

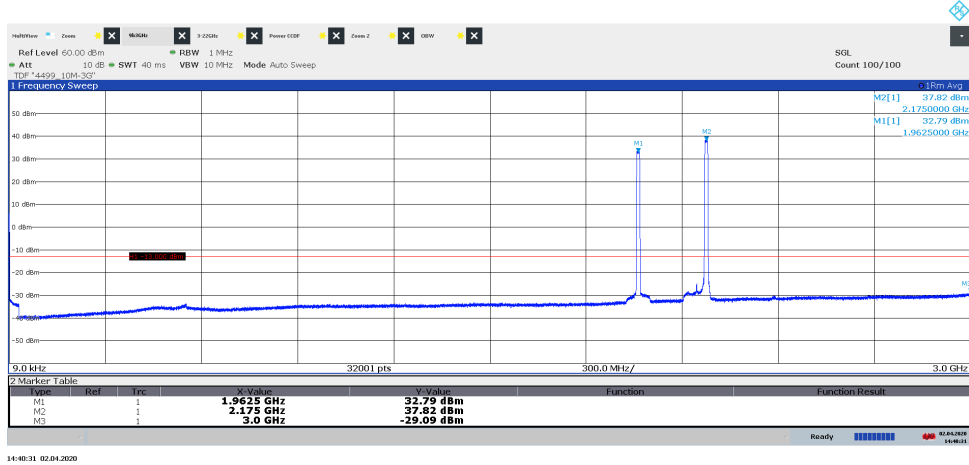
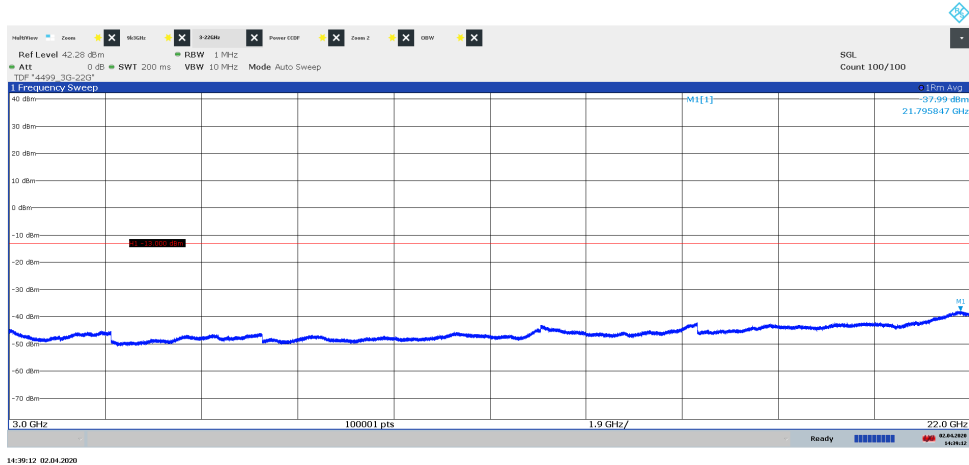
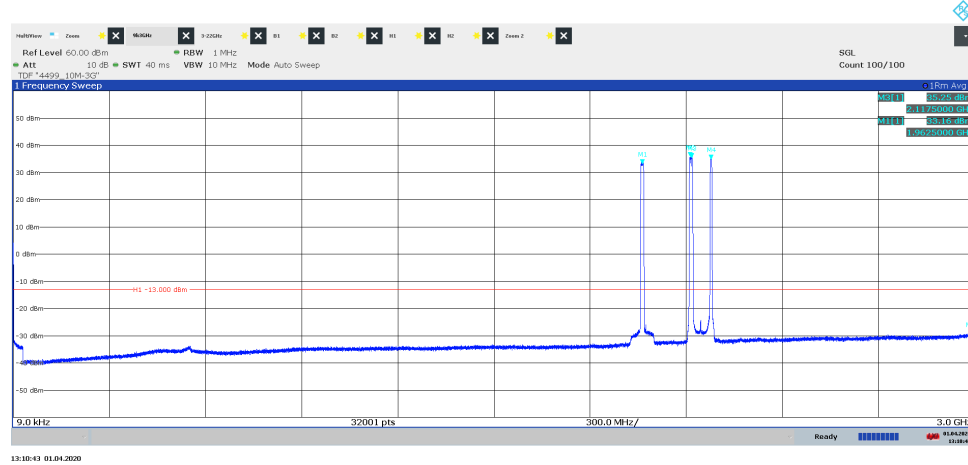
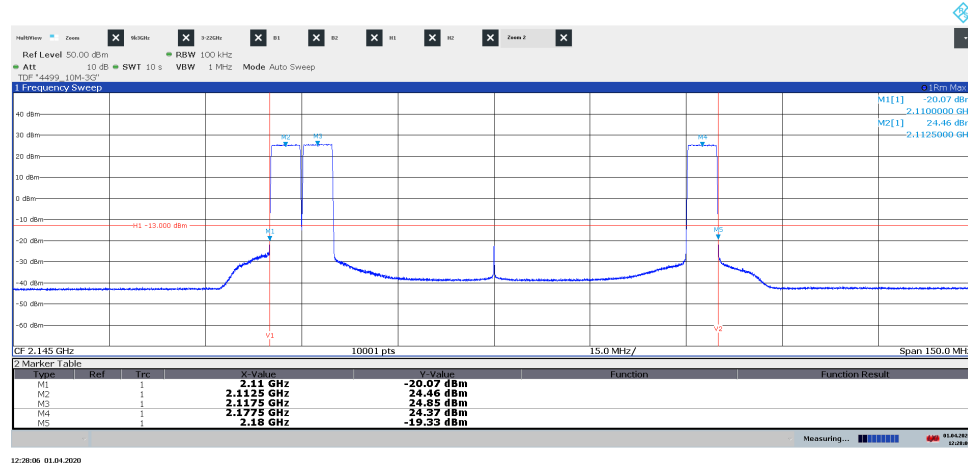
Diagram 3.25a, E-TM1.1, T_{10} , 9 kHz – 3 GHz, Port B:Diagram 3.25b, E-TM1.1, T_{10} , 3 GHz – 22 GHz, Port B:

Diagram 3.26a, E-TM1.1, Bim₅, 9 kHz – 3 GHz, Port B:Diagram 3.26b, E-TM1.1, Bim₅, 2.07 GHz – 2.22 GHz, Port B:

Note: The purpose of this measurement is to find IM products, not to verify compliance at the Band edges.

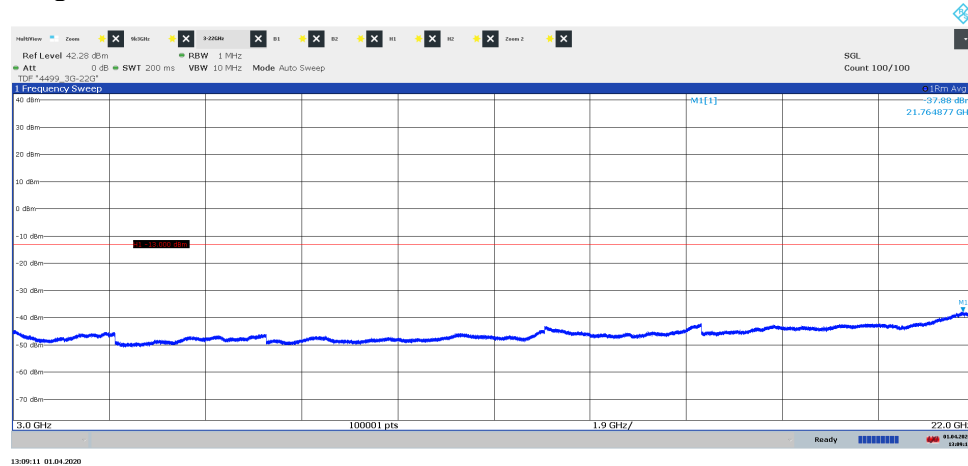
Diagram 3.26c, E-TM1.1, Bim₅, 3 GHz – 22 GHz, Port B:

Diagram 3.27a, E-TM1.1, Tim₅, 9 kHz – 3 GHz, Port B:

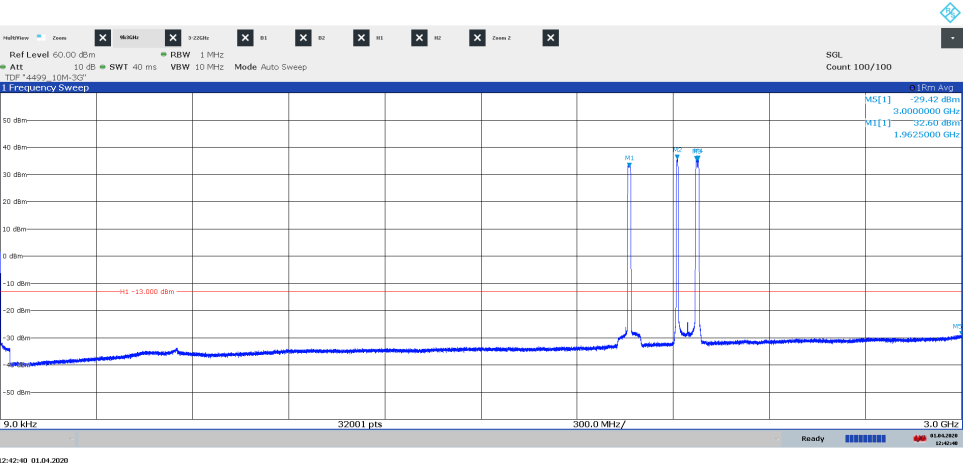
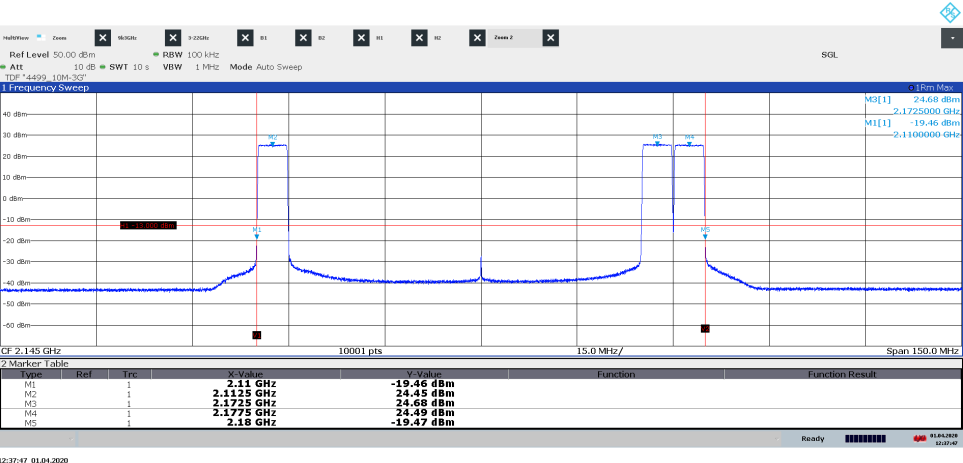


Diagram 3.27b, E-TM1.1, Tim₅, 2.07 GHz – 2.22 GHz, Port B:



Note: The purpose of this measurement is to find IM products, not to verify compliance at the Band edges.

Diagram 3.27c, E-TM1.1, Tim₅, 3 GHz – 22 GHz, Port B:

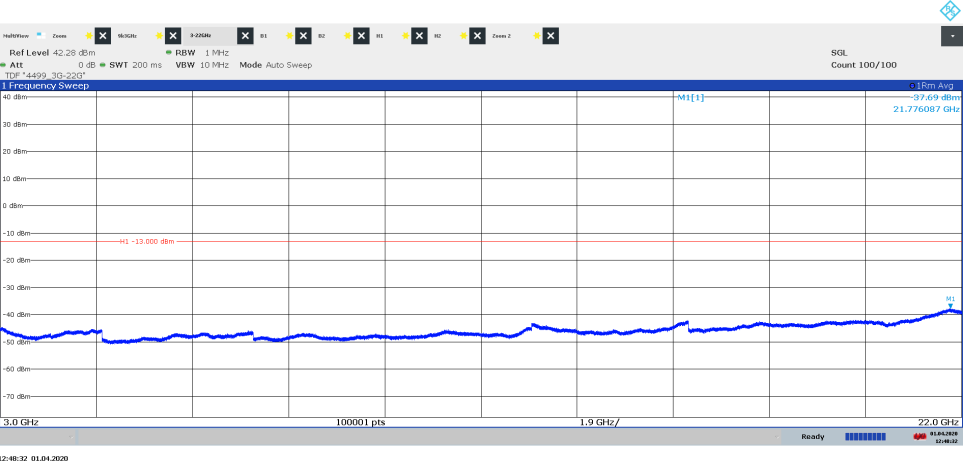


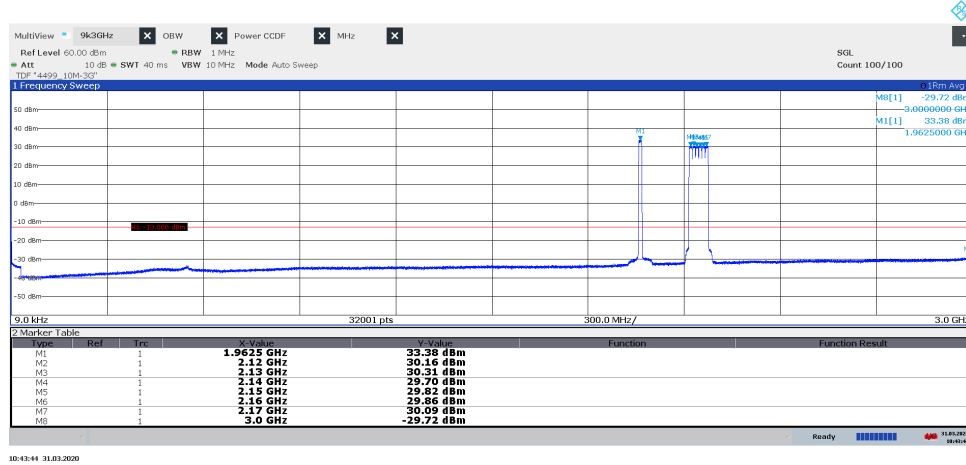
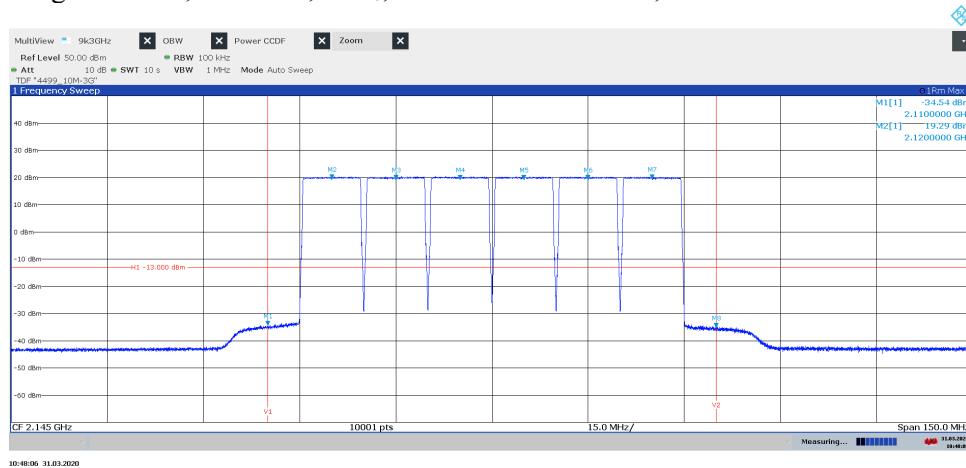
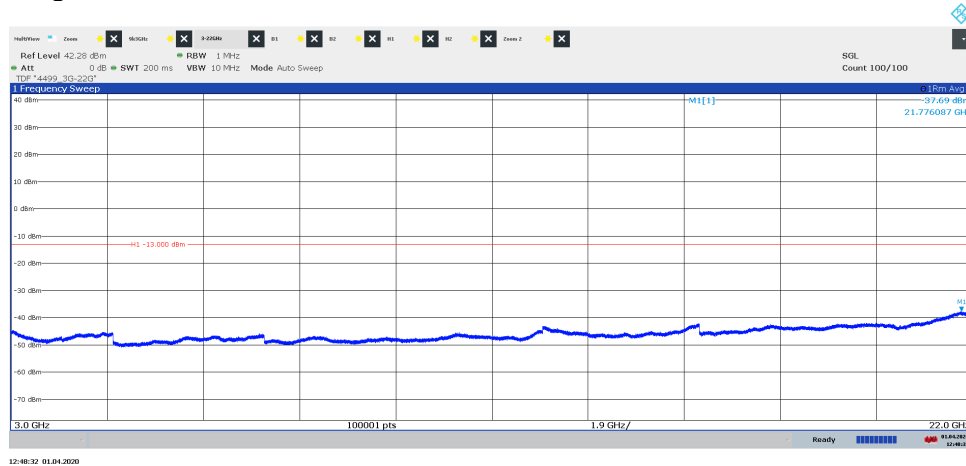
Diagram 3.28a, E-TM1.1, M6₁₀, 9 kHz – 3 GHz, Port B:Diagram 3.28b, E-TM1.1, M6₁₀, 2.07 GHz – 2.22 GHz, Port B:Diagram 3.28c, E-TM1.1, M6₁₀, 3 GHz – 22 GHz, Port B:

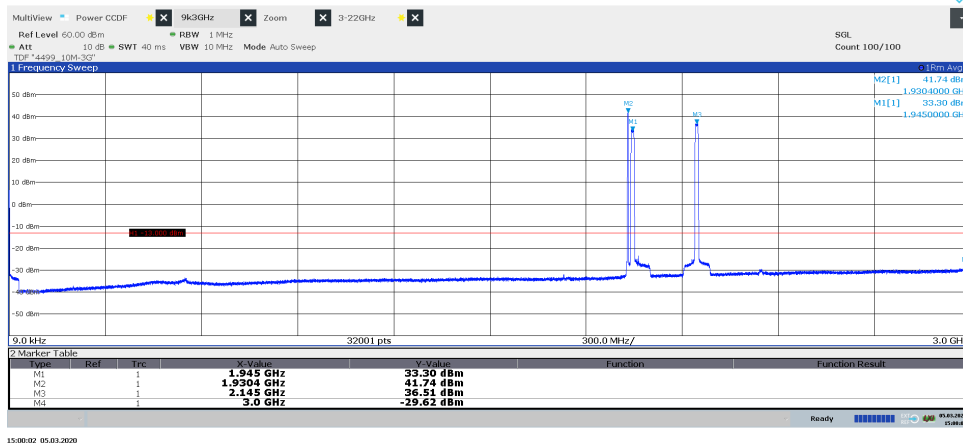
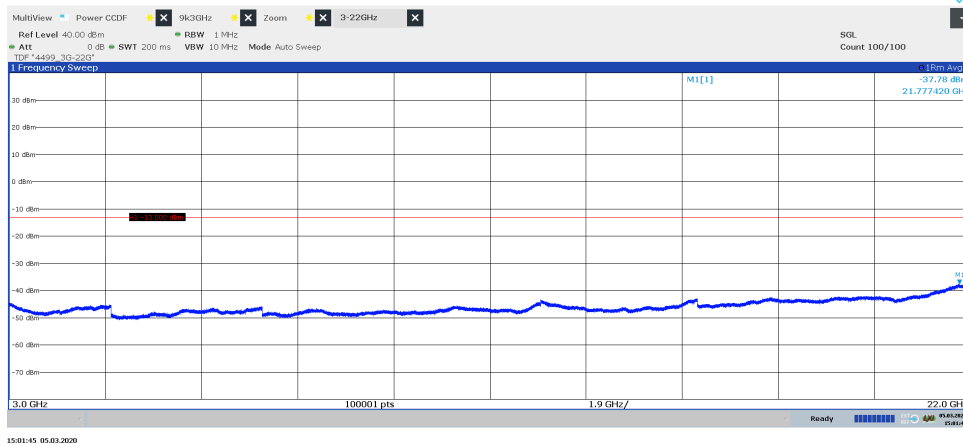
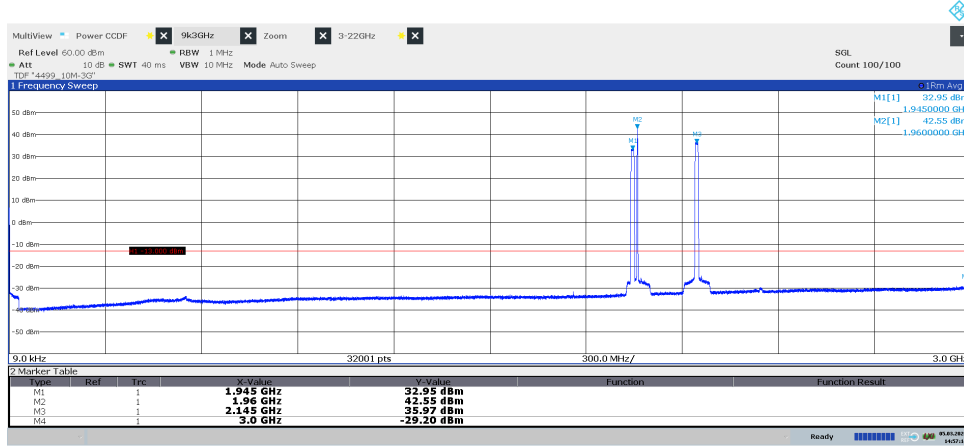
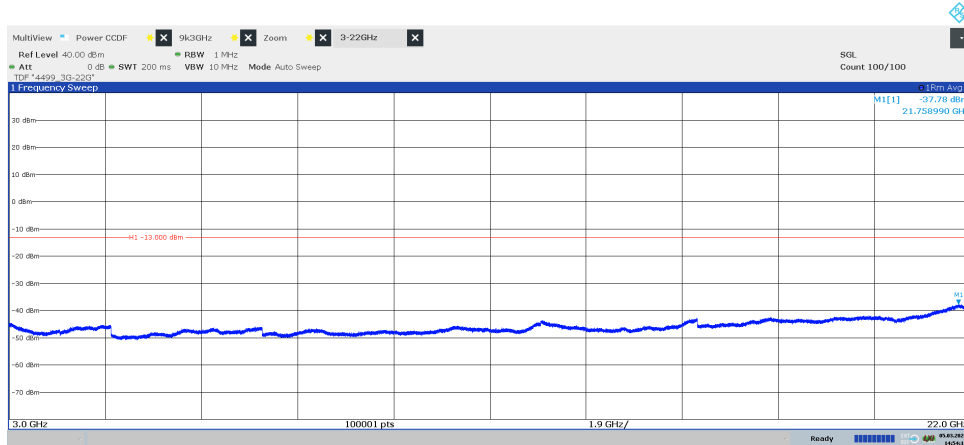
Diagram 3.29a, GSM: GMSK, LTE: E-TM1.1, B_{G+L} , 9 kHz – 3 GHz, Port B:Diagram 3.29b, GSM: GMSK, LTE: E-TM1.1, B_{G+L} , 3 GHz – 22 GHz, Port B:

Diagram 3.30a, GSM: GMSK, LTE: E-TM1.1, M_{G+L} , 9 kHz – 3 GHz, Port A:

14:57:15 05.03.2020

Diagram 3.30b, GSM: GMSK, LTE: E-TM1.1, M_{G+L} , 3 GHz – 22 GHz, Port A:

14:54:15 05.03.2020

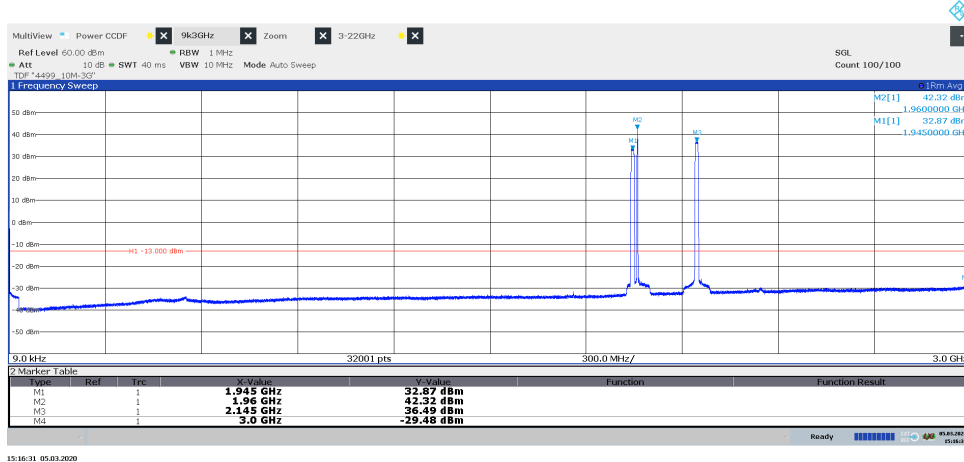
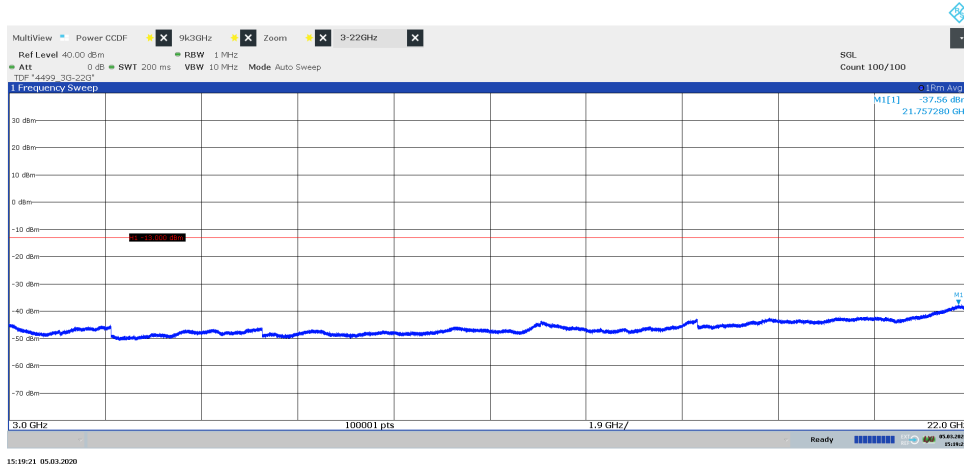
Diagram 3.31a, GSM: GMSK, LTE: E-TM1.1, M_{G+L} , 9 kHz – 3 GHz, Port B:Diagram 3.31b, GSM: GMSK, LTE: E-TM1.1, M_{G+L} , 3 GHz – 22 GHz, Port B:

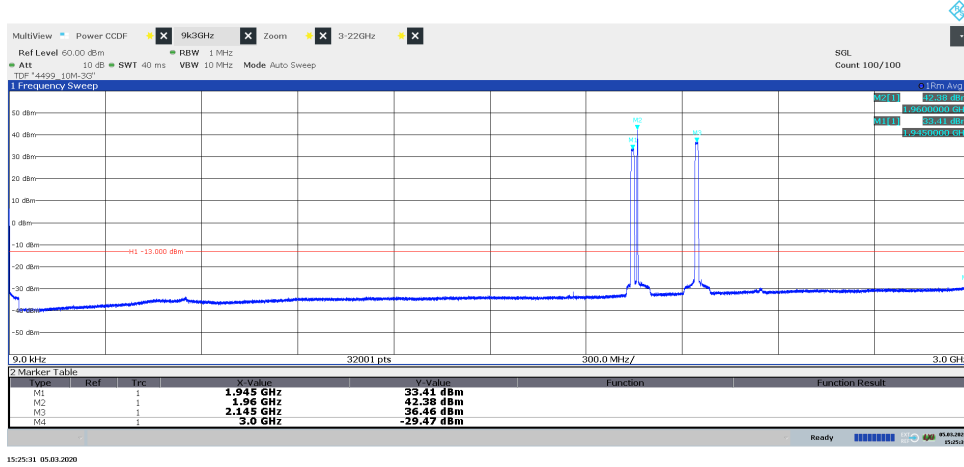
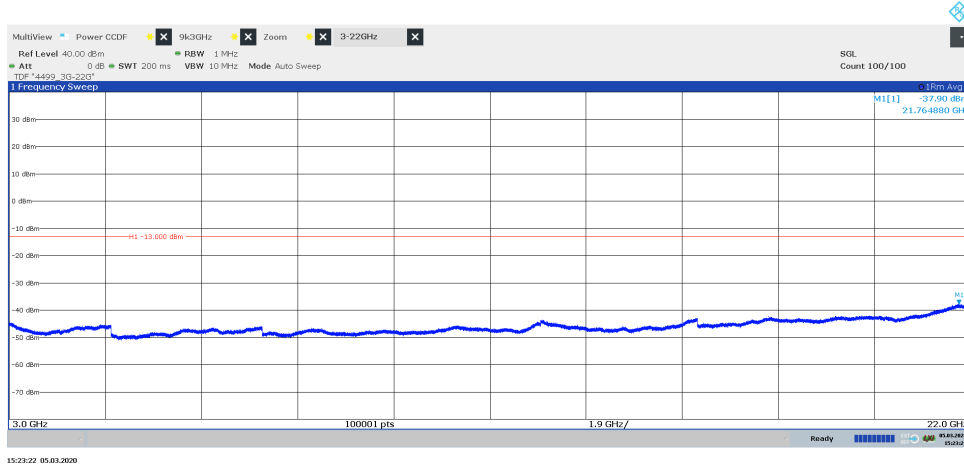
Diagram 3.32a, GSM: GMSK, LTE: E-TM1.1, M_{G+L} , 9 kHz – 3 GHz, Port C:Diagram 3.32b, GSM: GMSK, LTE: E-TM1.1, M_{G+L} , 3 GHz – 22 GHz, Port C:

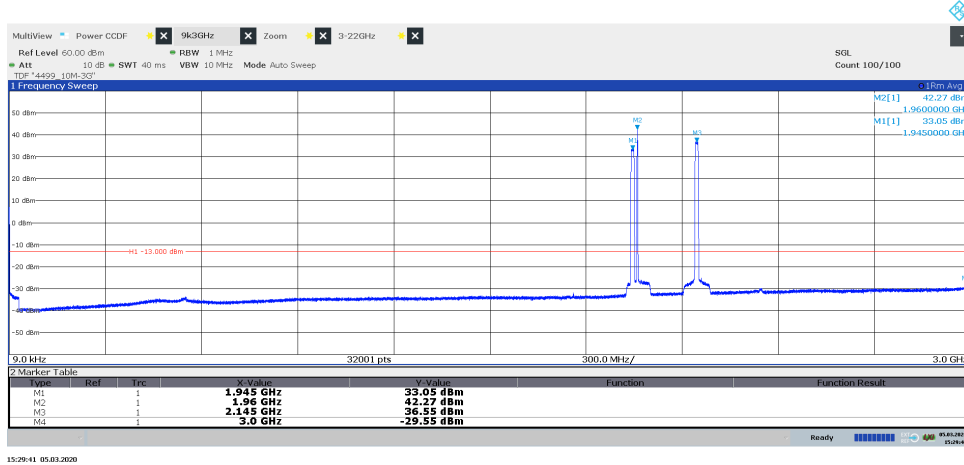
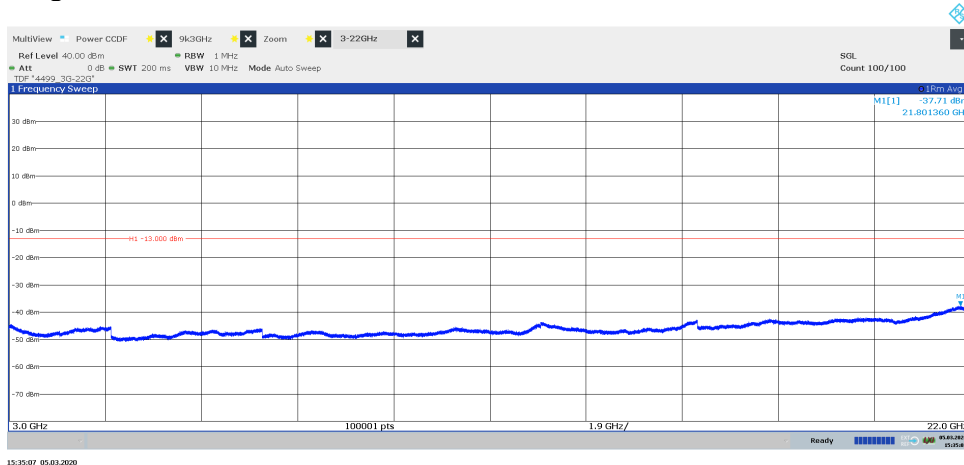
Diagram 3.33a, GSM: GMSK, LTE: E-TM1.1, M_{G+L} , 9 kHz – 3 GHz, Port D:Diagram 3.33b, GSM: GMSK, LTE: E-TM1.1, M_{G+L} , 3 GHz – 22 GHz, Port D:

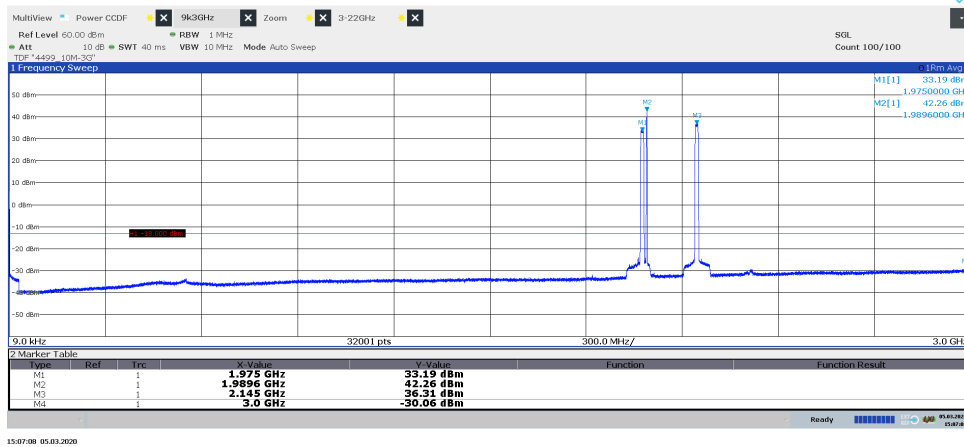
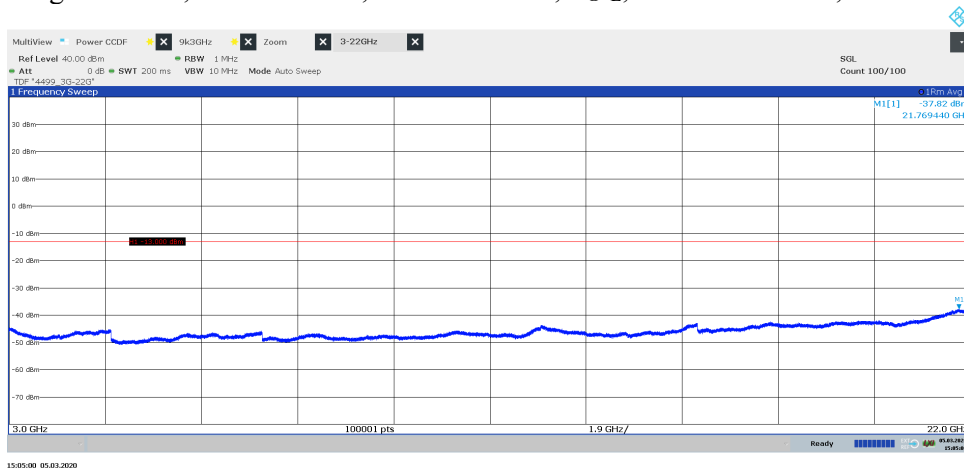
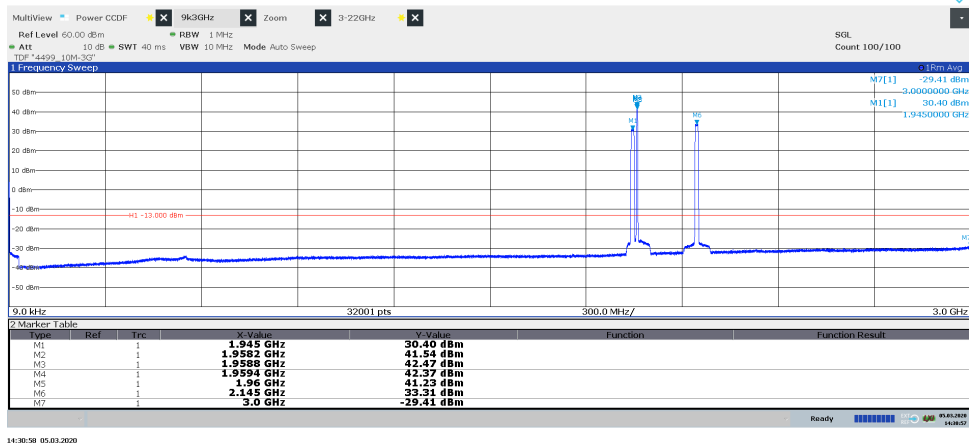
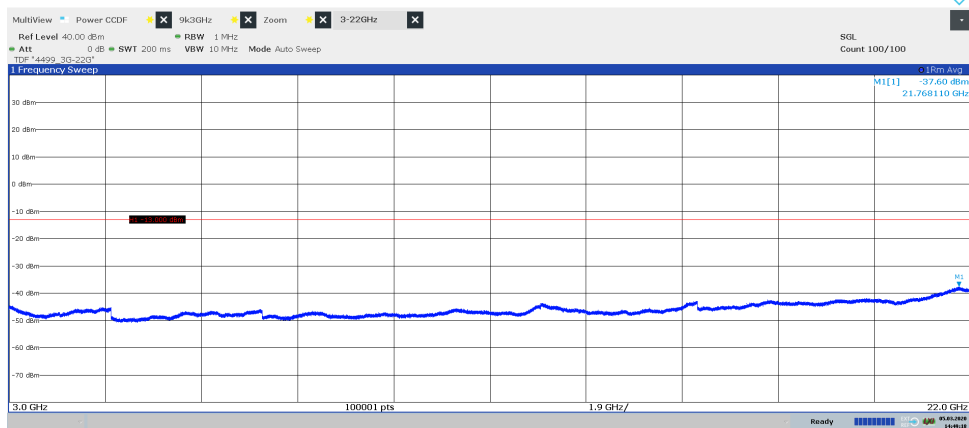
Diagram 3.34a, GSM: GMSK, LTE: E-TM1.1, T_{G+L} , 9 kHz – 3 GHz, Port A:Diagram 3.34b, GSM: GMSK, LTE: E-TM1.1, T_{G+L} , 3 GHz – 22 GHz, Port A:

Diagram 3.35a, GSM: GMSK, LTE: E-TM1.1, M4_{G+L}, 9 kHz – 3 GHz, Port A:

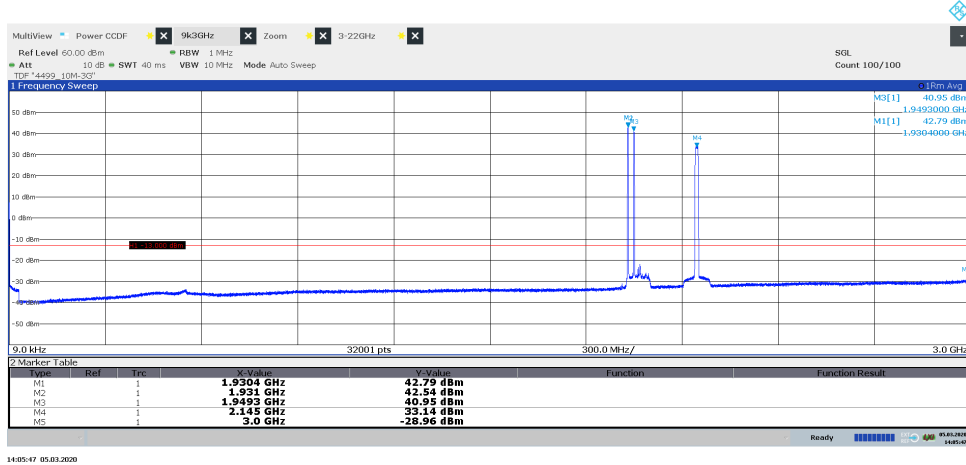
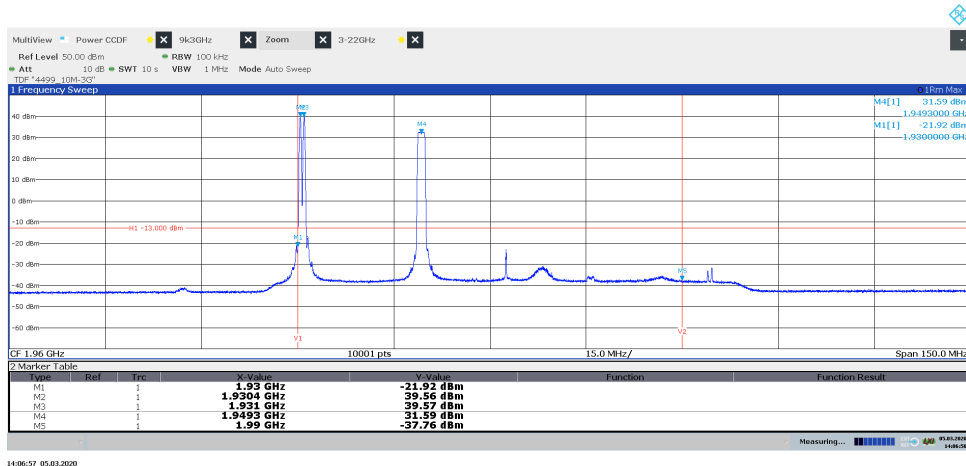
14:30:58 05.03.2020

Diagram 3.35b, GSM: GMSK, LTE: E-TM1.1, M4_{G+L}, 1.885 GHz – 2.035 GHz, Port A:

14:27:46 05.03.2020

Diagram 3.35c, GSM: GMSK, LTE: E-TM1.1, M4_{G+L}, 3 GHz – 22 GHz, Port A:

14:49:19 05.03.2020

Diagram 3.36a, GSM: 8PSK, LTE: E-TM1.1, Bim_{G+L}, 9 kHz – 3 GHz, Port B:Diagram 3.36b, GSM: 8PSK, LTE: E-TM1.1, Bim_{G+L}, 1.885 GHz – 2.035 GHz, Port B:

Note: The purpose of this measurement is to find IM products, not to verify compliance at the Band edges.

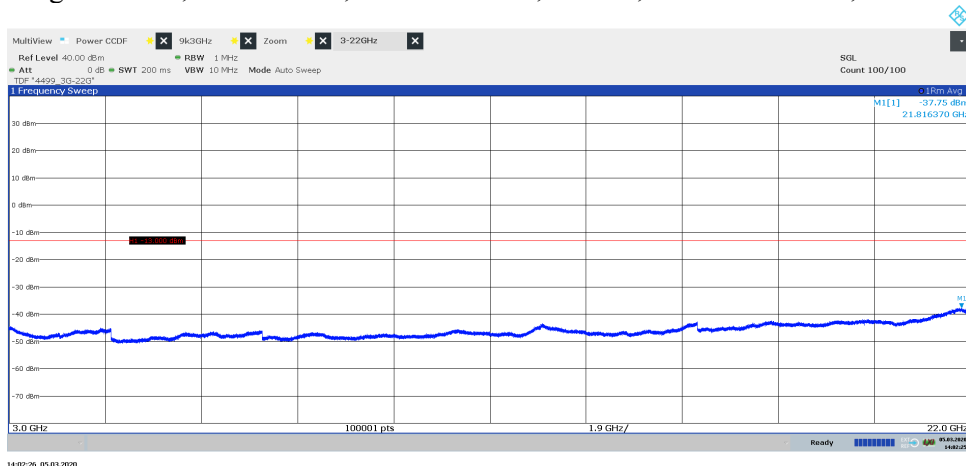
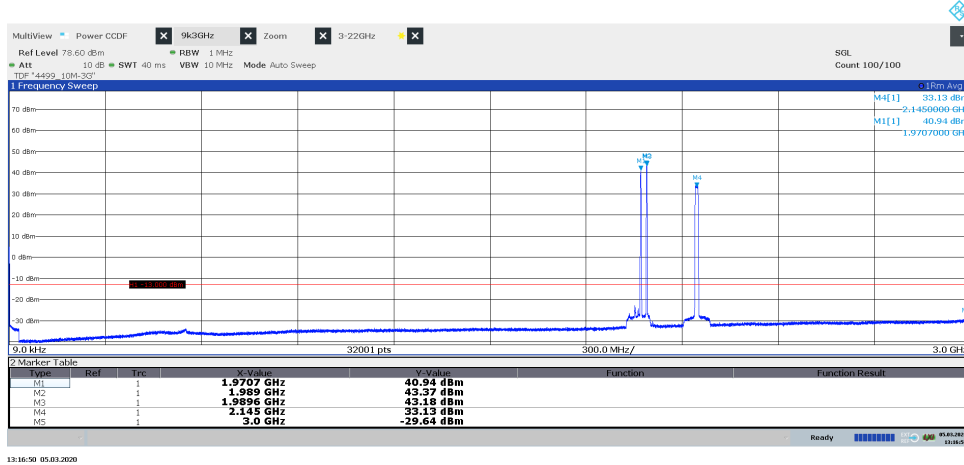
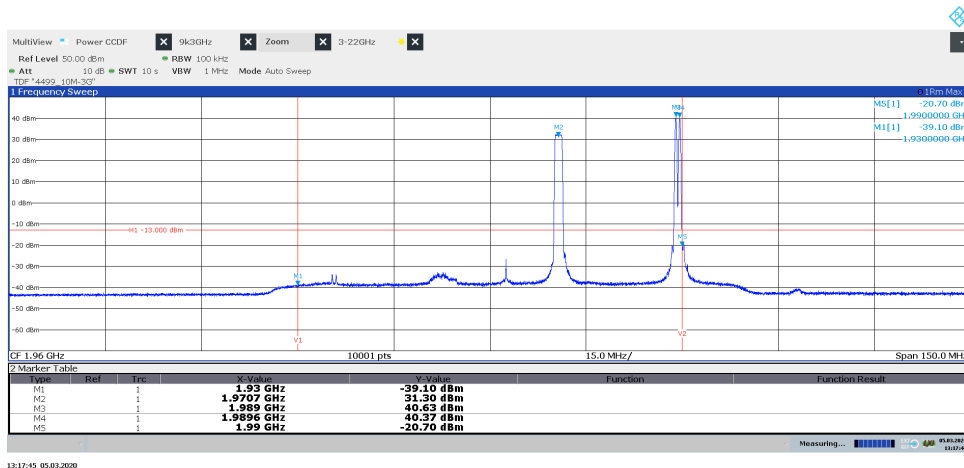
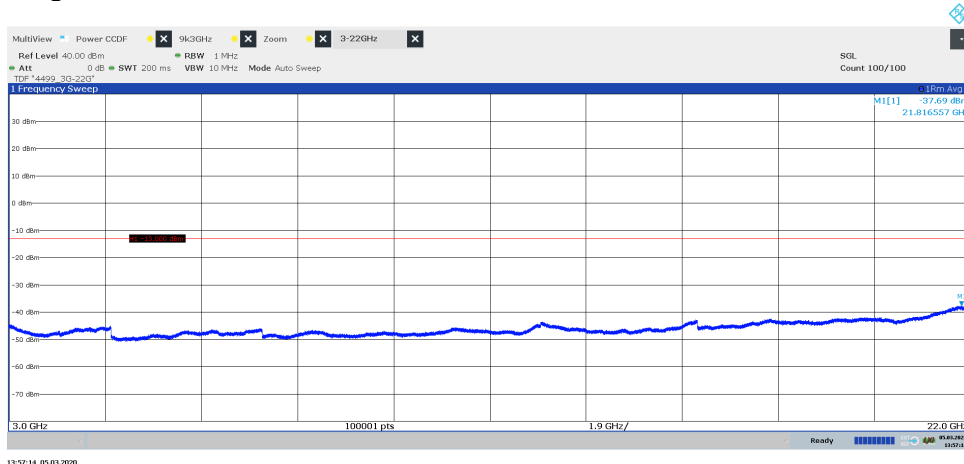
Diagram 3.36c, GSM: 8PSK, LTE: E-TM1.1, Bim_{G+L}, 3 GHz – 22 GHz, Port B:

Diagram 3.37a, GSM: 8PSK, LTE: E-TM1.1, Tim_{G+L} , 9 kHz – 3 GHz, Port B:Diagram 3.37b, GSM: 8PSK, LTE: E-TM1.1, Tim_{G+L} , 1.885 GHz – 2.035 GHz, Port B:

13:17:45 05.03.2020

Note: The purpose of this measurement is to find IM products, not to verify compliance at the Band edges.

Diagram 3.37c, GSM: 8PSK, LTE: E-TM1.1, Tim_{G+L} , 3 GHz – 22 GHz, Port A:

13:57:14 05.03.2020

Diagram 3.38a, NB IoT SA: N-TM, LTE: E-TM1.1, B_{IoT+L} , 9 kHz – 3 GHz,
Port A:

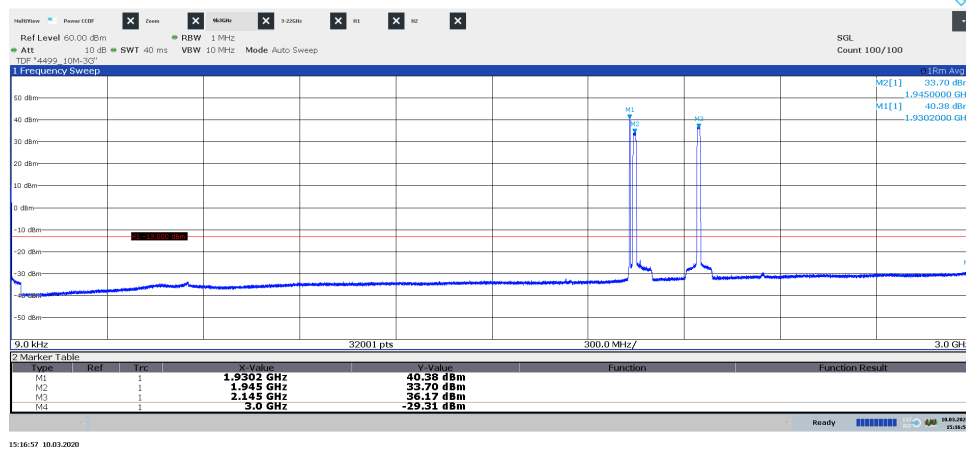
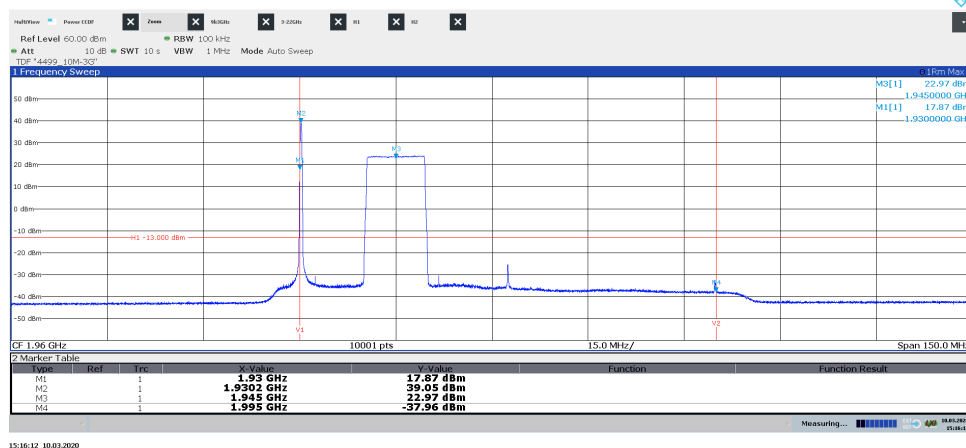


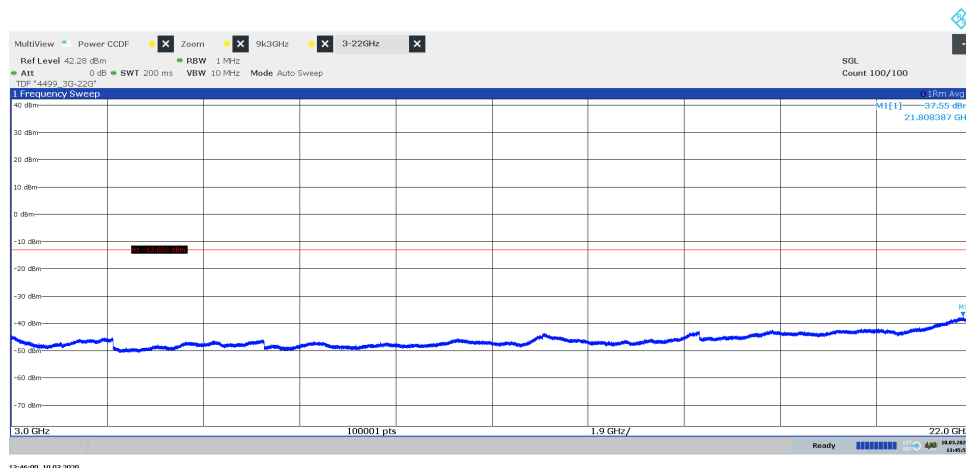
Diagram 3.38b, NB IoT SA: N-TM, LTE: E-TM1.1, B_{IoT+L} ,
1.885 GHz – 2.035 GHz, Port A:



15:16:12 10.03.2020

Note: The purpose of this measurement is to find IM products, not to verify compliance at the Band edges.

Diagram 3.38c, NB IoT SA: N-TM, LTE: E-TM1.1, B_{IoT+L} , 3 GHz – 22 GHz,
Port A:



13:46:00 10.03.2020

MultiView Spectrum Zoom 9k3GHz SGL

Ref Level 44.71 dBm RBW 1 MHz
Att 10 dB SWI 40 ms VBW 10 MHz Mode Auto Sweep
TDE 14499 10M:30°

1 Frequency Sweep

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

9.0 MHz 32001 pts 300.0 MHz/ 3.0 GHz

0.1cm Ave
M2(1) 35.63 dB
2.1450000 GHz
M1(1) 33.56 dB
1.9350000 GHz

Ready

11-05-36, 27.81.2020

Multiview **Spectrum** **Zoom** **9k3GHz**

Ref Level 72.00 dBm RBW 100 kHz Att 10 dB SWT 10 s VBW 1 MHz Mode Auto Sweep

DF 4499 104.30

Frequency Sweep

1.9 GHz 1.95 GHz

10001 pts 15.0 MHz/ Span 150.0 MHz

Marker Table

Type	Ref	Trc	Frequency	Power	Function	Function Result
M1	1		1.9287581 GHz	-37.25 dBm		
M2	1		1.93 GHz	-30.85 dBm		
M3	1		1.9351127 GHz	23.88 dBm		
M4	1		1.931308 GHz	29.04 dBm		
M5	1		1.99 GHz	-37.88 dBm		

Measuring... **9k3GHz**

MultiView Spectrum Zoom 9k3GHz 3-22GHz

Ref Level 42.28 dBm Att 0 dB SWI 200 ms VBW 10 MHz Mode Auto Sweep SGL Count 100/100

10 MHz

Frequency Sweep

M1: -10.000 dBm

M1[1] -37.66 dBm 21.762407 GHz

3.0 GHz 100001 pts 1.9 GHz/ 22.0 GHz

Ready

Diagram 3.40a, NB IoT SA: N-TM, LTE: E-TM1.1, M_{IoT+L} , 9 kHz – 3 GHz,
Port A:

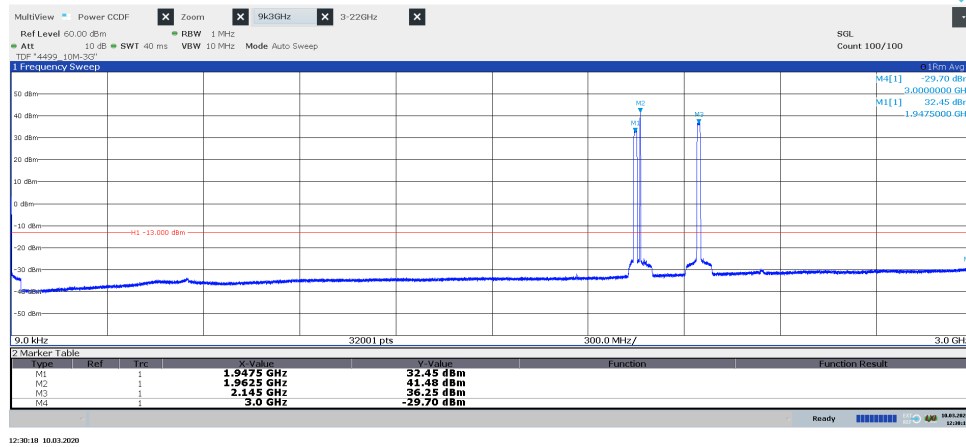


Diagram 3.40b, NB IoT SA: N-TM, LTE: E-TM1.1, M_{IoT+L} , 1.885 GHz – 2.035
GHz, Port A:

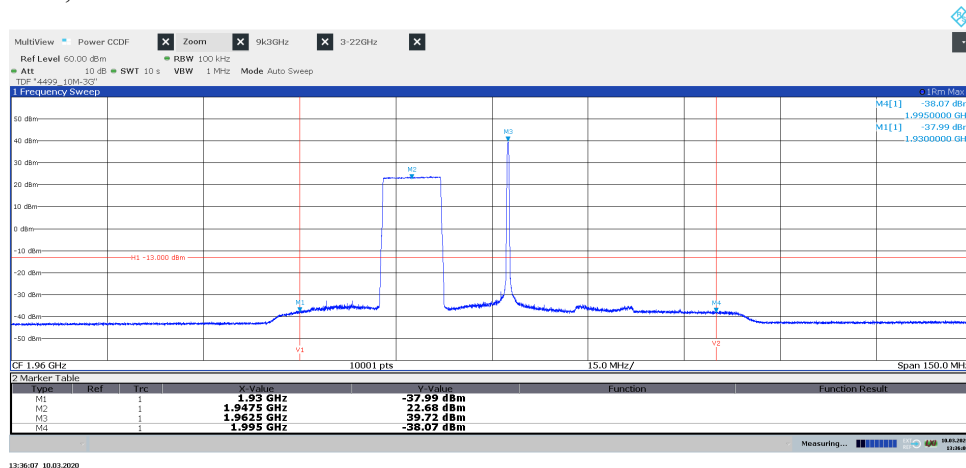


Diagram 3.40c, NB IoT SA: N-TM, LTE: E-TM1.1, M_{IoT+L} , 3 GHz – 22 GHz,
Port A:

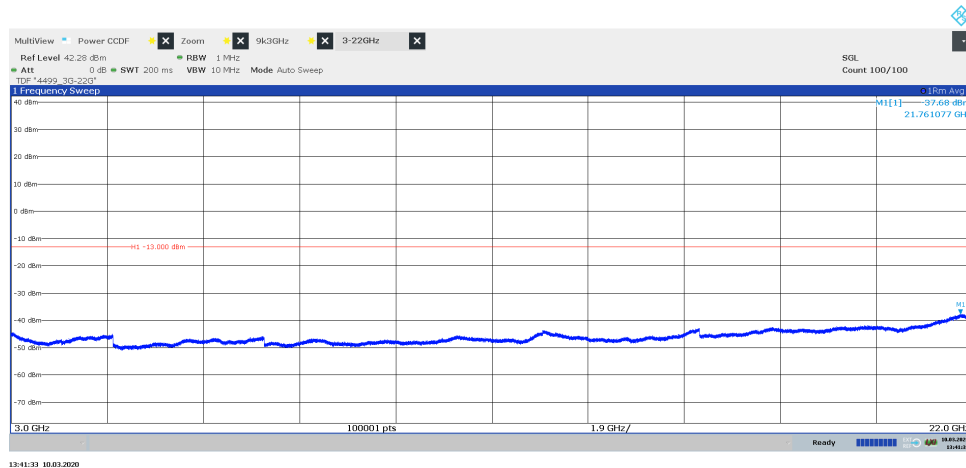


Diagram 3.41a, NB IoT SA: N-TM, LTE: E-TM1.1, M_{IoT+L} , 9 kHz – 3 GHz,
Port B:

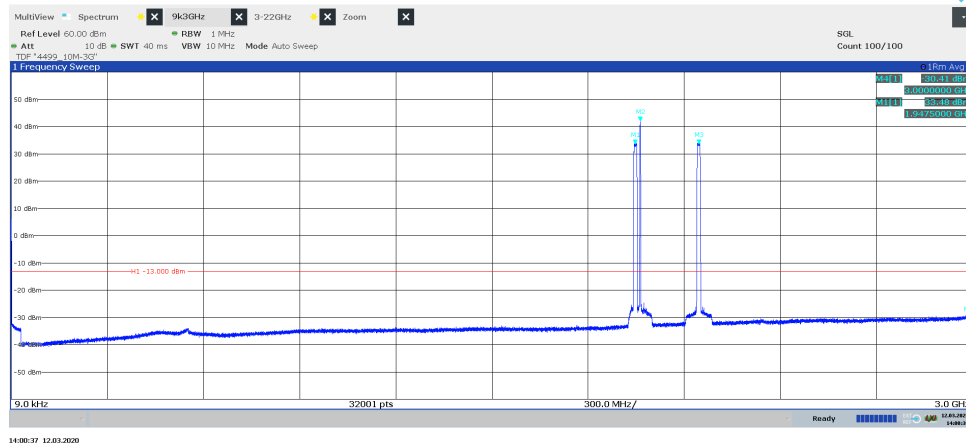


Diagram 3.41b, NB IoT SA: N-TM, LTE: E-TM1.1, M_{IoT+L} ,
1.885 GHz – 2.035 GHz, Port B:

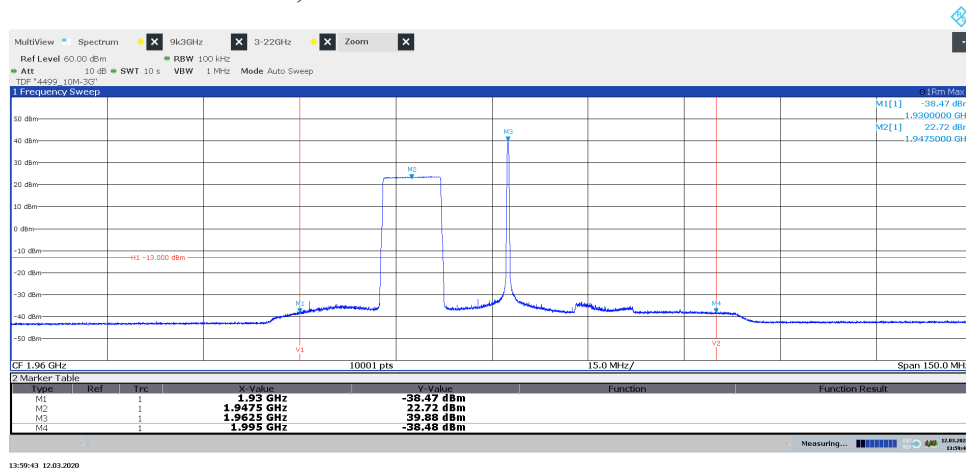


Diagram 3.41c, NB IoT SA: N-TM, LTE: E-TM1.1, M_{IoT+L} , 3 GHz – 22 GHz,
Port B:

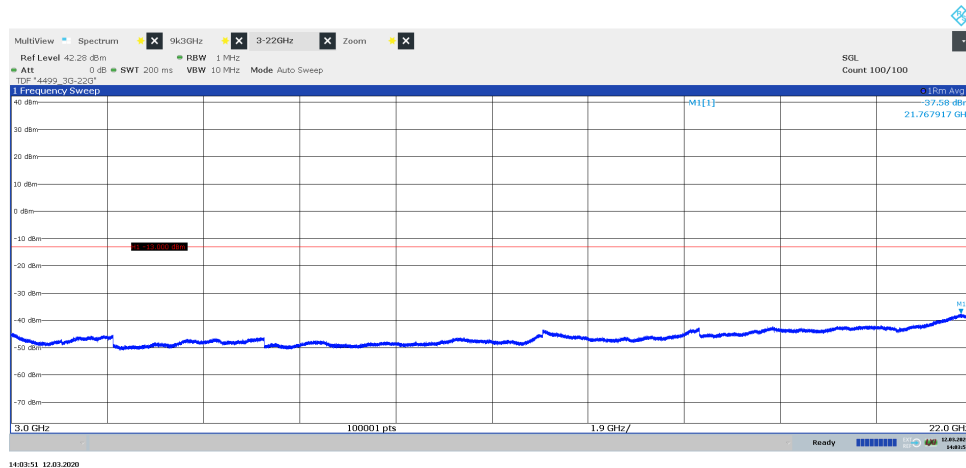


Diagram 3.42a, NB IoT SA: N-TM, LTE: E-TM1.1, M_{IoT+L} , 9 kHz – 3 GHz,
Port C:

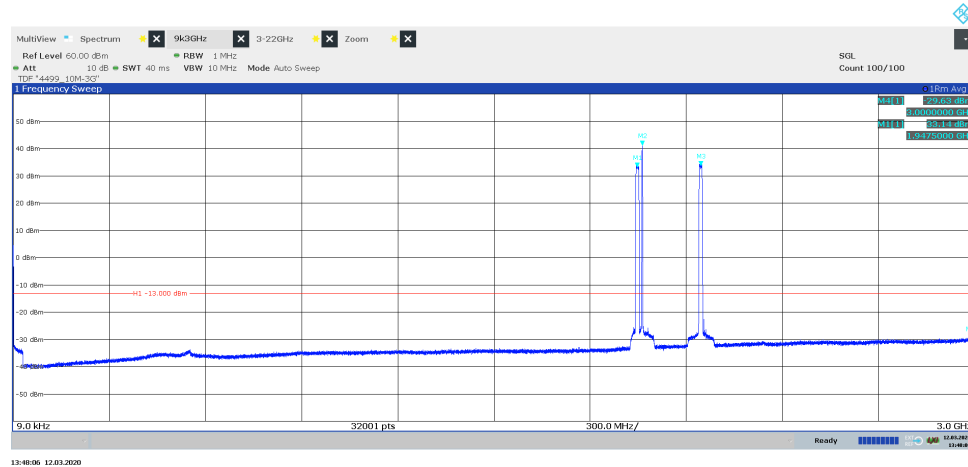


Diagram 3.42b, NB IoT SA: N-TM, LTE: E-TM1.1, M_{IoT+L} , 1.885 GHz – 2.035
GHz, Port C:

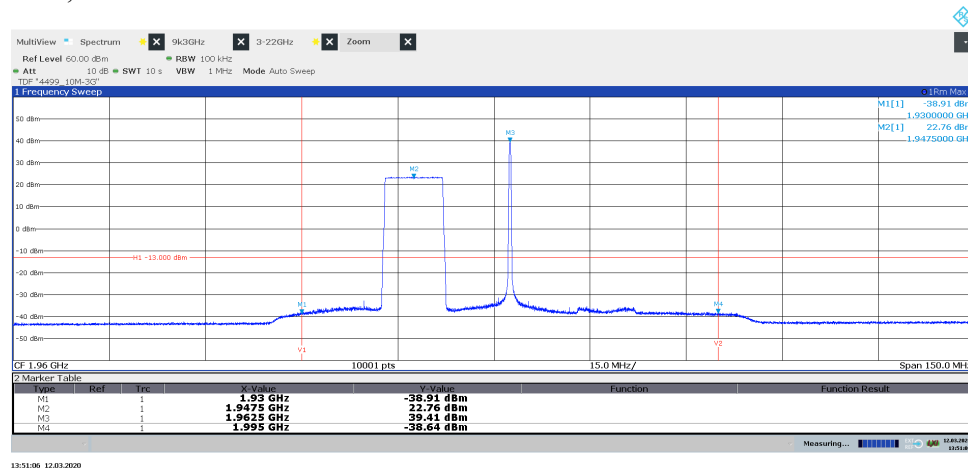


Diagram 3.42c, NB IoT SA: N-TM, LTE: E-TM1.1, M_{IoT+L} , 3 GHz – 22 GHz,
Port C:

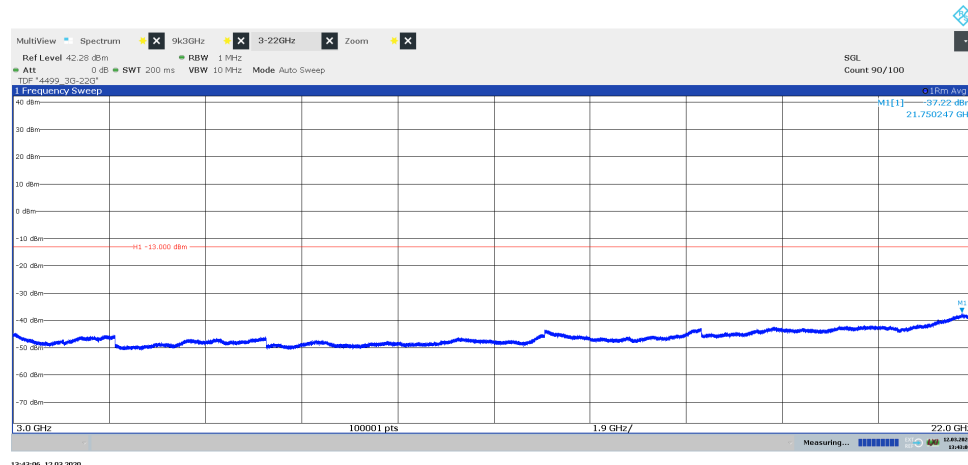


Diagram 3.43a, NB IoT SA: N-TM, LTE: E-TM1.1, M_{IoT+L} , 9 kHz – 3 GHz,
Port D:

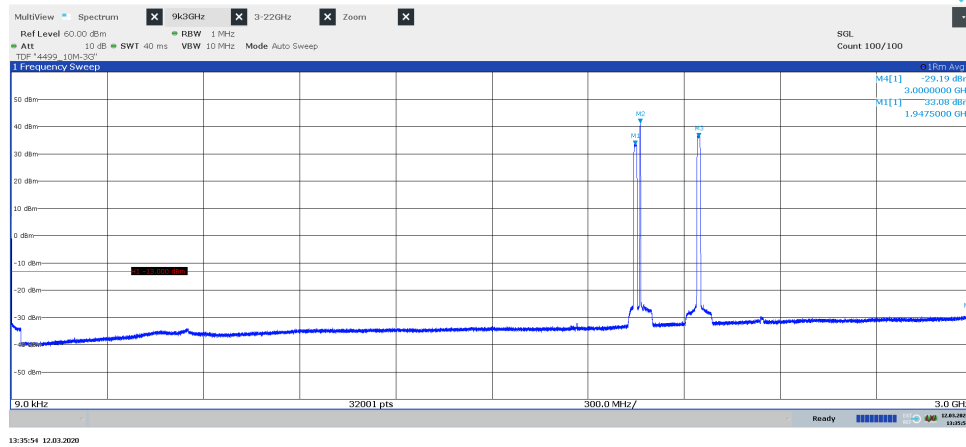


Diagram 3.43b, NB IoT SA: N-TM, LTE: E-TM1.1, M_{IoT+L} ,
1.885 GHz – 2.035 GHz, Port D:

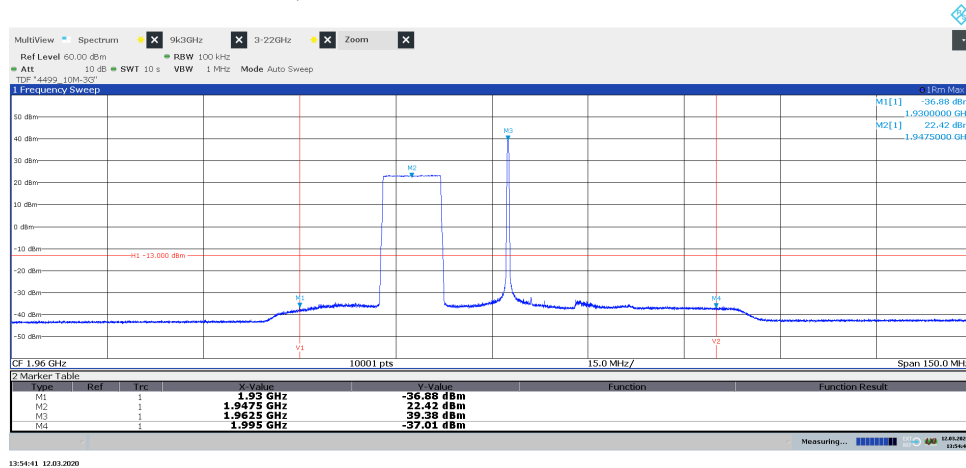


Diagram 3.43c, NB IoT SA: N-TM, LTE: E-TM1.1, M_{IoT+L} , 3 GHz – 22 GHz,
Port D:

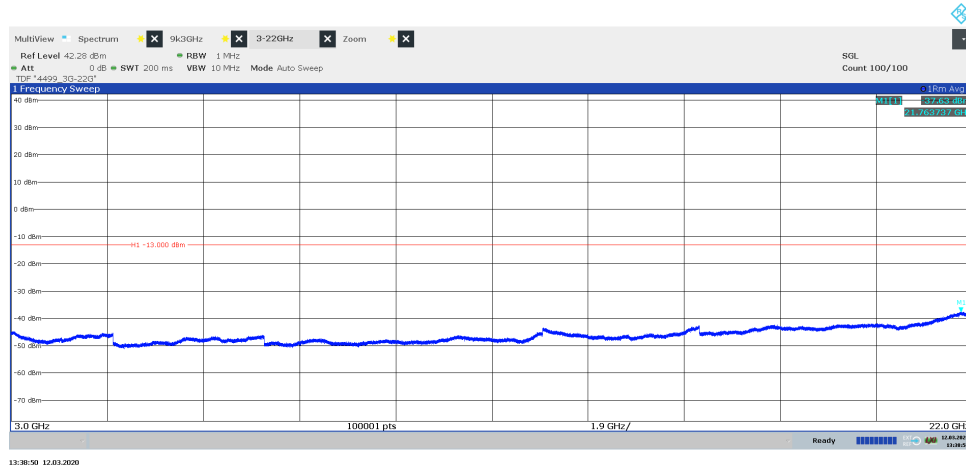


Diagram 3.44a, NB IoT IB: N-TM, LTE: E-TM3.1, $M_{IBIoT+L}$, 9 kHz – 3 GHz,
Port A:

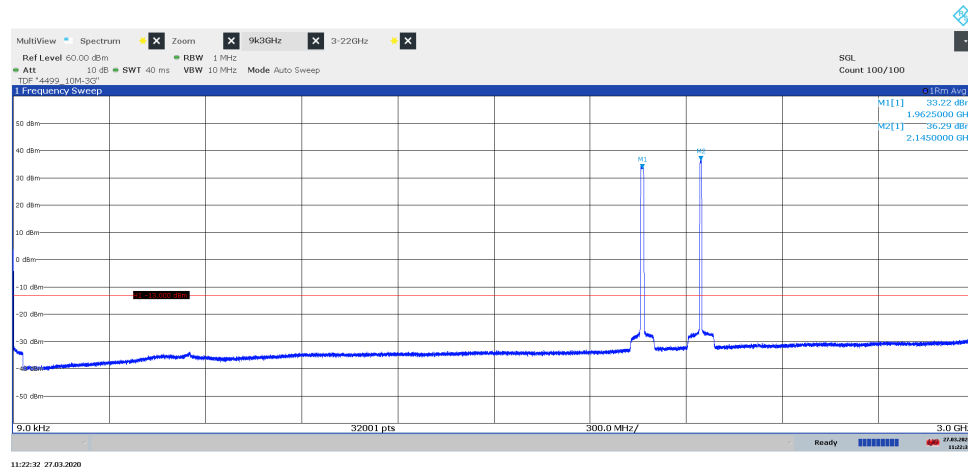


Diagram 3.44b, NB IoT IB: N-TM, LTE: E-TM3.1, $M_{IBIoT+L}$,
1.885 GHz – 2.035 GHz, Port A:

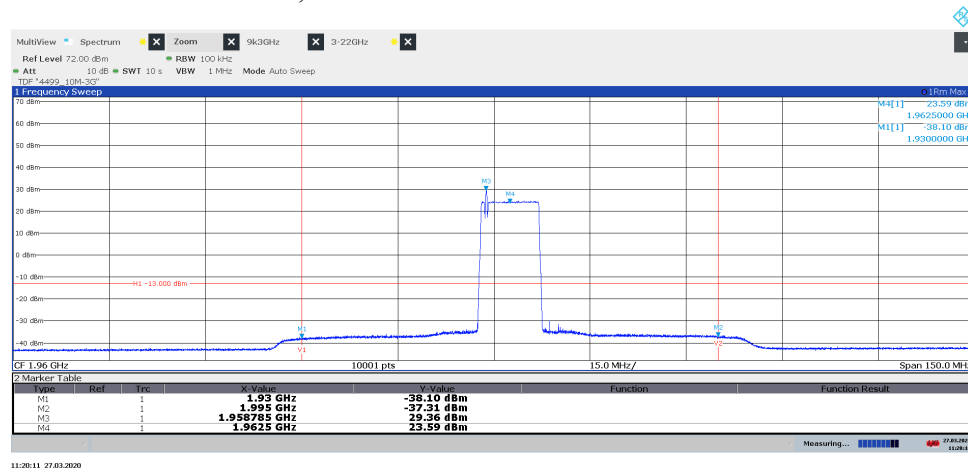


Diagram 3.44c, NB IoT IB: N-TM, LTE: E-TM3.1, $M_{IBIoT+L}$, 3 GHz – 22 GHz,
Port A:

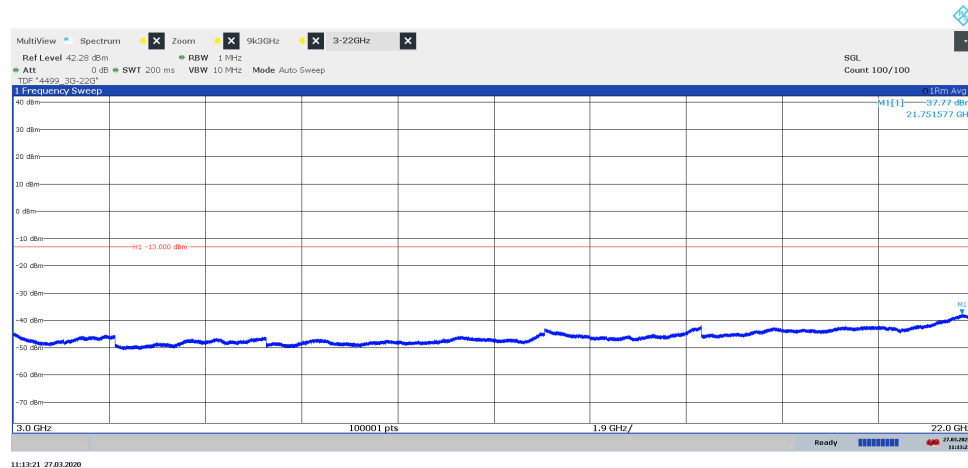


Diagram 3.45a, NB IoT SA: N-TM, LTE: E-TM1.1, T_{IoT+L} , 9 kHz – 3 GHz,
Port A:

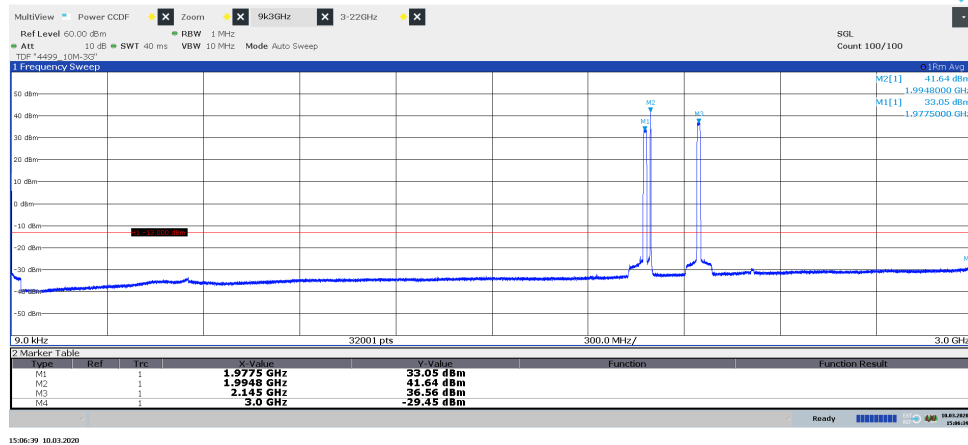
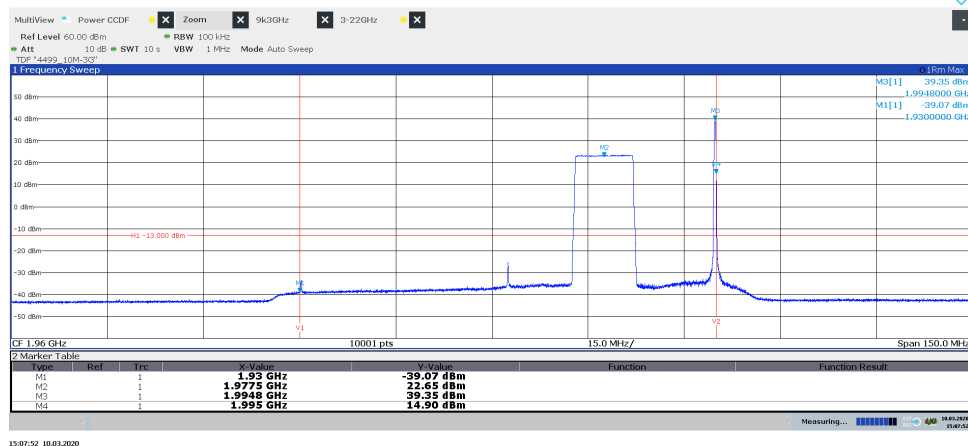


Diagram 3.45b, NB IoT SA: N-TM, LTE: E-TM1.1, T_{IoT+L} , 1.885 GHz – 2.035
GHz, Port A:



Note: The purpose of this measurement is to find IM products, not to verify compliance at the Band edges.

Diagram 3.45c, NB IoT SA: N-TM, LTE: E-TM1.1, T_{IoT+L} , 3 GHz – 22 GHz,
Port A:

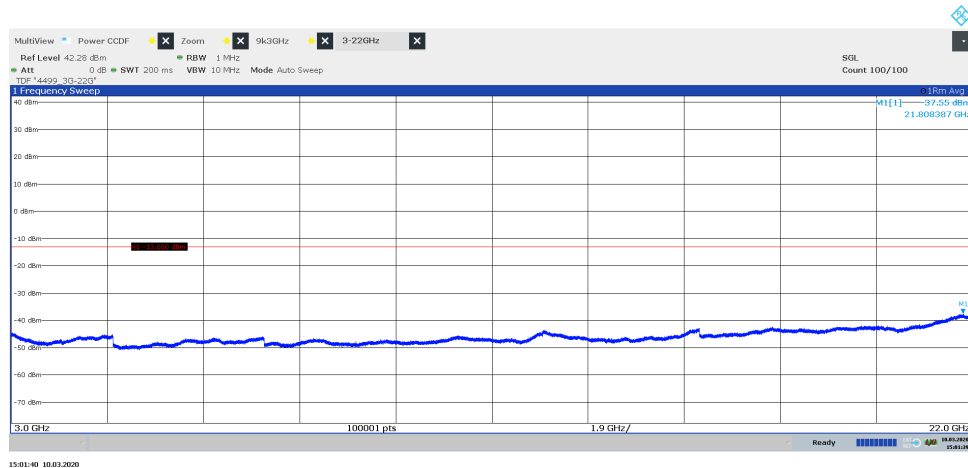


Diagram 3.46a, NB IoT IB: N-TM, LTE: E-TM3.1, $T_{IBIoT+L}$, 9 kHz – 3 GHz,
Port A:

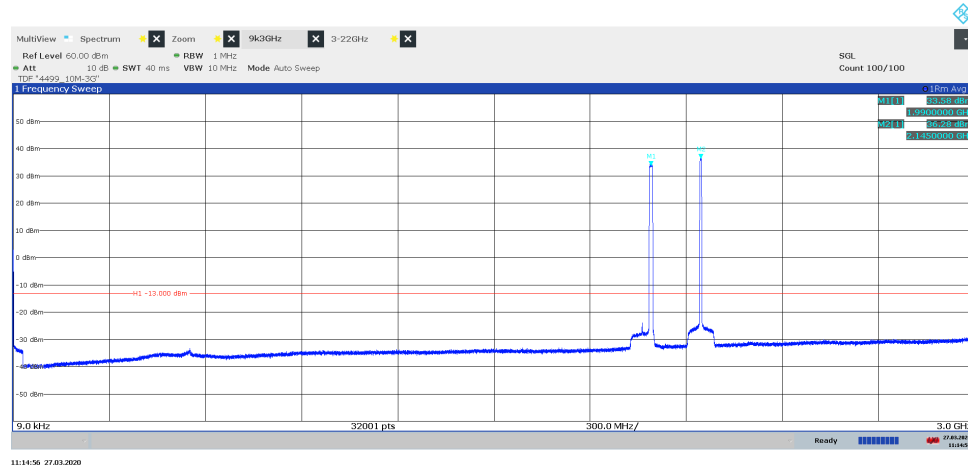


Diagram 3.46b, NB IoT IB: N-TM, LTE: E-TM3.1, $T_{IBIoT+L}$,
1.885 GHz – 2.035 GHz, Port A:

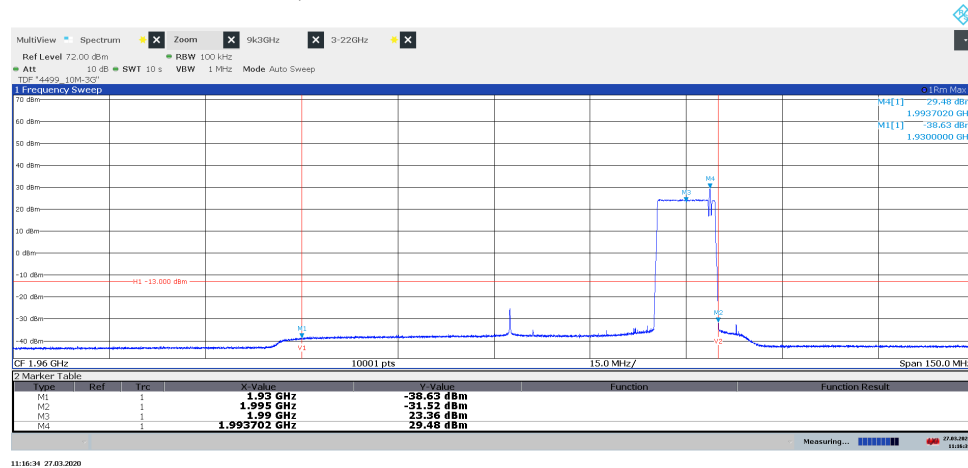


Diagram 3.46c, NB IoT IB: N-TM, LTE: E-TM3.1, $T_{IBIoT+L}$, 3 GHz – 22 GHz,
Port A:

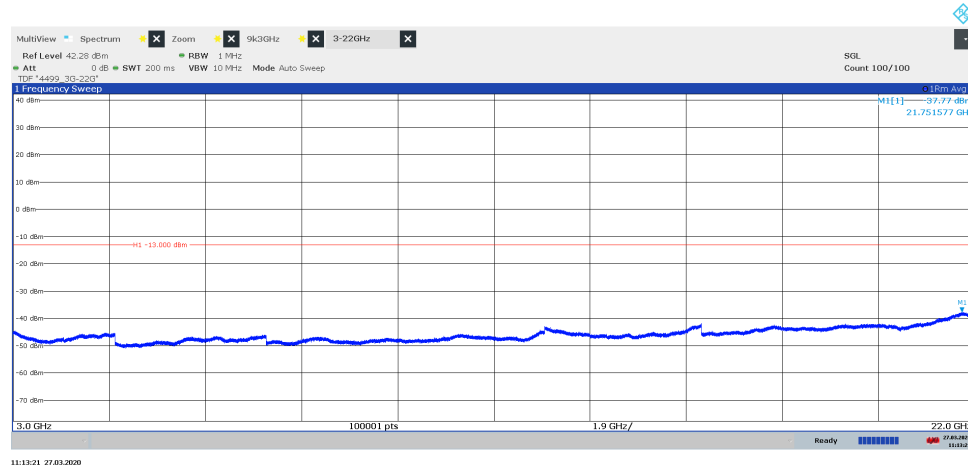


Diagram 3.47a, NB IoT GB: N-TM, LTE: E-TM3.1, T10_{Guard}, 9 kHz – 3 GHz,
Port A:

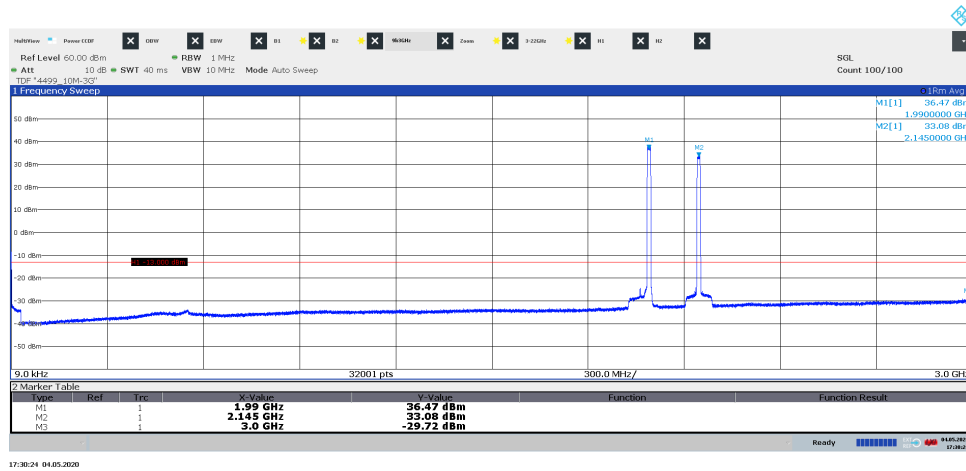


Diagram 3.47b, NB IoT GB: N-TM, LTE: E-TM3.1, T10_{Guard},
1.885 GHz – 2.035 GHz, Port A:

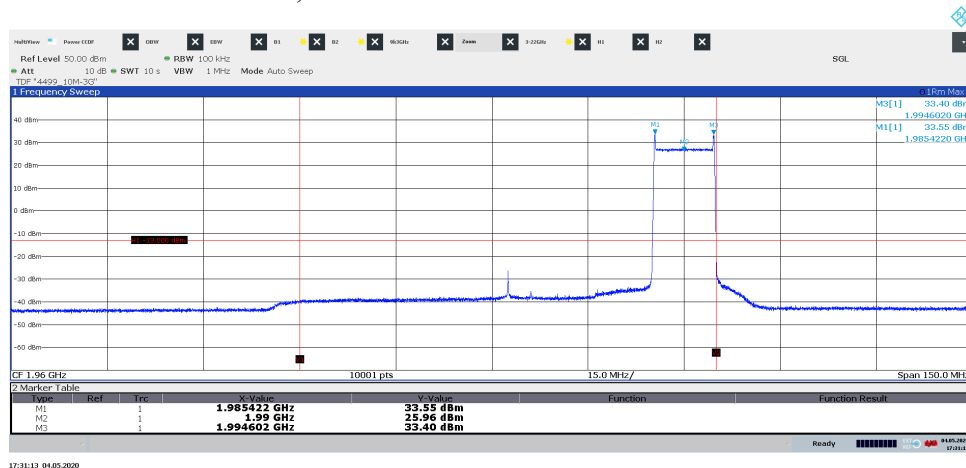


Diagram 3.47c, NB IoT GB: N-TM, LTE: E-TM3.1, T10_{Guard}, 3 GHz – 22 GHz,
Port A:

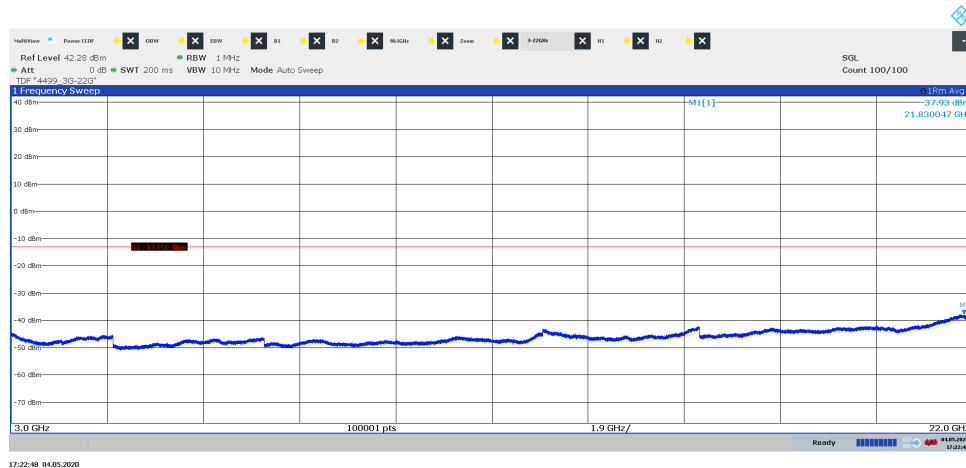


Diagram 3.48a, NB IoT GB: N-TM, LTE: E-TM3.1, T15_{Guard}, 9 kHz – 3 GHz,
Port A:

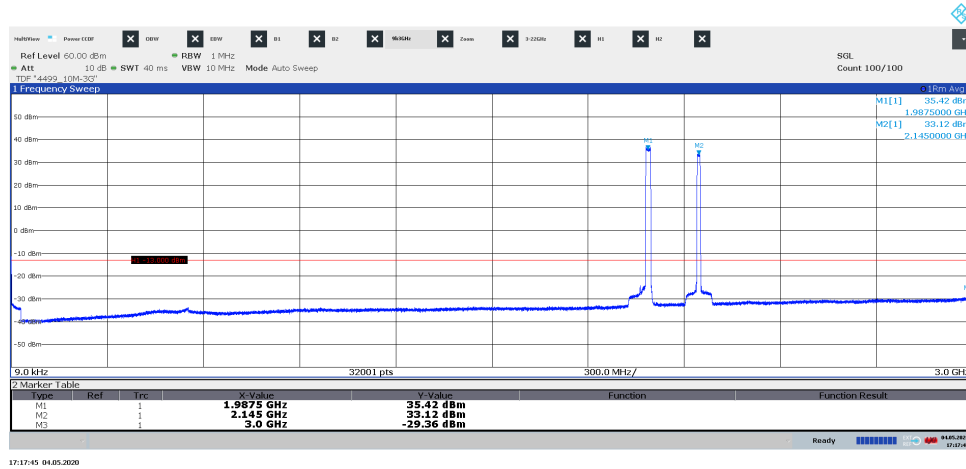


Diagram 3.48b, NB IoT GB: N-TM, LTE: E-TM3.1, T15_{Guard}, 1.885 GHz – 2.035 GHz, Port A:

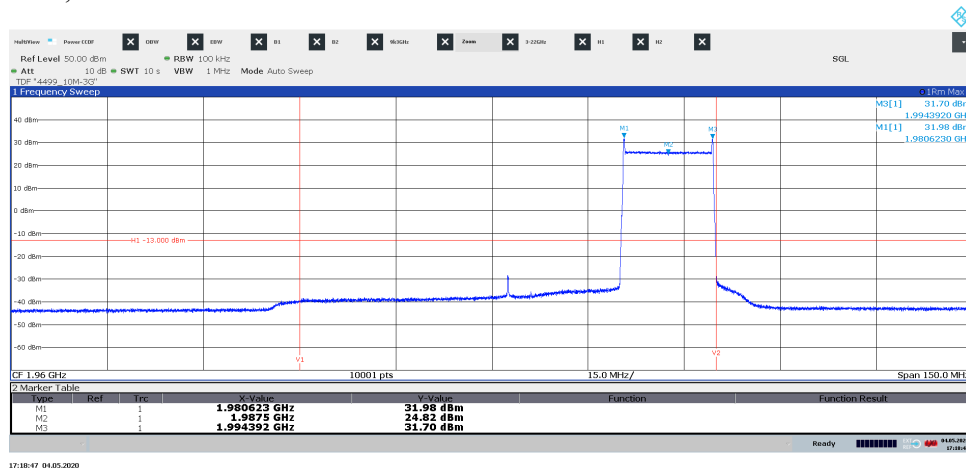


Diagram 3.48c, NB IoT GB: N-TM, LTE: E-TM3.1, T15_{Guard}, 3 GHz – 22 GHz,
Port A:

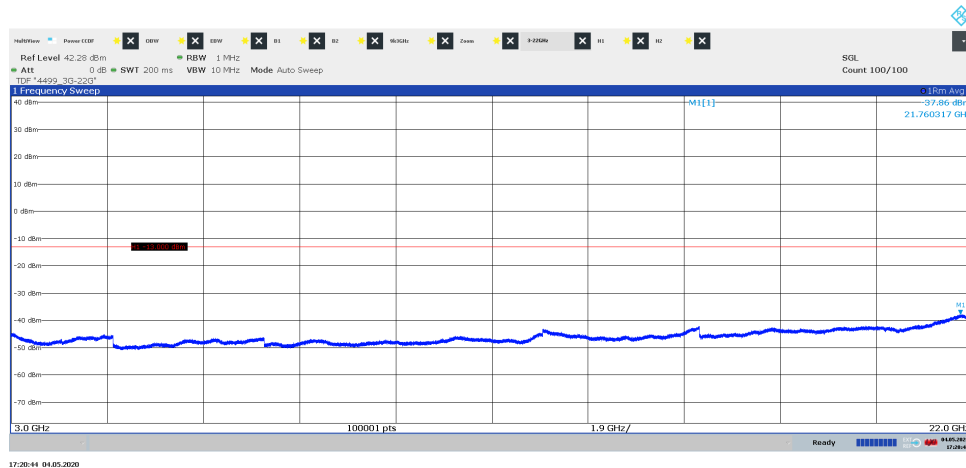


Diagram 3.49a, NB IoT GB: N-TM, LTE: E-TM3.1, T10_{Guard}, 9 kHz – 3 GHz,
Port A:

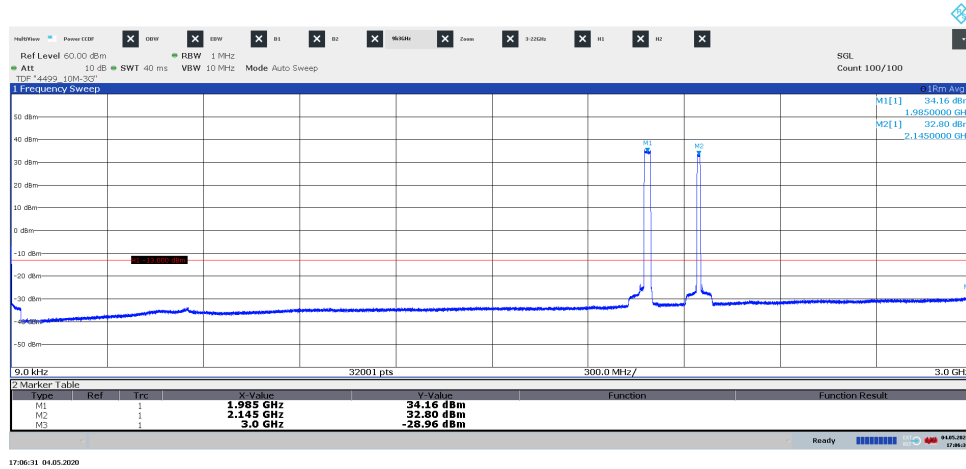


Diagram 3.49b, NB IoT GB: N-TM, LTE: E-TM3.1, T10_{Guard},
1.885 GHz – 2.035 GHz, Port A:

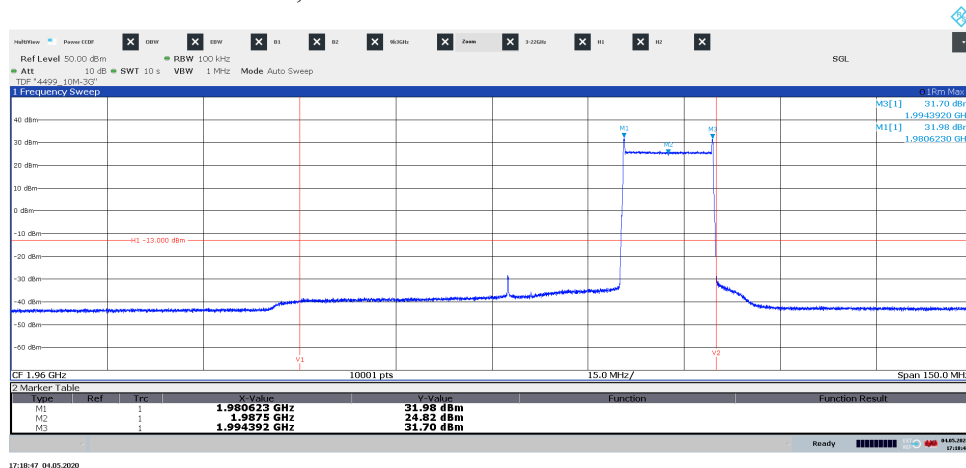


Diagram 3.49c, NB IoT GB: N-TM, LTE: E-TM3.1, T10_{Guard}, 3 GHz – 22 GHz,
Port A:

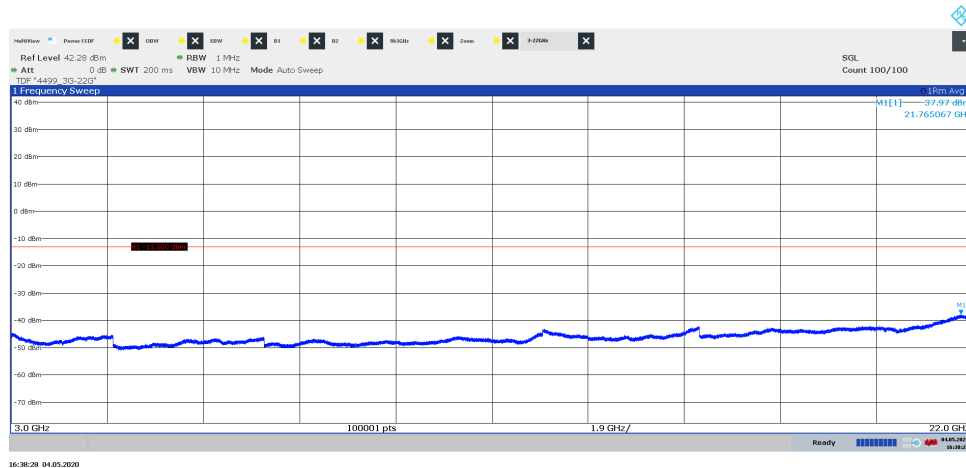


Diagram 3.50a, NB IoT SA: N-TM, LTE: E-TM1.1, B_{IoT+L} , 9 kHz – 3 GHz,
Port B:

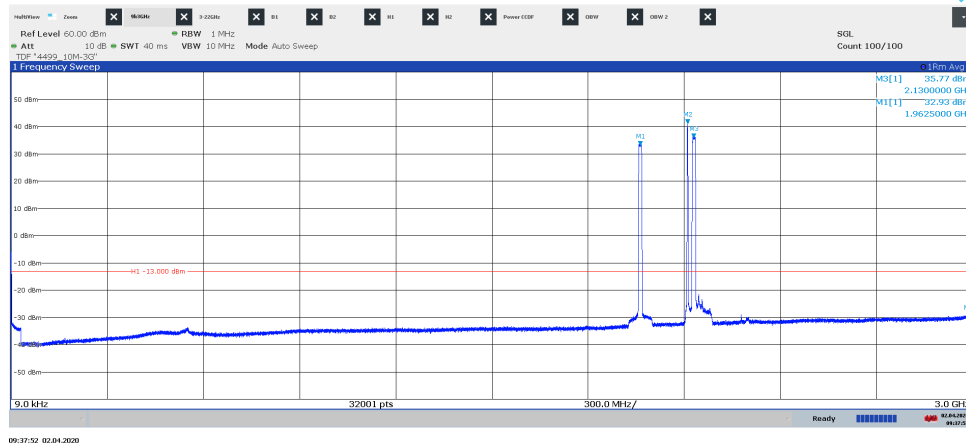
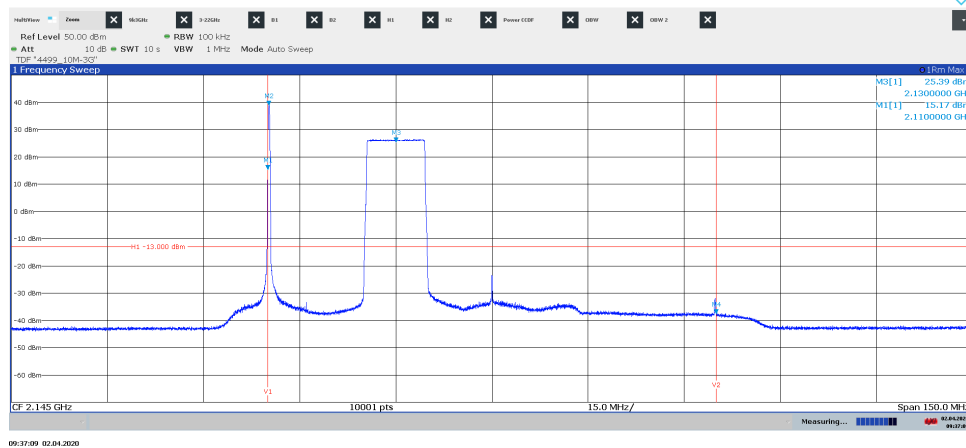


Diagram 3.50b, NB IoT SA: N-TM, LTE: E-TM1.1, B_{IoT+L} ,
2.07 GHz – 2.22 GHz, Port B:



Note: The purpose of this measurement is to find IM products, not to verify compliance at the Band edges.

Diagram 3.50c, NB IoT SA: N-TM, LTE: E-TM1.1, B_{IoT+L} , 3 GHz – 22 GHz,
Port B:

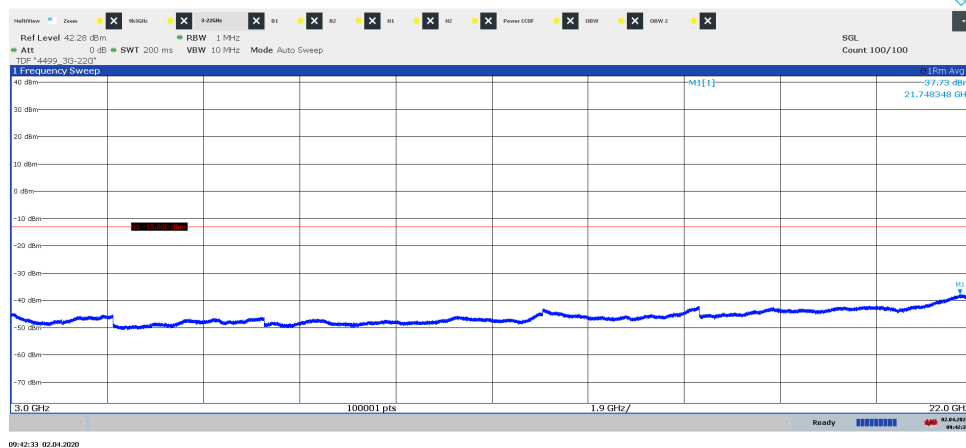


Diagram 3.51a, NB IoT IB: N-TM, LTE: E-TM3.1, $B_{\text{IBIoT+L}}$, 9 kHz – 3 GHz,
Port B:

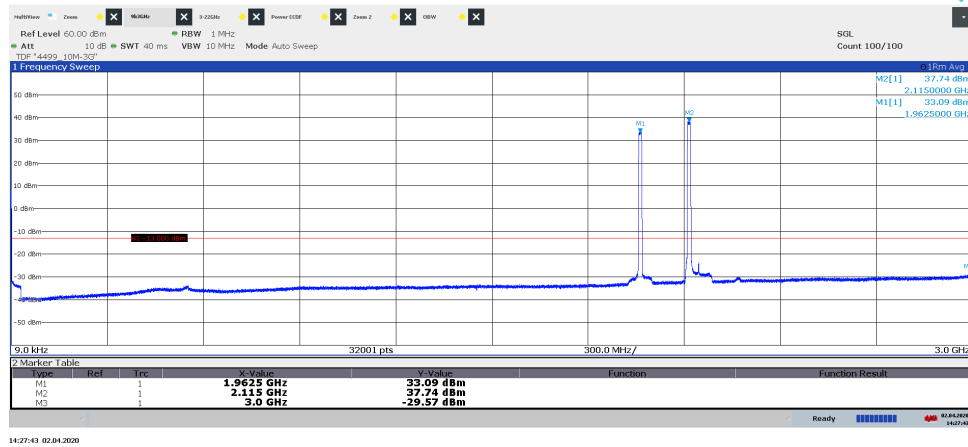
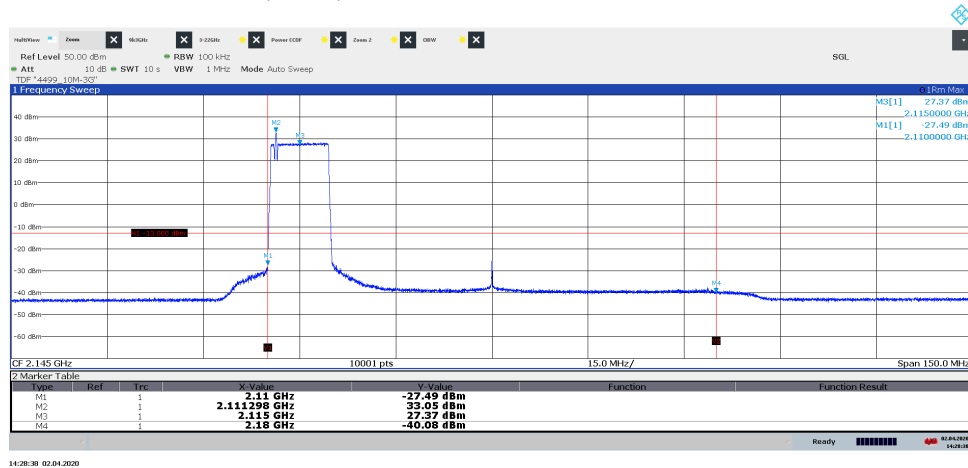


Diagram 3.51b, NB IoT IB: N-TM, LTE: E-TM3.1, $B_{\text{IBIoT+L}}$,
2.07 GHz – 2.22 GHz, GHz, Port B:



Note: The purpose of this measurement is to find IM products, not to verify compliance at the Band edges.

Diagram 3.51c, NB IoT IB: N-TM, LTE: E-TM3.1, $B_{\text{IBIoT+L}}$, 3 GHz – 22 GHz,
Port B:

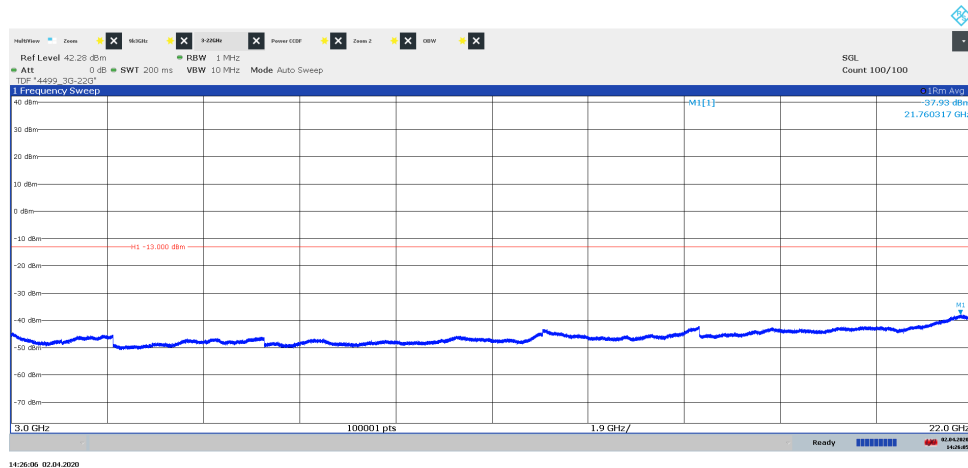


Diagram 3.52a, NB IoT GB: N-TM, LTE: E-TM3.1, B10_{Guard}, 9 kHz – 3 GHz, Port B:

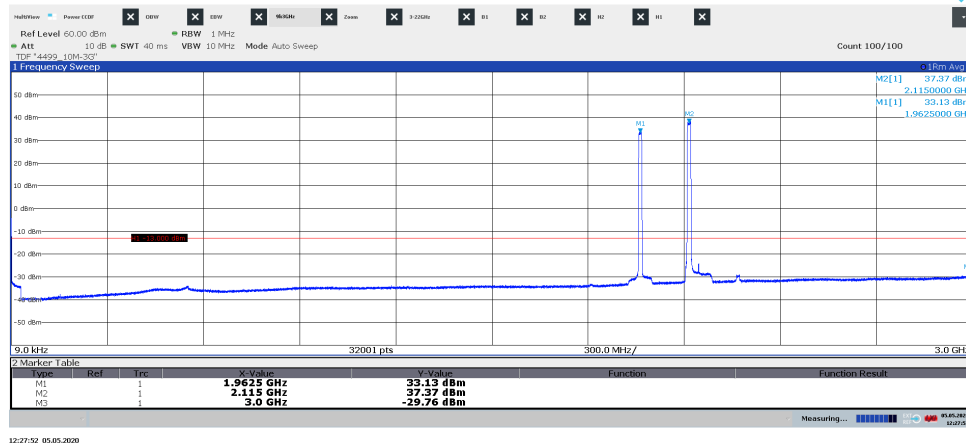


Diagram 3.52b, NB IoT GB: N-TM, LTE: E-TM3.1, B10_{Guard}, 2.07 GHz – 2.22 GHz, Port B:

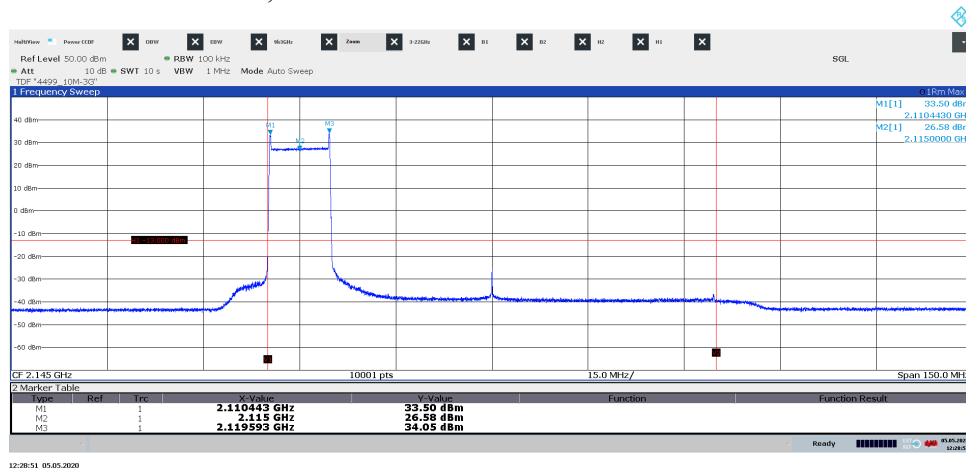


Diagram 3.52c, NB IoT GB: N-TM, LTE: E-TM3.1, B10_{Guard}, 3 GHz – 22 GHz, Port B:

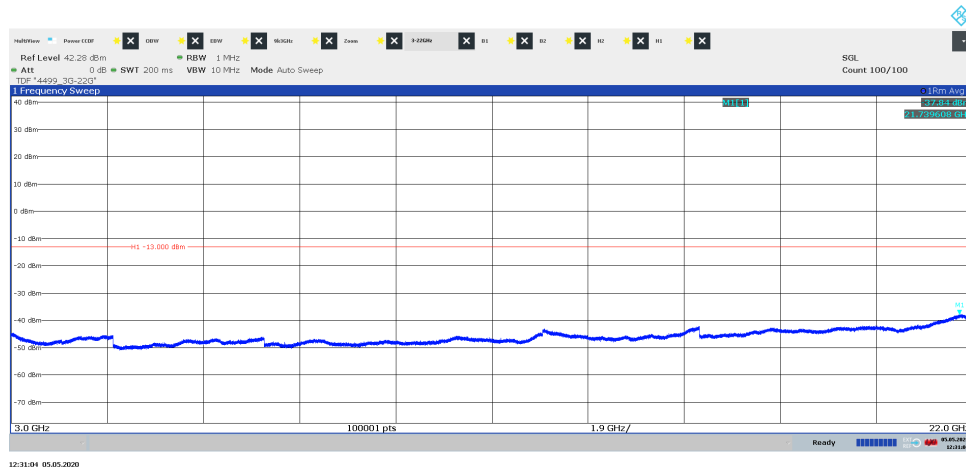


Diagram 3.53a, NB IoT GB: N-TM, LTE: E-TM3.1, B15_{Guard}, 9 kHz – 3 GHz, Port B:

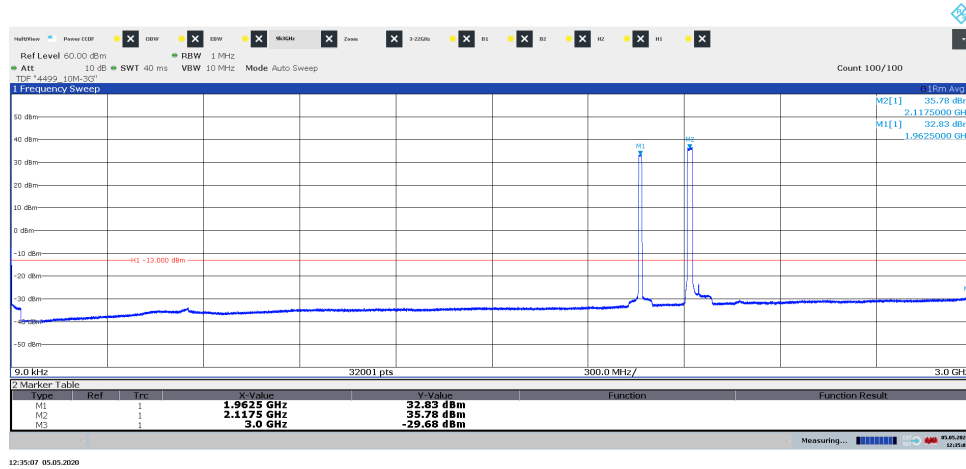


Diagram 3.53b, NB IoT GB: N-TM, LTE: E-TM3.1, B15_{Guard}, 2.07 GHz – 2.22 GHz, Port B:

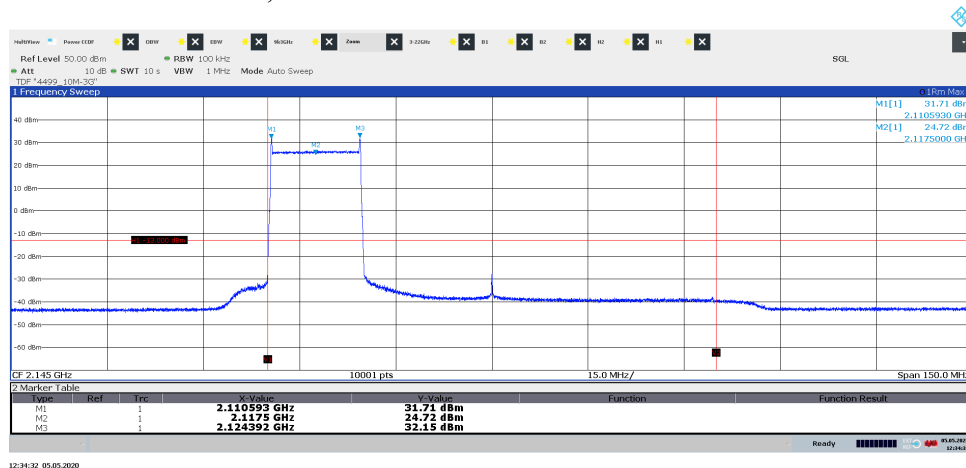


Diagram 3.53c, NB IoT GB: N-TM, LTE: E-TM3.1, B15_{Guard}, 3 GHz – 22 GHz, Port B:

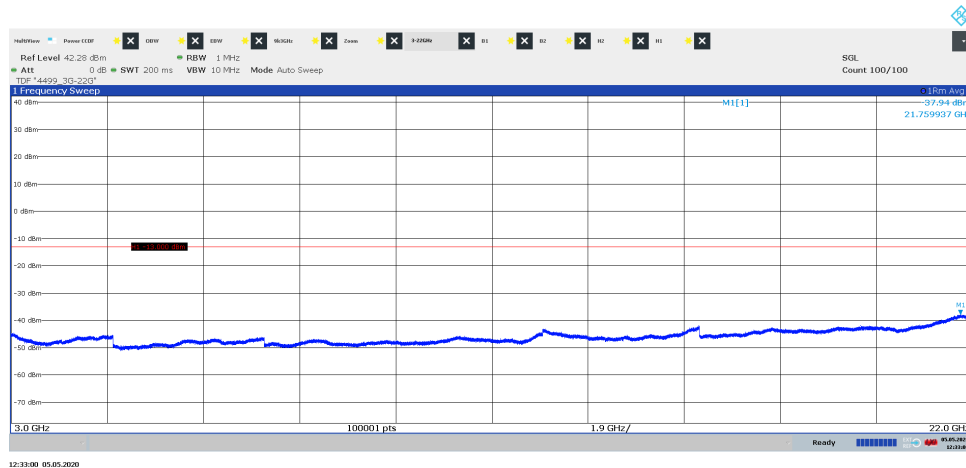




Diagram 3.55a, NB IoT SA: N-TM, LTE: E-TM1.1, M_{IoT+L} , 9 kHz – 3 GHz,
Port A:

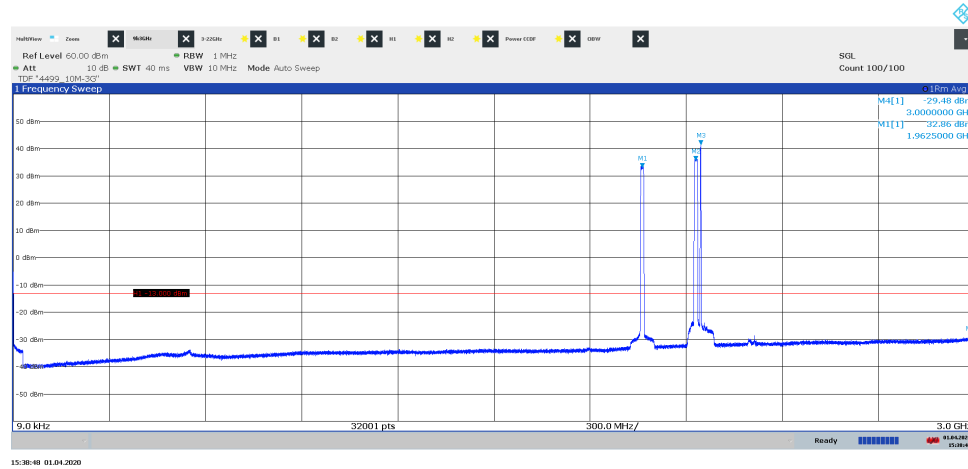


Diagram 3.55b, NB IoT SA: N-TM, LTE: E-TM1.1, M_{IoT+L} ,
2.07 GHz – 2.22 GHz, Port A:

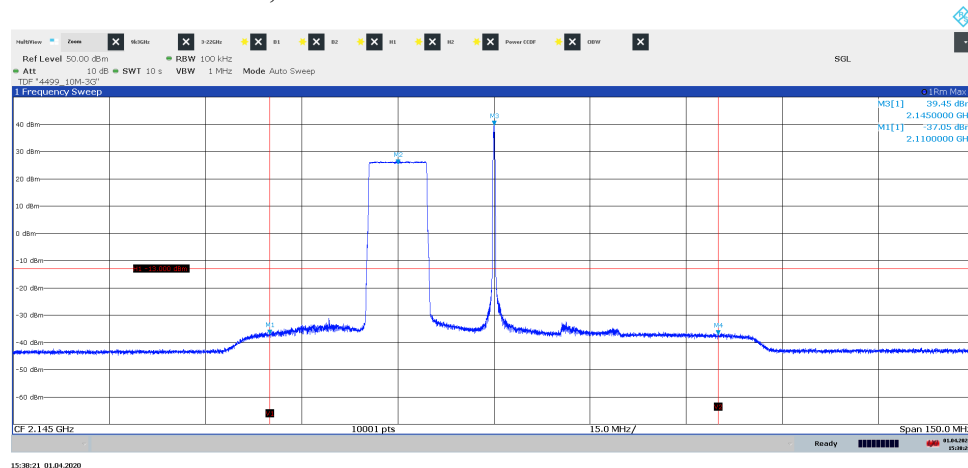


Diagram 3.55c, NB IoT SA: N-TM, LTE: E-TM1.1, M_{IoT+L} , 3 GHz – 22 GHz,
Port A:

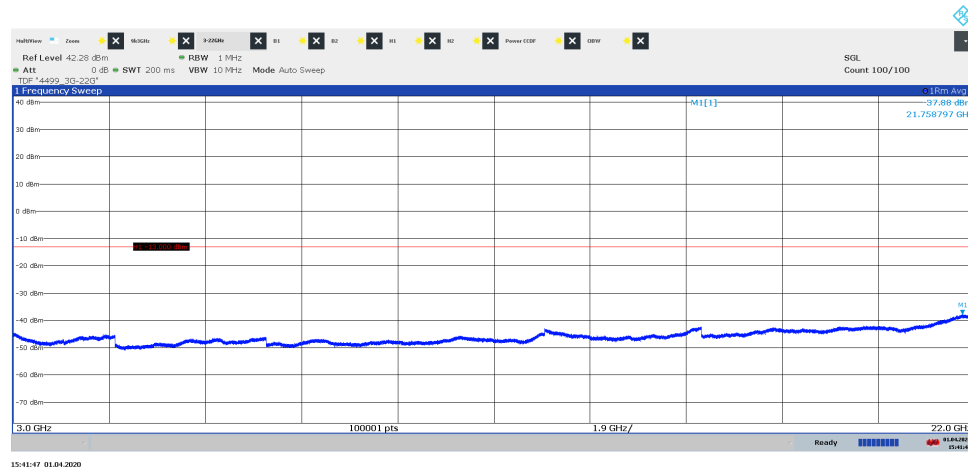


Diagram 3.56a, NB IoT SA: N-TM, LTE: E-TM1.1, M_{IoT+L} , 9 kHz – 3 GHz,
Port B:

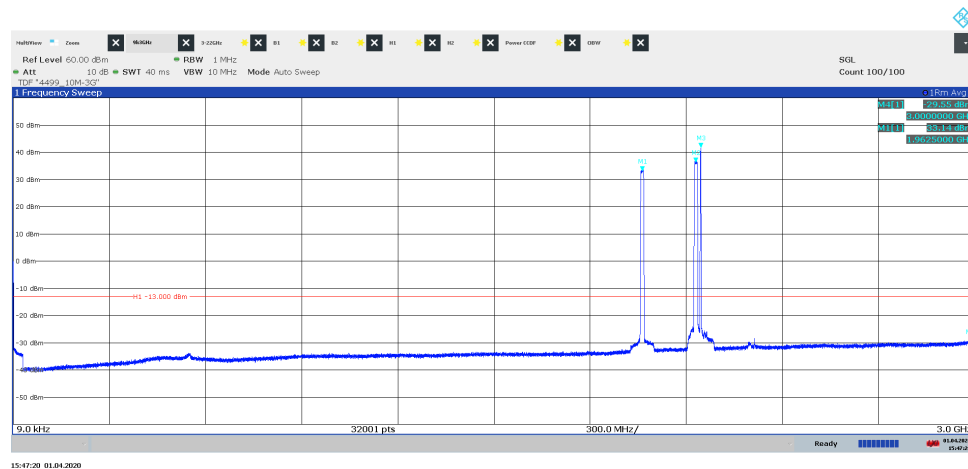


Diagram 3.56b, NB IoT SA: N-TM, LTE: E-TM1.1, M_{IoT+L} ,
2.07 GHz – 2.22 GHz, Port B:

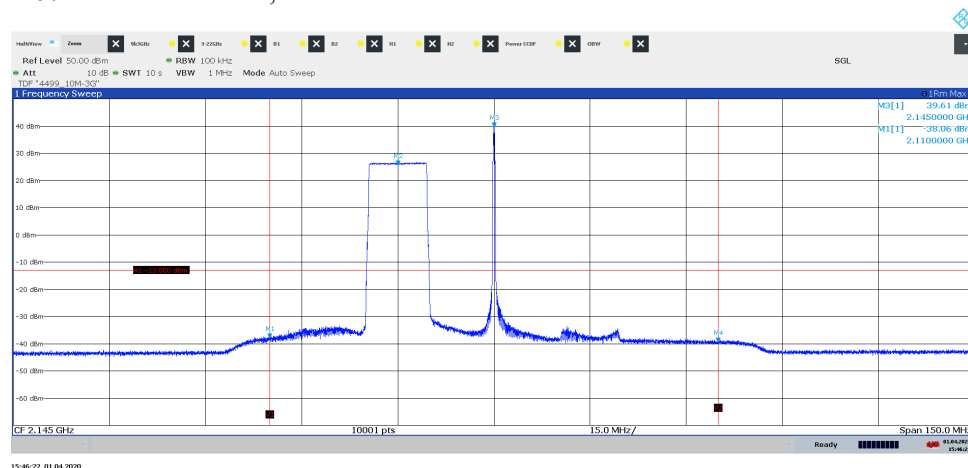


Diagram 3.56c, NB IoT SA: N-TM, LTE: E-TM1.1, M_{IoT+L} , 3 GHz – 22 GHz,
Port B:

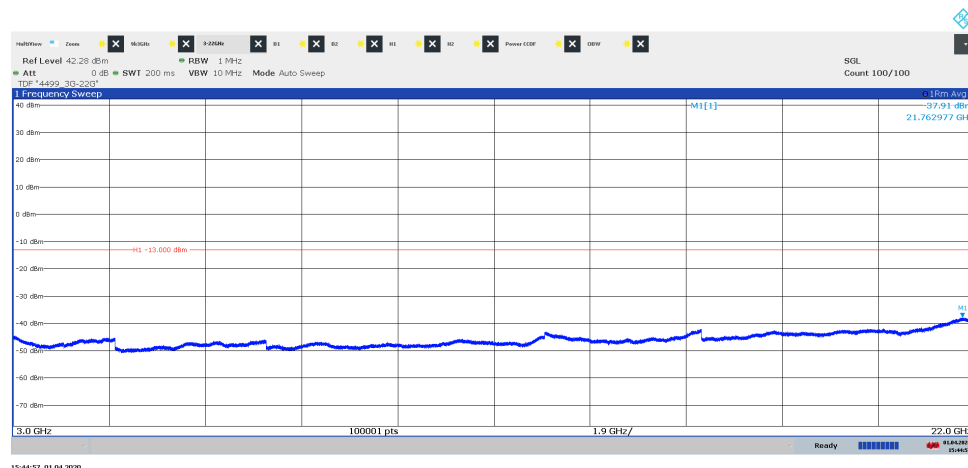


Diagram 3.57a, NB IoT SA: N-TM, LTE: E-TM1.1, M_{IoT+L} , 9 kHz – 3 GHz,
Port C:

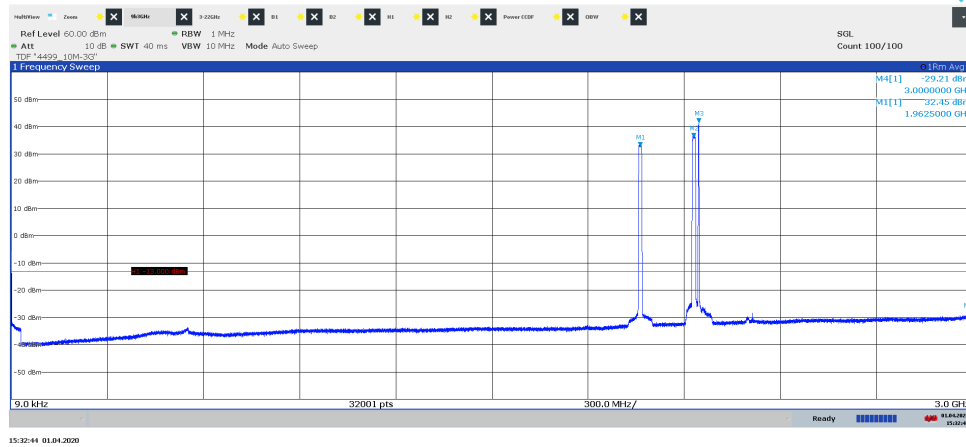


Diagram 3.57b, NB IoT SA: N-TM, LTE: E-TM1.1, M_{IoT+L} , 2.07 GHz – 2.22
GHz, Port C:

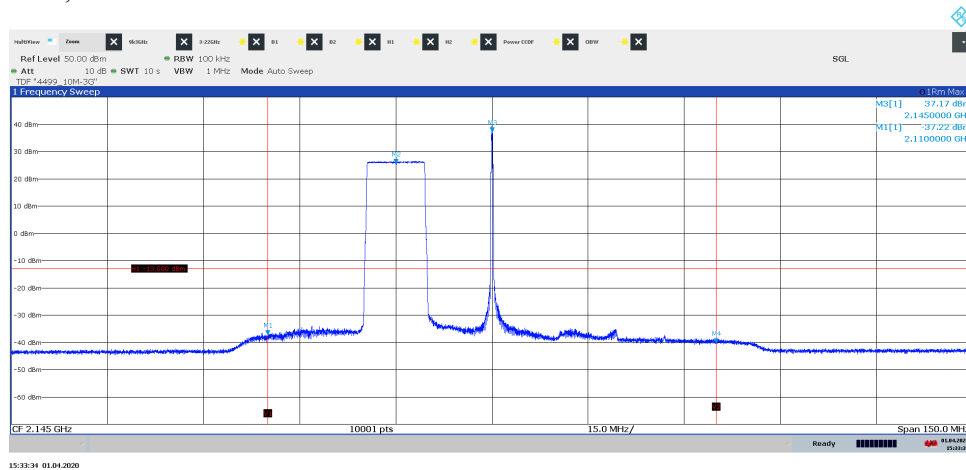


Diagram 3.57c, NB IoT SA: N-TM, LTE: E-TM1.1, M_{IoT+L} , 3 GHz – 22 GHz,
Port C:

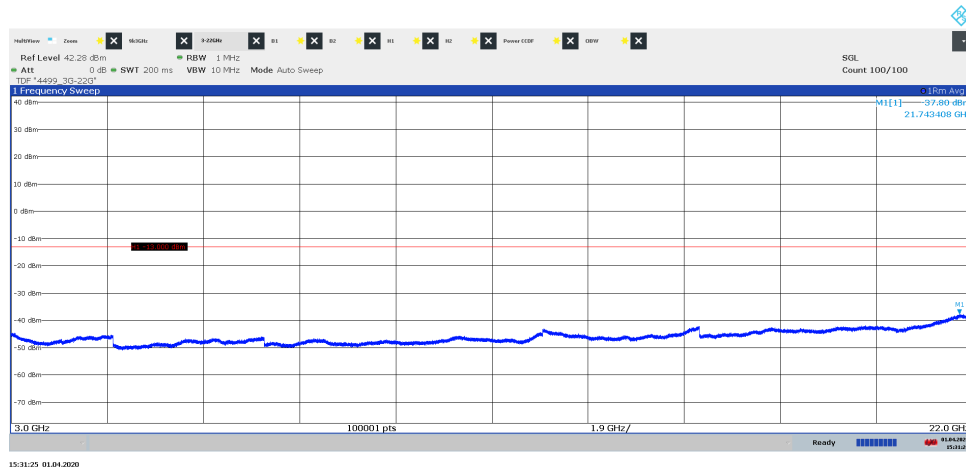


Diagram 3.58a, NB IoT SA: N-TM, LTE: E-TM1.1, M_{IoT+L} , 9 kHz – 3 GHz,
Port D:

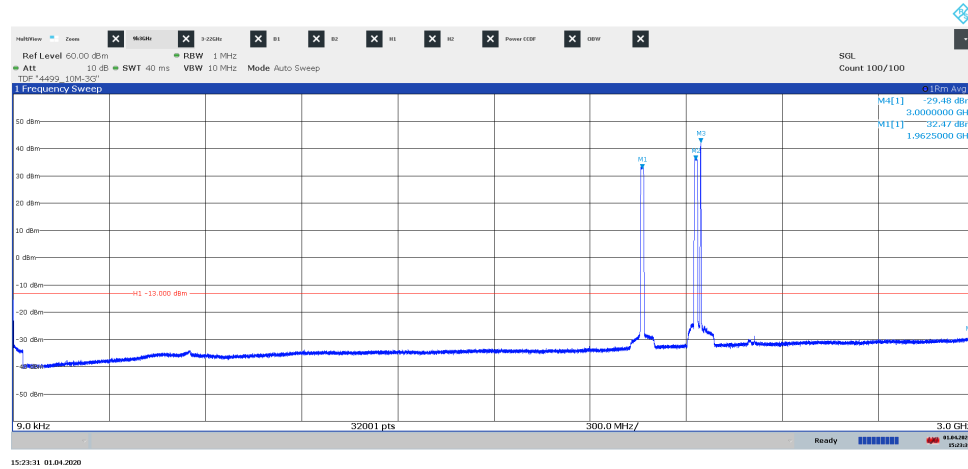


Diagram 3.58b, NB IoT SA: N-TM, LTE: E-TM1.1, M_{IoT+L} ,
2.07 GHz – 2.22 GHz, Port D:

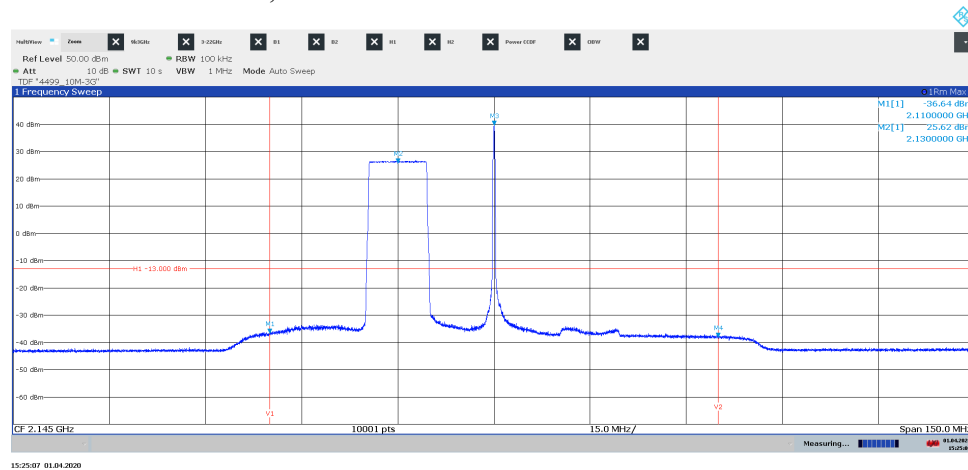


Diagram 3.58c, NB IoT SA: N-TM, LTE: E-TM1.1, M_{IoT+L} , 3 GHz – 22 GHz,
Port D:

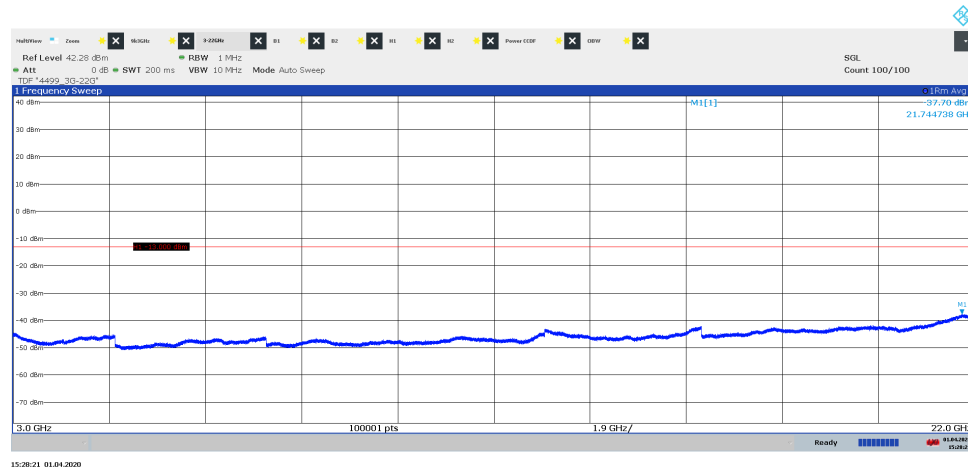


Diagram 3.59a, NB IoT IB: N-TM, LTE: E-TM3.1, $M_{IBIoT+L}$, 9 kHz – 3 GHz, Port B:

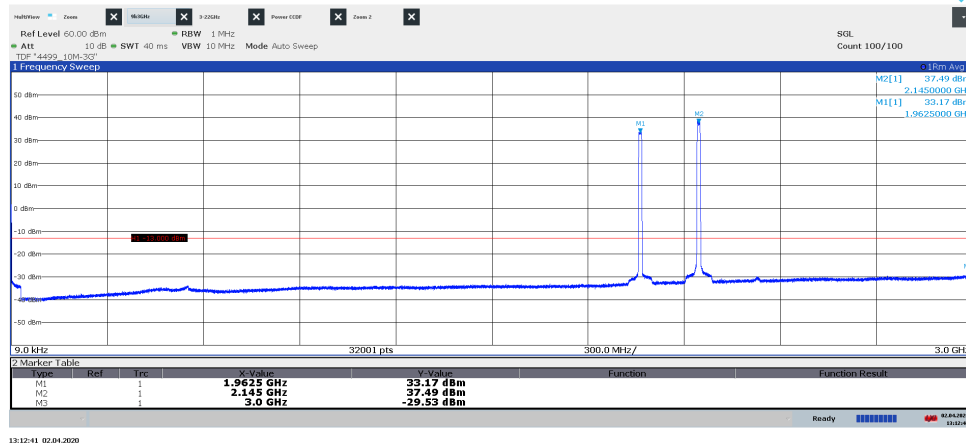


Diagram 3.59b, NB IoT IB: N-TM, LTE: E-TM3.1, $M_{IBIoT+L}$, 2.07 GHz – 2.22 GHz, Port B:

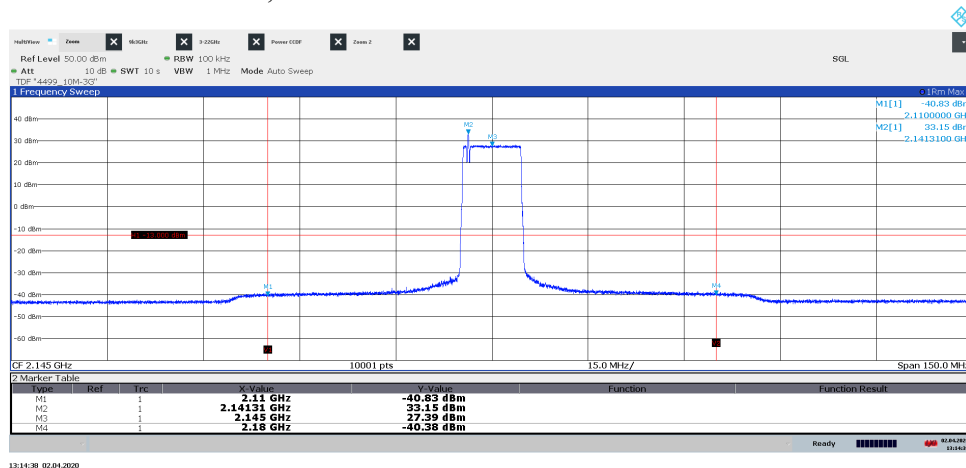


Diagram 3.59c, NB IoT IB: N-TM, LTE: E-TM3.1, $M_{IBIoT+L}$, 3 GHz – 22 GHz, Port B:

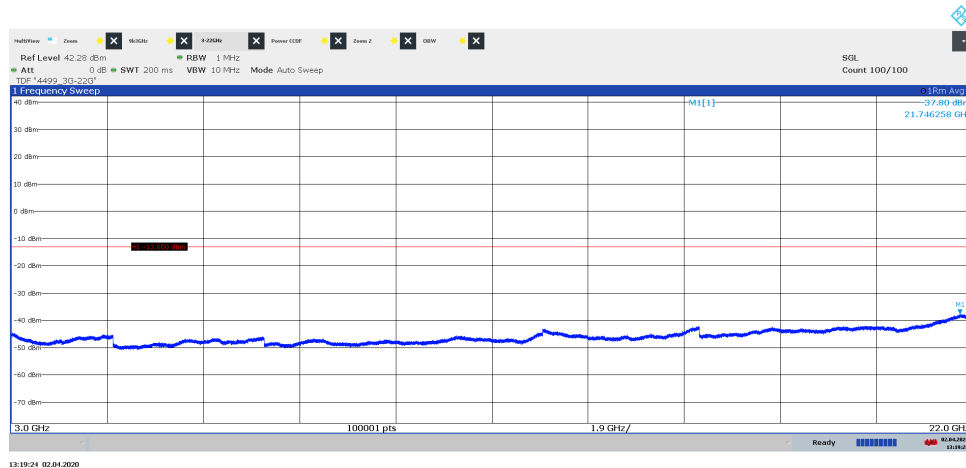


Diagram 3.60a, NB IoT SA: N-TM, LTE: E-TM1.1, T_{IoT+L} , 9 kHz – 3 GHz,
Port B:

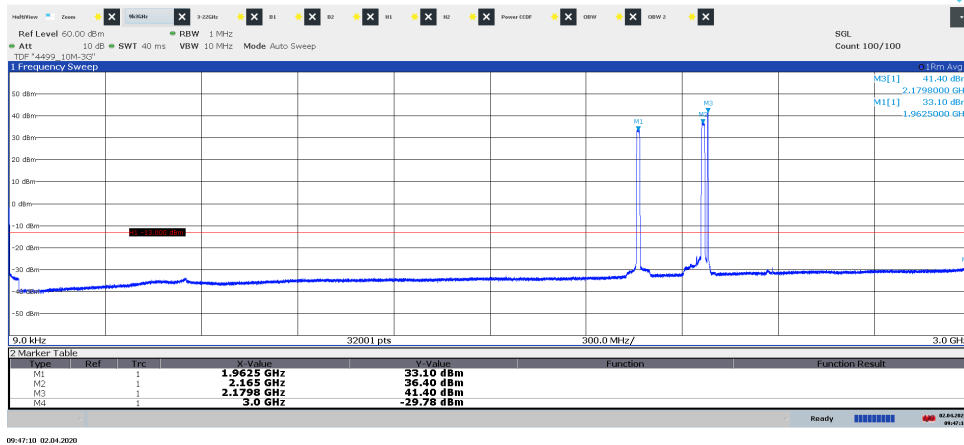
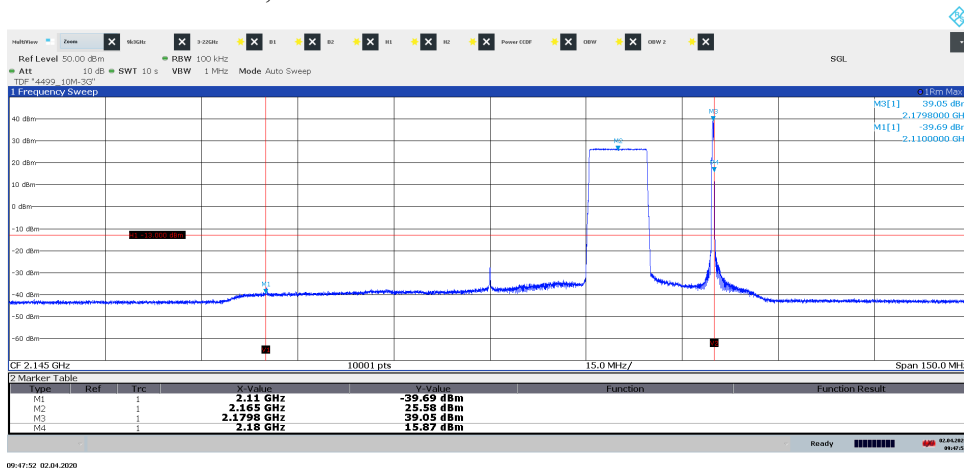


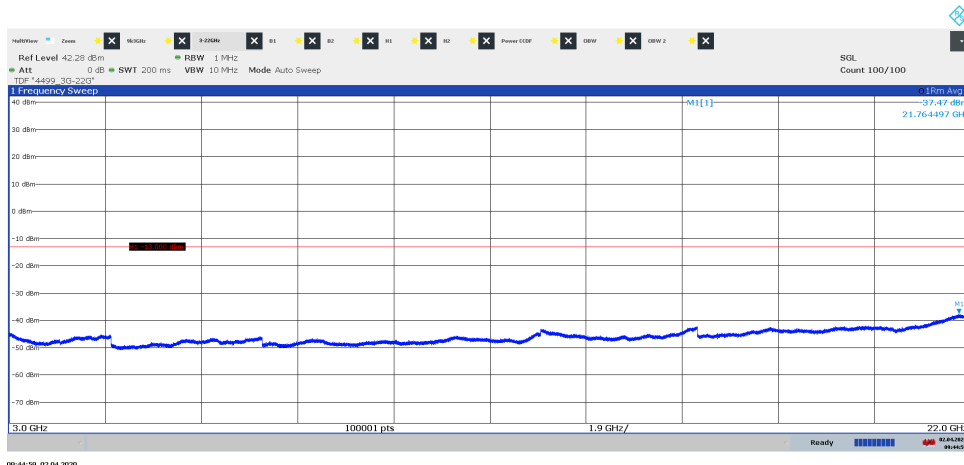
Diagram 3.60b, NB IoT SA: N-TM, LTE: E-TM1.1, T_{IoT+L} ,
2.07 GHz – 2.22 GHz, Port B:



09:47:52 02.04.2020

Note: The purpose of this measurement is to find IM products, not to verify compliance at the Band edges.

Diagram 3.60c, NB IoT SA: N-TM, LTE: E-TM1.1, T_{IoT+L} , 3 GHz – 22 GHz,
Port B:



09:44:59 02.04.2020

Diagram 3.61a, NB IoT IB: N-TM, LTE: E-TM3.1, $T_{IBIoT+L}$, 9 kHz – 3 GHz,
Port B:

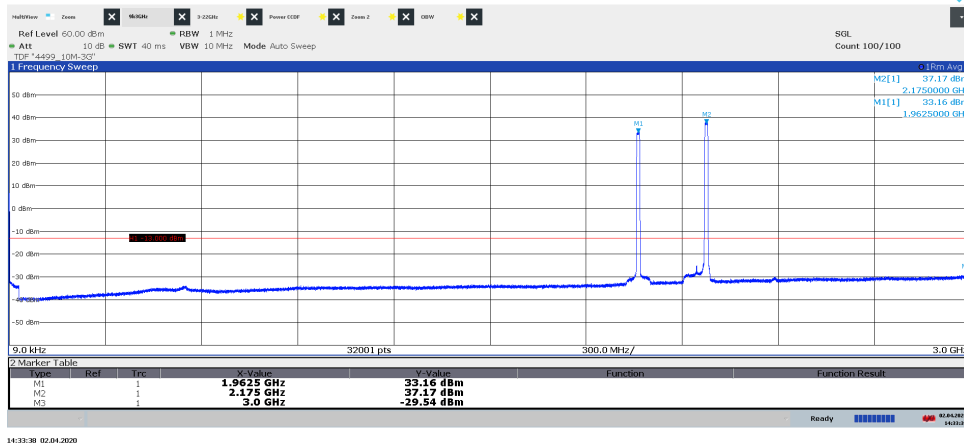


Diagram 3.61b, NB IoT IB: N-TM, LTE: E-TM3.1, $T_{IBIoT+L}$,
2.07 GHz – 2.22 GHz, Port B:

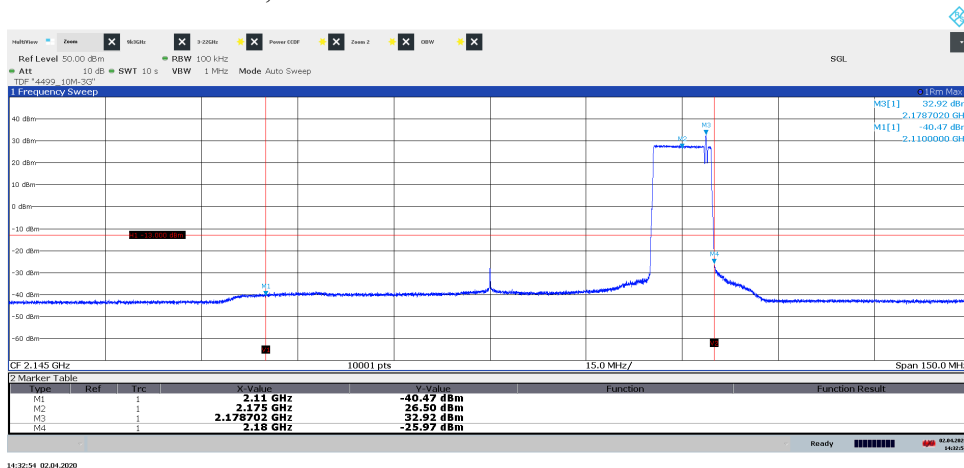


Diagram 3.61c, NB IoT IB: N-TM, LTE: E-TM3.1, $T_{IBIoT+L}$, 3 GHz – 22 GHz,
Port B:

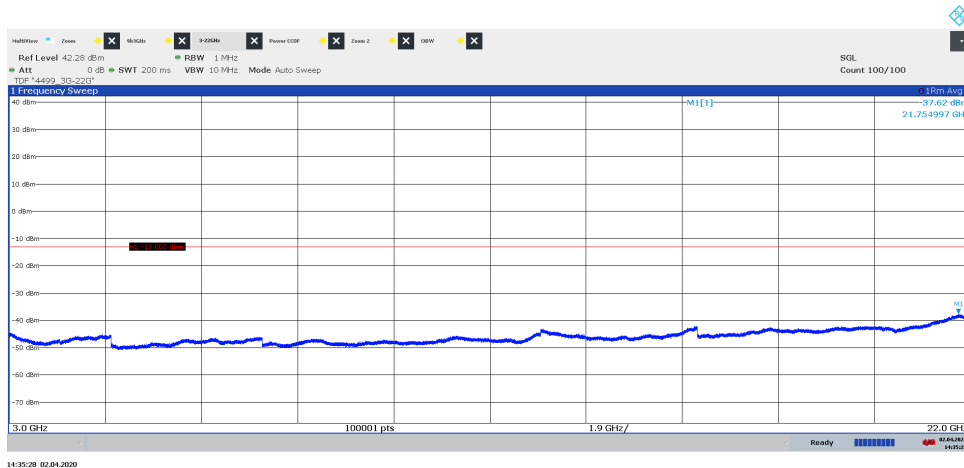


Diagram 3.62a, GSM: GMSK, NB IoT SA: N-TM, LTE: E-TM1.1,
Bim_{G+IoT+L}, 9kHz – 3GHz Port A:

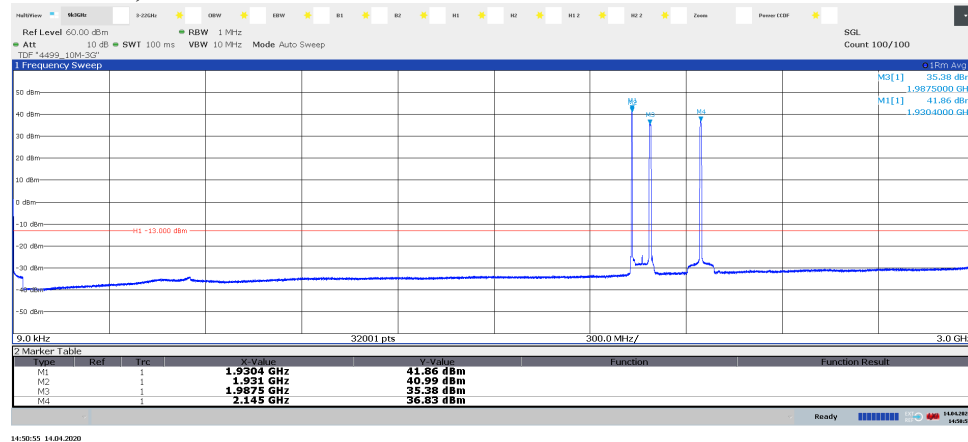
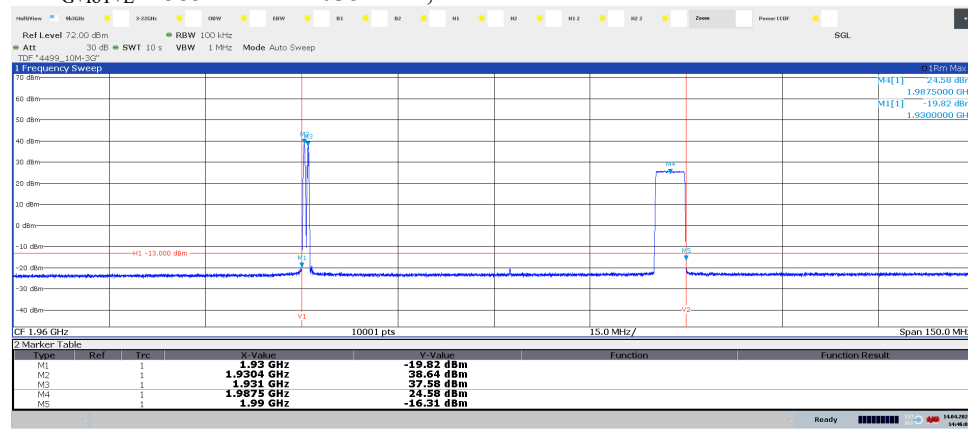


Diagram 3.62b, GSM: GMSK, NB IoT SA: N-TM, LTE: E-TM1.1,
Bim_{G+IoT+L} 1.885 GHz – 2.035 GHz, Port A:



Note: The purpose of this measurement is to find IM products, not to verify compliance at the Band edges.

Diagram 3.62c GSM: GMSK, NB IoT SA: N-TM, LTE: E-TM1.1,
Bim_{G+IoT+L}, 3 GHz – 22 GHz, Port A:

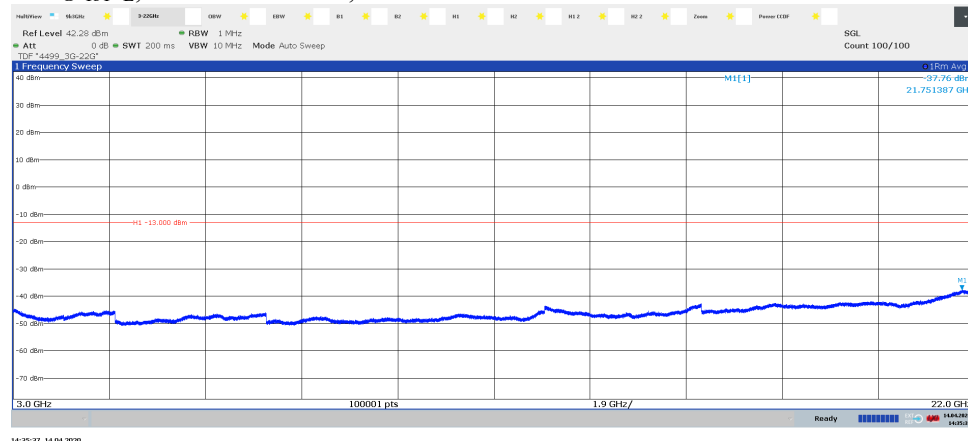


Diagram 3.63a, GSM: GMSK, NB IoT SA: N-TM, LTE: E-TM1.1,
Tim_{G+IoT+L}, 9kHz – 3GHz Port A:

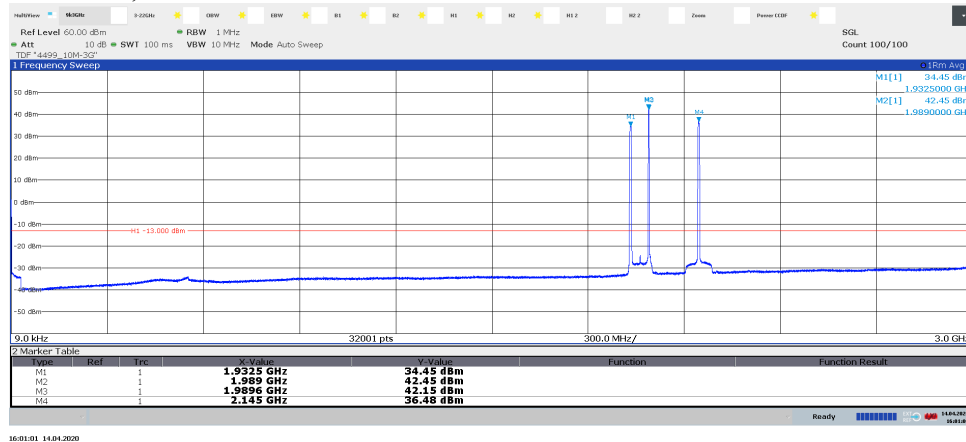
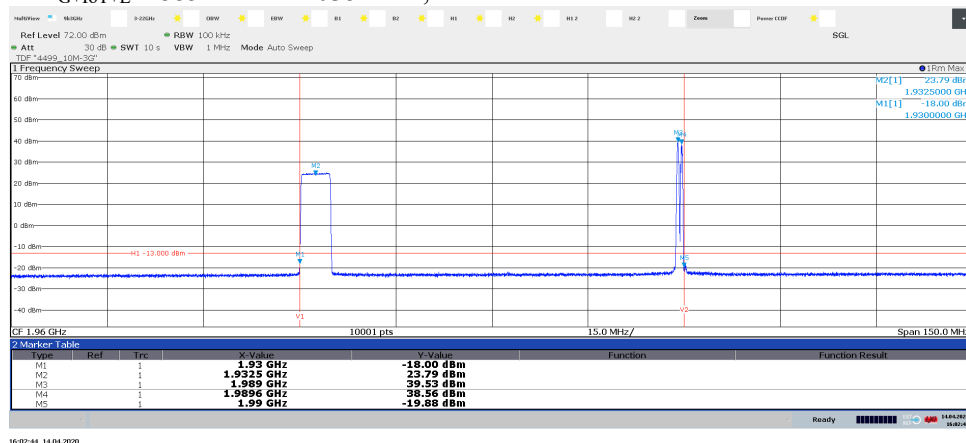


Diagram 3.63b, GSM: GMSK, NB IoT SA: N-TM, LTE: E-TM1.1,
Tim_{G+IoT+L} 1.885 GHz – 2.035 GHz, Port A:



Note: The purpose of this measurement is to find IM products, not to verify compliance at the Band edges.

Diagram 3.63c GSM: GMSK, NB IoT SA: N-TM, LTE: E-TM1.1,
Tim_{G+IoT+L}, 3 GHz – 22 GHz, Port B:

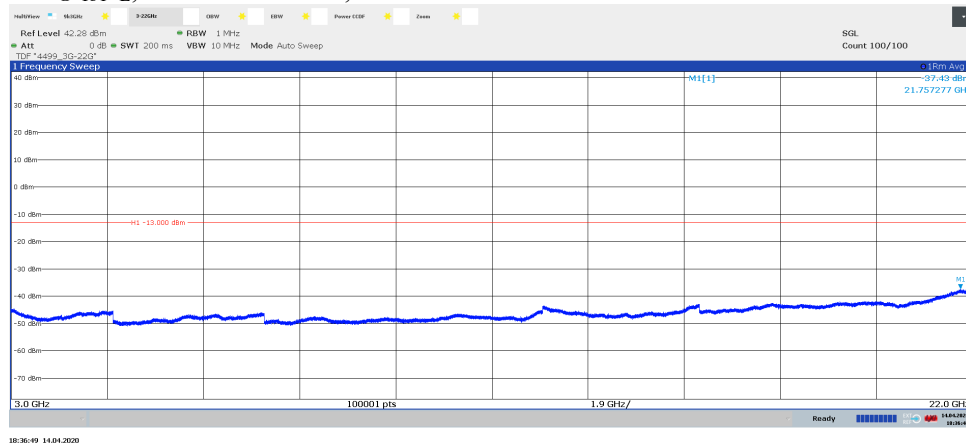


Diagram 3.64a, GSM: GMSK, NB IoT SA: N-TM, LTE: E-TM1.1,
Max_{G+IoT+L}, 9 kHz – 3 GHz, Port A:

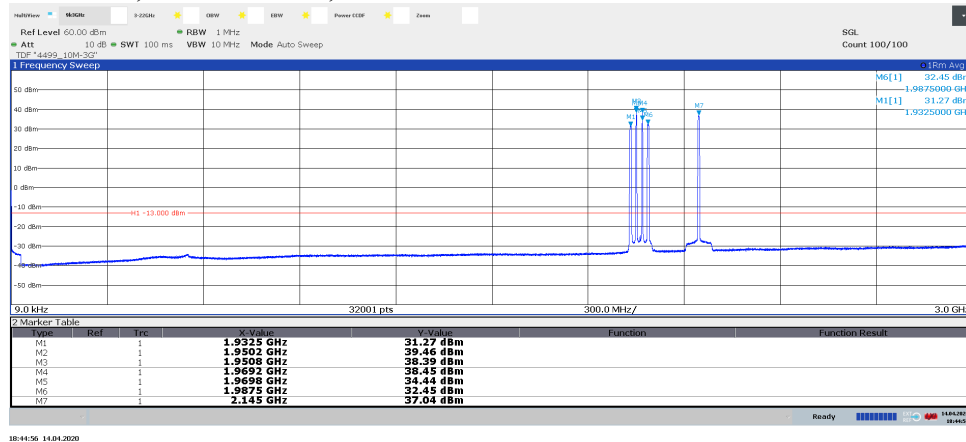
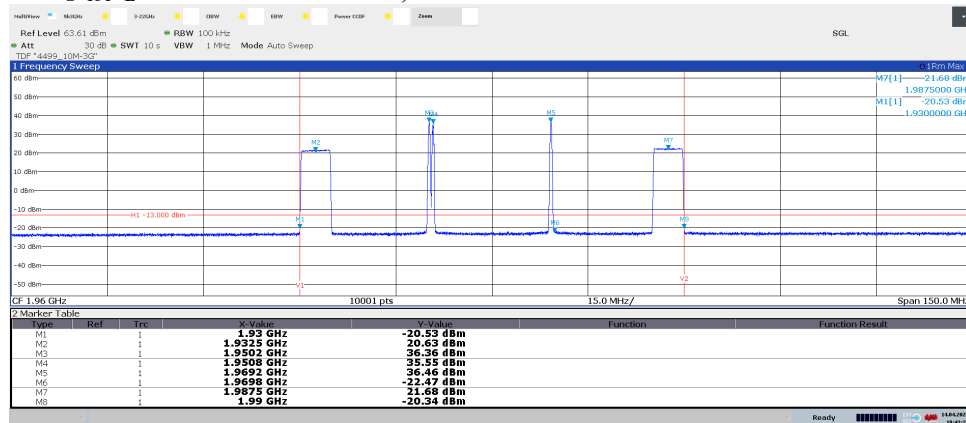
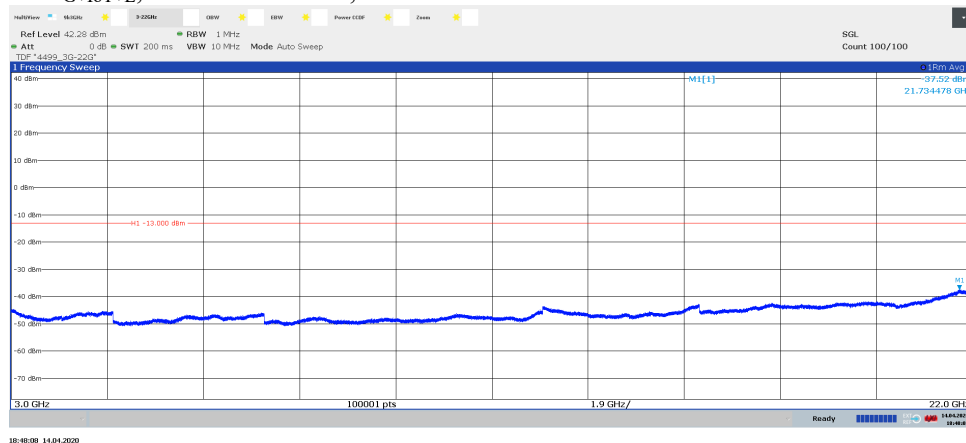


Diagram 3.64b, GSM: GMSK, NB IoT SA: N-TM, LTE: E-TM1.1,
Max_{G+IoT+L} 2.07 GHz – 2.22 GHz, Port A:



Note: The purpose of this measurement is to find IM products, not to verify compliance at the Band edges.

Diagram 3.64c, GSM: GMSK, NB IoT SA: N-TM, LTE: E-TM1.1,
Max_{G+IoT+L}, 3 GHz – 22 GHz, Port A:



Field strength of spurious radiation measurements according to CFR 47 §24.238 and §27.53(h) / RSS-133 6.5, RSS-139 6.6

Date	Temperature	Humidity
2020-02-14	23 °C ± 3 °C	32 % ± 5 %
2020-02-17	23 °C ± 3 °C	30 % ± 5 %
2020-02-18	23 °C ± 3 °C	30 % ± 5 %
2020-02-19	22 °C ± 3 °C	26 % ± 5 %
2020-02-26	22 °C ± 3 °C	21 % ± 5 %

The test site conforms to the site validation criterion specified in ANSI C63.4.

The measurements were performed with both horizontal and vertical polarization of the antenna. The antenna distance and test object height in the different frequency ranges can be seen below.

The antenna distance was 3 m in the frequency range 30 MHz – 18 GHz and 1 m in the frequency range 18 GHz – 26.5 GHz.

The EUT was placed 0.8 m above reference ground plane in frequency range 30 MHz – 1 GHz and 1.5 m above reference ground plane in frequency range 1 GHz – 26.5 GHz.

The measurement was performed with an RBW of 1 MHz.

A propagation loss in free space was calculated. The used formula was

$$\gamma = 20 \log \left(\frac{4\pi D}{\lambda} \right), \gamma \text{ is the propagation loss and } D \text{ is the antenna distance.}$$

The measurement procedure was as the following:

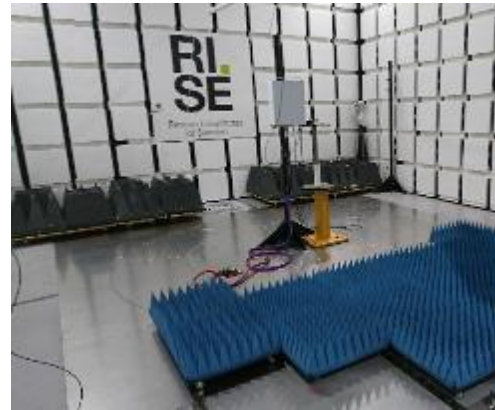
1. A pre-measurement is performed with peak detector. For measurement < 1 GHz the test object was measured in eight directions with the antenna at three heights, 1.0 m, 1.5 m and 2.0 m. For measurements > 1 GHz the test object was measured in seventeen directions with the antenna height 1.5 m, 2.0 m and 2.5 m with elevation angle.
2. Spurious radiation on frequencies closer than 20 dB to the limit in the pre-measurement is scanned 0-360 degrees and the antenna is scanned 1- 4 m with elevation angle for maximum response. The emission is then measured with the RMS detector and the RMS value is reported. Frequencies closer than 10 dB to the limit when measured with the RMS detector were measured with the substitution method according to ANSI 63.26.

The test set-up during the spurious radiation measurements is shown in the pictures below:

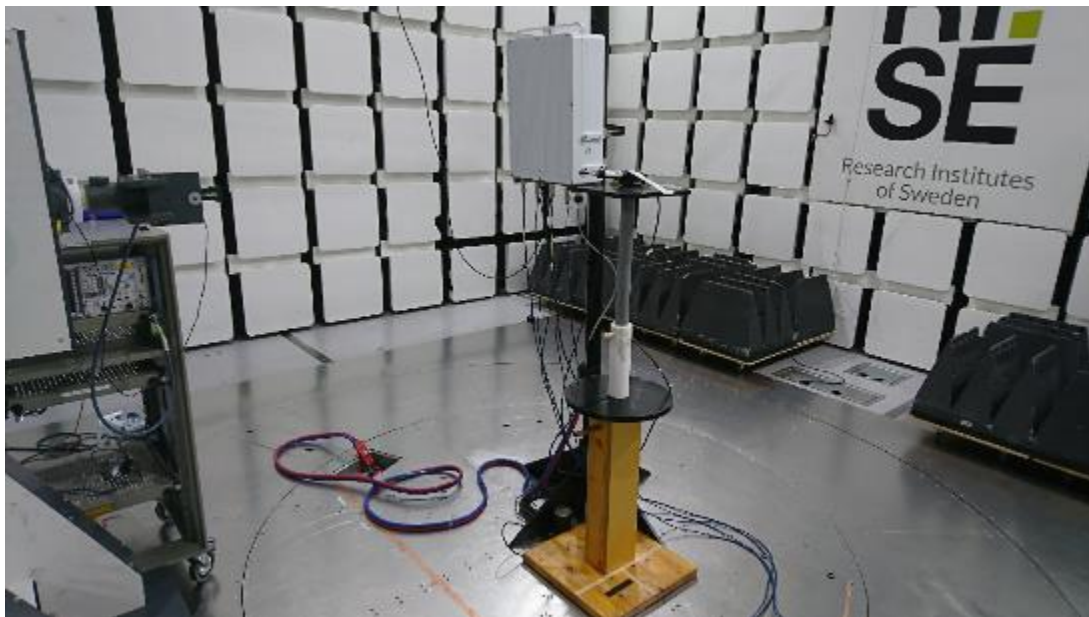
Test setup 30-1000 MHz:



Test setup 1-18 GHz:



Test setup 18-26.5 GHz:



Measurement equipment

Measurement equipment	RISE number
Test site Tesla	503 881
R&S ESU 40	901 385
Control computer with R&S software EMC32 version 10.60.10	BX62351
High pass filter 3-18 GHz	BX40074
Flann Standard Gain Horn 20240-20	BX92412
Teseq BiConiLog Antenna CBL6143A	BX92331
Coaxial cable, Tesla emission	BX91490
Coaxial cable	503 508
Coaxial cable	503 509
EMCO Horn Antenna 3115	502 175
µComp Nordic, Low Noise Amplifier	901 545
Miteq, Low Noise Amplifier	503 278
Temperature and humidity meter, Testo 625	504 188

Results

representing worst case:

Symbolic name T₅, TX top frequency, BW 5 MHz, E-TM3.2

Diagram 1a-d: Band 25 4x 40 W + Band 66 4x 40 W configuration.

Frequency (MHz)	Spurious emission level (dBm)	
	Vertical	Horizontal
30-26500	All emission > 20 dB below limit	All emission > 20 dB below limit

Measurement uncertainty: 3.1 dB

CFR 47 §24.238, §27.53(h) and RSS-133 6.5, RSS-139 6.6

- i. In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} P(\text{watts})$.
- ii. After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} P(\text{watts})$. If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required.

Complies?	Yes
-----------	-----

Diagram 1a:

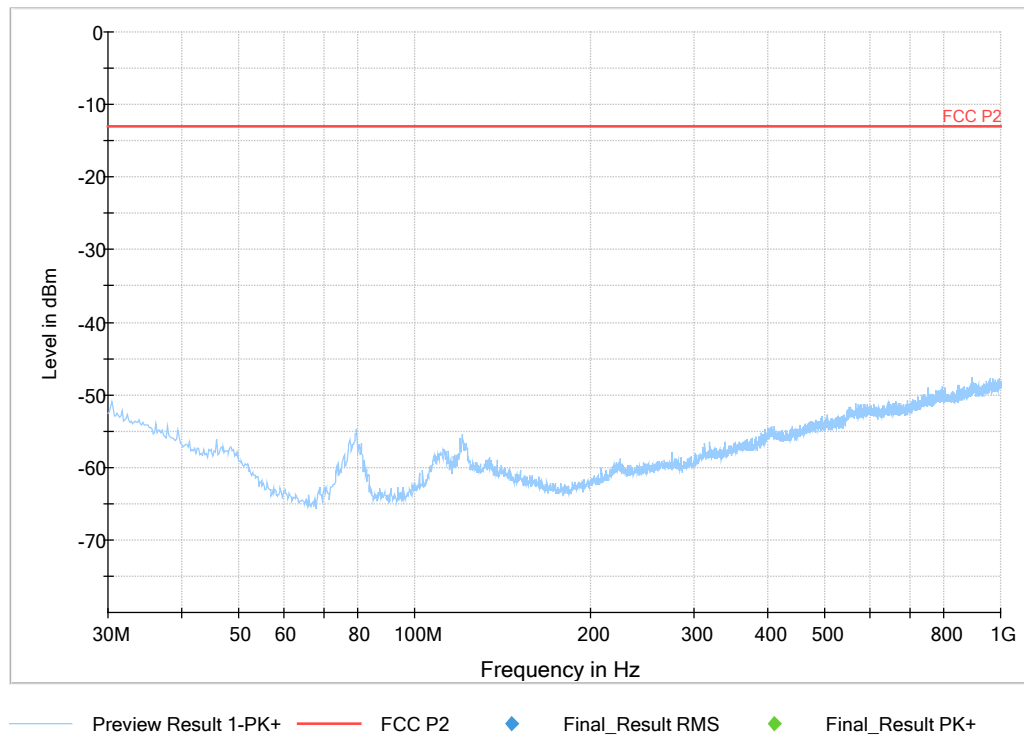
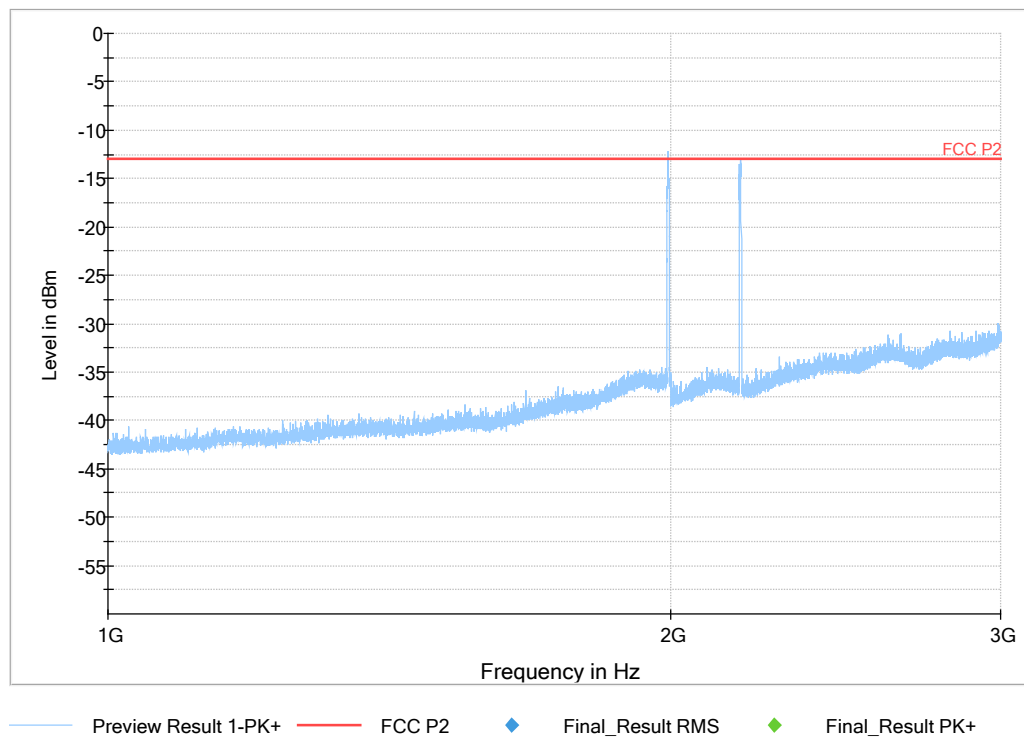


Diagram 1b:



Note: The emissions at 1992.5 MHz and 2177.5 MHz are the carrier frequency and shall be ignored in the context.

Diagram 1c:

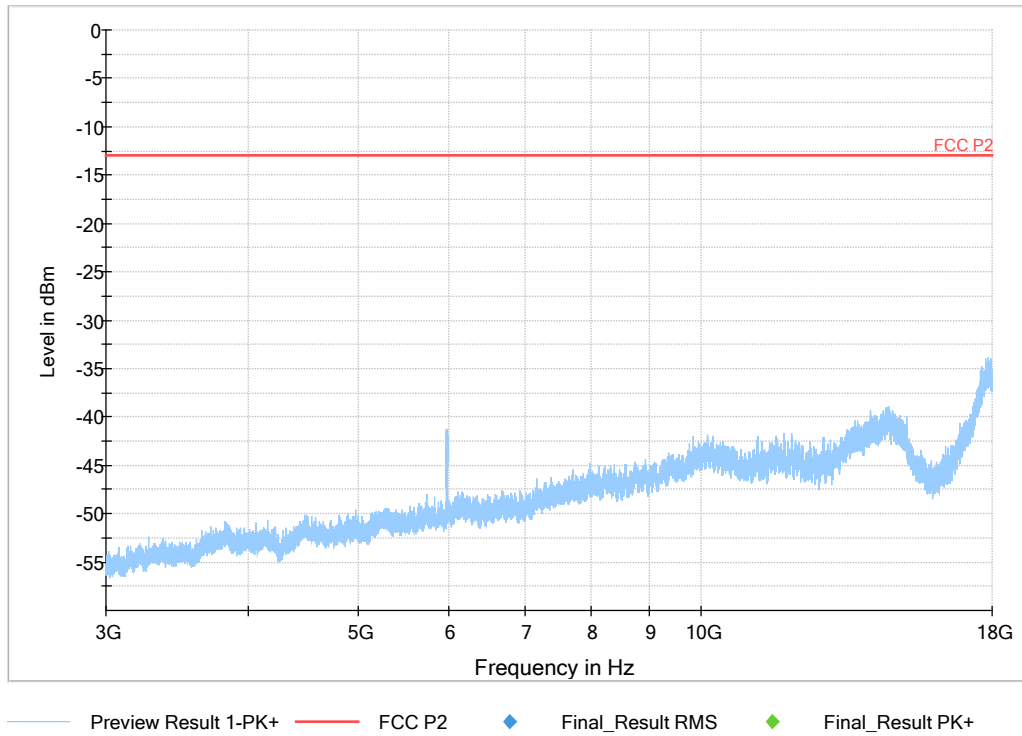
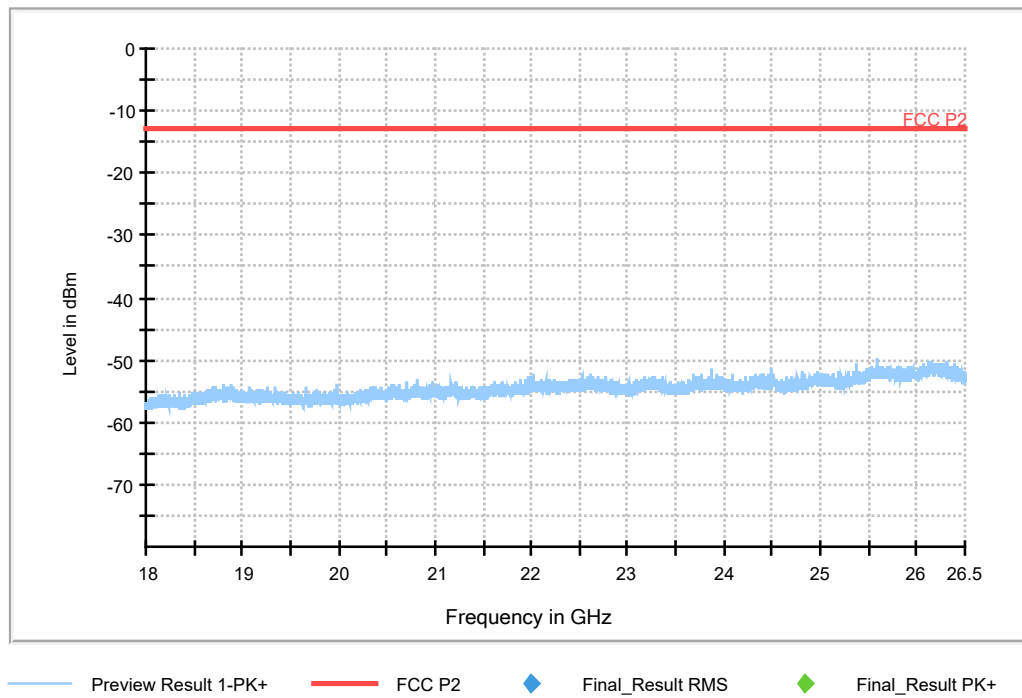


Diagram 1d:



Frequency stability measurements according to CFR 47 §24.235 and §27.54 / RSS-133 6.3 and RSS-139 6.4

Date	Temperature (test equipment)	Humidity (test equipment)
2020-03-16	23 °C ± 3 °C	15 % ± 5 %
2020-03-17	23 °C ± 3 °C	20 % ± 5 %
2020-03-18	23 °C ± 3 °C	18% ± 5 %
2020-03-19	23 °C ± 3 °C	20 % ± 5 %
2020-03-20	23 °C ± 3 °C	22 % ± 5 %

Test set-up and procedure

The measurement was made per 3GPP TS 36.141. The output was connected to a spectrum analyser. The spectrum analyser was connected to an external 10 MHz reference standard during the measurements.

Measurement equipment	RISE number
Rohde & Schwarz signal analyzer FSQ 40	504 143
Directional coupler	901 496
RF attenuator	902 282
Coaxial cable Megaphase	BX50191
Coaxial cable Sucoflex 102EA	BX50237
Temperature Chamber	503 360
Testo 635, temperature and humidity meter	504 203
Multimeter Fluke 87	502 190

Results LTE Frequency error

Nominal transmitter frequency was for B25 1960 MHz (M) with a bandwidth of 5 MHz and rated output power level at connector RF A at 46 dBm.

Nominal transmitter frequency was for B66 2145 MHz (M) with a bandwidth of 5 MHz and rated output power level at connector RF A at 46 dBm.

Test conditions		Frequency error (Hz) B25	Frequency error (Hz) B66
Supply voltage DC (V)	Temp. (°C)		
40.8	+20	6	5
55.2	+20	6	6
48	+20	5	5
48	+30	9	9
48	+40	5	6
48	+50	6	5
48	+10	5	5
48	0	7	5
48	-10	8	6
48	-20	6	5
48	-30	6	7
Maximum freq. error (Hz)		9	9
Measurement uncertainty		$< \pm 1 \times 10^{-7}$	

Results GSM Frequency error

Nominal transmitter frequency was for B2 1960 MHz (M) with a bandwidth of 200 kHz and rated output power level at connector RF A at 43 dBm.

Test conditions		Frequency error (Hz) B2
Supply voltage DC (V)	Temp. (°C)	
40.8	+20	19
55.2	+20	17
48	+20	18
48	+30	14
48	+40	15
48	+50	13
48	+10	14
48	0	13
48	-10	15
48	-20	14
48	-30	15
Maximum freq. error (Hz)		19
Measurement uncertainty		$< \pm 1 \times 10^{-7}$

B25 LTE Frequency margin

Rated output power level at connector RF A (maximum): 43 dBm for 3MHz Carrier Bandwidth and 47.8 dBm for 20 MHz carrier Bandwidth

Test conditions			Frequency margin to band edge at -19 dBm			
Supply voltage DC [V]	Temp [°C].	Carrier Bandwidth [MHz]	Test frequency Symbolic name Bottom		Test frequency Symbolic name Top	
			fL [MHz]	Offset to lower band edge (1930 MHz) [kHz]	fH [MHz]	Offset to upper band edge (1995 MHz) [kHz]
-48.0	+20	3	1930.002	2	1994.997	3
-48.0	+20	20	1930.223	223	1994.779	221

B66 LTE Frequency margin

Rated output power level at connector RF B (maximum): 47.8 dBm

Test conditions			Frequency margin to band edge at -19 dBm			
Supply voltage DC [V]	Temp [°C].	Carrier Bandwidth [MHz]	Test frequency Symbolic name Bottom		Test frequency Symbolic name Top	
			fL [MHz]	Offset to lower band edge (2110 MHz) [kHz]	fH [MHz]	Offset to upper band edge (2180 MHz) [kHz]
-48.0	+20	5	2110.032	32	2179.968	31
-48.0	+20	20	2110.142	142	2179.838	162

B2 GSM Frequency margin

Rated output power level at connector RF A (maximum): 43.0 dBm

Test conditions			Frequency margin to band edge at -13 dBm			
Supply voltage DC [V]	Temp [°C].	Carrier Bandwidth [MHz]	Test frequency Symbolic name Bottom		Test frequency Symbolic name Top	
			fL [MHz]	Offset to lower band edge (1930 MHz) [kHz]	fH [MHz]	Offset to upper band edge (1990 MHz) [kHz]
-48.0	+20	0.4	1930.179	179	1989.820	180

The frequency error results clearly shows that the frequency stability is good enough to ensure that the transmitted carrier stay within the operating band.

Remark

It was deemed sufficient to test one combination of TX frequency, channel bandwidth configuration and test model (modulation), as all combinations share a common internal reference to derive the TX frequency from.

Limits

CFR 47 §24.235 and §27.54 / IC RSS-133 6.3 and IC RSS-139 6.4

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Complies?	Yes
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Photos of test object

Front side



Rear side



Left side



Right side



Bottom side



Top side



Labels:

Radiated measurements:

Test object label:



SFP module Data 1:

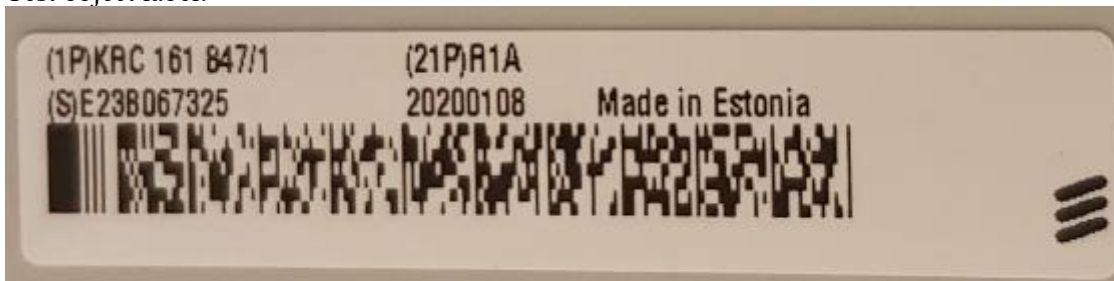


SFP module Data 2:



Conducted measurements:

Test object label:



SFP module Data 1:



SFP module Data 2:



End of report.