



TEST REPORT

No. I20Z60959-WMD06

for

OnePlus Technology (Shenzhen) Co., Ltd.

Smart Phone

Model Name: BE2028, BE2025, BE2026

FCC ID: 2ABZ2-EF170

with

Hardware Version: 16

Software Version: 10.5.5.BE88CB

Issued Date: 2020-10-29

Note:

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The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S.Government.

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I20Z60959-WMD06	Rev.0	1 st edition	2020-10-29

Note: the latest revision of the test report supersedes all previous version.

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1. Test Laboratory

1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2017 accredited test laboratory under NATIONAL VOLUNTARY LABORATORY ACCREDITATION PROGRAM (NVLAP) with lab code 600118-0 and is also an FCC accredited test laboratory (CN5017), and ISED accredited test laboratory (CN0066). The detail accreditation scope can be found on NVLAP website.

1.2. Testing Location

Location 1: CTTL (huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing,
P. R. China 100191

Location 2: CTTL (Shouxiang)

Address: No. 51 Shouxiang Science Building, Xueyuan Road,
Haidian District, Beijing, P. R. China 100191

Location 3: CTTL (BDA)

Address: No.18A, Kangding Street, Beijing Economic-Technology
Development Area, Beijing, P. R. China 100176

1.3. Testing Environment

Normal Temperature: 15-35℃
Relative Humidity: 20-75%

1.4. Project data

Testing Start Date: 2020-07-21
Testing End Date: 2020-10-26

1.5. Signature



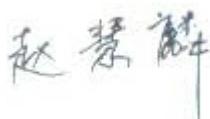
Dong Yuan

(Prepared this test report)



Zhou Yu

(Reviewed this test report)



Zhao Hui Lin

Deputy Director of the laboratory
(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name: OnePlus Technology (Shenzhen) Co., Ltd.
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Contact: Ariel Cheng
Email: ariel.cheng@oneplus.com
Telephone: 86 755 61898696-7023

2.2. Manufacturer Information

Company Name: OnePlus Technology (Shenzhen) Co., Ltd.
Address /Post: 18C02, 18C03, 18C04 and 18C05, Shum Yip Terra Building, Binhe Avenue North, Futian District, Shenzhen
Contact: Ariel Cheng
Email: ariel.cheng@oneplus.com
Telephone: 86 755 61898696-7023

3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Description	Smart Phone
Model Name	BE2028, BE2025, BE2026
FCC ID	2ABZ2-EF170
Antenna	Embedded
Output power	24.32dBm maximum EIRP measured for LTE Band 41
Extreme vol. Limits	3.45VDC to 4.45VDC (nominal: 3.87VDC)
Extreme temp. Tolerance	-10°C to +55°C

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of CTTL.

3.2. Internal Identification of EUT used during the test

EUT ID*	IMEI	HW Version	SW Version	Date of receipt
UT04a	990016800072090	16	10.5.5.BE88CB	2020-07-21
UT68a	990016800132043	16	10.5.5.BE88CB	2020-08-19

*EUT ID: is used to identify the test sample in the lab internally.

3.3. Internal Identification of AE used during the test

AE ID*	Description
AE1	Battery
AE1	
Model	BLP815
Manufacturer	Dongguan NVT Technology Co.,Ltd.
Capacity	4210mAh

*AE ID: is used to identify the test sample in the lab internally.

4. Reference Documents

4.1. Documents supplied by applicant

EUT parameters, referring to Annex A for detailed information, is supplied by the client or manufacturer, which is the basis of testing.

4.2. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part 27	MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES	10-1-19 Edition
ANSI/TIA-603-E	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards	2016
ANSI C63.26	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services	2015
KDB 971168 D01	MEASUREMENT GUIDANCE FOR CERTIFICATION OF LICENSED DIGITAL TRANSMITTERS	v03r01

5. Laboratory Environment

Control room / conducted chamber did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 20 %, Max. = 80 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 0.5 Ω

Fully-anechoic chamber 2 (8.6 meters × 6.1 meters × 3.85 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 1 Ω
Site voltage standing-wave ratio (S_{VSWR})	Between 0 and 6 dB, from 1GHz to 18GHz

Semi-anechoic chamber 2 / Fully-anechoic chamber 3 (10 meters × 6.7 meters × 6.15 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 0.5 Ω
Normalised site attenuation (NSA)	<±3.5 dB, 3 m distance
Site voltage standing-wave ratio (S_{VSWR})	Between 0 and 6 dB, from 1GHz to 18GHz

6. Summary Of Test Result

LTE Band 41

Items	Test Name	Clause in FCC rules	Verdict
1	Output Power	27.50	P
2	Emission Limit	2.1051/27.53	P
3	Frequency Stability	2.1055	P
4	Occupied Bandwidth	2.1049	P
5	Emission Bandwidth	27.53	P
6	Band Edge Compliance	27.53	P
7	Conducted Spurious Emission	27.53	P
8	Peak-to-Average Power Ratio	27.50	P

Terms used in Verdict column

P	Pass. The EUT complies with the essential requirements in the standard.
NP	Not Performed. The test was not performed by CTTL.
NA	Not Applicable. The test was not applicable.
BR	Re-use test data from basic model report.
F	Fail. The EUT does not comply with the essential requirements in the standard.

Explanation of worst-case configuration

The worst-case scenario for all measurements is based on the conducted output power measurement investigation results. Output power was measured on QPSK,16QAM modulations. It was found that QPSK was the worst case. All testing was performed using QPSK modulations to represent the worst case unless otherwise stated. The test results shown in the following sections represent the worst case emission.

7. Test Equipment Utilized

Description	Type	Series Number	Manufacture	Cal Due Date	Calibration Interval
Spectrum Analyzer	FSU	200030	R&S	2021-06-01	1 year
Climate chamber	SH-242	93008556	ESPEC	2020-12-21	3 years
EMI Antenna	VULB9163	9163-235	Schwarzbeck	2021-03-12	1 year
EMI Antenna	3117	00058889	ETS-Lindgren	2020-11-18	1 year
EMI Antenna	3117	00119021	ETS-Lindgren	2021-01-14	1 year
EMI Antenna	9117	177	Schwarzbeck	2021-10-12	1 year
Signal Generator	N5183A	MY49060052	R&S	2021-06-24	1 year
Test Receiver	E4440A	MY48250642	Agilent	2021-03-13	1 year
Universal Radio Communication Tester	CMW500	143008	R&S	2020-11-26	1 year
Power Amplifier	5S1G4	0341863	AR	/	/

Annex A: Measurement Results

A.1 Output Power

A.1.1 Summary

During the process of testing, the EUT was controlled via communication tester to ensure max power transmission and proper modulation.

In all cases, output power is within the specified limits.

A.1.2 Conducted

A.1.2.1 Method of Measurements

The EUT was set up for the max output power with pseudo random data modulation.

These measurements were done at 3 frequencies (bottom, middle and top of operational frequency range) for each bandwidth.

A.1.2.2 Measurement result

LTE band 41

Bandwidth	Frequency (MHz)	Frequency (MHz)	Modulation	PCC RB		SCC RB		Conducted Power(dBm)
				Size	Offset	Size	Offset	
5MHz/ 20MHz	2499.3	2511.0	QPSK	1	24	1	0	24.33
				25	0	100	0	22.44
			16QAM	1	24	1	0	23.36
				25	0	100	0	21.46
			64QAM	1	24	1	0	22.66
				25	0	100	0	21.43
	2583.8	2595.5	QPSK	1	24	1	0	24.16
				25	0	100	0	22.21
			16QAM	1	24	1	0	23.04
				25	0	100	0	21.32
			64QAM	1	24	1	0	22.35
				25	0	100	0	21.27
20MHz/ 5MHz	2668.3	2680.0	QPSK	1	24	1	0	24.15
				25	0	100	0	22.19
			16QAM	1	24	1	0	23.08
				25	0	100	0	21.26
			64QAM	1	24	1	0	22.29
				25	0	100	0	21.30
	2506.0	2517.7	QPSK	1	99	1	0	24.52
				100	0	25	0	22.55
			16QAM	1	99	1	0	23.53
				100	0	25	0	21.65
			64QAM	1	99	1	0	22.71

				100	0	25	0	21.58	
				QPSK	1	99	1	0	24.46
					100	0	25	0	22.34
				16QAM	1	99	1	0	23.38
					100	0	25	0	21.52
				64QAM	1	99	1	0	22.53
					100	0	25	0	21.41
				QPSK	1	99	1	0	24.38
					100	0	25	0	22.28
				16QAM	1	99	1	0	23.35
					100	0	25	0	21.41
10MHz/ 15MHz				64QAM	1	99	1	0	22.46
					100	0	25	0	21.36
				QPSK	1	49	1	0	24.46
					50	0	75	0	22.56
					1	49	1	0	23.55
				16QAM	50	0	75	0	21.61
					1	49	1	0	22.68
				64QAM	50	0	75	0	21.53
					1	49	1	0	24.33
15MHz/ 10MHz				QPSK	50	0	75	0	22.37
					1	49	1	0	23.34
				16QAM	50	0	75	0	21.43
					1	49	1	0	22.51
				64QAM	50	0	75	0	21.35
					1	49	1	0	24.19
				QPSK	50	0	75	0	22.28
					1	49	1	0	23.18
				16QAM	50	0	75	0	21.34
					1	49	1	0	22.37
				64QAM	50	0	75	0	21.27
15MHz/ 10MHz					1	74	1	0	24.39
			QPSK	75	0	50	0	22.52	
				1	74	1	0	23.54	
			16QAM	75	0	50	0	21.56	
				1	74	1	0	22.66	
			64QAM	75	0	50	0	21.54	
				1	74	1	0	24.41	
			QPSK	75	0	50	0	22.35	
				1	74	1	0	23.35	
			16QAM	75	0	50	0	21.32	
				1	74	1	0	22.47	
			64QAM	75	0	50	0	21.35	

15MHz/	2672.7	2684.7	QPSK	1	74	1	0	24.32
				75	0	50	0	22.21
			16QAM	1	74	1	0	23.25
				75	0	50	0	21.37
			64QAM	1	74	1	0	22.52
				75	0	50	0	21.35
	2501.5	2515.9	QPSK	1	40	1	0	24.49
				50	0	100	0	22.44
			16QAM	1	40	1	0	23.58
				50	0	100	0	21.55
			64QAM	1	40	1	0	22.69
	10MHz/ 20MHz	2583.6		50	0	100	0	21.52
		QPSK	1	40	1	0	24.36	
			50	0	100	0	22.27	
		16QAM	1	40	1	0	23.25	
			50	0	100	0	21.29	
		64QAM	1	40	1	0	22.41	
			50	0	100	0	21.26	
		QPSK	1	40	1	0	24.12	
			50	0	100	0	22.21	
	20MHz/ 10MHz	2665.6	16QAM	1	40	1	0	23.12
				50	0	100	0	21.32
			64QAM	1	40	1	0	22.33
				50	0	100	0	21.28
			QPSK	1	99	1	0	24.43
				100	0	50	0	22.47
			16QAM	1	99	1	0	23.51
				100	0	50	0	21.52
			64QAM	1	99	1	0	22.72
				100	0	50	0	21.53
	20MHz/ 10MHz	2588.1	QPSK	1	99	1	0	24.32
				100	0	50	0	22.35
			16QAM	1	99	1	0	23.37
				100	0	50	0	21.41
			64QAM	1	99	1	0	22.59
				100	0	50	0	21.33
			QPSK	1	99	1	0	24.31
				100	0	50	0	22.32
			16QAM	1	99	1	0	23.36
				100	0	50	0	21.31
			64QAM	1	99	1	0	22.38
				100	0	50	0	21.37
15MHz/	2503.5	2518.5	QPSK	1	74	1	0	24.45

15MHz	2585.5	2600.5		75	0	75	0	22.45
				1	74	1	0	23.54
			16QAM	75	0	75	0	21.59
			64QAM	1	74	1	0	22.75
				75	0	75	0	21.52
			QPSK	1	74	1	0	24.38
				75	0	75	0	22.31
			16QAM	1	74	1	0	23.36
				75	0	75	0	21.36
			64QAM	1	74	1	0	22.53
				75	0	75	0	21.32
15MHz/ 20MHz	2667.5	2682.5	QPSK	1	74	1	0	24.18
				75	0	75	0	22.23
			16QAM	1	74	1	0	23.16
				75	0	75	0	21.31
			64QAM	1	74	1	0	22.38
				75	0	75	0	21.33
			QPSK	1	74	1	0	24.39
				75	0	100	0	22.43
			16QAM	1	74	1	0	23.57
				75	0	100	0	21.52
			64QAM	1	74	1	0	22.76
				75	0	100	0	22.40
20MHz/ 15MHz	2503.8	2520.9	QPSK	1	74	1	0	24.37
				75	0	100	0	22.24
			16QAM	1	74	1	0	23.38
				75	0	100	0	21.25
			64QAM	1	74	1	0	22.57
				75	0	100	0	22.29
			QPSK	1	74	1	0	24.13
				75	0	100	0	22.24
			16QAM	1	74	1	0	23.15
				75	0	100	0	21.23
			64QAM	1	74	1	0	22.26
				75	0	100	0	22.19
20MHz/ 15MHz	2506	2523.1	QPSK	1	99	1	0	24.44
				100	0	75	0	24.47
			16QAM	1	99	1	0	24.92
				100	0	75	0	24.54
			64QAM	1	99	1	0	24.74
				100	0	75	0	24.46
			QPSK	1	99	1	0	24.34
				100	0	75	0	24.32

	2665.1	2682.2	16QAM	1	99	1	0	24.81
				100	0	75	0	24.37
			64QAM	1	99	1	0	24.69
				100	0	75	0	24.43
			QPSK	1	99	1	0	24.27
				100	0	75	0	24.29
			16QAM	1	99	1	0	24.71
				100	0	75	0	24.34
			64QAM	1	99	1	0	23.49
				100	0	75	0	23.57
20MHz/ 20MHz	2506	2525.8	QPSK	1	99	1	0	24.51
				100	0	100	0	22.42
			16QAM	1	99	1	0	23.54
				100	0	100	0	21.43
			64QAM	1	99	1	0	22.76
				100	0	100	0	21.38
	2583.1	2602.9	QPSK	1	99	1	0	24.26
				100	0	100	0	22.17
			16QAM	1	99	1	0	23.37
				100	0	100	0	21.26
			64QAM	1	99	1	0	22.52
				100	0	100	0	21.19
	2660.2	2680.0	QPSK	1	99	1	0	24.15
				100	0	100	0	22.22
			16QAM	1	99	1	0	23.22
				100	0	100	0	21.29
			64QAM	1	99	1	0	22.38
				100	0	100	0	21.28

A.1.3 Radiated

A.1.3.1 Description

This is the test for the maximum radiated power from the EUT.

FDD Band 41: 27.50(h)(2) specifies " *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".

A.1.3.2 Method of Measurement

NASI C63.26 chapter 5.2.5.5: when working in decibels (i.e., logarithmic scale), the ERP and EIRP represent the sum of the transmit antenna gain (in dBd or dBi, respectively) and the conducted RF output power (expressed in dB relative to watts or milliwatts).

The relevant equation for determining the maximum ERP or EIRP from the measured RF output power is given in Equation (1) as follows:

$$\text{ERP or EIRP} = P_{\text{Mea}} + G_T$$

Where

ERP or EIRP	effective radiated power or equivalent isotropically radiated power, respectively (expressed in the same units as P_{Mea} , e.g., dBm or dBW)
P_{Mea}	measured transmitter output power or PSD, in dBm or dBW
G_T	gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP)

LTE Band 41-EIRP
Limits: ≤33 dBm (2W)

Bandwidth	Frequency (MHz)	Frequency (MHz)	Modulation	PCC RB		SCC RB		Conducted Power(dBm)	G _T (dBi)	Radiated Power (dBm)
				Size	Offset	Size	Offset			
5MHz/ 20MHz	2499.3	2511	QPSK	1	24	1	0	24.33	-0.6	23.73
				25	0	100	0	22.44	-0.6	21.84
			16QAM	1	24	1	0	23.36	-0.6	22.76
				25	0	100	0	21.46	-0.6	20.86
			64QAM	1	24	1	0	22.66	-0.6	22.06
				25	0	100	0	21.43	-0.6	20.83
	2583.8	2595.5	QPSK	1	24	1	0	24.16	-0.6	23.56
				25	0	100	0	22.21	-0.6	21.61
			16QAM	1	24	1	0	23.04	-0.6	22.44
				25	0	100	0	21.32	-0.6	20.72
			64QAM	1	24	1	0	22.35	-0.6	21.75
				25	0	100	0	21.27	-0.6	20.67
20MHz/ 5MHz	2668.3	2680	QPSK	1	24	1	0	24.15	-0.6	23.55
				25	0	100	0	22.19	-0.6	21.59
			16QAM	1	24	1	0	23.08	-0.6	22.48
				25	0	100	0	21.26	-0.6	20.66
			64QAM	1	24	1	0	22.29	-0.6	21.69
				25	0	100	0	21.30	-0.6	20.70
	2506	2517.7	QPSK	1	99	1	0	24.52	-0.6	23.92
				100	0	25	0	22.55	-0.6	21.95
			16QAM	1	99	1	0	23.53	-0.6	22.93
				100	0	25	0	21.65	-0.6	21.05
			64QAM	1	99	1	0	22.71	-0.6	22.11
				100	0	25	0	21.58	-0.6	20.98
	2590.5	2602.2	QPSK	1	99	1	0	24.46	-0.6	23.86
				100	0	25	0	22.34	-0.6	21.74
			16QAM	1	99	1	0	23.38	-0.6	22.78
				100	0	25	0	21.52	-0.6	20.92
			64QAM	1	99	1	0	22.53	-0.6	21.93
				100	0	25	0	21.41	-0.6	20.81
2675	2686.7		QPSK	1	99	1	0	24.38	-0.6	23.78
				100	0	25	0	22.28	-0.6	21.68
			16QAM	1	99	1	0	23.35	-0.6	22.75
				100	0	25	0	21.41	-0.6	20.81
			64QAM	1	99	1	0	22.46	-0.6	21.86
				100	0	25	0	21.36	-0.6	20.76

10MHz/ 15MHz	2501.3	2513.3	QPSK	1	49	1	0	24.46	-0.6	23.86
				50	0	75	0	22.56	-0.6	21.96
			16QAM	1	49	1	0	23.55	-0.6	22.95
				50	0	75	0	21.61	-0.6	21.01
			64QAM	1	49	1	0	22.68	-0.6	22.08
				50	0	75	0	21.53	-0.6	20.93
	2585.9	2597.9	QPSK	1	49	1	0	24.33	-0.6	23.73
				50	0	75	0	22.37	-0.6	21.77
			16QAM	1	49	1	0	23.34	-0.6	22.74
				50	0	75	0	21.43	-0.6	20.83
			64QAM	1	49	1	0	22.51	-0.6	21.91
				50	0	75	0	21.35	-0.6	20.75
15MHz/ 10MHz	2670.5	2682.5	QPSK	1	49	1	0	24.19	-0.6	23.59
				50	0	75	0	22.28	-0.6	21.68
			16QAM	1	49	1	0	23.18	-0.6	22.58
				50	0	75	0	21.34	-0.6	20.74
			64QAM	1	49	1	0	22.37	-0.6	21.77
				50	0	75	0	21.27	-0.6	20.67
	2503.5	2515.5	QPSK	1	74	1	0	24.39	-0.6	23.79
				75	0	50	0	22.52	-0.6	21.92
			16QAM	1	74	1	0	23.54	-0.6	22.94
				75	0	50	0	21.56	-0.6	20.96
			64QAM	1	74	1	0	22.66	-0.6	22.06
				75	0	50	0	21.54	-0.6	20.94
10MHz/ 20MHz	2588.1	2600.1	QPSK	1	74	1	0	24.41	-0.6	23.81
				75	0	50	0	22.35	-0.6	21.75
			16QAM	1	74	1	0	23.35	-0.6	22.75
				75	0	50	0	21.32	-0.6	20.72
			64QAM	1	74	1	0	22.47	-0.6	21.87
				75	0	50	0	21.35	-0.6	20.75
	2672.7	2684.7	QPSK	1	74	1	0	24.32	-0.6	23.72
				75	0	50	0	22.21	-0.6	21.61
			16QAM	1	74	1	0	23.25	-0.6	22.65
				75	0	50	0	21.37	-0.6	20.77
			64QAM	1	74	1	0	22.52	-0.6	21.92
				75	0	50	0	21.35	-0.6	20.75

				50	0	100	0	21.52	-0.6	20.92
20MHz/ 10MHz	2583.6	2598	QPSK	1	40	1	0	24.36	-0.6	23.76
				50	0	100	0	22.27	-0.6	21.67
			16QAM	1	40	1	0	23.25	-0.6	22.65
				50	0	100	0	21.29	-0.6	20.69
			64QAM	1	40	1	0	22.41	-0.6	21.81
				50	0	100	0	21.26	-0.6	20.66
	2665.6	2680	QPSK	1	40	1	0	24.12	-0.6	23.52
				50	0	100	0	22.21	-0.6	21.61
			16QAM	1	40	1	0	23.12	-0.6	22.52
				50	0	100	0	21.32	-0.6	20.72
			64QAM	1	40	1	0	22.33	-0.6	21.73
				50	0	100	0	21.28	-0.6	20.68
15MHz/ 15MHz	2506	2520.4	QPSK	1	99	1	0	24.43	-0.6	23.83
				100	0	50	0	22.47	-0.6	21.87
			16QAM	1	99	1	0	23.51	-0.6	22.91
				100	0	50	0	21.52	-0.6	20.92
			64QAM	1	99	1	0	22.72	-0.6	22.12
				100	0	50	0	21.53	-0.6	20.93
	2588.1	2602.5	QPSK	1	99	1	0	24.32	-0.6	23.72
				100	0	50	0	22.35	-0.6	21.75
			16QAM	1	99	1	0	23.37	-0.6	22.77
				100	0	50	0	21.41	-0.6	20.81
			64QAM	1	99	1	0	22.59	-0.6	21.99
				100	0	50	0	21.33	-0.6	20.73
	2670.1	2684.5	QPSK	1	99	1	0	24.31	-0.6	23.71
				100	0	50	0	22.32	-0.6	21.72
			16QAM	1	99	1	0	23.36	-0.6	22.76
				100	0	50	0	21.31	-0.6	20.71
			64QAM	1	99	1	0	22.38	-0.6	21.78
				100	0	50	0	21.37	-0.6	20.77
	2503.5	2518.5	QPSK	1	74	1	0	24.45	-0.6	23.85
				75	0	75	0	22.45	-0.6	21.85
			16QAM	1	74	1	0	23.54	-0.6	22.94
				75	0	75	0	21.59	-0.6	20.99
			64QAM	1	74	1	0	22.75	-0.6	22.15
				75	0	75	0	21.52	-0.6	20.92
	2585.5	2600.5	QPSK	1	74	1	0	24.38	-0.6	23.78
				75	0	75	0	22.31	-0.6	21.71
			16QAM	1	74	1	0	23.36	-0.6	22.76
				75	0	75	0	21.36	-0.6	20.76

				64QAM	1	74	1	0	22.53	-0.6	21.93
					75	0	75	0	21.32	-0.6	20.72
				QPSK	1	74	1	0	24.18	-0.6	23.58
					75	0	75	0	22.23	-0.6	21.63
				16QAM	1	74	1	0	23.16	-0.6	22.56
					75	0	75	0	21.31	-0.6	20.71
				64QAM	1	74	1	0	22.38	-0.6	21.78
					75	0	75	0	21.33	-0.6	20.73
				QPSK	1	74	1	0	24.39	-0.6	23.79
					75	0	100	0	22.43	-0.6	21.83
15MHz/ 20MHz	2667.5	2682.5	16QAM	1	74	1	0	23.57	-0.6	22.97	
				75	0	100	0	21.52	-0.6	20.92	
			64QAM	1	74	1	0	22.76	-0.6	22.16	
				75	0	100	0	22.4	-0.6	21.8	
			QPSK	1	74	1	0	24.37	-0.6	23.77	
				75	0	100	0	22.24	-0.6	21.64	
	2503.8	2520.9	16QAM	1	74	1	0	23.38	-0.6	22.78	
				75	0	100	0	21.25	-0.6	20.65	
			64QAM	1	74	1	0	22.57	-0.6	21.97	
				75	0	100	0	22.29	-0.6	21.69	
			QPSK	1	74	1	0	24.13	-0.6	23.53	
				75	0	100	0	22.24	-0.6	21.64	
20MHz/ 15MHz	2583.3	2600.4	16QAM	1	74	1	0	23.15	-0.6	22.55	
				75	0	100	0	21.23	-0.6	20.63	
			64QAM	1	74	1	0	22.26	-0.6	21.66	
				75	0	100	0	22.19	-0.6	21.59	
			QPSK	1	99	1	0	24.44	-0.6	23.84	
				100	0	75	0	24.47	-0.6	23.87	
	2506	2523.1	16QAM	1	99	1	0	24.92	-0.6	24.32	
				100	0	75	0	24.54	-0.6	23.94	
			64QAM	1	99	1	0	24.74	-0.6	24.14	
				100	0	75	0	24.46	-0.6	23.86	
			QPSK	1	99	1	0	24.34	-0.6	23.74	
				100	0	75	0	24.32	-0.6	23.72	
20MHz/ 15MHz	2585.6	2602.7	16QAM	1	99	1	0	24.81	-0.6	24.21	
				100	0	75	0	24.37	-0.6	23.77	
			64QAM	1	99	1	0	24.69	-0.6	24.09	
				100	0	75	0	24.43	-0.6	23.83	
			QPSK	1	99	1	0	24.27	-0.6	23.67	
				100	0	75	0	24.29	-0.6	23.69	
	2665.1	2682.2	16QAM	1	99	1	0	24.71	-0.6	24.11	

				100	0	75	0	24.34	-0.6	23.74
20MHz/ 20MHz	2506	2525.8	64QAM	1	99	1	0	23.49	-0.6	22.89
				100	0	75	0	23.57	-0.6	22.97
				1	99	1	0	24.51	-0.6	23.91
			QPSK	100	0	100	0	22.42	-0.6	21.82
				1	99	1	0	23.54	-0.6	22.94
			16QAM	100	0	100	0	21.43	-0.6	20.83
				1	99	1	0	22.76	-0.6	22.16
			64QAM	100	0	100	0	21.38	-0.6	20.78
				1	99	1	0	24.26	-0.6	23.66
	2583.1	2602.9	QPSK	100	0	100	0	22.17	-0.6	21.57
				1	99	1	0	23.37	-0.6	22.77
			16QAM	100	0	100	0	21.26	-0.6	20.66
				1	99	1	0	22.52	-0.6	21.92
			64QAM	100	0	100	0	21.19	-0.6	20.59
				1	99	1	0	24.15	-0.6	23.55
			QPSK	100	0	100	0	22.22	-0.6	21.62
				1	99	1	0	23.22	-0.6	22.62
			16QAM	100	0	100	0	21.29	-0.6	20.69
				1	99	1	0	22.38	-0.6	21.78
			64QAM	100	0	100	0	21.28	-0.6	20.68

Sample:

2660.2MHz

Radiated output power(dBm)= Conducted output power (24.15dBm) + G_T (-0.6dBi) = 23.55dBm

A.2 Emission Limit

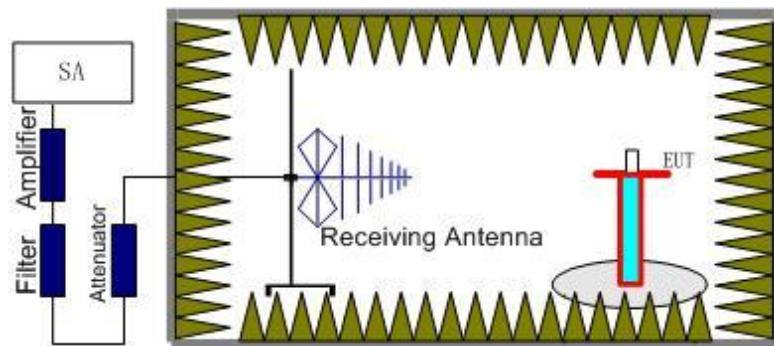
A.2.1 Measurement Method

The measurements procedures in TIA-603-E-2016 are used. This measurement is carried out in fully anechoic chamber FAC-3.

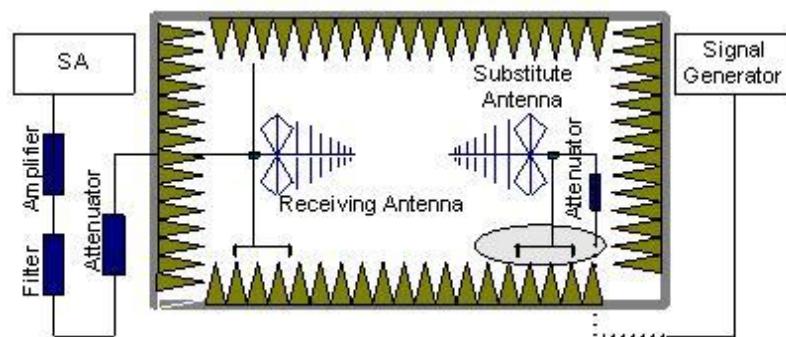
The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier. The resolution bandwidth is set 1MHz. The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of each LTE Band.

The procedure of radiated spurious emissions is as follows:

1. EUT was placed on a 1.5-meter-high non-conductive stand at a 3-meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360 and adjusting the receiving antenna polarization. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10th harmonic were measured with peak detector.



2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).
3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.



In the chamber, a substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere

with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna. Adjust the level of the signal generator output until the value of the receiver reaches the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

4. The Path loss (P_{pl}) between the Signal Source with the Substitution Antenna and the Substitution Antenna Gain (G_a) should be recorded after test.

An amplifier should be connected in for the test.

The Path loss (P_{pl}) is the summation of the cable loss and the gain of the amplifier.

The measurement results are obtained as described below:

$$\text{Power (EIRP)} = P_{Mea} + P_{pl} + G_a$$

5. This value is EIRP since the measurement is calibrated using an antenna of known gain (unit: dB) and known input power.
6. ERP can be calculated from EIRP by subtracting the gain of the dipole, $ERP = EIRP - 2.15\text{dB}$.

A.2.2 Measurement Limit

FDD Band 41: 27.53(m) (4) specifies " 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 than $43 + 10 \log (P)$ 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. ".

A.2.3 Measurement Results

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of each LTE Band. It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of each LTE Band into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this. The range of evaluated frequency is from 30MHz to 26GHz.

LTE band 41, 20MHz+15MHz bandwidth 16QAM(worst case of all bandwidths)
LTE Band 41, 5MHz, QPSK, Channel 39750

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
5005.02	-56.21	-6.59	9.91	-52.89	-25.00	27.89	V
7504.01	-53.59	-8.38	12.20	-49.77	-25.00	24.77	H
10007.01	-52.90	-9.20	12.90	-49.20	-25.00	24.20	H
12554.01	-48.71	-10.33	13.23	-45.81	-25.00	20.81	V
15012.00	-45.71	-11.23	13.99	-42.95	-25.00	17.95	H
17539.00	-43.59	-12.87	14.95	-41.51	-25.00	16.51	V

LTE Band 41, 5MHz, QPSK, Channel 40546

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
6465.02	-54.92	-7.54	10.97	-51.49	-25.00	26.49	H
7759.01	-55.00	-8.34	12.41	-50.93	-25.00	25.93	V
10338.01	-52.20	-9.70	13.04	-48.86	-25.00	23.86	H
12928.01	-49.31	-10.50	13.46	-46.35	-25.00	21.35	V
15518.00	-44.76	-11.53	13.70	-42.59	-25.00	17.59	H
16802.00	-42.14	-12.11	13.72	-40.53	-25.00	15.53	H

LTE Band 41, 5MHz, QPSK, Channel 41341

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
5352.02	-56.24	-6.93	10.39	-52.78	-25.00	27.78	H
7976.01	-53.77	-8.35	12.58	-49.54	-25.00	24.54	H
10673.01	-51.26	-9.30	13.13	-47.43	-25.00	22.43	V
13327.01	-48.45	-10.58	13.96	-45.07	-25.00	20.07	H
16011.00	-43.20	-11.83	13.70	-41.33	-25.00	16.33	H
17308.00	-44.09	-12.38	14.48	-41.99	-25.00	16.99	H

Sample calculation: 5352.02MHz

$$\begin{aligned}
 \text{Peak EIRP (dBm)} &= \text{PMea}(-56.24\text{dBm}) + \text{Pcl}(-6.93\text{dB}) + \text{Ga}(10.39 \text{ dBi}) \\
 &= -52.78 \text{ dBm}
 \end{aligned}$$

A.3 Frequency Stability

A.3.1 Method of Measurement

Frequency stability is a measure of the frequency drift due to temperature and supply voltage variations, with reference to the frequency measured at +20 °C and rated supply voltage. Two reference points are established at the applicable unwanted emissions limit using a RBW equal to the RBW required by the unwanted emissions specification of the applicable regulatory standard. These reference points measured using the lowest and highest channel of operation shall be identified as F_L and F_H respectively.

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a "call mode". This is accomplished with the use of CMW500.

1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at -30°C.
3. With the EUT, powered via nominal voltage, connected to the CMW500, and in a simulated call on middle channel for each LTE band, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
4. Repeat the above measurements at 10°C increments from -30°C to +50°C. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
5. Re-measure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1 Volt increments re-measuring carrier frequency at each voltage. Pause at nominal voltage for 1.5 hours unpowered, to allow any self-heating to stabilize, before continuing.
6. Subject the EUT to overnight soak at +50°C.
7. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on the center channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
8. Repeat the above measurements at 10 °C increments from -30°C to +50°C. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
9. At all temperature levels hold the temperature to +/- 0.5°C during the measurement procedure.

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. As this transceiver is considered "Hand carried, battery powered equipment" Section 2.1055(d)(2) applies. This requires that the lower voltage for frequency stability testing be specified by the manufacturer. This transceiver is specified to operate with an input voltage of the lower, higher and nominal voltage. Operation above or below these voltage limits is prohibited by transceiver software in order to prevent improper operation as well as to protect components from overstress.

A.3.2 Measurement results

LTE band 41, 20MHz+20MHz bandwidth QPSK(worst case of all bandwidths)

Frequency Error vs Temperature

Temperature(°C)	Voltage(V)	F_L (MHz)	F_H (MHz)	Offset(Hz)	Frequency error(ppm)
20	3.87	2496.235	2689.653	0.30	0.0001
50				2.40	0.0009
40				1.50	0.0006
30				-2.00	0.0008
10				-0.10	0.0000
0				0.30	0.0001
-10				0.60	0.0002
-20				0.40	0.0002
-30					

Frequency Error vs Voltage

Voltage(V)	Temperature(°C)	F_L (MHz)	F_H (MHz)	Offset(Hz)	Frequency error(ppm)
3.45	20	2496.235	2689.653	-2.20	0.0008
4.45				1.90	0.0007

A.4 Occupied Bandwidth

Occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the mid frequencies frequency. The table below lists the measured 99% BW. Spectrum analyzer plots are included on the following pages.

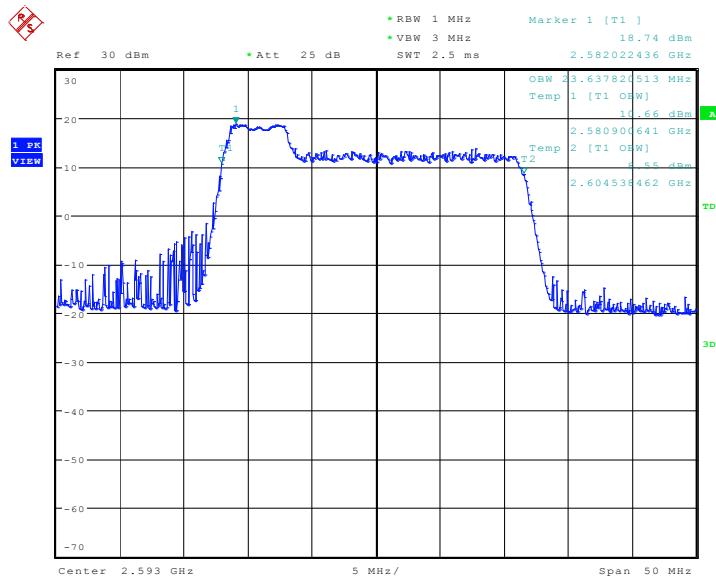
The measurement method is from ANSI C63.26:

- The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts.
- The nominal IF filter 3 dB bandwidth (RBW) shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set $\geq 3 \times$ RBW.
- Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation.
- Set the detection mode to peak, and the trace mode to max-hold.

LTE band 41 , 5MHz+20MHz (99%)

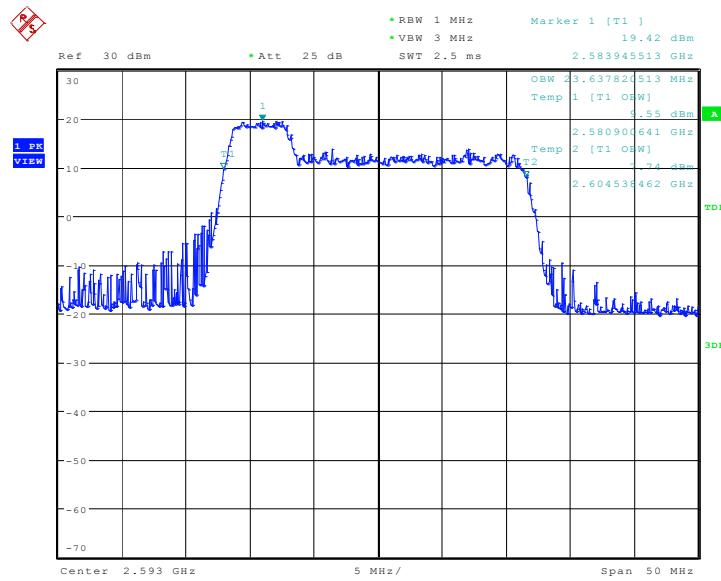
Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
2593.0	QPSK	16QAM
	23637.82	23637.82

LTE band 41 , 5MHz+20MHz Bandwidth, QPSK (99% BW)



Date: 21.AUG.2020 13:37:35

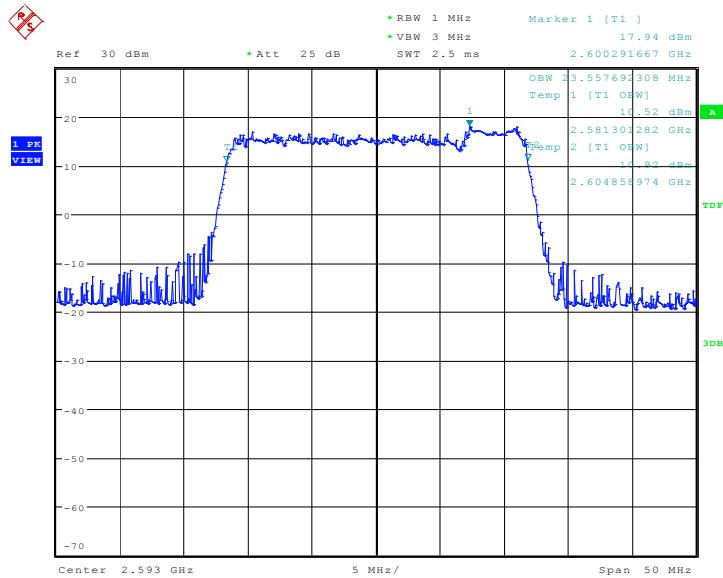
LTE band 41 , 5MHz+20MHz Bandwidth,16QAM (99% BW)



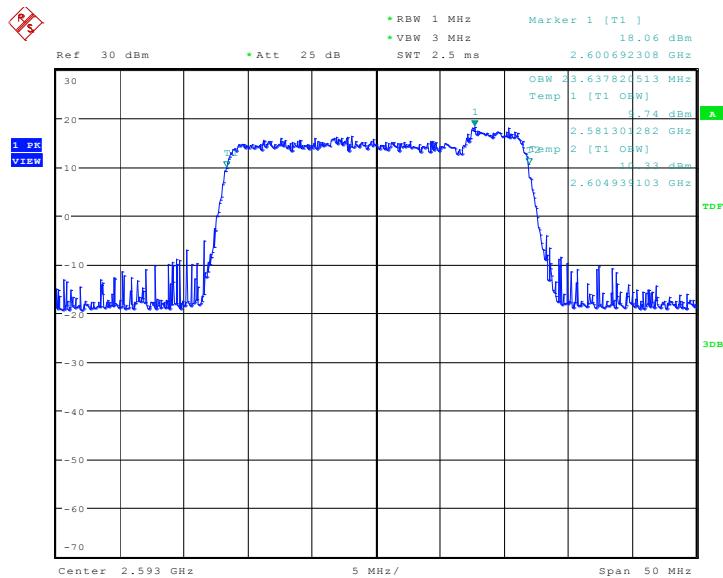
Date: 21.AUG.2020 13:39:08

LTE band 41 , 20MHz+5MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
2593.0	23557.69	23637.82

LTE band 41 , 20MHz+5MHz Bandwidth, QPSK (99% BW)


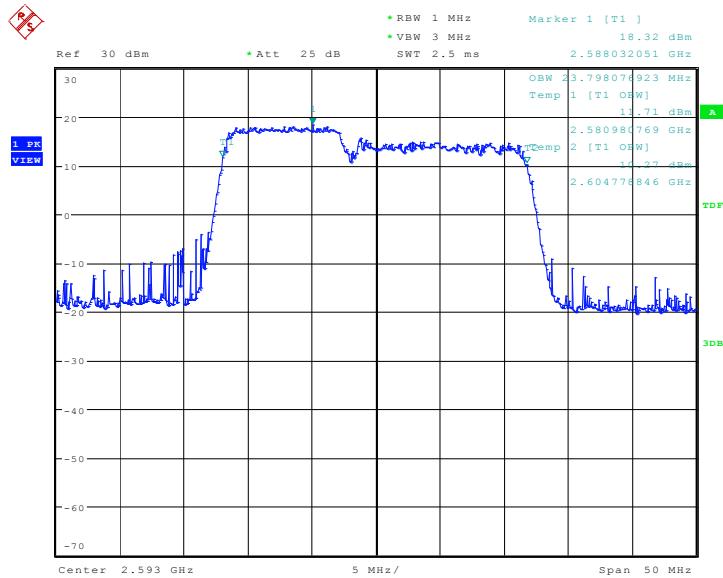
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LTE band 41 , 20MHz+5MHz Bandwidth,16QAM (99% BW)


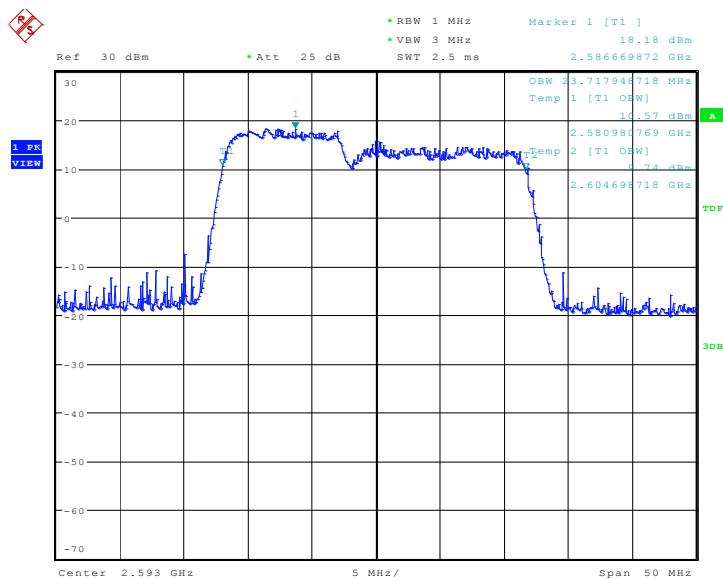
Date: 21.AUG.2020 13:42:40

LTE band 41 , 10MHz+15MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
2593.0	23798.08	23717.95

LTE band 41 , 10MHz+15MHz Bandwidth, QPSK (99% BW)


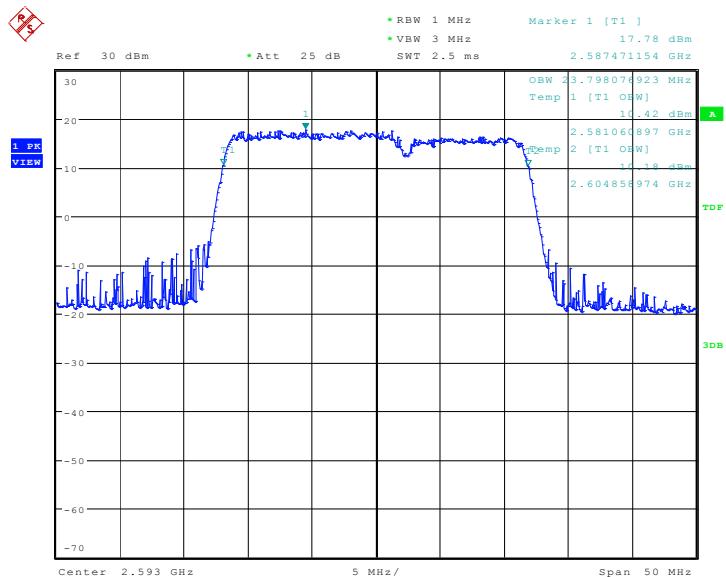
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LTE band 41 , 10MHz+15MHz Bandwidth,16QAM (99% BW)


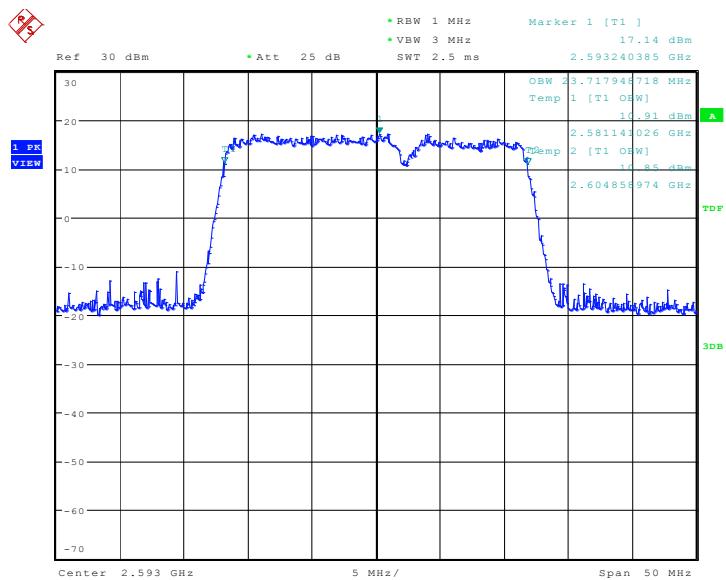
Date: 21.AUG.2020 13:50:35

LTE band 41 , 15MHz+10MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
2593.0	23798.08	23717.95

LTE band 41 , 15MHz+10MHz Bandwidth, QPSK (99% BW)


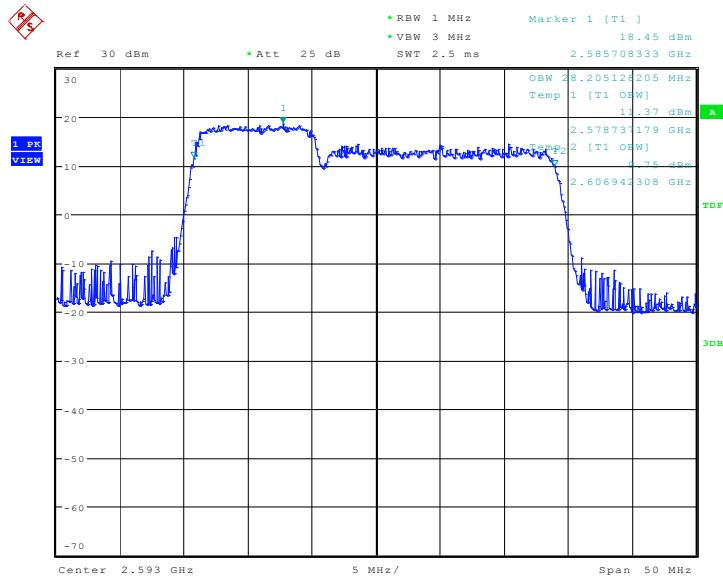
Date: 21.AUG.2020 13:56:46

LTE band 41 , 15MHz+10MHz Bandwidth,16QAM (99% BW)


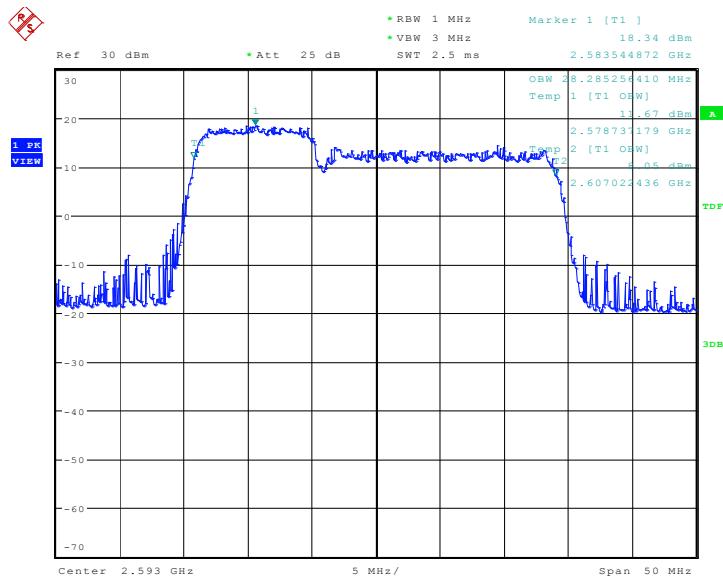
Date: 21.AUG.2020 13:53:35

LTE band 41 , 10MHz+20MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
2593.0		
	28205.13	28285.26

LTE band 41 , 10MHz+20MHz Bandwidth, QPSK (99% BW)


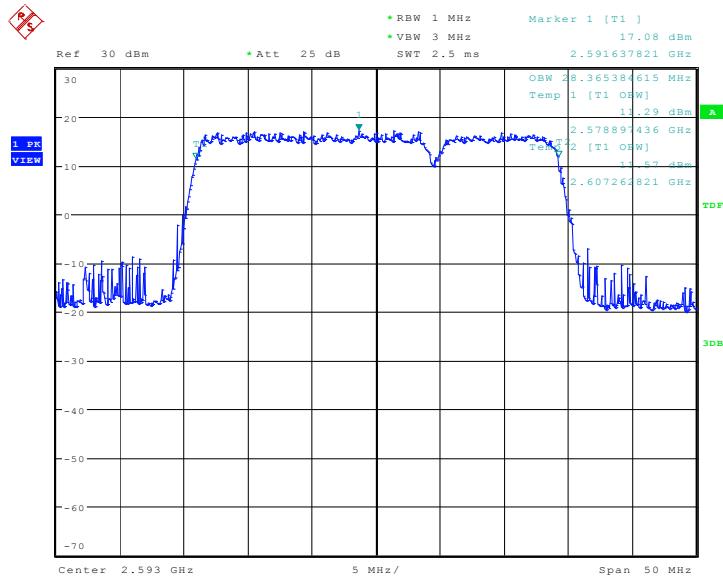
Date: 21.AUG.2020 14:01:20

LTE band 41 , 10MHz+20MHz Bandwidth,16QAM (99% BW)


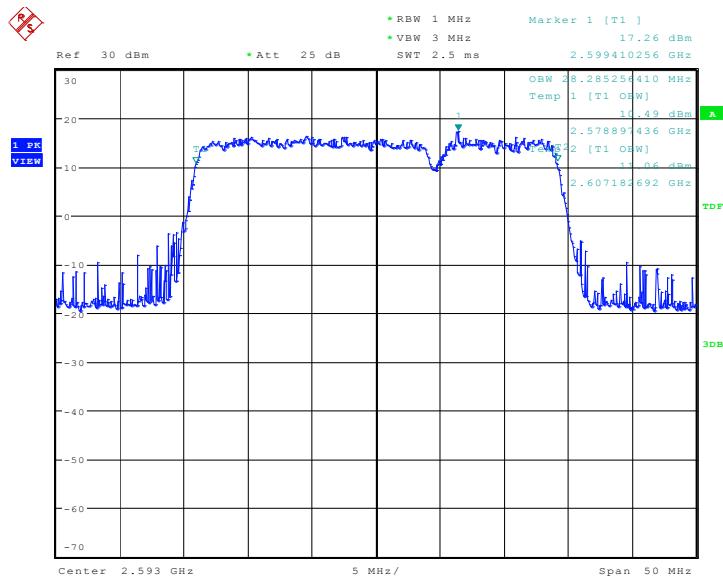
Date: 21.AUG.2020 14:03:34

LTE band 41 , 20MHz+10MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
2593.0	QPSK	16QAM
	28365.38	28285.26

LTE band 41 , 20MHz+10MHz Bandwidth, QPSK (99% BW)


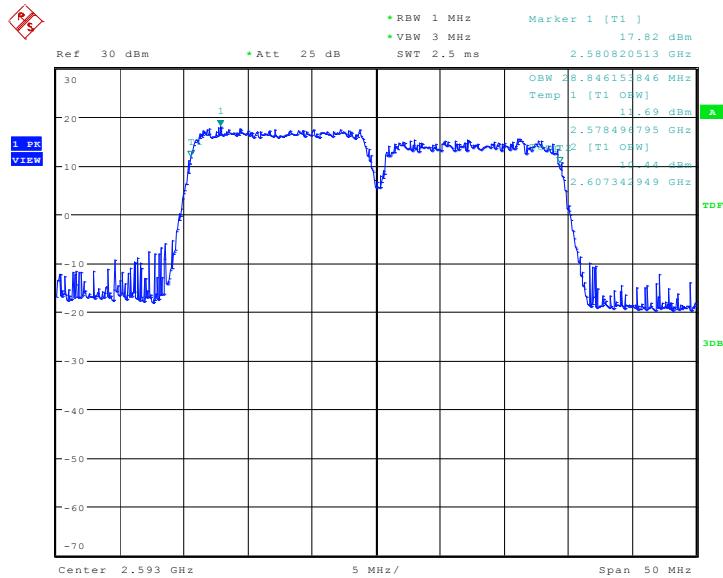
Date: 21.AUG.2020 14:11:59

LTE band 41 , 20MHz+10MHz Bandwidth,16QAM (99% BW)


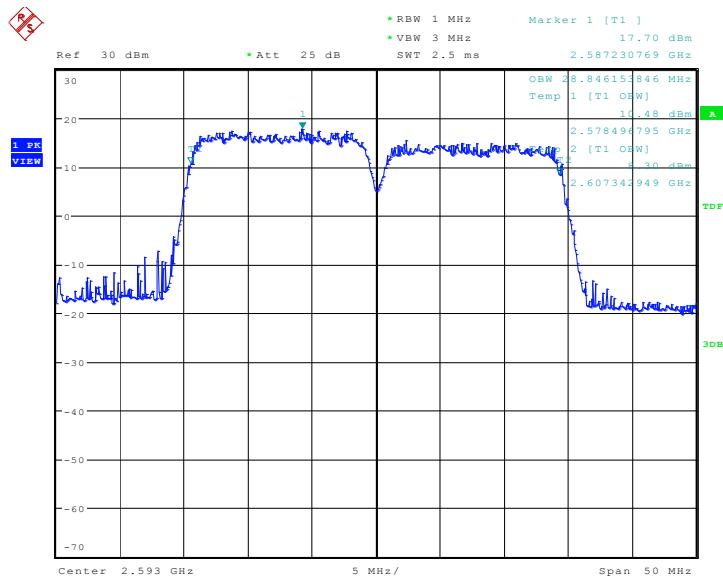
Date: 21.AUG.2020 14:09:04

LTE band 41 , 15MHz+15MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
2593.0	QPSK	16QAM
	28846.15	28846.15

LTE band 41 , 15MHz+15MHz Bandwidth, QPSK (99% BW)


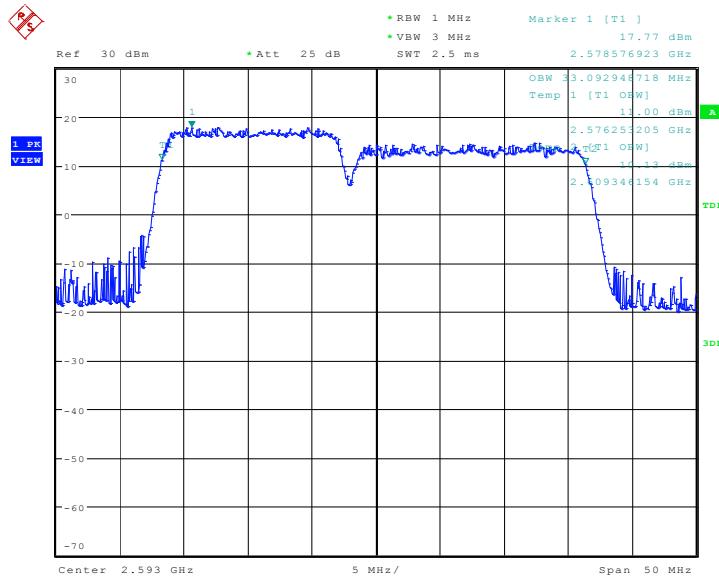
Date: 21.AUG.2020 14:15:54

LTE band 41 , 15MHz+15MHz Bandwidth,16QAM (99% BW)


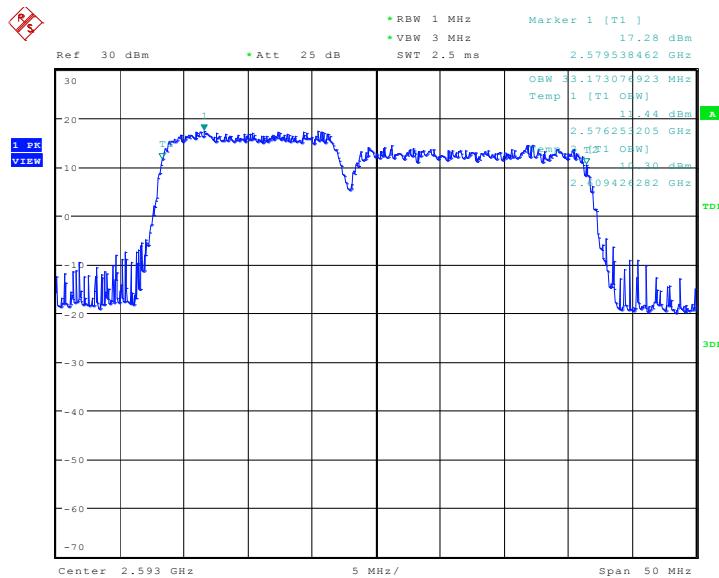
Date: 21.AUG.2020 14:19:05

LTE band 41 , 15MHz+20MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
2593.0	QPSK	16QAM
	33092.95	33173.08

LTE band 41 , 15MHz+20MHz Bandwidth, QPSK (99% BW)


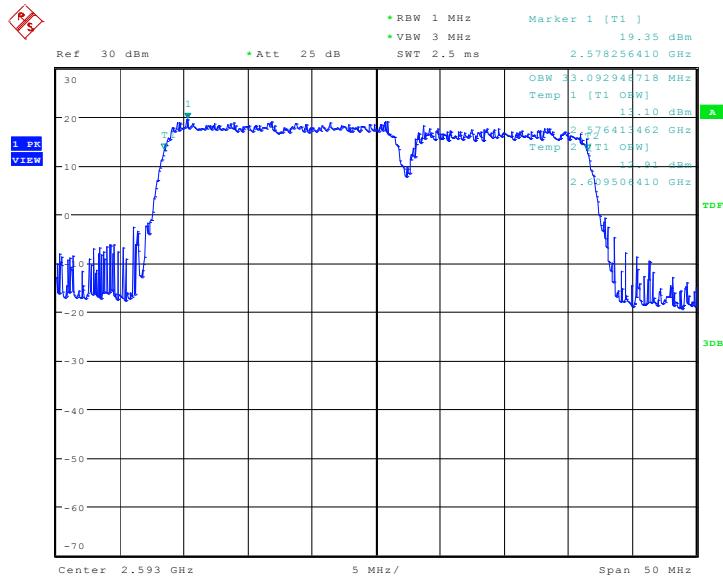
Date: 21.AUG.2020 14:27:21

LTE band 41 , 15MHz+20MHz Bandwidth,16QAM (99% BW)


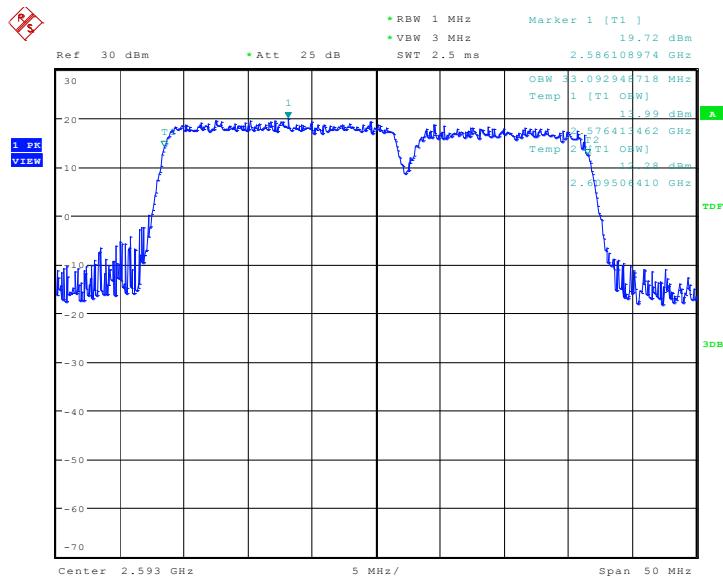
Date: 21.AUG.2020 14:25:03

LTE band 41 , 20MHz+15MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
2593.0	QPSK	16QAM
	33092.95	33092.95

LTE band 41 , 20MHz+15MHz Bandwidth, QPSK (99% BW)


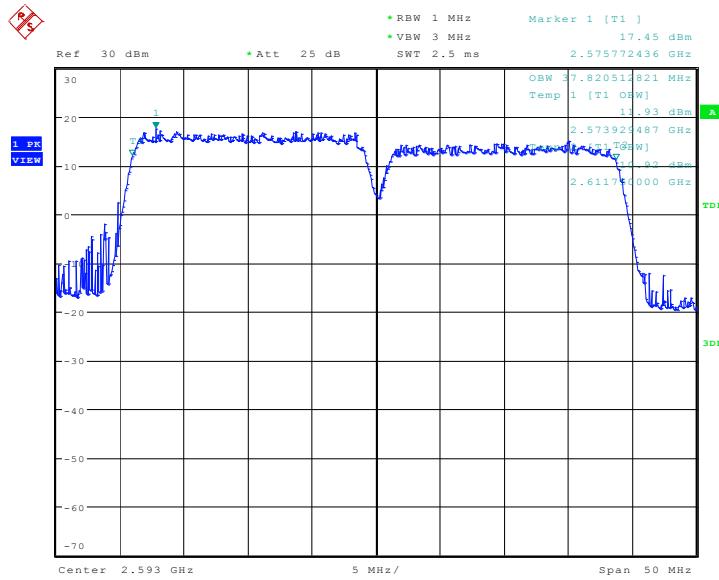
Date: 21.AUG.2020 14:30:49

LTE band 41 , 20MHz+15MHz Bandwidth,16QAM (99% BW)


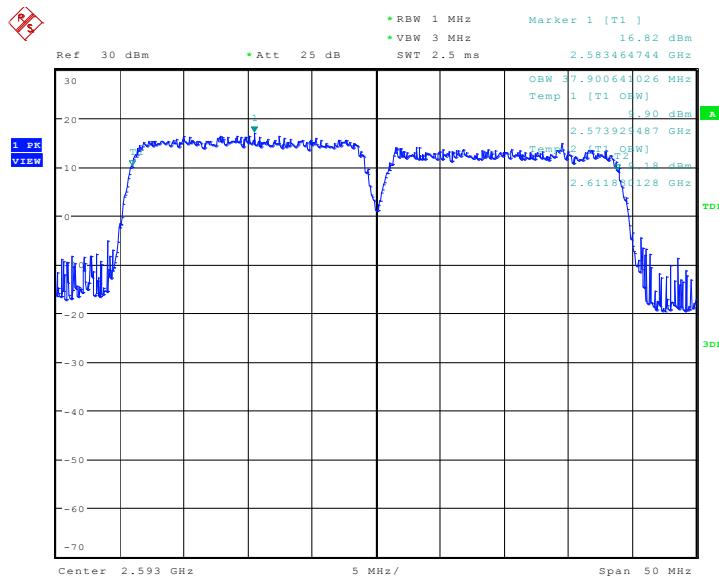
Date: 21.AUG.2020 14:32:39

LTE band 41 , 20MHz+20MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
2593.0	QPSK	16QAM
	37820.51	37900.64

LTE band 41 , 20MHz+20MHz Bandwidth, QPSK (99% BW)


Date: 21.AUG.2020 14:42:04

LTE band 41 , 20MHz+20MHz Bandwidth,16QAM (99% BW)


Date: 21.AUG.2020 14:40:35

A.5 Emission Bandwidth

The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. Table below lists the measured -26dBc BW. Spectrum analyzer plots are included on the following pages.

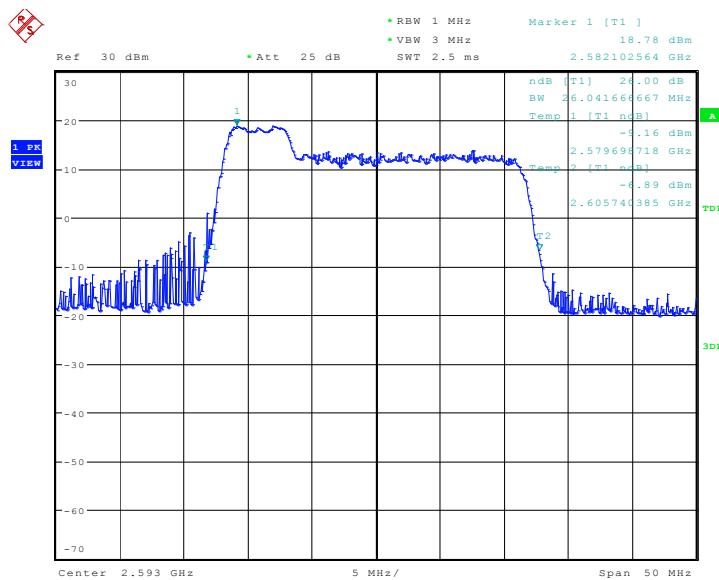
The measurement method is from ANSI C63.26:

- The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be wide enough to see sufficient roll off of the signal to make the measurement.
- The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set $\geq 3 \times$ RBW.
- Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation.
- The dynamic range of the spectrum analyzer at the selected RBW shall be more than 10 dB below the target “-X dB” requirement, i.e., if the requirement calls for measuring the -26 dB OBW, the spectrum analyzer noise floor at the selected RBW shall be at least 36 dB below the reference level.
- Set spectrum analyzer detection mode to peak, and the trace mode to max hold.

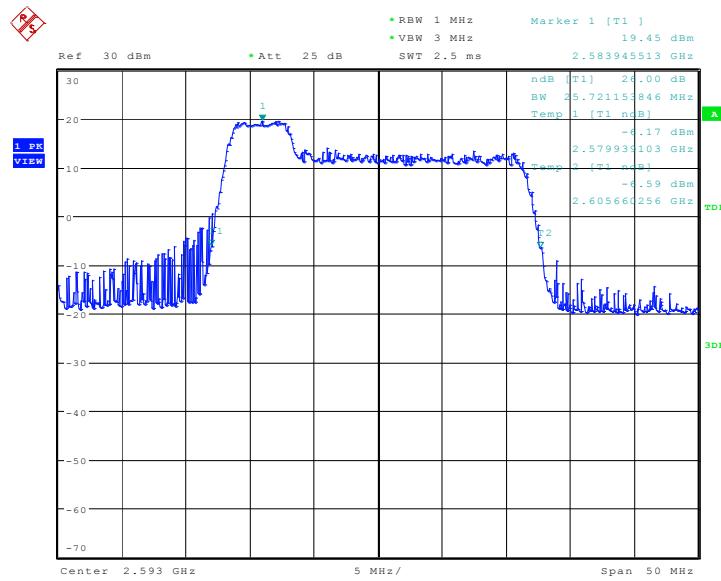
LTE band 41 , 5MHz+20MHz (-26dBc)

Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)	
2593.0	QPSK	16QAM
	26041.67	25721.15

LTE band 41 , 5MHz+20MHz Bandwidth, QPSK (-26dBc BW)



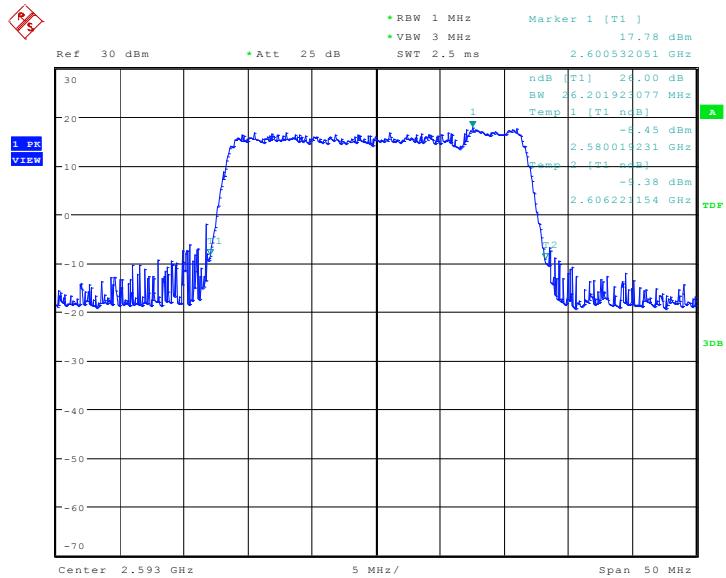
Date: 21.AUG.2020 13:37:59

LTE band 41 , 5MHz+20MHz Bandwidth,16QAM (-26dBc BW)


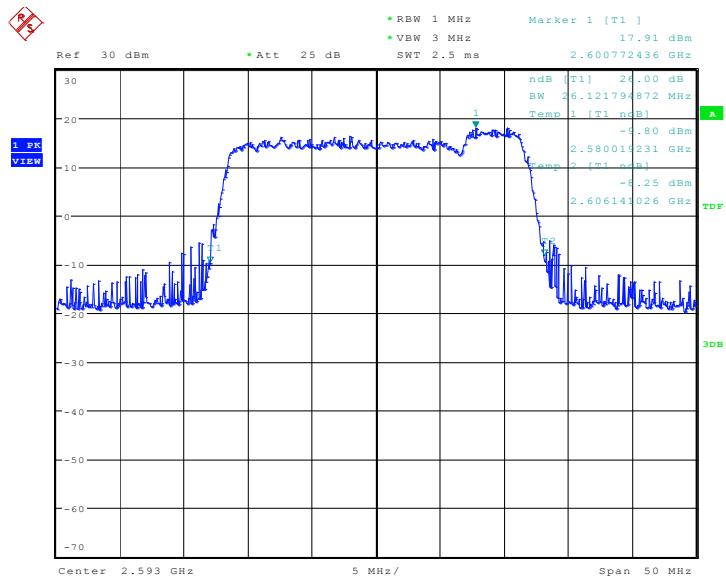
Date: 21.AUG.2020 13:39:45

LTE band 41 , 20MHz+5MHz (-26dBc)

Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)	
2593.0	QPSK	16QAM
	26201.92	26121.79

LTE band 41 , 20MHz+5MHz Bandwidth, QPSK (-26dBc BW)


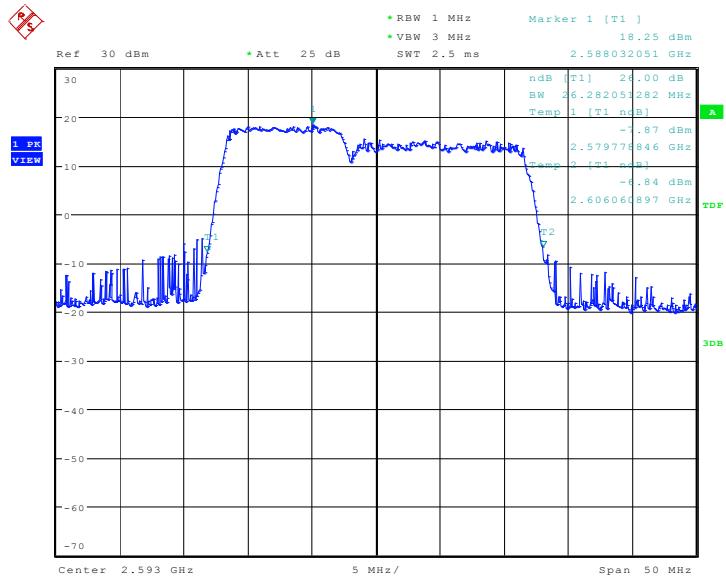
Date: 21.AUG.2020 13:45:03

LTE band 41 , 20MHz+5MHz Bandwidth,16QAM (-26dBc BW)


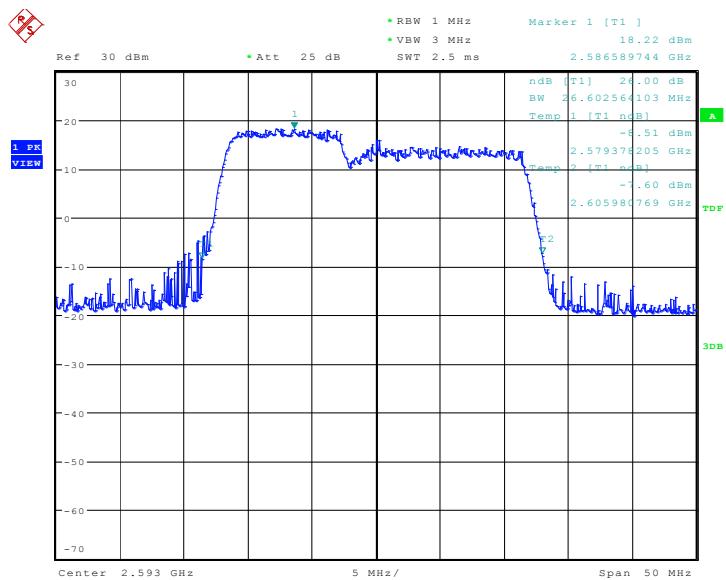
Date: 21.AUG.2020 13:42:56

LTE band 41 , 10MHz+15MHz (-26dBc)

Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)	
2593.0	QPSK	16QAM
	26282.05	26602.56

LTE band 41 , 10MHz+15MHz Bandwidth, QPSK (-26dBc BW)


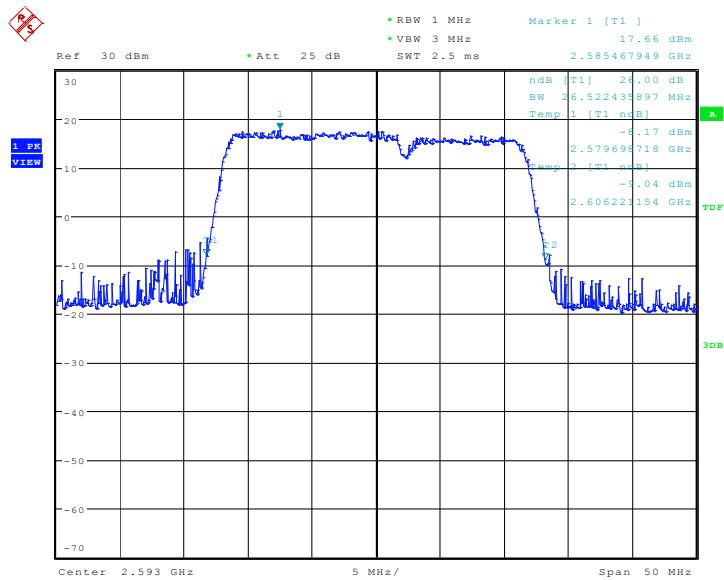
Date: 21.AUG.2020 13:48:07

LTE band 41 , 10MHz+15MHz Bandwidth,16QAM (-26dBc BW)


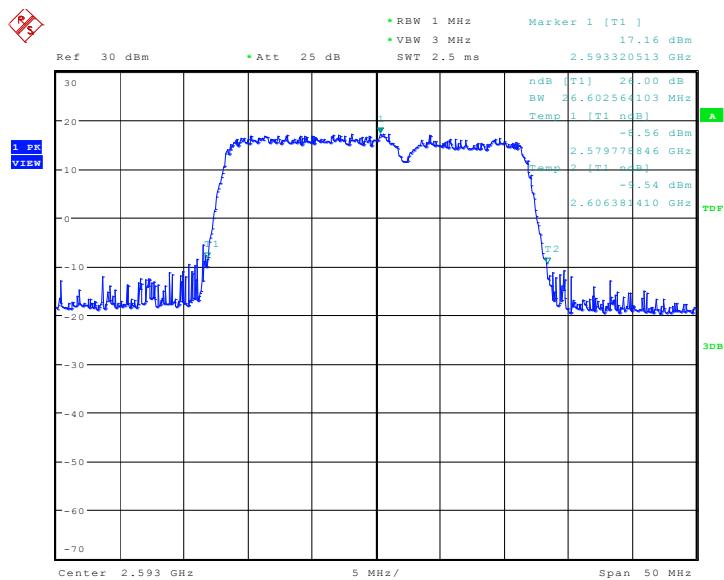
Date: 21.AUG.2020 13:51:04

LTE band 41 , 15MHz+10MHz (-26dBc)

Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)	
2593.0	QPSK	16QAM
	26522.44	26602.56

LTE band 41 , 15MHz+10MHz Bandwidth, QPSK (-26dBc BW)


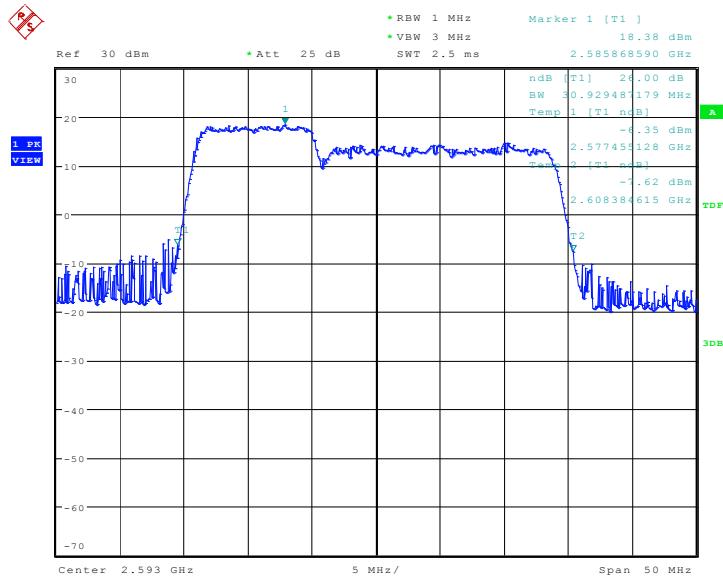
Date: 21.AUG.2020 13:57:12

LTE band 41 , 15MHz+10MHz Bandwidth,16QAM (-26dBc BW)


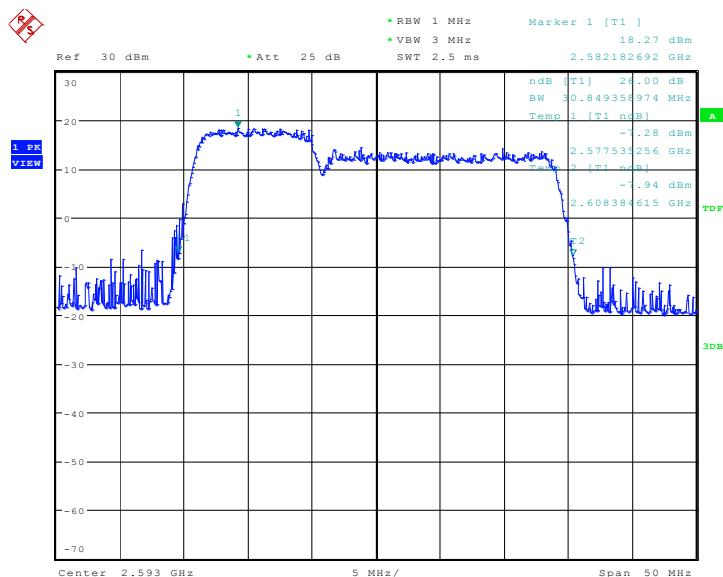
Date: 21.AUG.2020 13:53:58

LTE band 41 , 10MHz+20MHz (-26dBc)

Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)	
2593.0	QPSK	16QAM
	30929.49	30849.36

LTE band 41 , 10MHz+20MHz Bandwidth, QPSK (-26dBc BW)


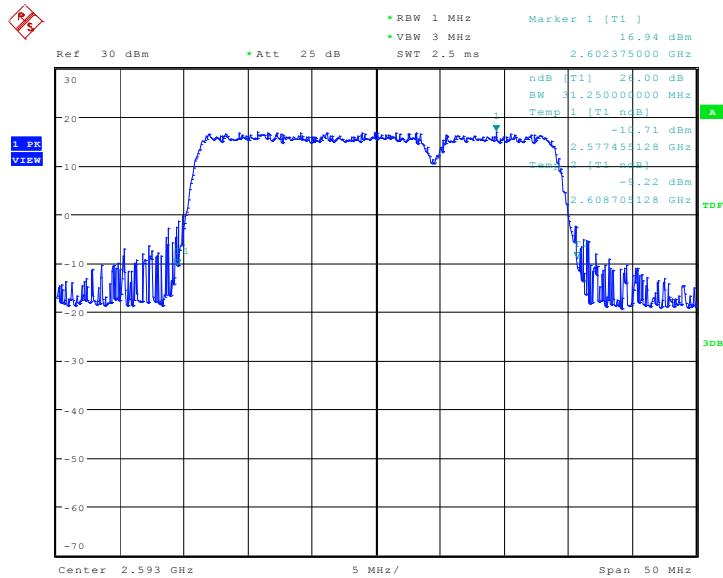
Date: 21.AUG.2020 14:01:46

LTE band 41 , 10MHz+20MHz Bandwidth,16QAM (-26dBc BW)


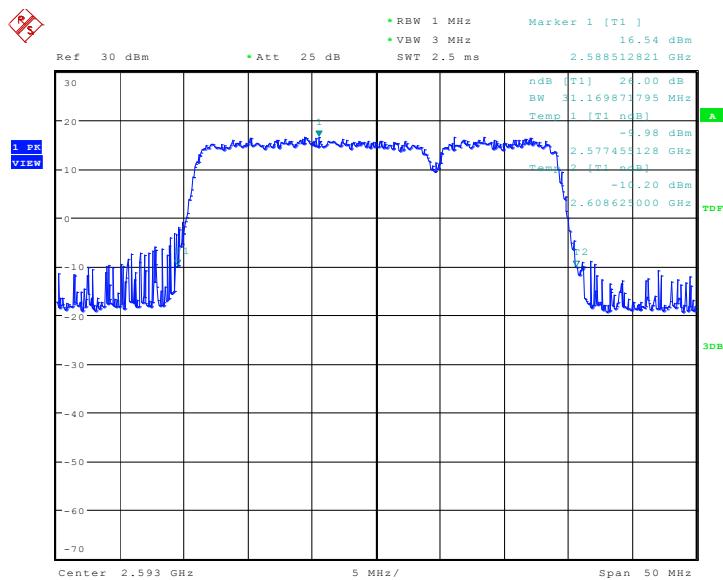
Date: 21.AUG.2020 14:03:58

LTE band 41 , 20MHz+10MHz (-26dBc)

Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)	
2593.0	QPSK	16QAM
	31250.00	31169.87

LTE band 41 , 20MHz+10MHz Bandwidth, QPSK (-26dBc BW)


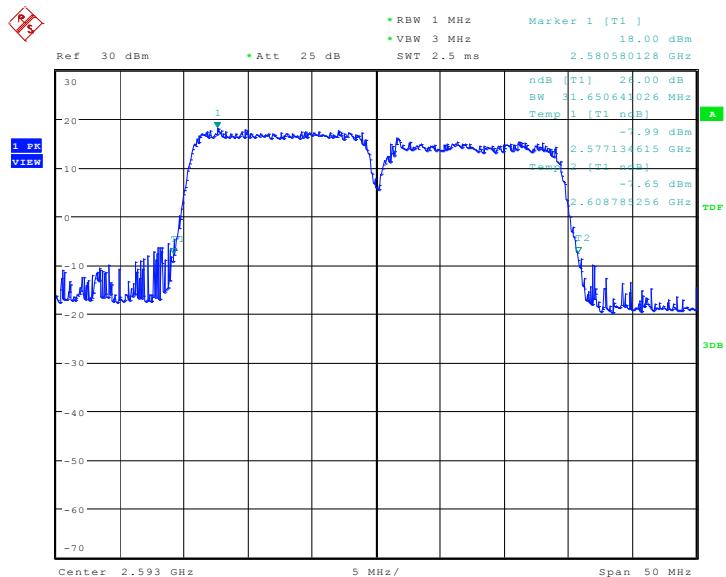
Date: 21.AUG.2020 14:12:16

LTE band 41 , 20MHz+10MHz Bandwidth,16QAM (-26dBc BW)


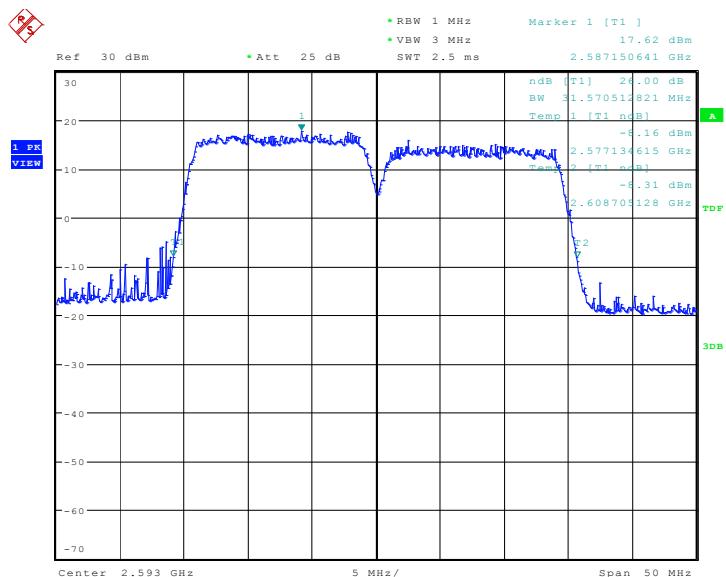
Date: 21.AUG.2020 14:09:23

LTE band 41 , 15MHz+15MHz (-26dBc)

Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)	
2593.0	QPSK	16QAM
	31650.64	31570.51

LTE band 41 , 15MHz+15MHz Bandwidth, QPSK (-26dBc BW)


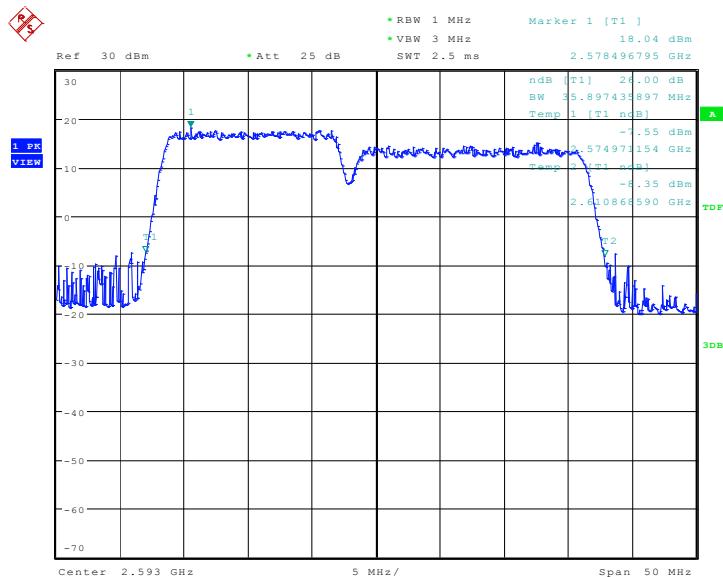
Date: 21.AUG.2020 14:17:33

LTE band 41 , 15MHz+15MHz Bandwidth,16QAM (-26dBc BW)


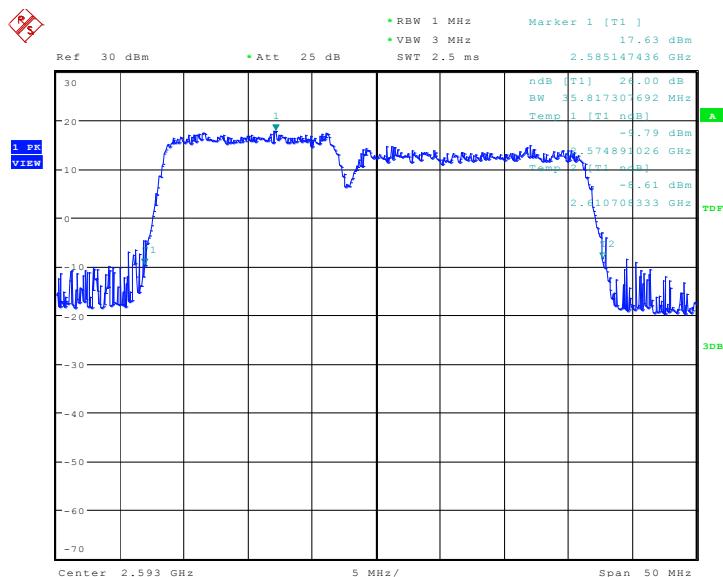
Date: 21.AUG.2020 14:20:00

LTE band 41 , 15MHz+20MHz (-26dBc)

Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)	
2593.0	QPSK	16QAM
	35897.44	35817.31

LTE band 41 , 15MHz+20MHz Bandwidth, QPSK (-26dBc BW)


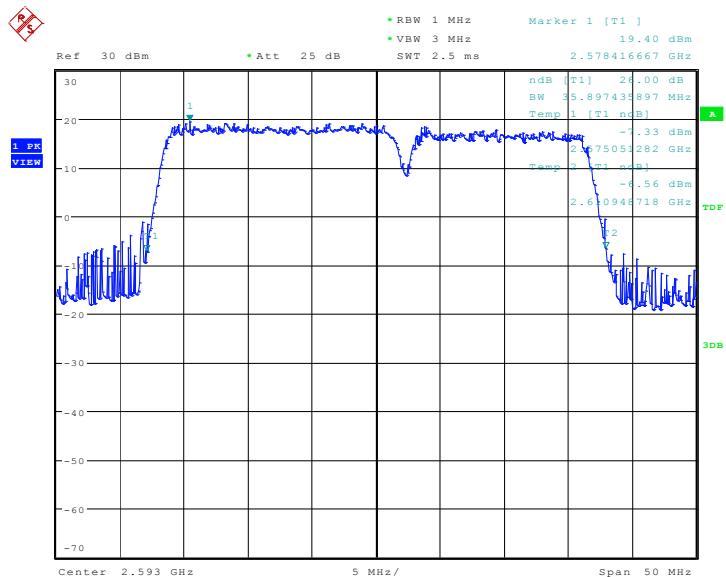
Date: 21.AUG.2020 14:27:55

LTE band 41 , 15MHz+20MHz Bandwidth,16QAM (-26dBc BW)


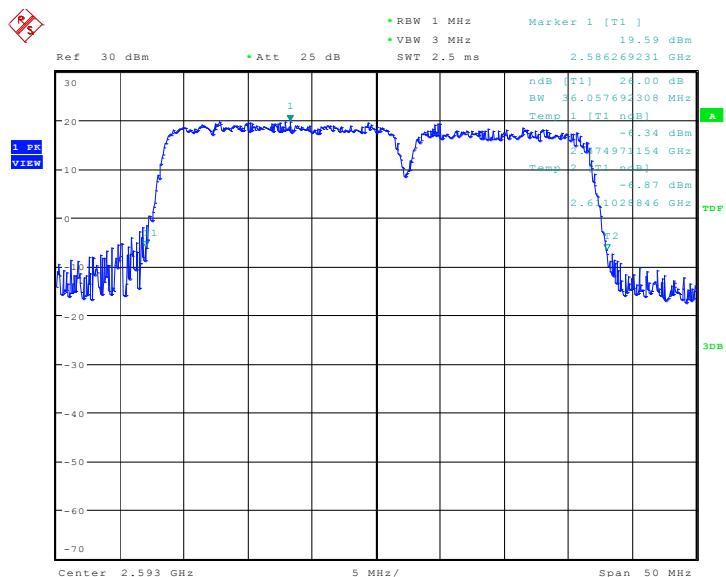
Date: 21.AUG.2020 14:26:29

LTE band 41 , 20MHz+15MHz (-26dBc)

Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)	
2593.0	QPSK	16QAM
	35897.44	36057.69

LTE band 41 , 20MHz+15MHz Bandwidth, QPSK (-26dBc BW)


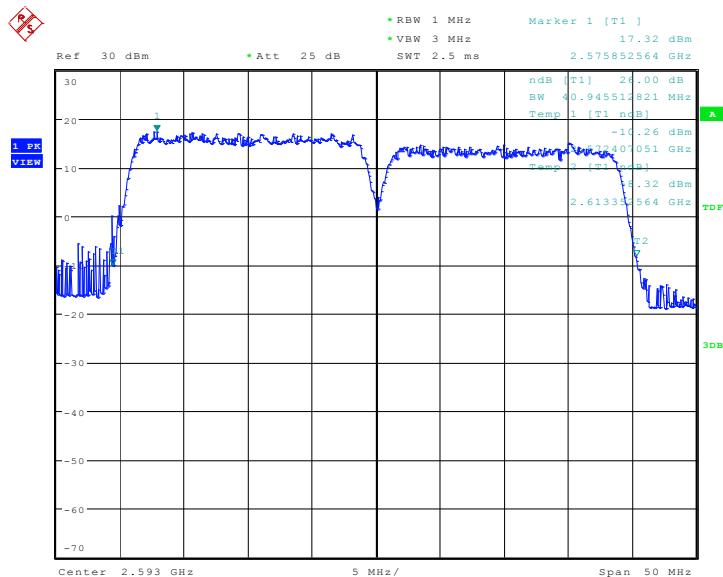
Date: 21.AUG.2020 14:31:21

LTE band 41 , 20MHz+15MHz Bandwidth,16QAM (-26dBc BW)


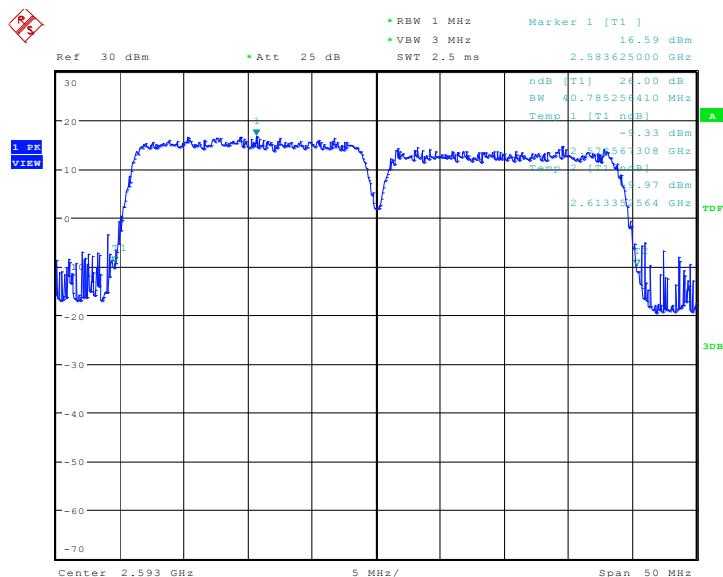
Date: 21.AUG.2020 14:36:18

LTE band 41 , 20MHz+20MHz (-26dBc)

Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)	
2593.0	QPSK	16QAM
	40945.51	40785.26

LTE band 41 , 20MHz+20MHz Bandwidth, QPSK (-26dBc BW)


Date: 21.AUG.2020 14:42:21

LTE band 41 , 20MHz+20MHz Bandwidth,16QAM (-26dBc BW)


Date: 21.AUG.2020 14:41:11

A.6 Band Edge Compliance

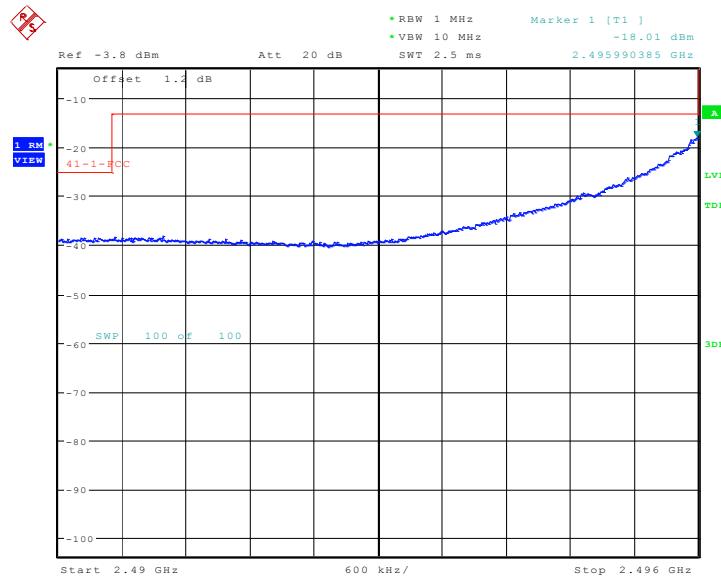
A.6.1 Measurement limit

Part 27.53(m)(4) specifies 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 than $43 + 10 \log (P)$ 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.

A.6.2 Measurement result

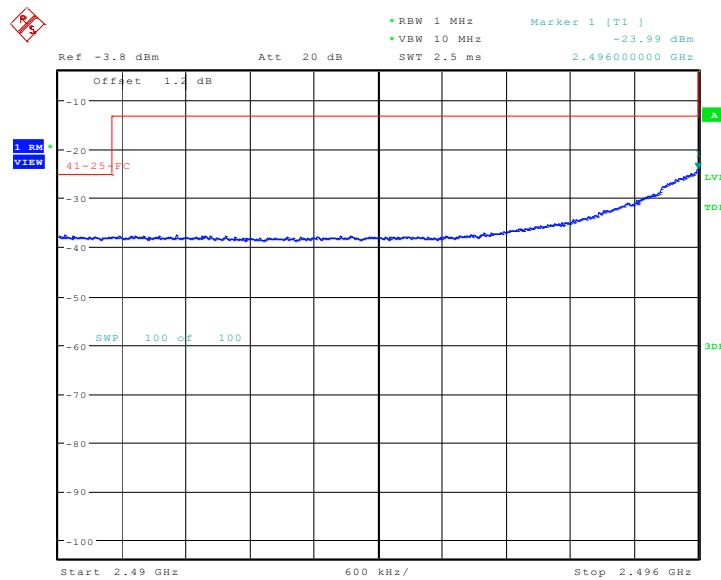
LTE band 41

LOW BAND EDGE BLOCK-5MHz+20MHz-1RB



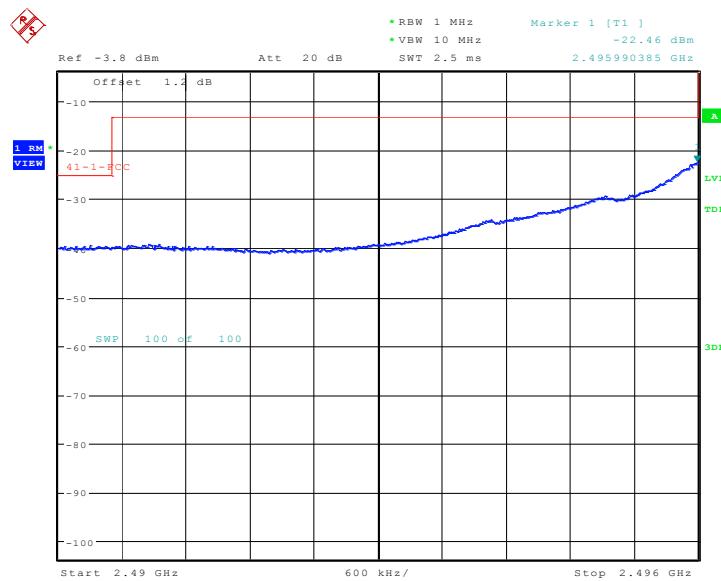
Date: 21.AUG.2020 20:03:00

LOW BAND EDGE BLOCK-5MHz+20MHz -100%RB



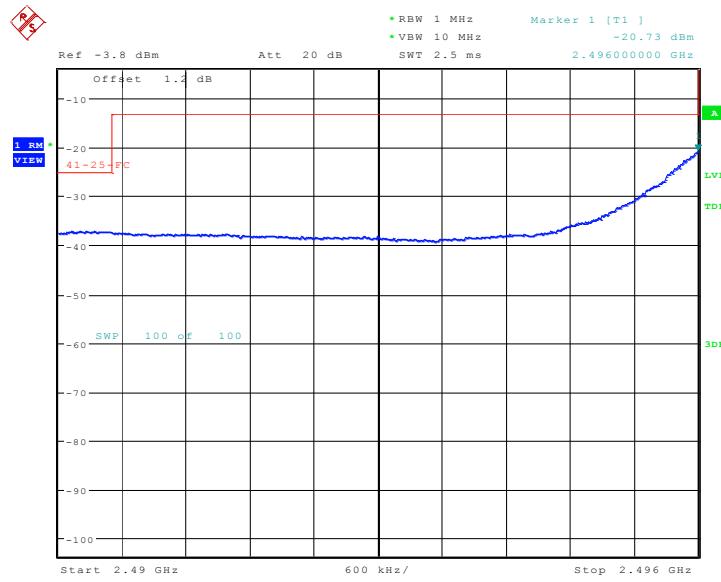
Date: 21.AUG.2020 20:04:17

LOW BAND EDGE BLOCK-10MHz+15MHz-1RB



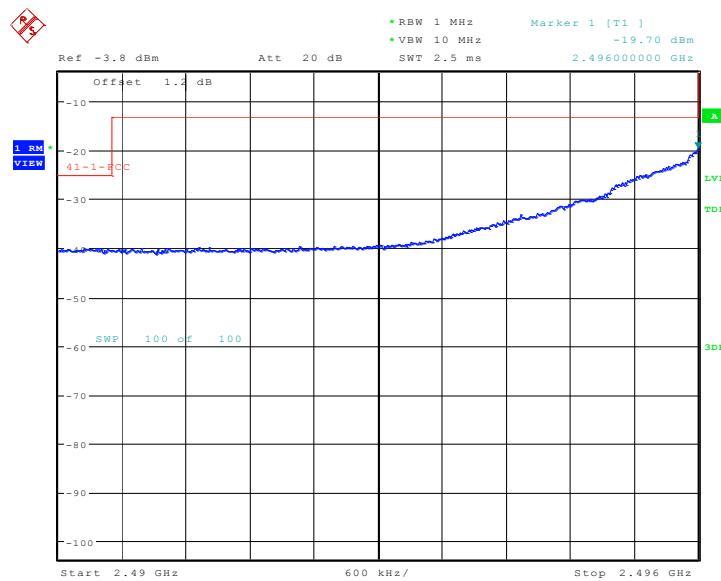
Date: 22.AUG.2020 19:58:10

LOW BAND EDGE BLOCK-10MHz+15MHz -100%RB



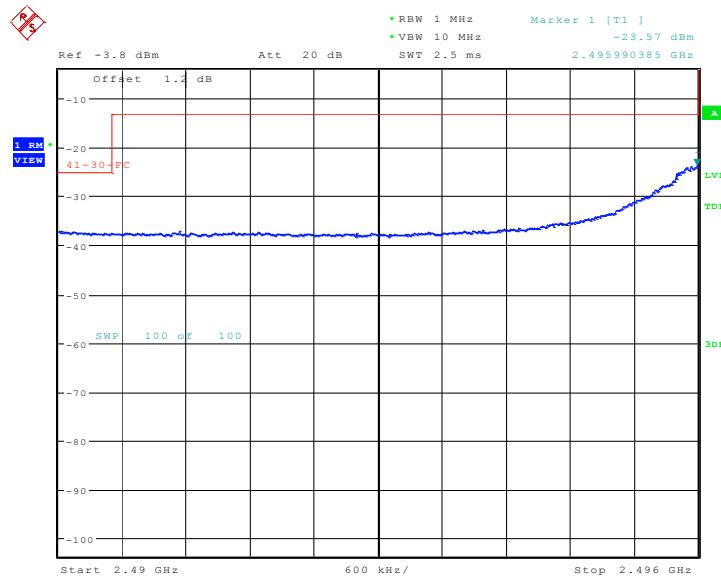
Date: 22.AUG.2020 19:58:58

LOW BAND EDGE BLOCK-10MHz+20MHz-1RB



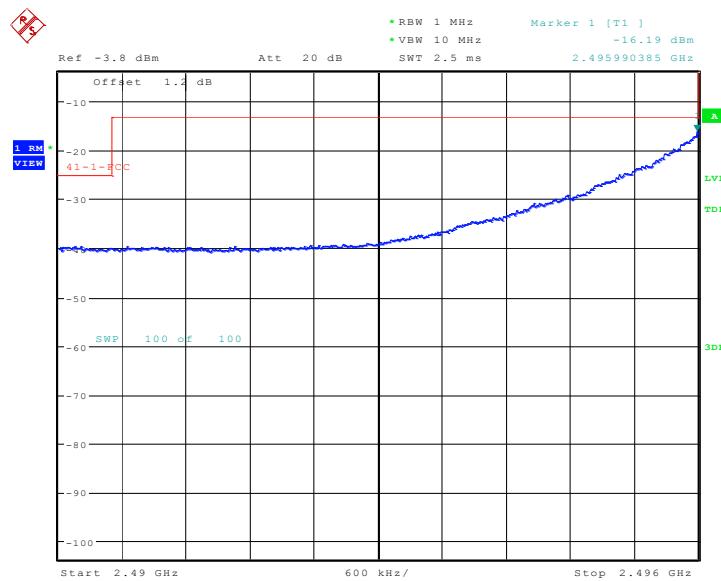
Date: 21.AUG.2020 20:07:23

LOW BAND EDGE BLOCK-10MHz+20MHz -100%RB



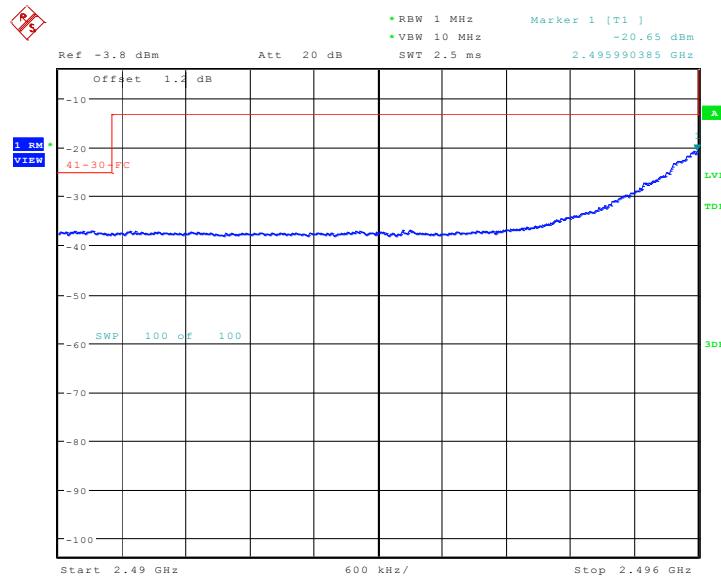
Date: 21.AUG.2020 20:08:31

LOW BAND EDGE BLOCK-15MHz+15MHz-1RB



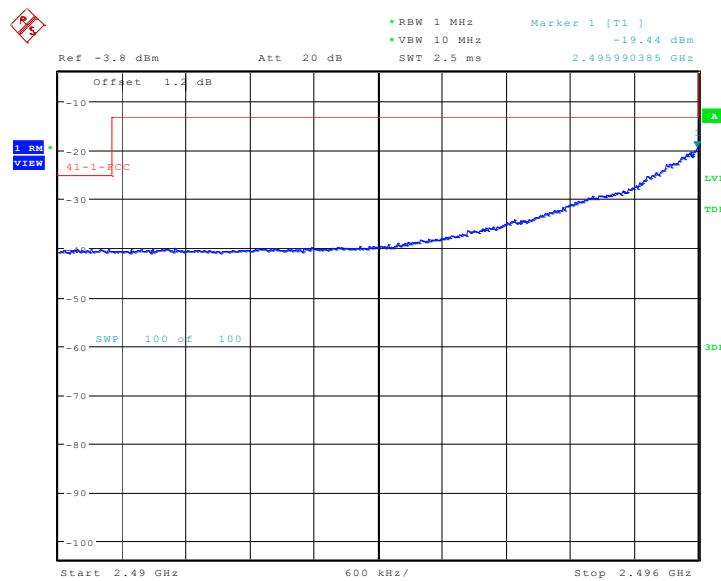
Date: 21.AUG.2020 20:11:43

LOW BAND EDGE BLOCK-15MHz+15MHz -100%RB



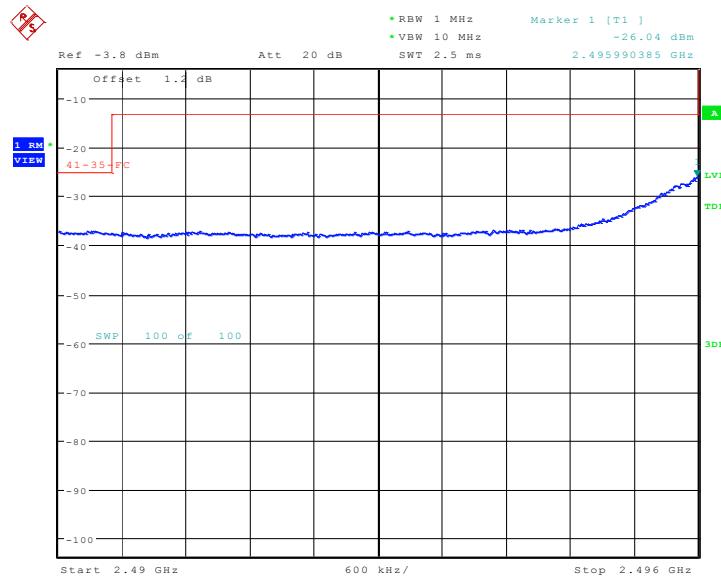
Date: 21.AUG.2020 20:12:28

LOW BAND EDGE BLOCK-15MHz+20MHz-1RB



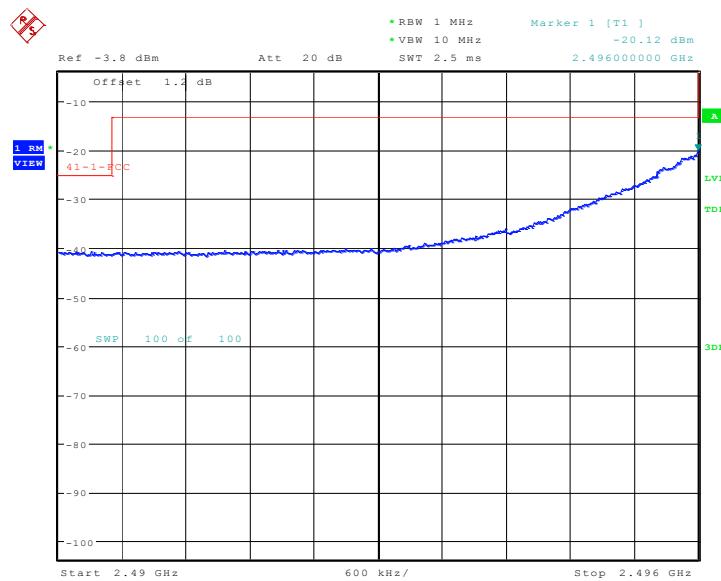
Date: 21.AUG.2020 20:15:10

LOW BAND EDGE BLOCK-15MHz+20MHz -100%RB



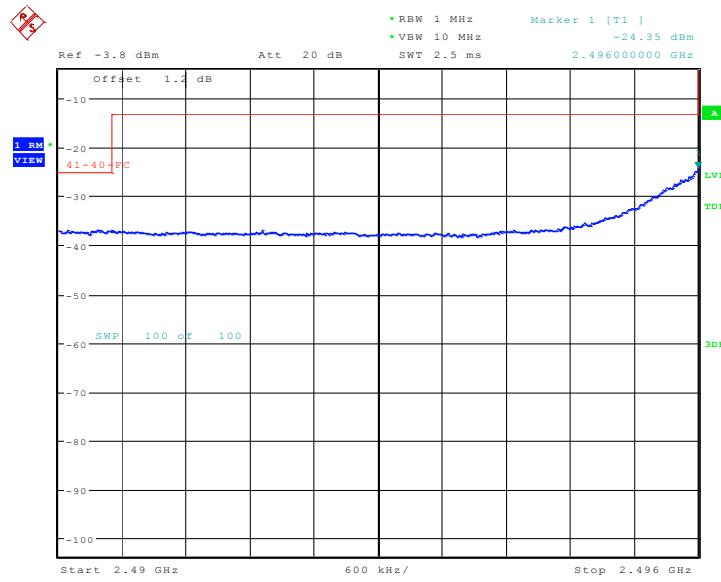
Date: 21.AUG.2020 20:15:52

LOW BAND EDGE BLOCK-20MHz+20MHz-1RB



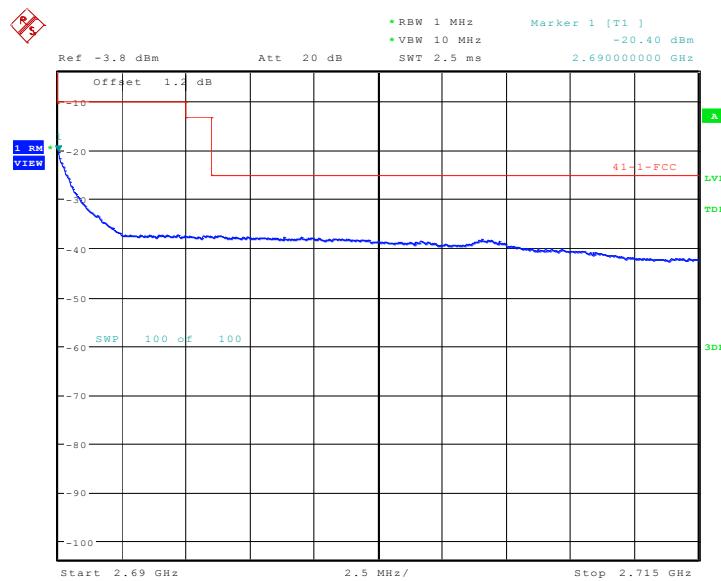
Date: 21.AUG.2020 20:18:14

LOW BAND EDGE BLOCK-20MHz+20MHz -100%RB



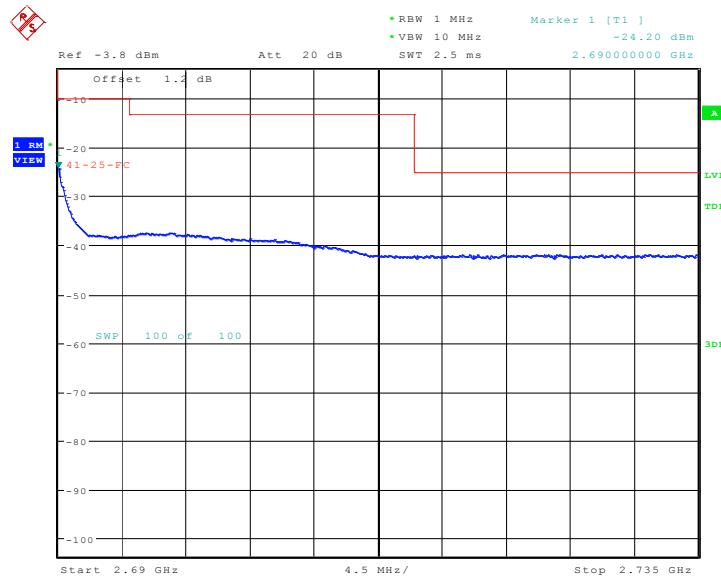
Date: 21.AUG.2020 20:19:33

HIGH BAND EDGE BLOCK-20MHz+5MHz-1RB



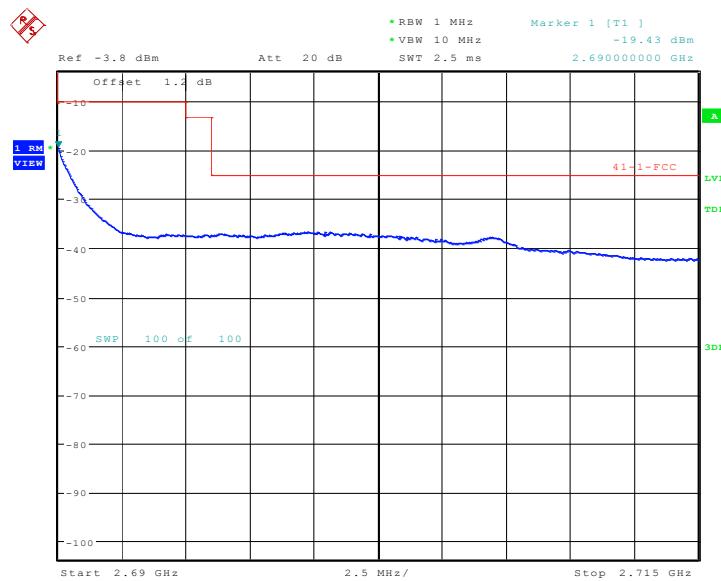
Date: 22.AUG.2020 18:36:00

HIGH BAND EDGE BLOCK-20MHz+5MHz -100%RB



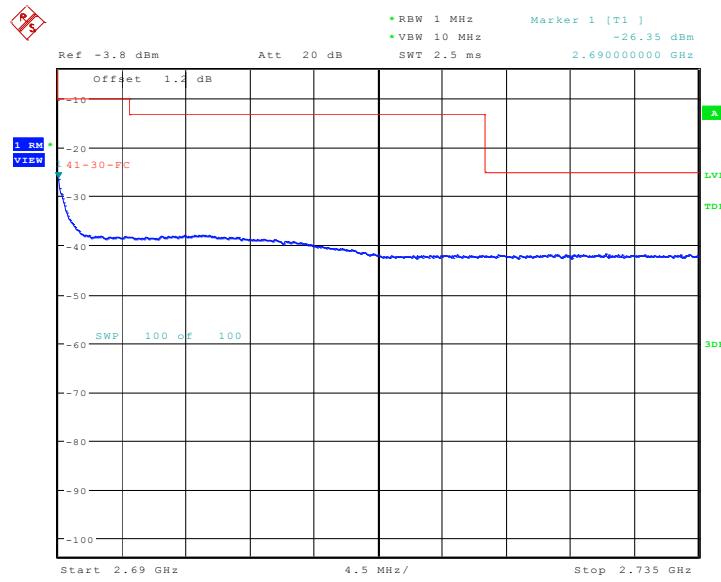
Date: 22.AUG.2020 18:37:09

HIGH BAND EDGE BLOCK-20MHz+10MHz-1RB



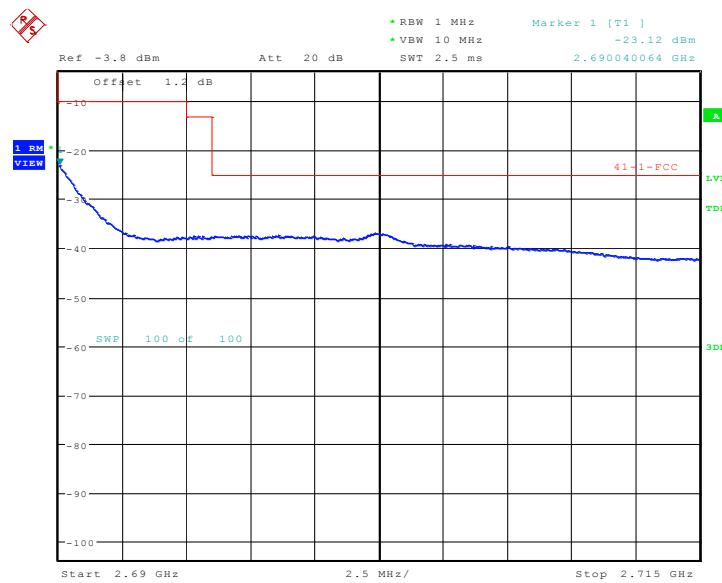
Date: 22.AUG.2020 18:40:30

HIGH BAND EDGE BLOCK-20MHz+10MHz -100%RB



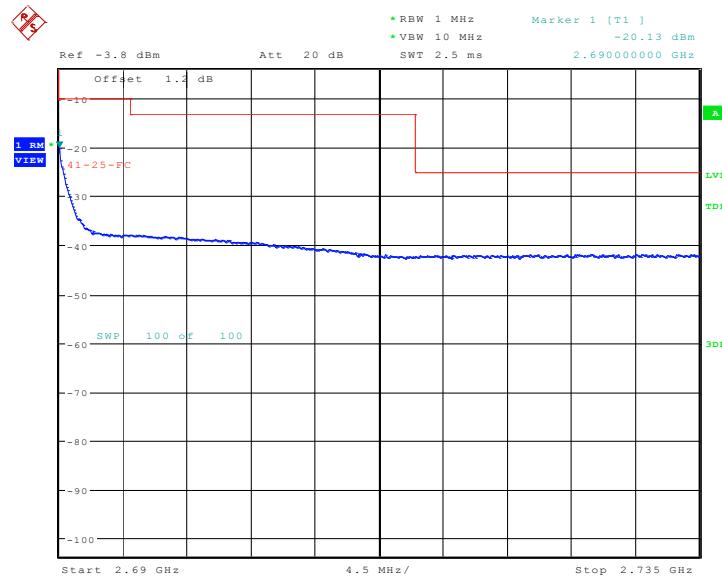
Date: 22.AUG.2020 18:39:22

HIGH BAND EDGE BLOCK-15MHz+10MHz-1RB



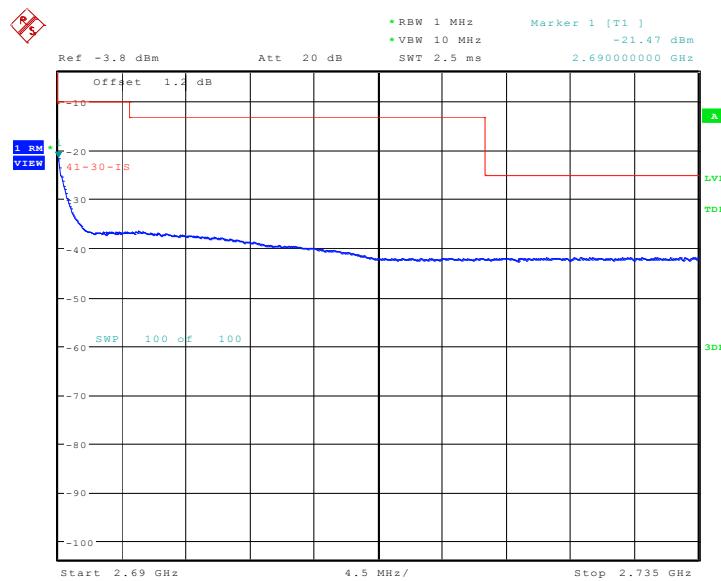
Date: 26.AUG.2020 15:20:47

HIGH BAND EDGE BLOCK-15MHz+10MHz -100%RB



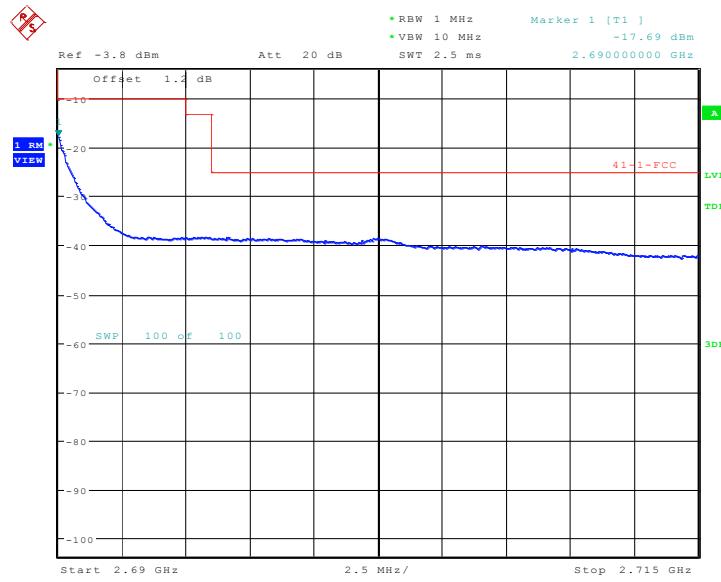
Date: 22.AUG.2020 18:45:22

HIGH BAND EDGE BLOCK-15MHz+15MHz-1RB



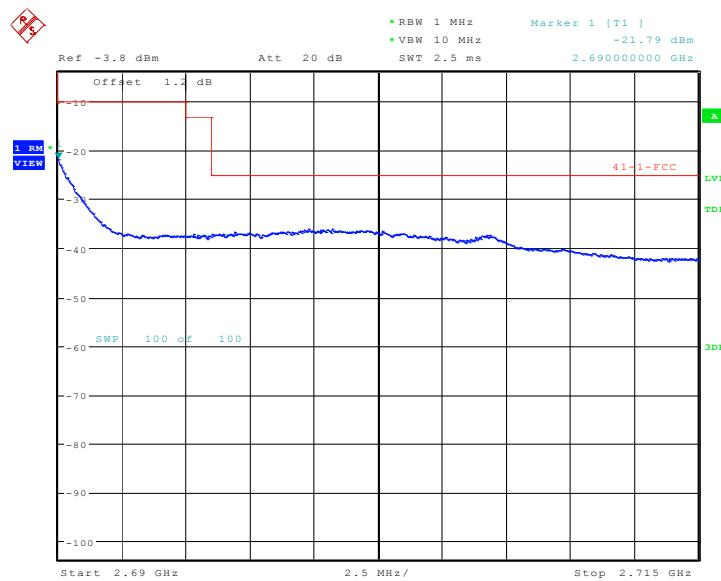
Date: 22.AUG.2020 18:47:41

HIGH BAND EDGE BLOCK-15MHz+15MHz -100%RB



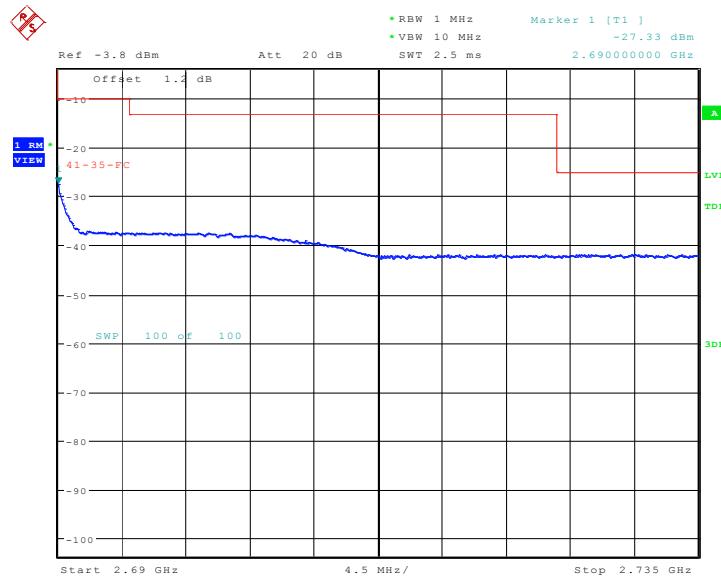
Date: 22.AUG.2020 18:48:38

HIGH BAND EDGE BLOCK-20MHz+15MHz-1RB



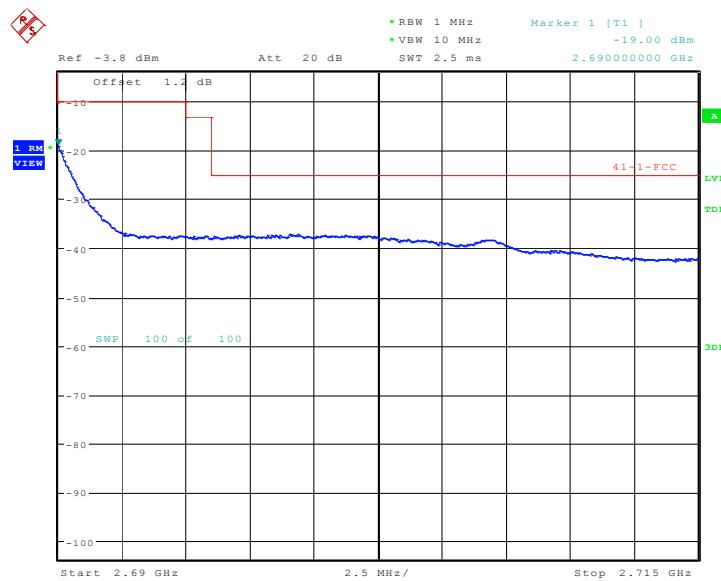
Date: 22.AUG.2020 18:51:25

HIGH BAND EDGE BLOCK-20MHz+15MHz -100%RB



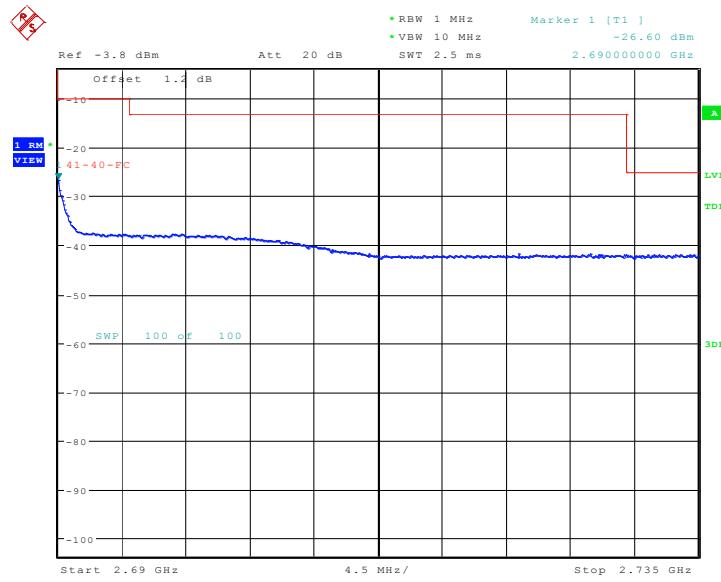
Date: 22.AUG.2020 18:52:12

HIGH BAND EDGE BLOCK-20MHz+20MHz-1RB



Date: 22.AUG.2020 18:54:45

HIGH BAND EDGE BLOCK-20MHz+20MHz -100%RB



Date: 22.AUG.2020 18:53:49

A.7 Conducted Spurious Emission

A.7.1 Measurement Method

The following steps outline the procedure used to measure the conducted emissions from the EUT.

1. In measuring unwanted emissions, the spectrum shall be investigated from 30 MHz or the lowest radio frequency signal generated in the equipment, whichever is lower, without going below 9 kHz, up to at least the frequency given below:
 - (a) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
 - (b) If the equipment operates at or above 10 GHz: to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.
2. Determine EUT transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.
3. The number of sweep points of spectrum analyzer is set to 30001 which is greater than span/RBW.

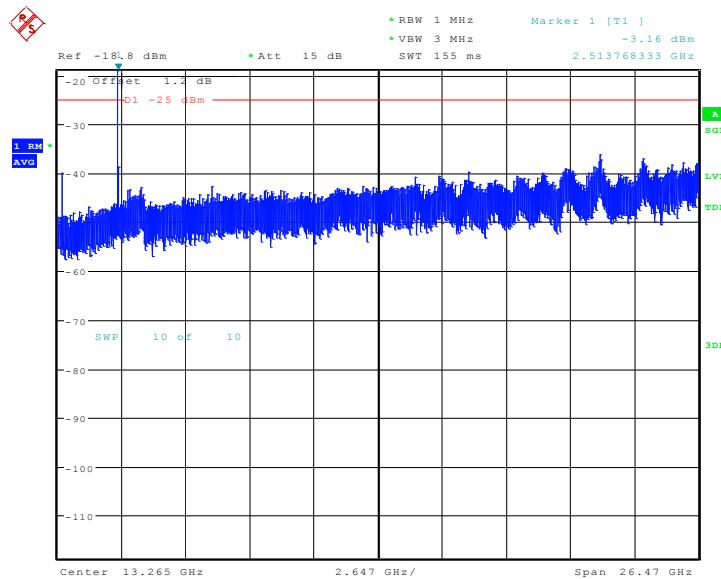
A. 7.2 Measurement Limit

Part 27.53(m)(4) specifies 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 than $43 + 10 \log (P)$ 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.

A. 7.3 Measurement result

Only worst case result is given below

LTE band 41



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A.8 Peak-to-Average Power Ratio

The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB

- a) Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;
- b) Set resolution/measurement bandwidth \geq signal's occupied bandwidth;
- c) Set the number of counts to a value that stabilizes the measured CCDF curve;
- d) Record the maximum PAPR level associated with a probability of 0.1%.

LTE band 41, 20MHz+20MHz

Frequency(MHz)	PAPR(dB)		
2593.0	QPSK	16QAM	64QAM
	8.81	9.29	9.36

ANNEX B: Accreditation Certificate

United States Department of Commerce
National Institute of Standards and Technology



Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 600118-0

Telecommunication Technology Labs, CAICT
Beijing
China

*is accredited by the National Voluntary Laboratory Accreditation Program for specific services,
listed on the Scope of Accreditation, for:*

Electromagnetic Compatibility & Telecommunications

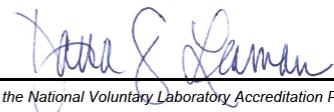
*This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005.
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality
management system (refer to joint ISO-ILAC-IAF Communiqué dated January 2009).*

2019-09-26 through 2020-09-30

Effective Dates



For the National Voluntary Laboratory Accreditation Program



*****END OF REPORT*****