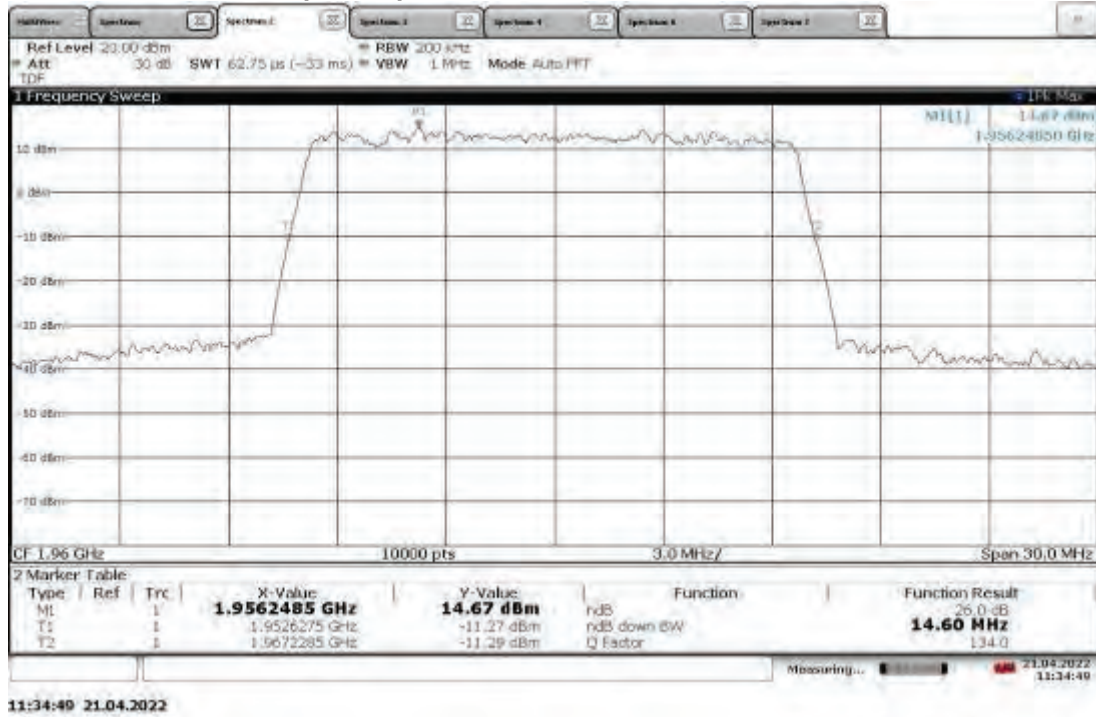
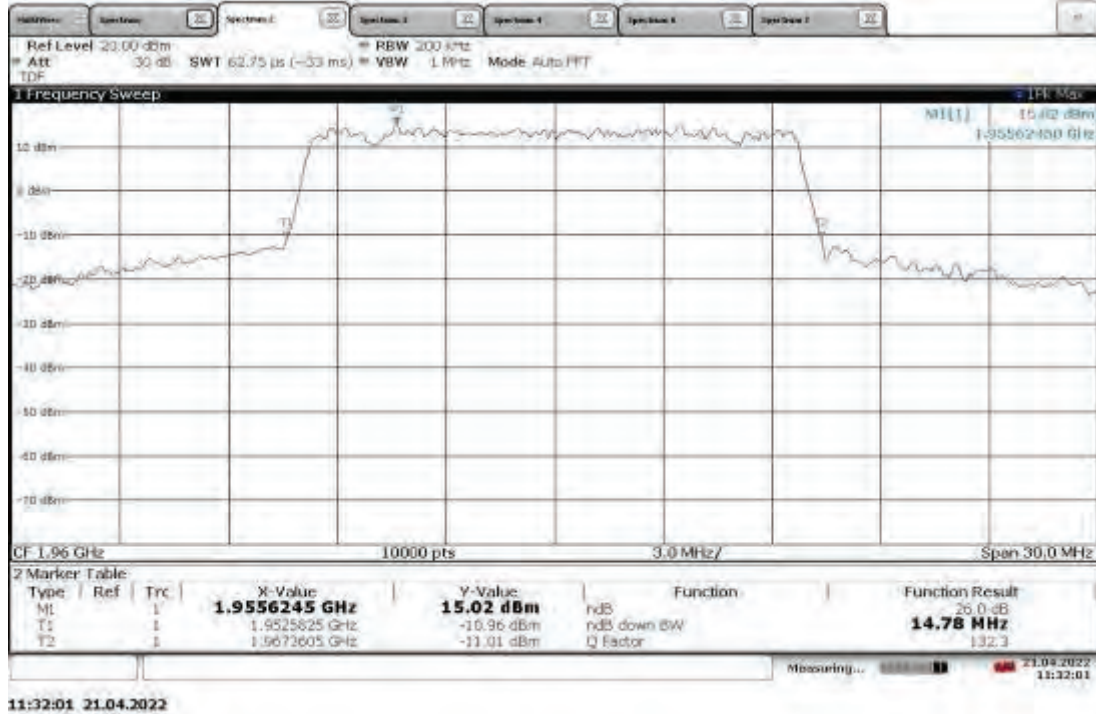


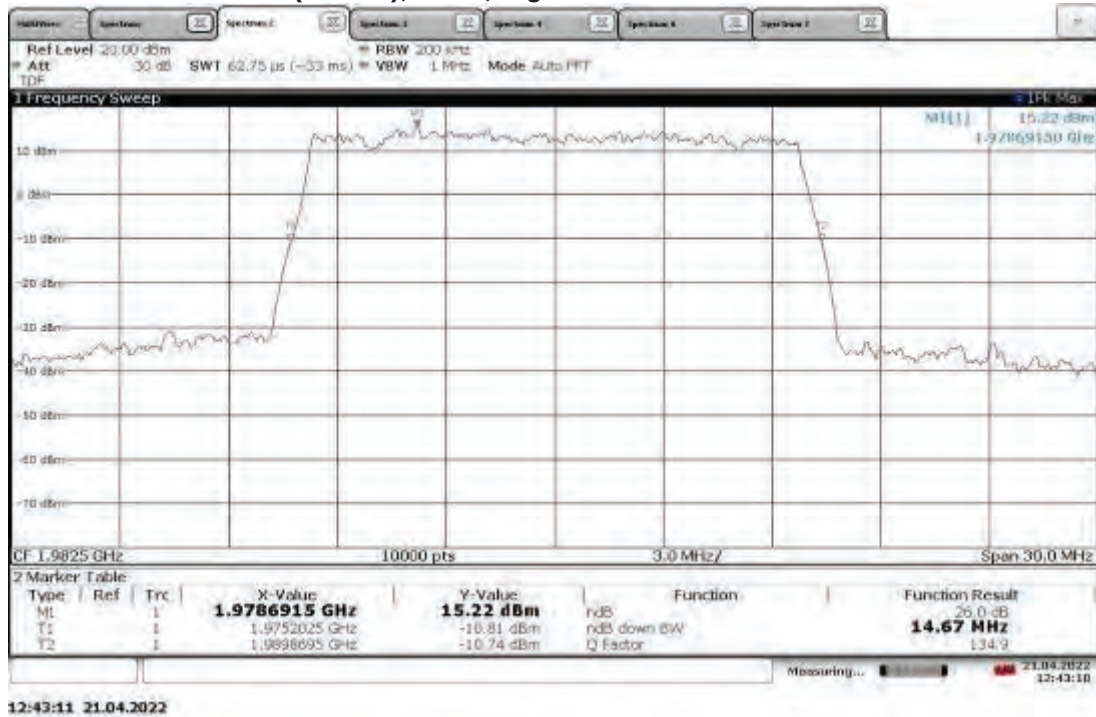
TM3.1-64QAM_15 MHz Bandwidth (4G LTE)
Slot 0 (Band 2), ANT0, Mid Channel 26 dB Bandwidth



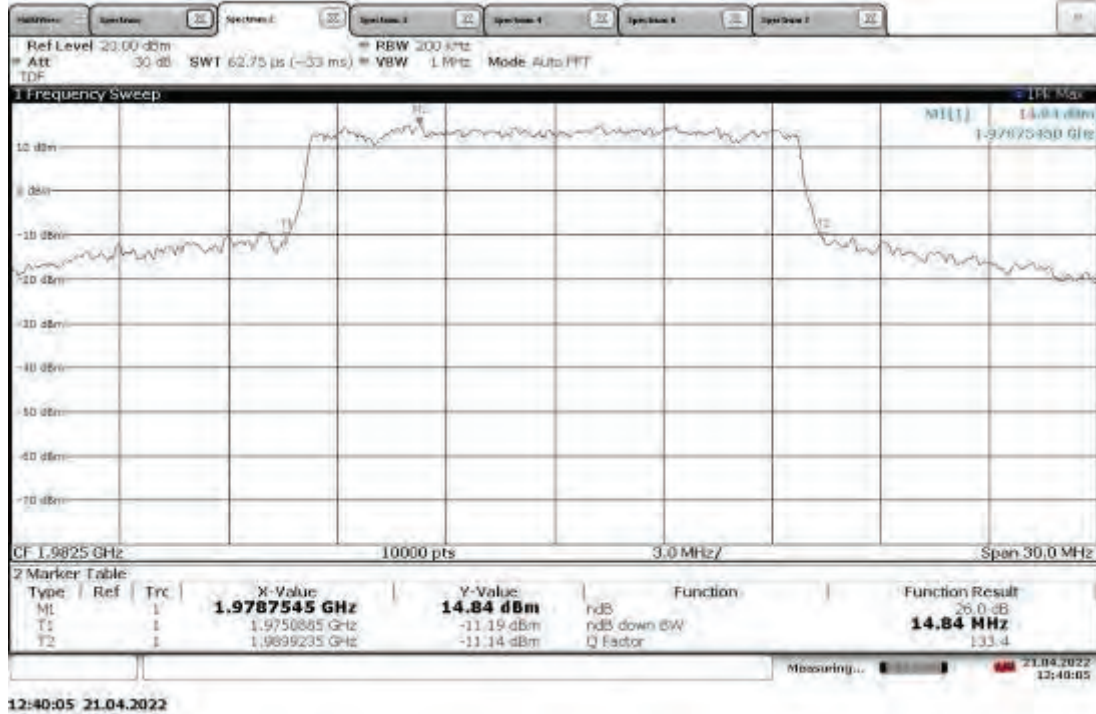
TM3.1-64QAM_15 MHz Bandwidth (4G LTE)
Slot 0 (Band 2), ANT1, Mid Channel 26 dB Bandwidth



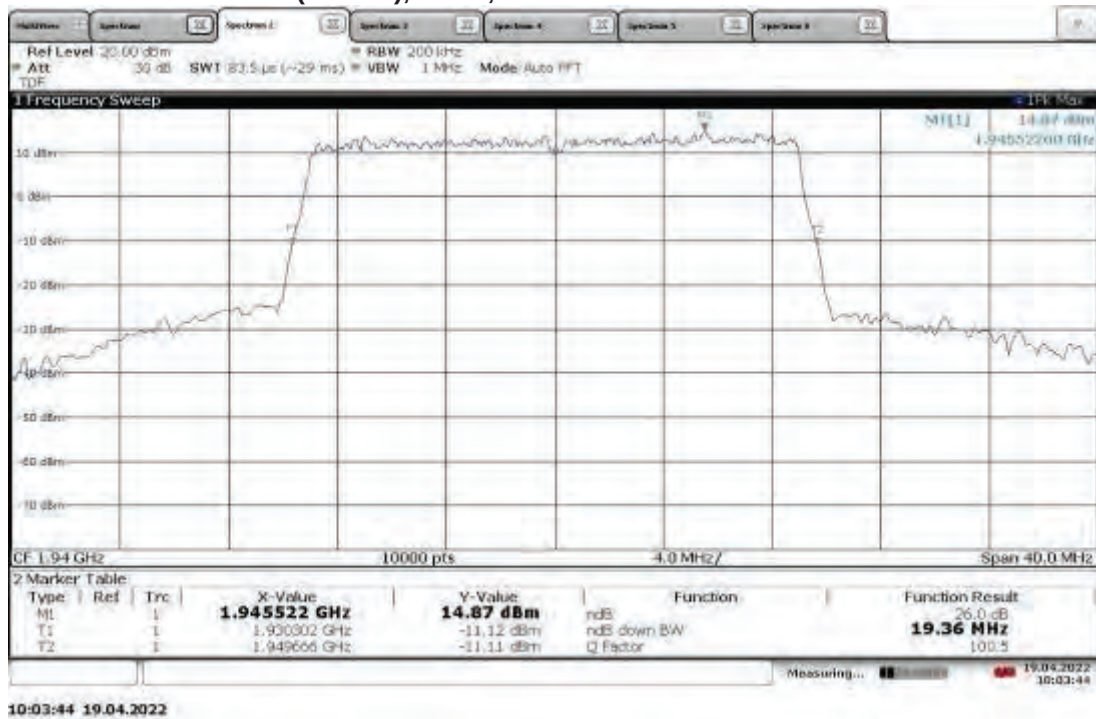
TM3.1-64QAM_15 MHz Bandwidth (4G LTE)
Slot 0 (Band 2), ANT0, High Channel 26 dB Bandwidth



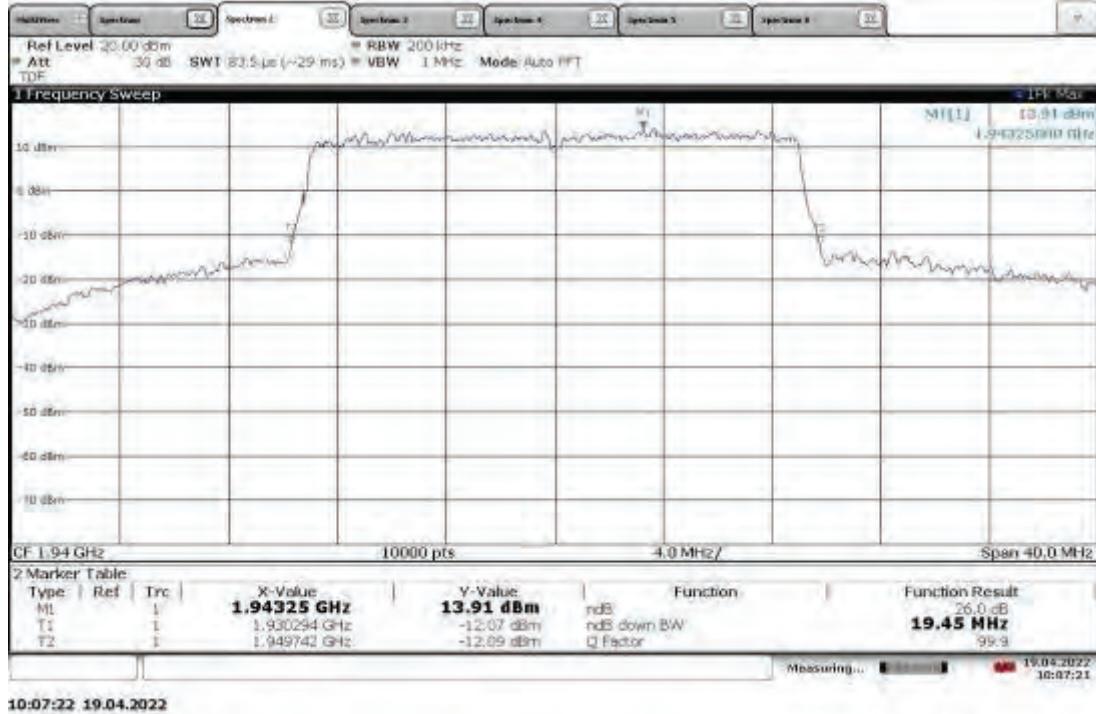
TM3.1-64QAM_15 MHz Bandwidth (4G LTE)
Slot 0 (Band 2), ANT1, High Channel 26 dB Bandwidth



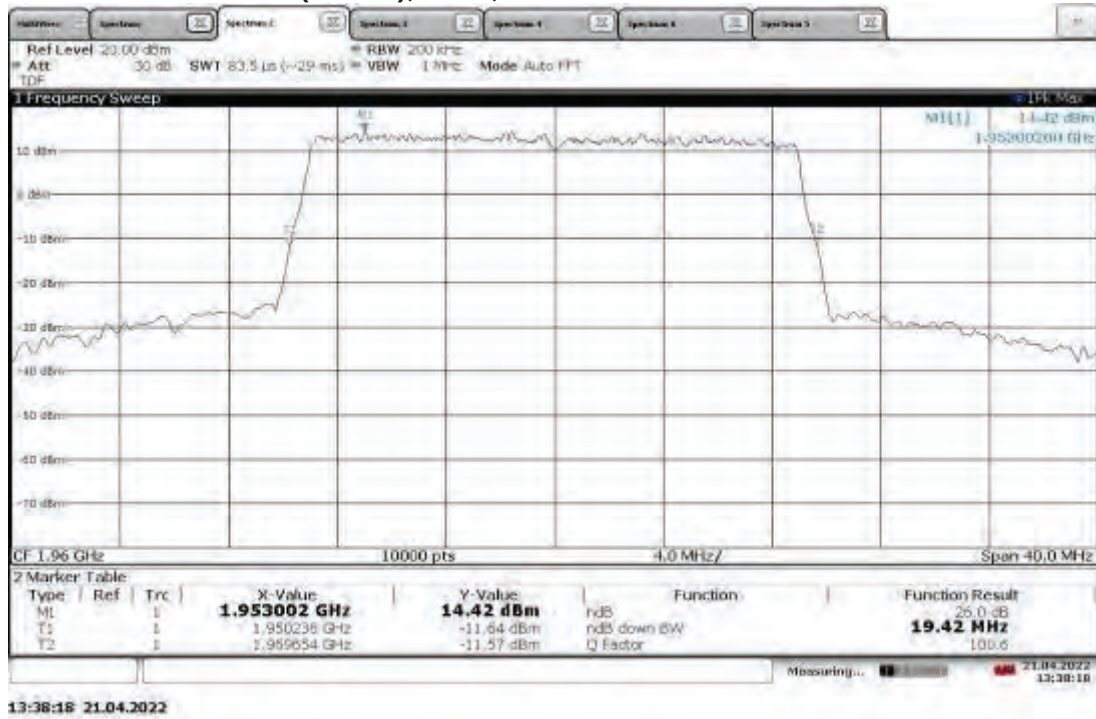
TM3.1-64QAM_20 MHz Bandwidth (4G LTE)
Slot 0 (Band 2), ANT0, Low Channel 26 dB Bandwidth



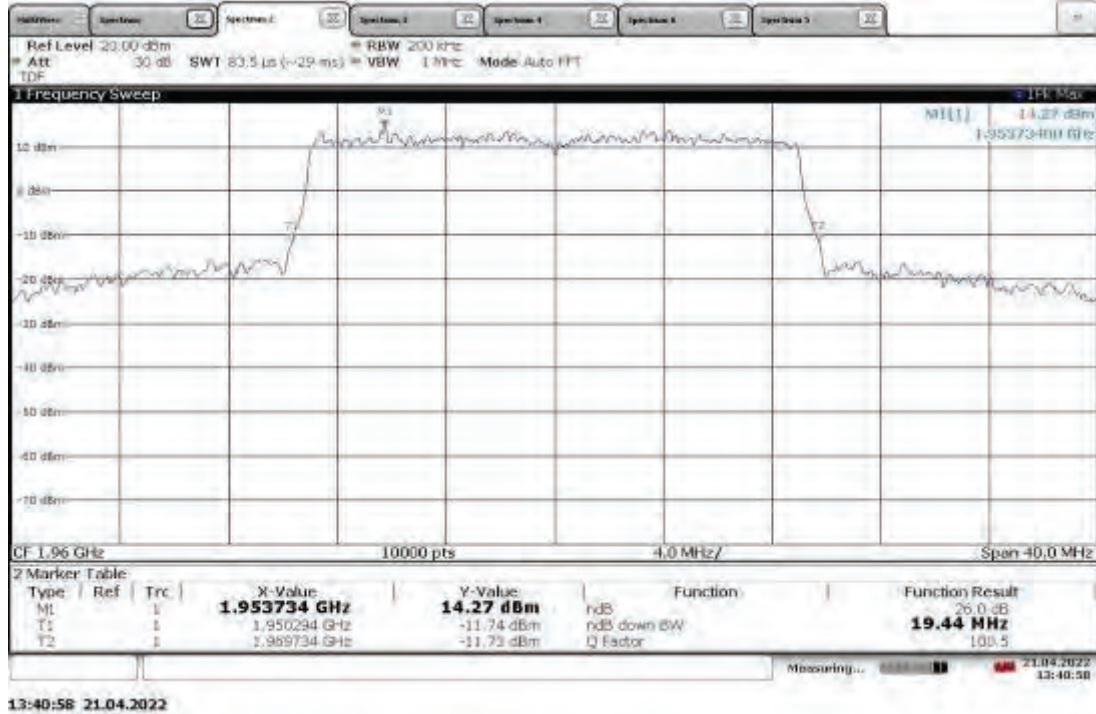
TM3.1-64QAM_20 MHz Bandwidth (4G LTE)
Slot 0 (Band 2), ANT1, Low Channel 26 dB Bandwidth



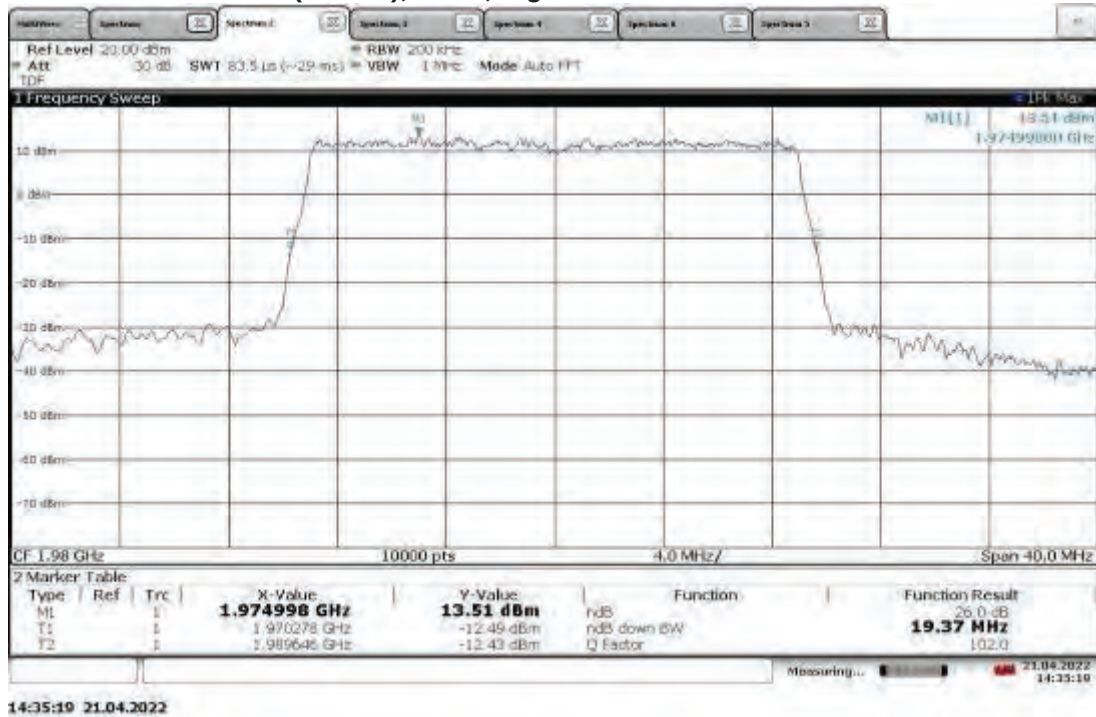
TM3.1-64QAM_20 MHz Bandwidth (4G LTE)
Slot 0 (Band 2), ANT0, Mid Channel 26 dB Bandwidth



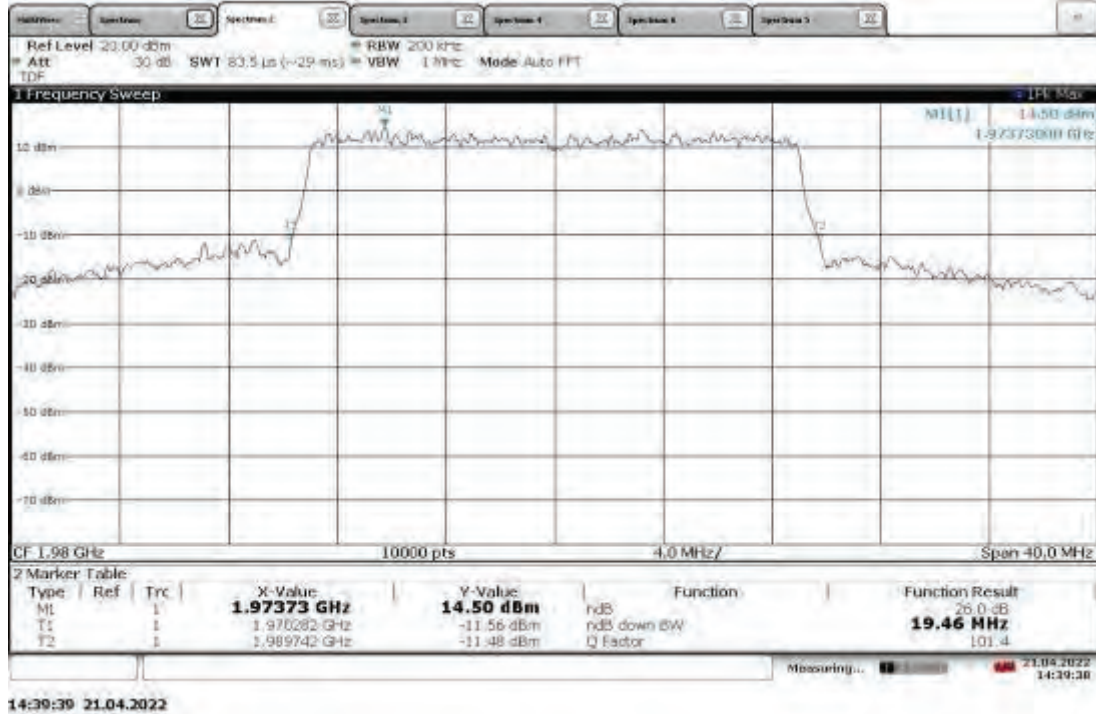
TM3.1-64QAM_20 MHz Bandwidth (4G LTE)
Slot 0 (Band 2), ANT1, Mid Channel 26 dB Bandwidth



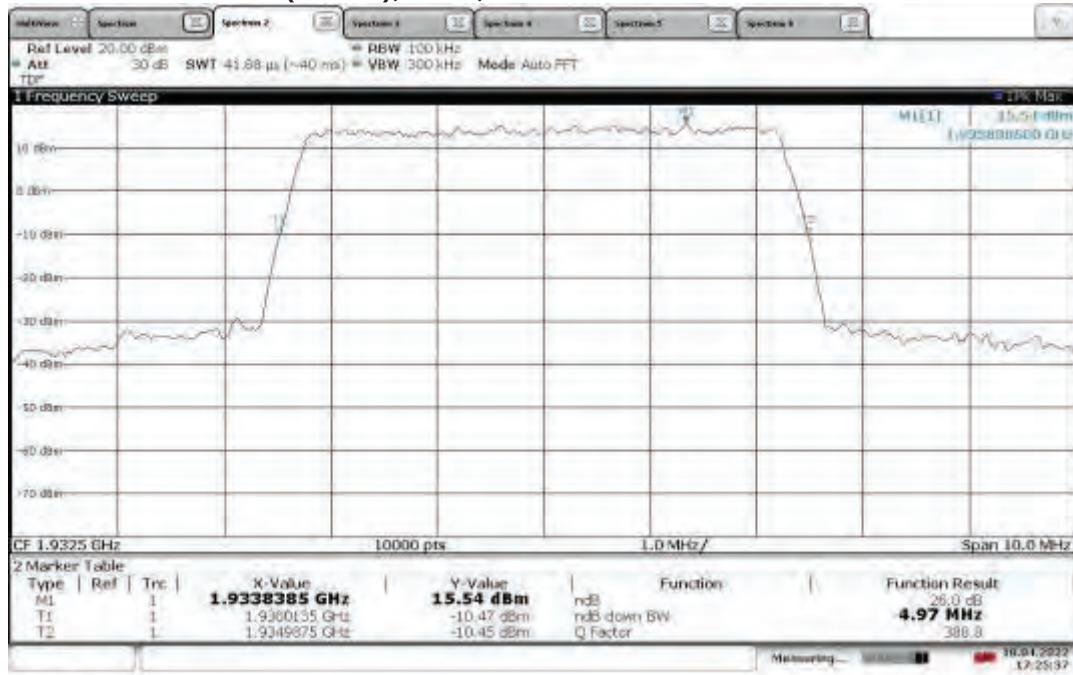
TM3.1-64QAM_20 MHz Bandwidth (4G LTE)
Slot 0 (Band 2), ANT0, High Channel 26 dB Bandwidth



TM3.1-64QAM_20 MHz Bandwidth (4G LTE)
Slot 0 (Band 2), ANT1, High Channel 26 dB Bandwidth

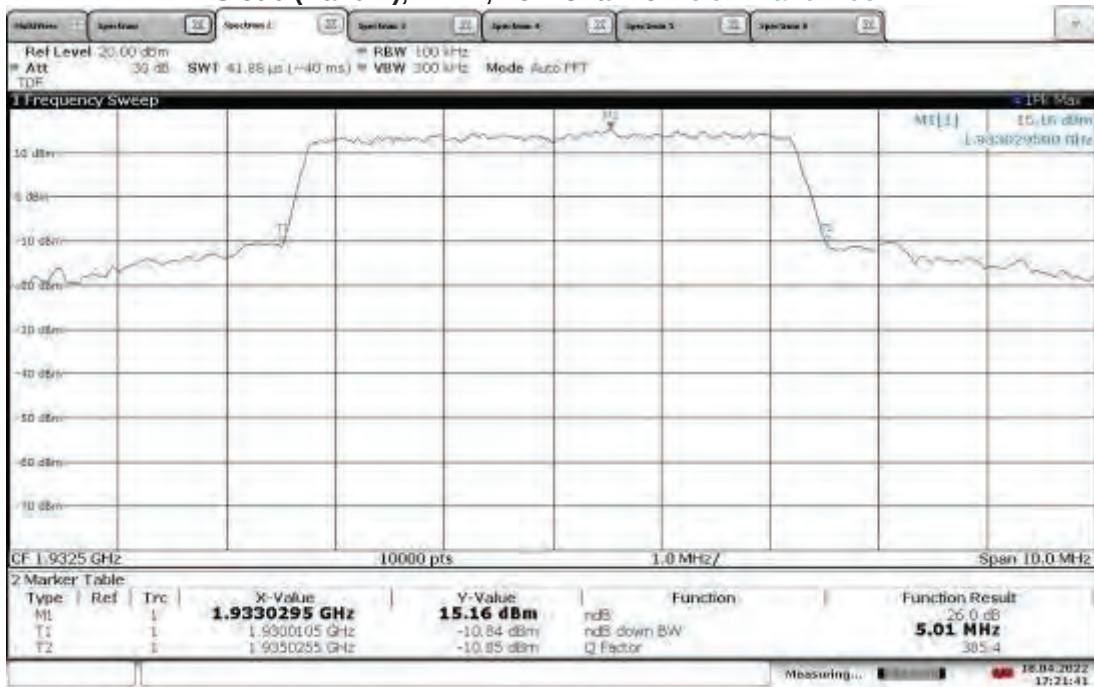


TM3.1a-256QAM_5 MHz Bandwidth (4G LTE)
Slot 0 (Band 2), ANT0, Low Channel 26 dB Bandwidth

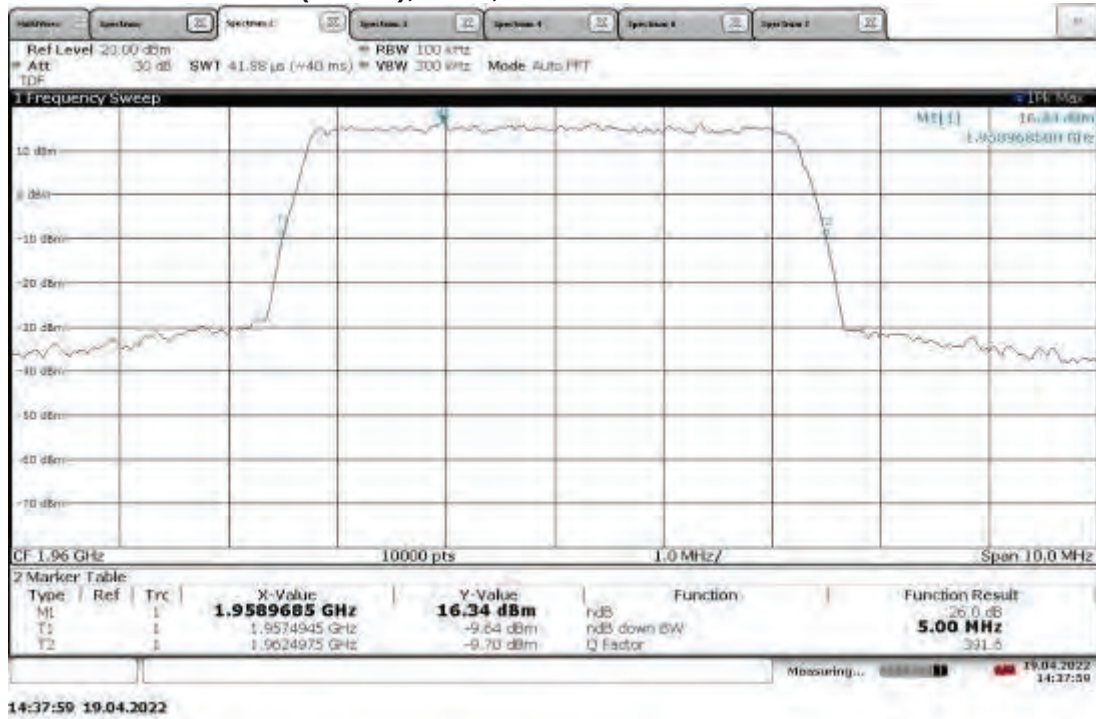
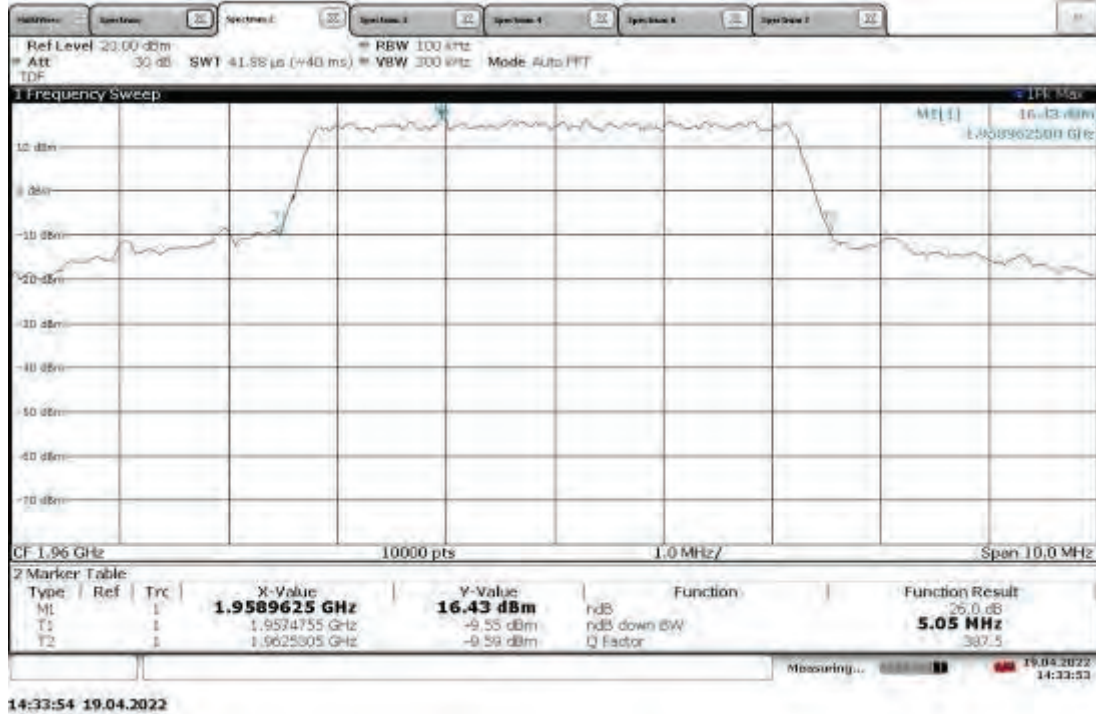


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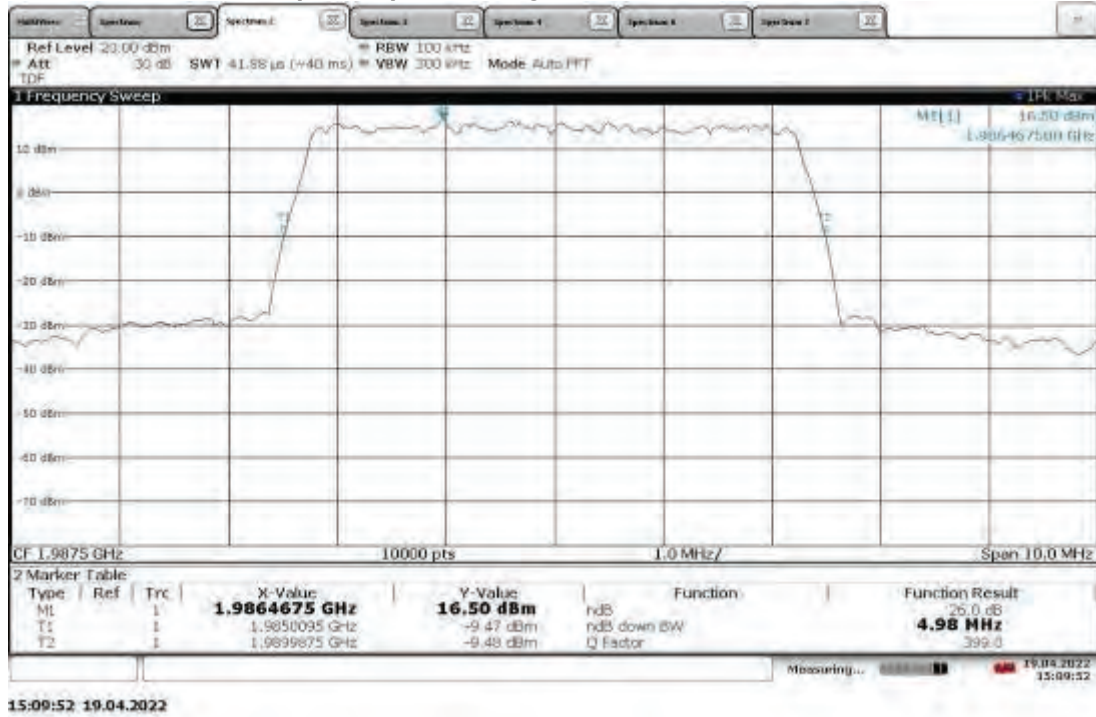
TM3.1a-256QAM_5 MHz Bandwidth (4G LTE)
Slot 0 (Band 2), ANT1, Low Channel 26 dB Bandwidth



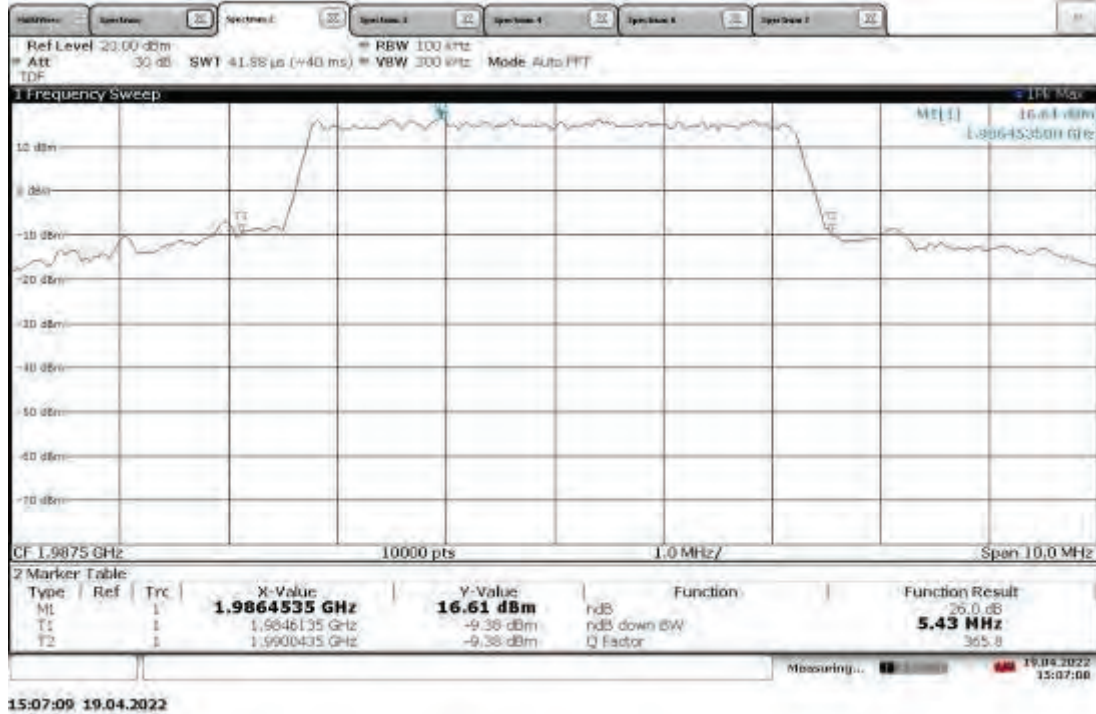
17:21:42 18.04.2022

TM3.1a-256QAM_5 MHz Bandwidth (4G LTE)
Slot 0 (Band 2), ANT0, Mid Channel 26 dB Bandwidth**TM3.1a-256QAM_5 MHz Bandwidth (4G LTE)**
Slot 0 (Band 2), ANT1, Mid Channel 26 dB Bandwidth

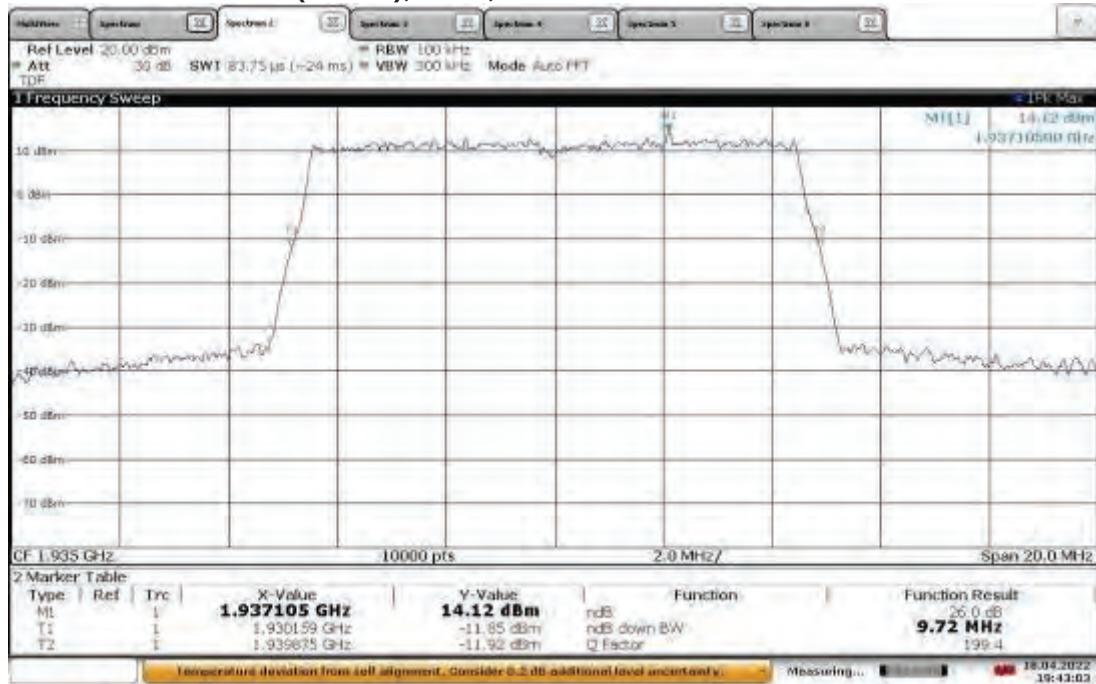
TM3.1a-256QAM_5 MHz Bandwidth (4G LTE)
Slot 0 (Band 2), ANT0, High Channel 26 dB Bandwidth



TM3.1a-256QAM_5 MHz Bandwidth (4G LTE)
Slot 0 (Band 2), ANT1, High Channel 26 dB Bandwidth

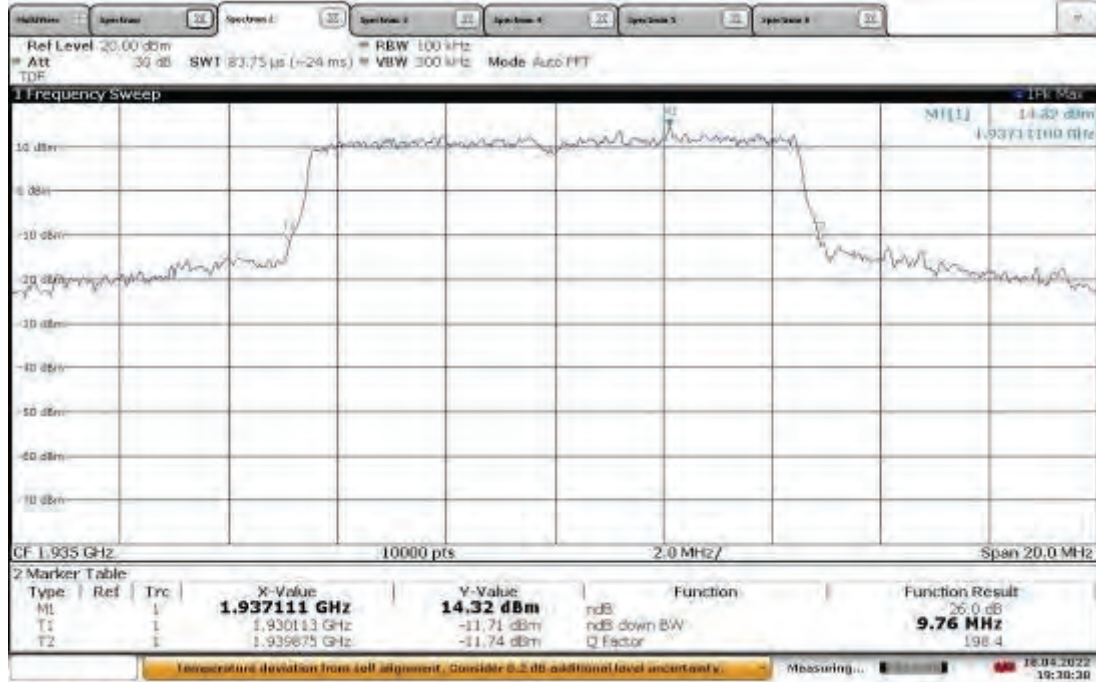


TM3.1a-256QAM_10 MHz Bandwidth (4G LTE)
Slot 0 (Band 2), ANT0, Low Channel 26 dB Bandwidth



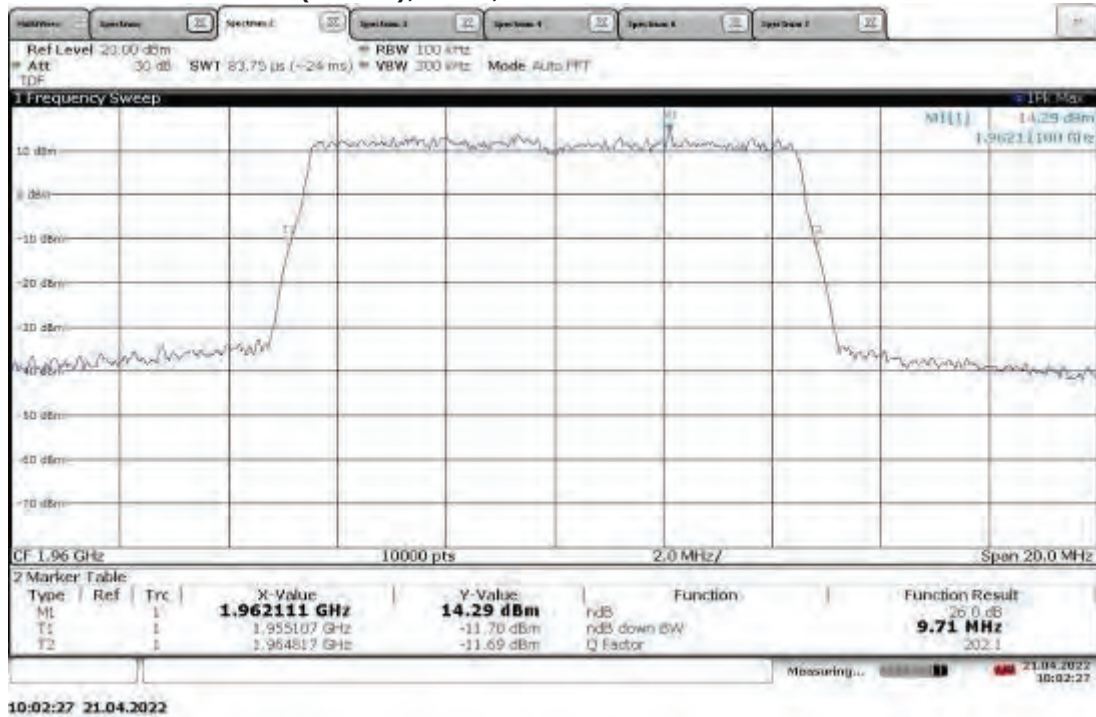
19:43:04 18.04.2022

TM3.1a-256QAM_10 MHz Bandwidth (4G LTE)
Slot 0 (Band 2), ANT1, Low Channel 26 dB Bandwidth

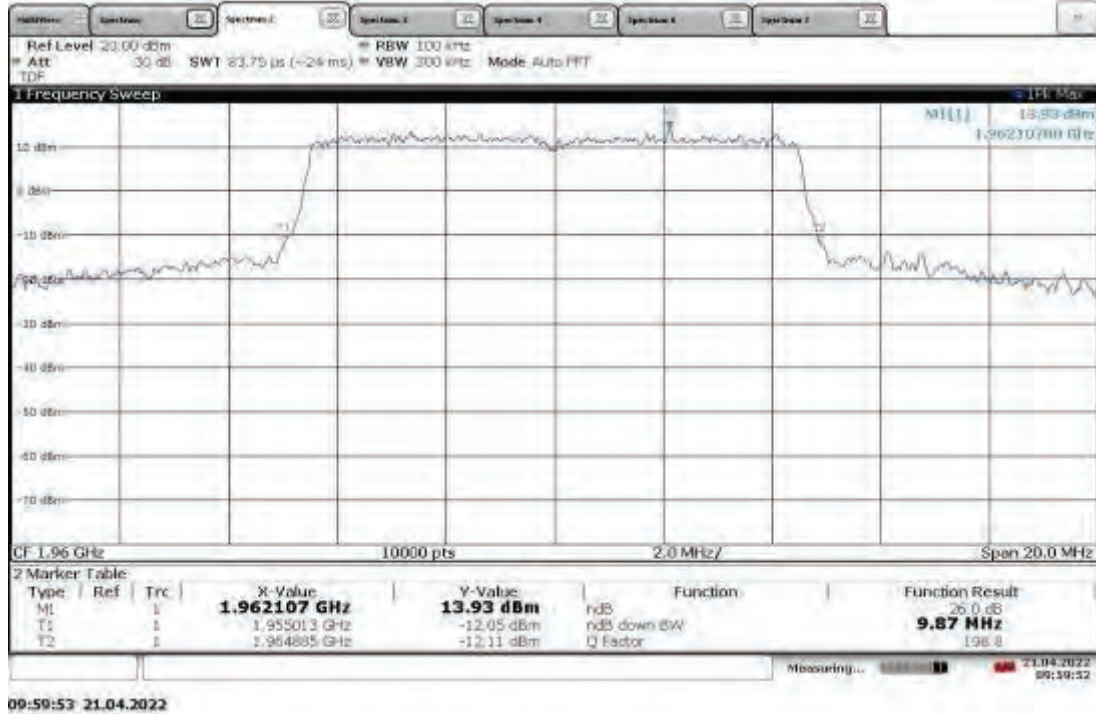


19:43:08 18.04.2022

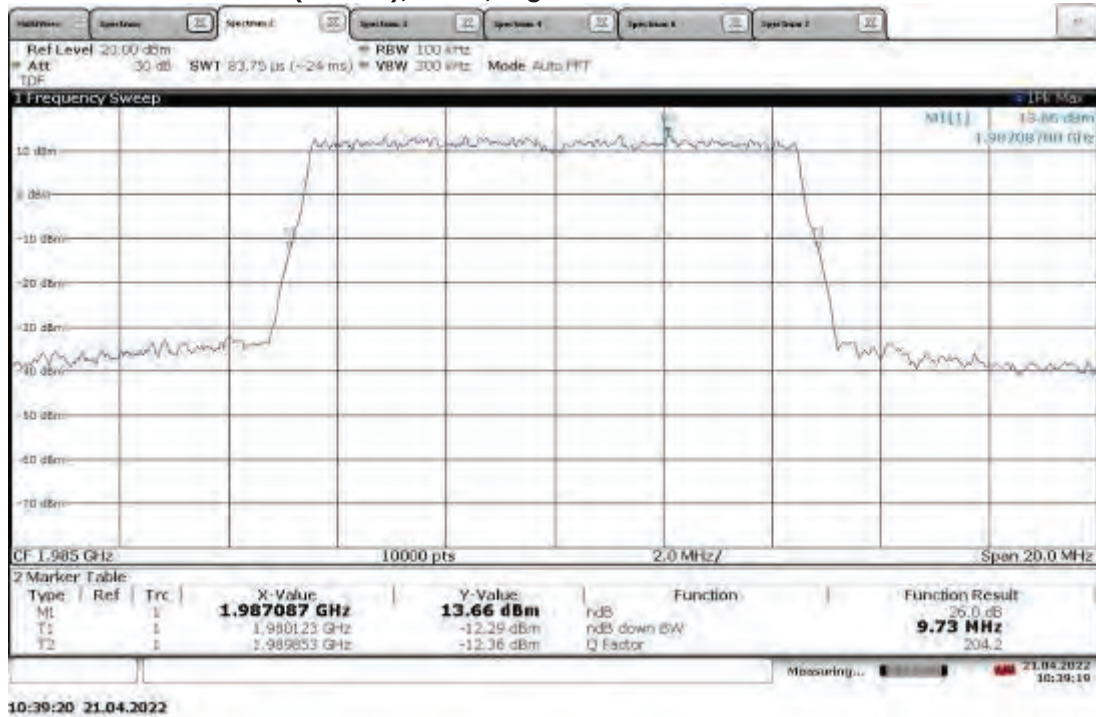
TM3.1a-256QAM_10 MHz Bandwidth (4G LTE)
Slot 0 (Band 2), ANT0, Mid Channel 26 dB Bandwidth



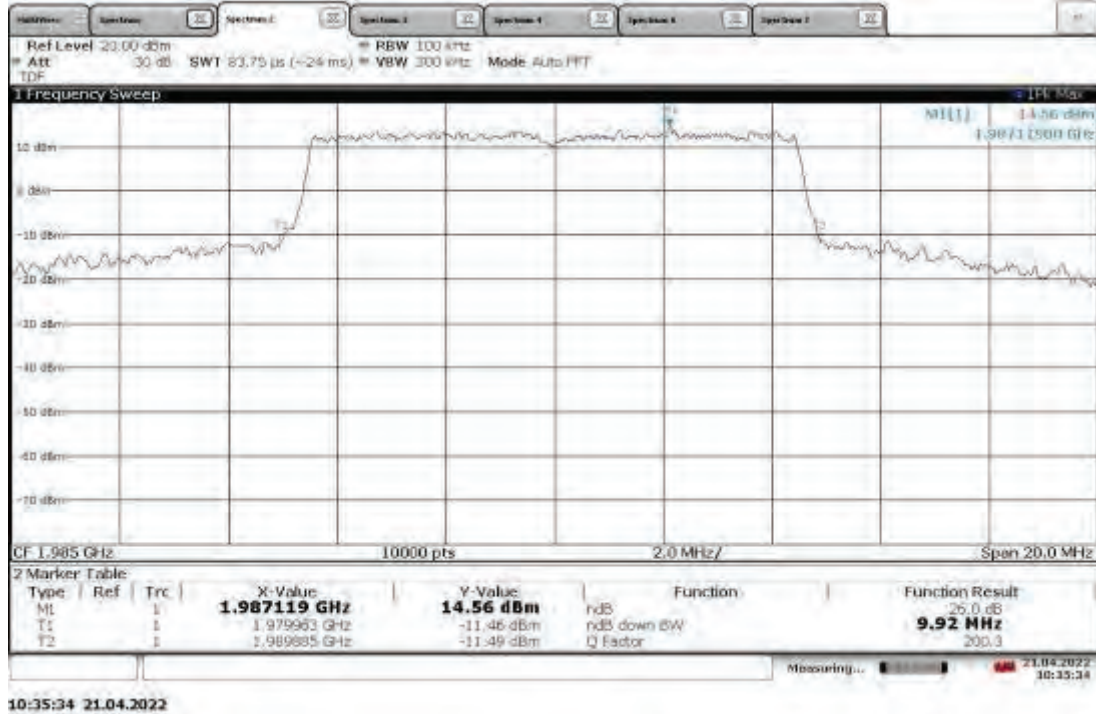
TM3.1a-256QAM_10 MHz Bandwidth (4G LTE)
Slot 0 (Band 2), ANT1, Mid Channel 26 dB Bandwidth



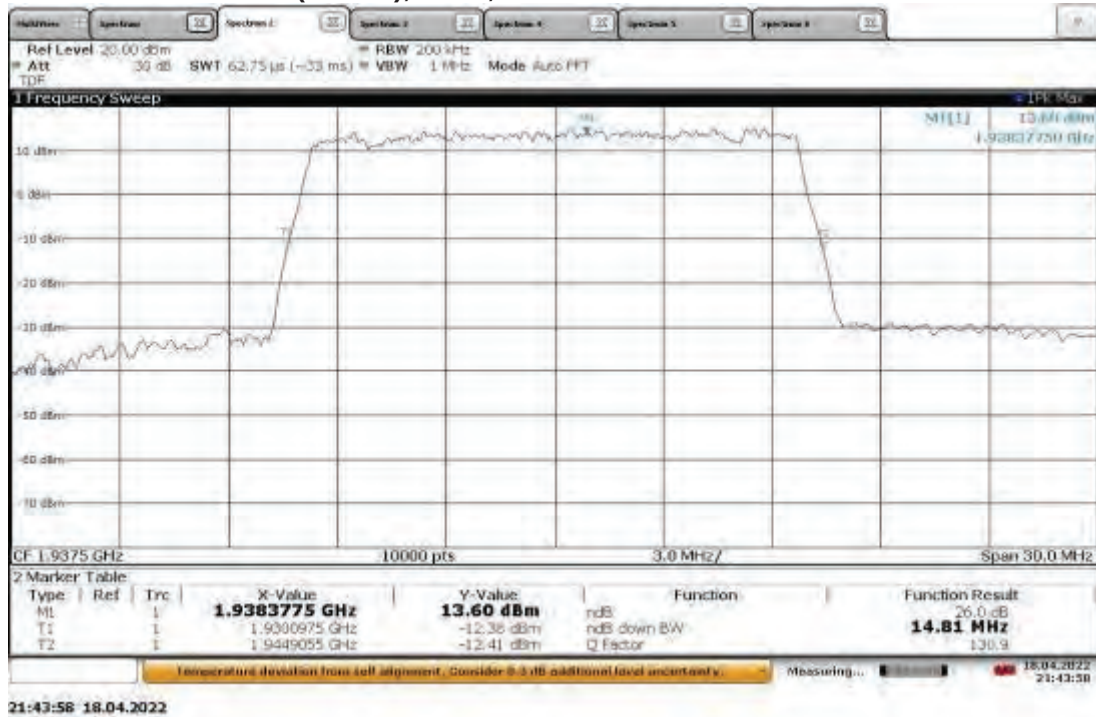
TM3.1a-256QAM_10 MHz Bandwidth (4G LTE)
Slot 0 (Band 2), ANT0, High Channel 26 dB Bandwidth



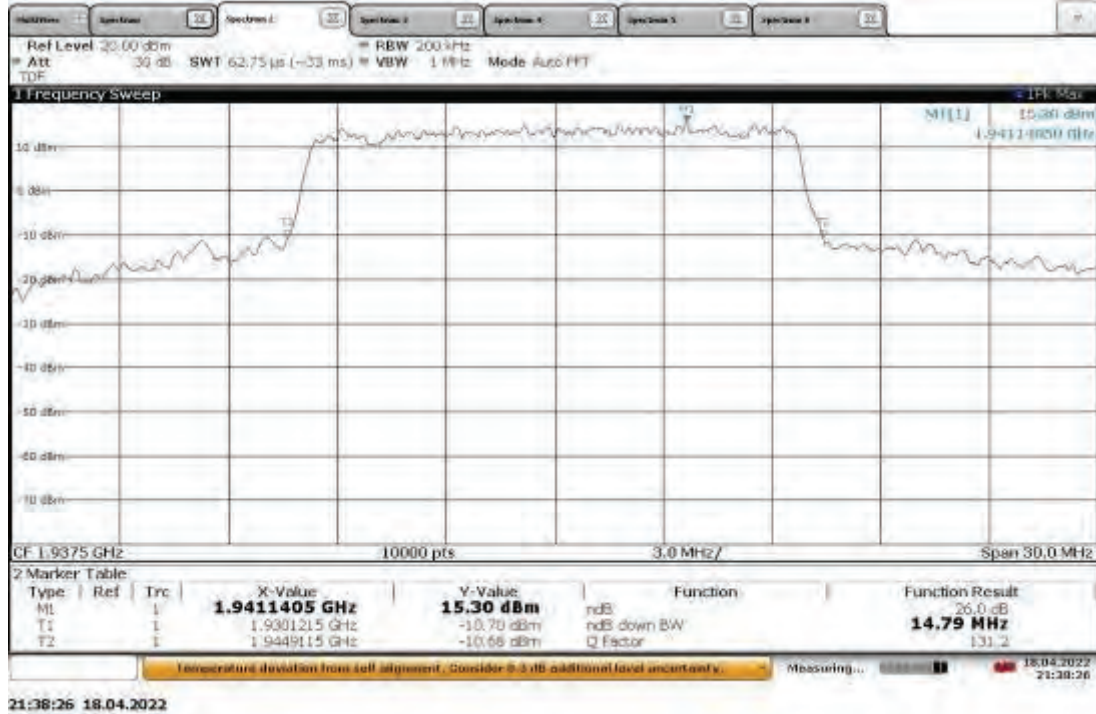
TM3.1a-256QAM_10 MHz Bandwidth (4G LTE)
Slot 0 (Band 2), ANT1, High Channel 26 dB Bandwidth



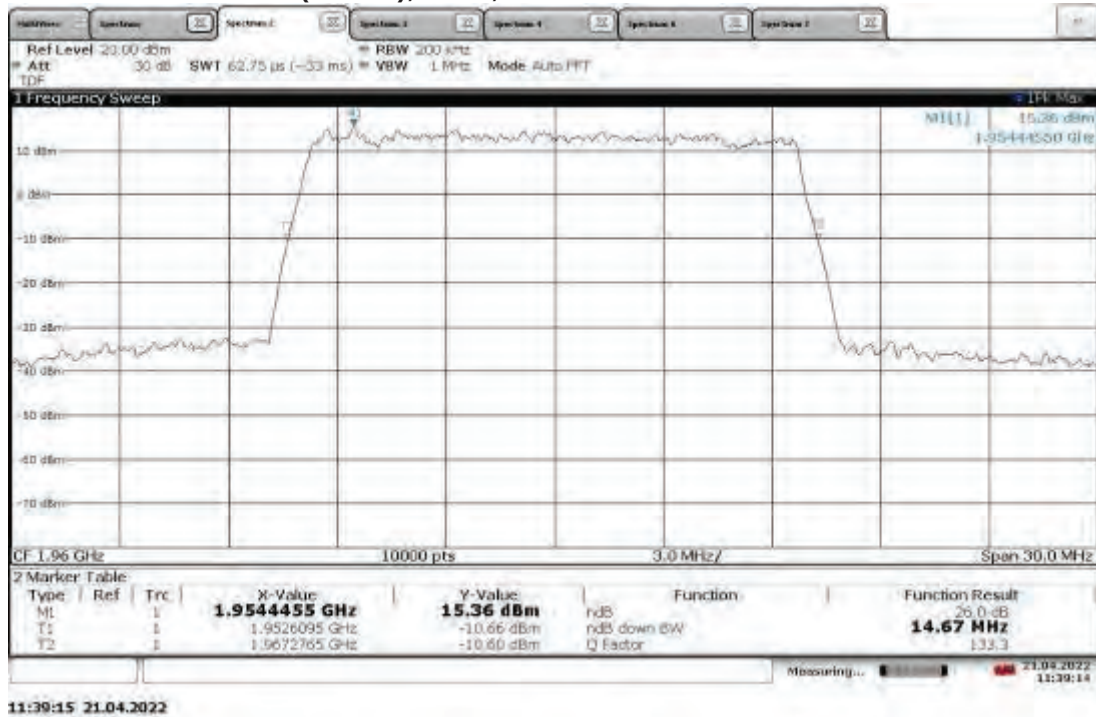
TM3.1a-256QAM_15 MHz Bandwidth (4G LTE)
Slot 0 (Band 2), ANT0, Low Channel 26 dB Bandwidth



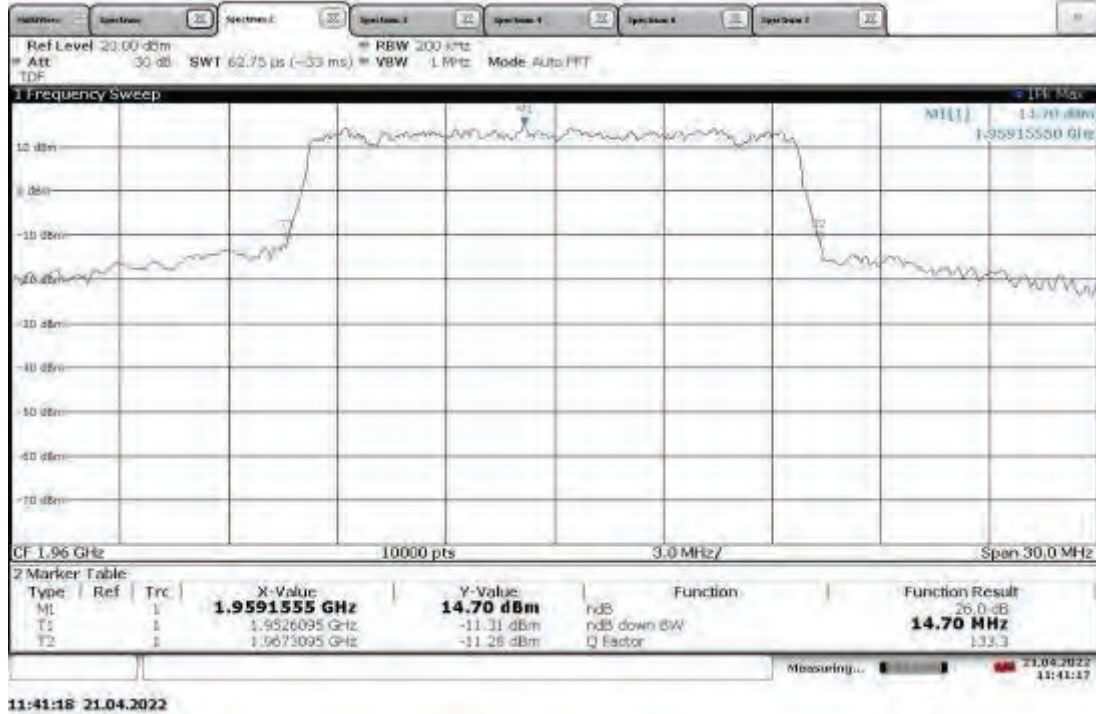
TM3.1a-256QAM_15 MHz Bandwidth (4G LTE)
Slot 0 (Band 2), ANT1, Low Channel 26 dB Bandwidth



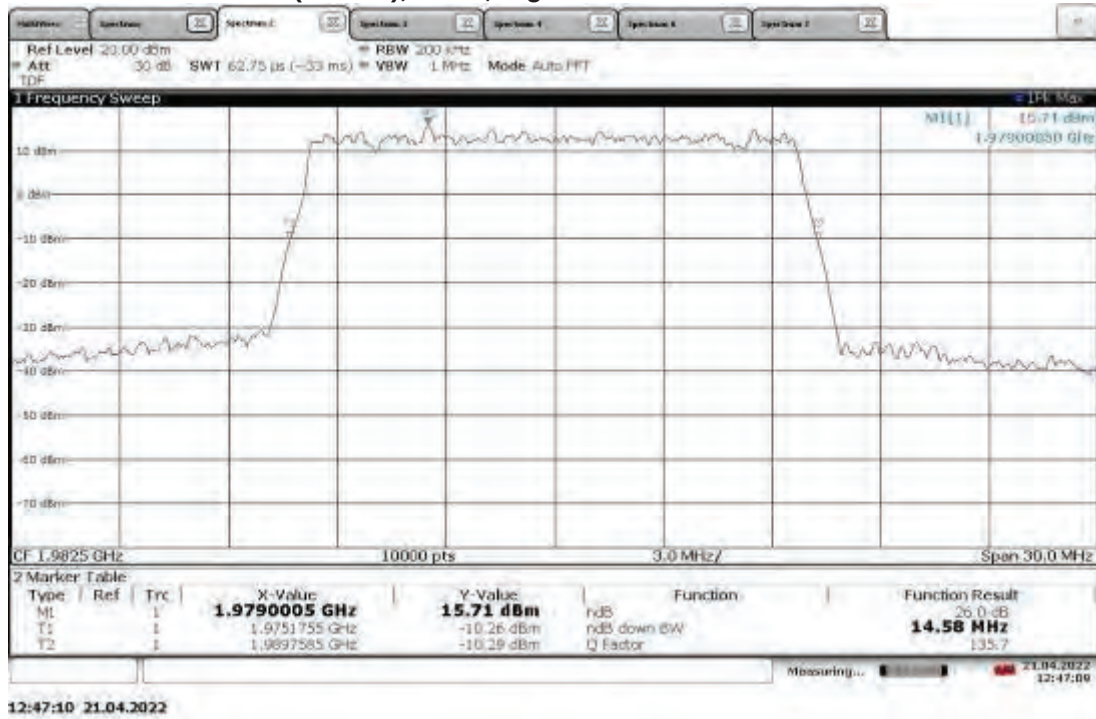
TM3.1a-256QAM_15 MHz Bandwidth (4G LTE)
Slot 0 (Band 2), ANT0, Mid Channel 26 dB Bandwidth



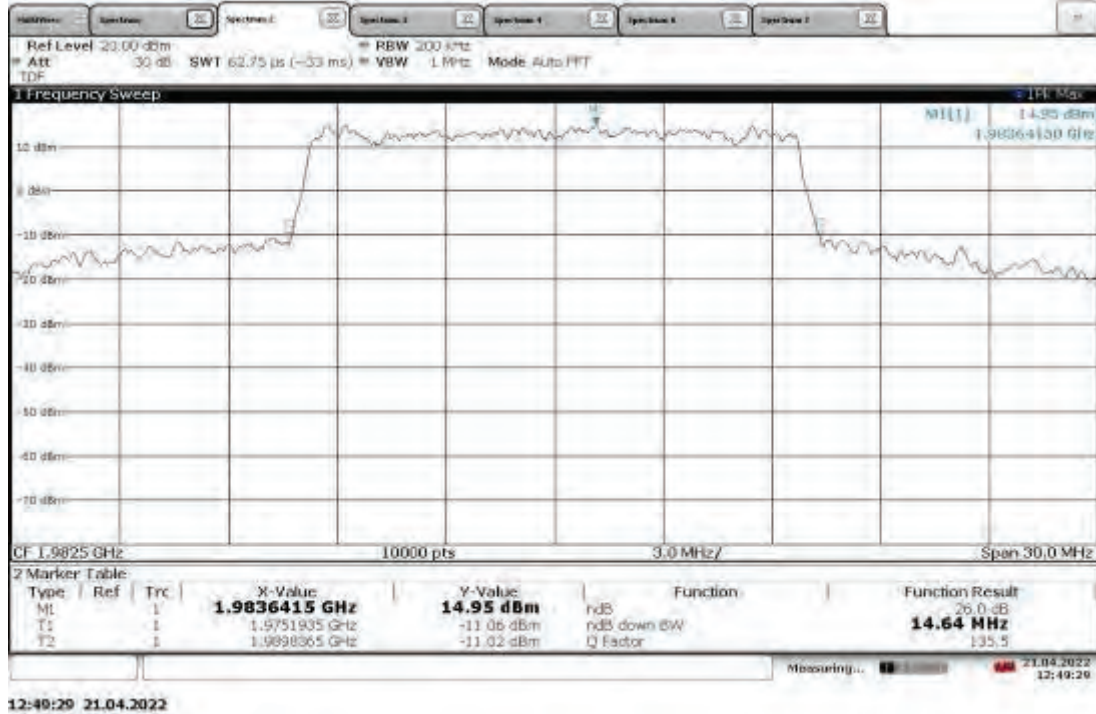
TM3.1a-256QAM_15 MHz Bandwidth (4G LTE)
Slot 0 (Band 2), ANT1, Mid Channel 26 dB Bandwidth



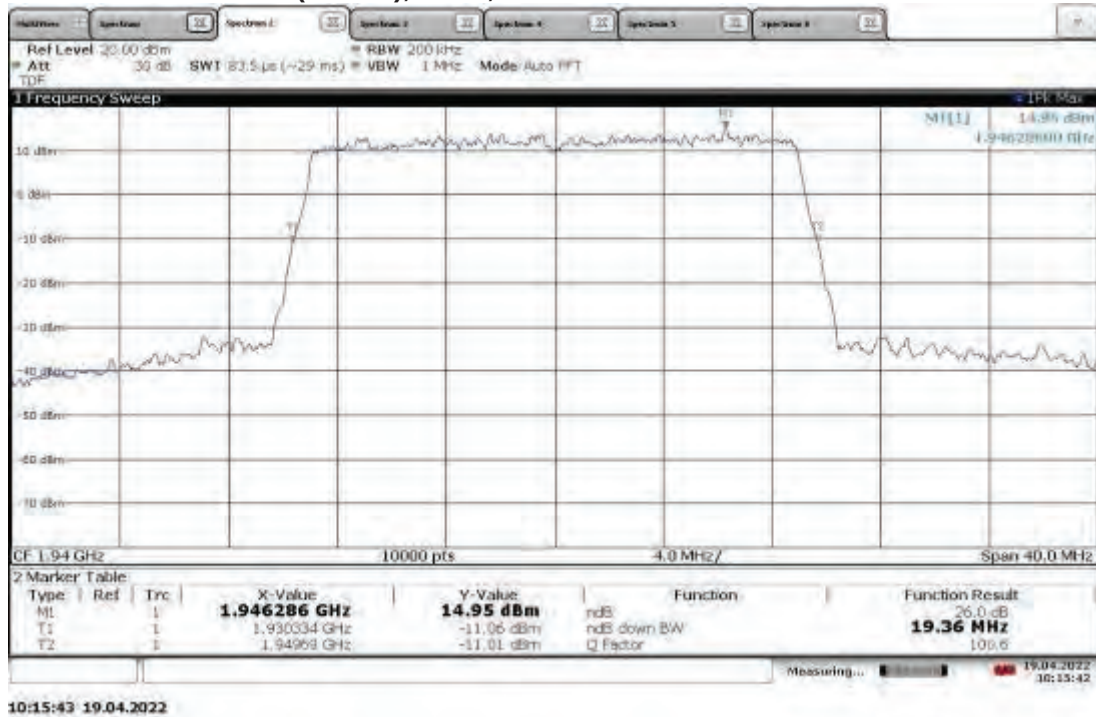
TM3.1a-256QAM_15 MHz Bandwidth (4G LTE)
Slot 0 (Band 2), ANT0, High Channel 26 dB Bandwidth



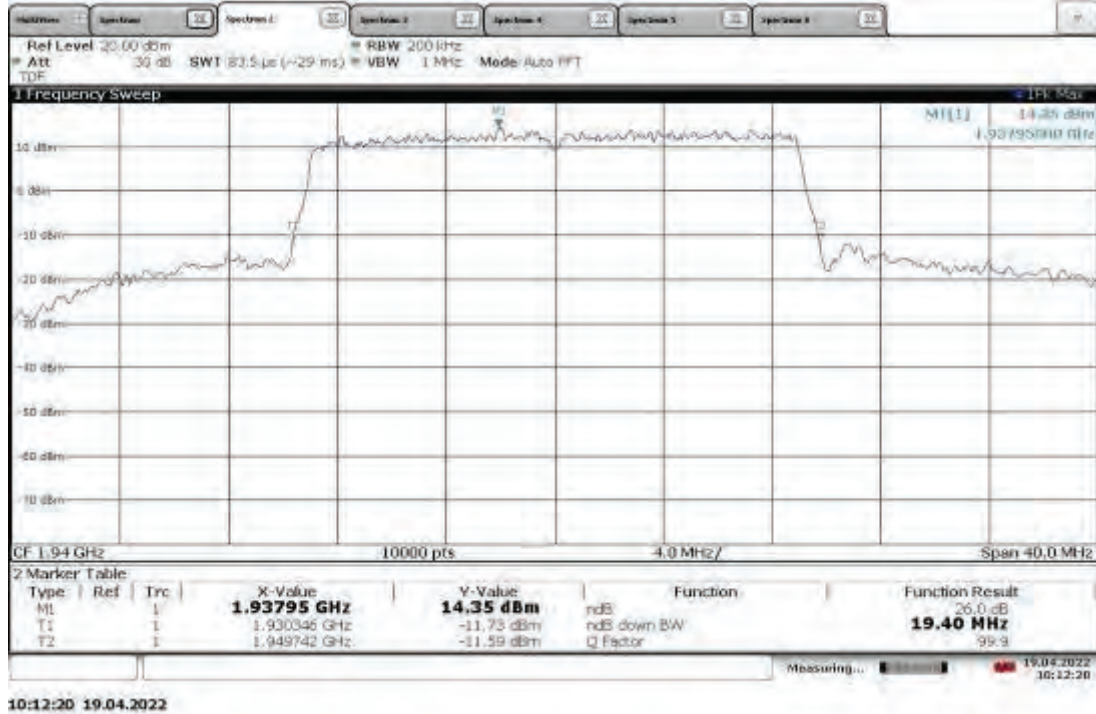
TM3.1a-256QAM_15 MHz Bandwidth (4G LTE)
Slot 0 (Band 2), ANT1, High Channel 26 dB Bandwidth



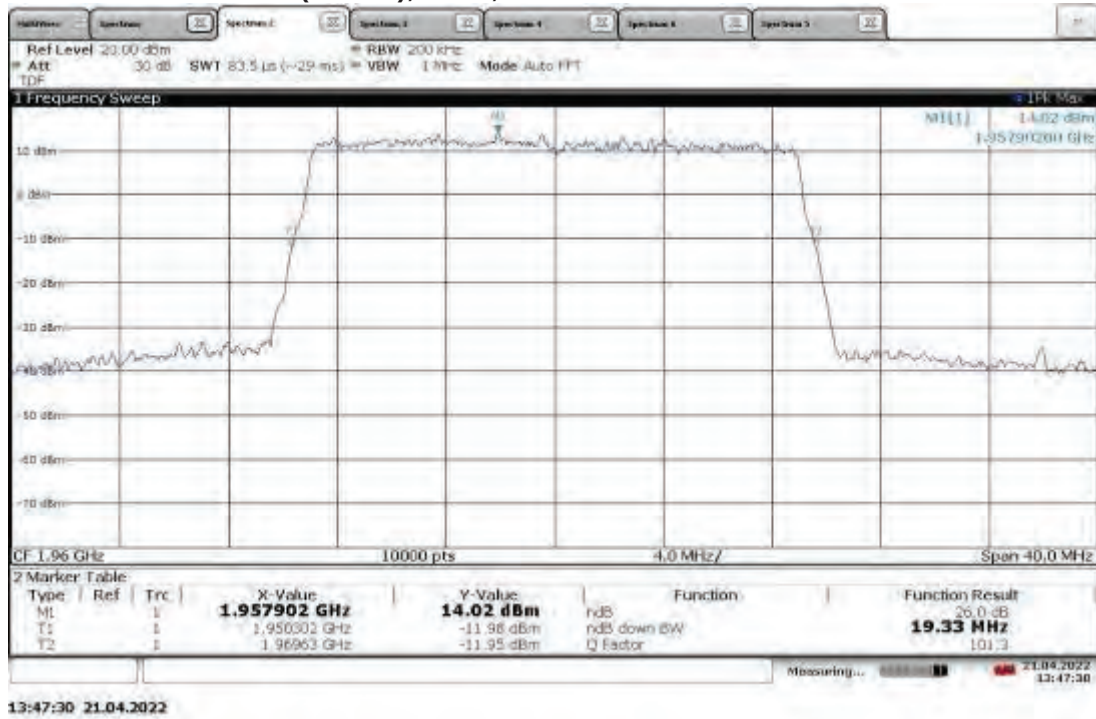
TM3.1a-256QAM_20 MHz Bandwidth (4G LTE)
Slot 0 (Band 2), ANT0, Low Channel 26 dB Bandwidth



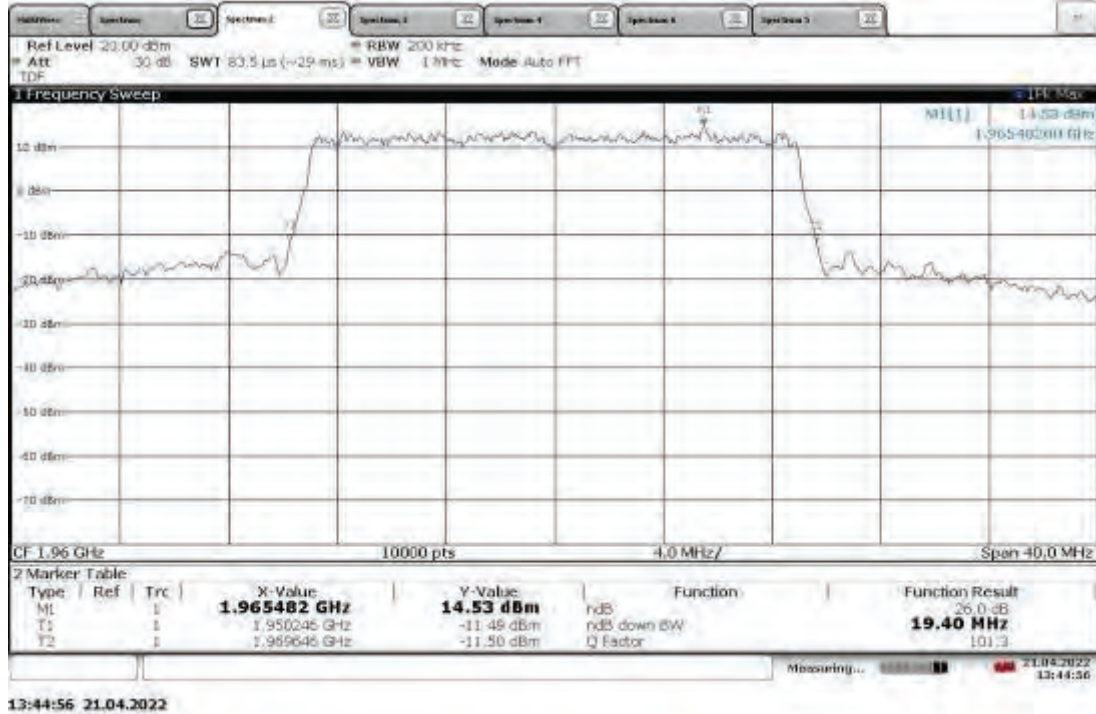
TM3.1a-256QAM_20 MHz Bandwidth (4G LTE)
Slot 0 (Band 2), ANT1, Low Channel 26 dB Bandwidth



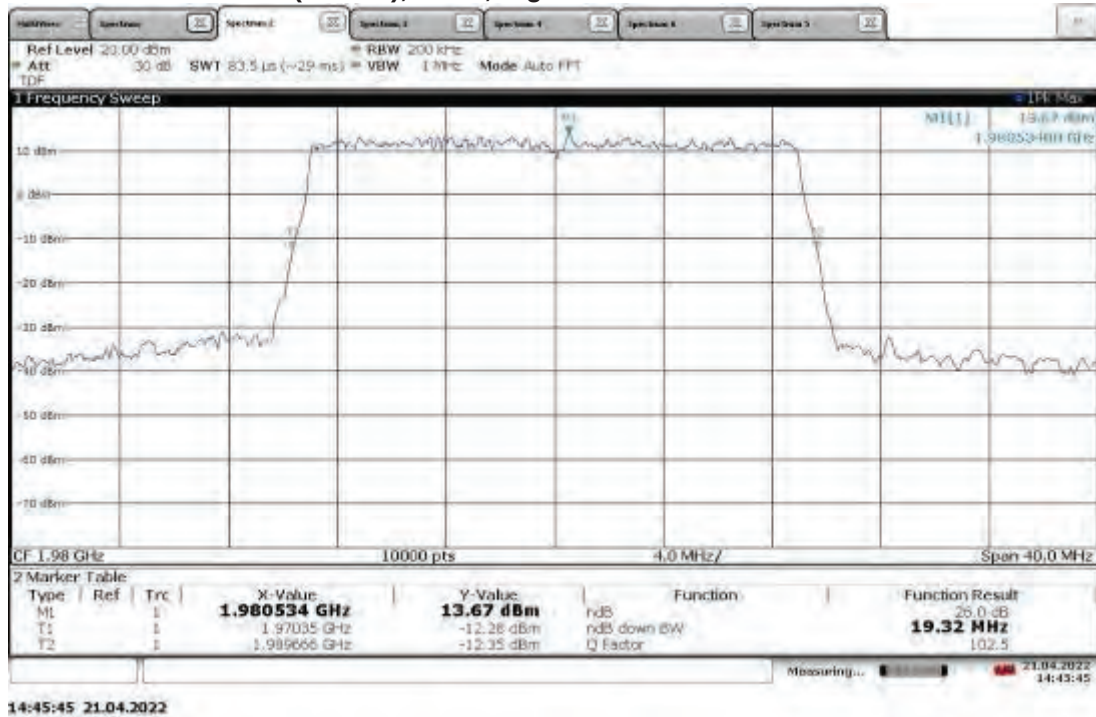
TM3.1a-256QAM_20 MHz Bandwidth (4G LTE)
Slot 0 (Band 2), ANT0, Mid Channel 26 dB Bandwidth



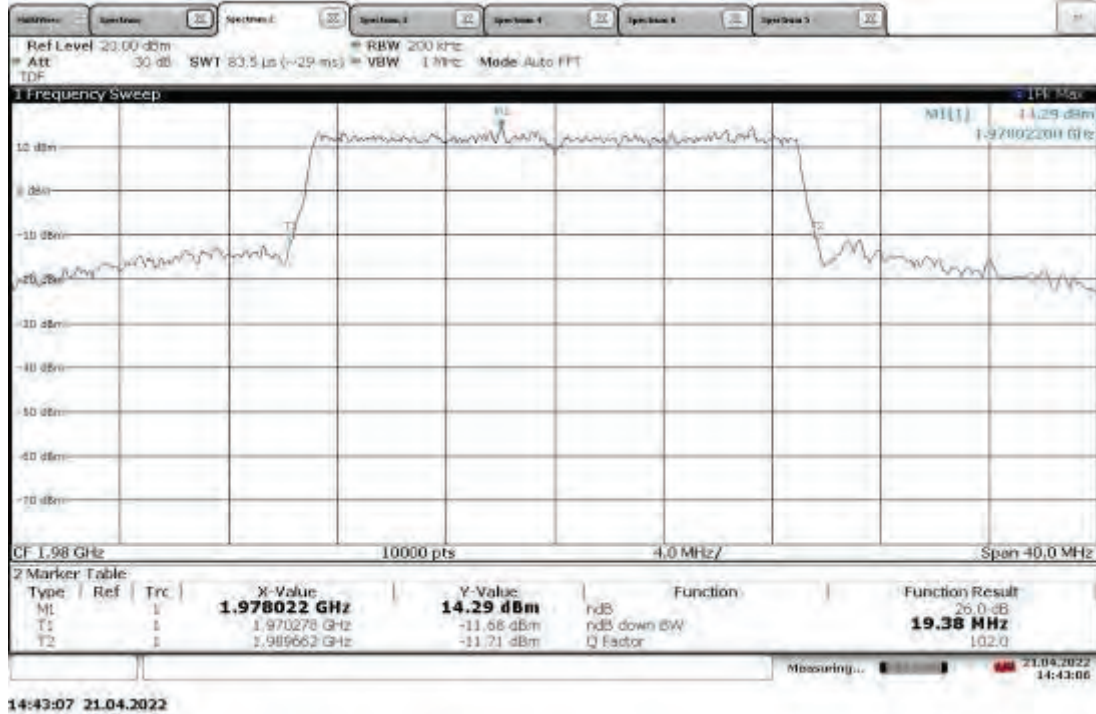
TM3.1a-256QAM_20 MHz Bandwidth (4G LTE)
Slot 0 (Band 2), ANT1, Mid Channel 26 dB Bandwidth



TM3.1a-256QAM_20 MHz Bandwidth (4G LTE)
Slot 0 (Band 2), ANT0, High Channel 26 dB Bandwidth



TM3.1a-256QAM_20 MHz Bandwidth (4G LTE)
Slot 0 (Band 2), ANT1, High Channel 26 dB Bandwidth



Test Personnel: Kouma Sinn *KS*
Supervising/Reviewing
Engineer:
(Where Applicable) N/A

Test Date: 04/18/2022, 04/19/2022, 04/21/2022

Product Standard: FCC Part 24
Input Voltage: 48 VDC (POE)

Limit Applied: See report section 8.3

Pretest Verification w/
Ambient Signals or
BB Source: N/A

Ambient Temperature: 25, 25, 24 °C

Relative Humidity: 18, 34, 23 %

Atmospheric Pressure: 1015, 988, 1024 mbars

Deviations, Additions, or Exclusions: None

9 Band Edge Compliance

9.1 Method

Tests are performed in accordance with ANSI C63.26 and CFR47 FCC Parts 2.1051, 2.1053, and 24.

TEST SITE: EMC Lab & 10m ALSE

The EMC Lab has one Semi-anechoic Chamber and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference ground-planes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

9.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV005'	Weather Station	Davis	6250	MS191218083	02/11/2022	02/11/2023
ROS005-1'	Signal and Spectrum Analyzer	Rohde and Shwartz	FSW43	100646	11/02/2021	11/02/2022
CEN001'	DC-40GHz attenuator 20dB	Centric RF	C411-20	CEN001	01/26/2022	01/26/2023
CBLHF2012-2M-2'	2m 9kHz-40GHz Coaxial Cable - SET2	Huber & Suhner	SF102	252675002	02/10/2023	02/10/2023

Software Utilized:

Name	Manufacturer	Version
None	--	--

9.3 Results:

The sample tested was found to Comply.

FCC Part §24.238 (a)(b) The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

Intertek

Report Number: 105029958BOX-005.1

Issued: 05/18/2022
Revised: 06/08/2022

Slot 0 (Band 2), Bandwidth: 5 MHz, Modulation: TM1.1-QPSK (4G LTE)

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)	Limit (dBm)	Margin
Low	1932.50	ANT0	-30.26	-13	-17.26
		ANT1	-17.61	-13	-4.61
High	1987.50	ANT0	-30.67	-13	-17.67
		ANT1	-13.62	-13	-0.62

Slot 0 (Band 2), Bandwidth: 10 MHz, Modulation: TM1.1-QPSK (4G LTE)

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)	Limit (dBm)	Margin
Low	1935	ANT0	-33.37	-13	-20.37
		ANT1	-17.72	-13	-4.72
High	1985	ANT0	-33.94	-13	-20.94
		ANT1	-16.30	-13	-3.3

Slot 0 (Band 2), Bandwidth: 15 MHz, Modulation: TM1.1-QPSK (4G LTE)

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)	Limit (dBm)	Margin
Low	1937.50	ANT0	-35.10	-13	-20.37
		ANT1	-18.72	-13	-4.72
High	1982.50	ANT0	-35.77	-13	-20.94
		ANT1	-17.73	-13	-3.3

Slot 0 (Band 2), Bandwidth: 20 MHz, Modulation: TM1.1-QPSK (4G LTE)

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)	Limit (dBm)	Margin
Low	1940	ANT0	-35.21	-13	-22.1
		ANT1	-20.27	-13	-5.72
High	1980	ANT0	-37.35	-13	-22.77
		ANT1	-19.48	-13	-4.73

Slot 0 (Band 2), Bandwidth: 5 MHz, Modulation: TM3.2-16QAM (4G LTE)

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)	Limit (dBm)	Margin
Low	1932.50	ANT0	-31.22	-13	-18.22
		ANT1	-16.11	-13	-3.11
High	1987.50	ANT0	-31.06	-13	-18.06
		ANT1	-13.73	-13	-0.73

Slot 0 (Band 2), Bandwidth: 10 MHz, Modulation: TM3.2-16QAM (4G LTE)

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)	Limit (dBm)	Margin
Low	1935	ANT0	-33.30	-13	-20.3
		ANT1	-18.19	-13	-5.19
High	1985	ANT0	-34.03	-13	-21.03
		ANT1	-16.21	-13	-3.21

Slot 0 (Band 2), Bandwidth: 15 MHz, Modulation: TM3.2-16QAM (4G LTE)

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)	Limit (dBm)	Margin
Low	1937.50	ANT0	-35.20	-13	-22.2
		ANT1	-19.34	-13	-6.34
High	1982.50	ANT0	-36.41	-13	-23.41
		ANT1	-18.30	-13	-5.3

Slot 0 (Band 2), Bandwidth: 20 MHz, Modulation: TM3.2-16QAM (4G LTE)

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)	Limit (dBm)	Margin
Low	1940	ANT0	-36.22	-13	-23.22
		ANT1	-20.31	-13	-7.31
High	1980	ANT0	-36.26	-13	-23.26
		ANT1	-19.68	-13	-6.68

Intertek

Report Number: 105029958BOX-005.1

Issued: 05/18/2022
Revised: 06/08/2022

Slot 0 (Band 2), Bandwidth: 5 MHz, Modulation: TM3.1-64QAM (4G LTE)

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)	Limit (dBm)	Margin
Low	1932.50	ANT0	-29.00	-13	-16
		ANT1	-15.80	-13	-2.8
High	1987.50	ANT0	-30.52	-13	-17.52
		ANT1	-13.35	-13	-0.35

Slot 0 (Band 2), Bandwidth: 10 MHz, Modulation: TM3.1-64QAM (4G LTE)

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)	Limit (dBm)	Margin
Low	1935	ANT0	-32.15	-13	-19.15
		ANT1	-17.46	-13	-4.46
High	1985	ANT0	-33.75	-13	-20.75
		ANT1	-15.81	-13	-2.81

Slot 0 (Band 2), Bandwidth: 15 MHz, Modulation: TM3.1-64QAM (4G LTE)

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)	Limit (dBm)	Margin
Low	1937.50	ANT0	-34.73	-13	-21.73
		ANT1	-18.35	-13	-5.35
High	1982.50	ANT0	-36.46	-13	-23.46
		ANT1	-18.04	-13	-5.04

Slot 0 (Band 2), Bandwidth: 20 MHz, Modulation: TM3.1-64QAM (4G LTE)

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)	Limit (dBm)	Margin
Low	1940	ANT0	-35.95	-13	-22.95
		ANT1	-20.50	-13	-7.5
High	1980	ANT0	-36.96	-13	-23.96
		ANT1	-18.48	-13	-5.48

Slot 0 (Band 2), Bandwidth: 5 MHz, Modulation: TM3.1a-256QAM (4G LTE)

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)	Limit (dBm)	Margin
Low	1932.50	ANT0	-28.72	-13	-15.72
		ANT1	-15.96	-13	-2.96
High	1987.50	ANT0	-30.81	-13	-17.81
		ANT1	-13.34	-13	-0.34

Slot 0 (Band 2), Bandwidth: 10 MHz, Modulation: TM3.1a-256QAM (4G LTE)

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)	Limit (dBm)	Margin
Low	1935	ANT0	-33.64	-13	-20.64
		ANT1	-17.83	-13	-4.83
High	1985	ANT0	-34.35	-13	-21.35
		ANT1	-15.77	-13	-2.77

Slot 0 (Band 2), Bandwidth: 15 MHz, Modulation: TM3.1a-256QAM (4G LTE)

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)	Limit (dBm)	Margin
Low	1937.50	ANT0	-35.04	-13	-22.04
		ANT1	-19.11	-13	-6.11
High	1982.50	ANT0	-35.73	-13	-22.73
		ANT1	-17.84	-13	-4.84

Slot 0 (Band 2), Bandwidth: 20 MHz, Modulation: TM3.1a-256QAM (4G LTE)

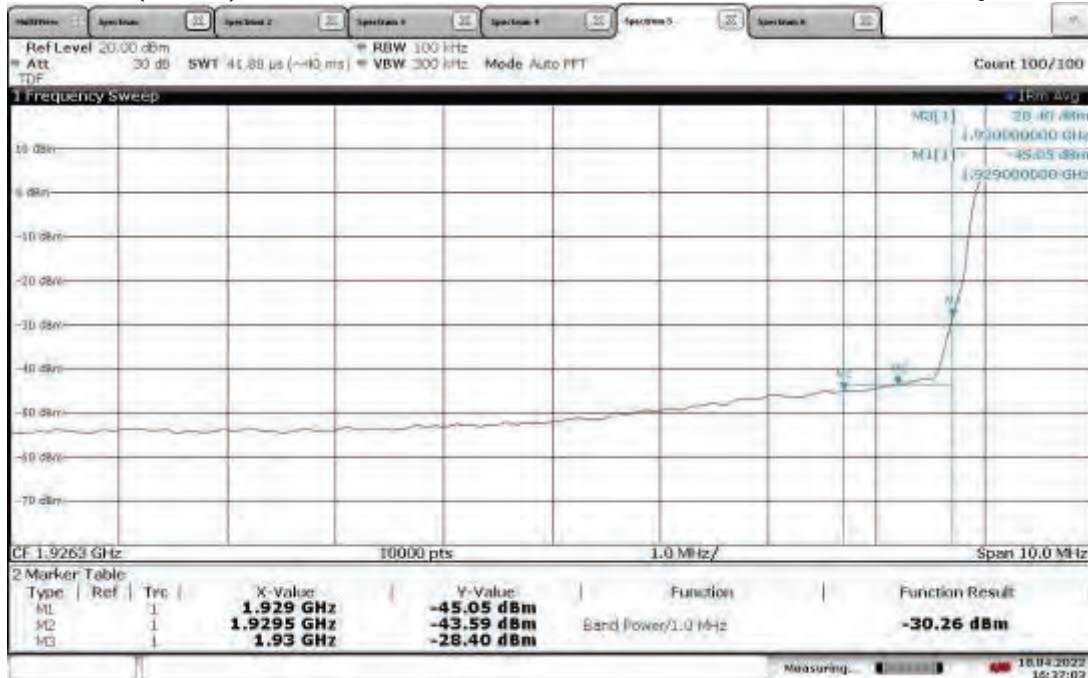
Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)	Limit (dBm)	Margin
Low	1940	ANT0	-33.96	-13	-20.96
		ANT1	-20.67	-13	-7.67
High	1980	ANT0	-35.46	-13	-22.46
		ANT1	-18.73	-13	-5.73

9.4 Setup Photograph:

Confidential – Photos not included in this report

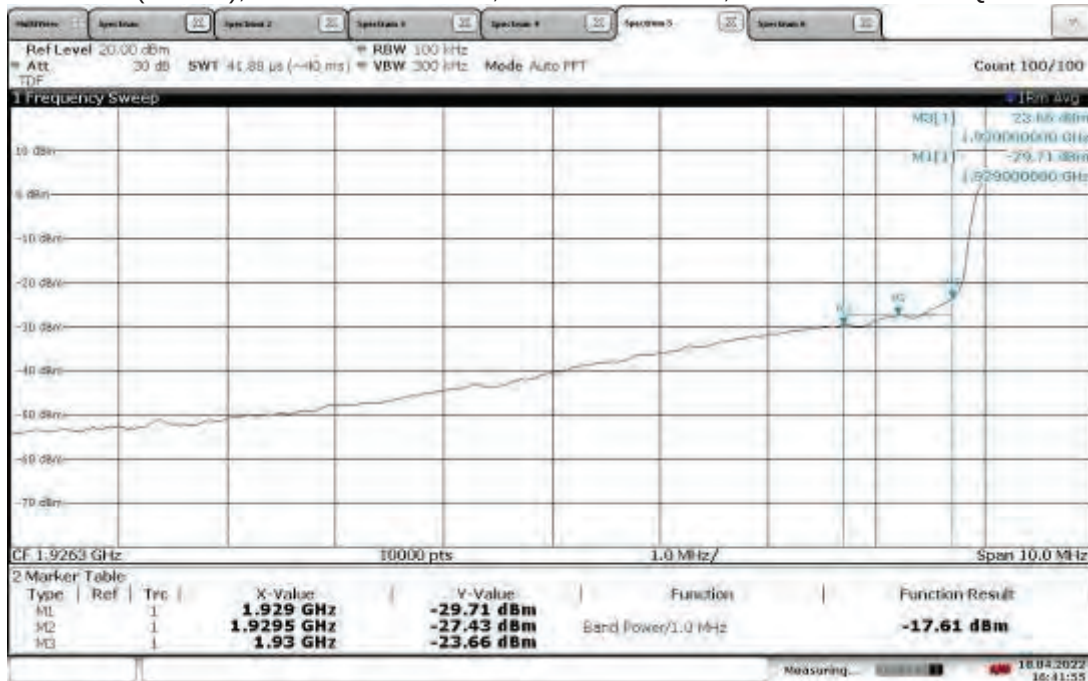
9.5 Plots/Data:

Band Edge Compliant, Lower Band Edge, 1932.5 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM1.1-QPSK



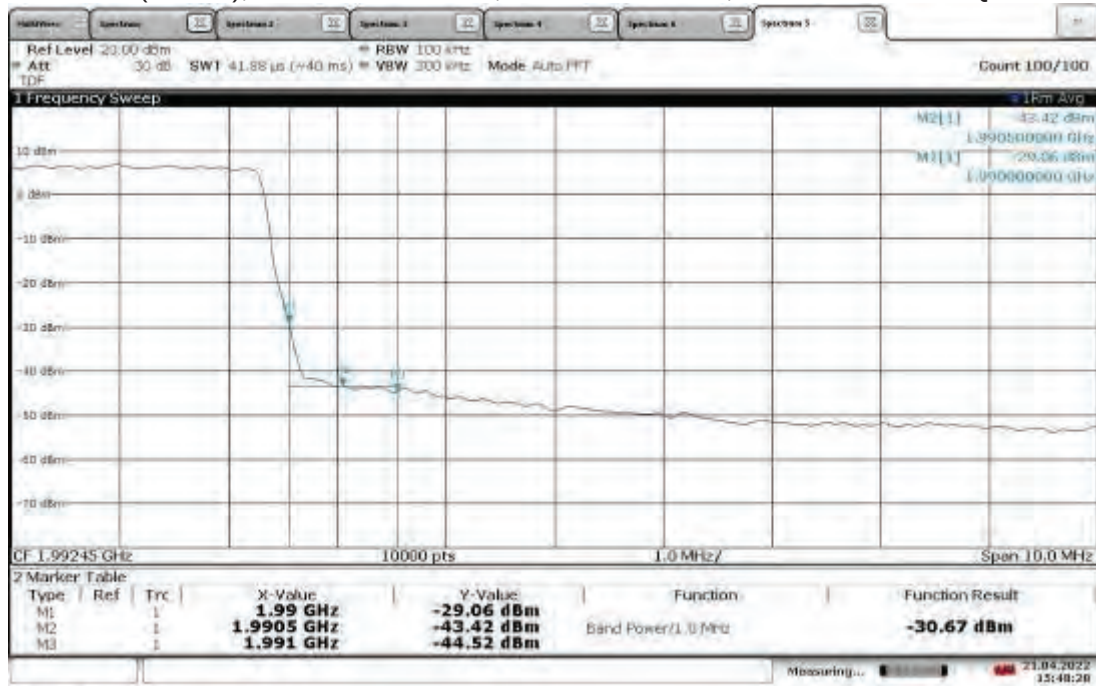
16:37:04 18.04.2022

Band Edge Compliant, Lower Band Edge, 1932.5 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM1.1-QPSK



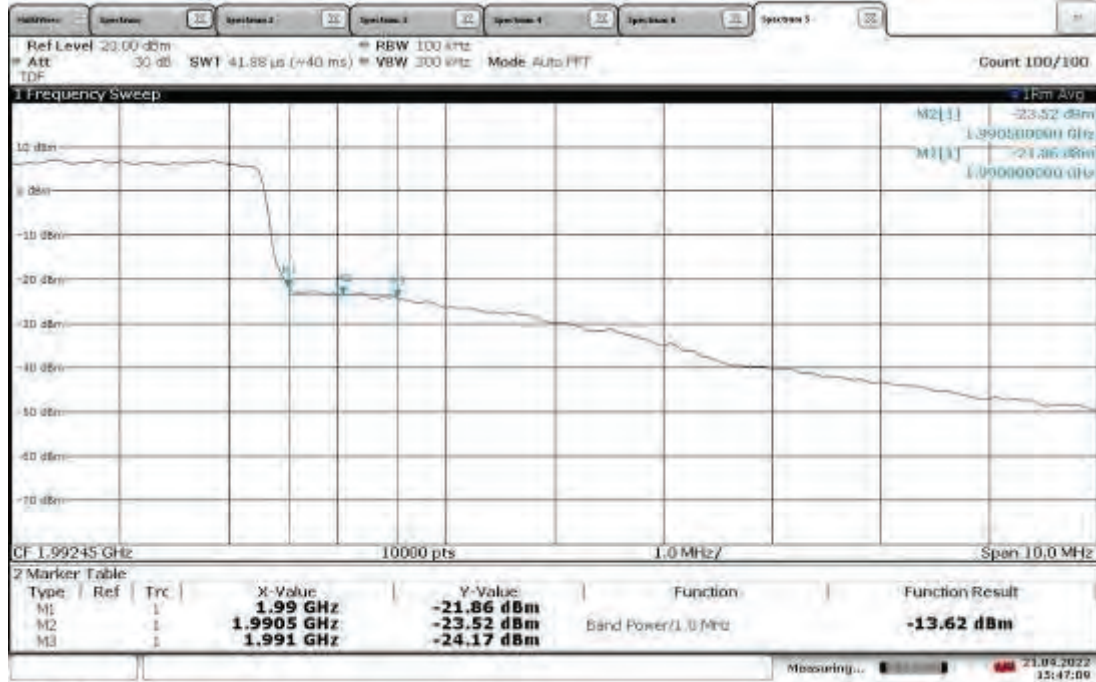
16:41:56 18.04.2022

Band Edge Compliant, Upper Band Edge, 1987.5 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM1.1-QPSK



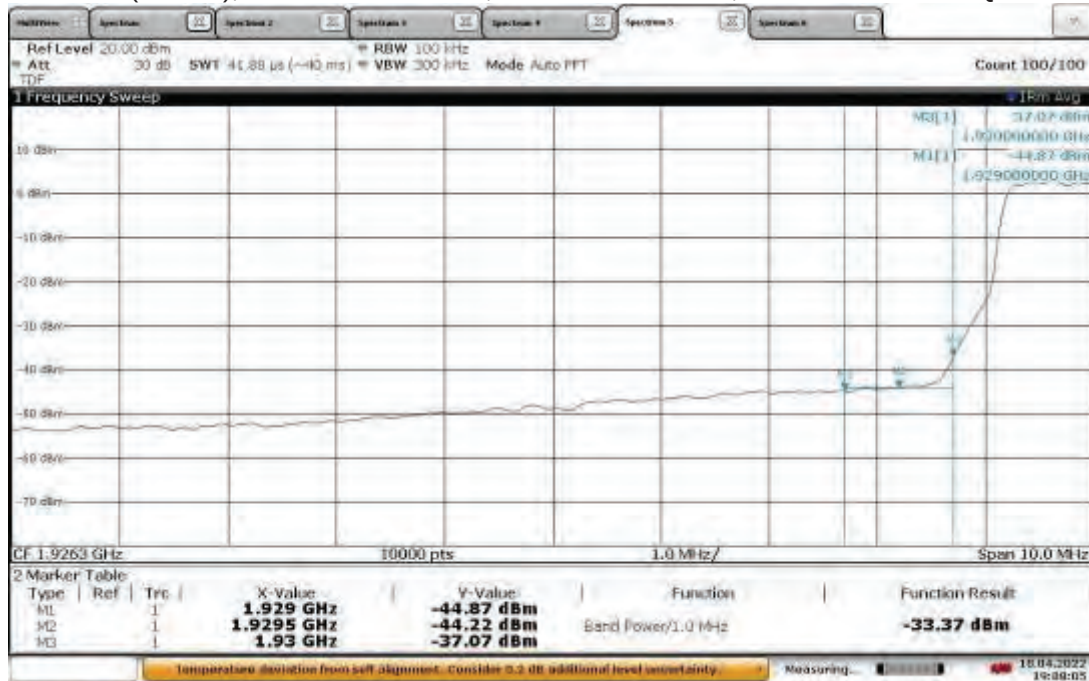
15:48:29 21.04.2022

Band Edge Compliant, Upper Band Edge, 1987.5 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM1.1-QPSK



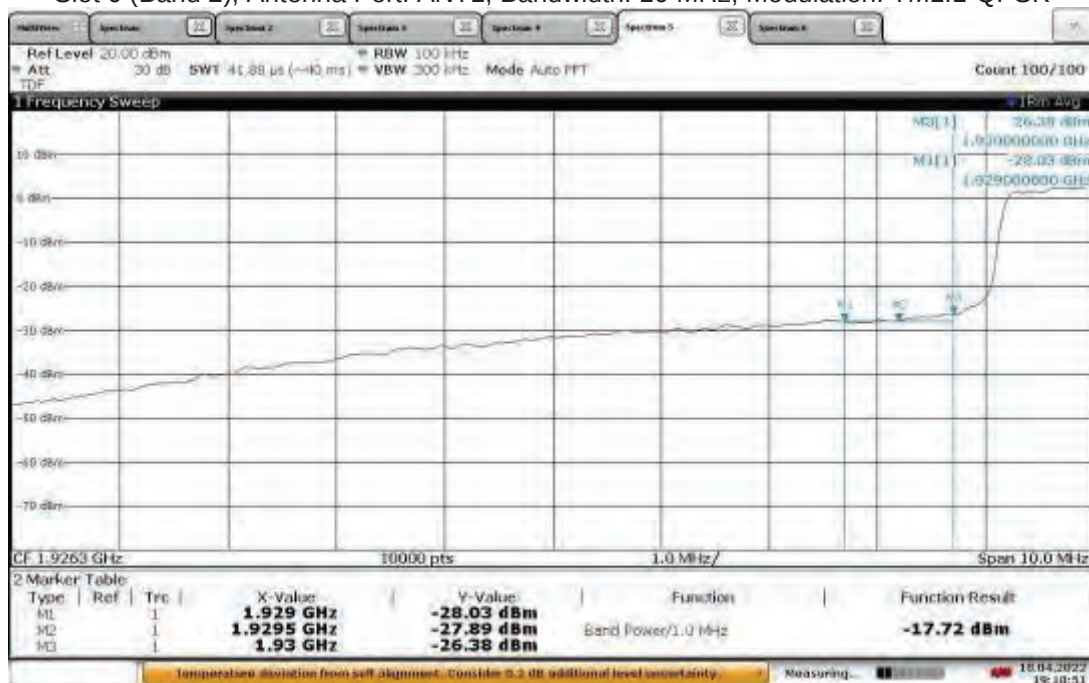
15:47:09 21.04.2022

Band Edge Compliant, Lower Band Edge, 1935 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM1.1-QPSK



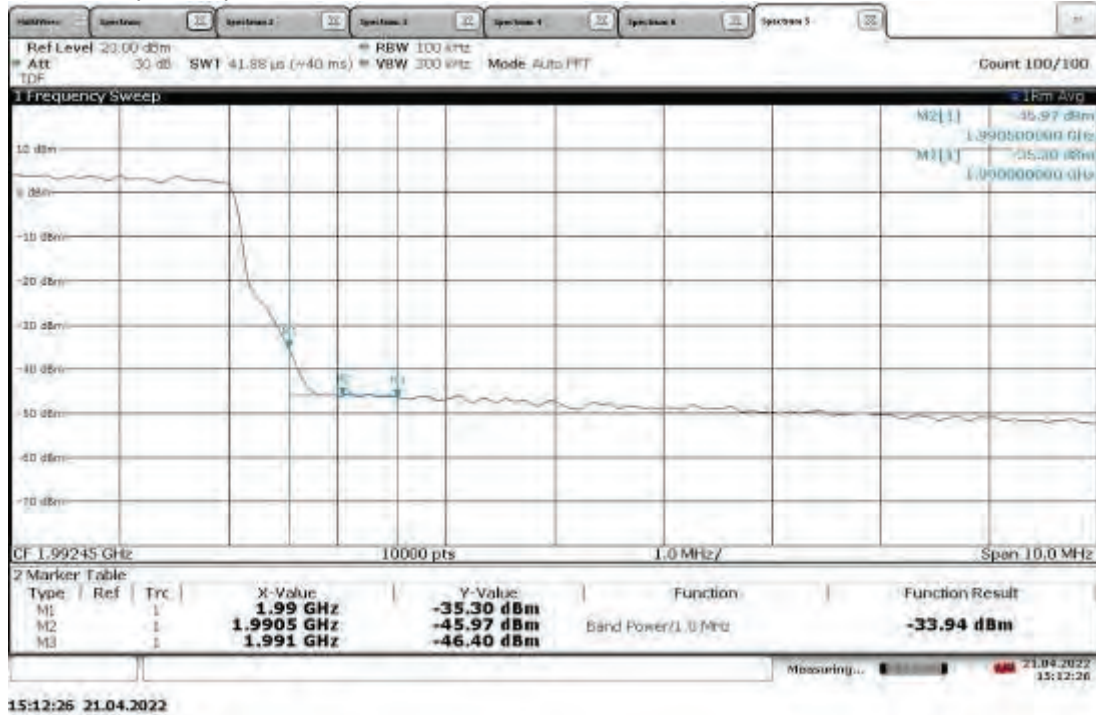
19:08:05 18.04.2022

Band Edge Compliant, Lower Band Edge, 1935 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM1.1-QPSK

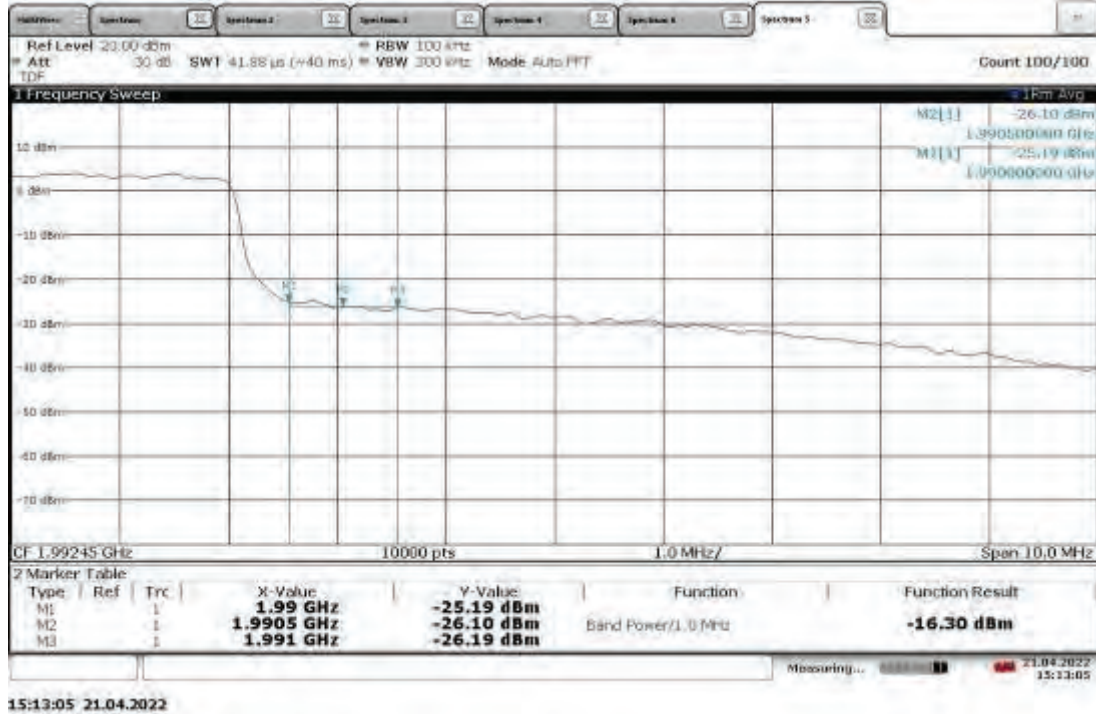


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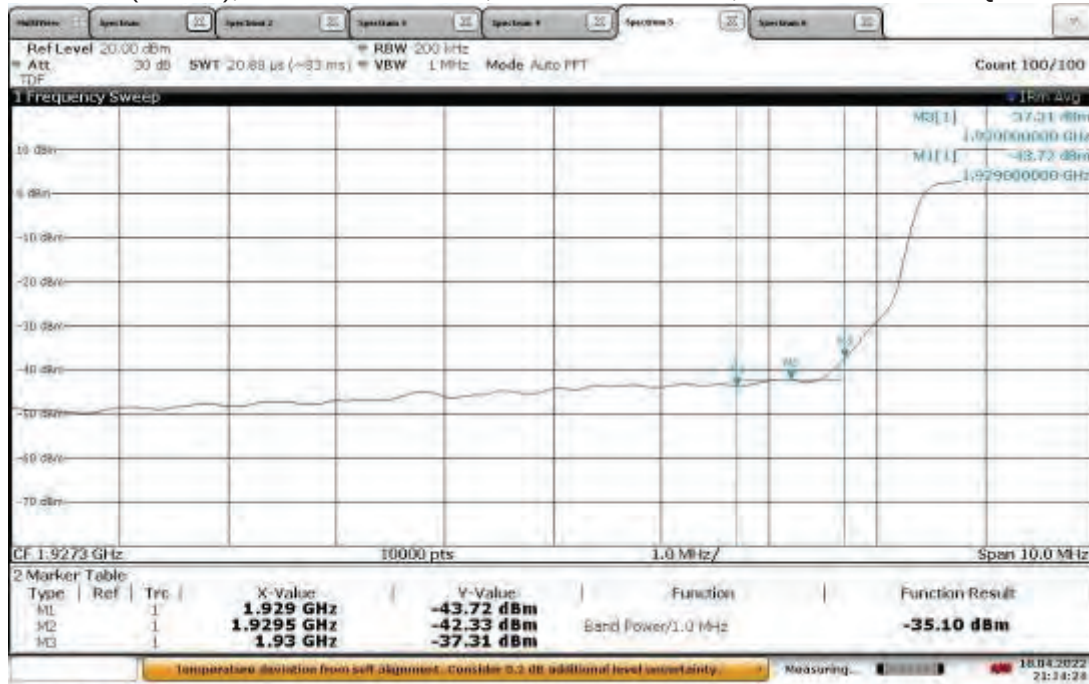
Band Edge Compliant, Upper Edge, 1985 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM1.1-QPSK



Band Edge Compliant, Upper Edge, 1985 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM1.1-QPSK

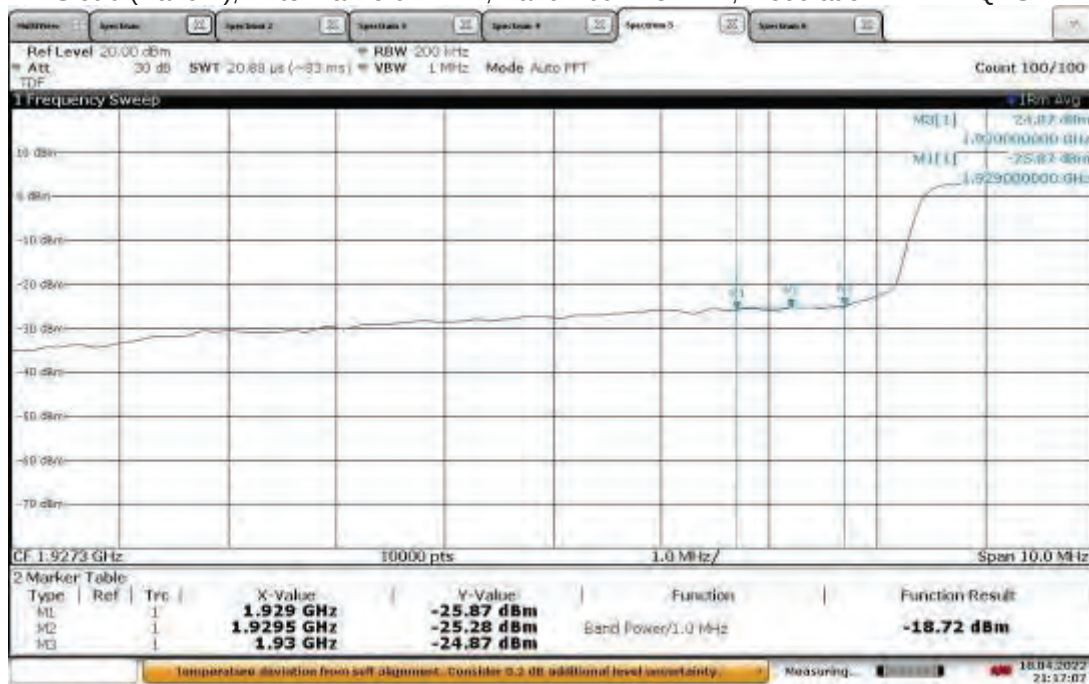


Band Edge Compliant, Lower Band Edge, 1937.5 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT0, Bandwidth: 15 MHz, Modulation: TM1.1-QPSK



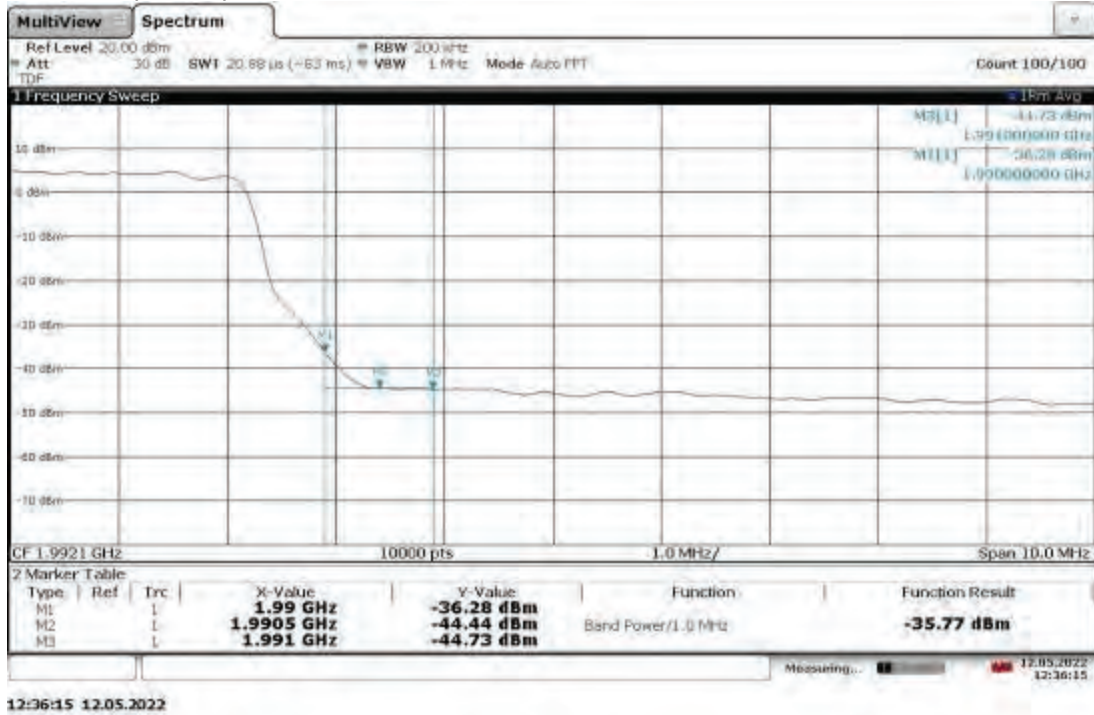
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Band Edge Compliant, Lower Band Edge, 1937.5 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM1.1-QPSK

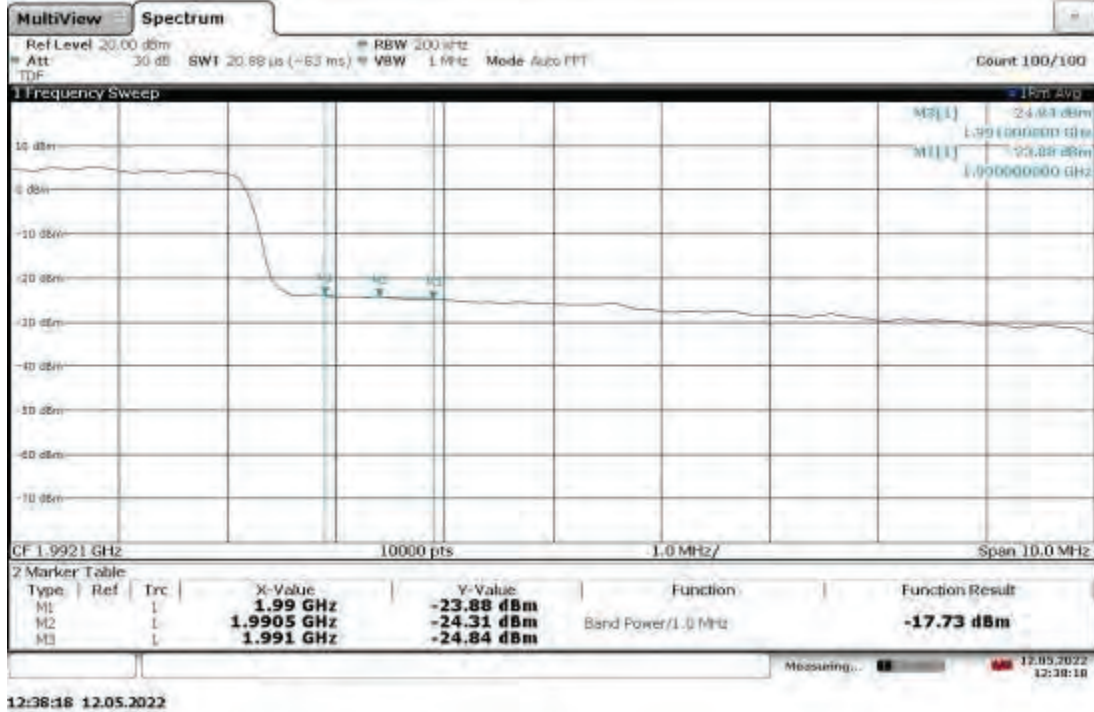


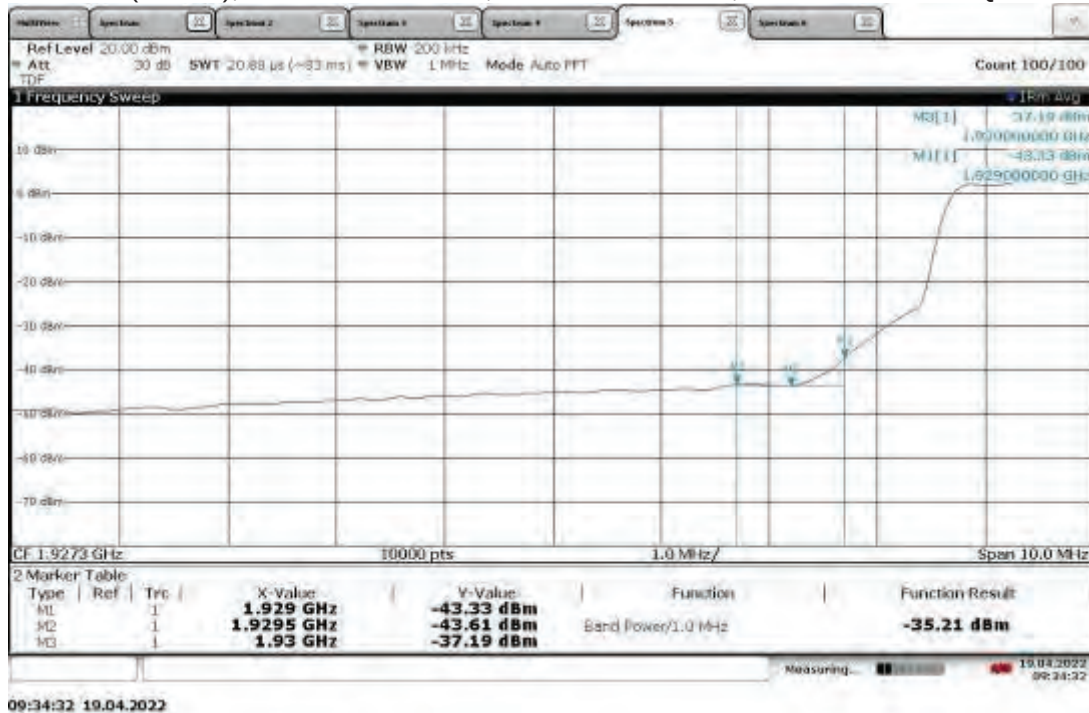
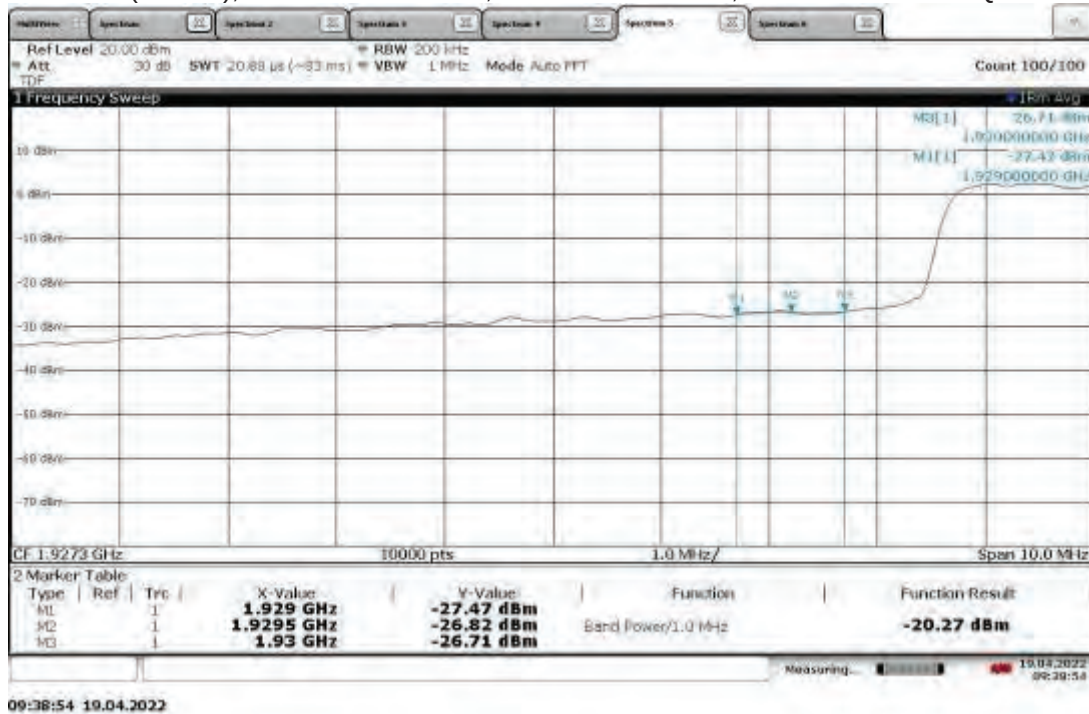
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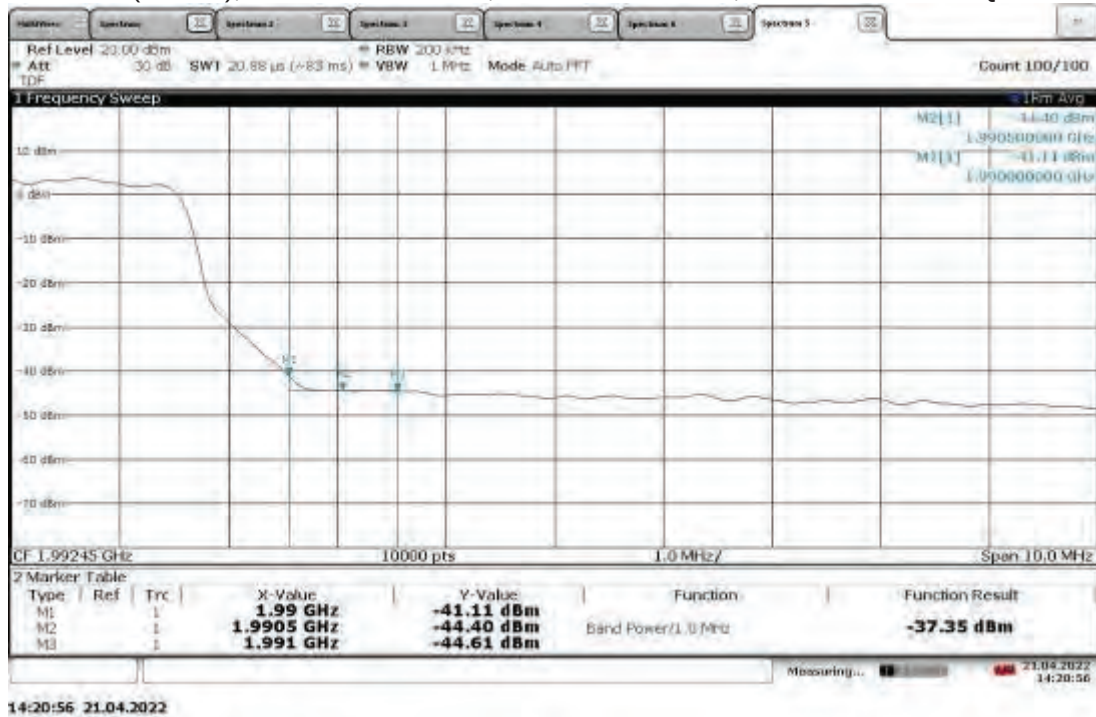
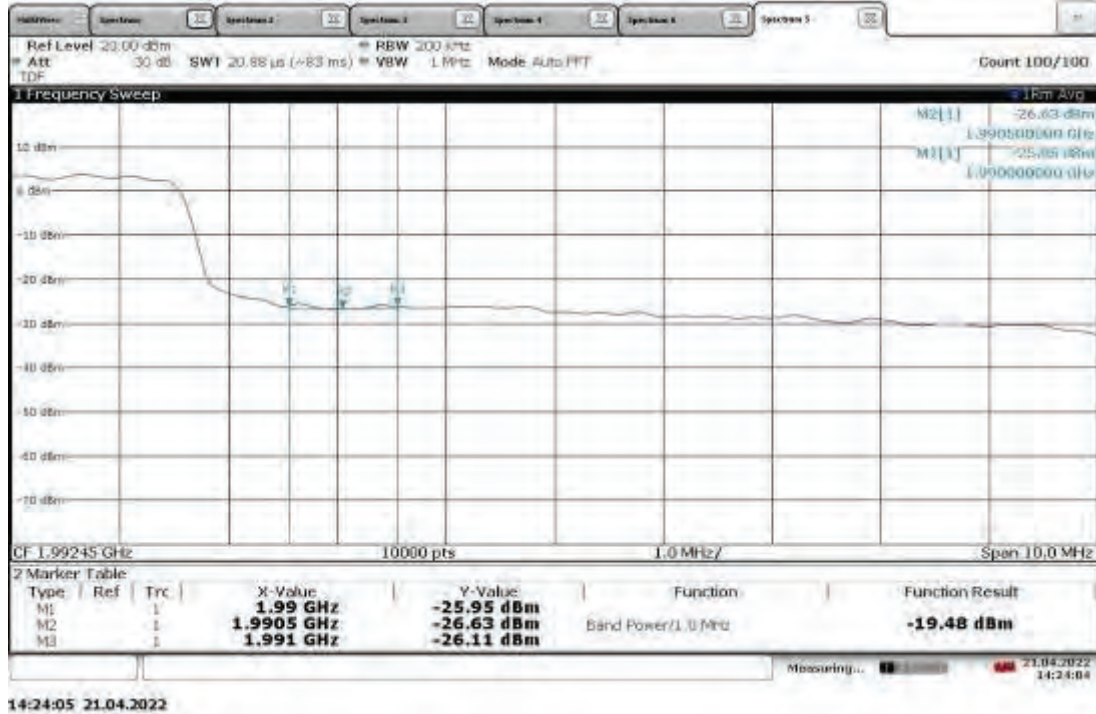
Band Edge Compliant, Upper Band Edge, 1982.5 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT0, Bandwidth: 15 MHz, Modulation: TM1.1-QPSK



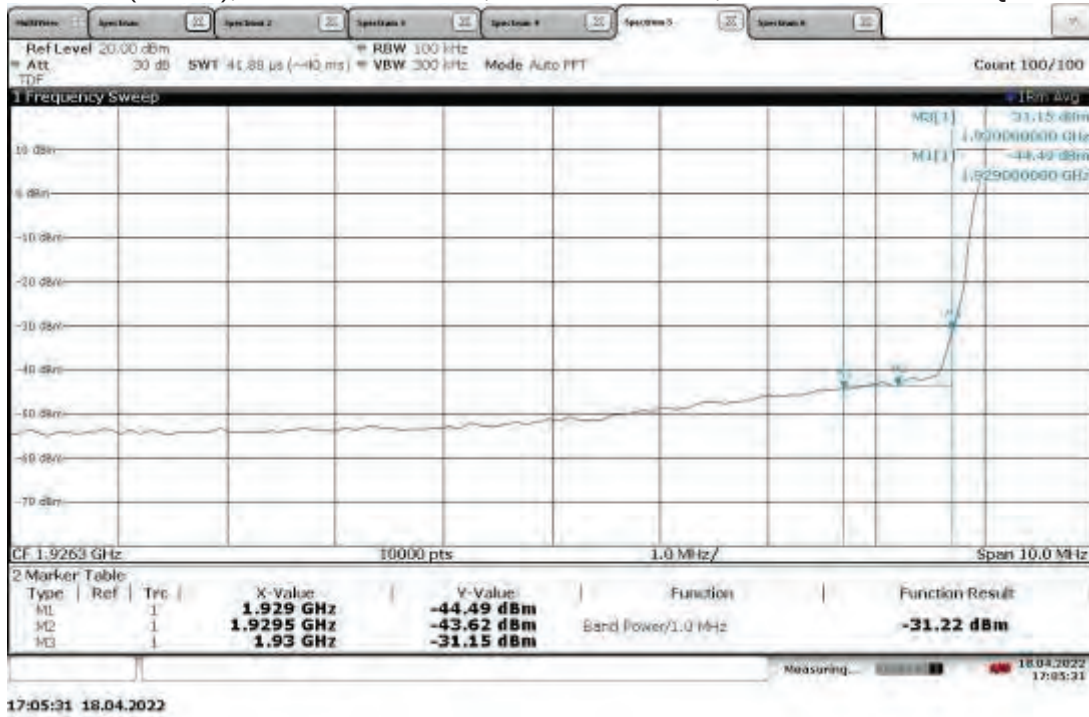
Band Edge Compliant, Upper Band Edge, 1982.5 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM1.1-QPSK



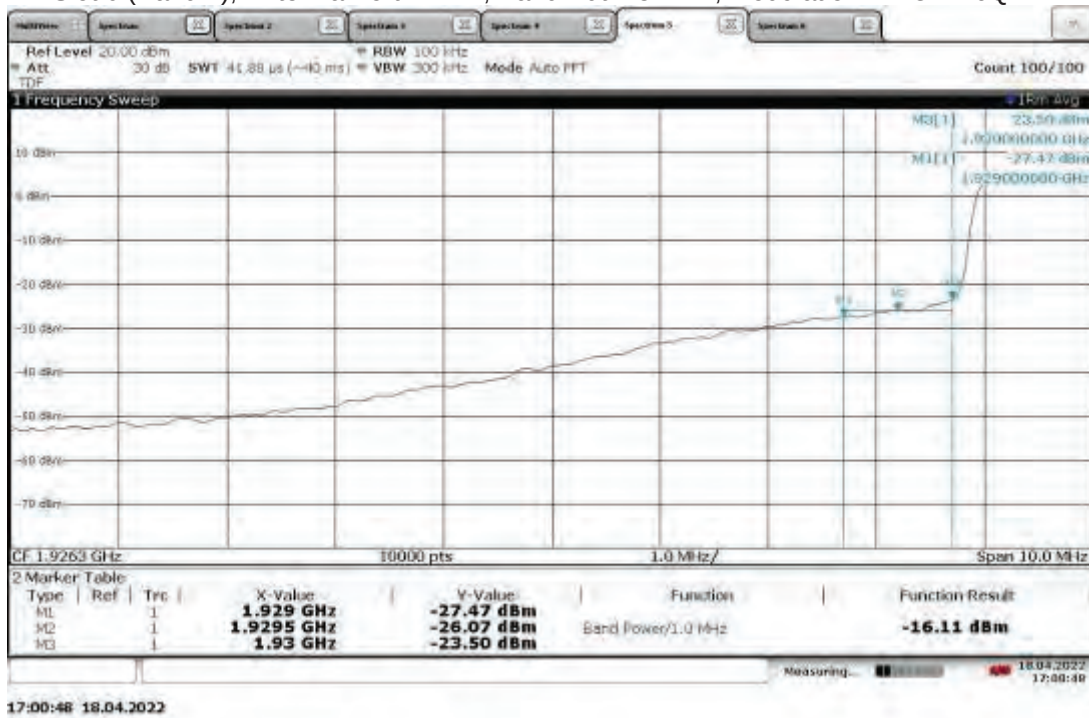
Band Edge Compliant, Lower Band Edge, 1940 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM1.1-QPSKBand Edge Compliant, Lower Band Edge, 1940 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM1.1-QPSK

Band Edge Compliant, Upper Band Edge, 1980 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM1.1-QPSKBand Edge Compliant, Upper Band Edge, 1980 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM1.1-QPSK

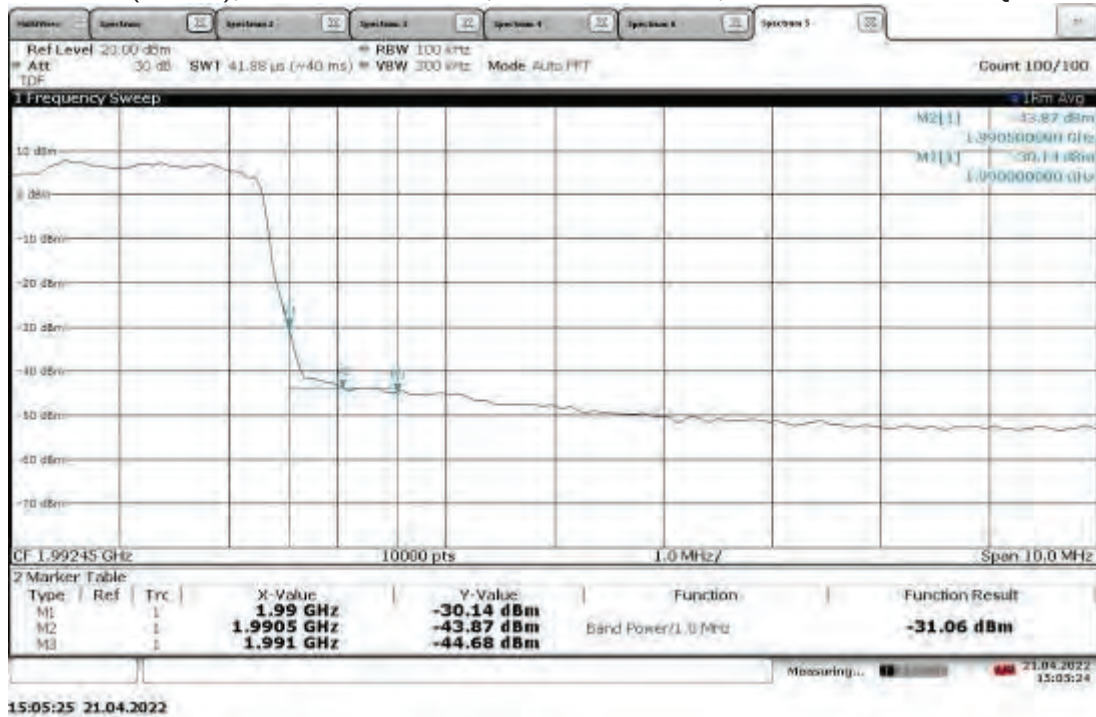
Band Edge Compliant, Lower Band Edge, 1932.5MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM3.2-16QAM



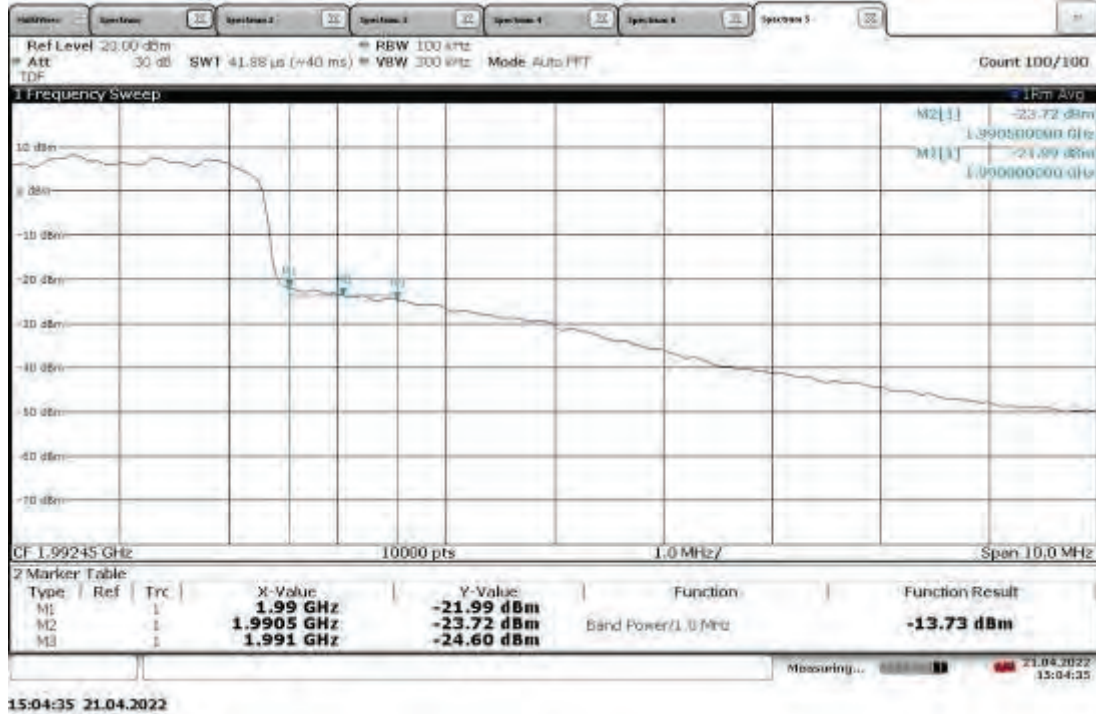
Band Edge Compliant, Lower Band Edge, 1932.5MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM3.2-16QAM



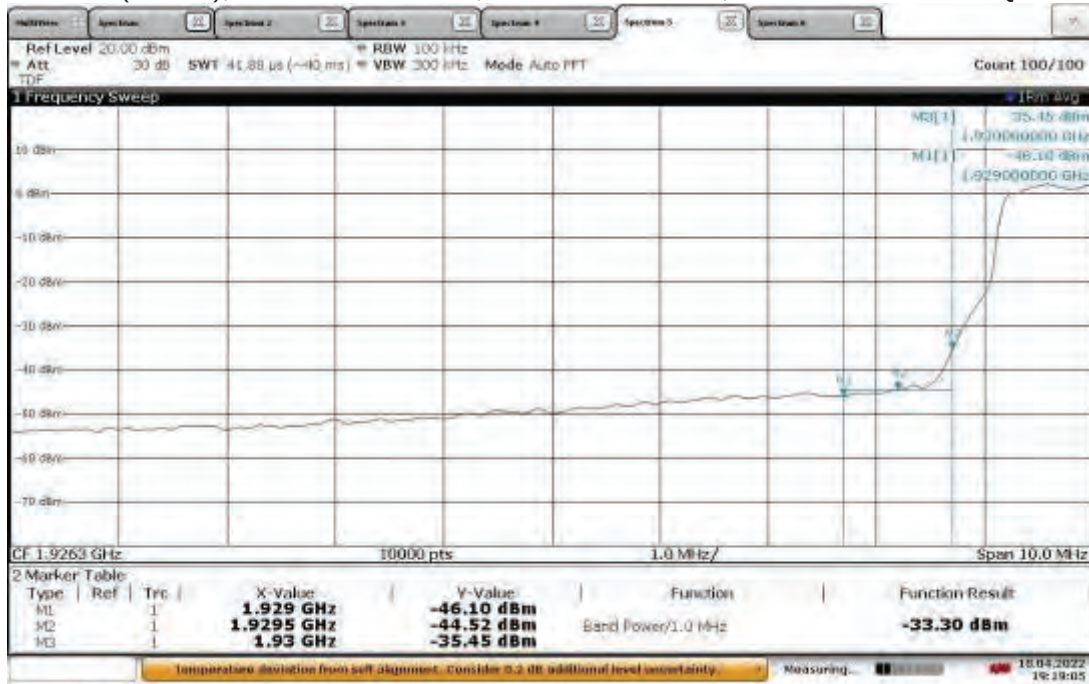
Band Edge Compliant, Upper Band Edge, 1987.5 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM3.2-16QAM



Band Edge Compliant, Upper Band Edge, 1987.5 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT, Bandwidth: 5 MHz, Modulation: TM3.2-16QAM

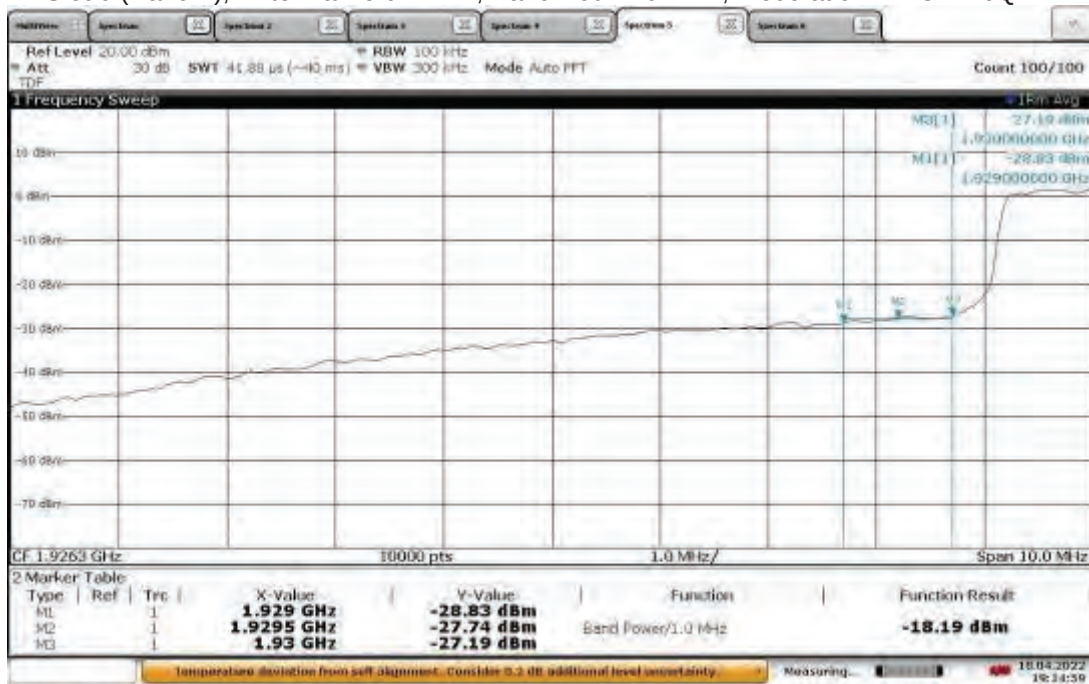


Band Edge Compliant, Lower Band Edge, 1935 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM3.2-16QAM



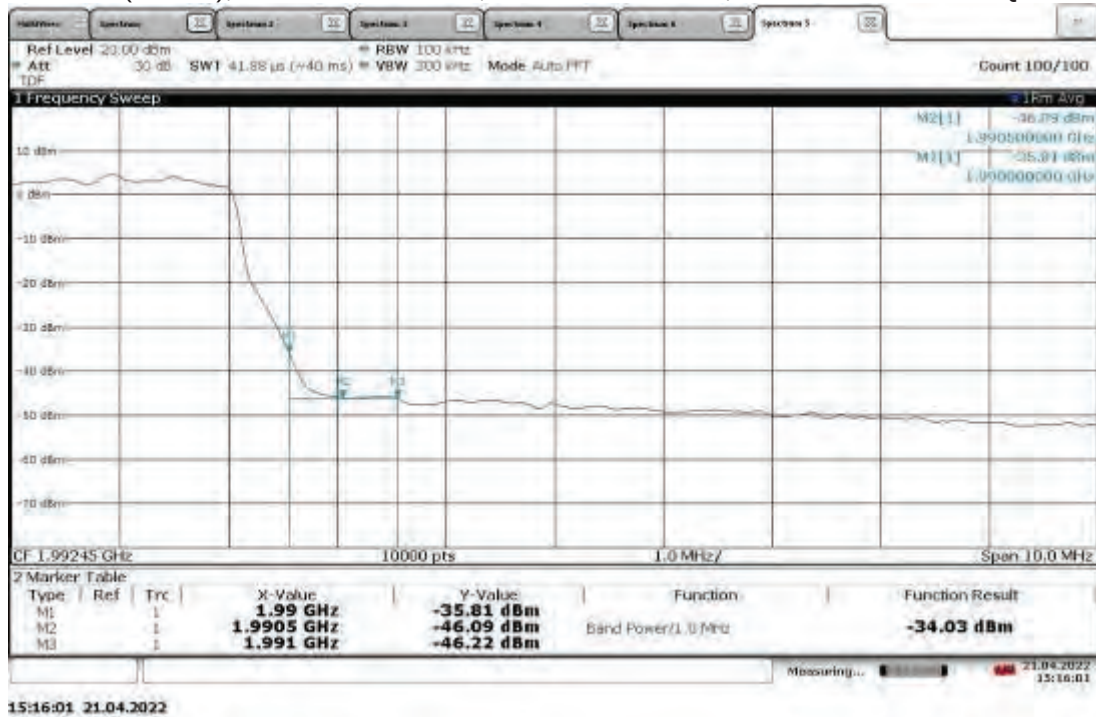
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Band Edge Compliant, Lower Band Edge, 1935 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM3.2-16QAM

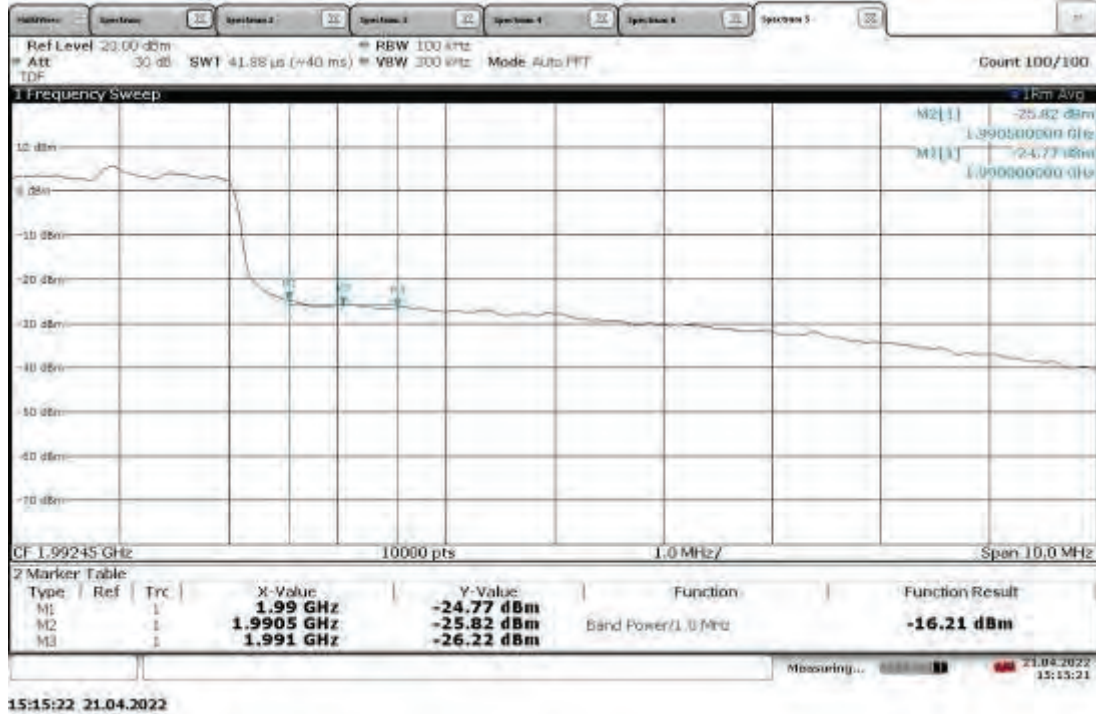


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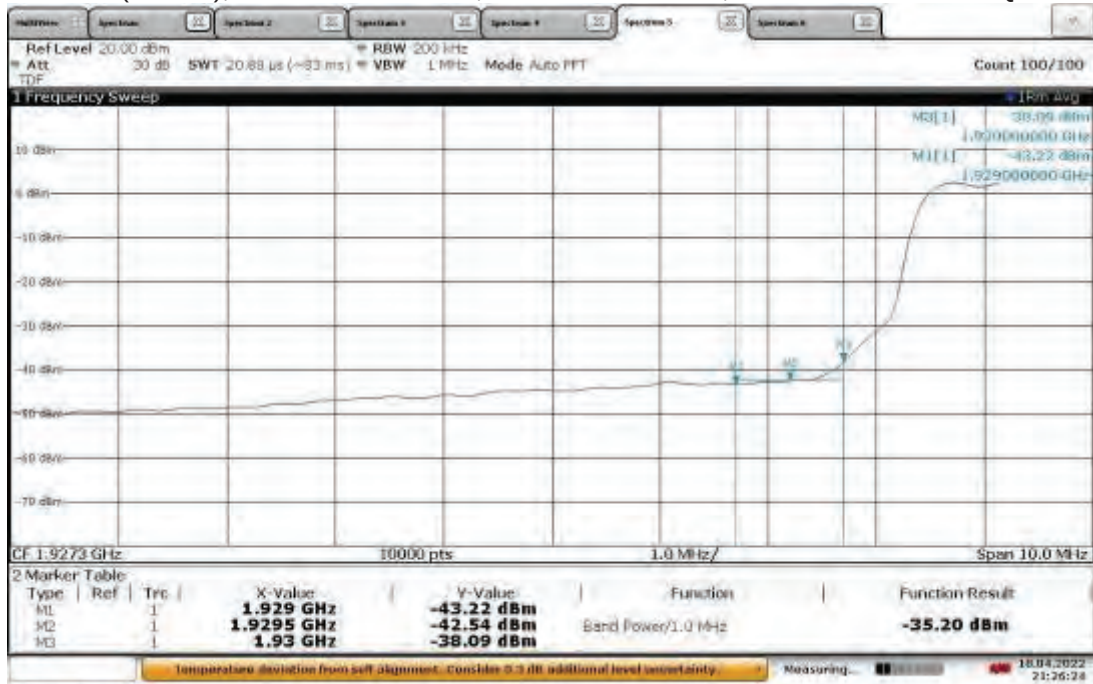
Band Edge Compliant, Upper Band Edge, 1985 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM3.2-16QAM



Band Edge Compliant, Upper Band Edge, 1985 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM3.2-16QAM

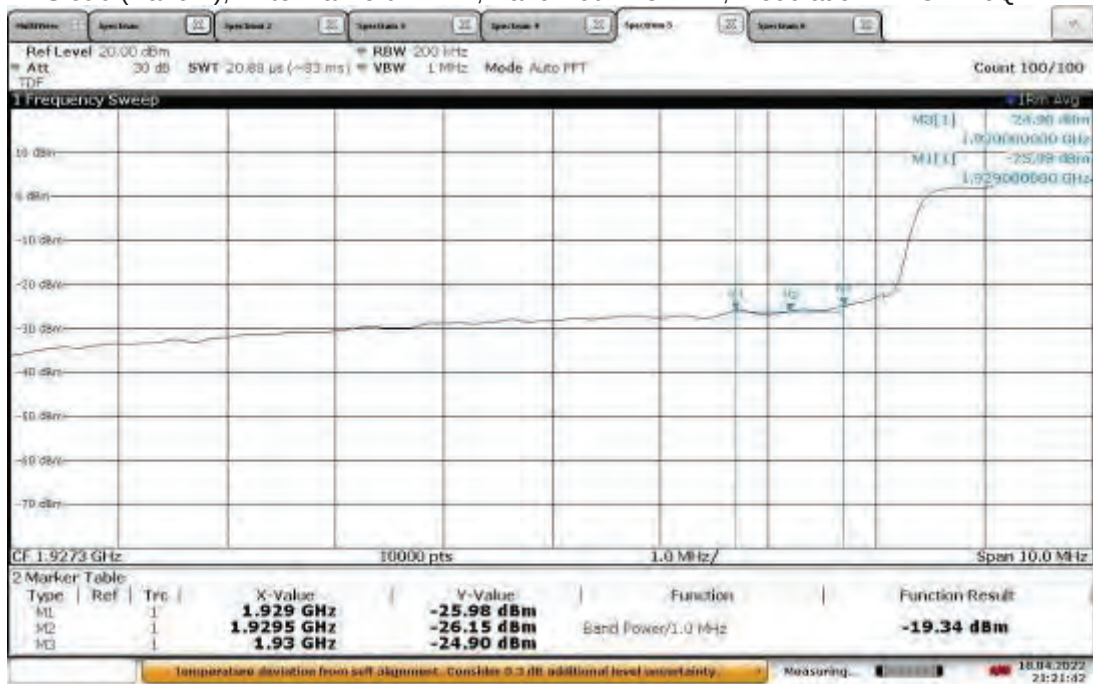


Band Edge Compliant, Lower Band Edge, 1937.5 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT0, Bandwidth: 15 MHz, Modulation: TM3.2-16QAM



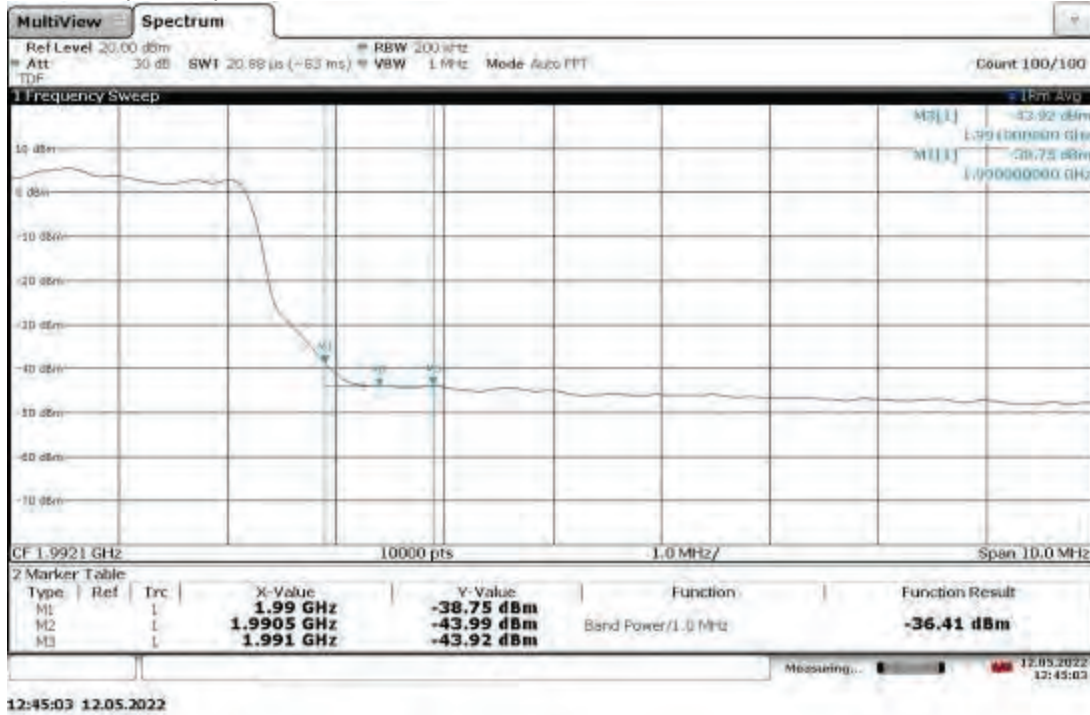
21:26:24 18.04.2022

Band Edge Compliant, Lower Band Edge, 1937.5 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM3.2-16QAM

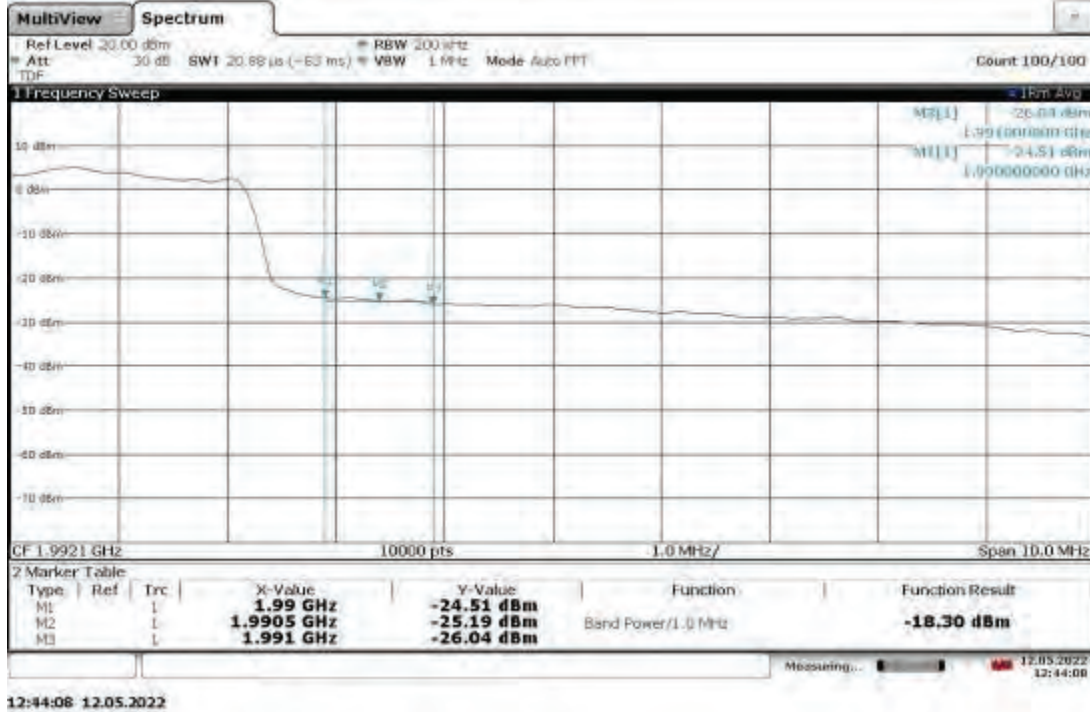


21:21:42 18.04.2022

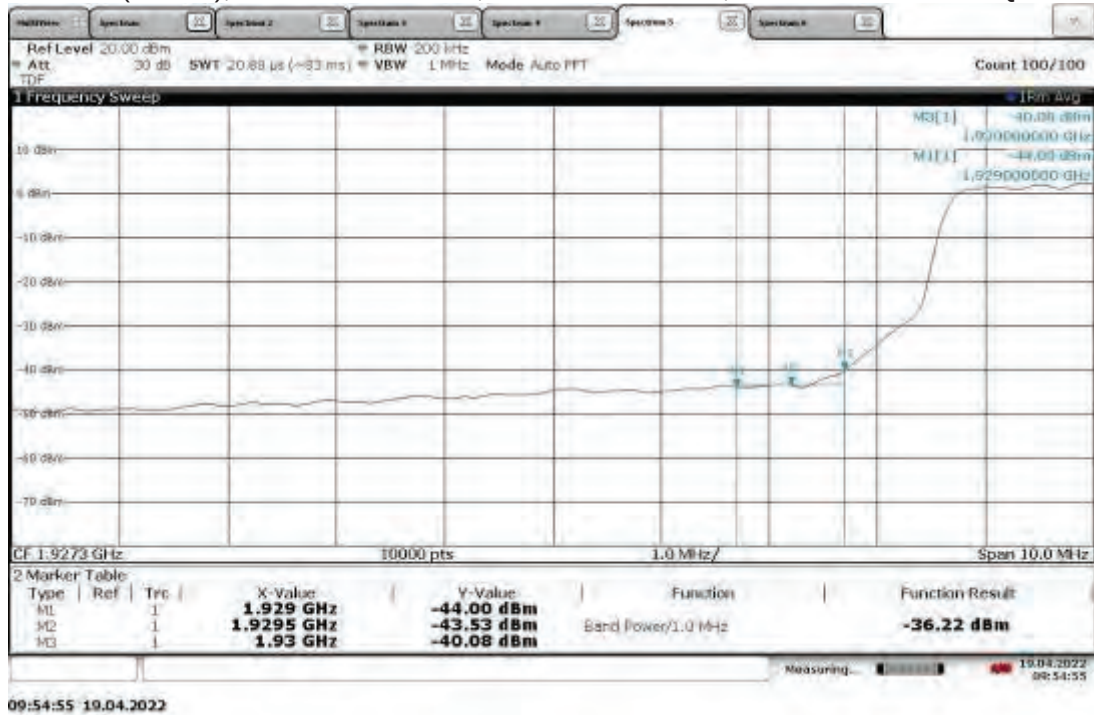
Band Edge Compliant, Upper Band Edge, 1982.5 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT0, Bandwidth: 15 MHz, Modulation: TM3.2-16QAM



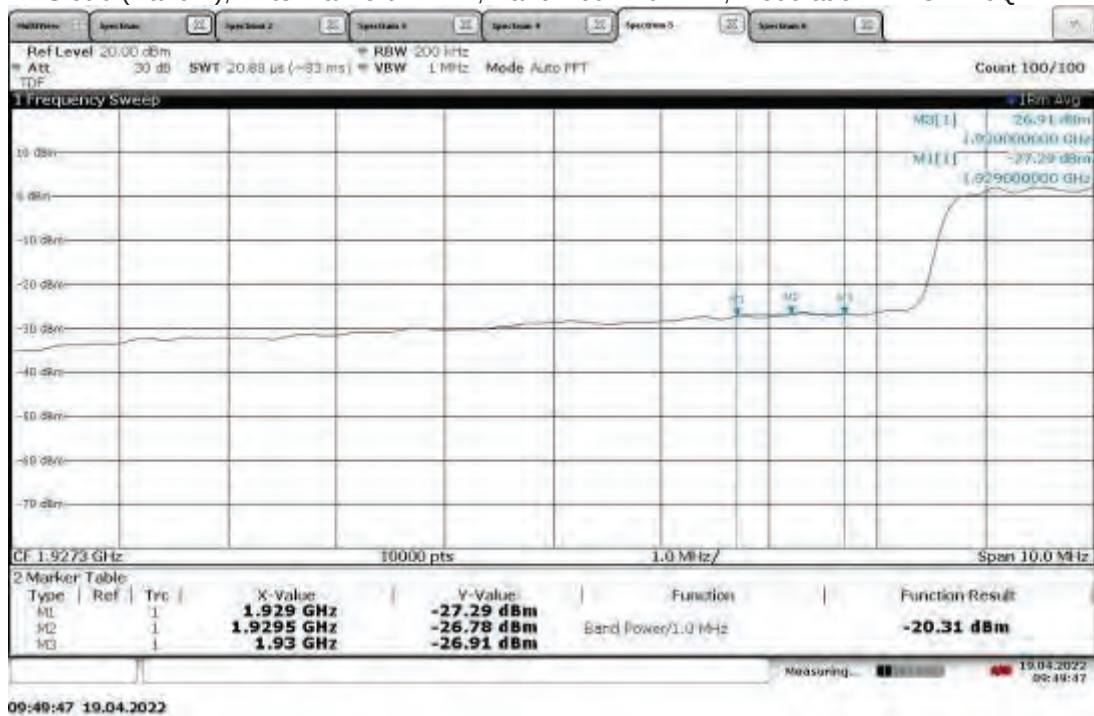
Band Edge Compliant, Upper Band Edge, 1982.5 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM3.2-16QAM



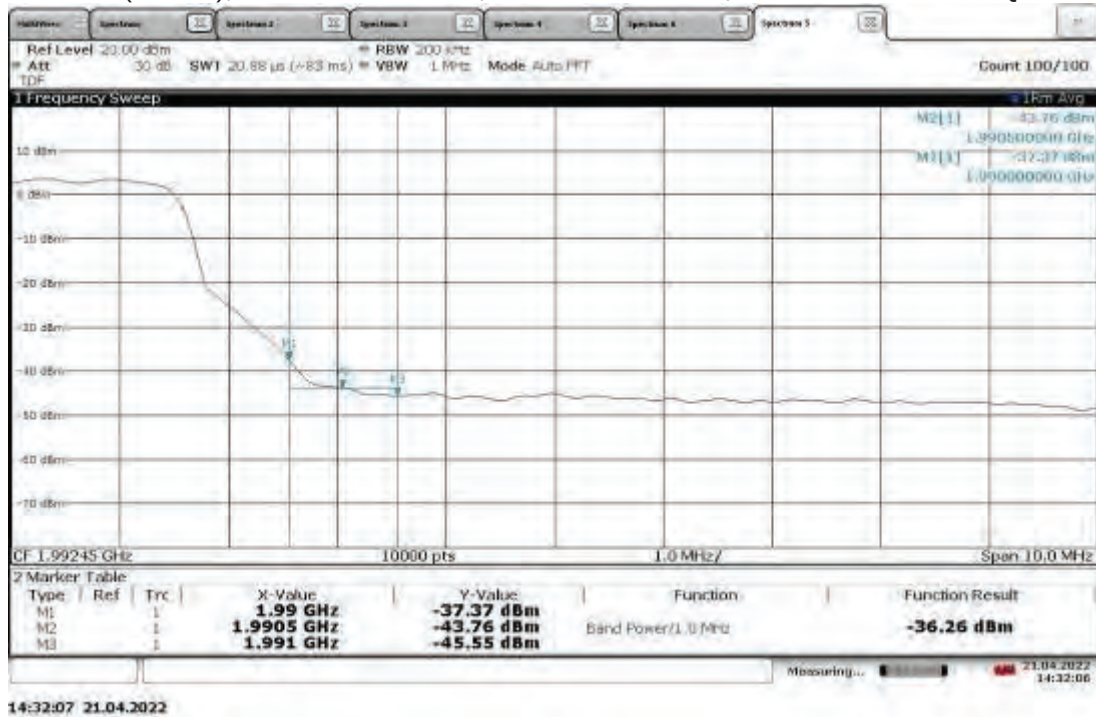
Band Edge Compliant, Lower Band Edge, 1940 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM3.2-16QAM



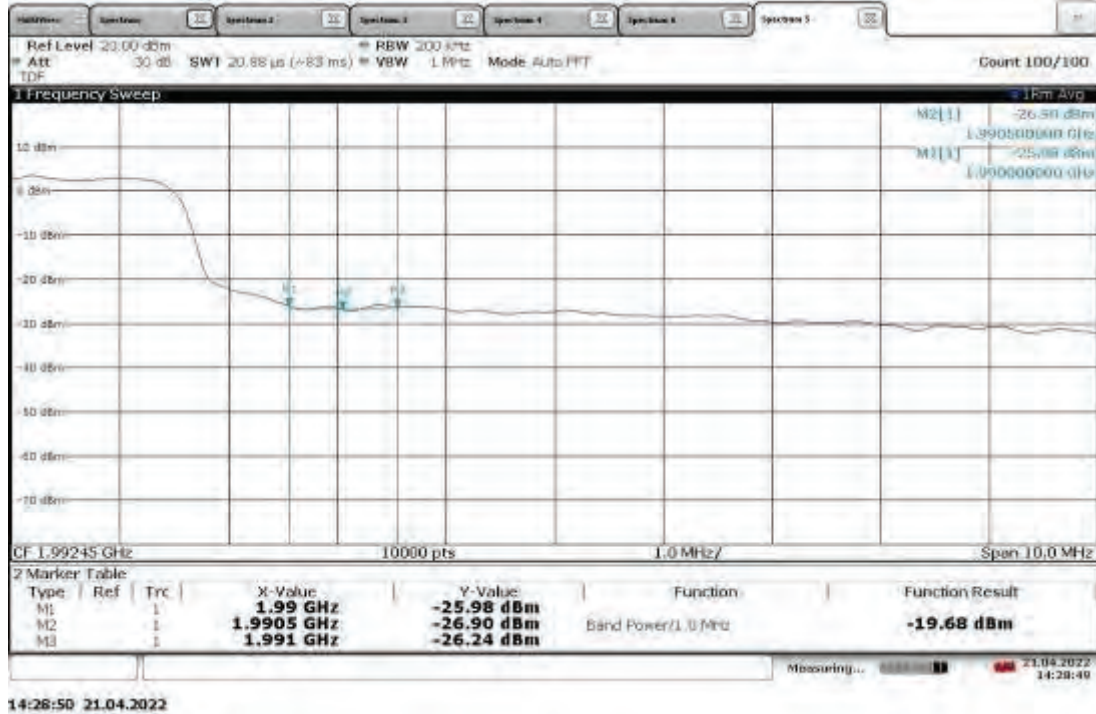
Band Edge Compliant, Lower Band Edge, 1940 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM3.2-16QAM



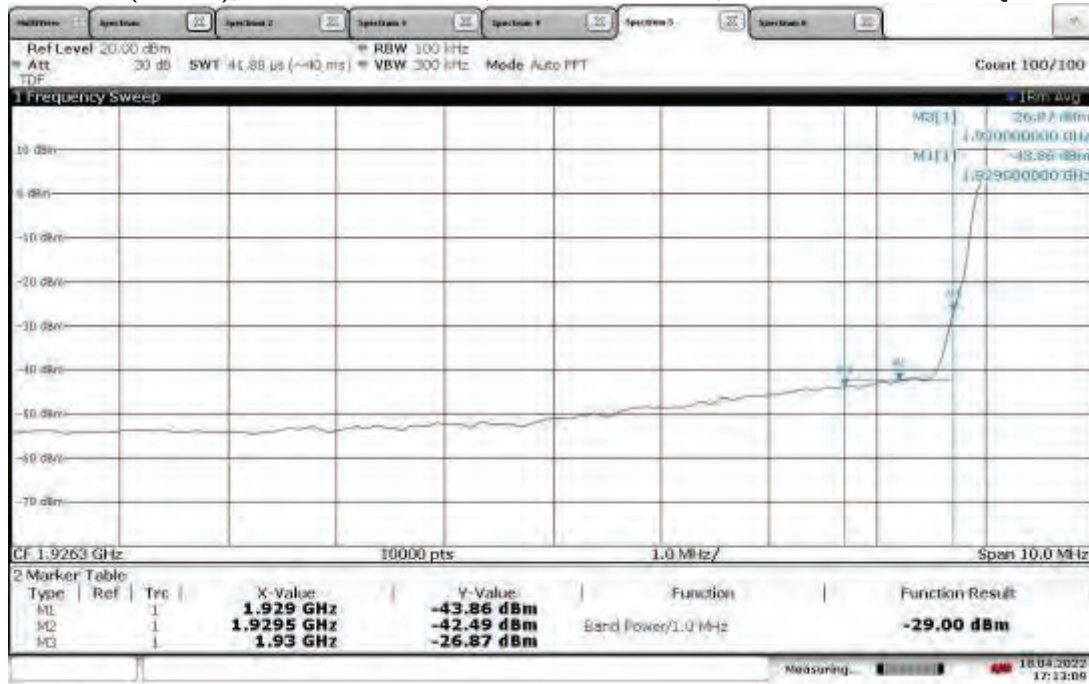
Band Edge Compliant, Upper Band Edge, 1980 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM3.2-16QAM



Band Edge Compliant, Upper Band Edge, 1980 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM3.2-16QAM

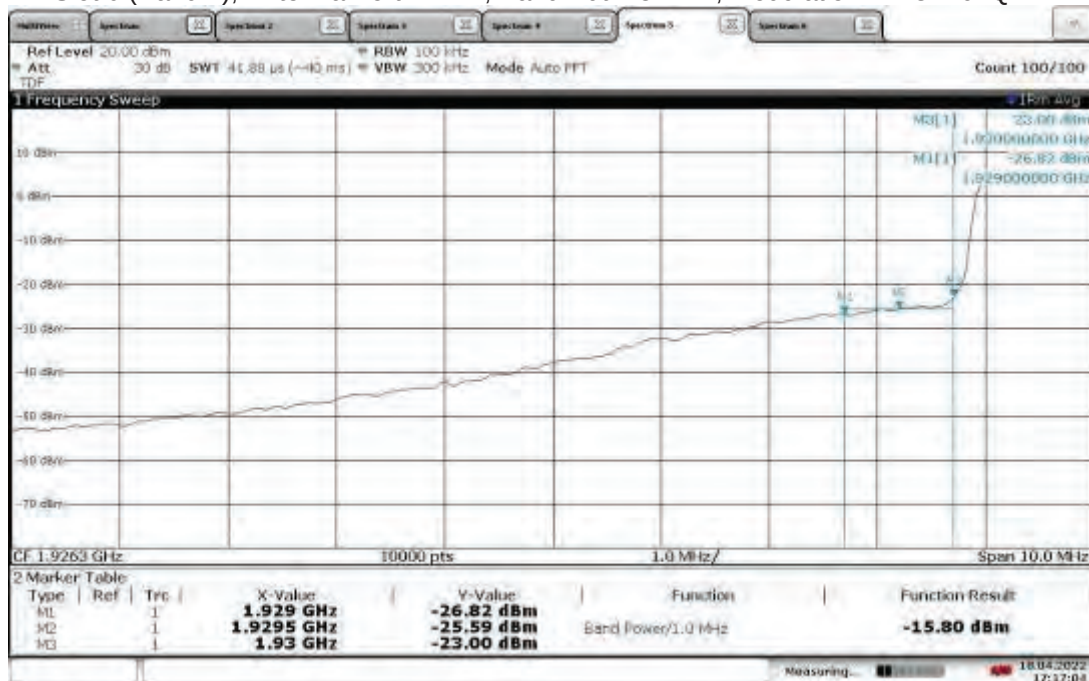


Band Edge Compliant, Lower Band Edge, 1932.5 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM3.1-64QAM



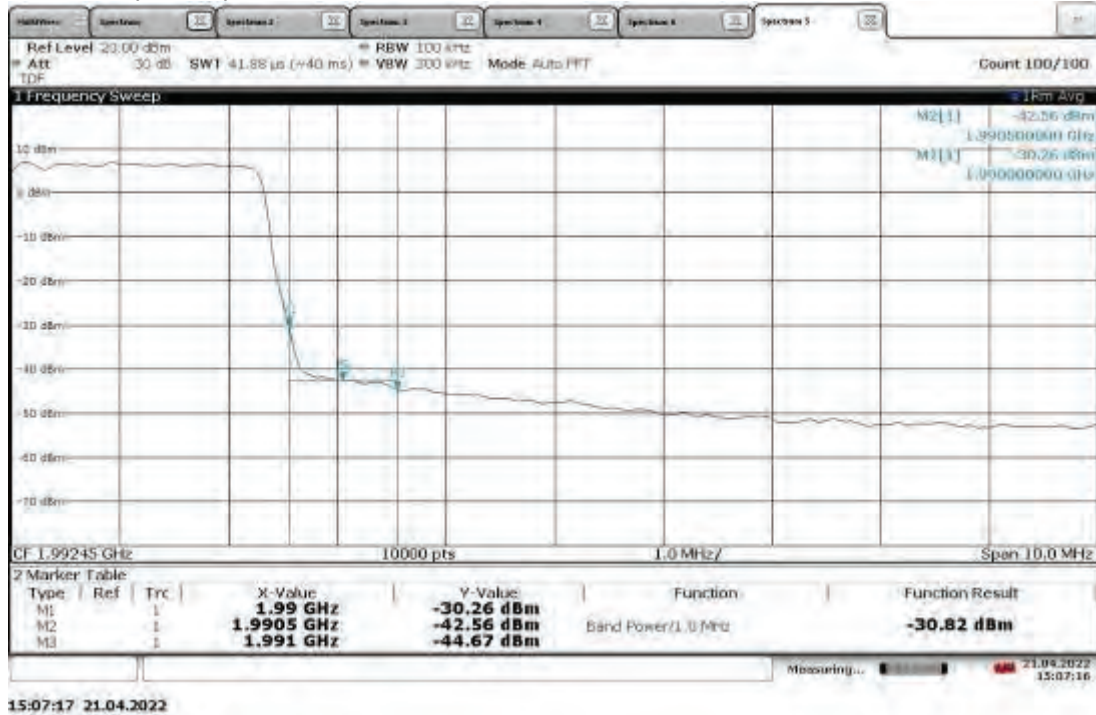
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Band Edge Compliant, Lower Band Edge, 1932.5 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM3.1-64QAM

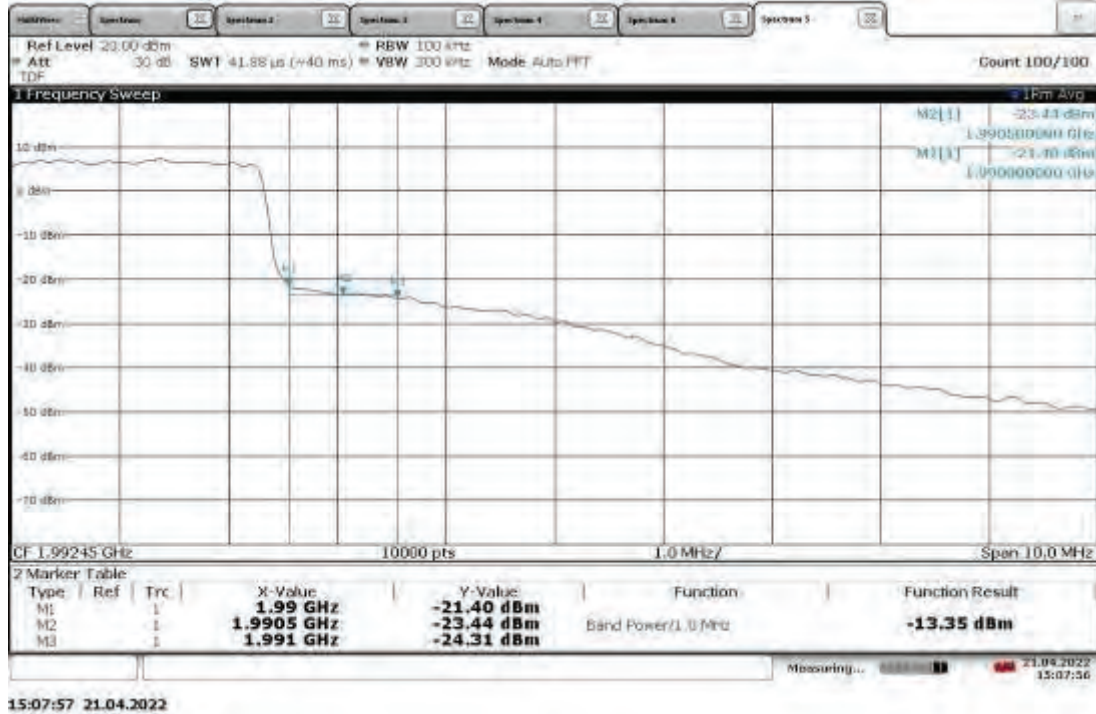


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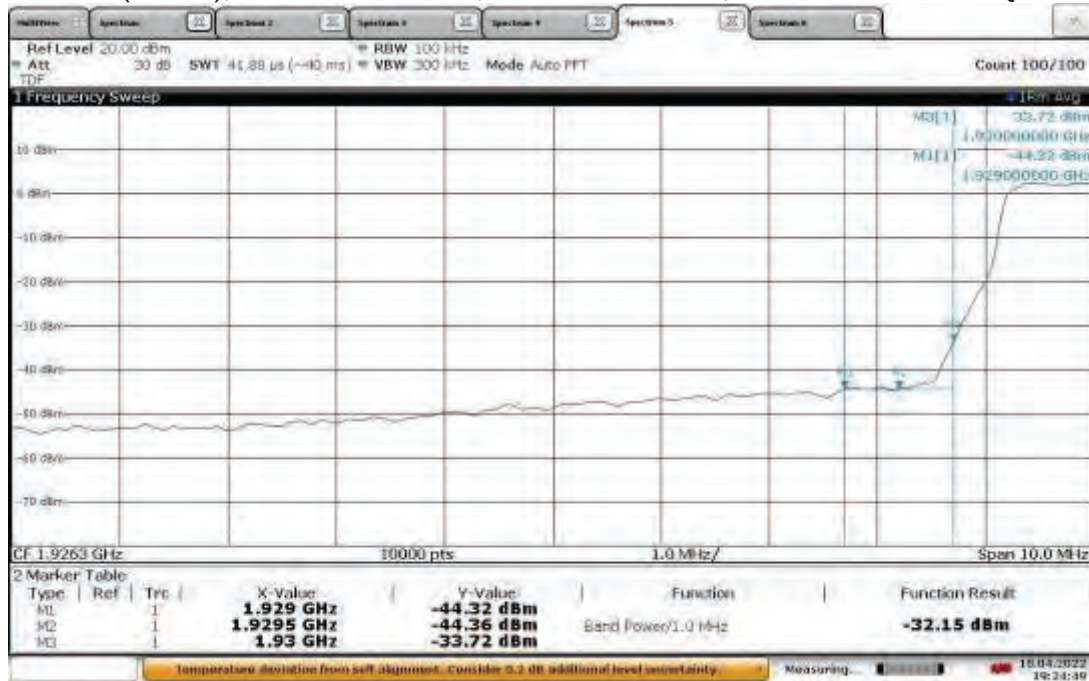
Band Edge Compliant, Upper Band Edge, 1987.5 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM3.1-64QAM



Band Edge Compliant, Upper Band Edge, 1987.5 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM3.1-64QAM

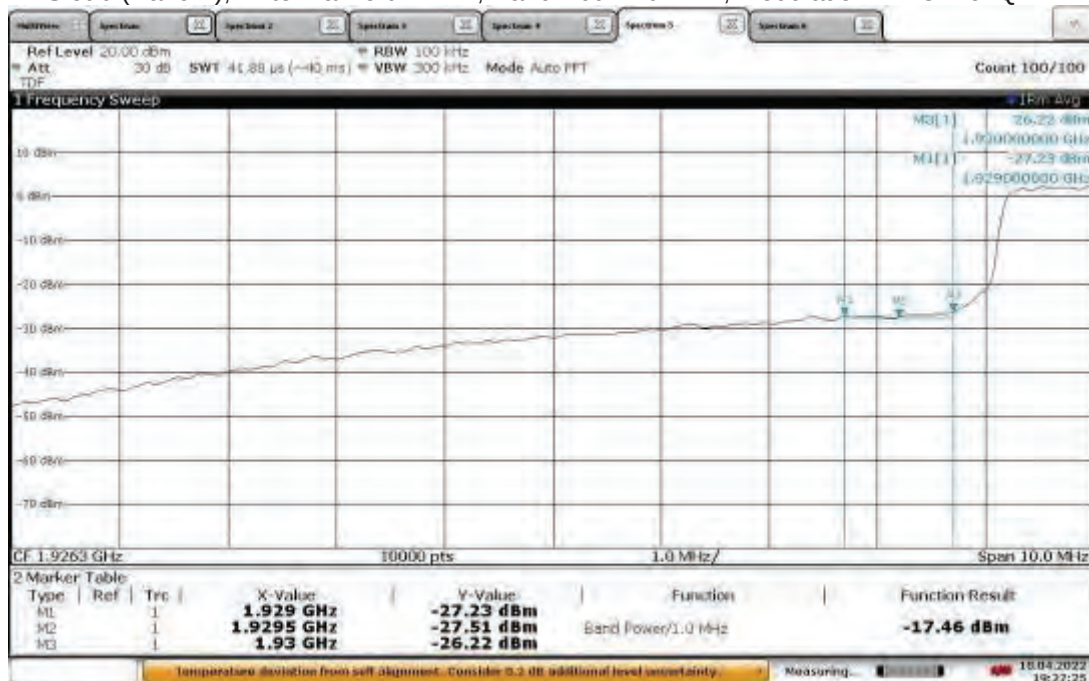


Band Edge Compliant, Lower Band Edge, 1935 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM3.1-64QAM

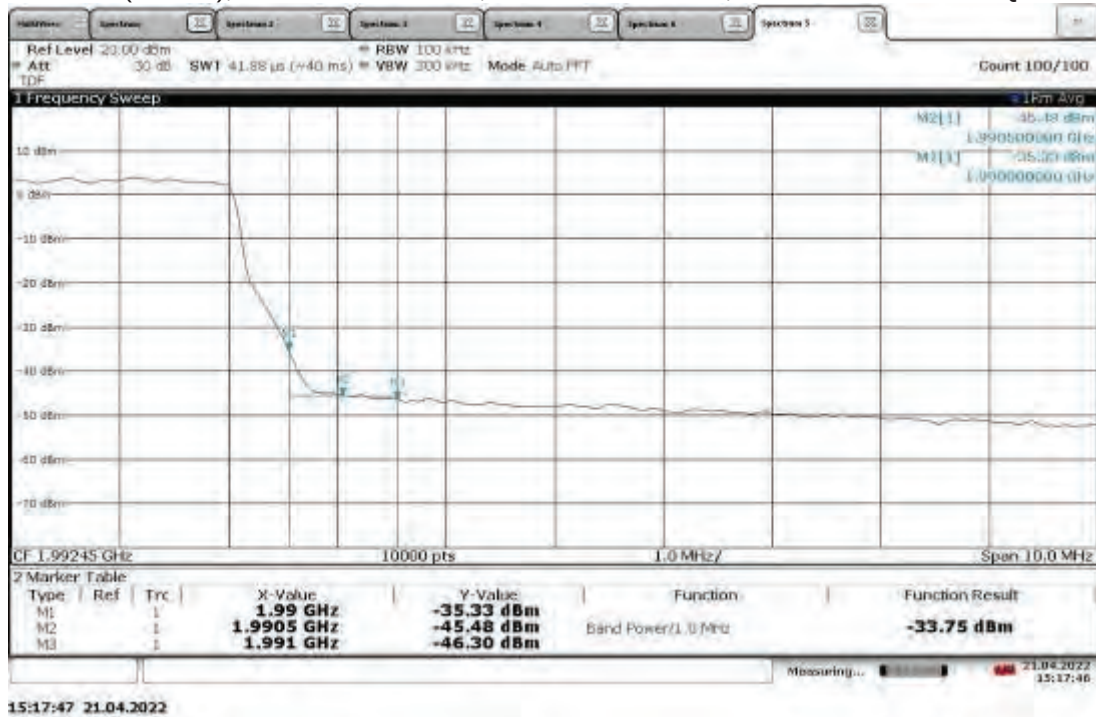


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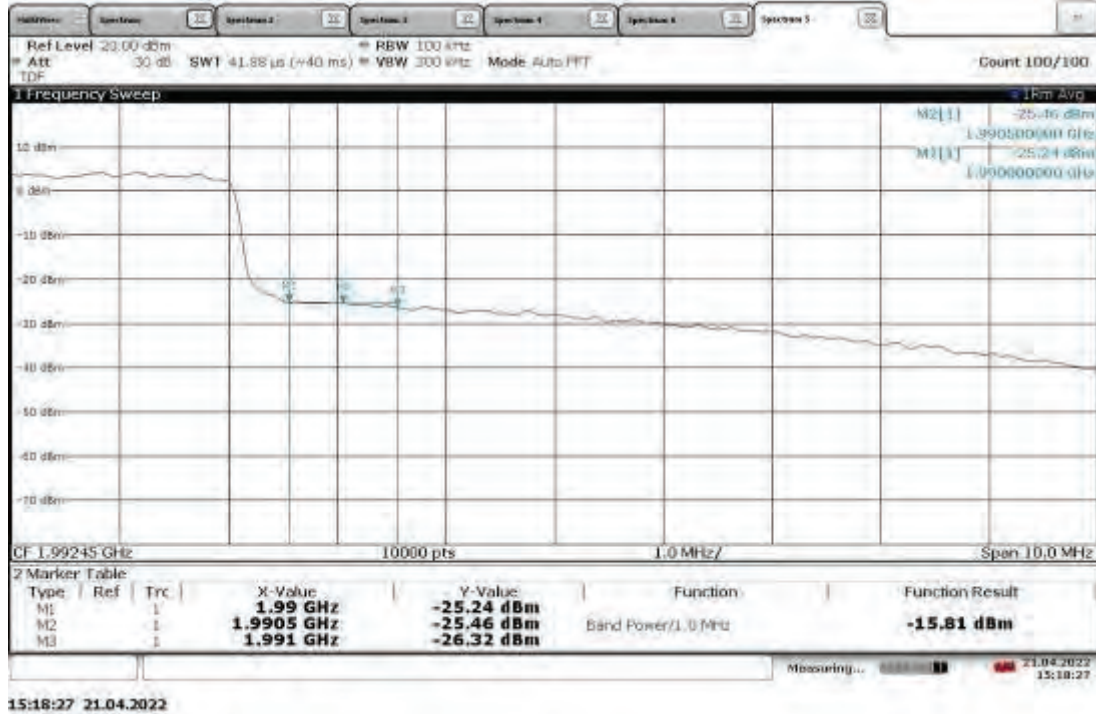
Band Edge Compliant, Lower Band Edge, 1935 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM3.1-64QAM



19:27:26 18.04.2022

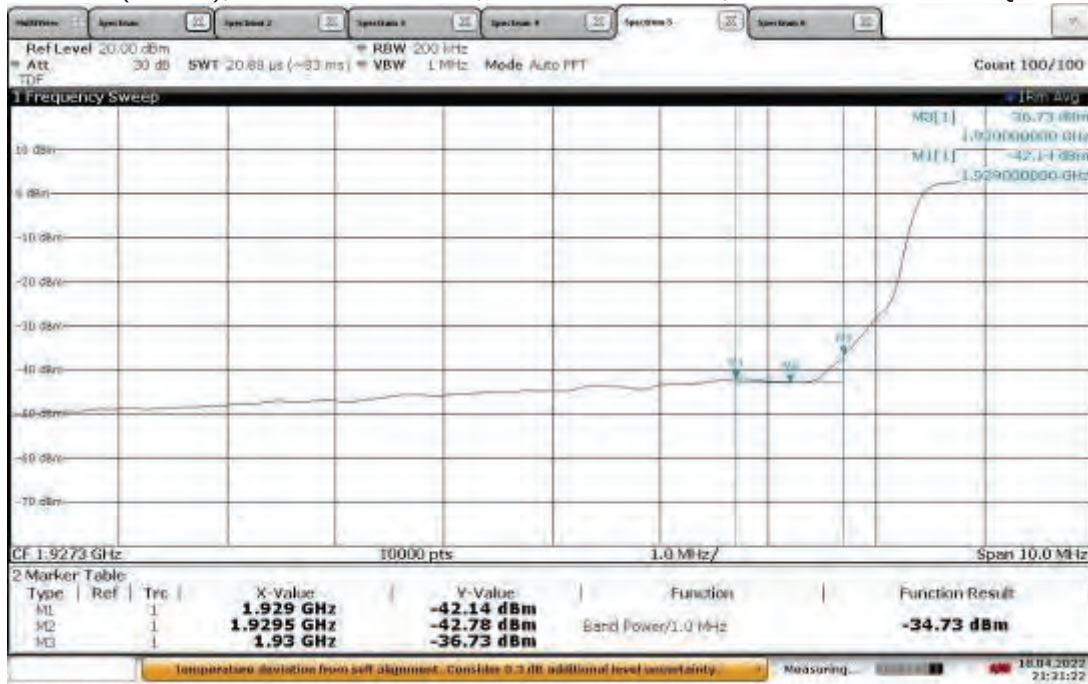
Band Edge Compliant, Upper Band Edge, 1985 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM3.1-64QAM

15:17:47 21.04.2022

Band Edge Compliant, Upper Band Edge, 1985 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM3.1-64QAM

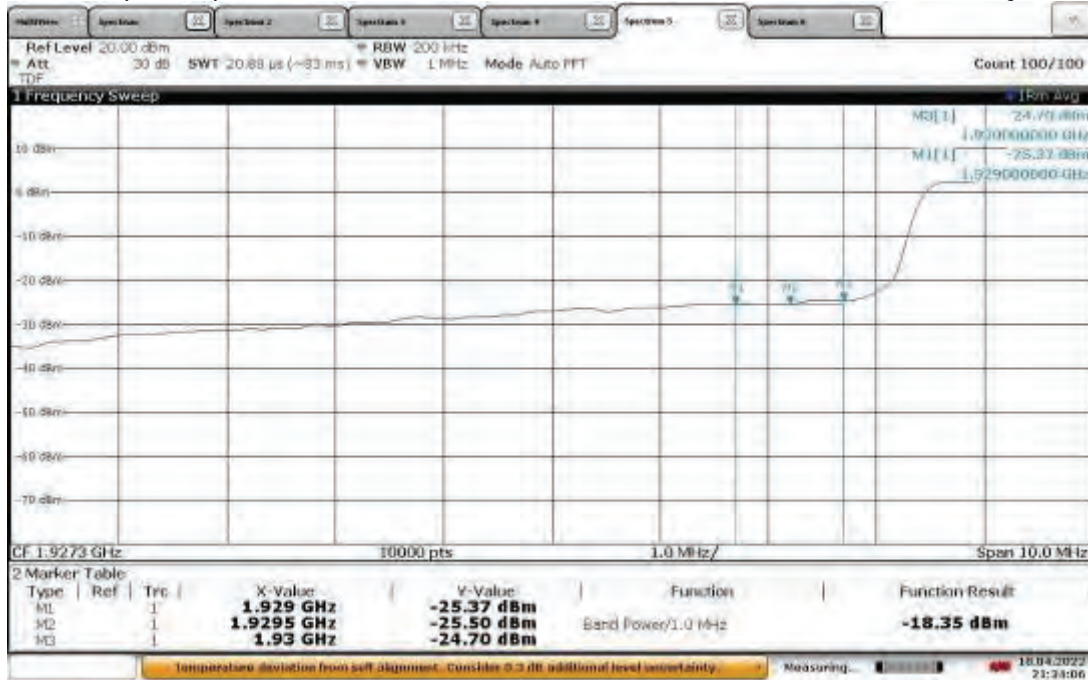
15:18:27 21.04.2022

Band Edge Compliant, Lower Band Edge, 1937.5 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT0, Bandwidth: 15 MHz, Modulation: TM3.1-64QAM



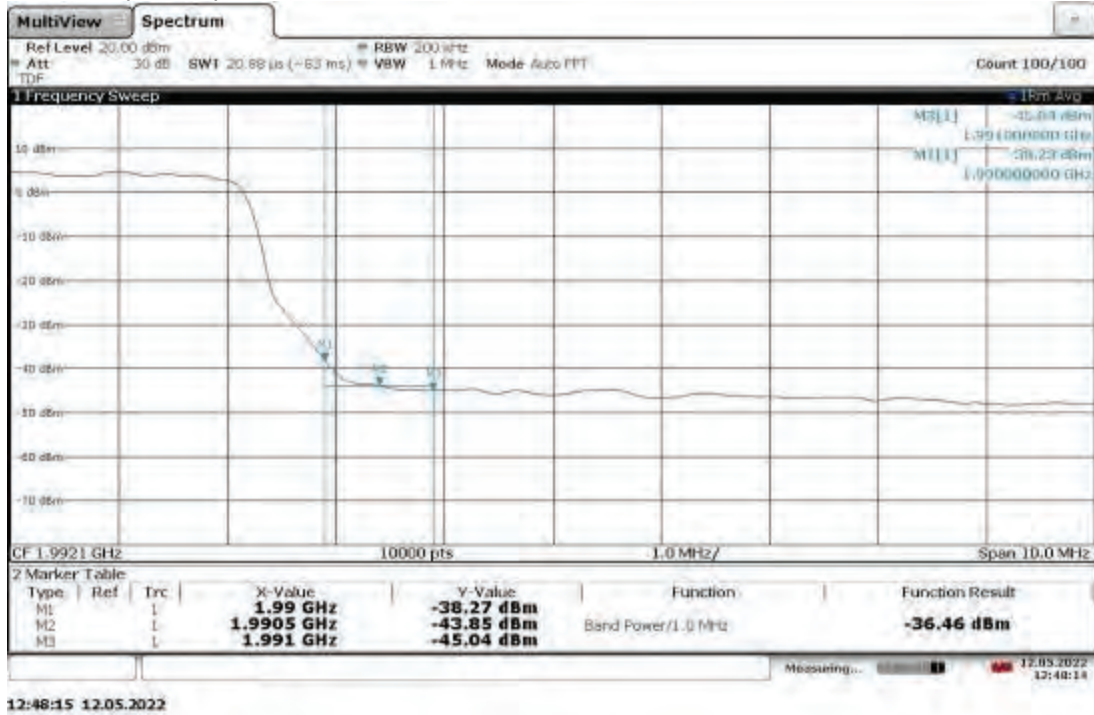
21:31:22 18.04.2022

Band Edge Compliant, Lower Band Edge, 1937.5 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM3.1-64QAM

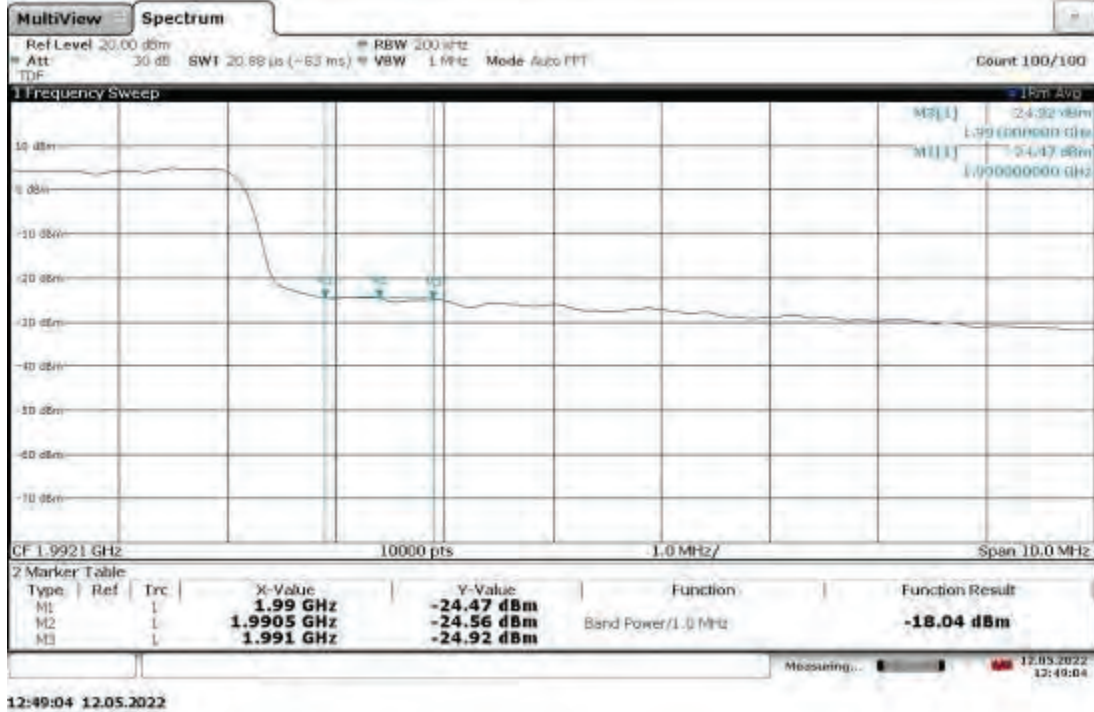


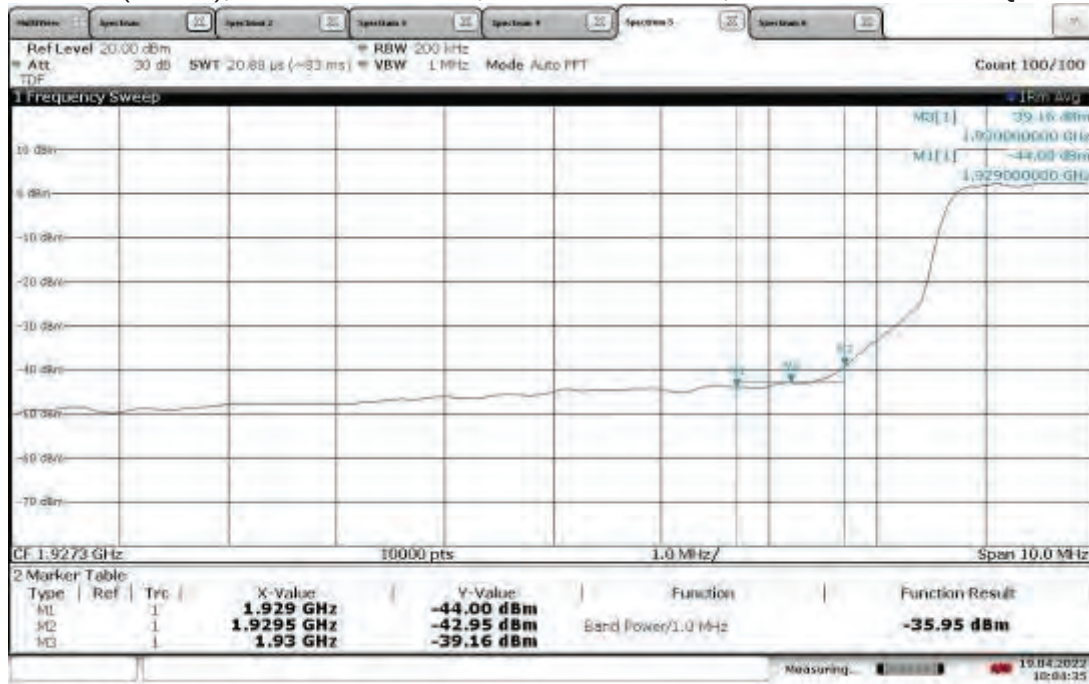
21:34:06 18.04.2022

Band Edge Compliant, Upper Band Edge, 1982.5 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT0, Bandwidth: 15 MHz, Modulation: TM3.1-64QAM

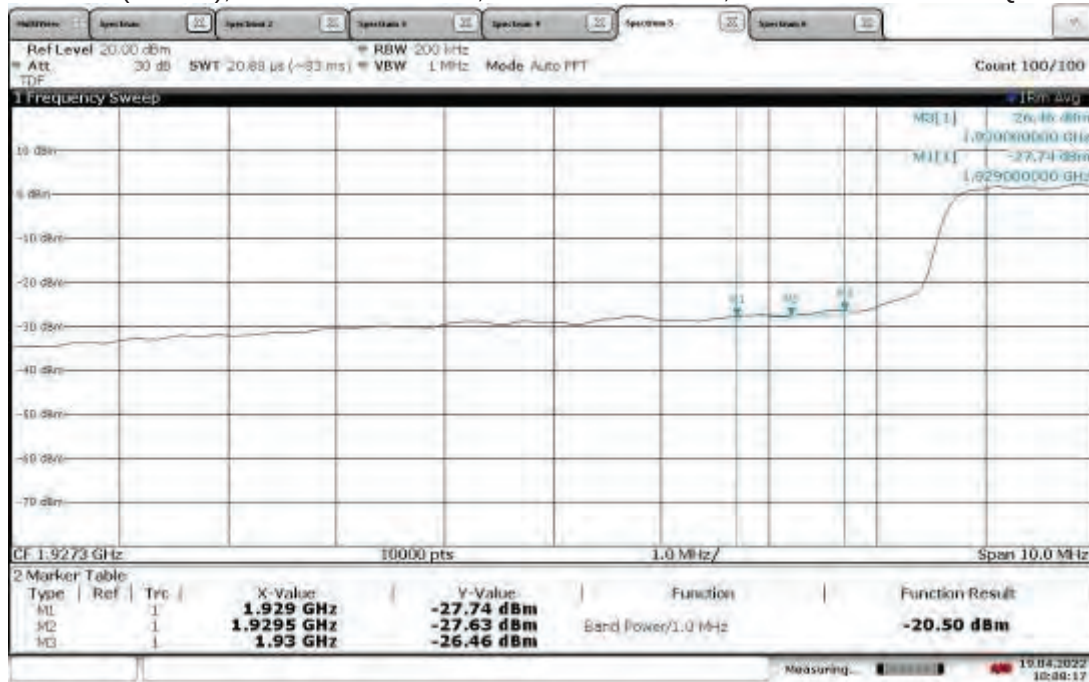


Band Edge Compliant, Upper Band Edge, 1982.5 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM3.1-64QAM

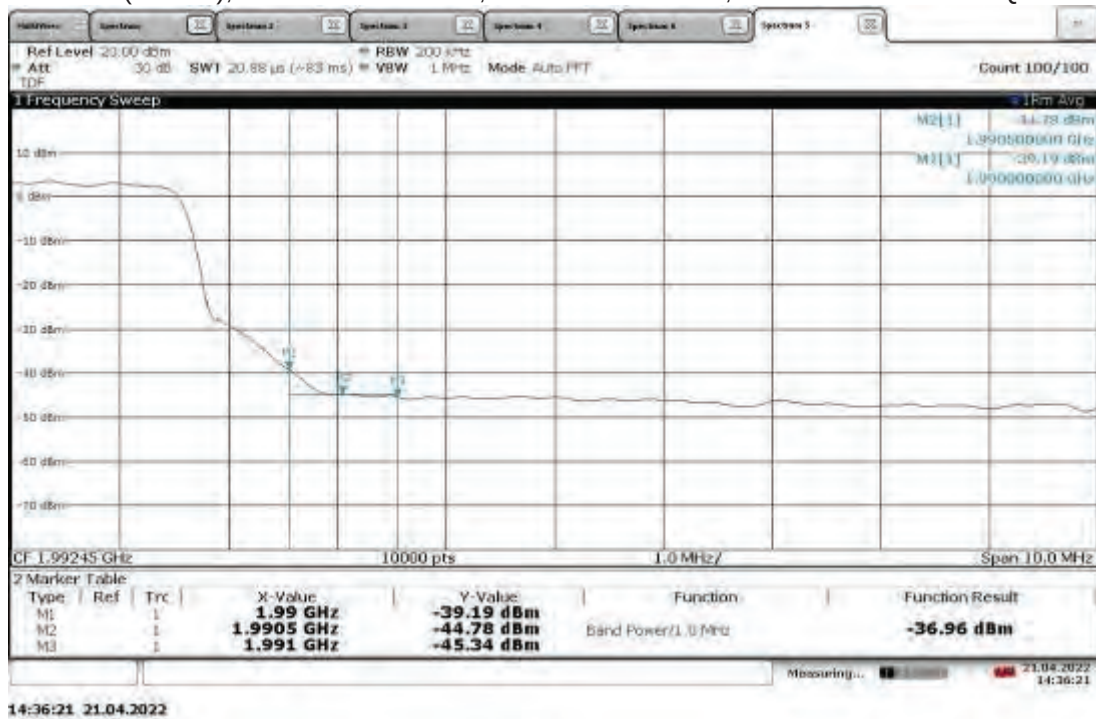
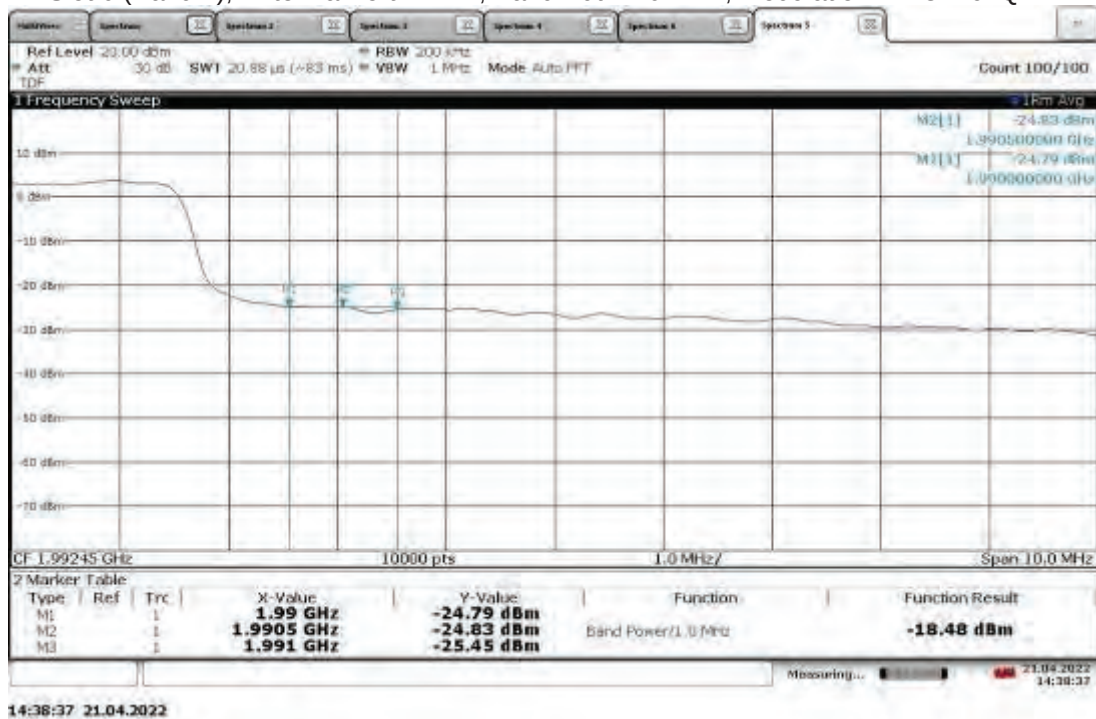


Band Edge Compliant, Lower Band Edge, 1940 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM3.1-64QAM

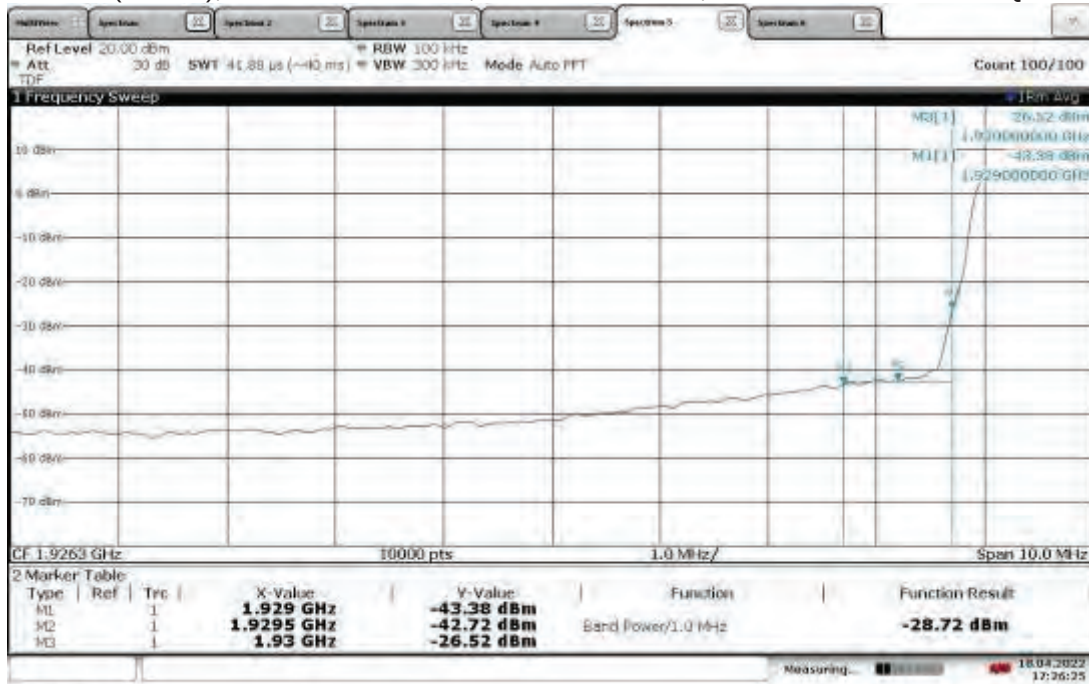
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Band Edge Compliant, Lower Band Edge, 1940 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM3.1-64QAM

10:06:17 19.04.2022

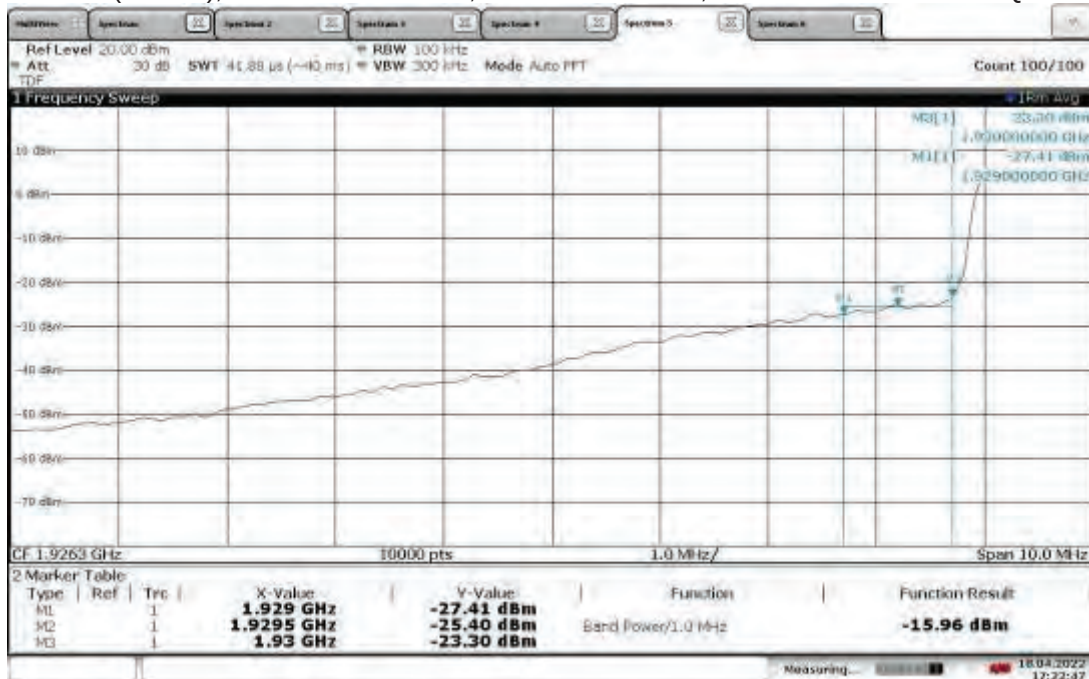
Band Edge Compliant, Upper Band Edge, 1980 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM3.1-64QAMBand Edge Compliant, Upper Band Edge, 1980 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM3.1-64QAM

Band Edge Compliant, Lower Band Edge, 1932.5 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM3.1a-256QAM



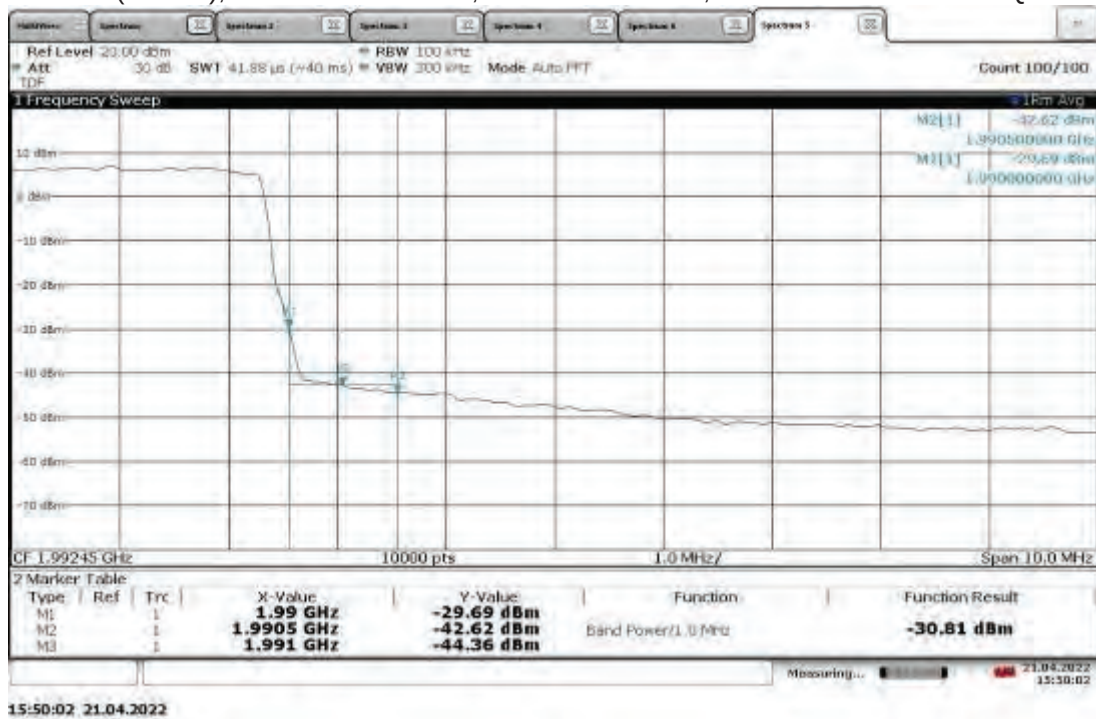
17:26:26 18.04.2022

Band Edge Compliant, Lower Band Edge, 1932.5 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM3.1a-256QAM

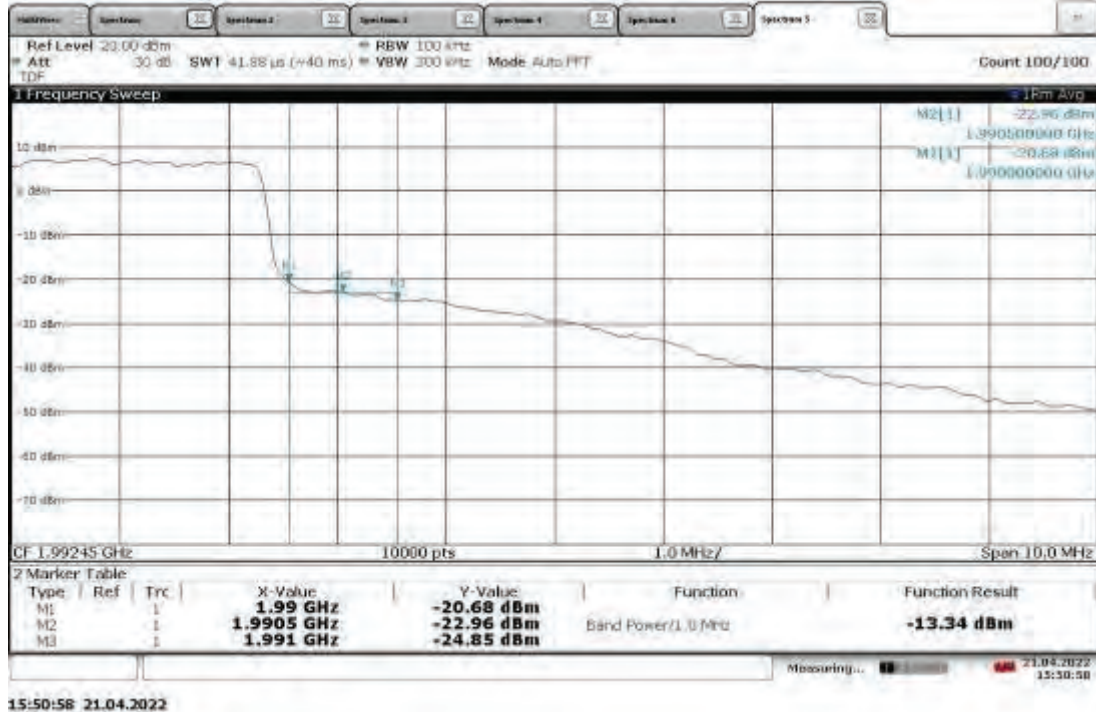


17:22:47 18.04.2022

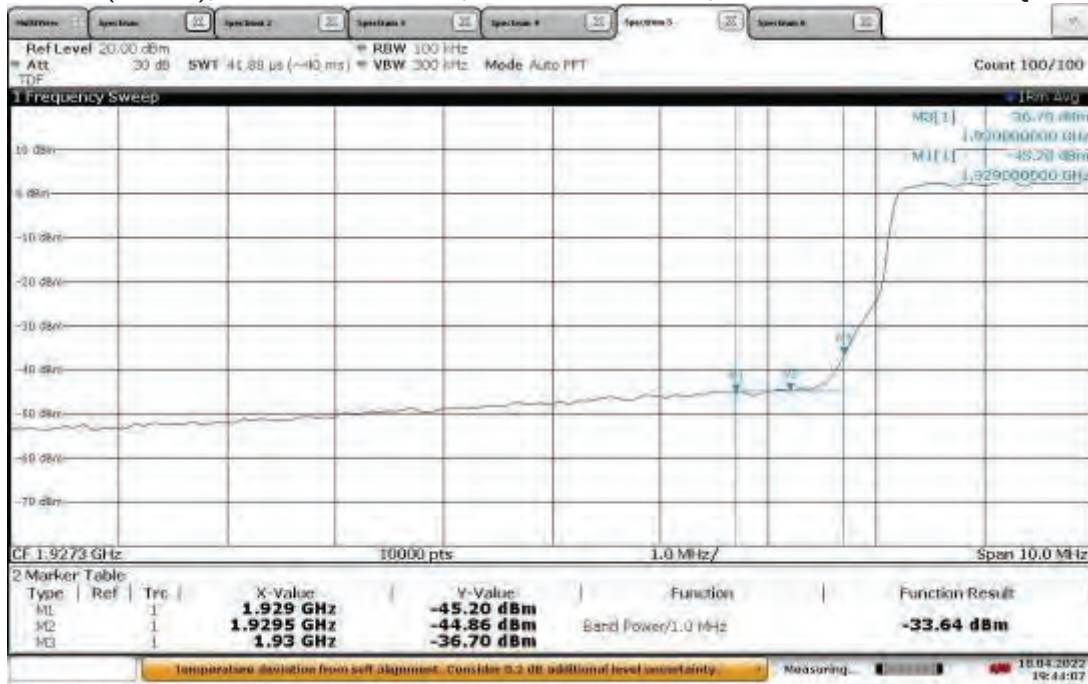
Band Edge Compliant, Upper Band Edge, 1987.5 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM3.1a-256QAM



Band Edge Compliant, Upper Band Edge, 1987.5 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM3.1a-256QAM

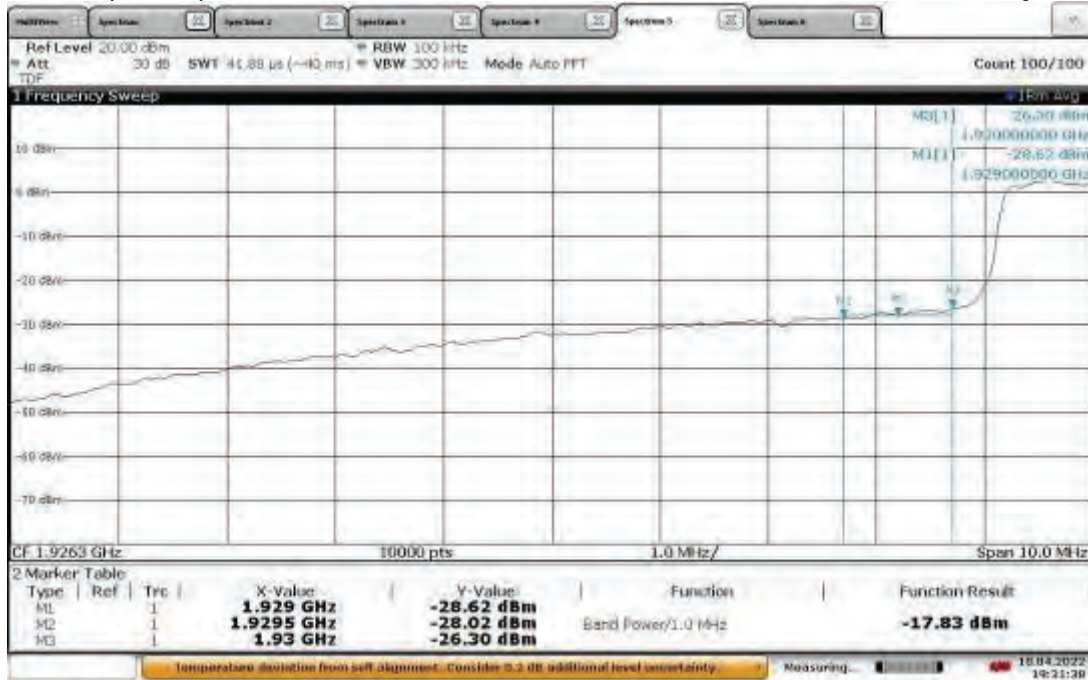


Band Edge Compliant, Lower Band Edge, 1935 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM3.1a-256QAM



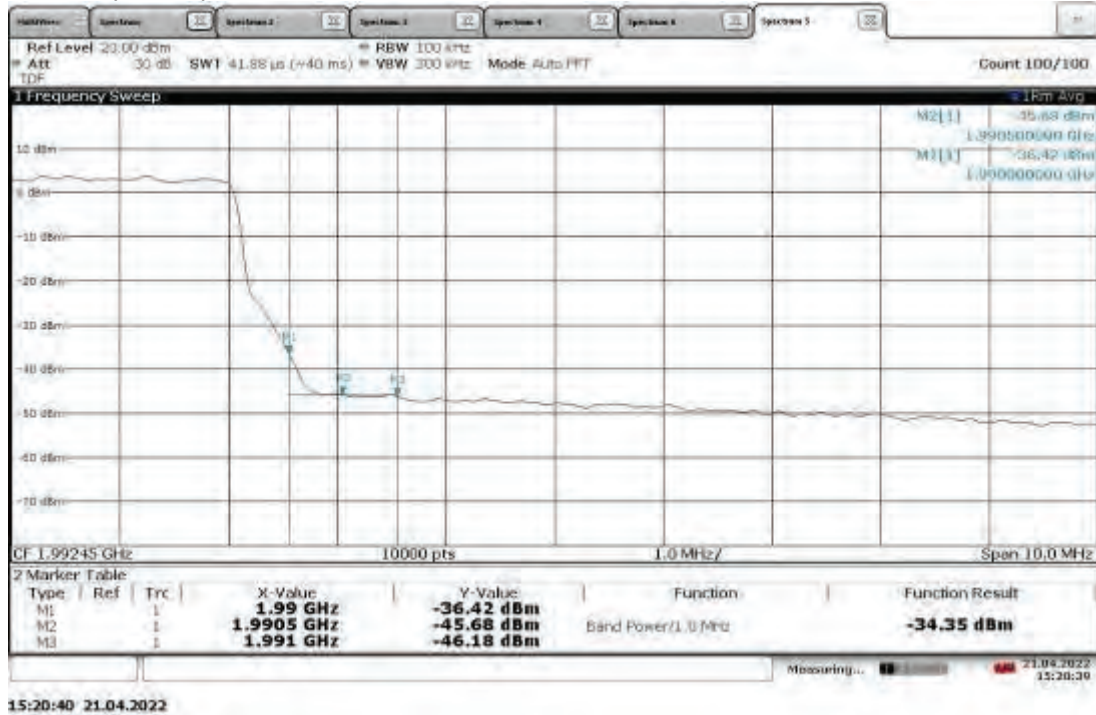
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Band Edge Compliant, Lower Band Edge, 1935 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM3.1a-256QAM

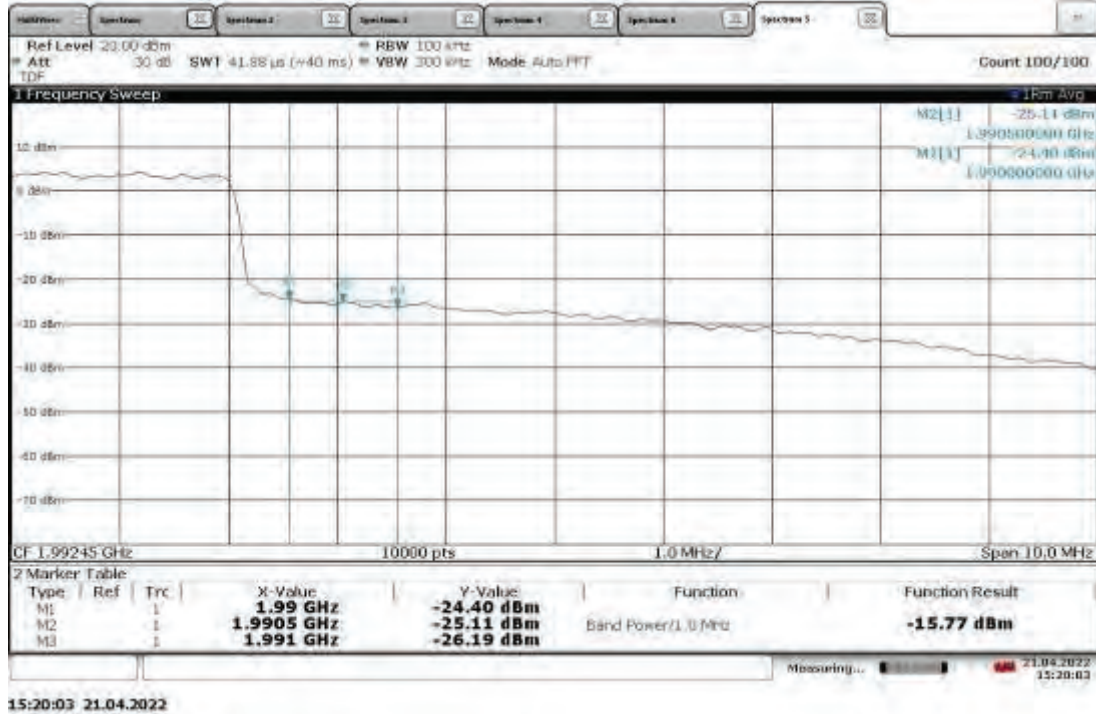


19:31:38 18.04.2022

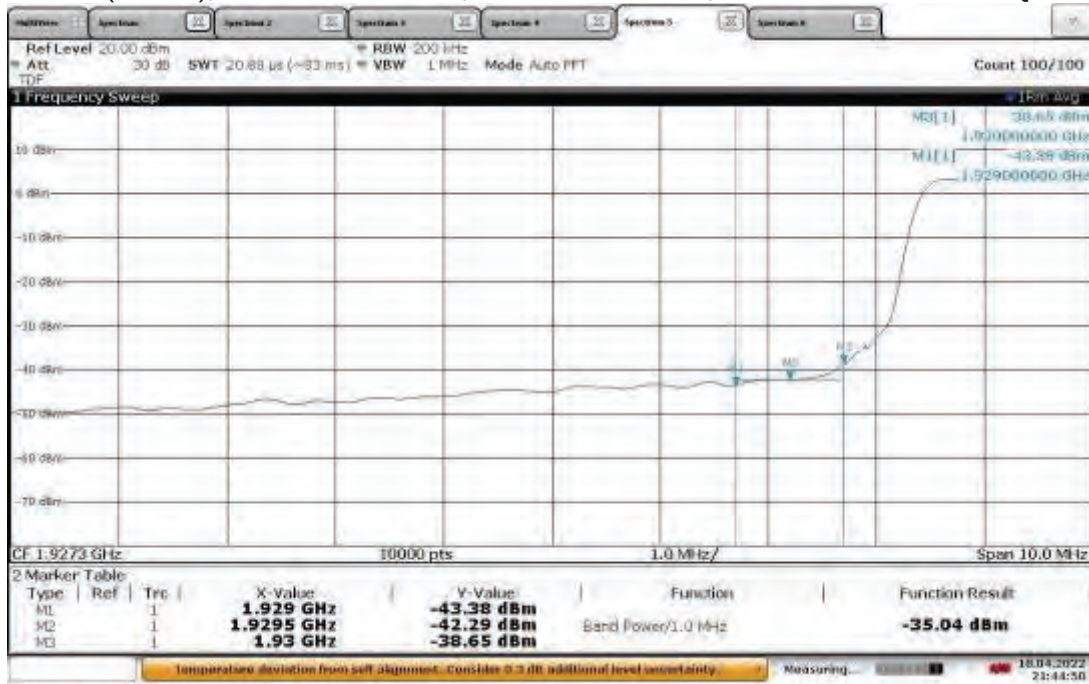
Band Edge Compliant, Upper Band Edge, 1985 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM3.1a-256QAM



Band Edge Compliant, Upper Band Edge, 1985 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM3.1a-256QAM

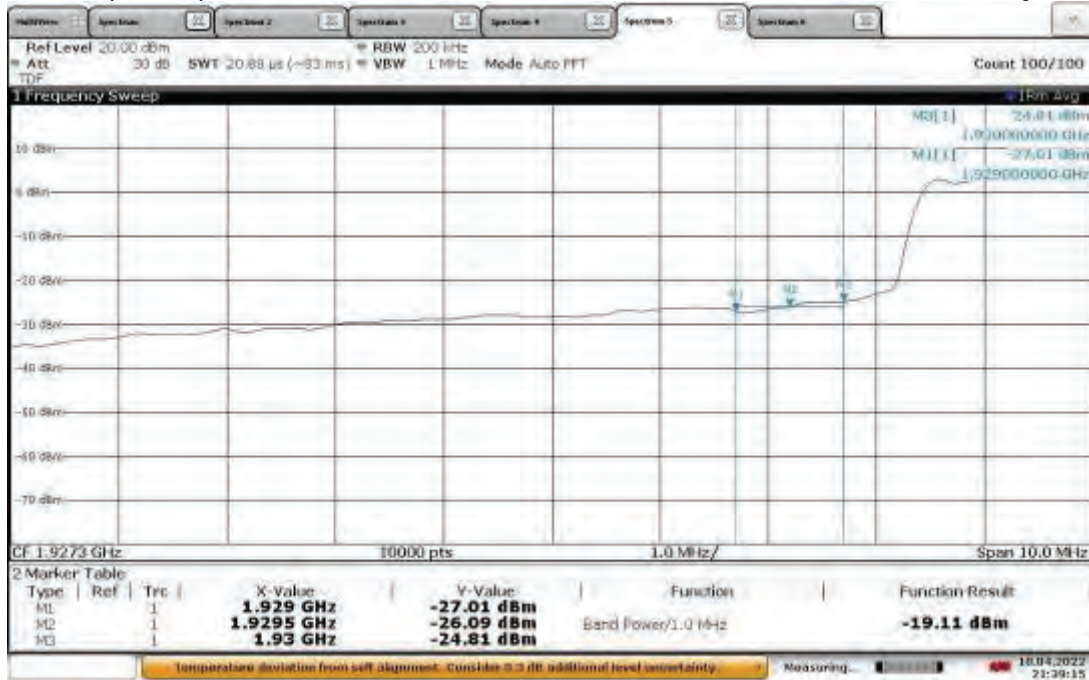


Band Edge Compliant, Lower Band Edge, 1937.5MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT0, Bandwidth: 15 MHz, Modulation: TM3.1a-256QAM



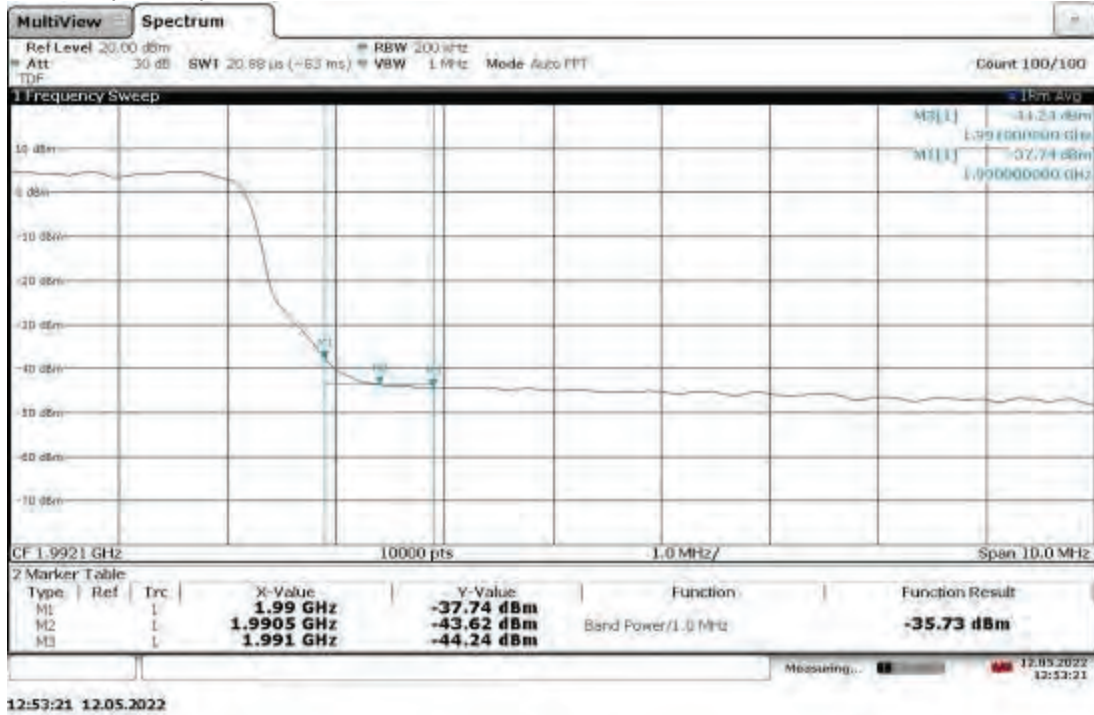
21:44:50 18.04.2022

Band Edge Compliant, Lower Band Edge, 1937.5MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM3.1a-256QAM

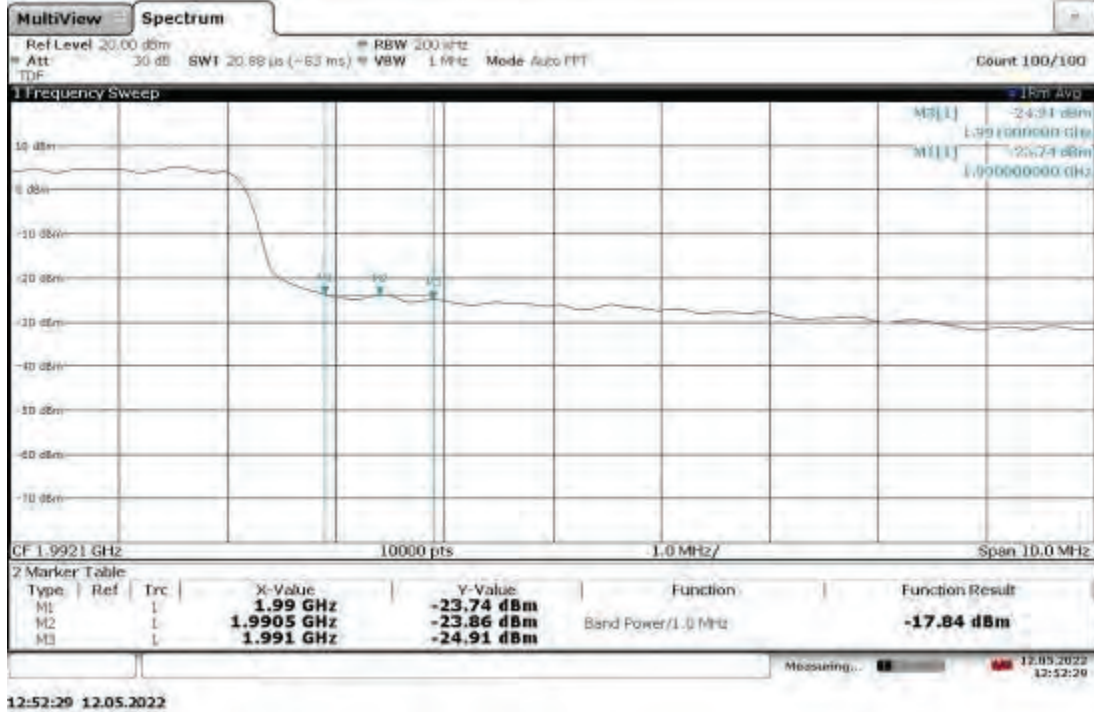


21:39:16 18.04.2022

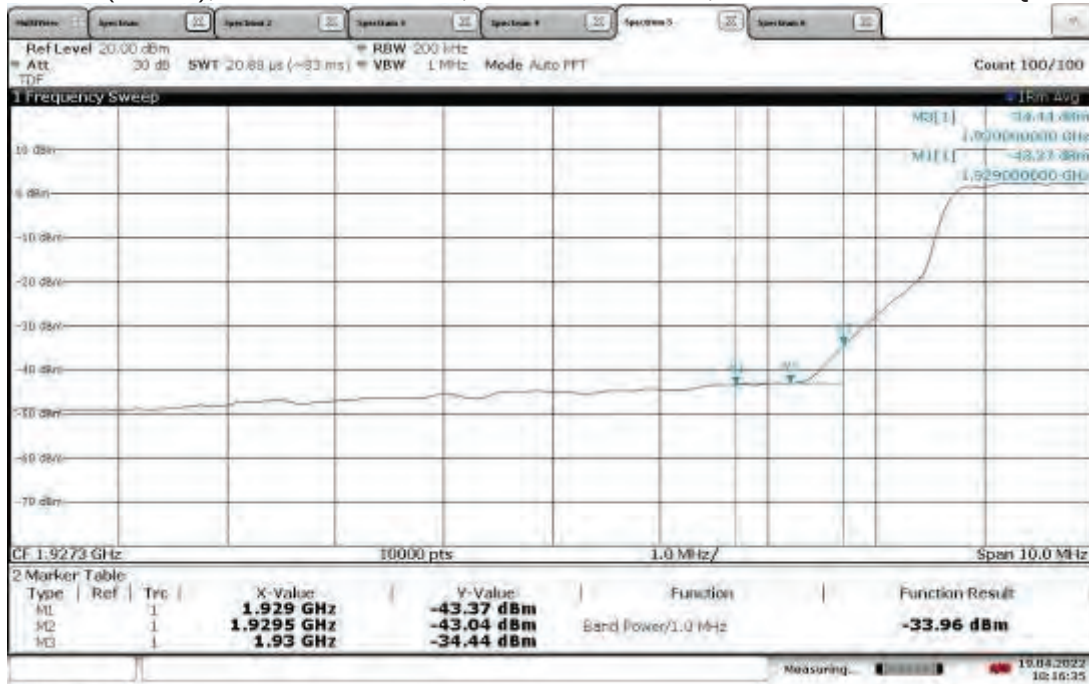
Band Edge Compliant, Upper Band Edge, 1982.5 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT0, Bandwidth: 15 MHz, Modulation: TM3.1a-256QAM



Band Edge Compliant, Upper Band Edge, 1982.5 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM3.1a-256QAM

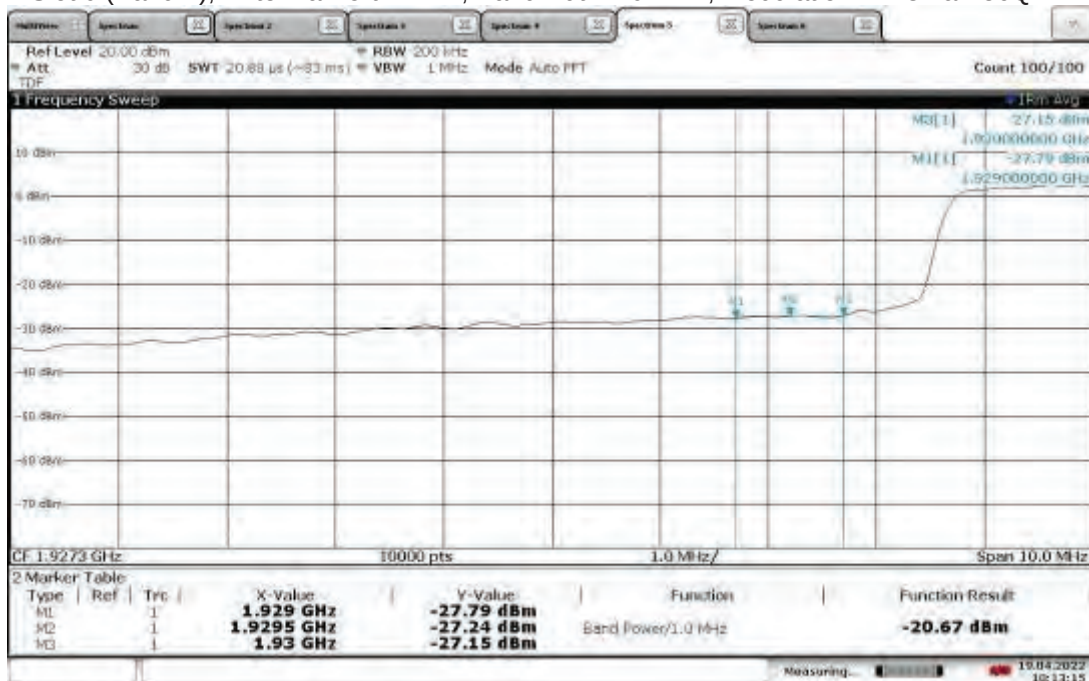


Band Edge Compliant, Lower Band Edge, 1940 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM3.1a-256QAM



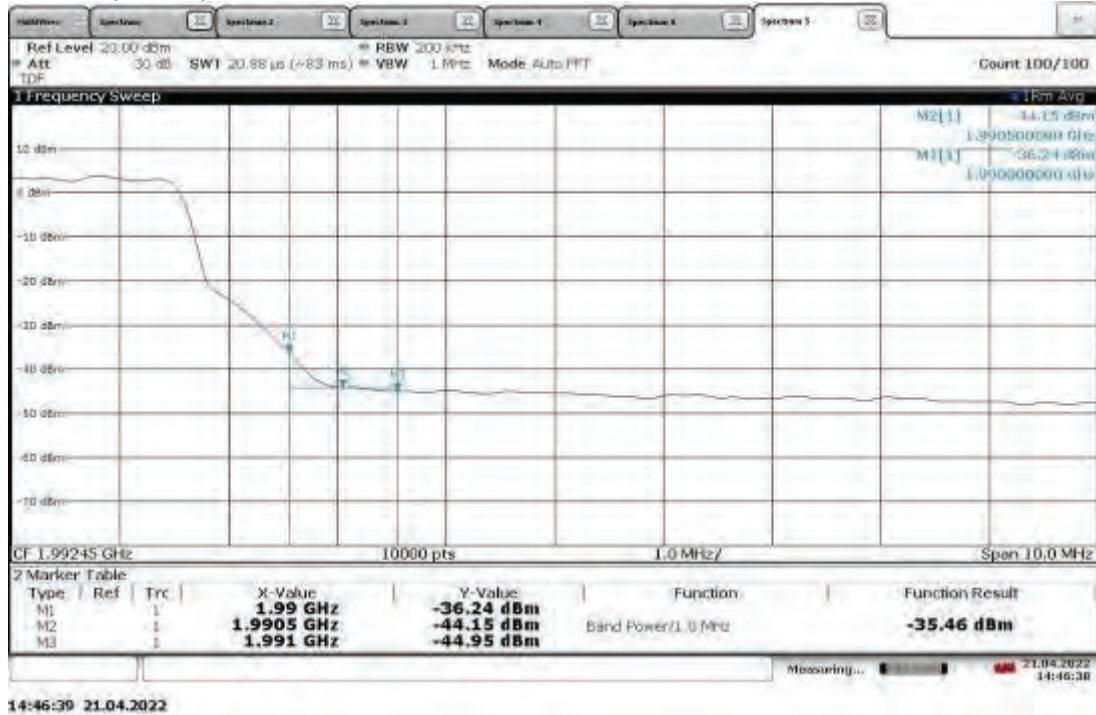
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Band Edge Compliant, Lower Band Edge, 1940 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM3.1a-256QAM

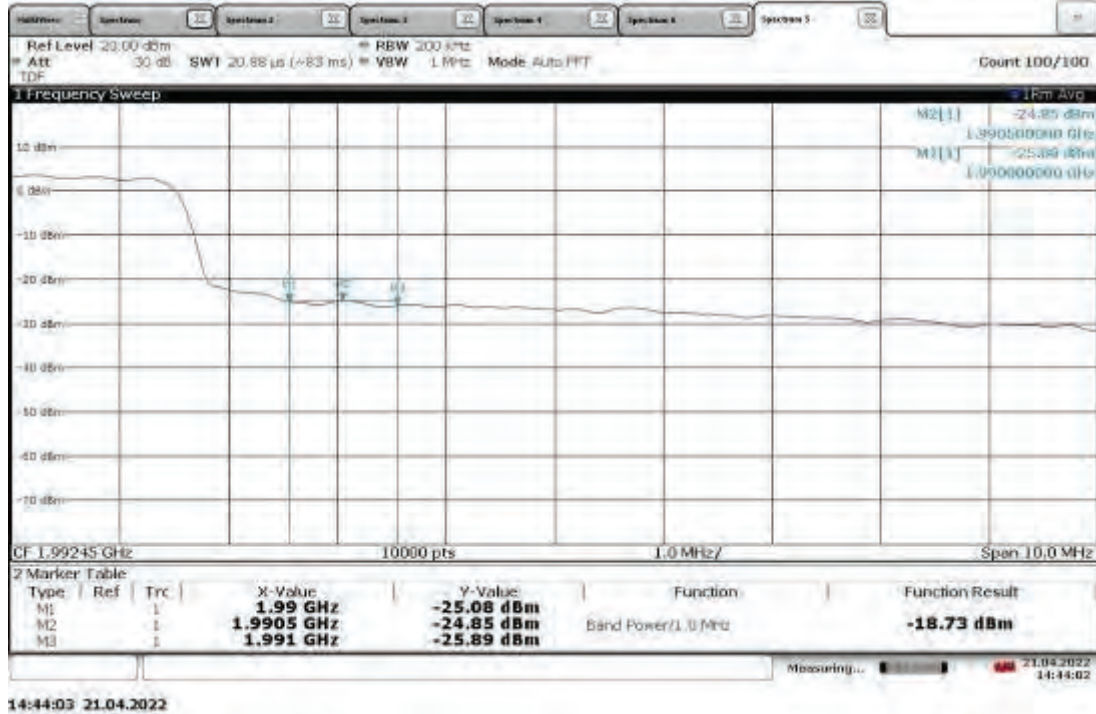


10:13:15 19.04.2022

Band Edge Compliant, Upper Band Edge, 1980 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM3.1a-256QAM



Band Edge Compliant, Upper Band Edge, 1980 MHz (4G LTE)
Slot 0 (Band 2), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM3.1a-256QAM



Test Personnel: Kouma Sinn *KS*
Supervising/Reviewing
Engineer:
(Where Applicable) N/A

Test Date: 04/18/2022, 04/21/2022, 05/12/2022

Product Standard: FCC Part 24
Input Voltage: 48 VDC (POE)

Limit Applied: See report section 9.3

Pretest Verification w/
Ambient Signals or
BB Source: N/A

Ambient Temperature: 25, 24, 25 °C

Relative Humidity: 18, 23, 46 %

Atmospheric Pressure: 1015, 1024, 1017 mbars

Deviations, Additions, or Exclusions: None

10 Frequency Stability

10.1 Method

Tests are performed in accordance with ANSI C63.26 and CFR47 FCC Parts 2.1055 and 24.

TEST SITE: Safety Lab

10.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
ROS005-1'	Signal and Spectrum Analyzer	Rohde and Shwartz	FSW43	100646	11/02/2021	11/02/2022
CEN001'	DC-40GHz attenuator 20dB	Centric RF	C411-20	CEN001	01/26/2022	01/26/2023
CBLHF2012-2M-2'	2m 9kHz-40GHz Coaxial Cable - SET2	Huber & Suhner	SF102	252675002	02/10/2023	02/10/2023
SAF1153'	Freezing Rain\icing\Temp\Humidity\ -73deg C to +190deg C, 95% humidity, Ice Freezing Rain	Cincinnati Sub-Zero	CTH-(FR)64-6-6-SC/AC	12-CT15628	11/22/2021	11/22/2022

Software Utilized:

Name	Manufacturer	Version
None	--	--

10.3 Results:

The sample tested was found to Comply.

FCC Part §24.235 Frequency stability – The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The occupied bandwidth measurement was used to make sure the lower and upper frequencies of the occupied bandwidth remains within the assigned band of 1930-1990 MHz.

Frequency stability over temperature

Band 2, Modulation: 256QAM, Bandwidth: 5MHz, Antenna Port: ANT0 , Channel: Low 1932.5 MHz

Worst-case output power, 21.76 dBm

Low Edge of Occupied Bandwidth

Temperature	Low Edge	Low Edge Deviation	Low Edge (%)	PPM	Limit
(Deg. C)	(GHz)	(GHz)	--	--	PPM
-30	1.9302401	-6.5E-06	-3.36747E-06	-0.03	2.5
-20	1.9302392	-5.6E-06	-2.9012E-06	-0.03	2.5
-10	1.9302383	-4.7E-06	-2.43494E-06	-0.02	2.5
0	1.9302376	4E-06	2.07229E-06	0.02	2.5
10	1.9302362	2.6E-06	1.34699E-06	0.01	2.5
20	1.9302336	0	0	0.00	--
30	1.9302356	2E-06	1.03614E-06	0.01	2.5
40	1.9302349	1.3E-06	6.73494E-07	0.01	2.5
50	1.9302347	1.1E-06	5.69879E-07	0.01	2.5

Upper Edge of Occupied Bandwidth

Temperature	Upper Edge	Upper Edge Deviation	Upper Edge (%)	PPM	Limit
(Deg. C)	(GHz)	(GHz)	--	--	PPM
-30	1.9347558	-7.2E-06	-3.72141E-06	-0.04	2.5
-20	1.9347547	-6.1E-06	-3.15286E-06	-0.03	2.5
-10	1.9347531	-4.5E-06	-2.32588E-06	-0.02	2.5
0	1.9347529	4.3E-06	2.22251E-06	0.02	2.5
10	1.9347526	4E-06	2.06745E-06	0.02	2.5
20	1.9347486	0	0	0.00	--
30	1.934752	3.4E-06	1.75733E-06	0.02	2.5
40	1.9347512	2.6E-06	1.34384E-06	0.01	2.5
50	1.9347502	1.6E-06	8.26981E-07	0.01	2.5

Frequency stability over temperature

Band 2, Modulation: 16QAM, Bandwidth: 5MHz, Antenna Port: ANT1 , Channel: High 1987.5 MHz

Worst-case output power, 22.97 dBm

Low Edge of Occupied Bandwidth

Temperature	Low Edge	Low Edge Deviation	Low Edge (%)	PPM	Limit
(Deg. C)	(GHz)	(GHz)	--	--	PPM
-30	1.9852199	-2.1E-06	-1.05782E-06	-0.01	2.5
-20	1.9852164	1.4E-06	7.05212E-07	0.01	2.5
-10	1.9852182	-4E-07	-2.01489E-07	0.00	2.5
0	1.9852161	-1.7E-06	-8.56329E-07	-0.01	2.5
10	1.9852186	8E-07	4.02978E-07	0.00	2.5
20	1.9852178	0	0	0.00	--
30	1.9852189	1.1E-06	5.54095E-07	0.01	2.5
40	1.9852142	-3.6E-06	-1.8134E-06	-0.02	2.5
50	1.9852159	-1.9E-06	-9.57074E-07	-0.01	2.5

Upper Edge of Occupied Bandwidth

Temperature	Upper Edge	Upper Edge Deviation	Upper Edge (%)	PPM	Limit
(Deg. C)	(GHz)	(GHz)	--	--	PPM
-30	1.989733	-1.6E-06	-8.04129E-07	-0.01	2.5
-20	1.989737	-5.6E-06	-2.81445E-06	-0.03	2.5
-10	1.9897318	-4E-07	-2.01032E-07	0.00	2.5
0	1.9897345	3.1E-06	1.558E-06	0.02	2.5
10	1.9897311	-3E-07	-1.50774E-07	0.00	2.5
20	1.9897314	0	0	0.00	--
30	1.9897292	-2.2E-06	-1.10568E-06	-0.01	2.5
40	1.9897306	-8E-07	-4.02064E-07	0.00	2.5
50	1.9897271	-4.3E-06	-2.1611E-06	-0.02	2.5

Frequency stability over temperature

Band 2, Modulation: 64QAM, Bandwidth: 20MHz, Antenna Port: ANT0 , Channel: Low 1940 MHz

Worst-case output power, 22.69 dBm

Low Edge of Occupied Bandwidth

Temperature	Low Edge	Low Edge Deviation	Low Edge (%)	PPM	Limit
(Deg. C)	(GHz)	(GHz)	--	--	PPM
-30	1.9310838	-2.07E-05	-1.07195E-05	-0.11	2.5
-20	1.9310769	-1.38E-05	-7.14632E-06	-0.07	2.5
-10	1.9310718	-8.7E-06	-4.50529E-06	-0.05	2.5
0	1.9310688	5.7E-06	2.95174E-06	0.03	2.5
10	1.9310663	3.2E-06	1.65712E-06	0.02	2.5
20	1.9310631	0	0	0.00	--
30	1.9310611	-2E-06	-1.0357E-06	-0.01	2.5
40	1.9310589	-4.2E-06	-2.17497E-06	-0.02	2.5
50	1.9310559	-7.2E-06	-3.72852E-06	-0.04	2.5

Upper Edge of Occupied Bandwidth

Temperature	Upper Edge	Upper Edge Deviation	Upper Edge (%)	PPM	Limit
(Deg. C)	(GHz)	(GHz)	--	--	PPM
-30	1.9489543	-7.6E-06	-3.89954E-06	-0.04	2.5
-20	1.9489525	-5.8E-06	-2.97597E-06	-0.03	2.5
-10	1.9489507	-4E-06	-2.05239E-06	-0.02	2.5
0	1.9489489	2.2E-06	1.12881E-06	0.01	2.5
10	1.9489475	8E-07	4.10478E-07	0.00	2.5
20	1.9489467	0	0	0.00	--
30	1.948946	-7E-07	-3.59168E-07	0.00	2.5
40	1.9489458	-9E-07	-4.61788E-07	0.00	2.5
50	1.9489455	-1.2E-06	-6.15717E-07	-0.01	2.5

Band 2 (20 MHz) High
B2-20MHz-256QAM-H1980MHz-ANT0 22.73dBm_05-03-22

Frequency stability over temperature

Band 2, Modulation: 256QAM, Bandwidth: 20MHz, Antenna Port: ANT0 , Channel: High 1980 MH

Worst-case output power, 22.73 dBm

Low Edge of Occupied Bandwidth

Temperature	Low Edge	Low Edge Deviation	Low Edge (%)	PPM	Limit
(Deg. C)	(GHz)	(GHz)	--	--	PPM
-30	1.9710284	3.3E-06	1.67425E-06	0.02	2.5
-20	1.97103	1.7E-06	8.62492E-07	0.01	2.5
-10	1.9710306	1.1E-06	5.58083E-07	0.01	2.5
0	1.9710314	-3E-07	-1.52205E-07	0.00	2.5
10	1.971032	3E-07	1.52205E-07	0.00	2.5
20	1.9710317	0	0	0.00	--
30	1.9710319	2E-07	1.0147E-07	0.00	2.5
40	1.9710336	1.9E-06	9.63962E-07	0.01	2.5
50	1.9710342	2.5E-06	1.26837E-06	0.01	2.5

Upper Edge of Occupied Bandwidth

Temperature	Upper Edge	Upper Edge Deviation	Upper Edge (%)	PPM	Limit
(Deg. C)	(GHz)	(GHz)	--	--	PPM
-30	1.9889355	3E-07	1.50834E-07	0.00	2.5
-20	1.9889367	-9E-07	-4.52503E-07	0.00	2.5
-10	1.988937	-1.2E-06	-6.03338E-07	-0.01	2.5
0	1.988937	1.2E-06	6.03338E-07	0.01	2.5
10	1.9889376	1.8E-06	9.05007E-07	0.01	2.5
20	1.9889358	0	0	0.00	--
30	1.9889357	-1E-07	-5.02781E-08	0.00	2.5
40	1.9889362	4E-07	2.01113E-07	0.00	2.5
50	1.9889324	-3.4E-06	-1.70946E-06	-0.02	2.5

Frequency stability over voltagesBand 2 (4G LTE), Modulation: 256QAM, Bandwidth: 5MHz, Antenna Port: ANT0 , [Low Ch. 1932.5 MHz](#)

Worst-case output power 21.76 dBm

Low Channel 1940 MHz, Low Edge of Occupied Bandwidth

Voltage	Low Edge	Low Edge Deviation	Low Edge (%)	PPM	Limit
(VDC)	(GHz)	(GHz)	--	--	PPM
41.1	1.9302369	4E-07	2.07228E-07	0.00	2.5
48	1.9302365	0	0	0.00	--
57	1.930236	-5E-07	-2.59036E-07	0.00	2.5

Low Channel 1940 MHz, Upper Edge of Occupied Bandwidth

Voltage	Upper Edge	Upper Edge Deviation	Upper Edge (%)	PPM	Limit
(VDC)	(GHz)	(GHz)	--	--	PPM
41.1	1.934752	6E-07	3.10117E-07	0.00	2.5
48	1.9347514	0	0	0.00	--
57	1.9347513	-1E-07	-5.16862E-08	0.00	2.5

Band 2 (4G LTE), Modulation: 16QAM, Bandwidth: 5MHz, Antenna Port: ANT1 , [High Ch. 1987.5 MHz](#)

Worst-case output power 22.97 dBm

High Channel 1980 MHz, Low Edge of Occupied Bandwidth

Voltage	Low Edge	Low Edge Deviation	Low Edge (%)	PPM	Limit
(VDC)	(GHz)	(GHz)	--	--	PPM
41.1	1.9852163	-3E-07	-1.51117E-07	0.00	2.5
48	1.9852166	0	0	0.00	--
57	1.985216	-6E-07	-3.02234E-07	0.00	2.5

High Channel 1980 MHz, Upper Edge of Occupied Bandwidth

Voltage	Upper Edge	Upper Edge Deviation	Upper Edge (%)	PPM	Limit
(VDC)	(GHz)	(GHz)	--	--	PPM
41.1	1.9897317	5E-07	2.5129E-07	0.00	2.5
48	1.9897312	0	0	0.00	--
57	1.9897317	5E-07	2.5129E-07	0.00	2.5

Band 2 (4G LTE), Modulation: 64QAM, Bandwidth: 20MHz, Antenna Port: ANT0 , [Low Ch. 1940 MHz](#)

Worst-case output 22.69 dBm

Low Channel 1940 MHz, Low Edge of Occupied Bandwidth

Voltage	Low Edge	Low Edge Deviation	Low Edge (%)	PPM	Limit
(VDC)	(GHz)	(GHz)	--	--	PPM
41.1	1.9310634	2E-07	1.0357E-07	0.00	2.5
48	1.9310632	0	0	0.00	--
57	1.9310627	-5E-07	-2.58925E-07	0.00	2.5

Low Channel 1940 MHz, Upper Edge of Occupied Bandwidth

Voltage	Upper Edge	Upper Edge Deviation	Upper Edge (%)	PPM	Limit
(VDC)	(GHz)	(GHz)	--	--	PPM
41.1	1.9489474	2E-07	1.0262E-07	0.00	2.5
48	1.9489472	0	0	0.00	--
57	1.9489462	-1E-06	-5.13098E-07	-0.01	2.5

Band 2 (4G LTE), Modulation: 256QAM, Bandwidth: 20MHz, Antenna Port: ANT0 , [High Ch. 1980 MHz](#)

Worst-case output power 22.73 dBm

High Channel 1980 MHz, Low Edge of Occupied Bandwidth

Voltage	Low Edge	Low Edge Deviation	Low Edge (%)	PPM	Limit
(VDC)	(GHz)	(GHz)	--	--	PPM
41.1	1.9710279	-5.4E-06	-2.73968E-06	-0.03	2.5
48	1.9710333	0	0	0.00	--
57	1.9710327	-6E-07	-3.04409E-07	0.00	2.5

High Channel 1980 MHz, Upper Edge of Occupied Bandwidth

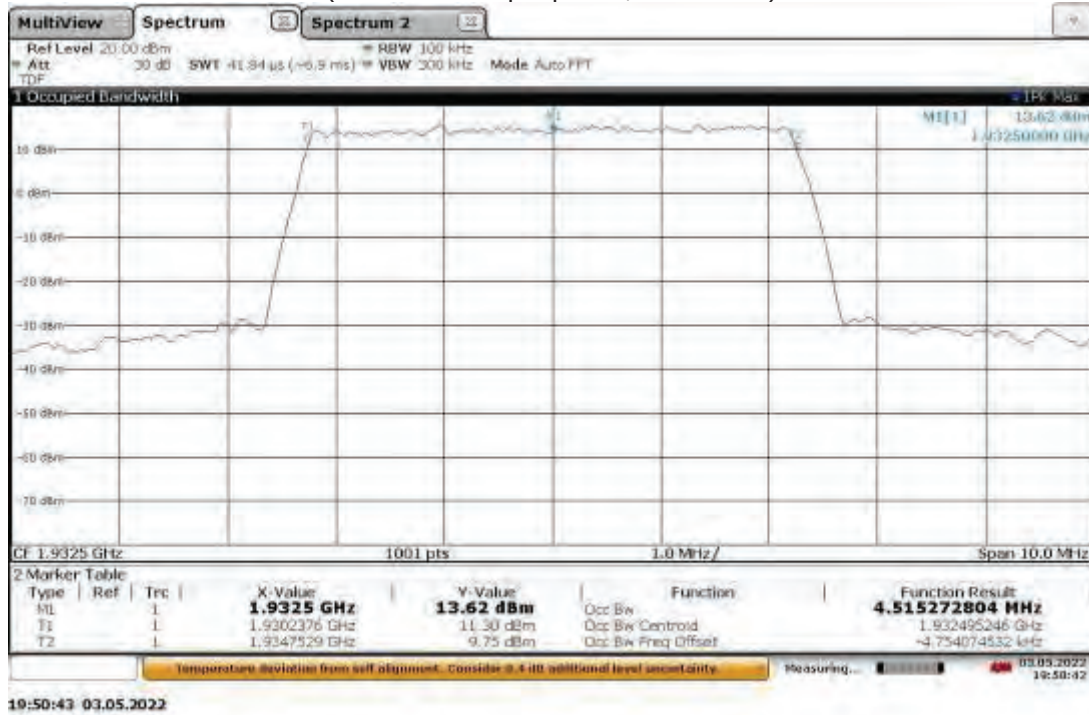
Voltage	Upper Edge	Upper Edge Deviation	Upper Edge (%)	PPM	Limit
(VDC)	(GHz)	(GHz)	--	--	PPM
41.1	1.9889362	-1E-06	-5.02781E-07	-0.01	2.5
48	1.9889372	0	0	0.00	--
57	1.9889381	9E-07	4.52503E-07	0.00	2.5

10.4 Setup Photographs:

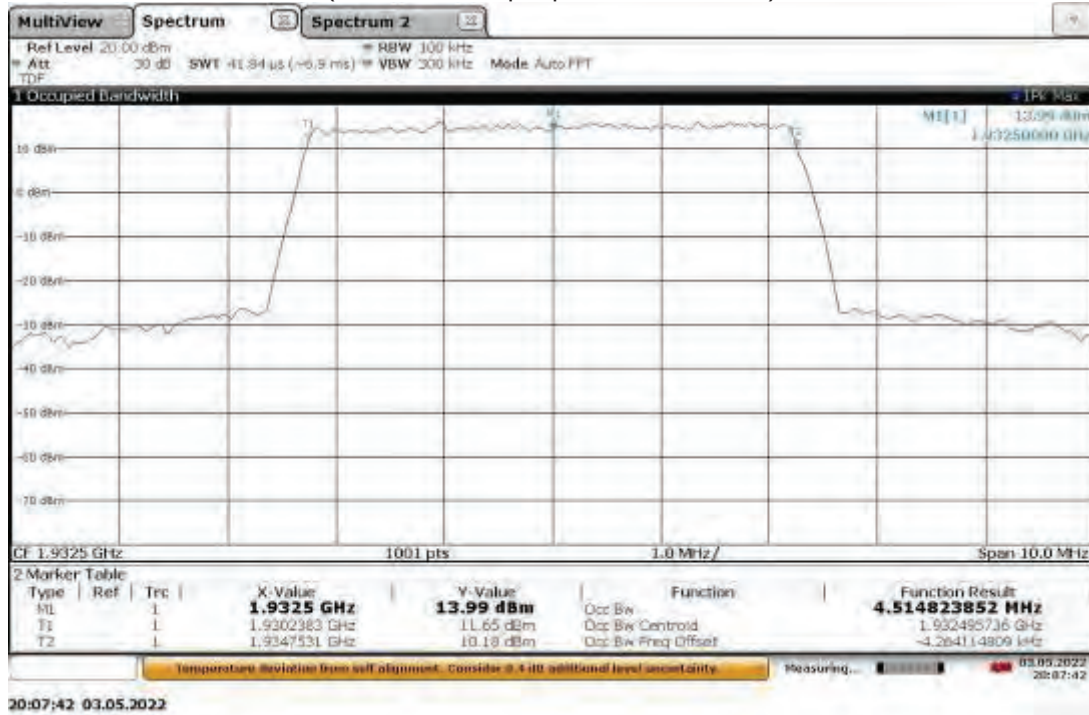
Confidential – Photos not included in this report

10.5 Plots/Data:

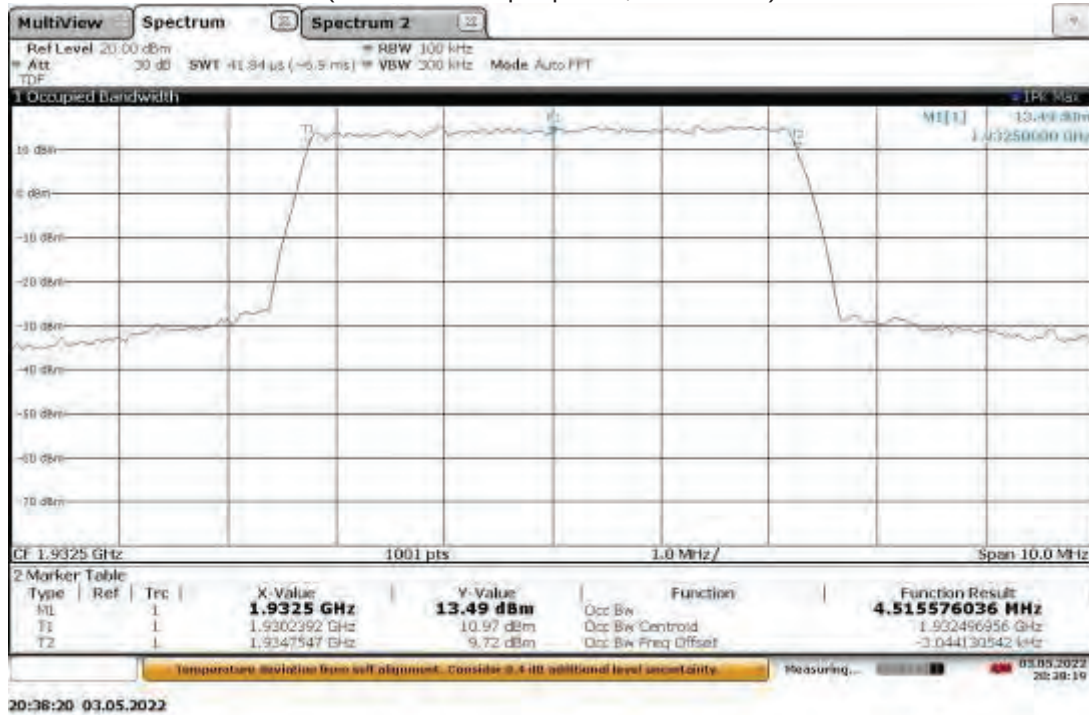
Slot 0 (Band 2), ANT0, Modulation: 256QAM, Bandwidth: 5 MHz Low Ch. 1932.5 MHz, 0 °C (4G LTE)
(worst-case output power, 21.76 dBm)



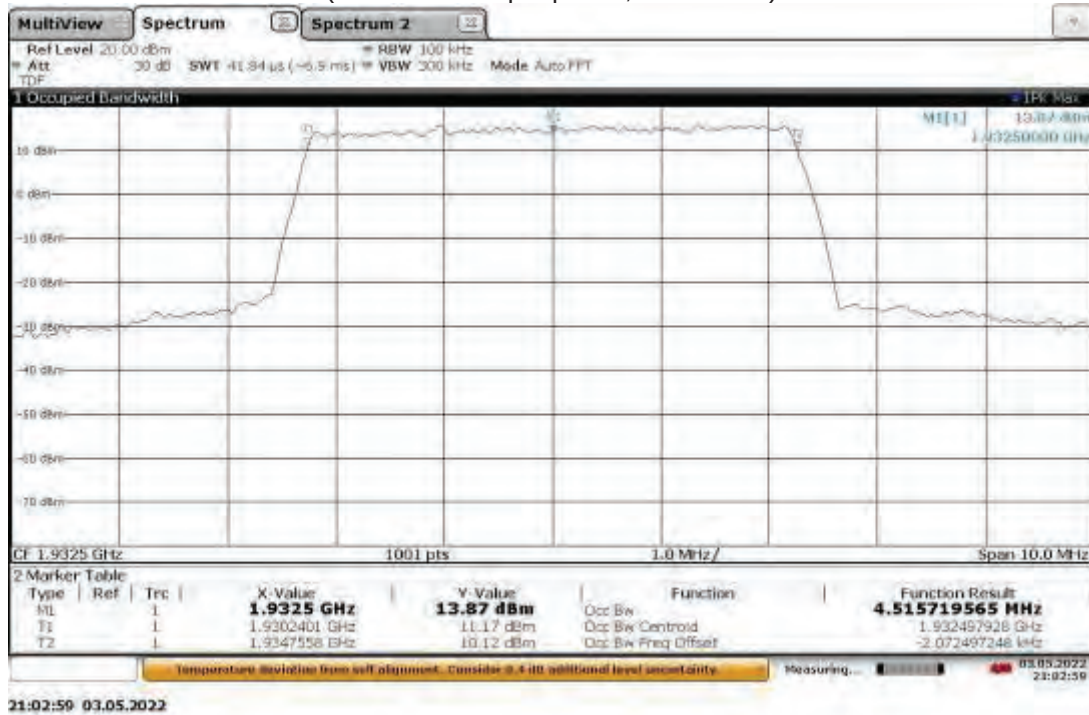
Slot 0 (Band 2), ANT0, Modulation: 256QAM, Bandwidth: 5 MHz Low Ch. 1932.5 MHz, -10 °C (4G LTE)
(worst-case output power, 21.76 dBm)



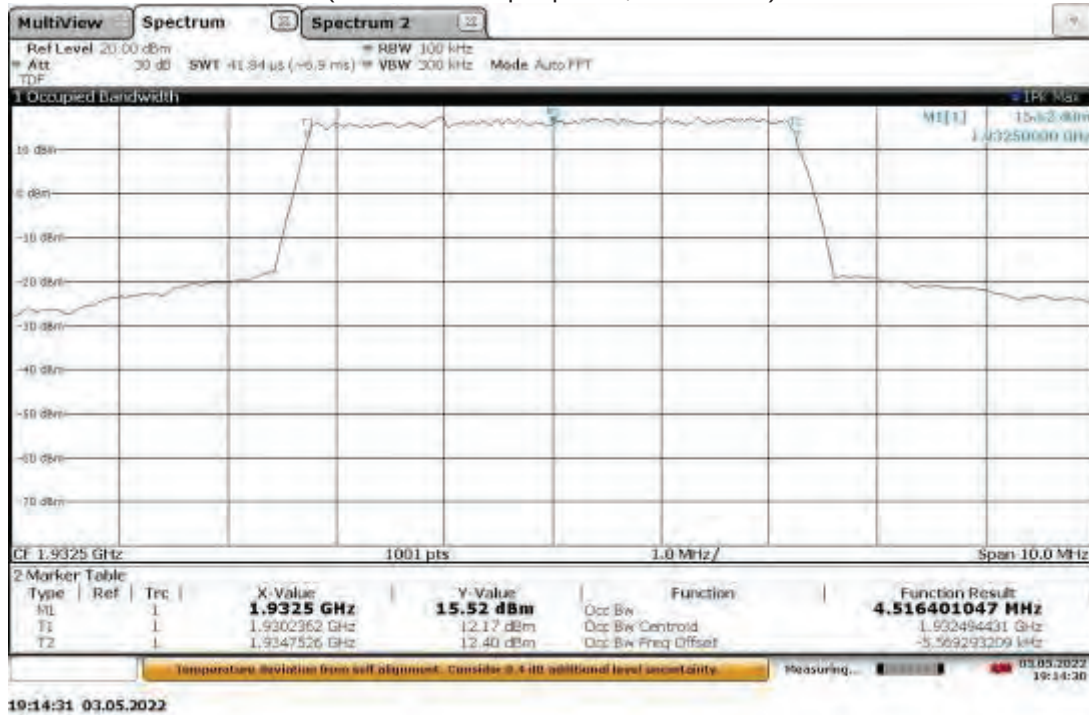
Slot 0 (Band 2), ANT0, Modulation: 256QAM, Bandwidth: 5 MHz Low Ch. 1932.5 MHz, -20 °C (4G LTE)
(worst-case output power, 21.76 dBm)



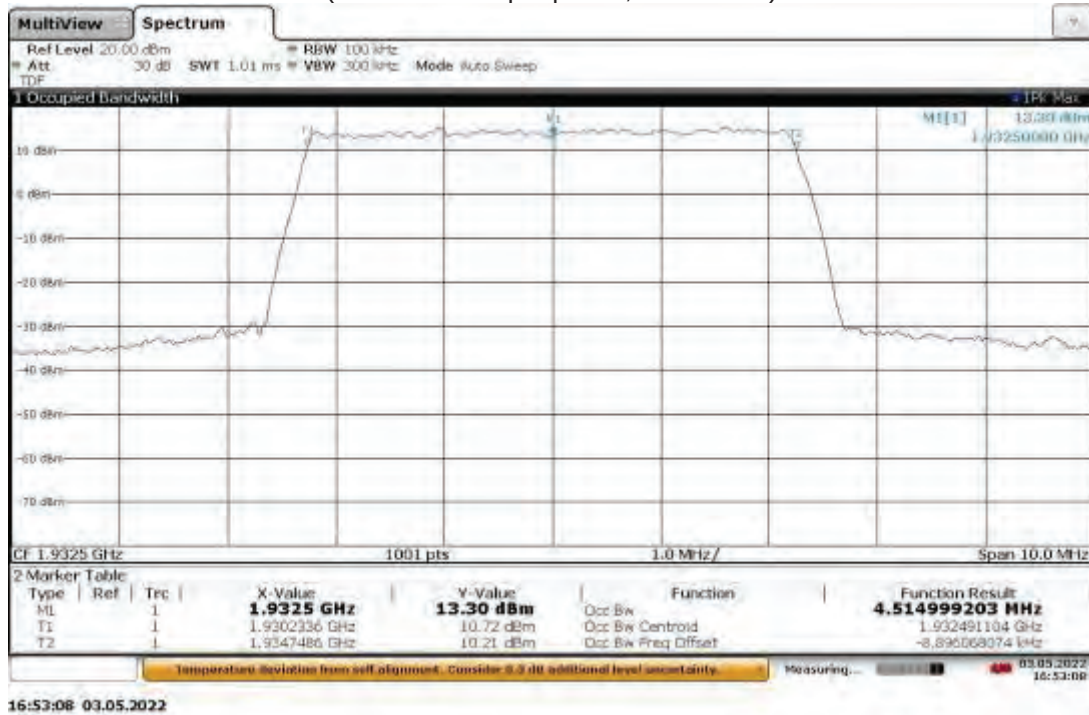
Slot 0 (Band 2), ANT0, Modulation: 256QAM, Bandwidth: 5 MHz Low Ch. 1932.5 MHz, -30 °C (4G LTE)
(worst-case output power, 21.76 dBm)



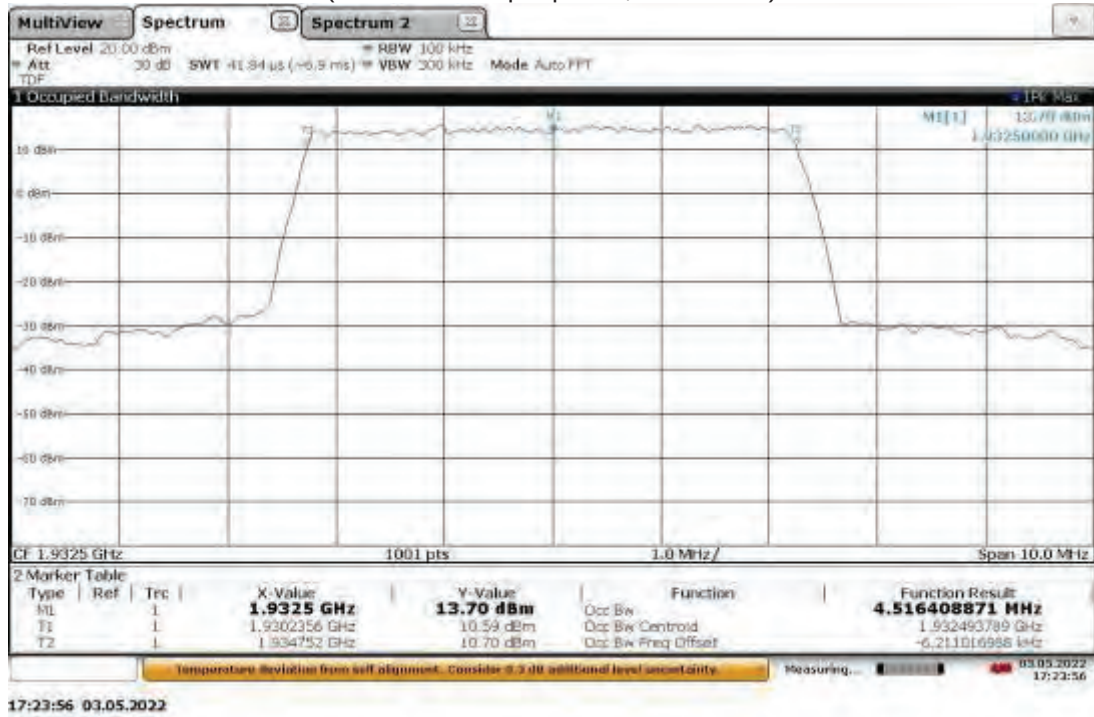
Slot 0 (Band 2), ANT0, Modulation: 256QAM, Bandwidth: 5 MHz Low Ch. 1932.5 MHz, 10 °C (4G LTE)
(worst-case output power, 21.76 dBm)



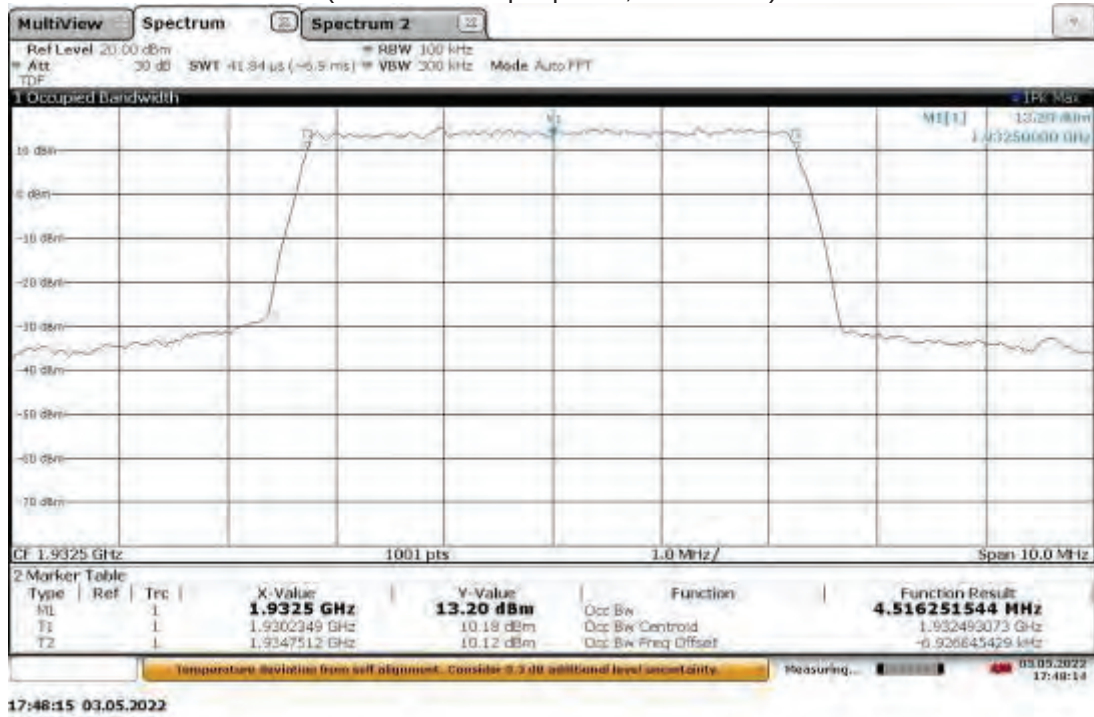
Slot 0 (Band 2), ANT0, Modulation: 256QAM, Bandwidth: 5 MHz Low Ch. 1932.5 MHz, 20 °C (4G LTE)
(worst-case output power, 21.76 dBm)



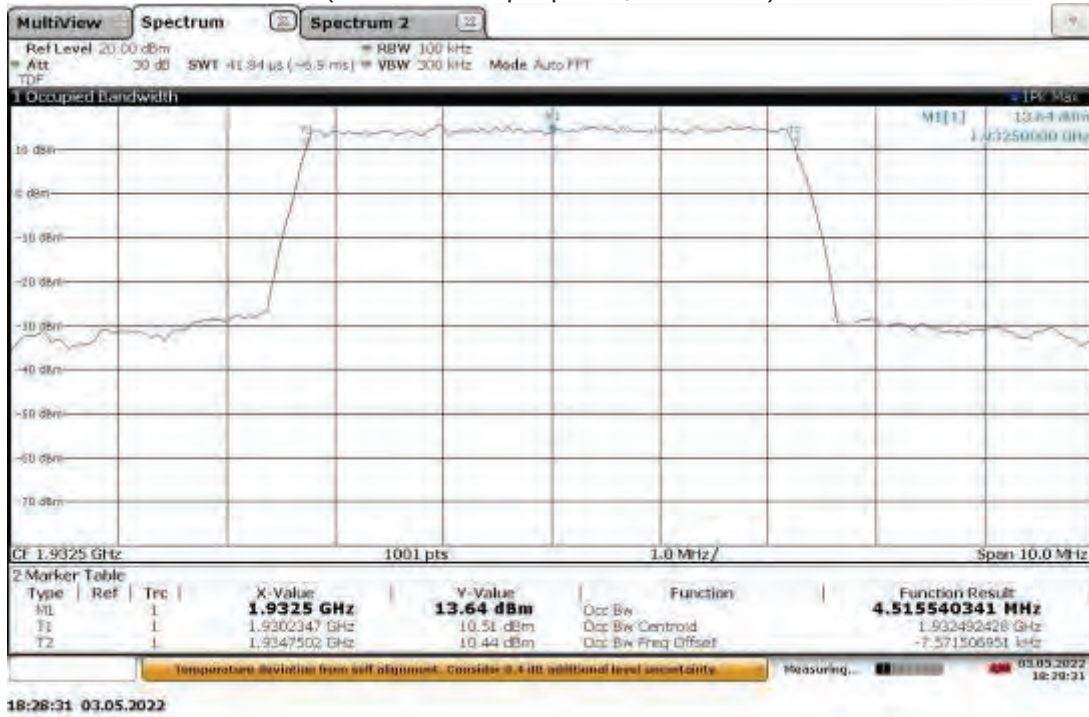
Slot 0 (Band 2), ANT0, Modulation: 256QAM, Bandwidth: 5 MHz Low Ch. 1932.5 MHz, 30 °C (4G LTE)
(worst-case output power, 21.76 dBm)



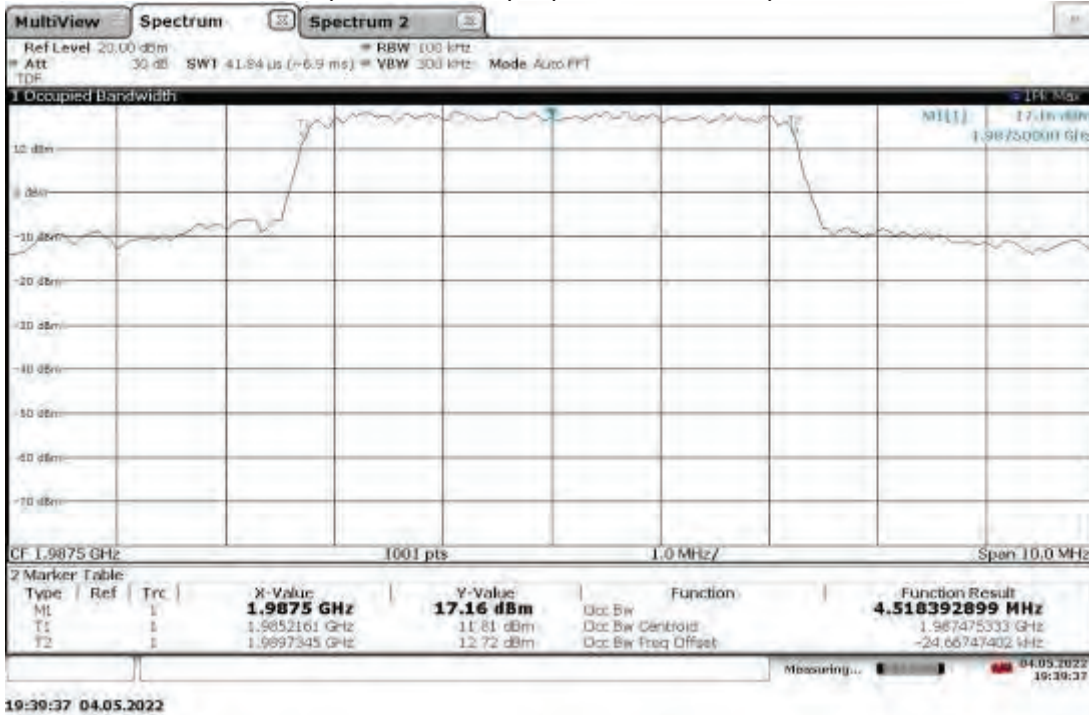
Slot 0 (Band 2), ANT0, Modulation: 256QAM, Bandwidth: 5 MHz Low Ch. 1932.5 MHz, 40 °C (4G LTE)
(worst-case output power, 21.76 dBm)



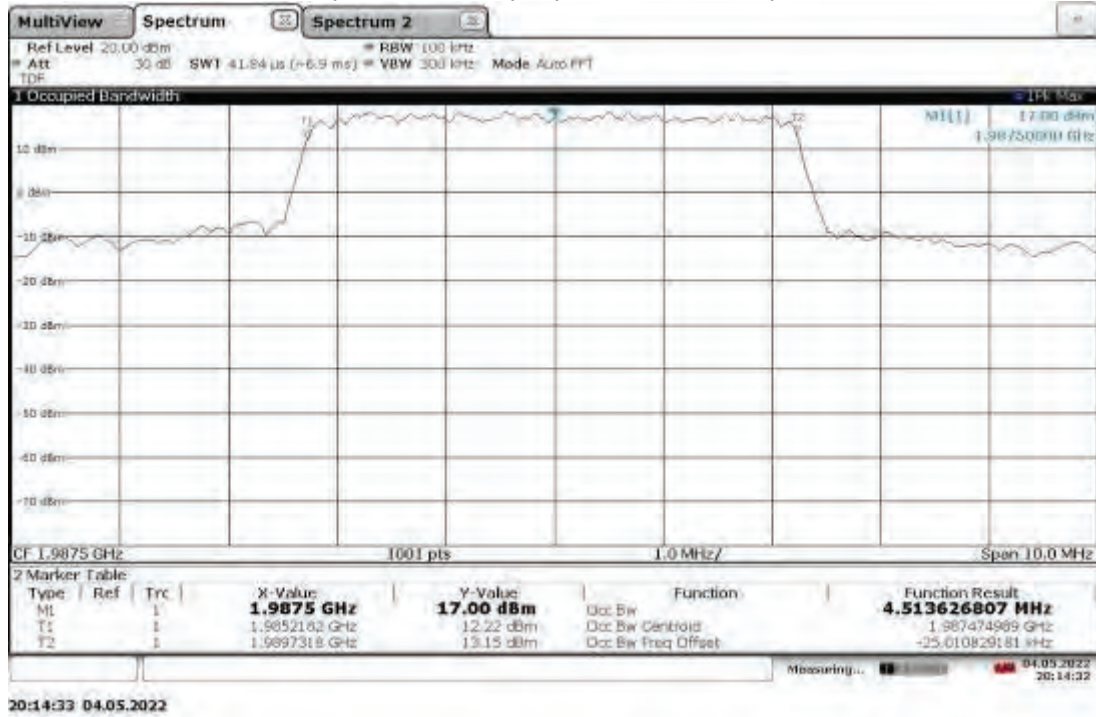
Slot 0 (Band 2), ANT0, Modulation: 256QAM, Bandwidth: 5 MHz Low Ch. 1932.5 MHz, 50 °C (4G LTE)
(worst-case output power, 21.76 dBm)



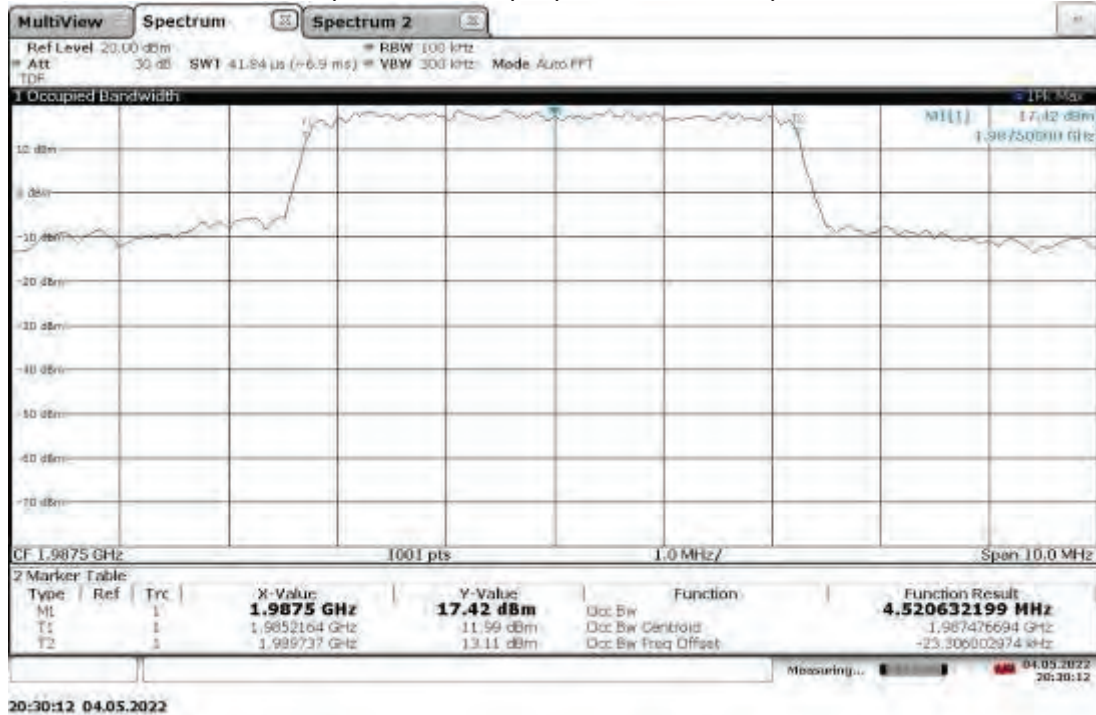
Slot 0 (Band 2), ANT1, Modulation: 16QAM, Bandwidth: 5 MHz High Ch. 1987.5 MHz, 0 °C (4G LTE)
(worst-case output power, 22.97 dBm)



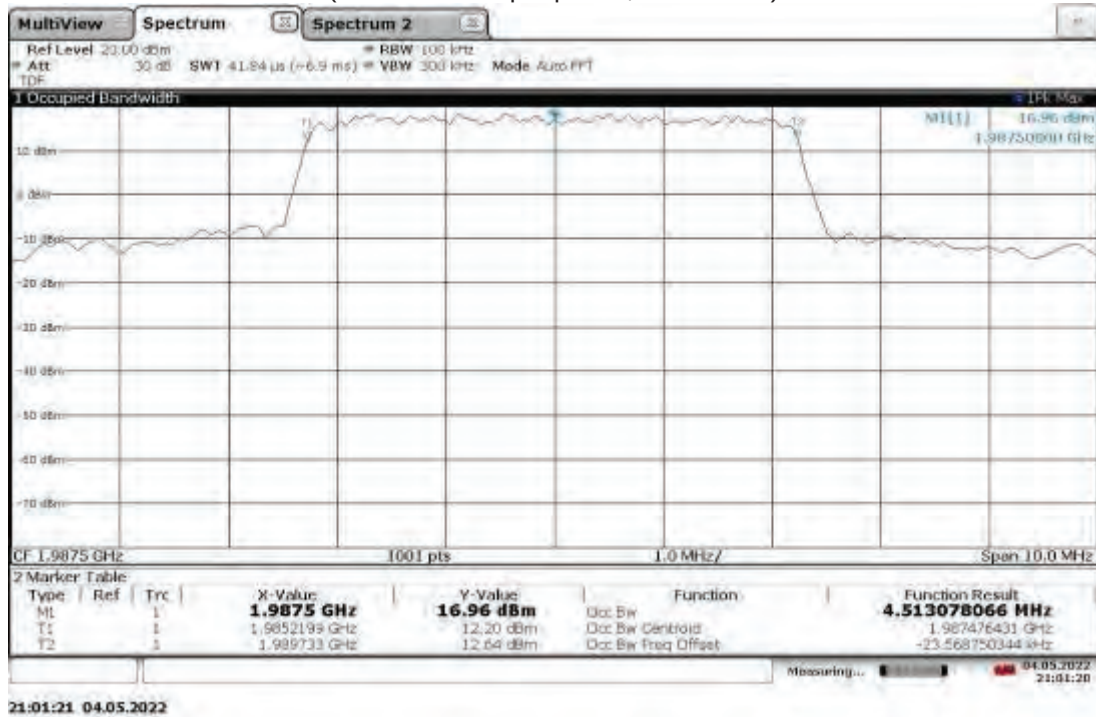
Slot 0 (Band 2), ANT1, Modulation: 16QAM, Bandwidth: 5 MHz High Ch. 1987.5 MHz, -10 °C (4G LTE)
(worst-case output power, 22.97 dBm)



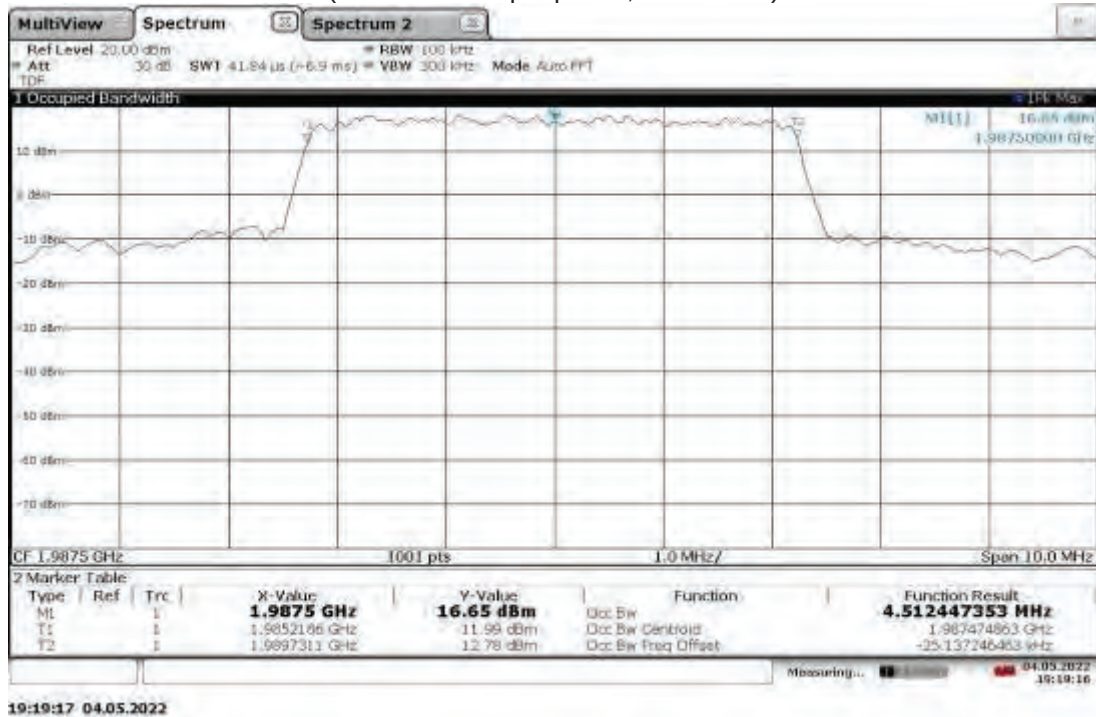
Slot 0 (Band 2), ANT1, Modulation: 16QAM, Bandwidth: 5 MHz High Ch. 1987.5 MHz, -20 °C (4G LTE)
(worst-case output power, 22.97 dBm)



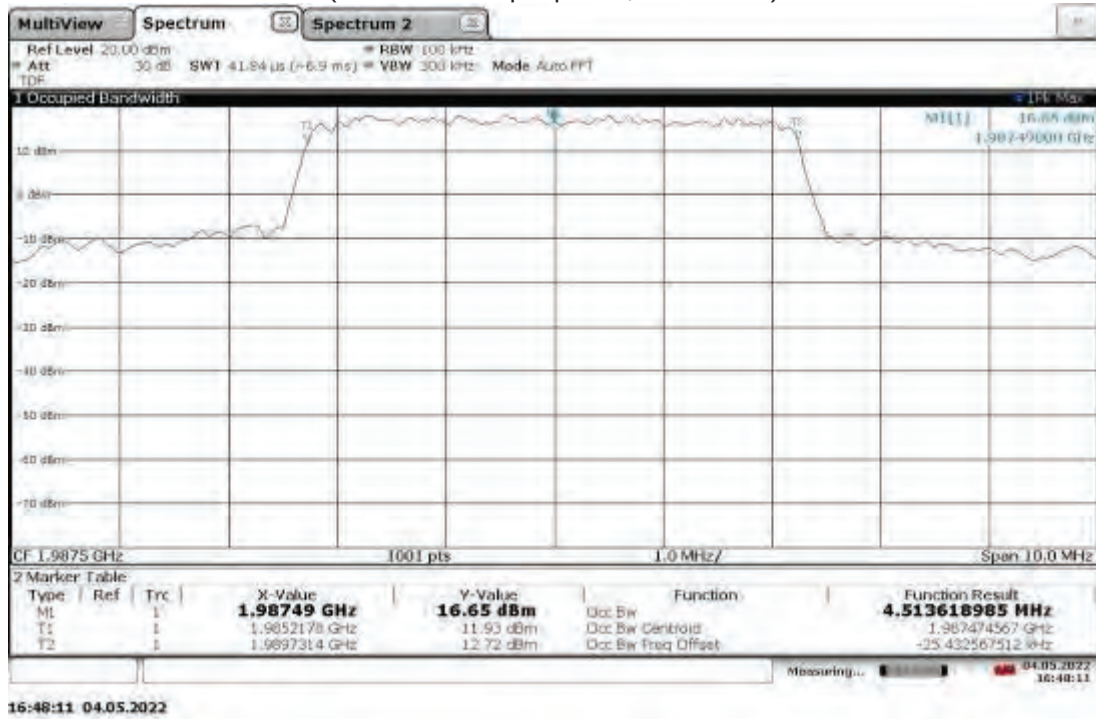
Slot 0 (Band 2), ANT1, Modulation: 16QAM, Bandwidth: 5 MHz High Ch. 1987.5 MHz, -30 °C (4G LTE)
(worst-case output power, 22.97 dBm)



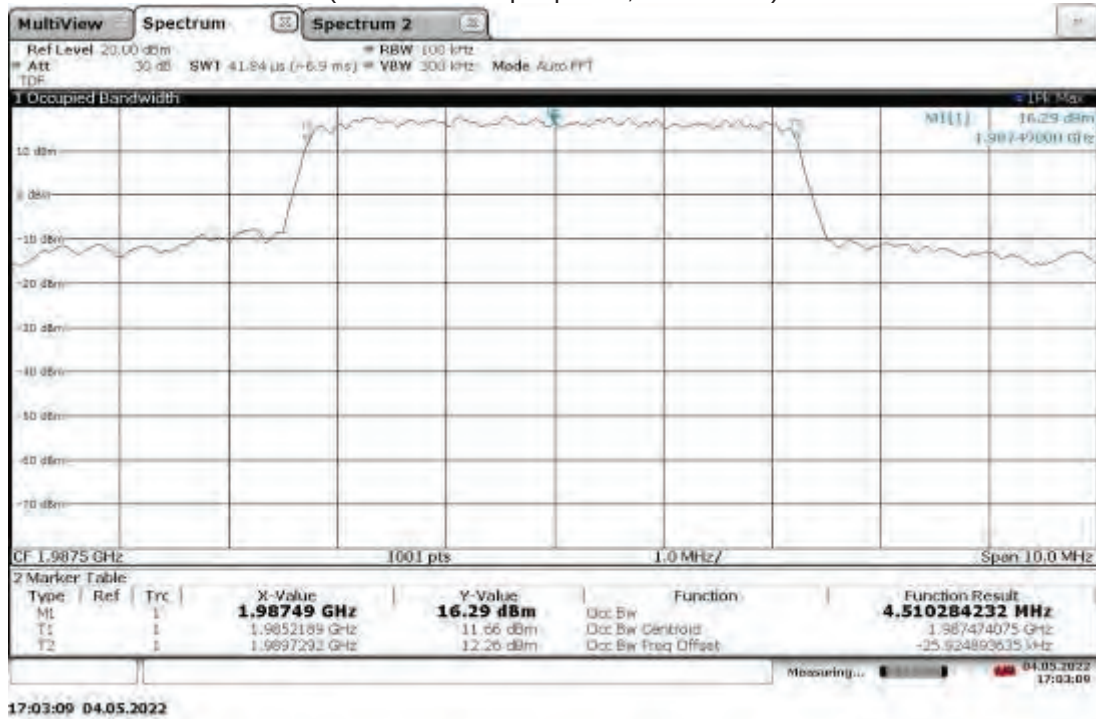
Slot 0 (Band 2), ANT1, Modulation: 16QAM, Bandwidth: 5 MHz High Ch. 1987.5 MHz, 10 °C (4G LTE)
(worst-case output power, 22.97 dBm)



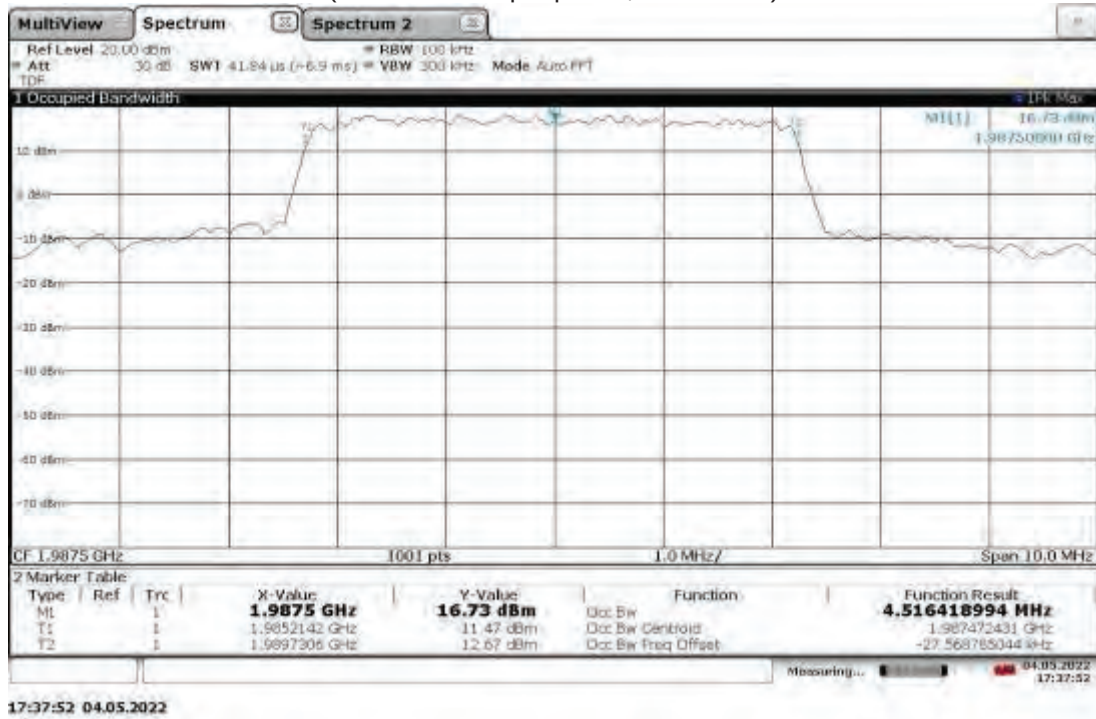
Slot 0 (Band 2), ANT1, Modulation: 16QAM, Bandwidth: 5 MHz High Ch. 1987.5 MHz, 20 °C (4G LTE)
(worst-case output power, 22.97 dBm)



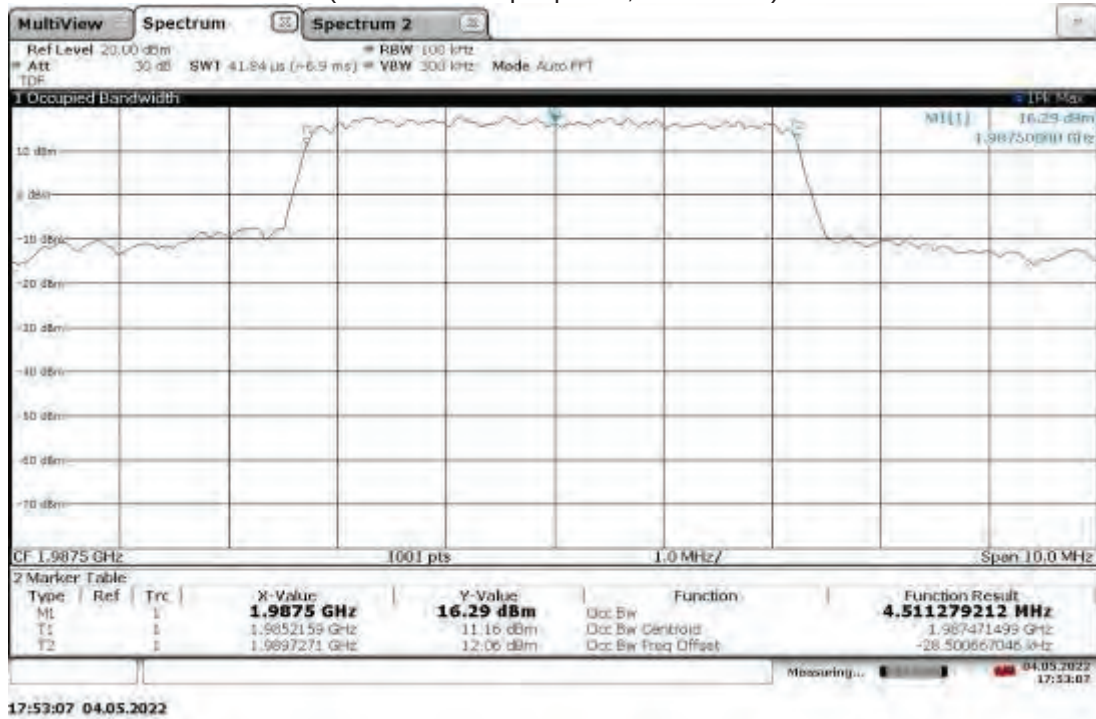
Slot 0 (Band 2), ANT1, Modulation: 16QAM, Bandwidth: 5 MHz High Ch. 1987.5 MHz, 30 °C (4G LTE)
(worst-case output power, 22.97 dBm)



Slot 0 (Band 2), ANT1, Modulation: 16QAM, Bandwidth: 5 MHz High Ch. 1987.5 MHz, 40 °C (4G LTE)
(worst-case output power, 22.97 dBm)



Slot 0 (Band 2), ANT1, Modulation: 16QAM, Bandwidth: 5 MHz High Ch. 1987.5 MHz, 50 °C (4G LTE)
(worst-case output power, 22.97 dBm)



MultiView Spectrum

Ref Level 20.00 dBm RBW 200 kHz
 Att 30 dB SWT 1.01 ms VBW 1 MHz Mode Auto Sweep

1 Occupied Bandwidth

Y-axis: dBm (from -70 to 10)
 X-axis: Frequency (from 1.94 GHz to 1.9404 GHz)

Marker Table:

Type	Ref	Freq	Value	Function
ML	1	1.9310688 GHz	12.54 dBm	Occ Bw
T1	1	1.9489489 GHz	10.58 dBm	Occ Bw Centroid
T2	1	1.9489489 GHz	12.28 dBm	Occ Bw Freq Offset

Function Result:

Function	Result
Occ Bw	17.880056263 MHz
Occ Bw Centroid	1.94000828 GHz
Occ Bw Freq Offset	8.827500649 kHz

Measuring... 05.05.2022 18:01:54

MultiView Spectrum

Ref Level 20.00 dBm Att 30 dB SWF 1.01 ms RBW 200 kHz VBW 1 MHz Mode Auto Sweep

1 Occupied Bandwidth

10 dBm
5 dBm
0 dBm
-5 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm

CF 1.94 GHz 1001 pts 4.0 MHz/ Span 40.0 MHz

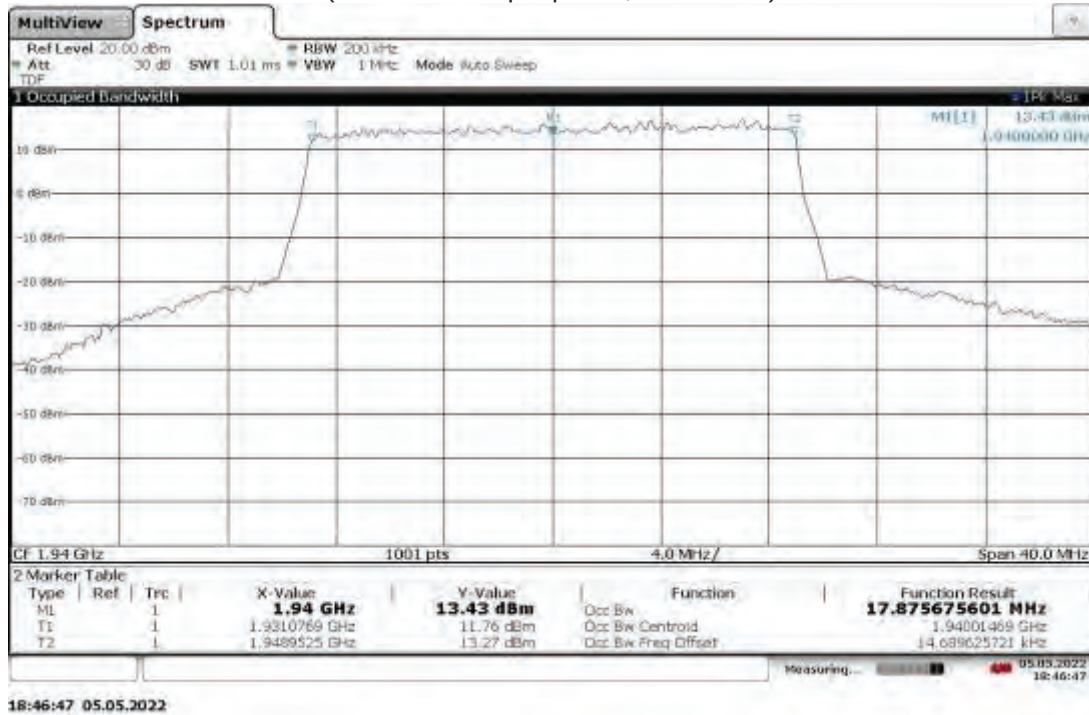
2 Marker Table

Type	Ref	Trc	X-Value	Y-Value	Function
ML	1		1.94 GHz	13.01 dBm	Occ Bw
T1	1		1.9310718 GHz	11.37 dBm	Occ Bw Centroid
T2	1		1.9489507 GHz	12.78 dBm	Occ Bw Freq Offset

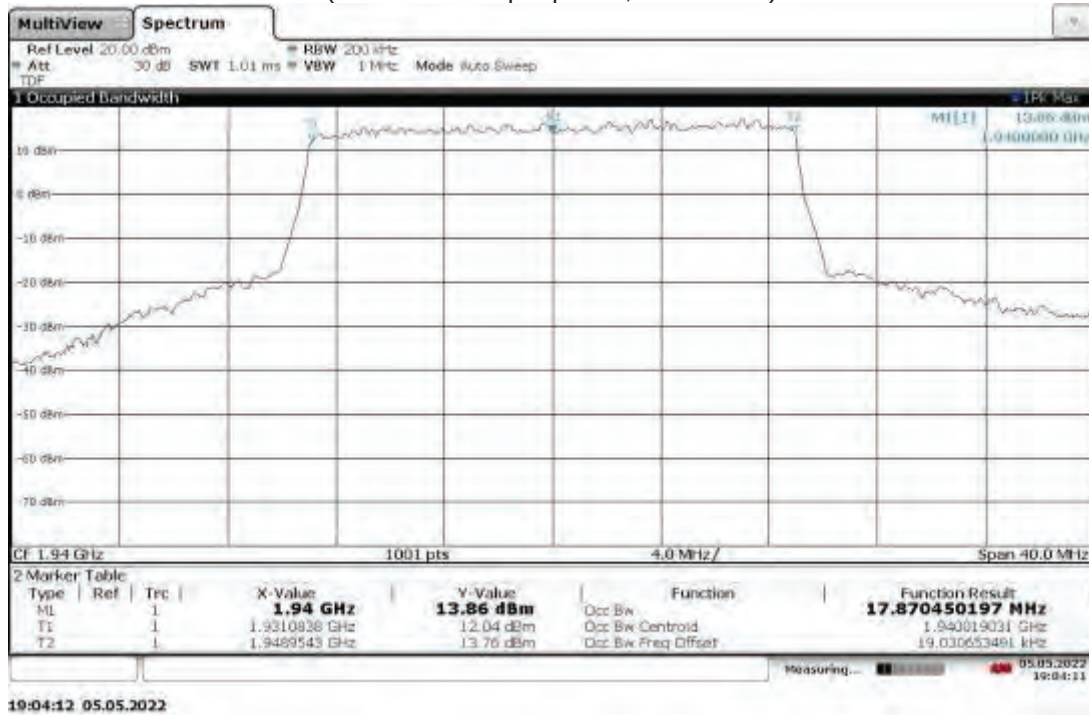
Function Result
17.878900004 MHz
1.940011246 GHz
11.245812833 kHz

Measuring... 05.05.2022 18:21:51

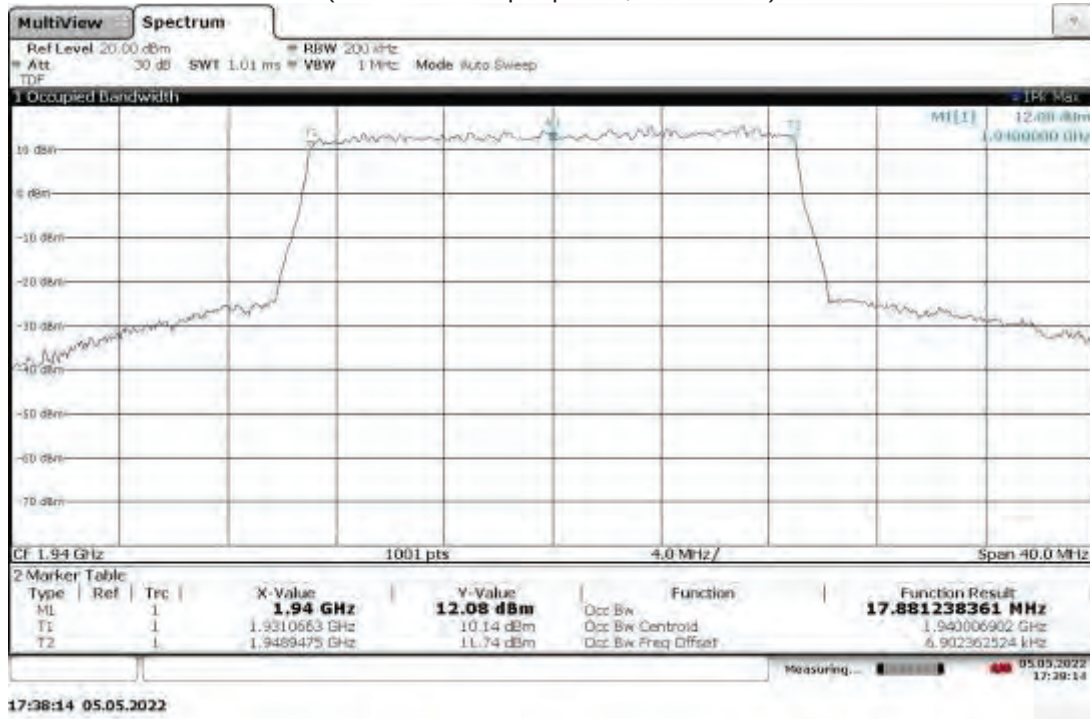
Slot 0 (Band 2), ANT0, Modulation: 64QAM, Bandwidth: 20 MHz Low Ch. 1940 MHz, -20 °C (4G LTE)
(worst-case output power, 22.69 dBm)



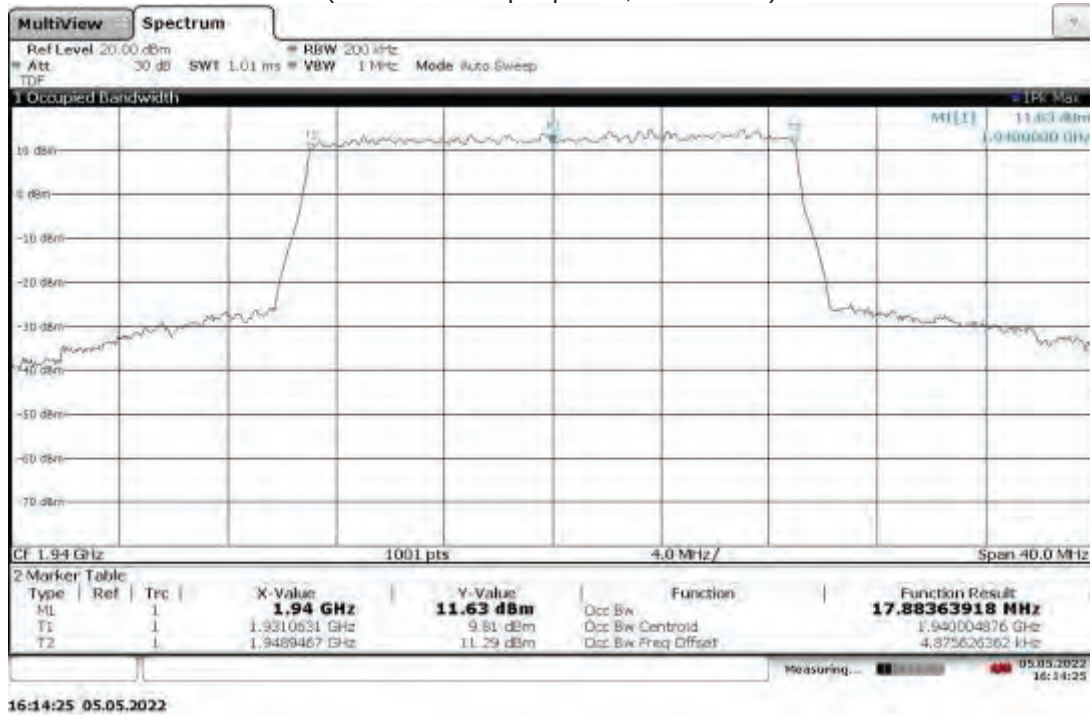
Slot 0 (Band 2), ANT0, Modulation: 64QAM, Bandwidth: 20 MHz Low Ch. 1940 MHz, -30 °C (4G LTE)
(worst-case output power, 22.69 dBm)



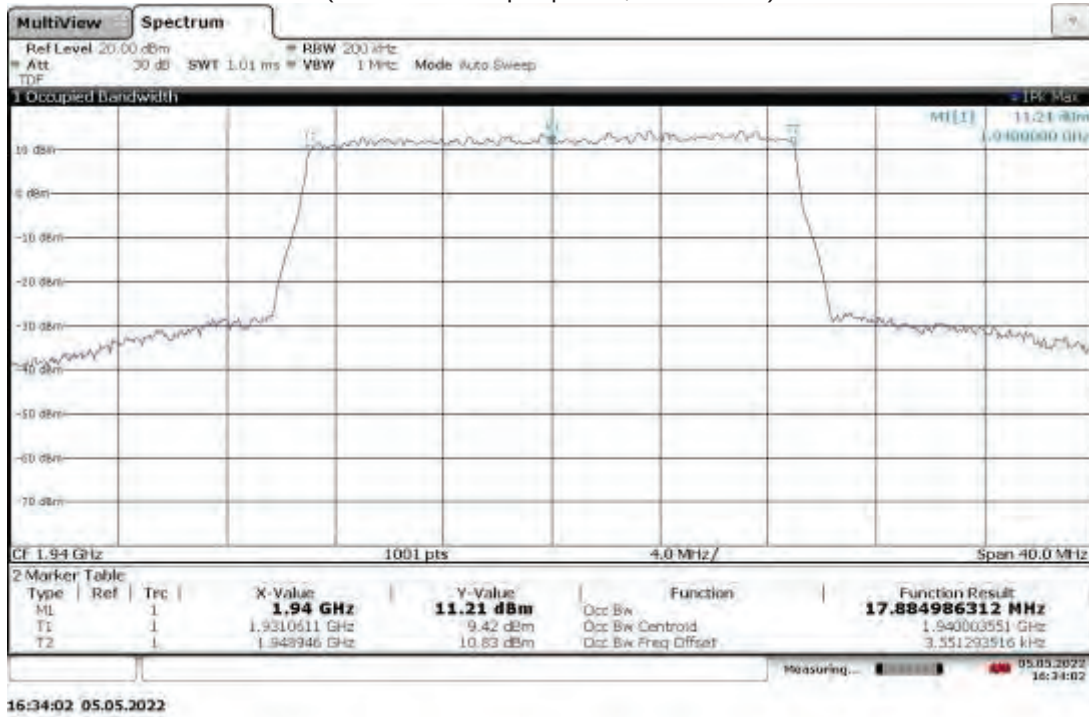
Slot 0 (Band 2), ANT0, Modulation: 64QAM, Bandwidth: 20 MHz Low Ch. 1940 MHz, 10 °C (4G LTE)
(worst-case output power, 22.69 dBm)



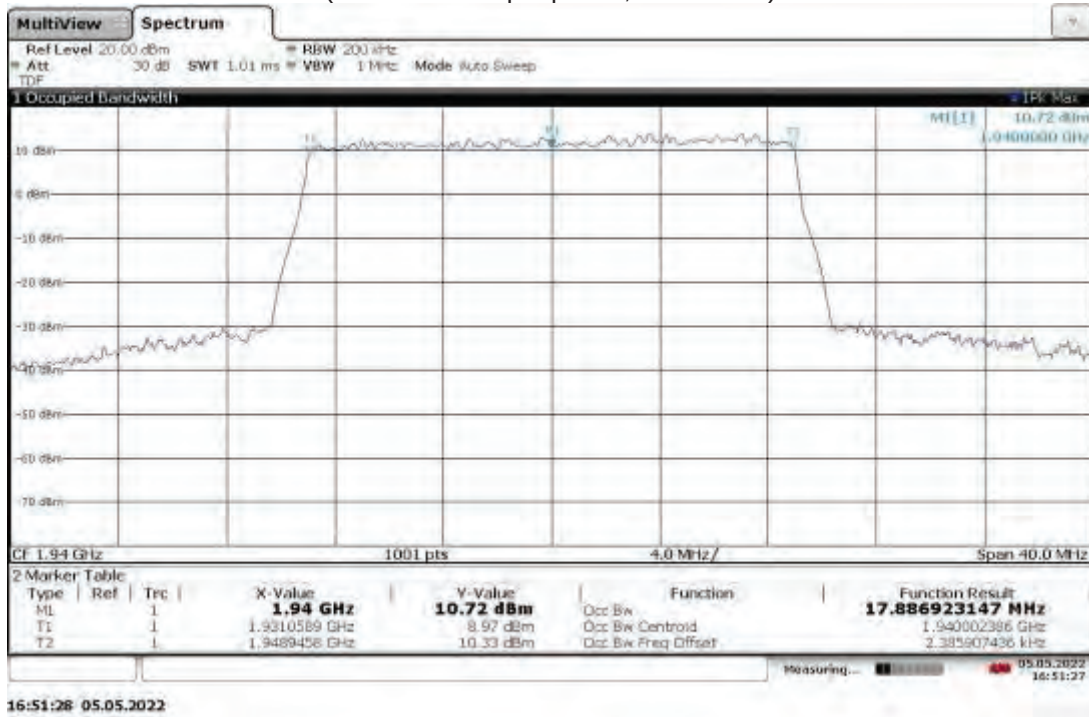
Slot 0 (Band 2), ANT0, Modulation: 64QAM, Bandwidth: 20 MHz Low Ch. 1940 MHz, 20 °C (4G LTE)
(worst-case output power, 22.69 dBm)



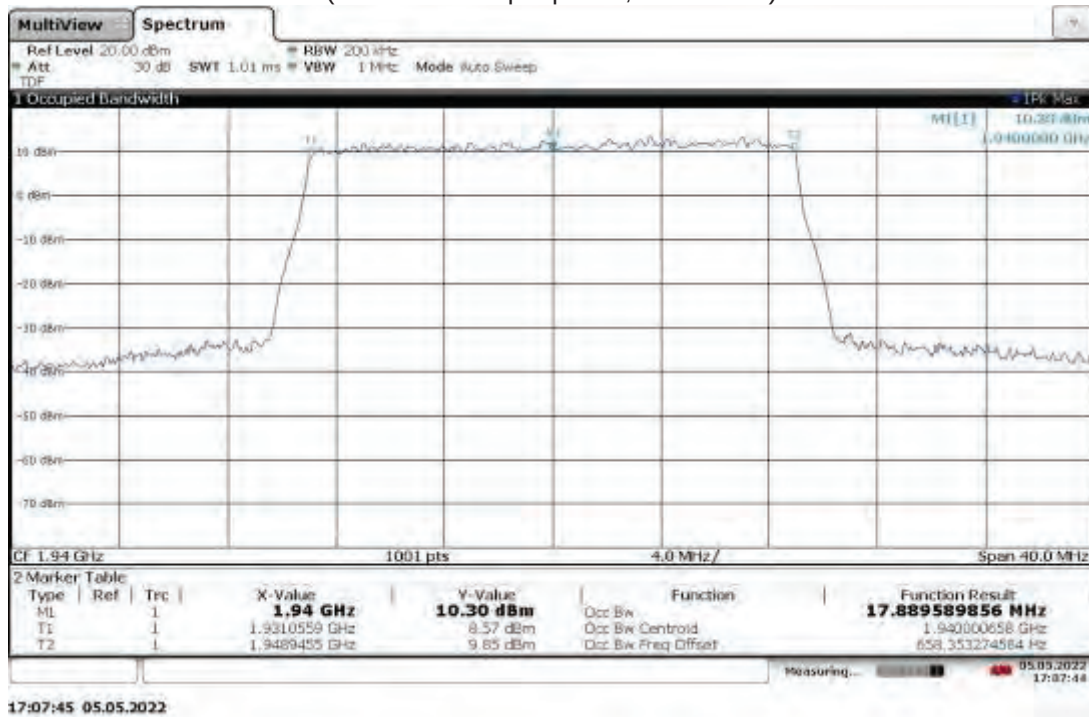
Slot 0 (Band 2), ANT0, Modulation: 64QAM, Bandwidth: 20 MHz Low Ch. 1940 MHz, 30 °C (4G LTE)
(worst-case output power, 22.69 dBm)



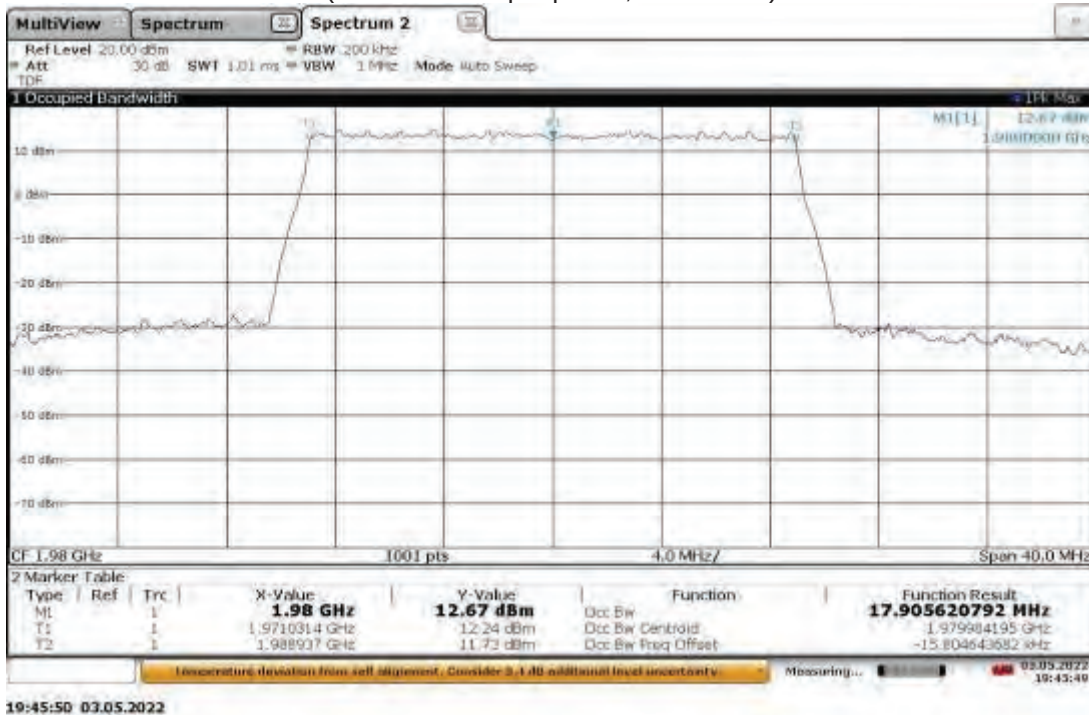
Slot 0 (Band 2), ANT0, Modulation: 64QAM, Bandwidth: 20 MHz Low Ch. 1940 MHz, 40 °C (4G LTE)
(worst-case output power, 22.69 dBm)



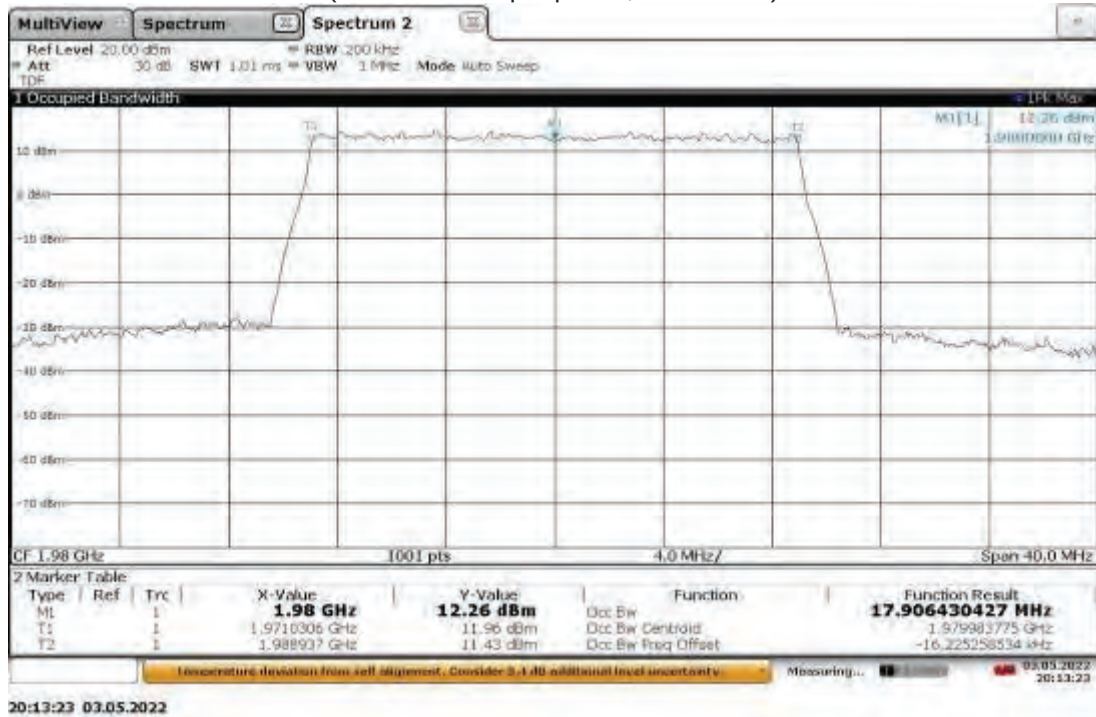
Slot 0 (Band 2), ANT0, Modulation: 64QAM, Bandwidth: 20 MHz Low Ch. 1940 MHz, 50 °C (4G LTE)
(worst-case output power, 22.69 dBm)



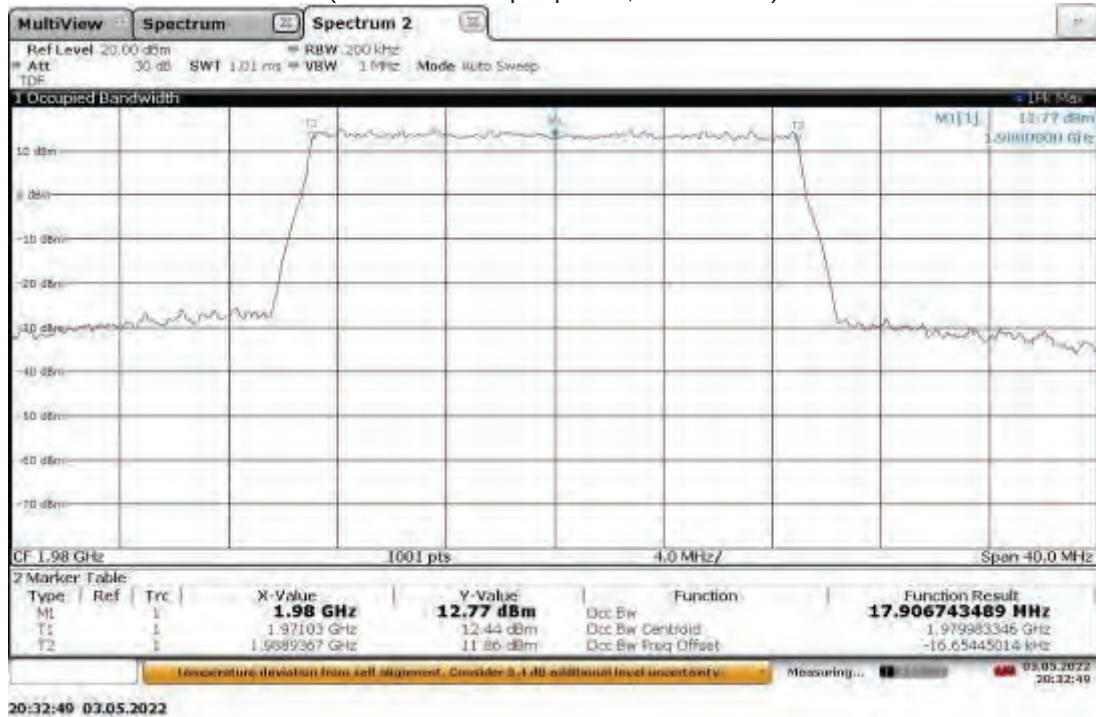
Slot 0 (Band 2), ANT0, Modulation: 256QAM, Bandwidth: 20 MHz High Ch. 1980 MHz, 0 °C (4G LTE)
(worst-case output power, 21.73 dBm)



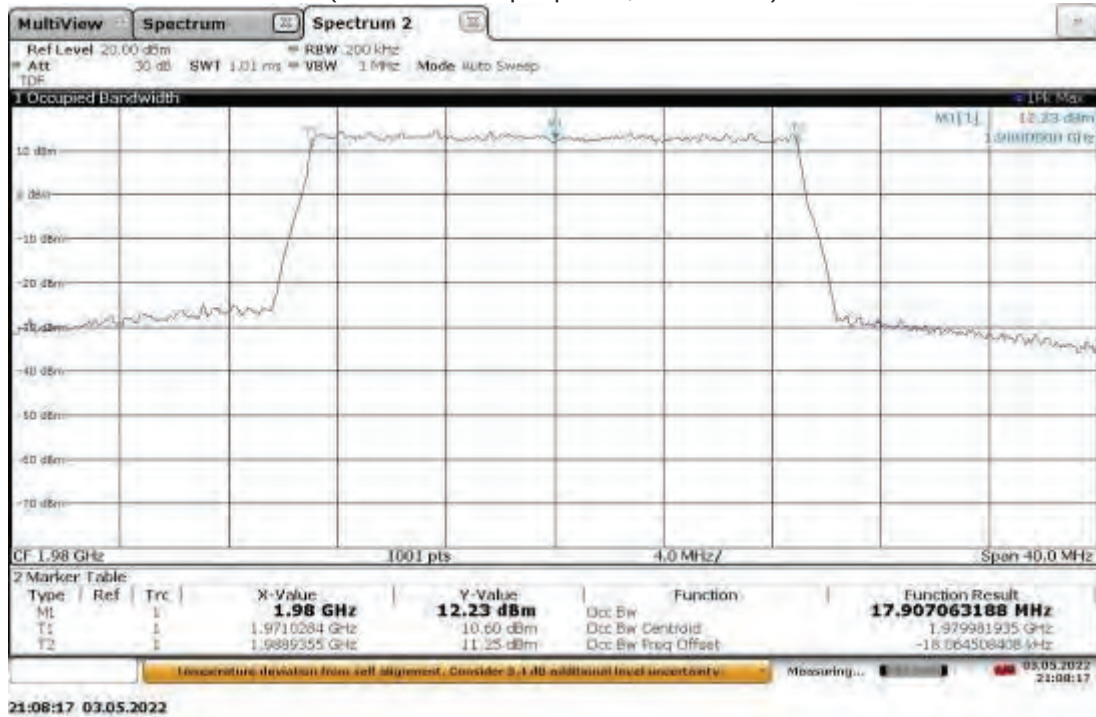
Slot 0 (Band 2), ANT0, Modulation: 256QAM, Bandwidth: 20 MHz High Ch. 1980 MHz, -10 °C (4G LTE)
(worst-case output power, 21.73 dBm)



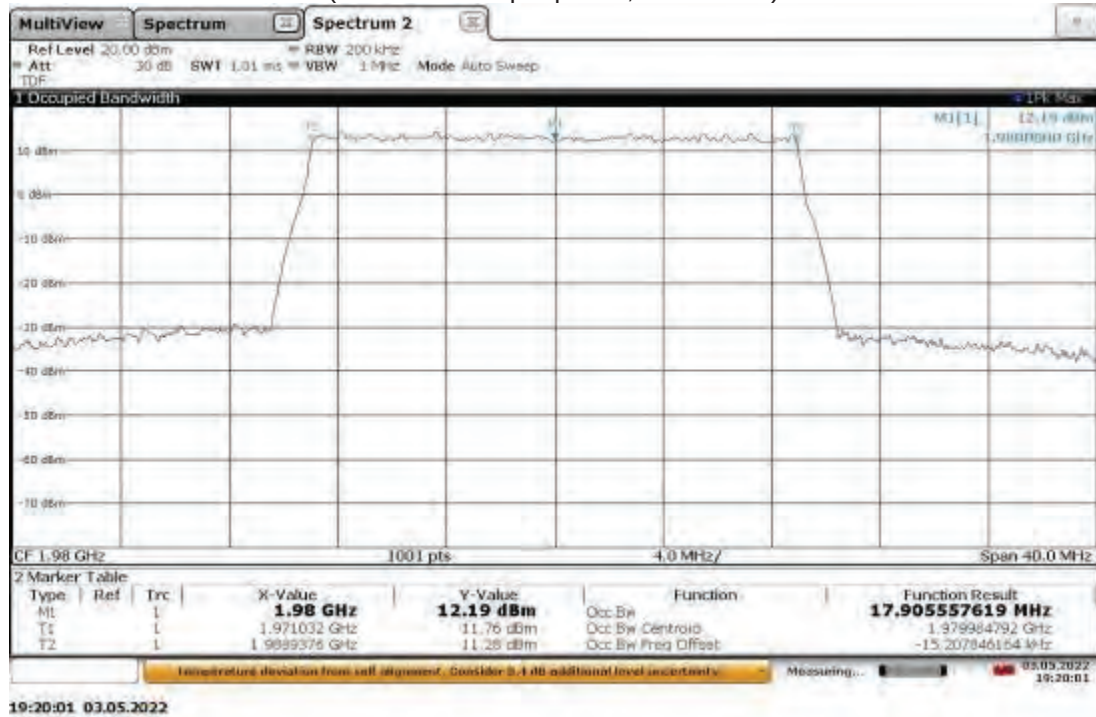
Slot 0 (Band 2), ANT0, Modulation: 256QAM, Bandwidth: 20 MHz High Ch. 1980 MHz, -20 °C (4G LTE)
(worst-case output power, 21.73 dBm)



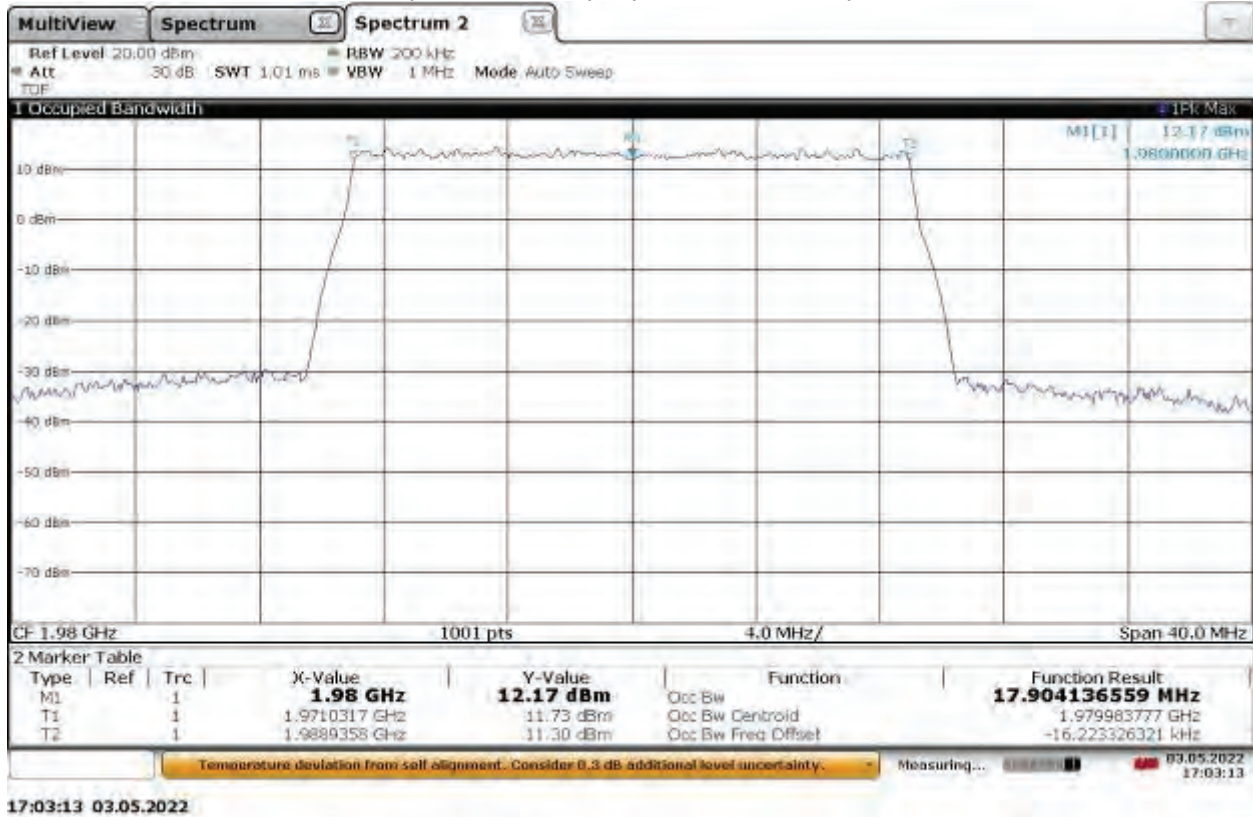
Slot 0 (Band 2), ANT0, Modulation: 256QAM, Bandwidth: 20 MHz High Ch. 1980 MHz, -30 °C (4G LTE)
(worst-case output power, 21.73 dBm)



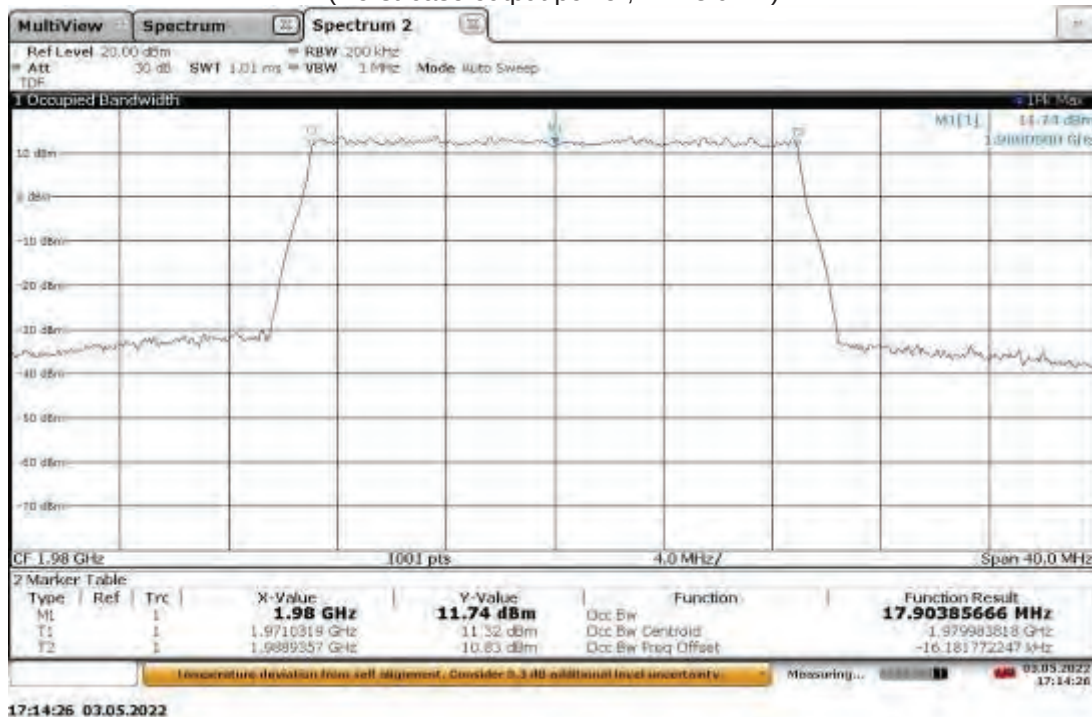
Slot 0 (Band 2), ANT0, Modulation: 256QAM, Bandwidth: 20 MHz High Ch. 1980 MHz, 10 °C (4G LTE)
(worst-case output power, 21.73 dBm)



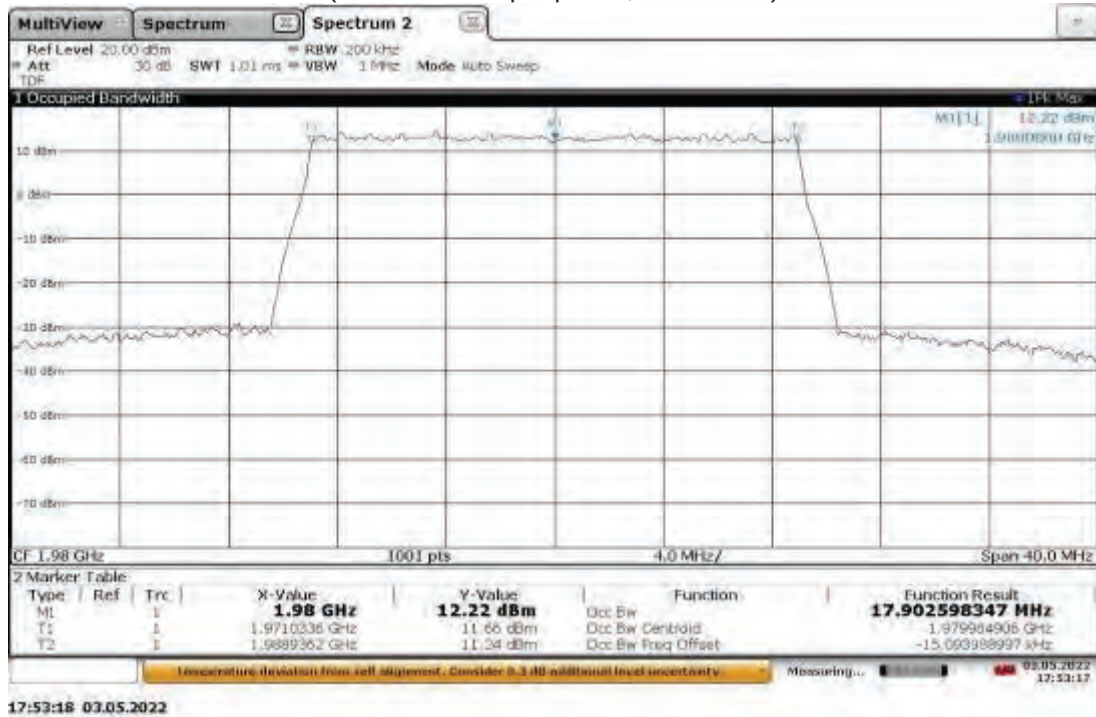
Slot 0 (Band 2), ANT0, Modulation: 256QAM, Bandwidth: 20 MHz High Ch. 1980 MHz, 20 °C (4G LTE)
(worst-case output power, 21.73 dBm)



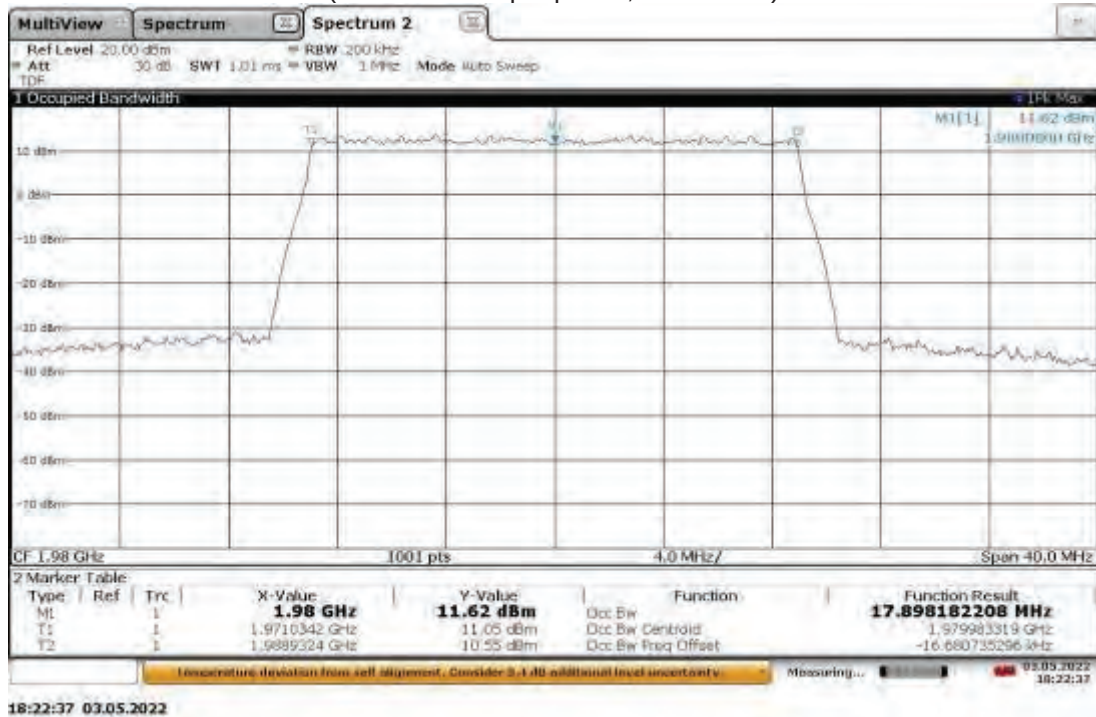
Slot 0 (Band 2), ANT0, Modulation: 256QAM, Bandwidth: 20 MHz High Ch. 1980 MHz, 30 °C (4G LTE)
(worst-case output power, 21.73 dBm)



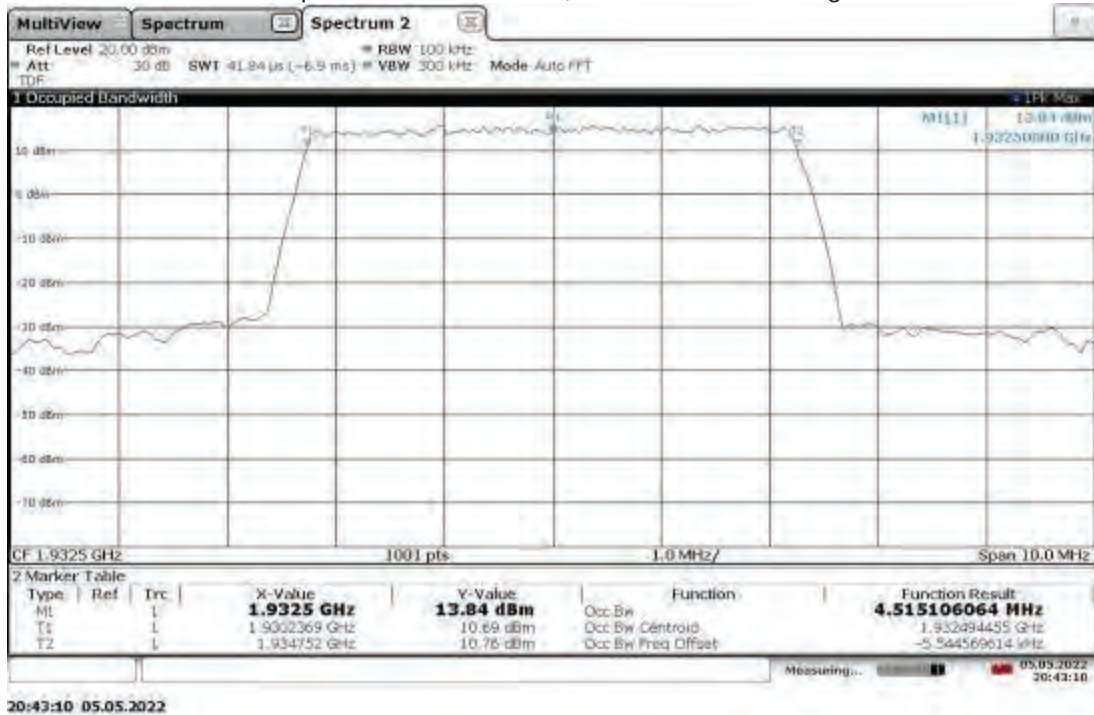
Slot 0 (Band 2), ANT0, Modulation: 256QAM, Bandwidth: 20 MHz High Ch. 1980 MHz, 40 °C (4G LTE)
(worst-case output power, 21.73 dBm)



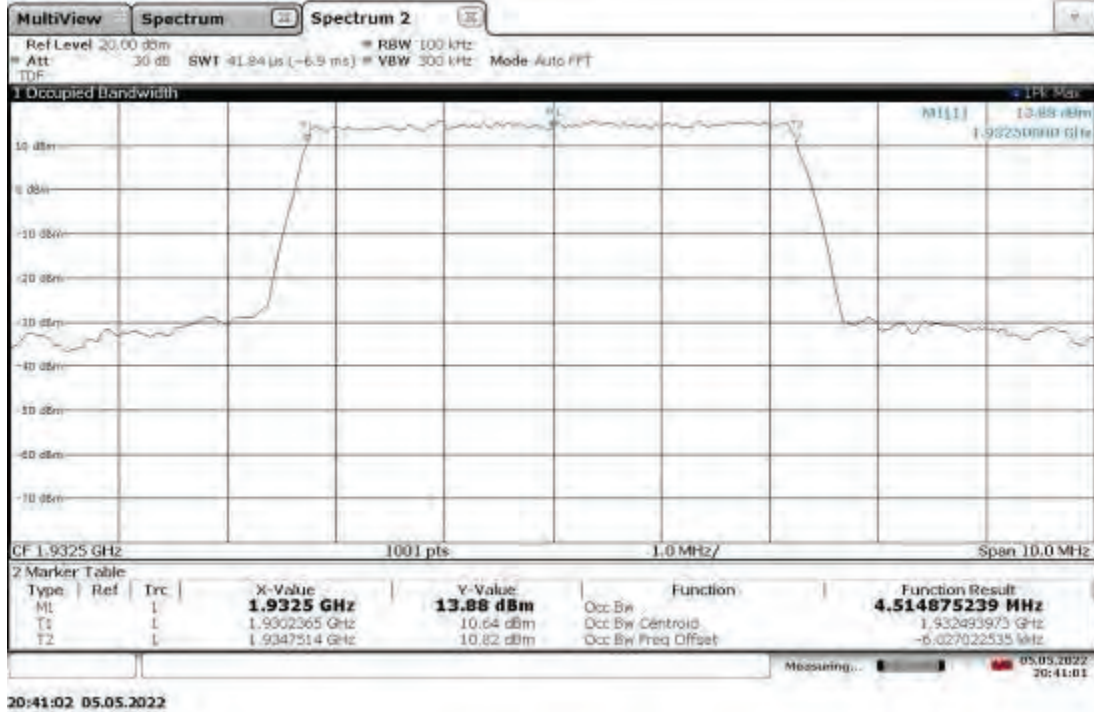
Slot 0 (Band 2), ANT0, Modulation: 256QAM, Bandwidth: 20 MHz High Ch. 1980 MHz, 50 °C (4G LTE)
(worst-case output power, 21.73 dBm)



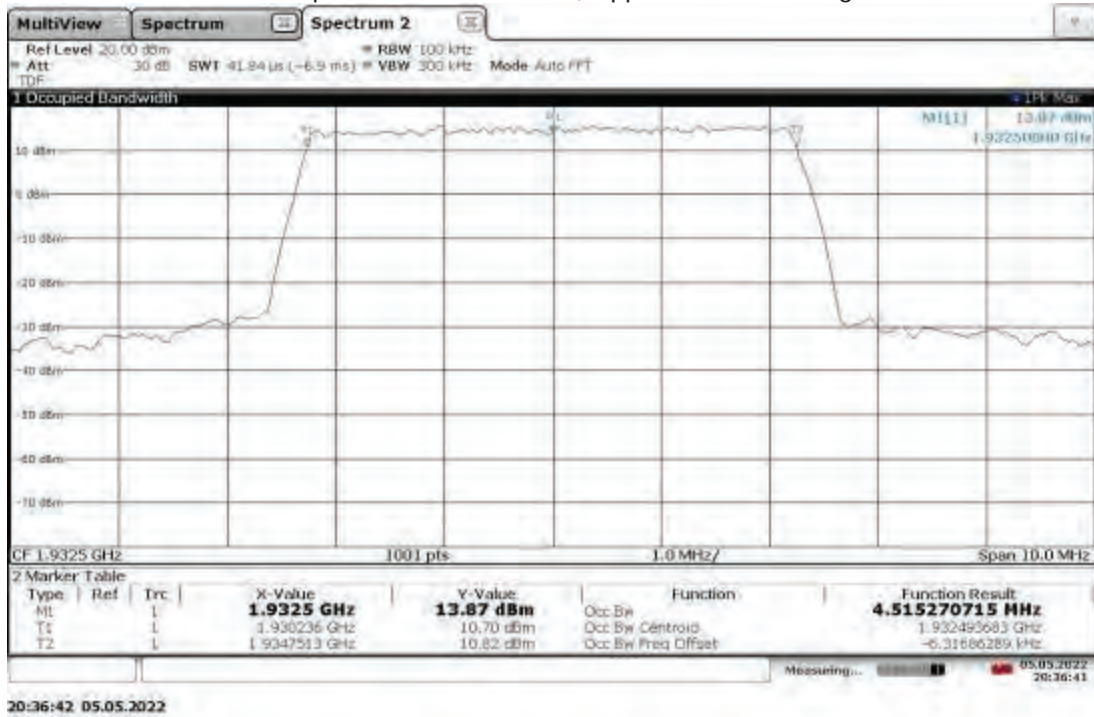
Slot 0 (Band 2), ANT0, Modulation: 256, QAM, Bandwidth: 5 MHz, Low Channel 1932.5 MHz (4G LTE)
Worst-case Output Power: 21.76 dBm, Lower Extreme Voltage: 41.1 VDC



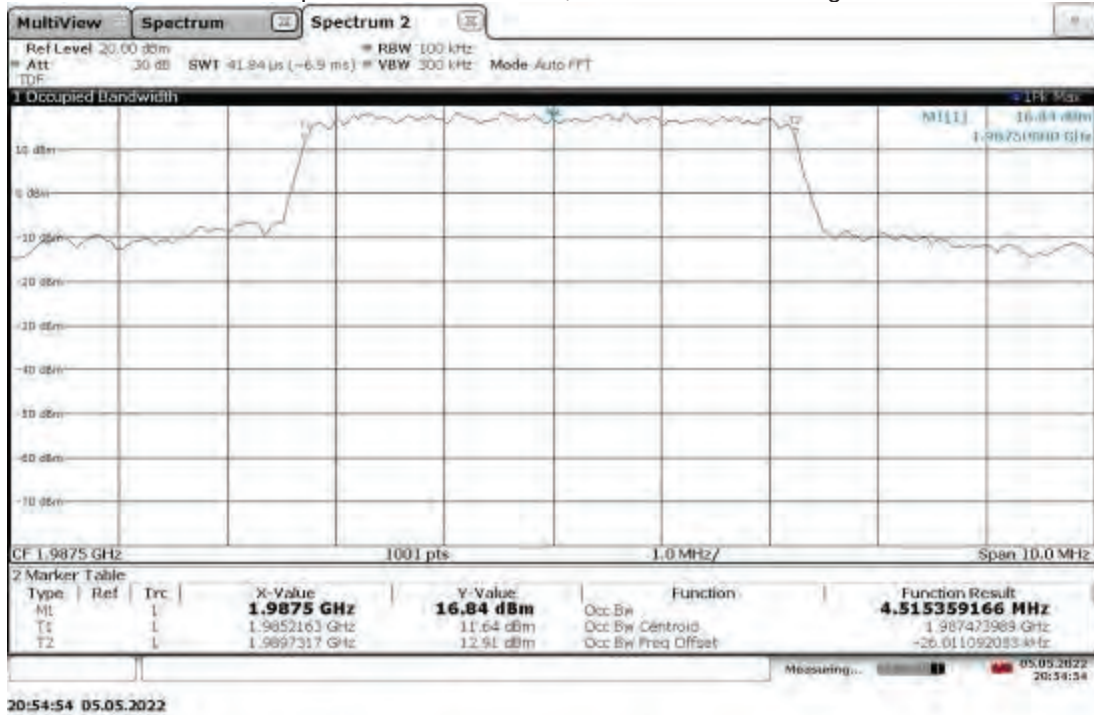
Slot 0 (Band 2), ANT0, Modulation: 256, QAM, Bandwidth: 5 MHz, Low Channel 1932.5 MHz (4G LTE)
Worst-case Output Power: 21.76 dBm, Nominal Voltage: 48 VDC



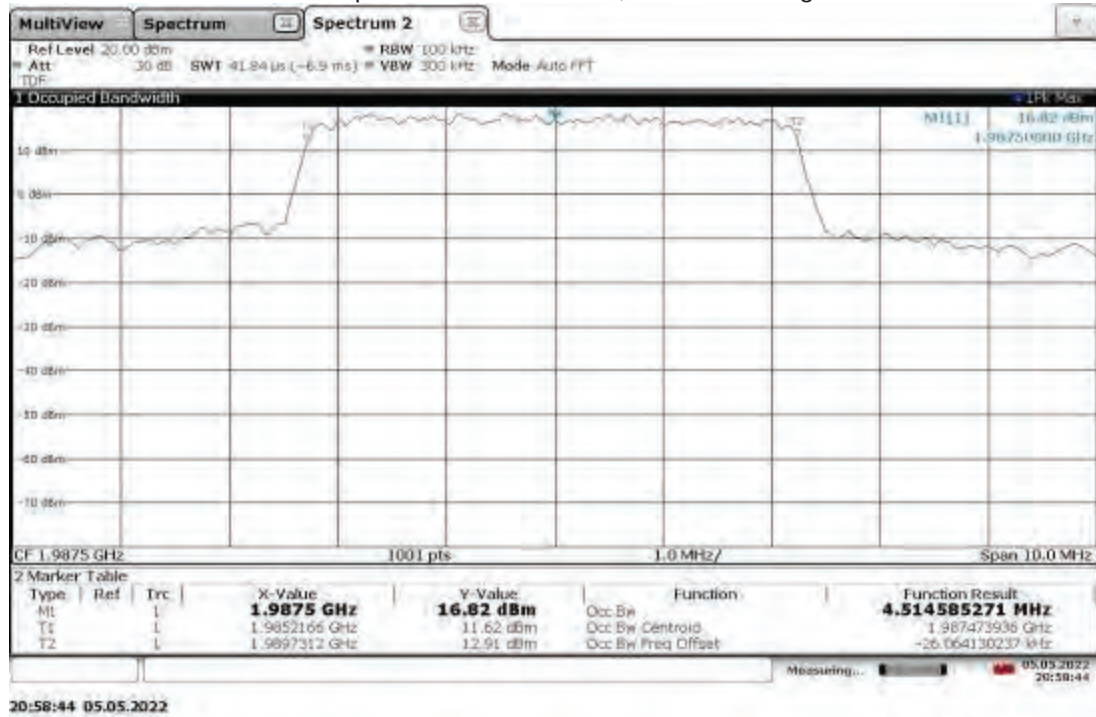
Slot 0 (Band 2), ANT0, Modulation: 256, QAM, Bandwidth: 5 MHz, Low Channel 1932.5 MHz (4G LTE)
Worst-case Output Power: 21.76 dBm, Upper Extreme Voltage: 57 VDC



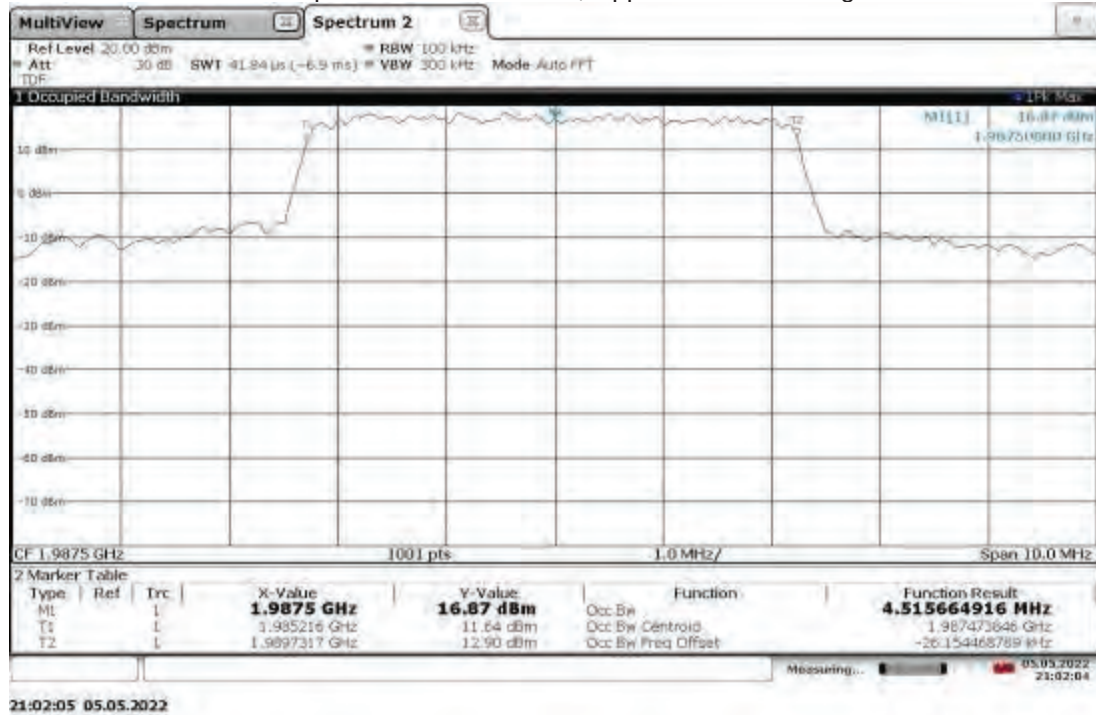
Slot 0 (Band 2), ANT1, Modulation: 16QAM, Bandwidth: 5 MHz, High Channel 1987.5 MHz (4G LTE)
Worst-case Output Power: 22.97 dBm, Lower Extreme Voltage: 41.1 VDC



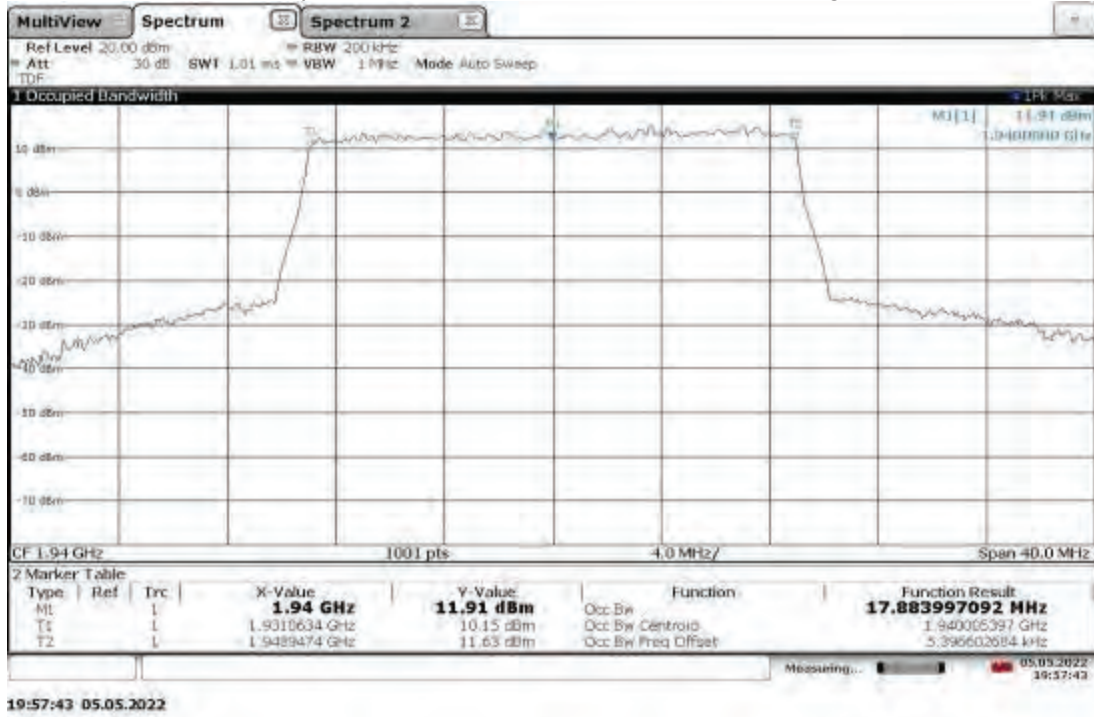
Slot 0 (Band 2), ANT1, Modulation: 16QAM, Bandwidth: 5 MHz, High Channel 1987.5 MHz (4G LTE)
Worst-case Output Power: 22.97 dBm, Nominal Voltage: 48 VDC



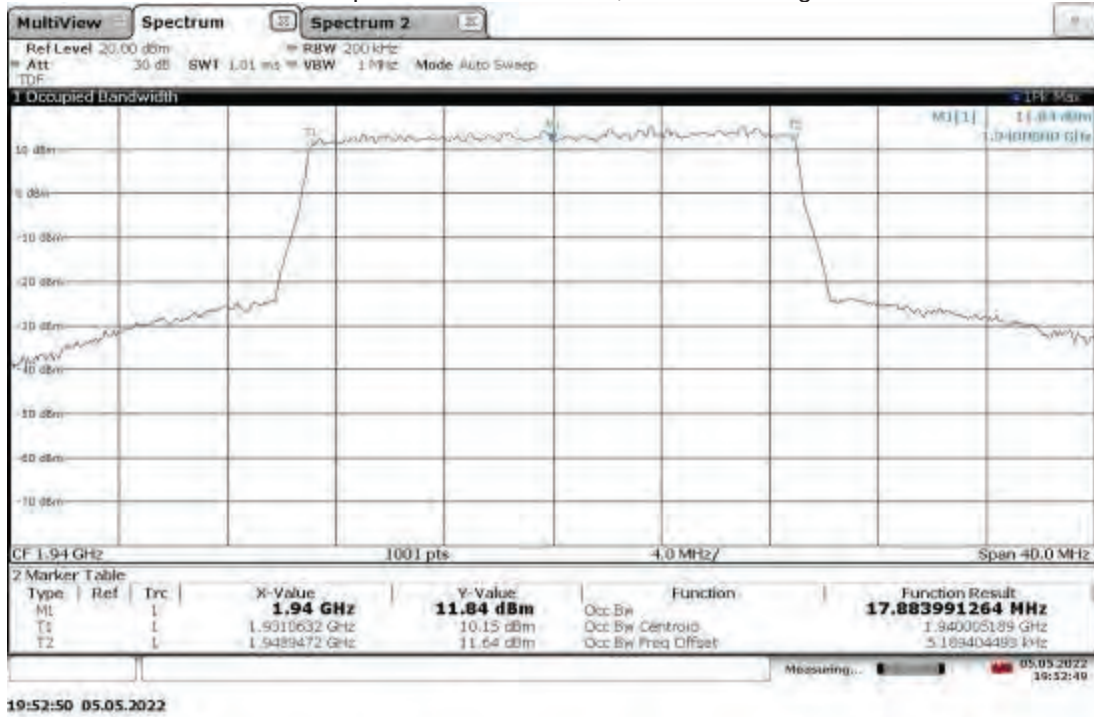
Slot 0 (Band 2), ANT1, Modulation: 16QAM, Bandwidth: 5 MHz, High Channel 1987.5 MHz (4G LTE)
Worst-case Output Power: 22.97 dBm, Upper Extreme Voltage: 57 VDC



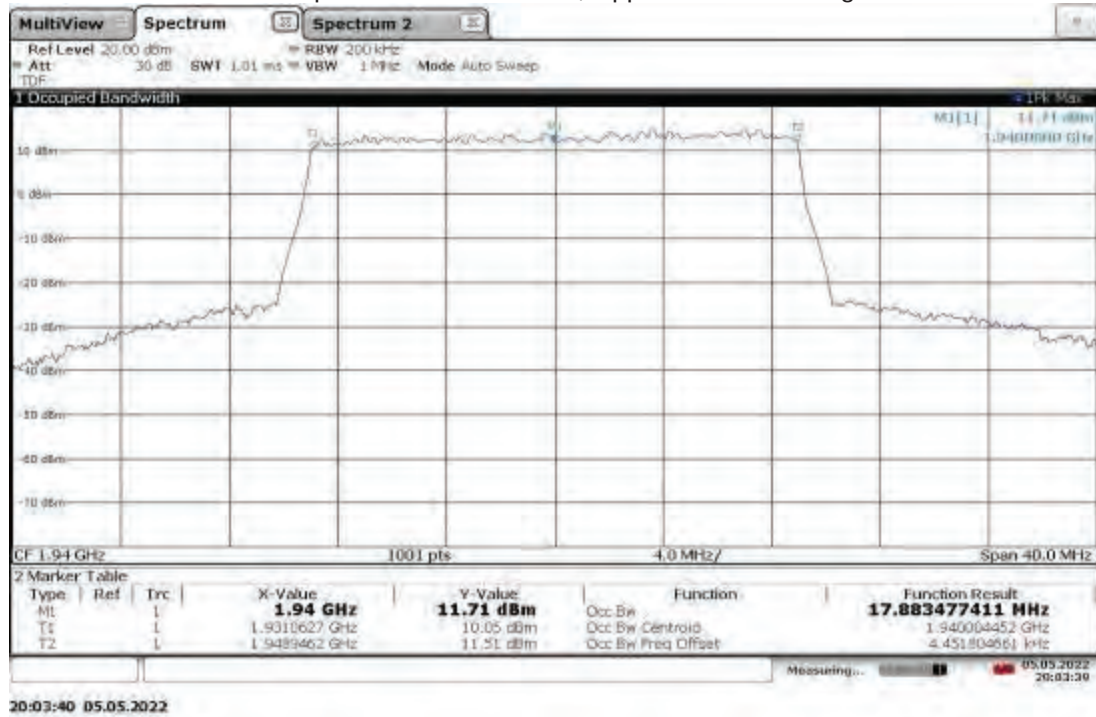
Slot 0 (Band 2), ANT0, Modulation: 64QAM, Bandwidth: 20 MHz, Low Channel 1940 MHz (4G LTE)
Worst-case Output Power: 22.69 dBm, Lower Extreme Voltage: 41.1 VDC



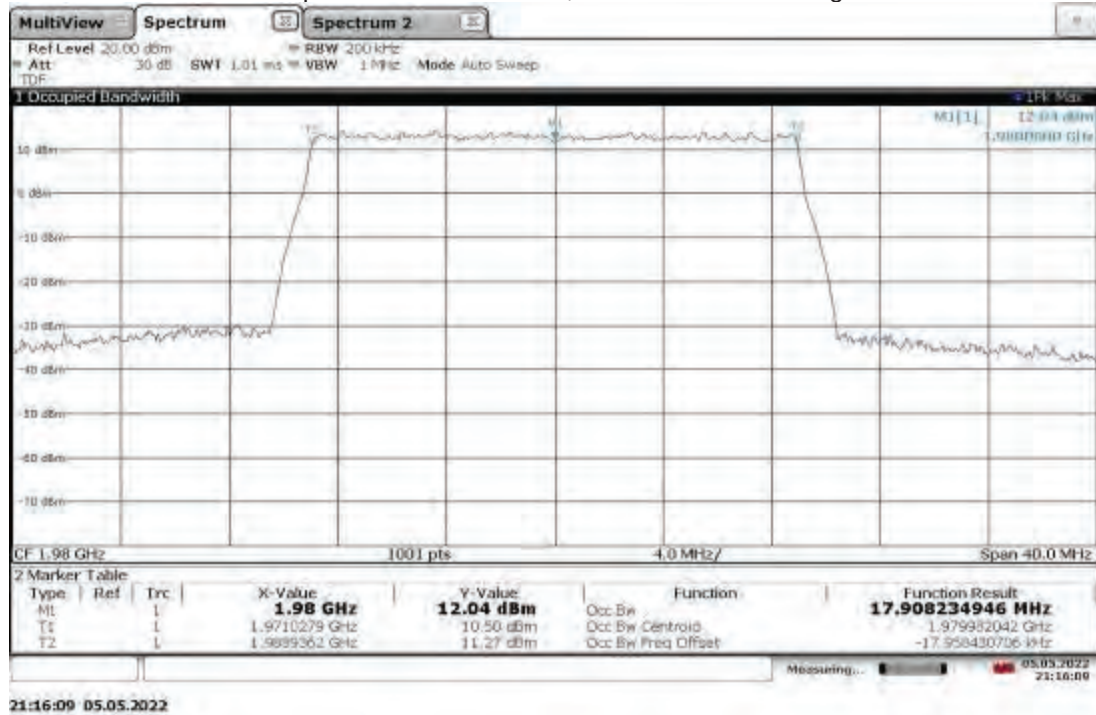
Slot 0 (Band 2), ANT0, Modulation: 64QAM, Bandwidth: 20 MHz, Low Channel 1940 MHz (4G LTE)
Worst-case Output Power: 22.69 dBm, Nominal Voltage: 48 VDC



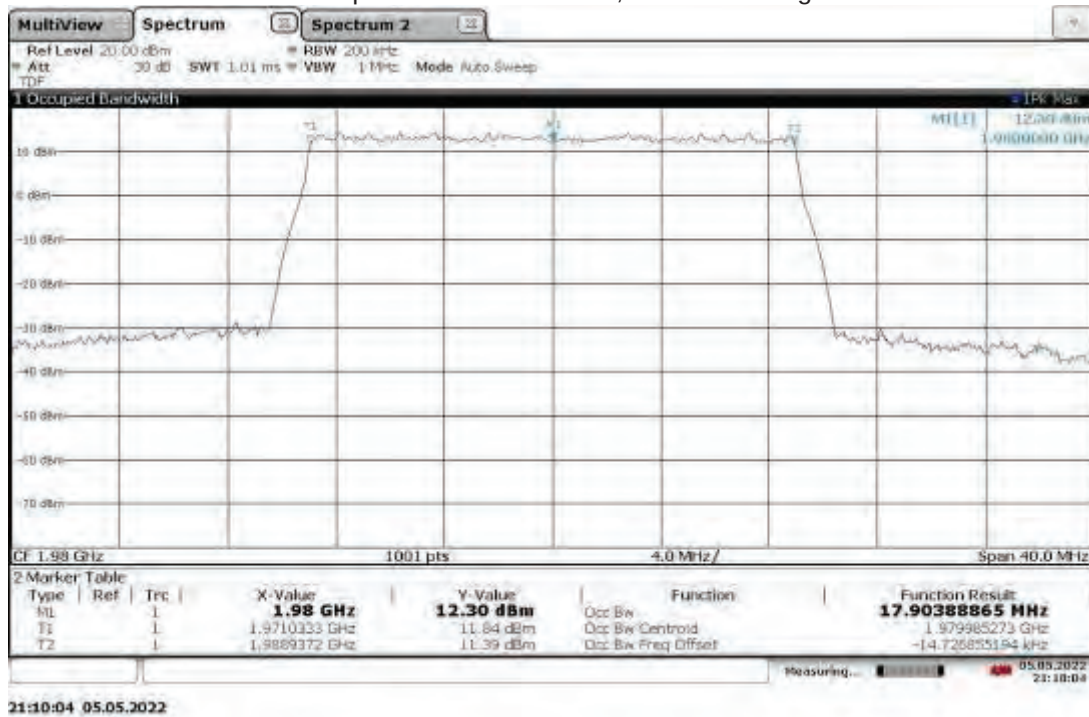
Slot 0 (Band 2), ANT0, Modulation: 64QAM, Bandwidth: 20 MHz, Low Channel 1940 MHz (4G LTE)
Worst-case Output Power: 22.69 dBm, Upper Extreme Voltage: 57 VDC



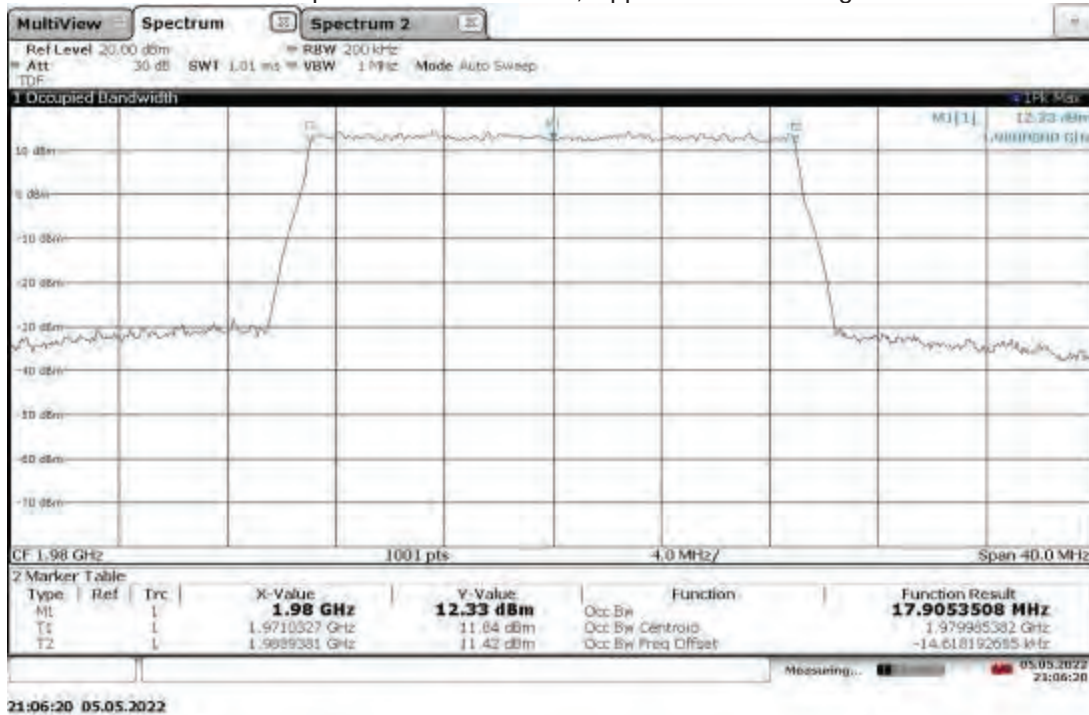
Slot 0 (Band 2), ANT0, Modulation: 256QAM, Bandwidth: 20 MHz, High Channel 1980 MHz (4G LTE)
Worst-case Output Power: 22.73 dBm, Lower Extreme Voltage: 41.1 VDC



Slot 0 (Band 2), ANT0, Modulation: 256QAM, Bandwidth: 20 MHz, High Channel 1980 MHz (4G LTE)
Worst-case Output Power: 22.73 dBm, Nominal Voltage: 48 VDC



Slot 0 (Band 2), ANT0, Modulation: 256QAM, Bandwidth: 20 MHz, High Channel 1980 MHz (4G LTE)
Worst-case Output Power: 22.73 dBm, Upper Extreme Voltage: 57 VDC



Test Personnel: Kouma Sinn *KPS*
Supervising/Reviewing
Engineer:
(Where Applicable) N/A

Test Date: 05/03/2022-05/05/2022

Product Standard: FCC Part 24
Input Voltage: 48VDC (POE)

Limit Applied: See report section 10.3

Pretest Verification w/
Ambient Signals or
BB Source: N/A

Ambient Temperature: N/A

Relative Humidity: N/A

Atmospheric Pressure: N/A

Deviations, Additions, or Exclusions: None

11 Transmitter spurious emissions

11.1 Method

Tests are performed in accordance with ANSI C63.26 and CFR47 FCC Parts 2.1051, 2.1053, 2.1057, and 24.

TEST SITE: EMC Lab & 10m ALSE

The EMC Lab has one Semi-anechoic Chamber and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference ground-planes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

The 10m ALSE is 13m (Length) x 21m (Depth) x 10m (Height) with the effective size in terms of space from the tips of the absorber is 12m (Length) x 20m (Depth) x 8.5m (Height). This chamber achieves broadband performance using a unique arrangement of hybrid and ferrite tile absorber. This chamber has a built in 3m diameter turntable (Embedded type). The metal structure of the table makes electrical connection around the entire circumference of the turntable to the ground plane with a metal brush type connection. The turntable is located on one end of the chamber and the antennas are mounted 3 and 10 meters away at the other end of the chamber on the adjustable an Antenna Mast. The antenna mast is a non-conductive bore sighted type with remote control of antenna height and polarization. The Antenna Mast and the turntable can be remotely controlled through the controller located in the adjacent Control room. A Styrofoam table 80 cm high is used for table-top equipment.

Measurement Uncertainty

Measurement	Frequency Range	Expanded Uncertainty (k=2)	Ucisp
Radiated Emissions, 10m	30-1000 MHz	4.6dB	6.3 dB
Radiated Emissions, 3m	30-1000 MHz	5.3 dB	6.3 dB
Radiated Emissions, 3m	1-6 GHz	4.5 dB	5.2 dB
Radiated Emissions, 3m	6-15 GHz	5.2 dB	5.5 dB
Radiated Emissions, 3m	15-18 GHz	5.0 dB	5.5 dB
Radiated Emissions, 3m	18-40 GHz	5.0 dB	5.5 dB

As shown in the table above our radiated emissions U_{lab} is less than the corresponding U_{CISPR} reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11.

Sample Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

Where

- FS = Field Strength in dB μ V/m
- RA = Receiver Amplitude (including preamplifier) in dB μ V
- CF = Cable Attenuation Factor in dB
- AF = Antenna Factor in dB
- AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 dB μ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

$$RA = 52.0 \text{ dB}\mu\text{V}$$

$$AF = 7.4 \text{ dB/m}$$

$$CF = 1.6 \text{ dB}$$

$$AG = 29.0 \text{ dB}$$

$$FS = 32 \text{ dB}\mu\text{V/m}$$

To convert from dB μ V to μ V or mV the following was used:

$$UF = 10^{(NF / 20)} \text{ where } UF = \text{Net Reading in } \mu\text{V}$$
$$NF = \text{Net Reading in dB}\mu\text{V}$$

Example:

$$FS = RA + AF + CF - AG = 52.0 + 7.4 + 1.6 - 29.0 = 32.0$$

$$UF = 10^{(32 \text{ dB}\mu\text{V} / 20)} = 39.8 \mu\text{V/m}$$

Alternately, when BAT-EMC Emission Software is used, the "Level" includes all losses and gains and is compared directly in the "Margin" column to the "Limit". The "Correction" includes Antenna Factor, Preamp, and Cable Loss. These are already accounted for in the "Level" column.

11.2 Test Equipment Used:

Test equipment used for antenna port conducted measurements

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV005'	Weather Station	Davis	6250	MS191218083	02/11/2022	02/11/2023
ROS005-1'	Signal and Spectrum Analyzer	Rohde and Schwartz	FSW43	100646	11/02/2021	11/02/2022
CEN001'	DC-40GHz attenuator 20dB	Centric RF	C411-20	CEN001	01/26/2022	01/26/2023
CBLHF2012-2M-2'	2m 9kHz-40GHz Coaxial Cable - SET2	Huber & Suhner	SF102	252675002	02/10/2023	02/10/2023

Software Utilized:

Name	Manufacturer	Version
None	--	--

Test equipment used for radiated emissions from 9 kHz-30 MHz

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV007'	Weather Station Vantage Vue	Davis	6250	MS191212003	03/08/2022	03/08/2023
145-414'	Cables 145-400 145-403 145-405 145-409	Huber + Suhner	3m Track A cables	multiple	07/09/2021	07/09/2022
IW001'	2 meter cable	Insulated Wire	2801-NPS	001	09/23/2021	09/23/2022
IW002'	2 meter Armored cable	Insulated Wire	2800-NPS	002	09/23/2021	09/23/2022
IW003'	8.4 meter cable	Insulated Wire	2800-NPS	003	10/15/2022	10/15/2022
145108'	EMI Test Receiver (20Hz - 40GHz)	Rohde & Schwarz	ESIB40	100209	06/22/2021	06/22/2022
ETS003'	9kHz-30MHz Active Loop Antenna	ETS Lindgren	6502	00143396	08/26/2021	08/26/2022

Software Utilized:

Name	Manufacturer	Version
BAT-EMC	Nexio	3.18.0.16

Test equipment used for radiated emissions from 30-1000 MHz

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
IW001'	2 meter cable	Insulated Wire	2801-NPS	001	09/23/2021	09/23/2022
145106'	Bilog Antenna (30MHz - 5GHz)	Sunol Sciences	JB5	A111003	07/15/2021	07/15/2022
HS002'	DC-18GHz cable 1.5M long	Huber & Suhner	SucoFlex 106A	HS002	12/06/2021	12/06/2022
IW006'	DC-18GHz cable 8.4m long	Insulated Wire	2800-NPS	IW006	07/22/2021	07/22/2022
PRE11'	50dB gain pre-amp	Pasternack	PRE11	PRE11	09/02/2021	09/02/2022
DAV007'	Weather Station Vantage Vue	Davis	6250	MS191212003	03/08/2022	03/08/2023
145145'	Broadband Hybrid Antenna 30 MHz - 3 GHz	Sunol Sciences Corp.	JB3	A122313	06/09/2021	06/09/2022
145108'	EMI Test Receiver (20Hz - 40GHz)	Rohde & Schwarz	ESIB40	100209	06/22/2021	06/22/2022

Software Utilized:

Name	Manufacturer	Version
BAT-EMC	Nexio	3.18.0.16

Test equipment used for radiated emissions from 1-18 GHz

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV007'	Weather Station Vantage Vue	Davis	6250	MS191212003	03/08/2022	03/08/2023
145-414'	Cables 145-400 145-403 145-405 145-409	Huber + Suhner	3m Track A cables	multiple	07/09/2021	07/09/2022
IW001'	2 meter cable	Insulated Wire	2801-NPS	001	09/23/2021	09/23/2022
IW002'	2 meter Armored cable	Insulated Wire	2800-NPS	002	09/23/2021	09/23/2022
IW003'	8.4 meter cable	Insulated Wire	2800-NPS	003	10/15/2022	10/15/2022
145108'	EMI Test Receiver (20Hz - 40GHz)	Rohde & Schwarz	ESIB40	100209	06/22/2021	06/22/2022
ETS002'	1-18GHz DRG Horn Antenna	ETS Lindgren	3117	00143260	08/24/2021	08/24/2022
PRE12'	Pre-amplifier	Com Power	PAM-118A	18040117	12/06/2021	12/06/2022

Test equipment used for radiated emissions from 18-20 GHz

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV007'	Weather Station Vantage Vue	Davis	6250	MS191212003	03/08/2022	03/08/2023
PRE8'	PREAMPLIFIER 1- 40 GHz	MITEQ	NSP4000-NF	507145	12/27/2021	12/27/2022
CBLHF2012-5M-2'	5m 9kHz-40GHz Coaxial Cable - SET2	Huber & Suhner	SF102	252676002	02/16/2022	02/16/2023
CBLSHF202'	Cable, SMA - SMA, 9kHz-40GHz	Sucoflex (Huber Suhner)	104PE	CBLSHF202	01/21/2022	02/21/2023
ETS004'	18-40GHz horn antenna	ets004	3116C	00218579	03/11/2022	03/11/2023
ROS005-1'	Signal and Spectrum Analyzer	Rohde and Schwartz	FSW43	100646	11/02/2021	11/02/2022

11.3 Results:

The sample tested was found to Comply. Where a resolution bandwidth of less than 1 MHz was used (in some cases, 120 kHz or 100 kHz), more than 10 dB margin to the limit is shown. Since the two antenna ports transmit uncorrelated data streams and use cross polarized antennas, no adjustments to the test results were applied due to MIMO operation, per KDB 662911.

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

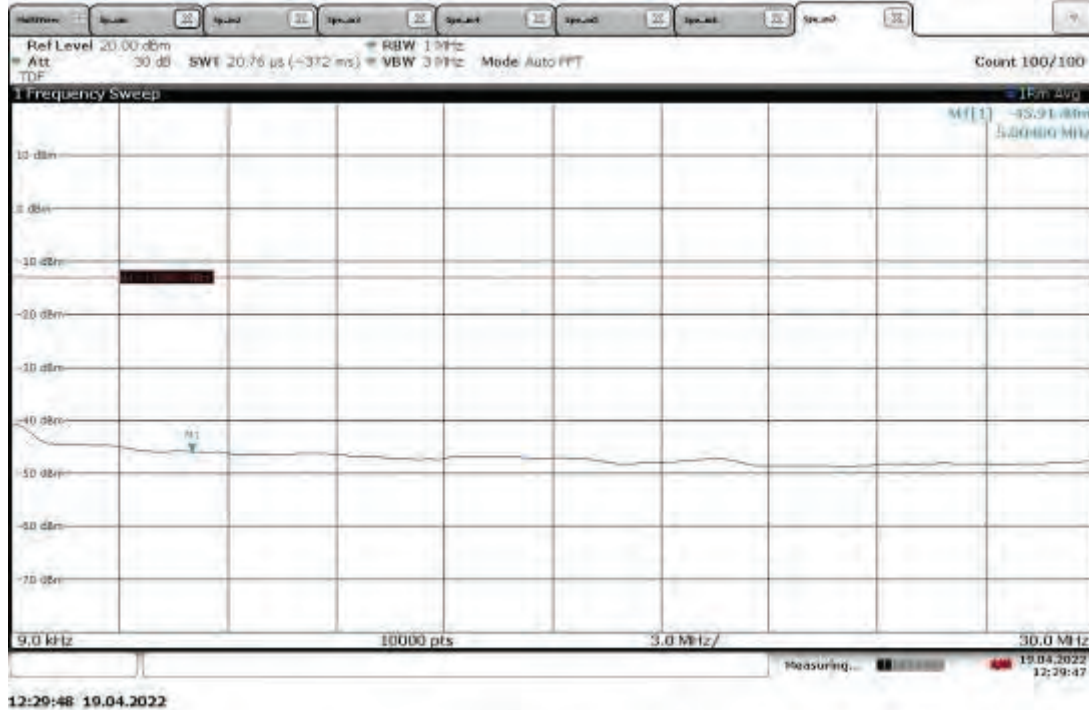
(b) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). 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.

11.4 Setup Photographs:

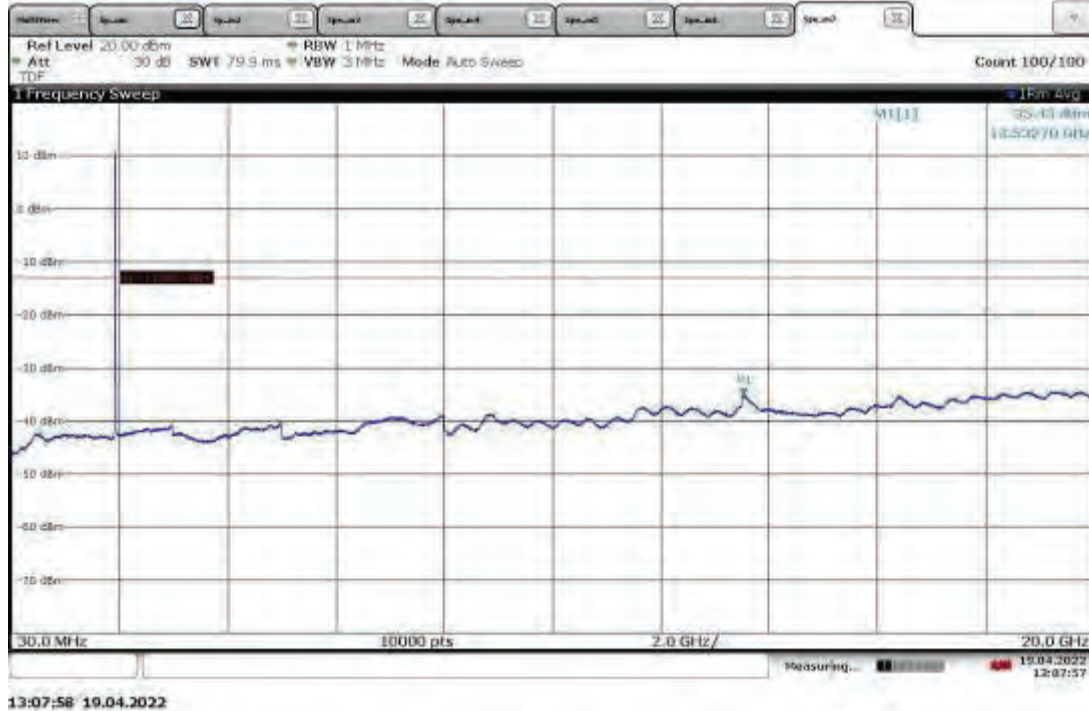
Confidential – Photos not included in this report

11.5 Plots/Data:

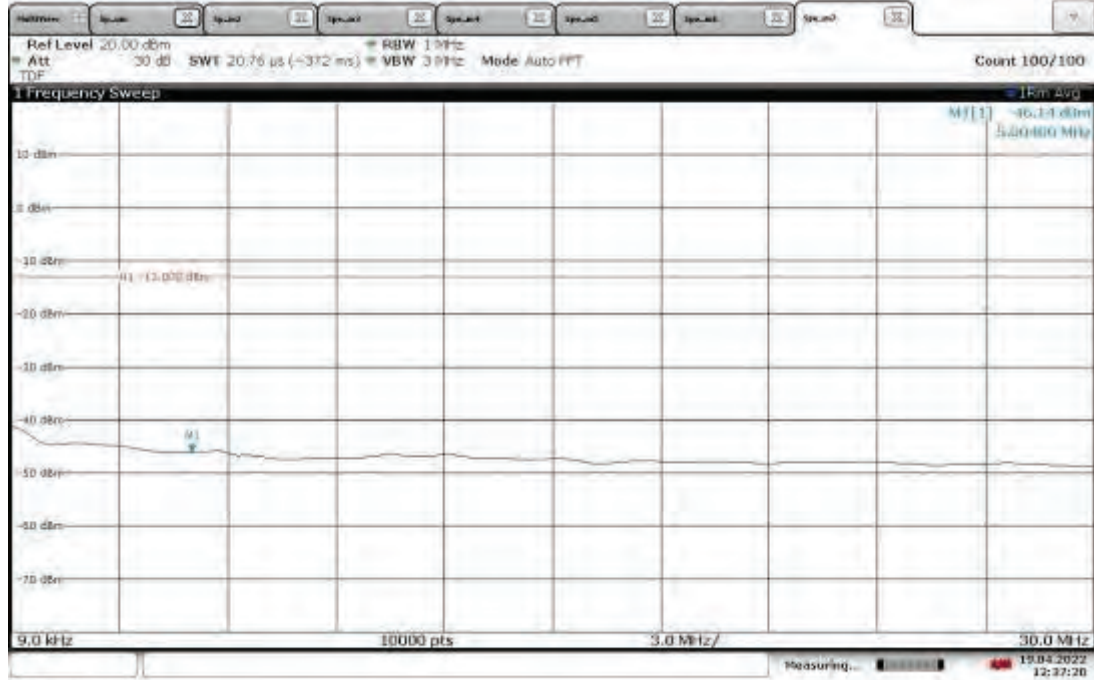
Low Channel 1940 MHz, Antenna Port (ANT0) Conducted Emissions, 9kHz-30MHz
Band 2 (4G LTE), BW 20 MHz, Modulation 64QAM (Worst-case output power, 22.69 dBm)



Low Channel 1940 MHz, Antenna Port (ANT0) Conducted Emissions, 30 MHz-20 GHz
Band 2 (4G LTE), BW 20 MHz, Modulation 64QAM (Worst-case output power, 22.69 dBm)

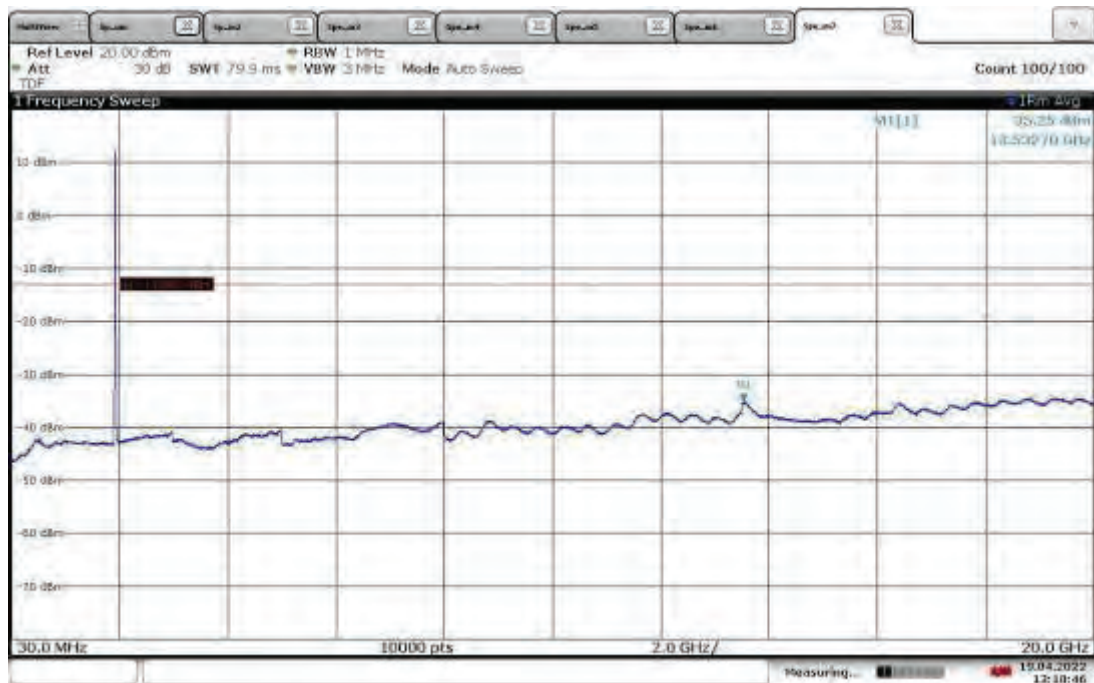


**Low Channel 1937.5 MHz, Antenna Port (ANT1) Conducted Emissions, 9 kHz-30 MHz
Band 2 (4G LTE), BW 15 MHz, Modulation QPSK (Worst-case output power, 22.55 dBm)**



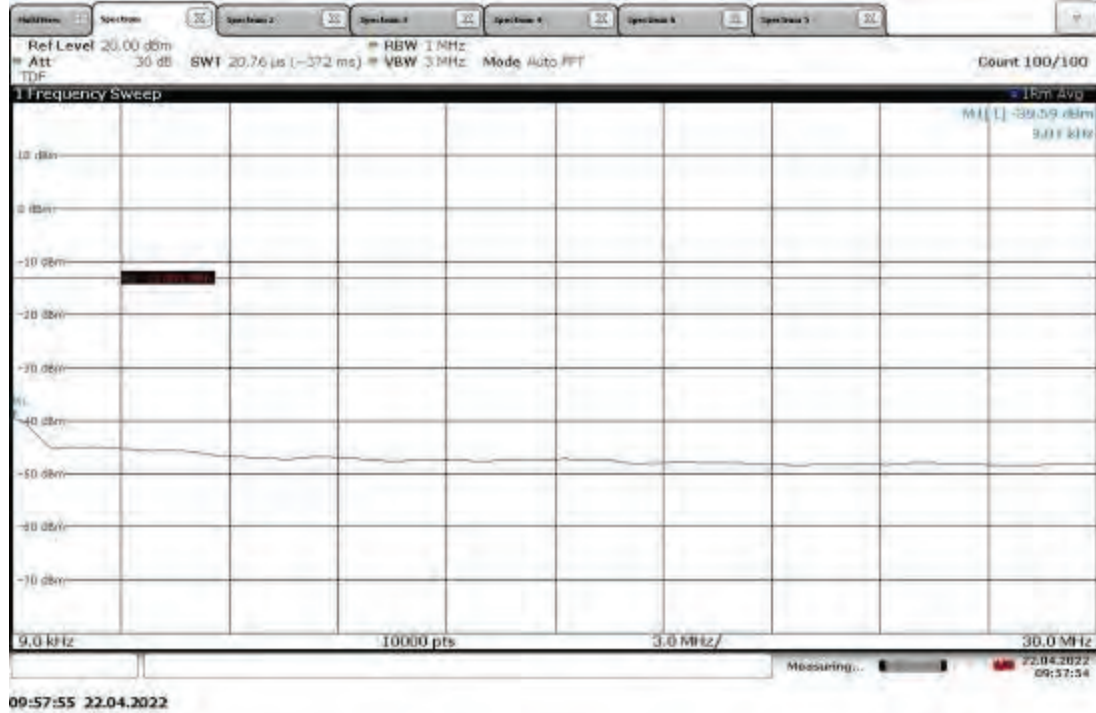
12:37:20 19.04.2022

**Low Channel 1937.5 MHz, Antenna Port (ANT1) Conducted Emissions, 30 MHz-20 GHz
Band 2 (4G LTE), BW 15 MHz, Modulation QPSK (Worst-case output power, 22.55 dBm)**

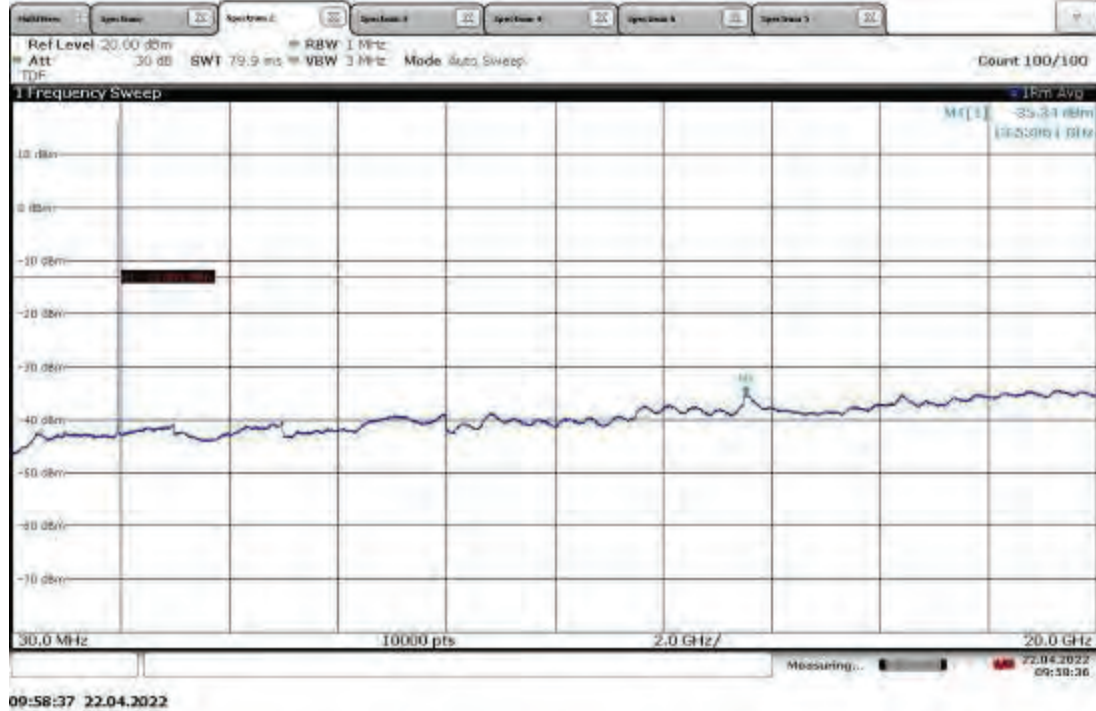


12:38:46 19.04.2022

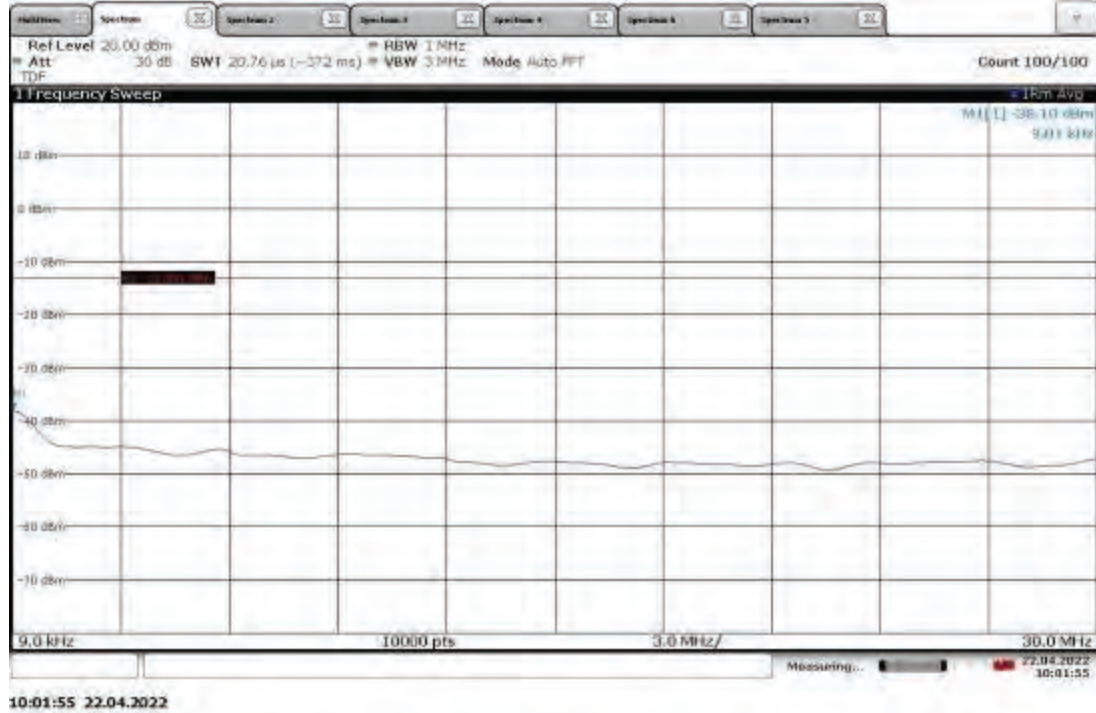
**Mid Channel 1960 MHz, Antenna Port (ANT0) Conducted Emissions, 9 kHz-30 MHz
Band 2 (4G LTE), BW 5 MHz, Modulation 16QAM (Worst-case output power, 22.55 dBm)**



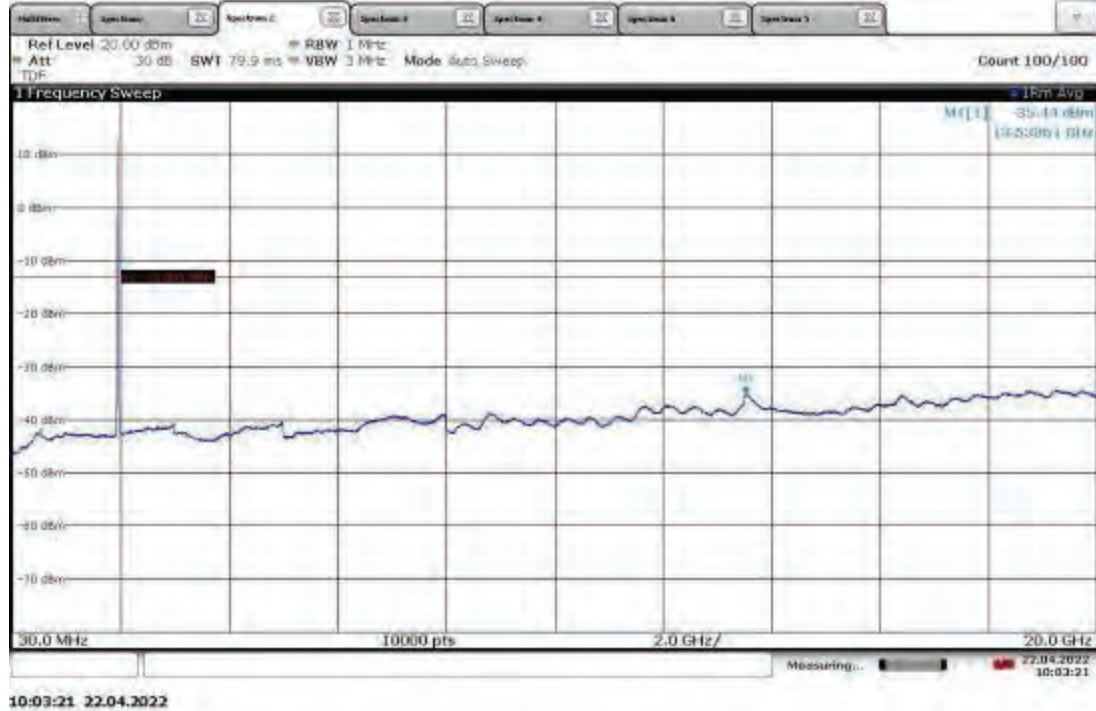
**Mid Channel 1960 MHz, Antenna Port (ANT0) Conducted Emissions, 30 MHz-20 GHz
Band 2 (4G LTE), BW 5 MHz, Modulation 16QAM (Worst-case output power, 22.55 dBm)**



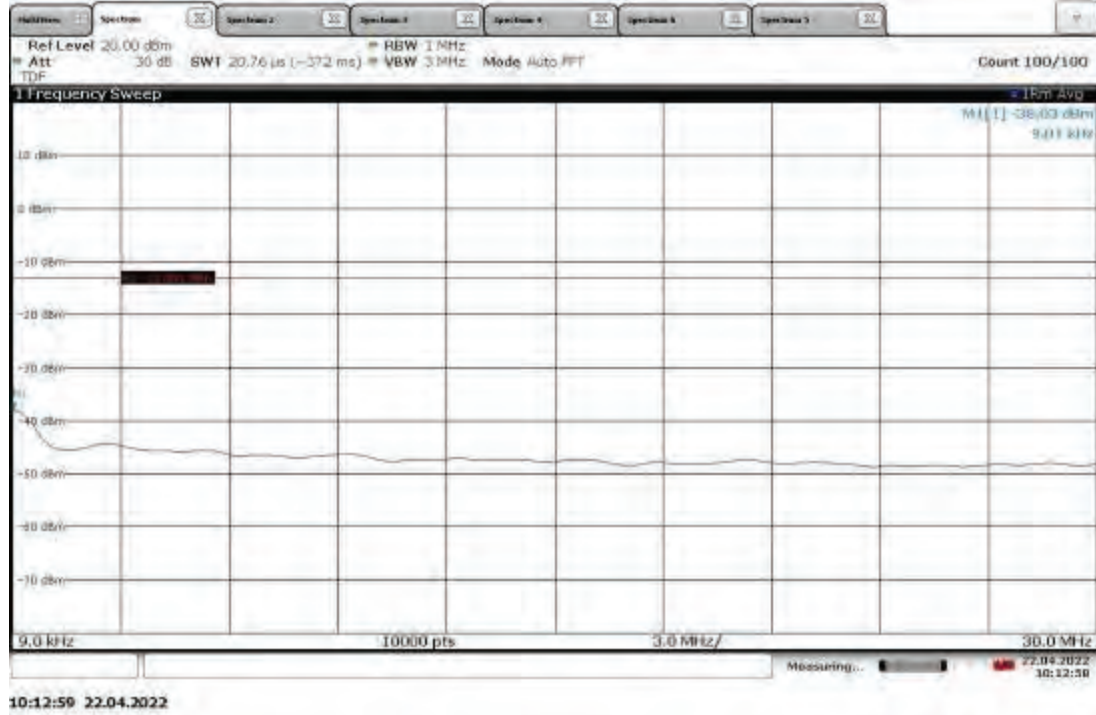
**Mid Channel 1960 MHz, Antenna Port (ANT1) Conducted Emissions, 9 kHz-30 MHz
Band 2 (4G LTE), BW 15 MHz, Modulation 16QAM (Worst-case output power, 22.77 dBm)**



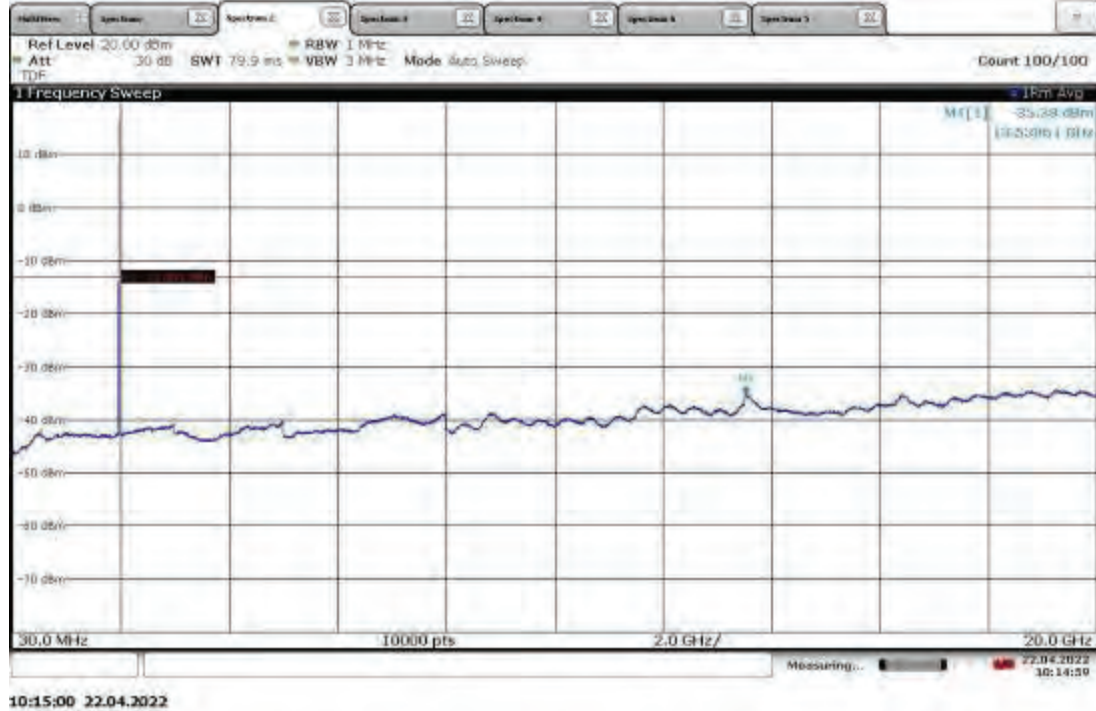
**Mid Channel 1960 MHz, Antenna Port (ANT1) Conducted Emissions, 30 MHz-20 GHz
Band 2 (4G LTE), BW 15 MHz, Modulation 16QAM (Worst-case output power, 22.77 dBm)**



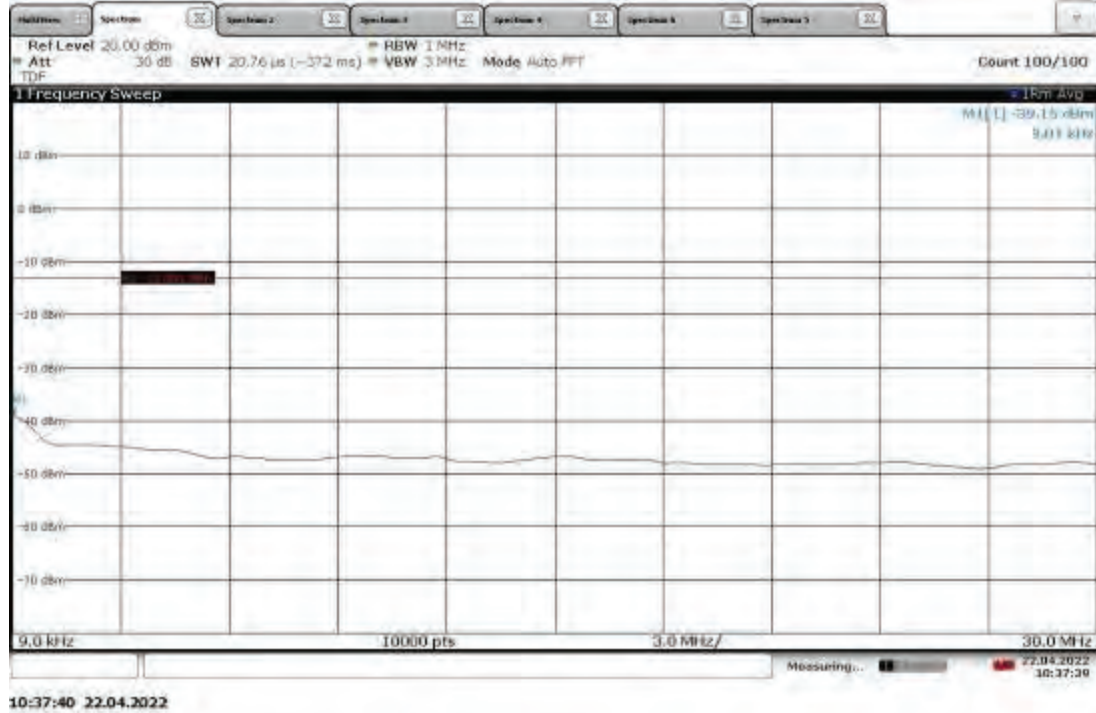
**High Channel 1987.5 MHz, Antenna Port (ANT0) Conducted Emissions, 9 kHz-30 MHz
Band 2 (4G LTE), BW 5 MHz, Modulation 64QAM (Worst-case output power, 22.92 dBm)**



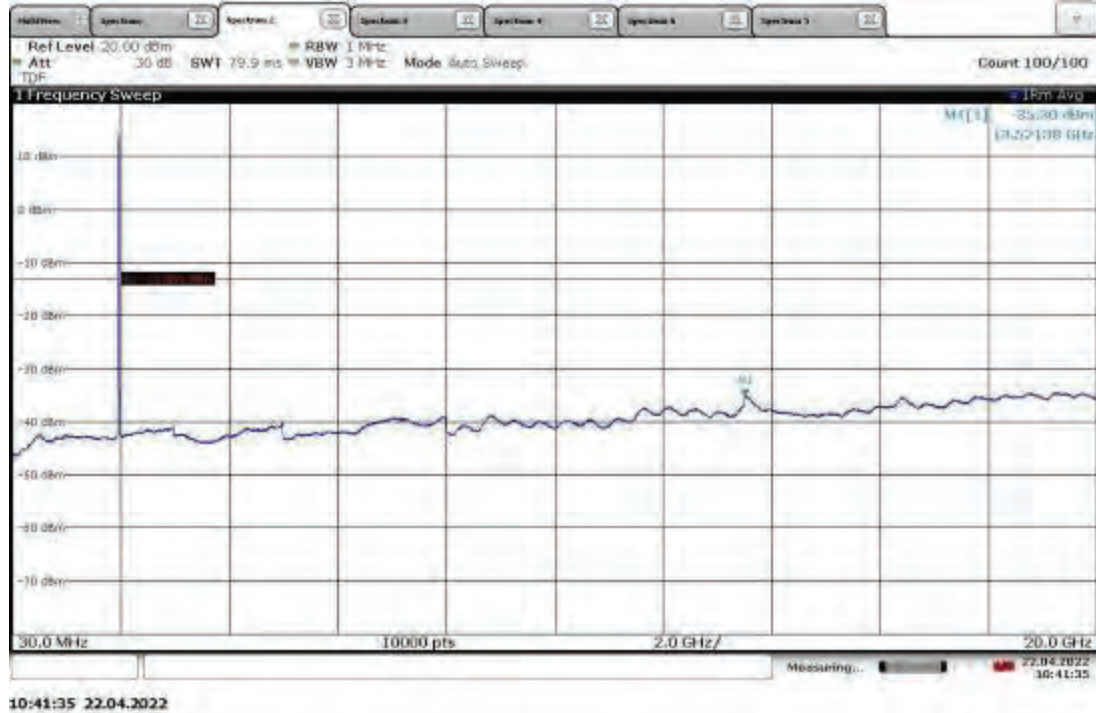
**High Channel 1987.5 MHz, Antenna Port (ANT0) Conducted Emissions, 30 MHz-20 GHz
Band 2 (4G LTE), BW 5 MHz, Modulation 64QAM (Worst-case output power, 22.92 dBm)**



**High Channel 1985 MHz, Antenna Port (ANT1) Conducted Emissions, 9 kHz-30 MHz
Band 2 (4G LTE), BW 10 MHz, Modulation 16QAM (Worst-case output power, 23.10 dBm)**



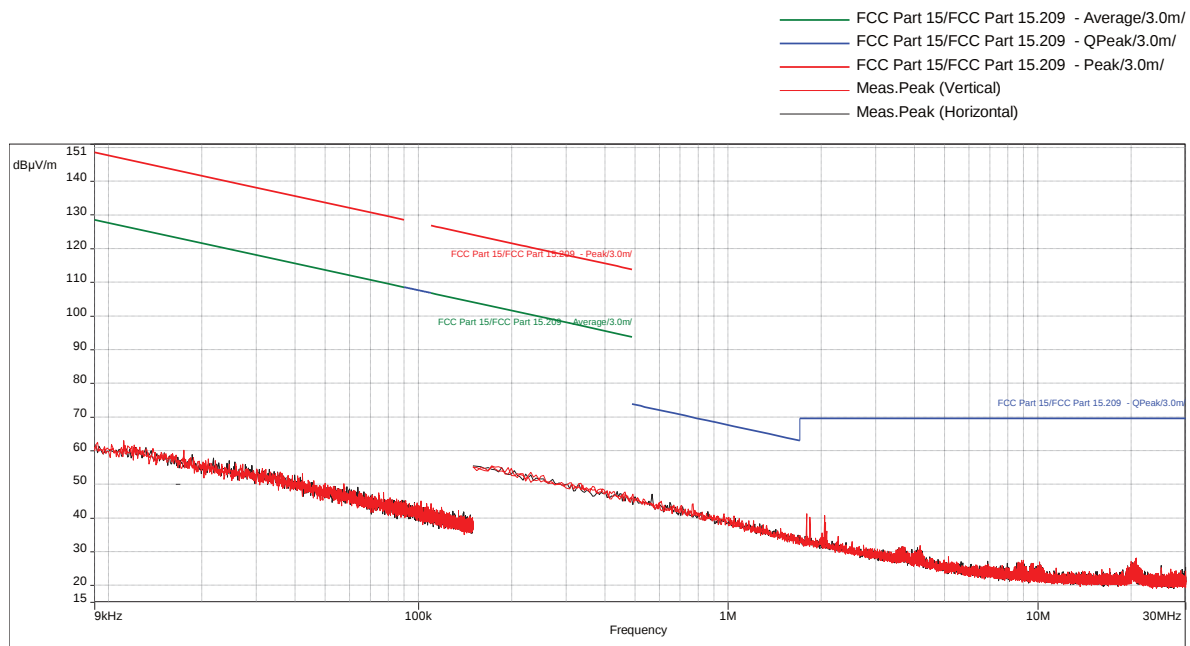
**High Channel 1985 MHz, Antenna Port (ANT1) Conducted Emissions, 30 MHz-20 GHz
Band 2 (4G LTE), BW 10 MHz, Modulation 16QAM (Worst-case output power, 23.10 dBm)**



Low Channel 1940 MHz, Radiated Emissions, 9 kHz-30 MHz
Band 2 (4G LTE), BW 20 MHz, Modulation 64QAM (Worst-case output power, 22.69 dBm)

Test Information:

Date and Time	5/6/2022 10:15:22 PM
Client and Project Number	Ingersoll Rand
Engineer	Kouma Sinn
Temperature	24 C
Humidity	26 %
Atmospheric Pressure	1002 mbar
Comments	Scan 7: Band 2, Tx Low 1940 MHz, 20MHz BW, 64QAM (Worst-case power, 22.69dBm), 9kHz-30MHz Loop antenna, Electric Field, 3M Location (FCC 15.209)

Graph:

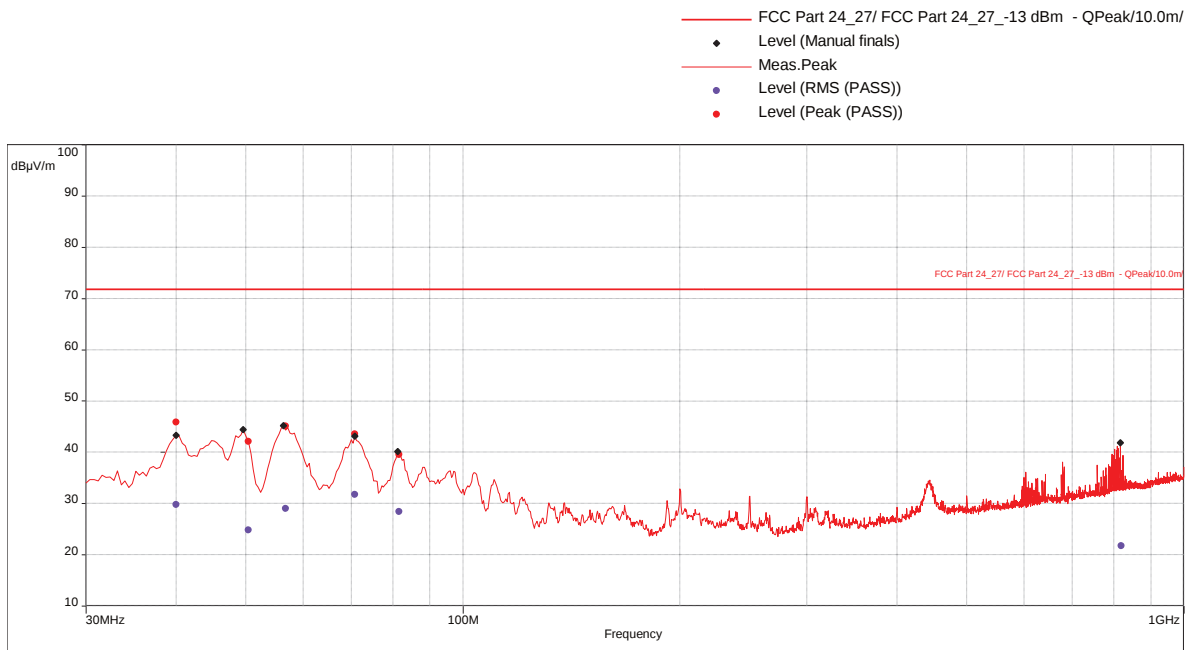
Results: Only one worst-case channel was tested from 9 kHz-30 MHz. No emission was detected.

Low Channel 1940 MHz, Radiated Emissions, 30-1000 MHz
Band 2 (4G LTE), BW 20 MHz, Modulation 64QAM (Worst-case output power, 22.69 dBm)

Test Information:

Date and Time	5/6/2022 4:40:49 PM
Client and Project Number	Ingersoll Rand
Engineer	Kouma Sinn
Temperature	24 C
Humidity	26 %
Atmospheric Pressure	1002 mbar
Comments	Scan 1: Band 2, Tx Low 1940 MHz, 20MHz BW, 64QAM (Worst-case power, 22.69 dBm), RE 30-1000MHz SA mode

Graph:



Results:

EIRP Peak (PASS) (6)

Frequency (MHz)	Peak Level (dBμV/m)	EIRP Level (dBm)	Limit (dBm)	EIRP Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
40	45.81	-38.99	-13	-25.99	110.00	1.62	Vertical	1000000.00	-19.33
50.38947368	42.09	-42.71	-13	-29.71	82.00	1.30	Vertical	1000000.00	-25.63
56.66315789	45.05	-39.75	-13	-26.75	0.00	1.46	Vertical	1000000.00	-26.18
70.8	43.52	-41.28	-13	-28.28	161.00	1.35	Vertical	1000000.00	-25.09
81.46315789	39.50	-45.3	-13	-32.3	176.00	1.29	Vertical	1000000.00	-25.64
818.6421053	34.29	-50.51	-13	-37.51	191.00	3.99	Vertical	1000000.00	-7.53

Notes:

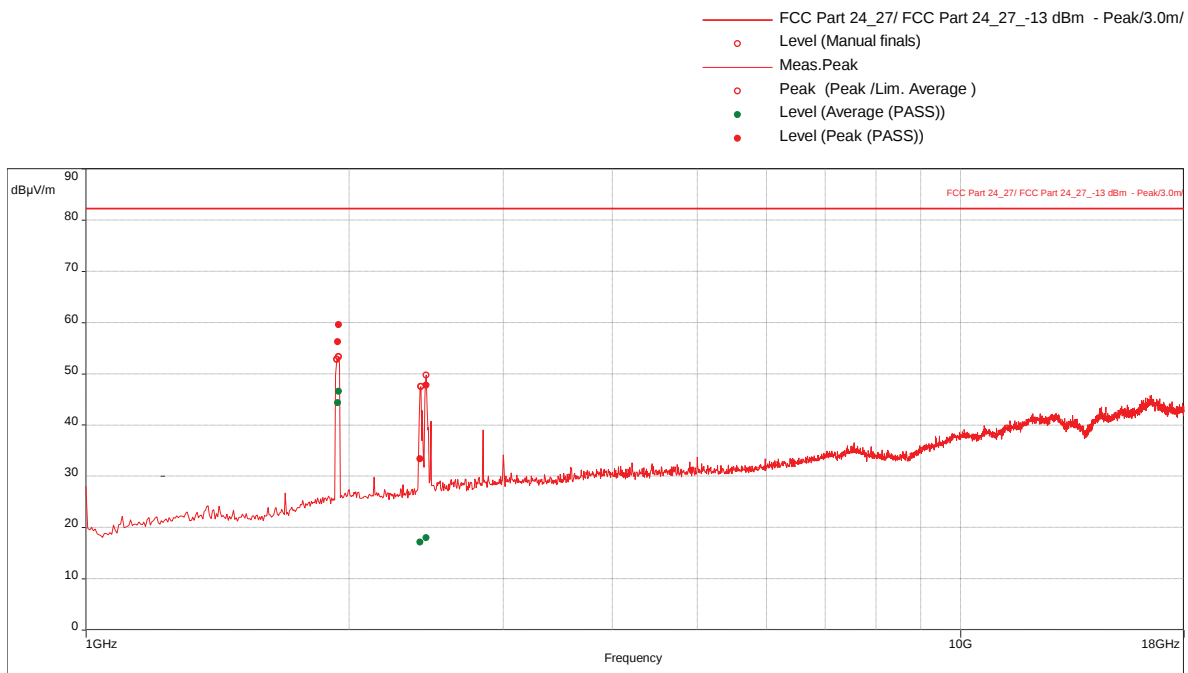
The level in EIRP (dBm) is calculated from the peak readings as, EIRP (dBm) = E Peak (dBμV/m) + 20*Log(d) – 104.8, where d is the measurement distance (in the far field region) in meter.

Low Channel 1940 MHz, Radiated Emissions, 18-20 GHz
Band 2 (4G LTE), BW 20 MHz, Modulation 64QAM (Worst-case output power, 22.69 dBm)

Test Information:

Date and Time	5/12/2022 8:24:29 PM
Client and Project Number	CommScope
Engineer	Vathana Ven
Temperature	26 C
Humidity	35 %
Atmospheric Pressure	1017 mbar
Comments	RE 1 to 18 GHz_Band 2, Tx Low 1940 MHz, 20MHz BW, 64QAM (Worst-case power, 22.69 dBm)

Graph:



Results:

EIRP Peak (PASS) (4)

Frequency (MHz)	Peak Level (dBμV/m)	EIRP Level (dBm)	Limit (dBm)	EIRP Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
1939.210526	56.22	-39.039	-13	-26.04	17.00	3.30	Vertical	1000000.00	-16.64
1945.526316	59.52	-35.738	-13	-22.74	192.00	3.89	Vertical	1000000.00	-16.58
2412.105263	33.40	-61.858	-13	-48.86	256.00	2.10	Vertical	1000000.00	-15.08
2449.210526	47.71	-47.548	-13	-34.55	228.00	3.39	Vertical	1000000.00	-14.80

Notes:

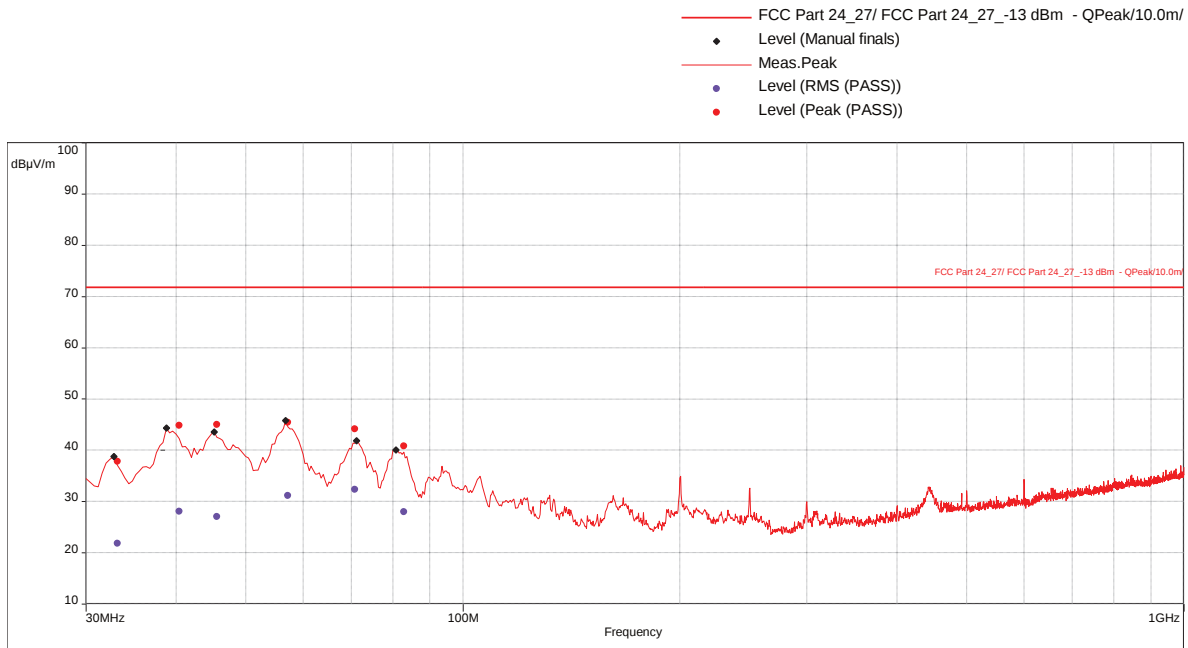
The level in EIRP (dBm) is calculated from the peak readings as, $EIRP (dBm) = E \text{ Peak } (dB\mu V/m) + 20 \cdot \log(d) - 104.8$, where d is the measurement distance (in the far field region) in meter. The scan from 18-20 GHz was performed manually at 20 cm distance. No emission was detected above the measuring equipment noise floor.

Mid Channel 1960 MHz, Radiated Emissions, 30-1000 MHz
Band 2 (4G LTE), BW 15 MHz, Modulation 16QAM (Worst-case output power, 22.77 dBm)

Test Information:

Date and Time	5/6/2022 6:49:45 PM
Client and Project Number	Ingersoll Rand
Engineer	Kouma Sinn
Temperature	24 C
Humidity	26 %
Atmospheric Pressure	1002 mbar
Comments	Scan 4: Band 2, Tx Mid 1960 MHz, 15MHz BW, 16QAM (Worst-case power, 22.77 dBm), RE 30-1000MHz SA mode

Graph:



Results:

EIRP Peak (PASS) (6)

Frequency (MHz)	Peak Level (dBμV/m)	EIRP Level (dBm)	Limit (dBm)	EIRP Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
33.32631579	37.81	-46.99	-13	-33.99	55.00	3.23	Vertical	1000000.00	-14.76
40.37894737	44.85	-39.95	-13	-26.95	103.00	3.02	Vertical	1000000.00	-19.59
45.46315789	45.01	-39.79	-13	-26.79	0.00	1.35	Vertical	1000000.00	-23.10
57.32631579	45.44	-39.36	-13	-26.36	17.00	2.52	Vertical	1000000.00	-26.11
70.93684211	44.10	-40.7	-13	-27.7	9.00	1.51	Vertical	1000000.00	-25.09
82.64210526	40.84	-43.96	-13	-30.96	38.00	1.35	Vertical	1000000.00	-25.69

Notes:

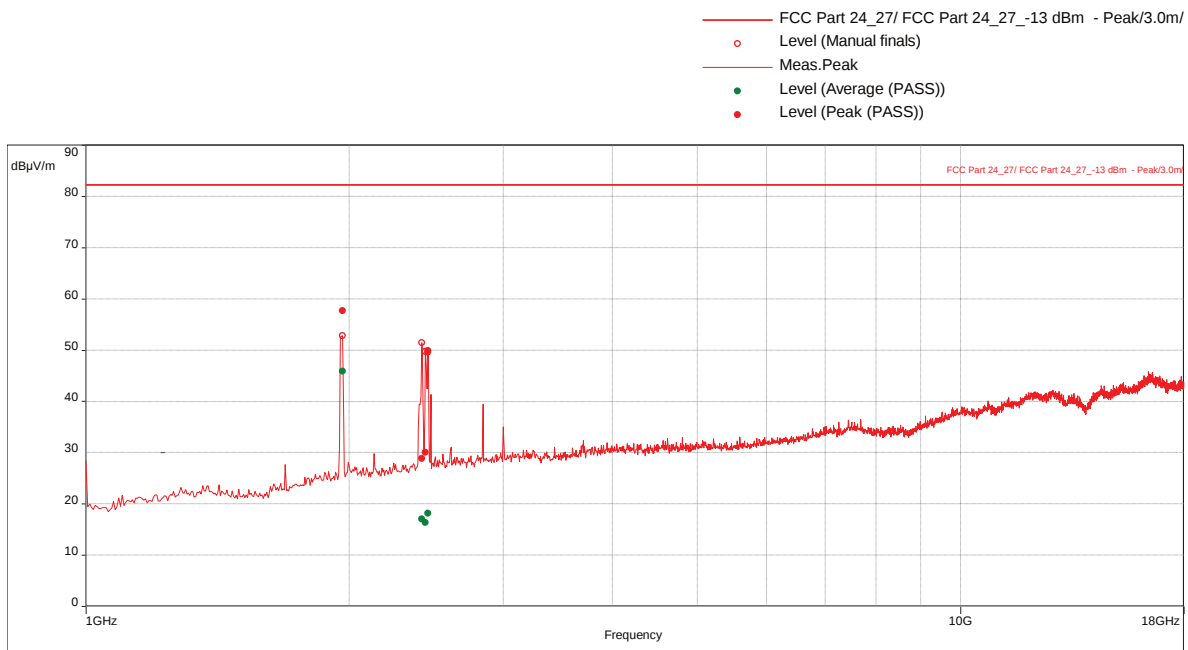
The level in EIRP (dBm) is calculated from the peak readings as, EIRP (dBm) = E Peak (dBμV/m) + 20*Log(d) – 104.8, where d is the measurement distance (in the far field region) in meter.

Mid Channel 1960 MHz, Radiated Emissions, 18-20 GHz
Band 2 (4G LTE), BW 15 MHz, Modulation 16QAM (Worst-case output power, 22.77 dBm)

Test Information:

Date and Time	5/12/2022 9:41:31 PM
Client and Project Number	CommScope
Engineer	Vathana Ven
Temperature	26 C
Humidity	35 %
Atmospheric Pressure	1017 mbar
Comments	RE 1 to 18 GHz_Band 2, Tx Mid 1960 MHz, 15MHz BW, 16QAM (Worst-case power, 22.77 dBm)

Graph:



Results:

Peak (PASS) (4)

Frequency (MHz)	Peak Level (dBμV/m)	EIRP Level (dBm)	Limit (dBm)	EIRP Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
1963.157895	57.69	-37.568	-13	-24.57	9.00	3.69	Vertical	1000000.00	-16.33
2421.842105	28.87	-66.388	-13	-53.39	316.00	3.25	Vertical	1000000.00	-15.01
2443.157895	30.02	-65.238	-13	-52.24	308.00	2.40	Vertical	1000000.00	-14.82
2460.526316	49.90	-45.358	-13	-32.36	54.00	1.40	Vertical	1000000.00	-14.65

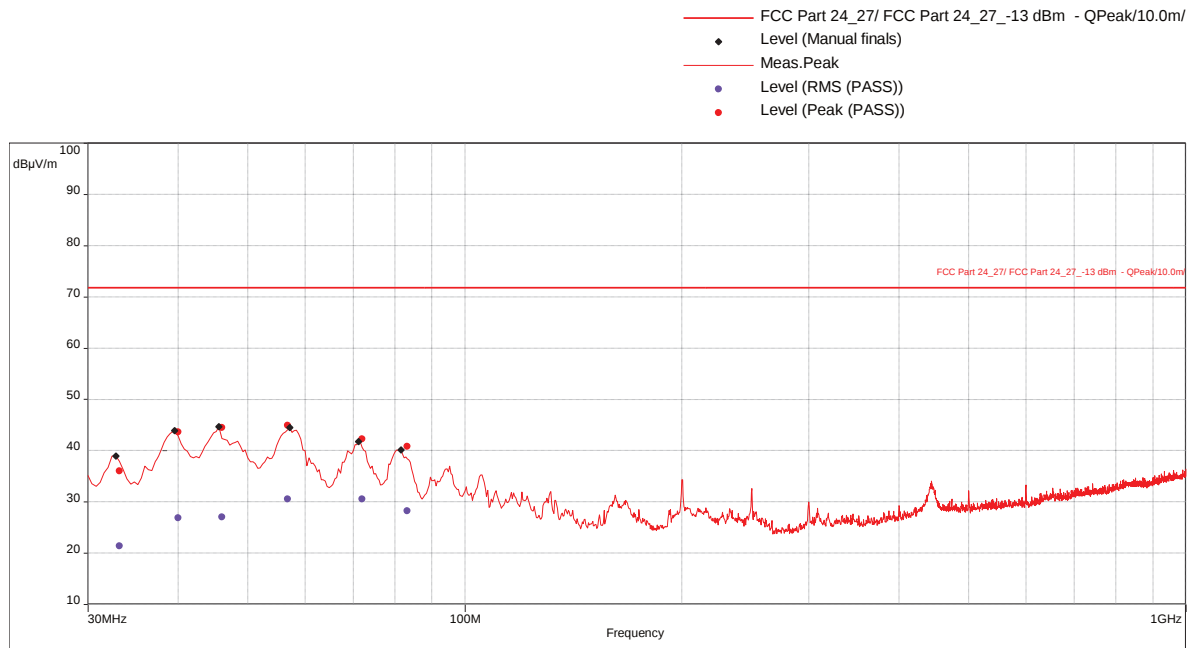
Notes:

The level in EIRP (dBm) is calculated from the peak readings as, $EIRP (dBm) = E \text{ Peak } (dB\mu V/m) + 20 * \log(d) - 104.8$, where d is the measurement distance (in the far field region) in meter. The scan from 18-20 GHz was performed manually at 20 cm distance. No emission was detected above the measuring equipment noise floor.

**High Channel 1985 MHz, Radiated Emissions, 30-1000 MHz
Band 2 (4G LTE), BW 10 MHz, Modulation 16QAM (Worst-case output power, 23.10 dBm)**

Test Information:

Date and Time	5/6/2022 7:39:13 PM
Client and Project Number	Ingersoll Rand
Engineer	Kouma Sinn
Temperature	24 C
Humidity	26 %
Atmospheric Pressure	1002 mbar
Comments	Scan 5: Band 2, Tx High 1985 MHz, 10MHz BW, 16QAM (Worst-case power, 23.10 dBm), RE 30-1000MHz SA mode

Graph:**Results:**

EIRP Peak (PASS) (6)

Frequency (MHz)	Peak Level (dBμV/m)	EIRP Level (dBm)	Limit (dBm)	EIRP Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
33.06315789	36.00	-48.8	-13	-35.8	291.00	3.24	Vertical	1000000.00	-14.58
39.86315789	43.64	-41.16	-13	-28.16	272.00	2.47	Vertical	1000000.00	-19.22
45.86315789	44.47	-40.33	-13	-27.33	257.00	2.75	Vertical	1000000.00	-23.38
56.93684211	44.92	-39.88	-13	-26.88	3.00	1.00	Vertical	1000000.00	-26.15
71.98947368	42.24	-42.56	-13	-29.56	264.00	2.90	Vertical	1000000.00	-25.08
83.17894737	40.85	-43.95	-13	-30.95	54.00	2.36	Vertical	1000000.00	-25.69

Notes:

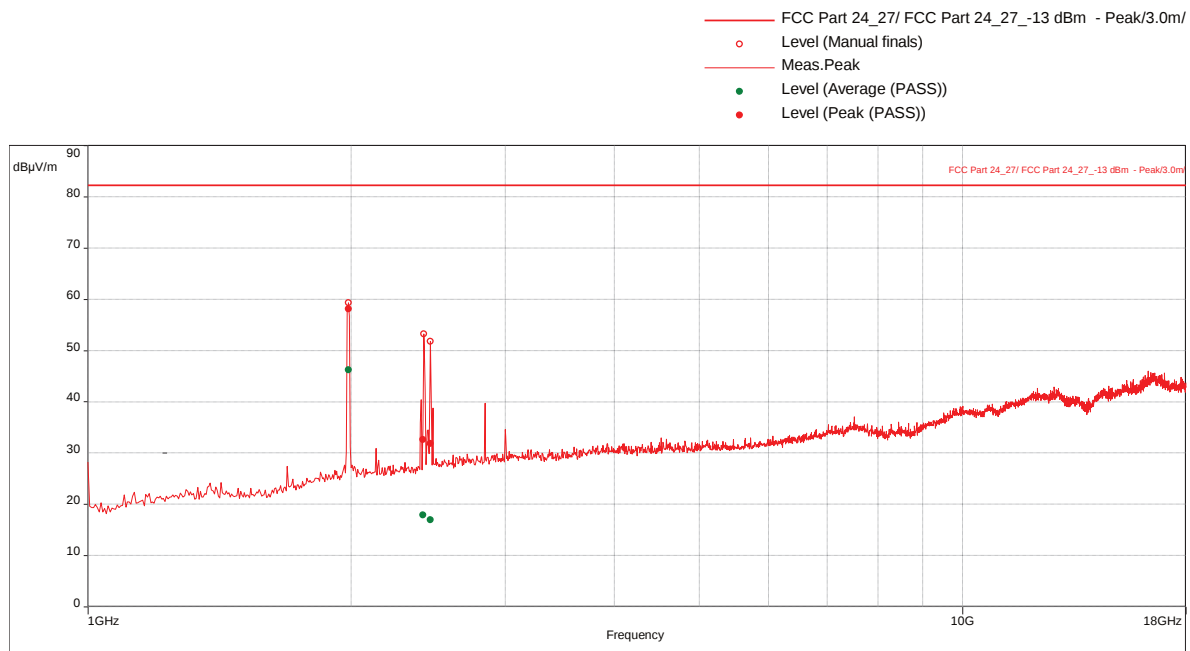
The level in EIRP (dBm) is calculated from the peak readings as, EIRP (dBm) = E Peak (dBμV/m) + 20*Log(d) – 104.8, where d is the measurement distance (in the far field region) in meter.

High Channel 1985 MHz, Radiated Emissions, 1-20 GHz
Band 2 (4G LTE), BW 10 MHz, Modulation 16QAM (Worst-case output power, 23.10 dBm)

Test Information:

Date and Time	5/12/2022 10:08:10 PM
Client and Project Number	CommScope
Engineer	Vathana Ven
Temperature	26 C
Humidity	35 %
Atmospheric Pressure	1017 mbar
Comments	RE 1 to 18 GHz_Band 2, Tx High 1985 MHz, 10MHz BW, 16QAM (Worst-case power, 23.10 dBm)

Graph:



Results:

Peak (PASS) (3)

Frequency (MHz)	Peak Level (dBμV/m)	EIRP Level (dBm)	Limit (dBm)	EIRP Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
1985.263158	58.14	-37.118	-13	-24.12	125.00	2.35	Vertical	1000000.00	-16.03
2417.368421	32.63	-62.628	-13	-49.63	111.00	1.15	Vertical	1000000.00	-15.05
2464.210526	31.86	-63.398	-13	-50.40	178.00	2.10	Vertical	1000000.00	-14.58

Notes:

The level in EIRP (dBm) is calculated from the peak readings as, EIRP (dBm) = E Peak (dBμV/m) + 20*Log(d) – 104.8, where d is the measurement distance (in the far field region) in meter. The scan from 18-20 GHz was performed manually at 20 cm distance. No emission was detected above the measuring equipment noise floor.

Test Personnel: <u>Kouma Sinn <i>KPS</i></u> Supervising/Reviewing Engineer: <u>Vathana F. Ven <i>VSV</i></u> (Where Applicable) <u>N/A</u> Product Standard: <u>FCC Part 24</u> Input Voltage: <u>48 VDC (POE)</u> Pretest Verification w/ Ambient Signals or BB Source: <u>N/A</u>	Test Date: <u>04/19/2022, 04/22/2022, 05/06/2022</u> <u>05/12/2022</u> Limit Applied: <u>See report section 11.3</u> Ambient Temperature: <u>25, 24, 24, 26 °C</u> Relative Humidity: <u>34, 27, 26, 35 %</u> Atmospheric Pressure: <u>988, 1015, 1002, 1017 mbars</u>
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Deviations, Additions, or Exclusions: None

12 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	05/18/2022	105029958BOX-005	KPS <i>KPS</i>	VFV <i>VFV</i>	Original Issue
1	06/08/2022	105029958BOX-005.1	KPS <i>KPS</i>	VFV <i>VFV</i>	Removed test setup photos on pages 222, 294, and 295