Freq	Integ BW	dBm	Lower ΔLim(dB)	Lower Freq (Hz)	<- Peak -> dBm	Upper ΔLim(dB)	Upper Freq (Hz)
0.0 Hz	1.000 MHz	510.0 kHz	-26.66	(-16.66)	0.0	-25.82	(-15.82)	585.0 k
1.000 MHz	5.000 MHz	1.000 MHz	-24.21	(-14.21)	-1.080 M	-23.11	(-13.11)	1.660 M
5.000 MHz	25.00 MHz	1.000 MHz	-25.57	(-12.57)	-5.100 M	-23.38	(-10.38)	5.000 M
25.00 MHz	100.0 MHz	1.000 MHz	-34.40	(-9.40)	-25.00 M	-46.37	(-21.37)	31.75 M
11.00 MHz	15.00 MHz	1.000 MHz	---	(---)	---	---	(---)	---
15.00 MHz	30.00 MHz	1.000 MHz	---	(---)	---	---	(---)	---
30.00 MHz	40.00 MHz	1.000 MHz	---	(---)	---	---	(---)	---

LTE B41 15MHz + 10MHz 16QAM Low Ch RB1-0 + RB1-49

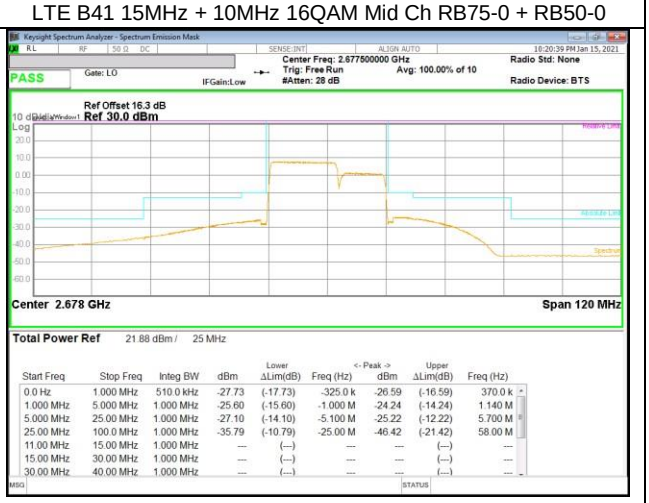
LTE B41 15MHz + 10MHz 16QAM Low Ch RB75-0 + RB50-0

LTE B41 15MHz + 10MHz 16QAM Mid Ch RB1-0 + RB1-49

LTE B41 15MHz + 10MHz 16QAM Mid Ch RB75-0 + RB50-0



LTE B41 15MHz + 10MHz 16QAM High Ch RB1-0 + RB1-49



LTE B41 15MHz + 10MHz 16QAM High Ch RB75-0 + RB50-0