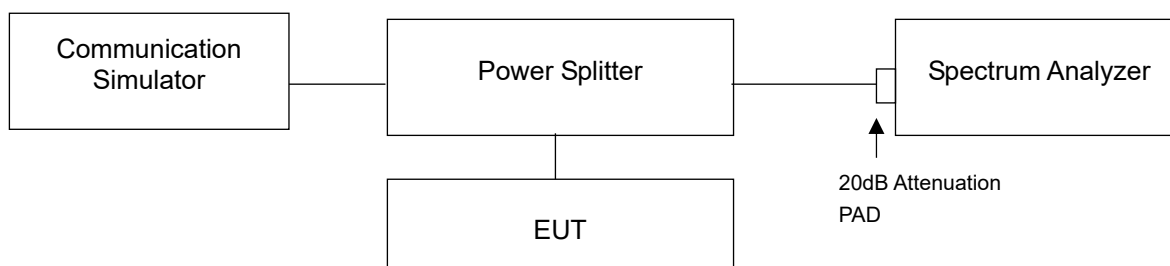


4.6 Conducted Spurious Emissions

4.6.1 Limits of Conducted Spurious Emissions Measurement

Power of any emissions outside the Fundamental	Limit
Within 0-10MHz above the Assigned Channel	-13 dBm/MHz
Within 0-10MHz below the Assigned Channel	
Greater than 0-10MHz above the Assigned Channel	-25 dBm/MHz
Greater than 0-10MHz below the Assigned Channel	
Power of any emission below 3530MHz	-40 dBm/MHz
Power of any emission above 3720MHz	

4.6.2 Test Setup



4.6.3 Test Procedure

- The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- Measuring frequency range are from 9 kHz to 40GHz. 20dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.
- Measuring frequency band edge, 20dB attenuation pad is connected with spectrum. 1% of the fundamental emission bandwidth is used for conducted emission measurement.
- For 5 MHz channel BW mode, extend the 1% range from 1M to 2M above and below the channel edge and then reduce the limit further by $10 \log (1000/100)=10\text{dB}$ (i.e. total $-13 + -10=-23\text{dB}$) to compensate for the integration from 100k to 1M.

4.6.4 Test Results

LTE Band 48, Channel Bandwidth 5MHz

Channel 55265 (3552.5MHz)

1RB



Full RB



Channel 55990 (3625.0MHz)

1RB



Full RB

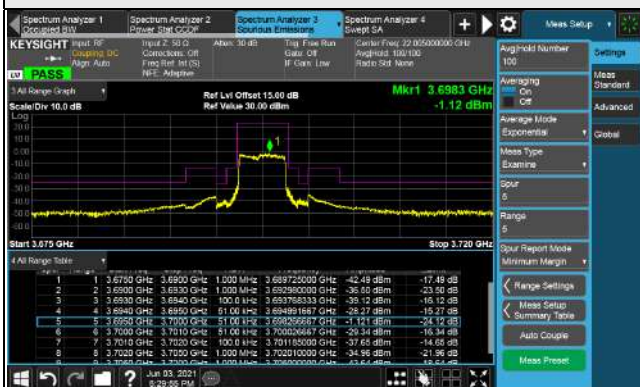


Channel 56715 (3697.5MHz)

1RB



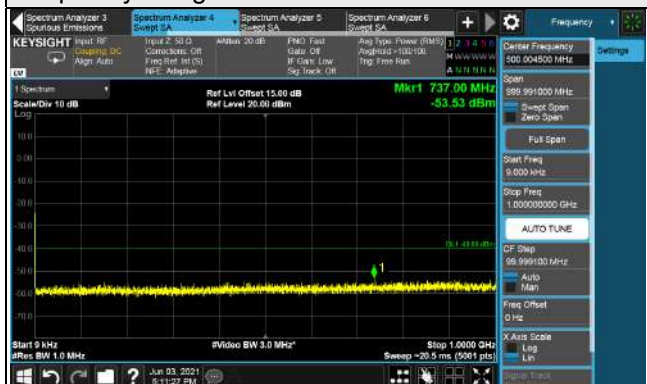
Full RB



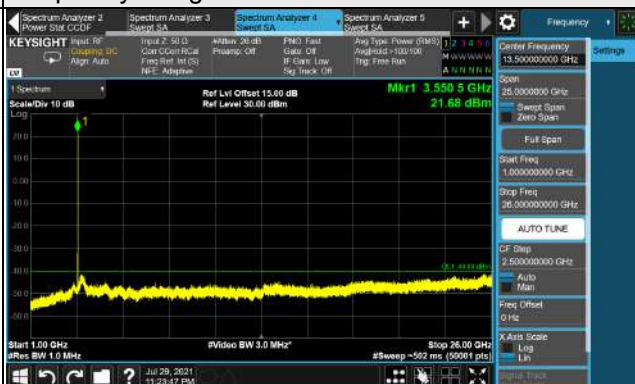
LTE Band 48, Channel Bandwidth 5MHz

Channel 55265 (3552.5MHz)

Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~13GHz



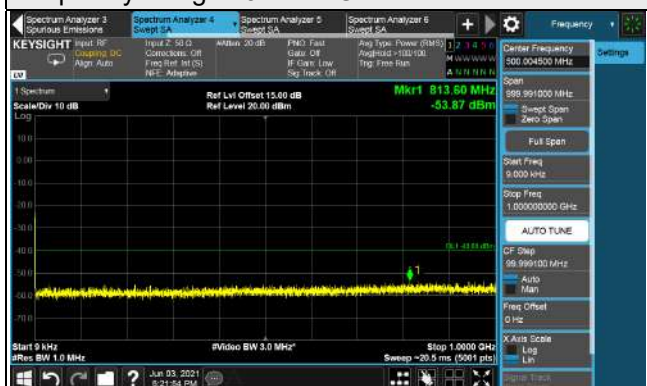
Frequency Range : 26GHz~40GHz



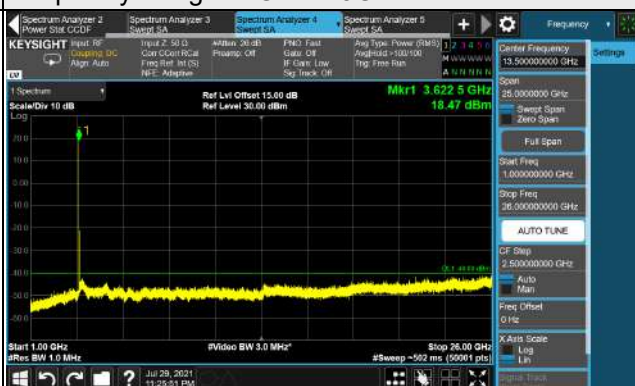
LTE Band 48, Channel Bandwidth 5MHz

Channel 55990 (3625.0MHz)

Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~13GHz



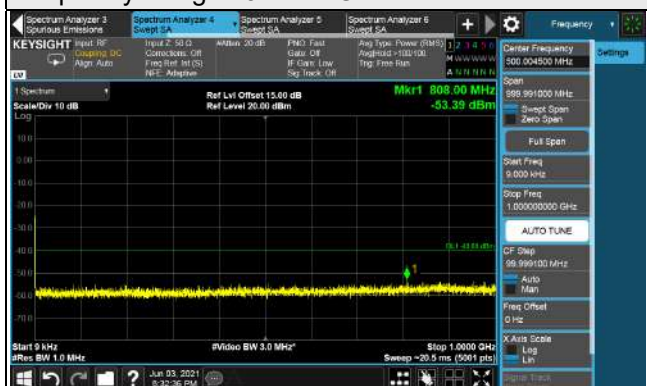
Frequency Range : 26GHz~40GHz



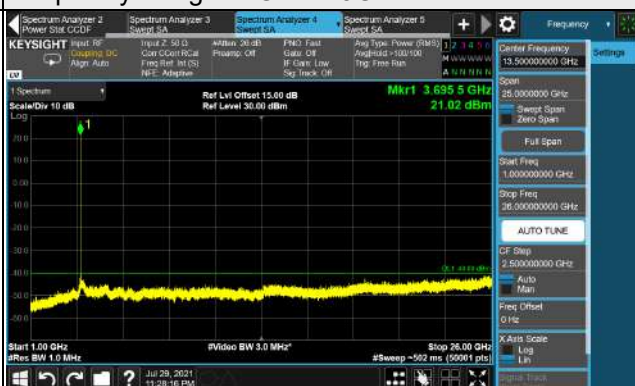
LTE Band 48, Channel Bandwidth 5MHz

Channel 56715 (3697.50MHz)

Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~13GHz



Frequency Range : 26GHz~40GHz



LTE Band 48, Channel Bandwidth 10MHz

Channel 55290 (3555.0MHz)

1RB



Full RB



Channel 55990 (3625.00MHz)

1RB



Full RB



Channel 56690 (3695.0MHz)

1RB



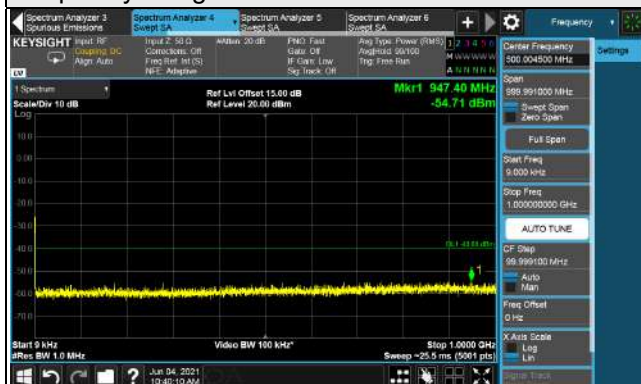
Full RB



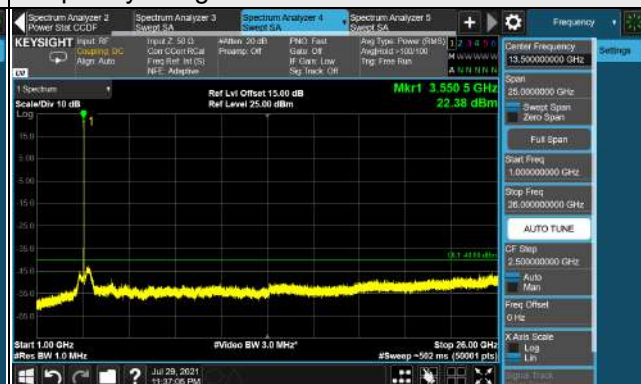
LTE Band 48, Channel Bandwidth 10MHz

Channel 55290 (3555.0MHz)

Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~26GHz



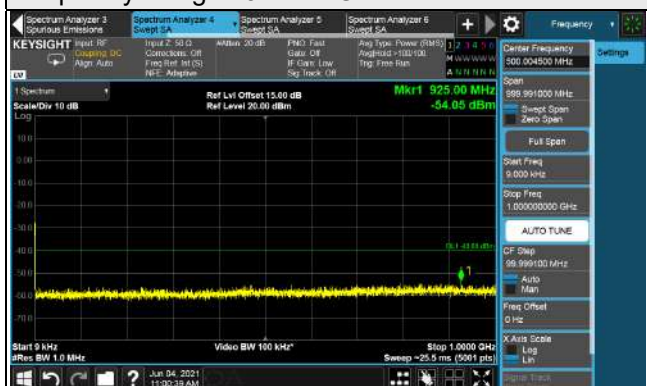
Frequency Range : 26GHz~40GHz



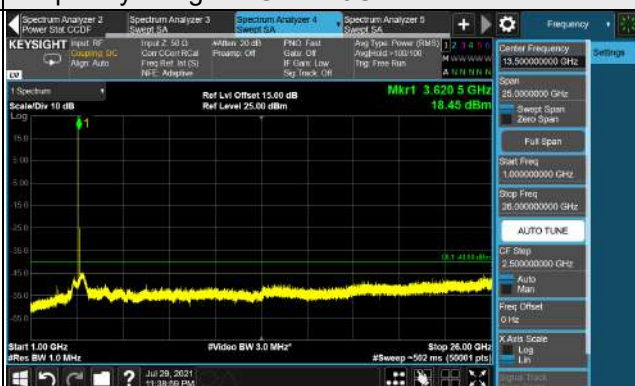
LTE Band 48, Channel Bandwidth 10MHz

Channel 55990 (3625.00MHz)

Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~26GHz



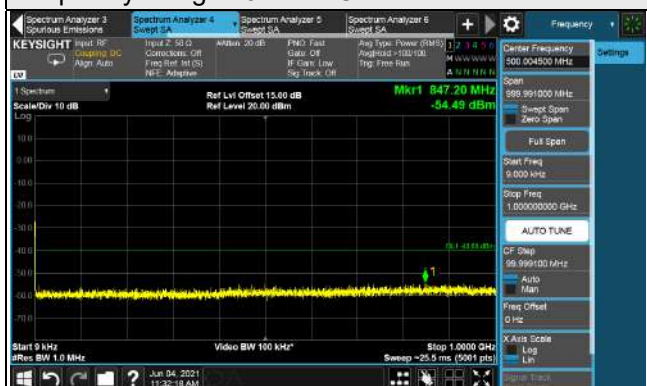
Frequency Range : 26GHz~40GHz



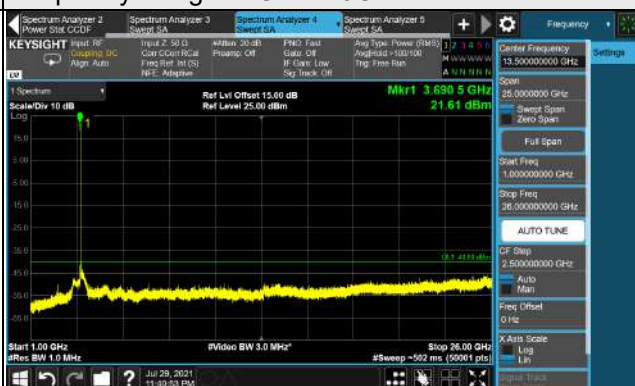
LTE Band 48, Channel Bandwidth 10MHz

Channel 56690 (3695.0MHz)

Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~26GHz



Frequency Range : 26GHz~40GHz



LTE Band 48, Channel Bandwidth 15MHz

Channel 55315 (3557.50MHz)

1RB



Full RB

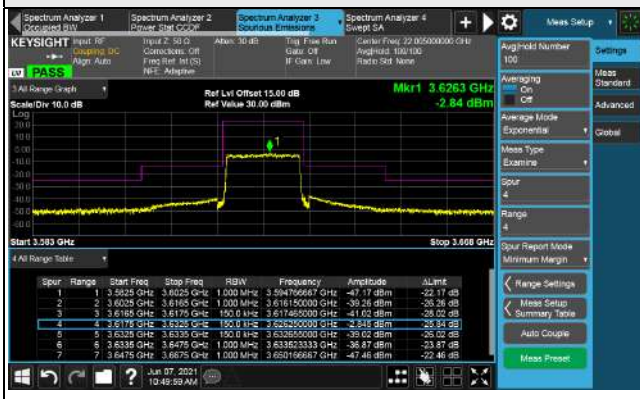


Channel 55990 (3625.0MHz)

1RB



Full RB

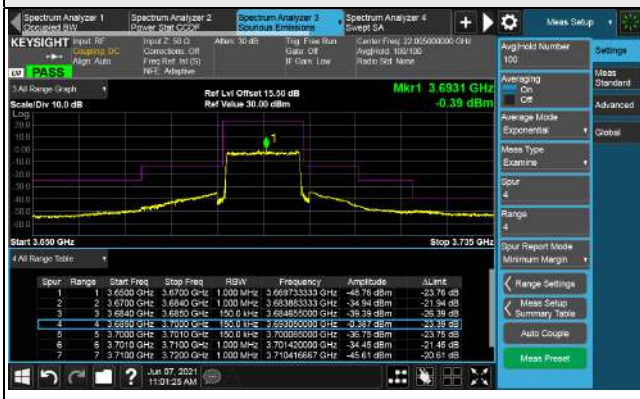


Channel 56665 (3692.5MHz)

1RB



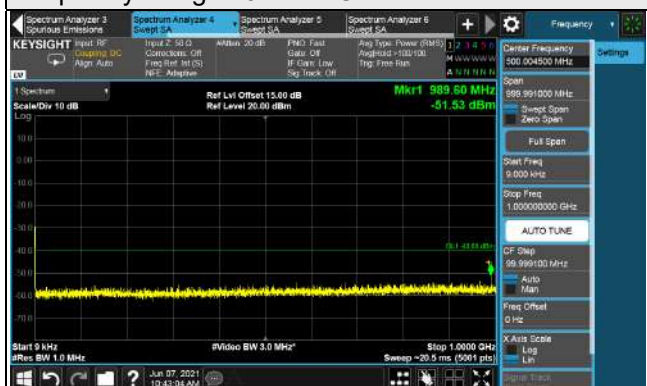
Full RB



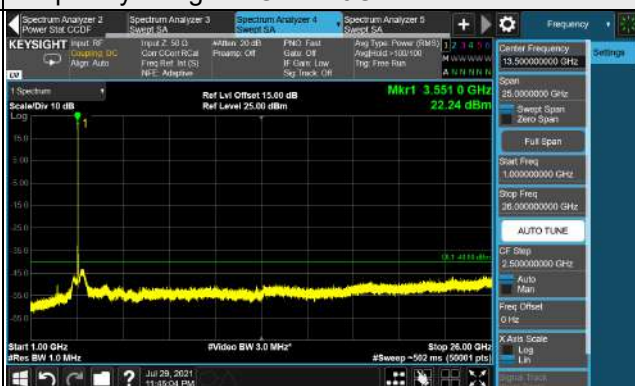
LTE Band 48, Channel Bandwidth 15MHz

Channel 55315 (3557.50MHz)

Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~26GHz

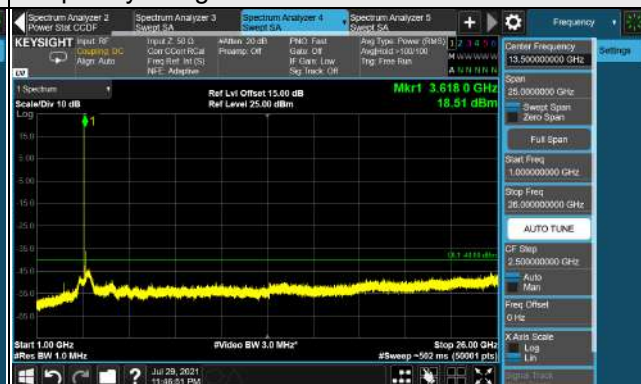


Frequency Range : 26GHz~40GHz



Frequency Range : 9kHz~1GHz

Frequency Range : 1GHz~26GHz



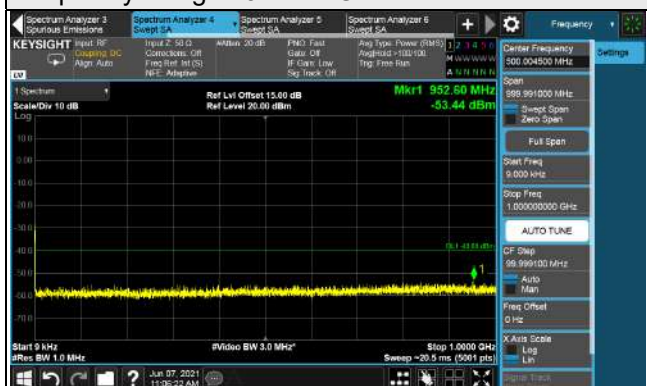
Frequency Range : 26GHz~40GHz



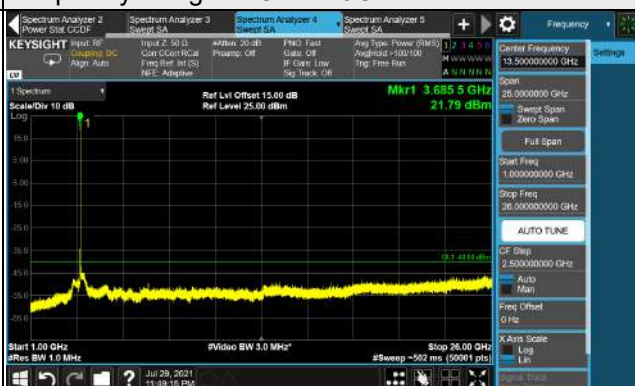
LTE Band 48, Channel Bandwidth 15MHz

Channel 56665 (3692.50MHz)

Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~26GHz



Frequency Range : 26GHz~40GHz



LTE Band 48, Channel Bandwidth 20MHz

Channel 55340 (3560.0MHz)

1RB



Full RB



Channel 55990 (3625.0MHz)

1RB

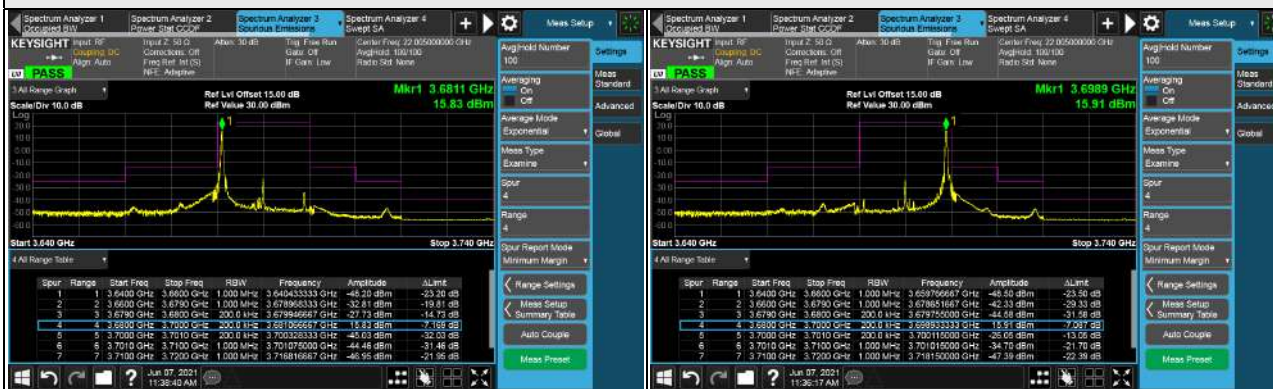


Full RB



Channel 56640 (3690.0MHz)

1RB



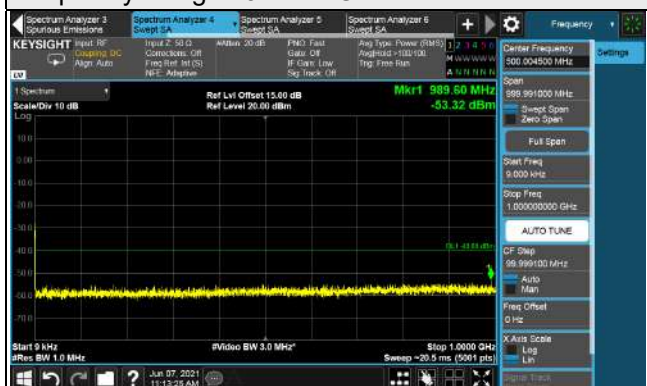
Full RB



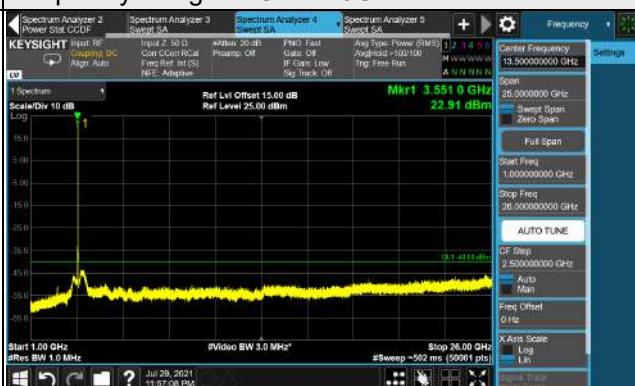
LTE Band 48, Channel Bandwidth 20MHz

Channel 55340 (3560.0MHz)

Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~26GHz



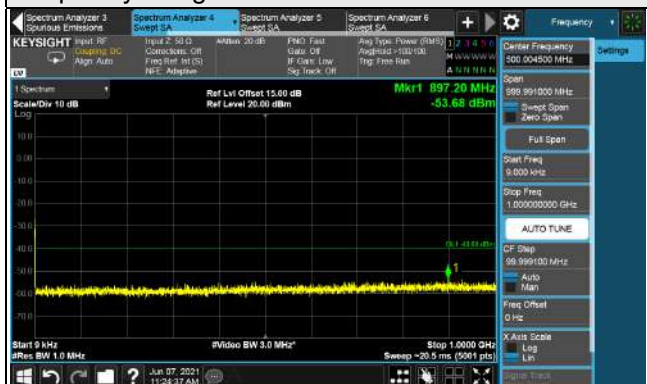
Frequency Range : 26GHz~40GHz



LTE Band 48, Channel Bandwidth 20MHz

Channel 55990 (3625.0MHz)

Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~26GHz



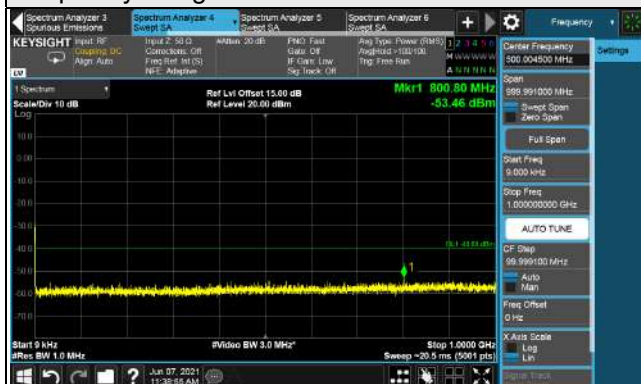
Frequency Range : 26GHz~40GHz



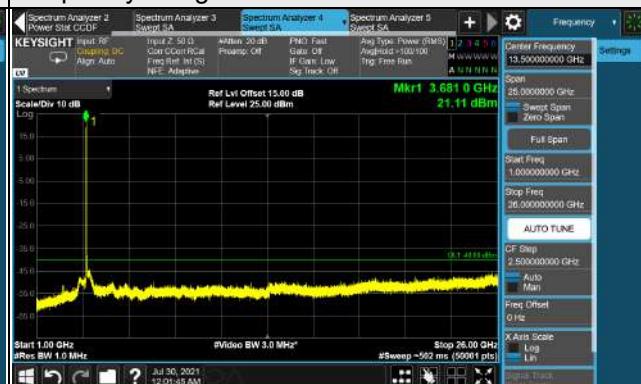
LTE Band 48, Channel Bandwidth 20MHz

Channel 56640 (3690.0MHz)

Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~26GHz



Frequency Range : 26GHz~40GHz



4.7 Radiated Emission Measurement

4.7.1 Limits of Radiated Emission Measurement

The power of any emissions below 3530 MHz or above 3720 MHz shall not exceed -40dBm/MHz.

4.7.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Spectrum Analyzer Agilent	N9010A	MY52220314	Dec. 07, 2020	Dec. 06, 2021
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Apr. 12, 2021	Apr. 11, 2022
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-969	Nov. 22, 2020	Nov. 21, 2021
BILOG Antenna SCHWARZBECK	VULB 9168	9168-472	Nov. 06, 2020	Nov. 05, 2021
Fixed Attenuator WOKEN	MDCS18N-10	MDCS18N-10-01	Apr. 13, 2021	Apr. 12, 2022
MXG Vector signal generator Agilent	N5182B	MY53050430	Nov. 25, 2020	Nov. 24, 2021
Preamplifier EMCI	EMC001340	980201	Oct. 21, 2020	Oct. 20, 2021
Preamplifier EMCI	EMC 012645	980115	Oct. 07, 2020	Oct. 06, 2021
Preamplifier EMCI	EMC 184045	980116	Oct. 07, 2020	Oct. 06, 2021
Preamplifier EMCI	EMC 330H	980112	Oct. 07, 2020	Oct. 06, 2021
Power Meter Anritsu	ML2495A	1012010	Sep. 01, 2020	Aug. 31, 2021
Power Sensor Anritsu	MA2411B	1315050	Sep. 01, 2020	Aug. 31, 2021
RF Coaxial Cable EMCI	EMC104-SM-SM-8 000	171005	Oct. 07, 2020	Oct. 06, 2021
RF Coaxial Cable WOKEN	8D-FB	Cable-Ch10-01	Oct. 07, 2020	Oct. 06, 2021
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Software BV ADT	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower & Turn Table Controller MF	MF-7802	NA	NA	NA
Radio Communication Analyzer Anritsu	MT8821C	6201462755	Feb. 07, 2021	Feb. 07, 2022

Note: 1. The calibration interval of the above test instruments is 12 / 24 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Chamber 10.

4.7.3 Test Procedures

- a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m (below or equal 1 GHz) and/or 1.5 m (above 1 GHz) height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- b. $EIRP = \text{Output power level} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$. Correction Factor (includes EIRP and ERP unit conversion factor) = Antenna gain of substitution horn. – Tx cable loss. Measurement method refers to ANSI C63.26 section 5.5 and 5.7.
- c. ERP power can be calculated form EIRP power by subtracting the gain of dipole, $ERP \text{ power} = EIRP \text{ power} - 2.15\text{dBi}$.

Note:

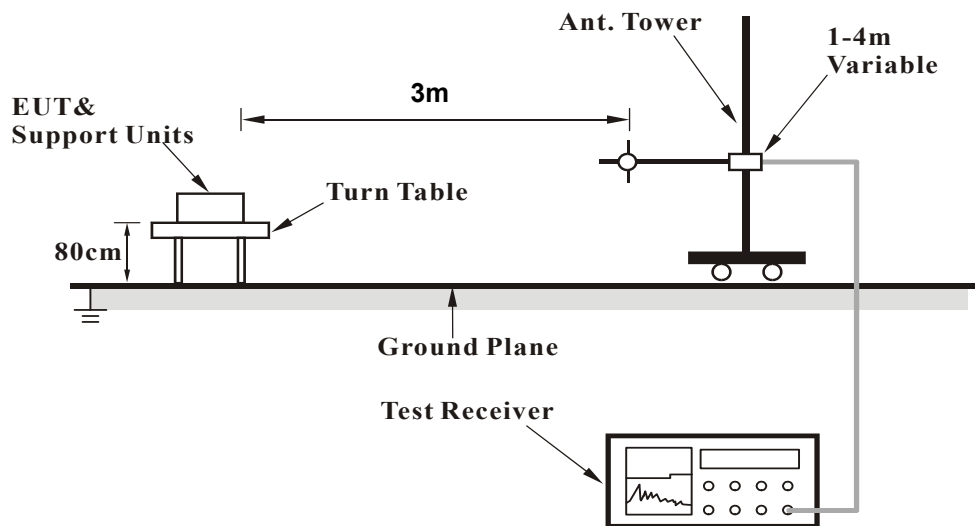
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.
2. The emission levels were against the limit of frequency range 9 kHz ~ 30 MHz: The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

4.7.4 Deviation from Test Standard

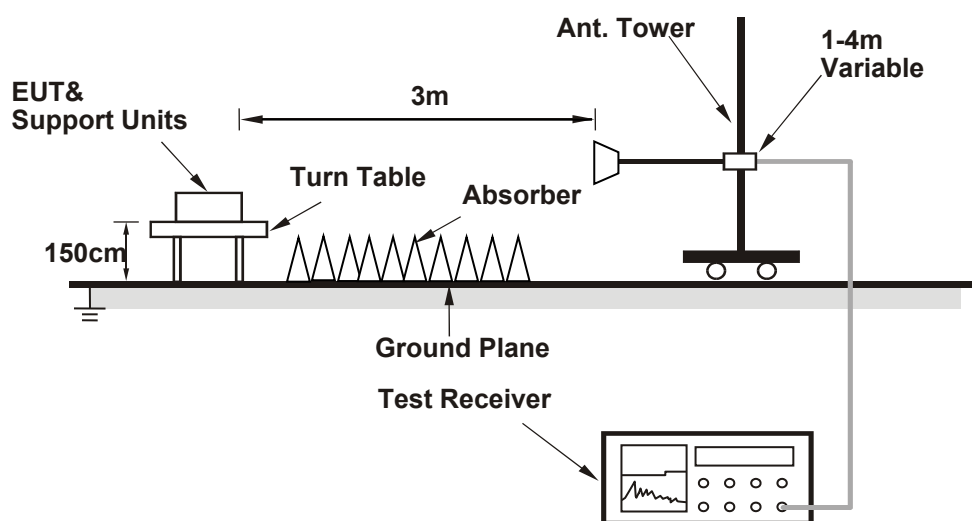
No deviation.

4.7.5 Test Set Up

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.7.6 Test Results

Test was done with 50ohm terminator on antenna port.

LTE Band 48

Channel Bandwidth: 5 MHz / QPSK

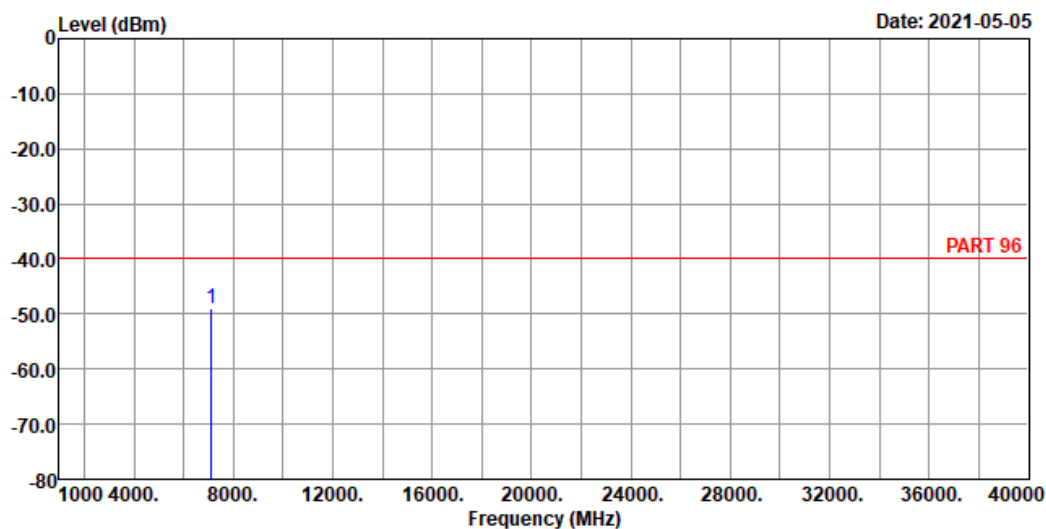
Low Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5

Condition: PART 96 HORIZONTAL

Remak : LTE Band 48 QPSK_5M Link_L-CH

Tested by: tim-chen

Freq	Level	Read Level	Limit	Over	
MHz	dBm	dBm	dBm	dB	dB

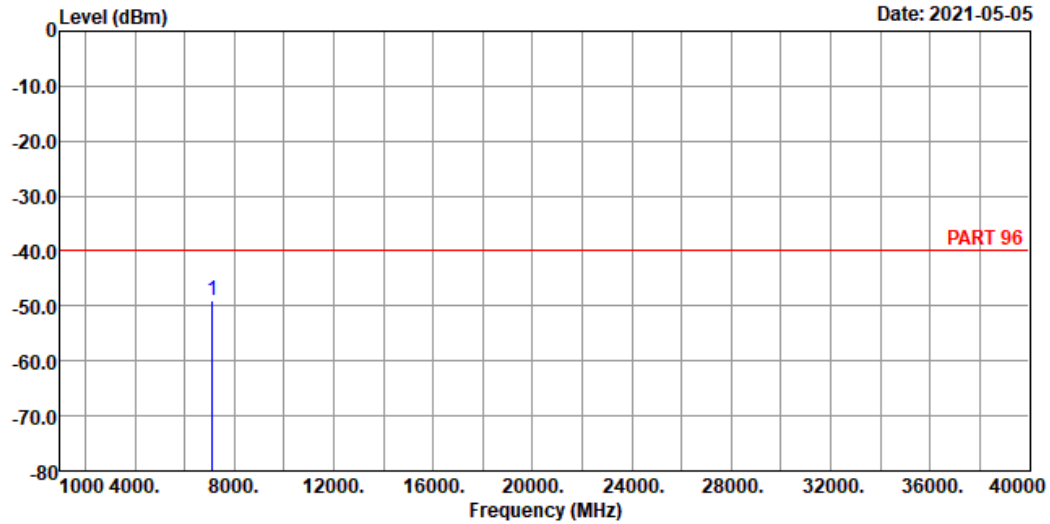
1 pp 7105.00 -48.86 -52.16 -40.00 3.30 -8.86 Peak



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A D T

Data: 4



Site : 966 Chamber 5

Condition: PART 96 VERTICAL

Remak : LTE Band 48 QPSK_5M Link_L-CH

Tested by: tim-chen

Freq	Level	Read	Limit	Line Factor	Over	Remark
		Level	Line		Limit	
MHz	dBm	dBm	dBm	dB	dB	
1 pp 7105.00	-48.91	-52.21	-40.00	3.30	-8.91	Peak

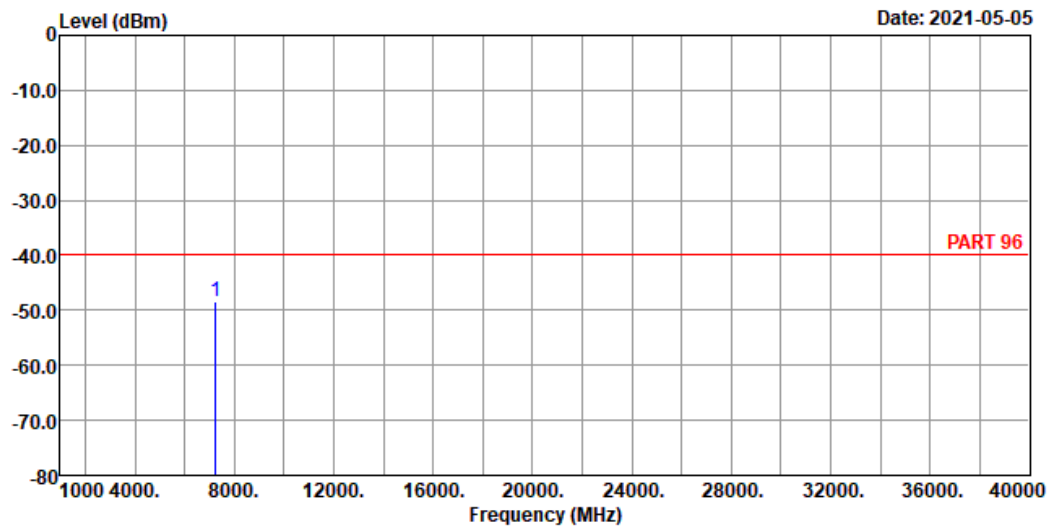
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5
 Condition: PART 96 HORIZONTAL
 Remak : LTE Band 48 QPSK_5M Link_M-CH
 Tested by: tim-chen

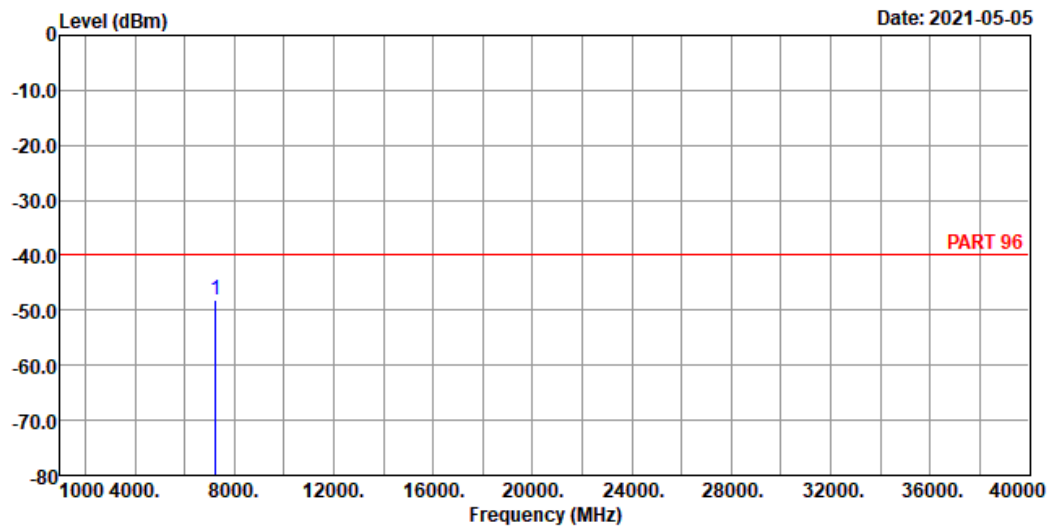
Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 7250.00	-48.55	-52.51	-40.00	3.96	-8.55	Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4



Site : 966 Chamber 5
 Condition: PART 96 VERTICAL
 Remak : LTE Band 48 QPSK_5M Link_M-CH
 Tested by: tim-chen

Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 7250.00	-48.03	-51.99	-40.00	3.96	-8.03	Peak

High Channel

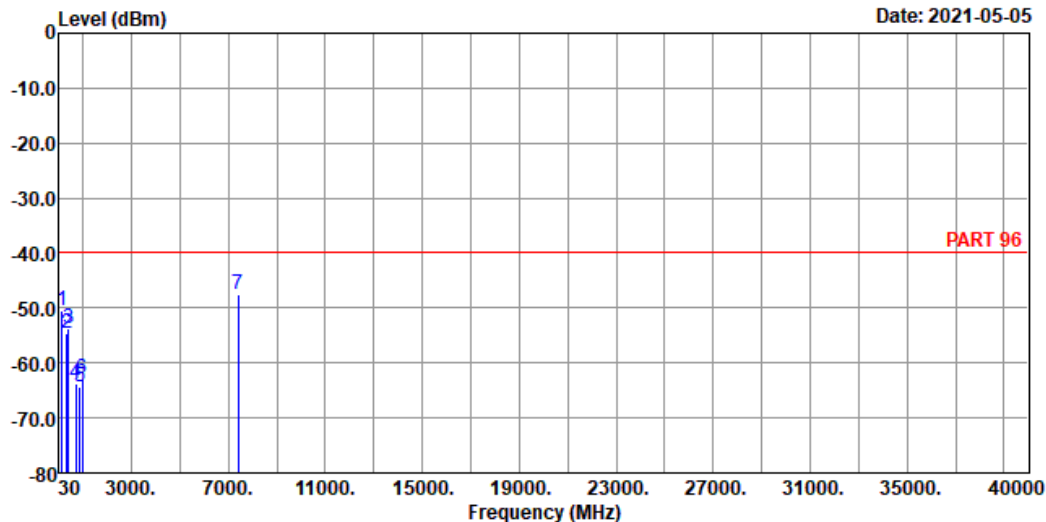


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A D T

Data: 5

Date: 2021-05-05



Site : 966 Chamber 5

Condition: PART 96 HORIZONTAL

Remak : LTE Band 48 QPSK_5M Link_H-CH

Tested by: tim-chen

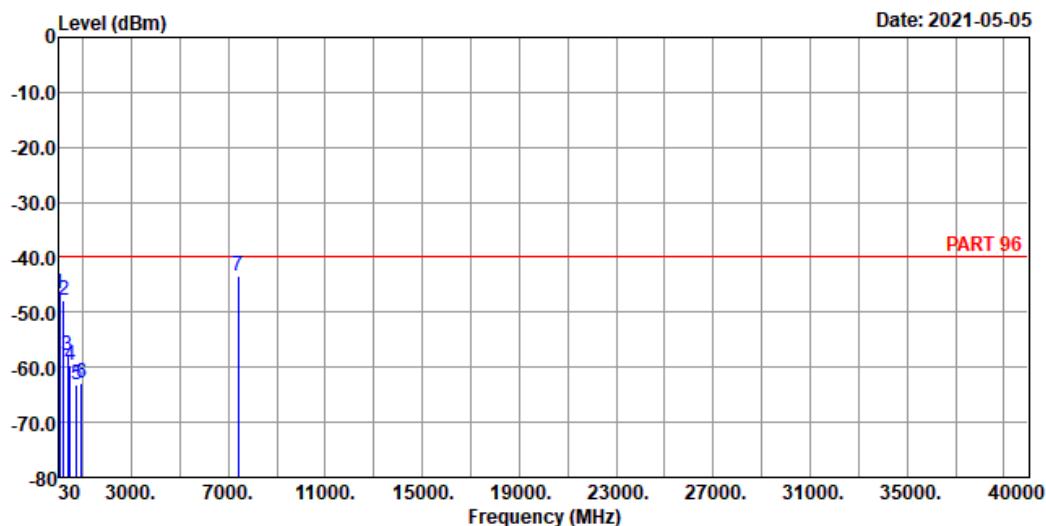
	Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	147.37	-50.40	-42.53	-40.00	-7.87	-10.40	Peak
2	326.82	-54.49	-47.89	-40.00	-6.60	-14.49	Peak
3	398.60	-53.66	-47.71	-40.00	-5.95	-13.66	Peak
4	707.06	-63.67	-63.71	-40.00	0.04	-23.67	Peak
5	884.57	-64.34	-64.83	-40.00	0.49	-24.34	Peak
6	990.30	-62.85	-66.09	-40.00	3.24	-22.85	Peak
7 pp	7395.00	-47.51	-51.62	-40.00	4.11	-7.51	Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6



Site : 966 Chamber 5

Condition: PART 96 VERTICAL

Remak : LTE Band 48 QPSK_5M Link_H-CH

Tested by: tim-chen

	Freq	Level	Read Level	Limit	Over	
	MHz	dBm	dBm	dBm	Factor	Limit Remark
1	30.00	-46.61	-46.99	-40.00	0.38	-6.61 Peak
2	206.54	-47.83	-40.08	-40.00	-7.75	-7.83 Peak
3	380.17	-57.88	-51.82	-40.00	-6.06	-17.88 Peak
4	478.14	-59.51	-54.48	-40.00	-5.03	-19.51 Peak
5	747.80	-63.27	-64.11	-40.00	0.84	-23.27 Peak
6	957.32	-62.99	-65.06	-40.00	2.07	-22.99 Peak
7 pp	7395.00	-43.26	-47.37	-40.00	4.11	-3.26 Peak

Channel Bandwidth: 20 MHz / QPSK

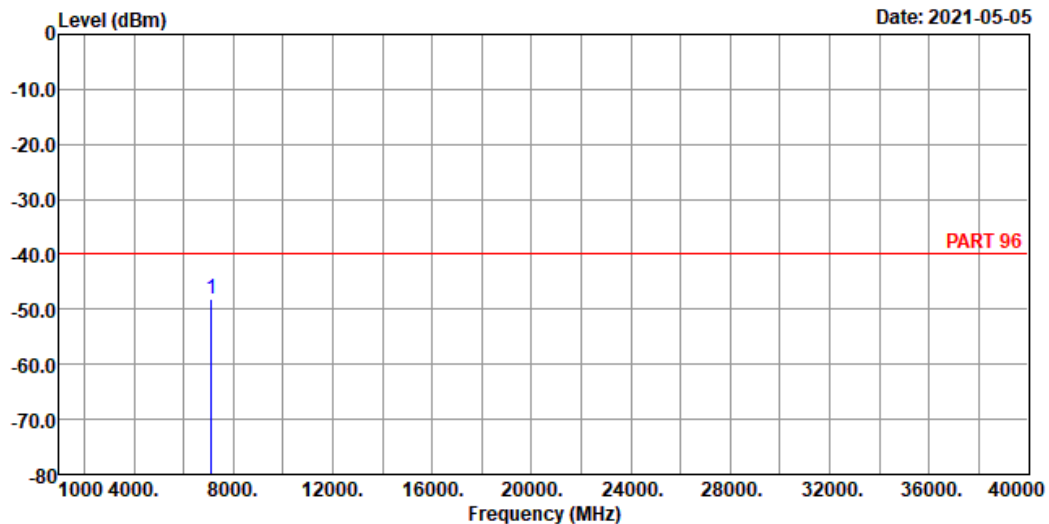
Low Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5

Condition: PART 96 HORIZONTAL

Remak : LTE Band 48 QPSK_20M Link_L-CH

Tested by: tim-chen

Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
MHz	dBm	dBm	dBm	dB	dB	

1 pp 7120.00 -47.98 -51.28 -40.00 3.30 -7.98 Peak

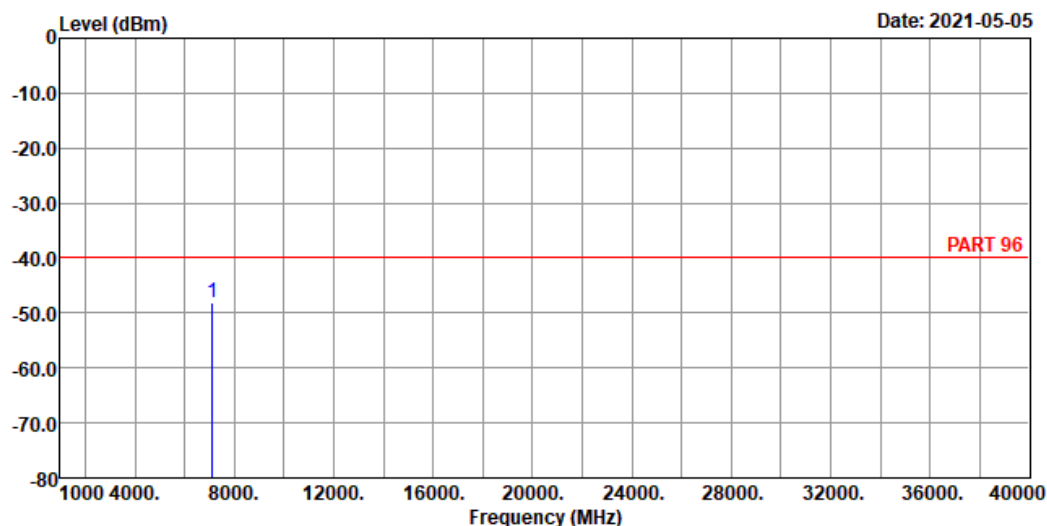


Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4

Date: 2021-05-05



Site : 966 Chamber 5

Condition: PART 96 VERTICAL

Remak : LTE Band 48 QPSK_20M Link_L-CH

Tested by: tim-chen

Freq	Level	Read Level	Limit	Over	Limit	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 7120.00	-47.97	-51.27	-40.00	3.30	-7.97	Peak

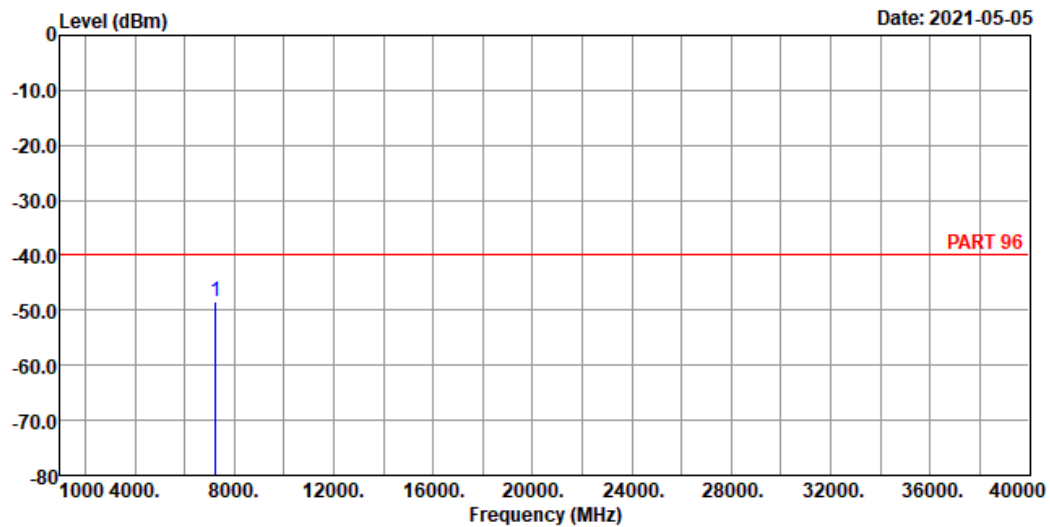
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5
 Condition: PART 96 HORIZONTAL
 Remak : LTE Band 48 QPSK_20M Link_M-CH
 Tested by: tim-chen

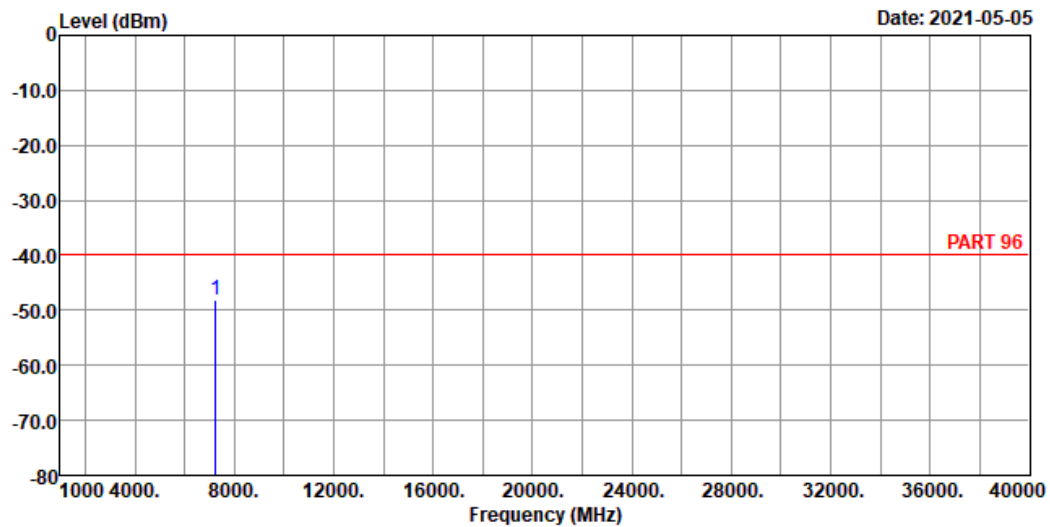
Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 7250.00	-48.33	-52.29	-40.00	3.96	-8.33	Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4



Site : 966 Chamber 5
 Condition: PART 96 VERTICAL
 Remak : LTE Band 48 QPSK_20M Link_M-CH
 Tested by: tim-chen

Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 7250.00	-48.02	-51.98	-40.00	3.96	-8.02	Peak

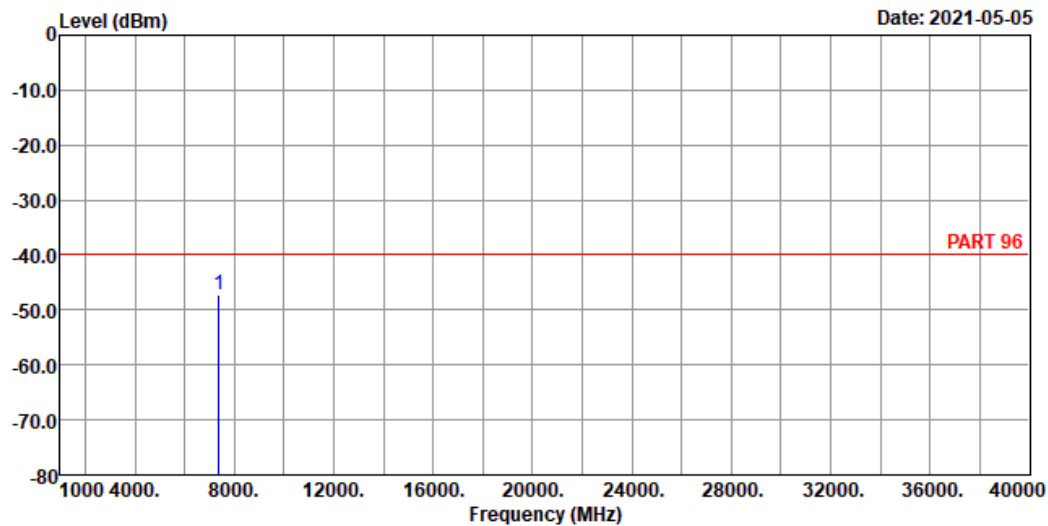
High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 3



Site : 966 Chamber 5
 Condition: PART 96 HORIZONTAL
 Remak : LTE Band 48 QPSK_20M Link_H-CH
 Tested by: tim-chen

		Read	Limit		Over	
Freq	Level	Level	Line	Factor	Limit	Remark
MHz	dBm	dBm	dBm	dB	dB	

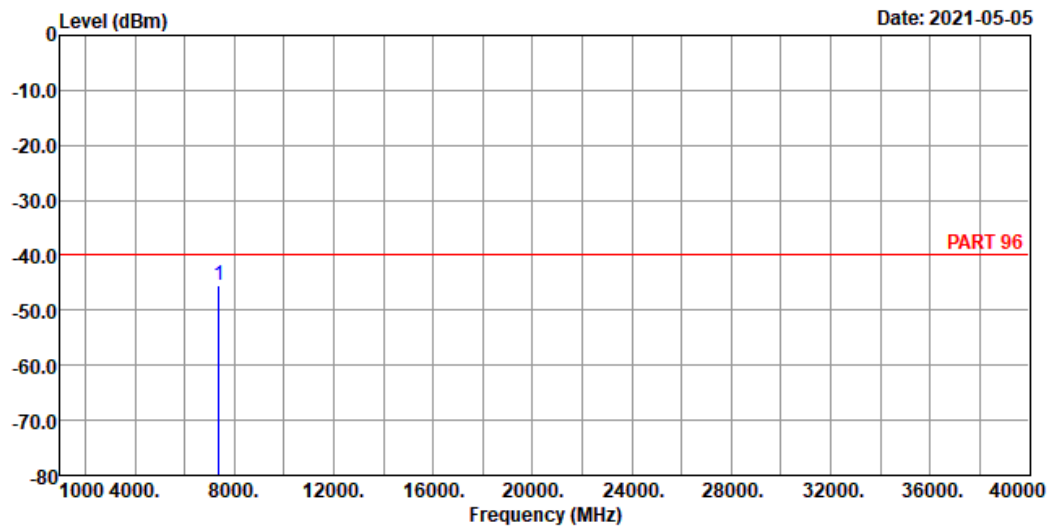
1 pp 7380.00 -47.27 -51.36 -40.00 4.09 -7.27 Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 4



Site : 966 Chamber 5
 Condition: PART 96 VERTICAL
 Remak : LTE Band 48 QPSK_20M Link_H-CH
 Tested by: tim-chen

Freq	Level	Read Level	Limit Line	Factor	Over Limit	Remark
MHz	dBm	dBm	dBm	dB	dB	
1 pp 7380.00	-45.55	-49.64	-40.00	4.09	-5.55	Peak

5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

Lin Kou EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF Lab/Telecom Lab

Tel: 886-3-6668565

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The address and road map of all our labs can be found in our web site also.

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