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Page

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Radio measurements on AIR 5322 B258A

Rev1 2022-04-12: Frequency stability added.

Product name: AIR 5322 B258A

Product number: KRD 901 200/2

RISE Research Institutes of Sweden AB Vehicles and Automation – EMC-ICT

Performed by



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Accred. No. 1002
Testing
ISO/IEC 17025



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Summary

Standard Listed part of	Compliant
FCC CFR 47 part 30 Subpart C	
2.1046/ 30.202 RF power output	Yes
2.1049 Occupied bandwidth	Yes
2.1053/ 30.203 Field strength of spurious radiation	Yes
2.1055 Frequency stability	Yes

Description of the test object

Equipment:	Radio equipment AIR 5322 B258A Product number: KRD 901 200/2 containing KRX 101 03/1 Rev. R1A with FCC ID: TA8AKRX10103
Hardware revision state:	R1A
Tested configuration:	3GPP NR TDD
Frequency range:	TX/ RX: 24.25 – 24.45 and 24.75 – 25.25 GHz
No of supported beams:	Config mode 0: 4 beams in 2 orthogonal polarizations each, 8 beams in total. Config mode 1: 2 beams in 2 orthogonal polarizations each, 4 beams in total. Config mode 2: 1 beam in 2 orthogonal polarizations each, 2 beams in total.
Operating bandwidth:	Config mode 0: 4 segments of 200 MHz (700 MHz in total) Config mode 1: 2 segments of 400 MHz (600 MHz in total) Config mode 2: 1 segment of 400 MHz
Nominal Output power (EIRP):	Config mode 0: 47 dBm/ beam and polarization Config mode 1: 53 dBm/ beam and polarization Config mode 2: 59 dBm/ beam and polarization
RF configurations:	TX Diversity, SU and MU MIMO up to 2 layers 1x(2x2), Contiguous Spectrum (CS) and Non-Contiguous spectrum (NCS), Carrier Aggregation (CA) intra-band supported
Antenna beam steering:	Azimuth ± 60 deg, elevation ± 15 deg
Channel bandwidth(s)/ Sub Carrier Spacing:	50, 100 and 200 MHz/ 120 kHz
Modulations:	QPSK, 16QAM and 64QAM
Emission designators:	45M9W7D, 94M8W7D and 189MW7D
Emission designators Carrier Aggregation:	Intra-band Maximum 492MW7D (5x100 MHz) Inter-band Maximum 680MW7D (200 + 500 MHz)
RF power Tolerance:	+2.4/ -2.0 dB
CPRI Speed	10.1 and 24.3 Gbps

The information above is supplied by the manufacturer.

Purpose of test

The purpose of the tests is to verify compliance to the performance characteristics specified in applicable items of FCC CFR 47 Part 30.

Operation modes during measurements

The measurements were performed with the test object transmitting test models as defined in 3GPP TS 38.141-2. Test model NR-FR2 TM 1.1 is used to represent QPSK, test model NR-FR2 TM 3.2 to represent 16QAM, test model NR-FR2 TM 3.1 to represent 64QAM modulation

The settings below were deemed representative for worst case settings, for all traffic scenarios when settings with different modulations and RF configurations was found to represent worst case settings.

MIMO mode, NR-FR2 TM1.1, QPSK with the beams locked in boresight. All measurements were performed with the test object configured for maximum transmit power.

The measurement shall be done during active part of transmission, or if the measurement is performed with constant duty cycle <98%, the result shall be adjusted for the duty cycle according to ANSI C63.26 5.2.4.3.4. The duty cycle was measured to 74% and to compensate for this 1.30 dB was added to the test results.

Measurements

The test object was powered with -48 VDC by an external power supply. Additional connections are documented in the setup drawings for radiated measurements.

Evaluation of spurious emissions have been done in several beam directions, including extreme settings both in azimuth and elevation planes. Results have shown that Beam index 0/Boresight can represent worst case.

RISE 10 MHz reference was connected to the signal analyser as external reference, during all measurements.

Far field distance for power, OBW and Band edge measurements is 4.66 m, based on the EUT antenna dimensions and the highest transmitter frequency (25.25 GHz).

Far field distances for OOB emissions is based on the measurement antenna dimension and highest frequency in the measurement range :

Frequency range [GHz]	Far field distance R [m]	Measurement distance [m]
18 – 26.5	0.73	5
26.5 – 40	0.48	5
40 – 60	0.34	3
60 – 90	0.22	1
90 – 100	0.17	1

Formula for far field distance calculation, with R being far field distance and D meaning antenna aperture size:

$$R = 2 \times D^2 / \lambda$$

References

Measurements were done according to relevant parts of the following standards:

CFR 47 part 30, June 2021

ANSI C63.26-2015

KDB 842590 D01 Upper Microwave Flexible Use Service v01r02

KDB 971168 D01 Power Meas License Digital Systems v03r01

KDB 971168 D03 IM Emission Repeater Amp v01

3GPP TR 38.141-2 V15.9.0

3GPP TR 37.842 V13.3.0 (2020-01)

Measurement equipment

	Calibration Due	RISE number
Anechoic chamber, Hertz	2021-09	BX50194
R&S FSW 43	2021-07	902 073
R&S ESU 40	2021-07	901 385
R&S ZNB 40	2021-07	BX50051
RF Cable VNA-calibration	2022-01	BX50189
RF Cable VNA-calibration	2022-01	BX50190
RF Cable	2021-09	BX50192
RF Cable	2022-05	BX81423
RF Cable	2022-04	KWP04236
RF Cable	2021-09	503 681
RF Cable FSW-B21	2021-09	BX62069
RF Cable FSW-B21	2021-09	BX62073
Attenuator 20 dB	2022-01	BX90205
Bilog antenna Schaffner 6143A	2021-08	504079
EMCO Horn Antenna 3115	2021-07	502 175
EMCO Horn Antenna 3115	2021-12	902 212
EMCO Horn Antenna 3116	2021-07	503 279
Flann STD Gain Horn Antenna 20240-20	-	KWP02600
Flann STD Gain Horn Antenna 22240-20	-	KWP02601
Flann STD Gain Horn Antenna 24240-20	-	BX92414
Flann STD Gain Horn Antenna 26240-20	-	BX92416
Flann STD Gain Horn Antenna 27240-20	-	BX92417
Mixer FS-Z60	2023-09	BX90566
Mixer FS-Z90	2022-01	BX90567
Mixer FS-Z110	2024-01	BX81425
µComp Nordic, Low Noise Amplifier	2022-01	901 544
Miteq, Low Noise Amplifier	2022-01	503 278
Temperature and humidity meter, Testo 615	2021-06	503 498

Frequency stability 2022-02

	Calibration Due	RISE number
R&S FSW 43	2022-07	902 073
RF Cable	2022-04	BX50236
EMCO Horn Antenna 3116	2024-06	503 279
Temperature Chamber	-	503 360
Testo 635, temperature and humidity meter	2022-07	504 203
Multimeter Fluke 87	2022-05	502 190

EAB Measurement equipment

Calibrated at RISE before testing.

	Calibration Due	S/N
Eravant SCF-21306340-SFSF-B3 Bandpass filter	2022-05	04881-01
Eravant SCF-34312340-KFKF-B3 Bandpass filter	2022-05	04876-01

Uncertainties

Measurement and test instrument uncertainties are described in the quality assurance documentation "SP-QD 10885". The uncertainties are calculated with a coverage factor $k=2$ (95% level of confidence).

Compliance evaluation is based on a shared risk principle with respect to the measurement uncertainty.

Reservation

The test results in this report apply only to the particular test object as declared in the report.

Delivery of test object

The test object was delivered: 2021-04-14.

Manufacturer's representative

Mikael Jansson, Ericsson AB.

Test engineers

Tomas Lennhager and Björn Skönvall, RISE

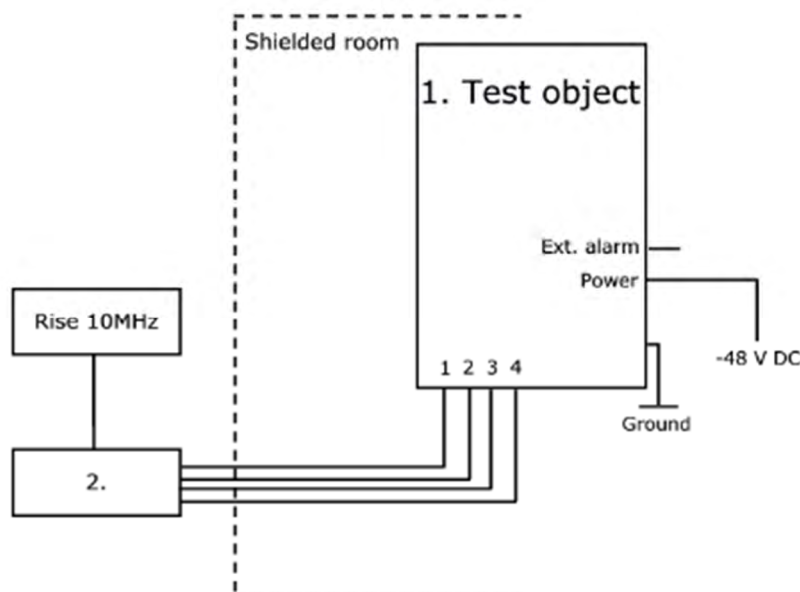
Test participant(-s)

None

Test frequencies used for radiated measurements

Frequency Hor/ Ver [MHz]	Symbolic name	Config mode	Comment
24275.04	BL ₅₀	2	50 MHz BW, TX bottom frequency configuration lower band
24425.04	TL ₅₀	2	50 MHz BW, TX top frequency configuration lower band
24775.08	BH ₅₀	2	50 MHz BW, TX bottom frequency configuration higher band
25225.08	TH ₅₀	2	50 MHz BW, TX top frequency configuration higher band
24300.00	BL ₁₀₀	2	100 MHz BW, TX bottom frequency configuration lower band
24800.04	BH ₁₀₀	2	100 MHz BW, TX bottom frequency configuration higher band
25200.00	TH ₁₀₀	2	100 MHz BW, TX top frequency configuration higher band
24350.04	BL ₂₀₀	2	200 MHz BW, TX bottom frequency configuration lower band
24850.08	BH ₂₀₀	2	200 MHz BW, TX bottom frequency configuration higher band
25150.08	TH ₂₀₀	2	200 MHz BW, TX top frequency configuration higher band
24800.04 24900.00 25000.08 25100.04	BH4 ₁₀₀	2	100 MHz BW, 4 carrier, TX Bottom frequencies configuration lower band
24275.04 24325.08 24425.04	BimL ₅₀	2	50 MHz BW, 3 carrier, TX bottom frequencies configuration lower band
24275.04 24375.00 24425.04	TimL ₅₀	2	50 MHz BW, 3 carrier, TX top frequencies configuration lower band
24775.08 24825.00 25125.00	BimH ₅₀	2	50 MHz BW, 3 carrier, TX bottom frequencies configuration higher band
24875.04 25175.04 25225.08	TimH ₅₀	2	50 MHz BW, 3 carrier, TX top frequencies configuration higher band

Frequency Hor/ Ver [MHz]	Symbolic name	Config mode	Comment
24275.04 24325.08 24375.00 24425.04 25075.08 25125.00 25175.04 25225.08	BT ₈₅₀	1	50 MHz BW, 8 carrier, bottom and top frequencies configuration
24275.04 24325.08 24775.08 24825.00 24975.00 25025.04 25175.04 25225.08	BMT ₈₅₀	0	50 MHz BW, 8 carrier, bottom near mid and top frequencies configuration
24800.04 24900.00 25000.08 25100.04 25200.00	CA ₅₁₀₀	1	100MHz BW, 5 carrier higher band

Test setup: radiated measurements**Test object:**

- | | |
|----|--|
| 1. | Air 5322 B258A, KRD 901 200/2, rev. R1A, s/n: E23C835113,
Radio Software: CXP 203 0045/1, rev. R9A779
containing KRX 101 03/1 Rev. R1A with FCC ID: TA8AKRX10103
For Frequency stability test 2022-02
Radio Software: CXP 203 0045/1, rev. R11C957 |
|----|--|

Associated equipment:

- | | |
|----|--|
| 2. | Testing Equipment:
CT11, LPC102494/1, rev. R2A, s/n: T01G487940, BAMS – 1001967409
For Frequency stability test 2022-02
Baseband 6630, KDU 137 848/1, rev. R3B, s/n: E23B720988
with software: CXP9024418/15, rev. R47A306 |
|----|--|

Functional test equipment:

- | | |
|----|---------------------------------------|
| 2. | Computer, Mac Mini, BAMS - 1001997578 |
|----|---------------------------------------|

Interfaces:

Power input configuration DC (KRD 901 200/2): -48 VDC	Power
EXT Alarm, shielded multi-wire	Signal
1, Optical Interface Link, single mode opto fibre	Signal
2, Optical Interface Link, single mode opto fibre	Signal
3, Optical Interface Link, single mode opto fibre	Signal
4, Optical Interface Link, single mode opto fibre	Signal
Ground wire	Ground

RF power output measurements according to CFR 47 §30.202

Date	Temperature	Humidity
2021-05-21	23 °C ± 3 °C	20 % ± 5 %
2021-06-04	24 °C ± 3 °C	26 % ± 5 %

Test set-up and procedure

The test object was located in an anechoic chamber. The measuring antenna was aligned to the centre of the PAAM. A turn table was used to find the highest output power. A signal analyzer with the channel power function activated was used to measure the output power with the RMS detector activated. The bandwidth setting of the channel power function was set to 100 MHz.

A substitution measurement defined in 3GPP TR 37.842 chapter 10.3.1.1.2 was used to get the actual correction factor (Transducer factor A-D in the figure 1 below) with a Network analyzer (ZNB 40).

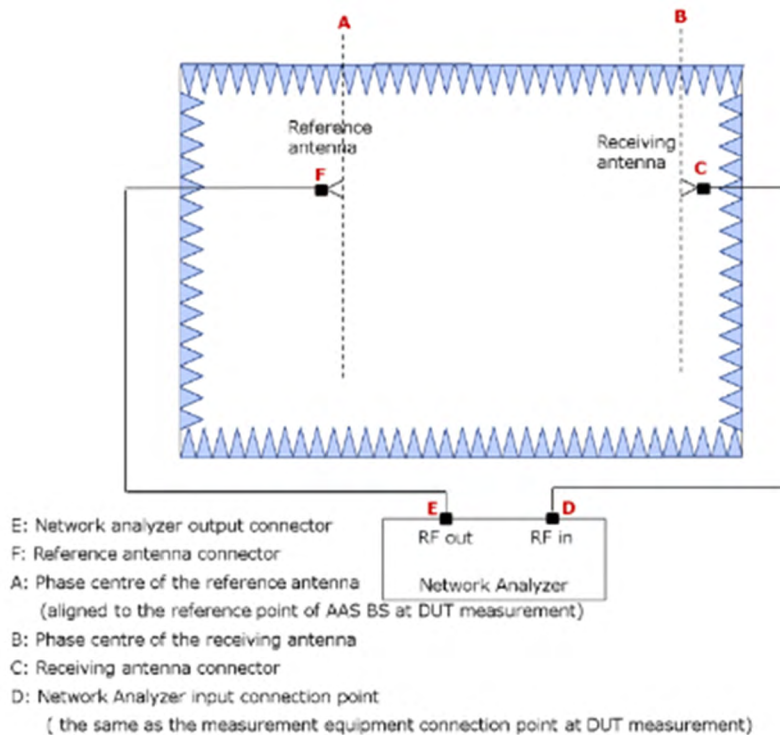


Figure 1: Indoor Anechoic Chamber calibration system setup for EIRP

Stage 1 - Calibration:

- 1) Connect the reference antenna and the receiving antenna to the measurement RF out port and RF in port of the network analyzer, respectively, as shown in figure 1.
- 2) Install the reference antenna with its *beam peak direction* and the height of its phase centre aligned with the receiving antenna.
- 3) Set the centre frequency of the network analyzer to the carrier centre frequency of the tested signal for EIRP measurement of the EUT and measure $LF_{EIRP, E \rightarrow D}$, which is equivalent to $20\log|S_{21}|$ (dB) obtained by the network analyzer:
 $LF_{EIRP, E \rightarrow D}$: Pathloss between E and D in figure 1.
- 4) Measure the cable loss, $LF_{EIRP, E \rightarrow F}$ between the reference antenna connector and the network analyzer connector:
 $LF_{EIRP, E \rightarrow F}$: Cable loss between E and F in figure 1.
- 5) Calculate the calibration value between A and D with the following formula:
 $L_{EIRP_cal, A \rightarrow D} = LF_{EIRP, E \rightarrow D} + G_{REF_ANT_EIRP, A \rightarrow F} - LF_{EIRP, E \rightarrow F}$.
 $L_{EIRP_cal, A \rightarrow D}$: Calibration value between A and D in figure 1. Was implemented in the spectrum analyzer as a transducer.
 $G_{REF_ANT_EIRP, A \rightarrow F}$: Antenna gain of the reference antenna.

Stage 2 - Measurement:

- 6) Uninstall the reference antenna and install the EUT with the manufacturer declared coordinate system reference point in the same place as the phase centre of the reference antenna. The manufacturer declared coordinate system orientation of the EUT is set to be aligned with the testing system.
- 7) Measure the mean power, $P_{R_EUT_EIRP, D}$, D in figure 1.
- 8) Calculate the EIRP with the following formula:

$$EIRP = P_{R_EUT_EIRP, D} + L_{EIRP_cal, A \rightarrow D}$$

Test Setup, measuring distance 5m:

Measurement equipment	RISE number
Anechoic chamber, Hertz	BX50194
R&S FSW 43	902 073
R&S ZNB 40	BX50051
EMCO Horn Antenna 3116	503 279
FLANN Std gain 20240-20	KWP02600
RF Cable	BX81423
RF Cable VNA-calibration	BX50189
RF Cable VNA-calibration	BX50190
RF Cable	KWP04236
RF Cable	BX50192
Testo 615, temperature and humidity meter	503 498

Measurement uncertainty: 3.3 dB

Results

Single carrier Config mode 2

Beam index 0 Bore site, Bandwidth 50MHz, QPSK

Nominal rated output power (EIRP) per Beam: 59 dBm/ Polarization.

	Output power per 100 MHz, EIRP [RMS dBm] Vertical/ Horizontal
Symbolic name	Carrier 1
BL ₅₀	59.17/ 59.79
BH ₅₀	57.95/ 59.29
TH ₅₀	58.52/ 59.51

Beam index 0 Bore site, Bandwidth 100MHz, QPSK

Nominal rated output power (EIRP) per Beam: 59 dBm/ Polarization.

	Output power per 100 MHz, EIRP [RMS dBm] Vertical/ Horizontal
Symbolic name	Carrier 1
BL ₁₀₀	59.32/ 59.55
BH ₁₀₀	57.75/ 58.95
TH ₁₀₀	58.55/ 59.35

Beam index 0 Bore site, Bandwidth 200MHz, QPSK

Nominal rated output power (EIRP) per Beam: 59 dBm/ Polarization.

	Output power per 100 MHz, EIRP [RMS dBm] Vertical/ Horizontal		
Symbolic name	Carrier 1 Part A	Carrier 1 Part B	Total (per 200 MHz)
BL ₂₀₀	56.53/ 57.22	56.57/ 56.68	59.56/ 59.97
BH ₂₀₀	55.35/ 56.65	55.80/ 56.75	58.59/ 59.71
TH ₂₀₀	55.58/ 56.69	56.10/ 56.86	58.86/ 59.79

Multi carrier

4-Carrier Config mode 2

Beam index 0 Bore site, Bandwidth 100MHz, QPSK

Nominal rated output power (EIRP) per Beam: 59 dBm/ Polarization.

	Output power per 100 MHz, EIRP [RMS dBm] Vertical/ Horizontal				
Symbolic name	Carrier 1	Carrier 2	Carrier 3	Carrier 4	Total (per 400 MHz)
BH4 ₁₀₀	52.69/ 53.61	52.49/ 53.51	52.94/ 53.65	52.76/ 54.01	58.74/ 59.72

8-Carrier Config mode 1

Beam index 0 Boresight, Carrier Bandwidth 50 MHz, QPSK

Nominal rated output power (EIRP) per Beam: 53 dBm/ Polarization.

	Output power per 50 MHz, EIRP [RMS dBm] Vertical/ Horizontal									
	Beam 1					Beam 2				
Symbolic name	A	B	C	D	Total Power Beam 1 (per 200 MHz)	E	F	G	H	Total power Beam 2 (per 400 MHz)
BT8 ₅₀	47.21/ 47.89	48.05/ 48.88	48.31/ 48.66	48.56/ 48.53	54.08/ 54.52	46.18/ 47.11	46.82/ 48.08	46.91/ 47.99	47.02/ 48.05	52.77/ 53.84

5-Carrier Config mode 1

Beam index 0 Boresight, Carrier Bandwidth 100 MHz, QPSK

Nominal rated output power (EIRP) per Beam: 53 dBm/ Polarization.

	Output power per 100 MHz, EIRP [RMS dBm] Vertical/ Horizontal						
	Beam 1				Beam 2		
Symbolic name	A	B	C	Total Power Beam 1 (per 200 MHz)	E	F	Total power Beam 2 (per 400 MHz)
CAH5 ₁₀₀	48.83/ 49.17	48.09/ 48.90	48.38/ 48.71	53.22/ 53.70	49.80/ 50.11	50.20/ 50.41	53.01/ 53.27

8-Carrier Config mode 0

Beam index 0 Boresight, Carrier Bandwidth 50 MHz, QPSK

Nominal rated output power (EIRP) per Beam: 47 dBm/ Polarization.

	Output power per 50 MHz, EIRP [RMS dBm] Vertical/ Horizontal					
	Beam 1			Beam 2		
Symbolic name	A	B	Total Power Beam 1 (per 100 MHz)	C	D	Total power Beam 2 (per 100 MHz)
BMT8 ₅₀	45.01/ 44.73	45.35/ 45.56	48.19/ 48.18	42.96/ 43.64	43.1/ 44.49	46.04/ 47.10
	Beam 3			Beam 4		
Symbolic name	E	F	Total Power Beam 3 (per 100 MHz)	G	H	Total power Beam 4 (per 100 MHz)
BMT8 ₅₀	44.40/ 44.62	43.43/ 45.30	46.95/ 47.98	43.89/ 43.64	43.89/ 44.34	46.90/ 47.01

Limits

CFR47 §30.202 Power limits.

- (a) For fixed and base stations operating in connection with mobile systems, the average power of the sum of all antenna elements is limited to an equivalent isotopically radiated power (EIRP) density of +75dBm/100 MHz. For channel bandwidths less than 100 MHz the EIRP must be reduced proportionally and linearly based on the bandwidth relative to 100 MHz.

Complies?	Yes
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Occupied bandwidth measurements according to CFR47 §2.1049

Date	Temperature	Humidity
2021-05-20	23 °C ± 3 °C	25 % ± 5 %
2021-05-21	23 °C ± 3 °C	20 % ± 5 %

Test set-up and procedure

The test object was located in a anechoic chamber. The measuring antenna was aligned to the centre of the of the PAAM. A turn table was used to find the highest output power. A signal analyzer with Peak detector and max hold was used to measure the OBW.

Test Setup, measuring distance 5m:

Measurement equipment	RISE number
Anechoic chamber, Hertz	BX50194
R&S FSW 43	902 073
R&S ZNB 40	BX50051
EMCO Horn Antenna 3116	503 279
FLANN Std gain 20240-20	KWP02600
RF Cable	BX81423
RF Cable VNA-calibration	BX50189
RF Cable VNA-calibration	BX50190
RF Cable	KWP04236
RF Cable	BX50192
Testo 615, temperature and humidity meter	503 498

Measurement uncertainty: 3.3 dB

Results

Single carrier, Config mode 2, Bandwidth: 50MHz Modulation: QPSK

Diagram	Symbolic name	Polarization	Occupied BW (99%) [MHz]
1.1	BH ₅₀	Hor	45.755
1.2	BH ₅₀	Ver	45.921

Single carrier, Config mode 2, Bandwidth: 100MHz Modulation: QPSK

Diagram	Symbolic name	Polarization	Occupied BW (99%) [MHz]
1.3	BH ₁₀₀	Hor	94.419
1.4	BH ₁₀₀	Ver	94.829

Single carrier, Config mode 2, Bandwidth: 200MHz Modulation: QPSK

Diagram	Symbolic name	Polarization	Occupied BW (99%) [MHz]
1.5	BH ₂₀₀	Hor	188.558
1.6	BH ₂₀₀	Ver	188.567

Carrier Aggregation, Config mode 2, Bandwidth: 4x 100MHz, Modulation: QPSK

Diagram	Symbolic name	Polarization	Occupied BW (99%) [MHz]
1.7	BH4 ₁₀₀	Hor	392.187
1.8	BH4 ₁₀₀	Ver	391.555

Carrier Aggregation contiguous spectrum

Config mode 1, Bandwidth: 5x 100MHz, Modulation: QPSK

Diagram	Symbolic name	Polarization	Occupied BW (99%) [MHz]
1.9	CAH5 ₁₀₀	Hor	490.875
1.10	CAH5 ₁₀₀	Ver	491.577

Carrier Aggregation Non-contiguous spectrum

Config mode 0, Bandwidth: 7x 100MHz (2x 100MHz + 5x 100MHz)

Calculated maximum aggregated bandwidth: $= 188.567 + 491.577 = 680.144$ MHz

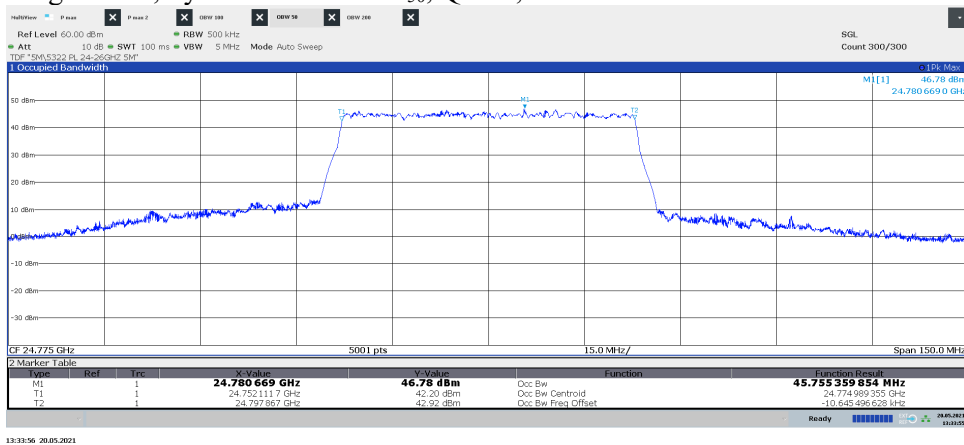
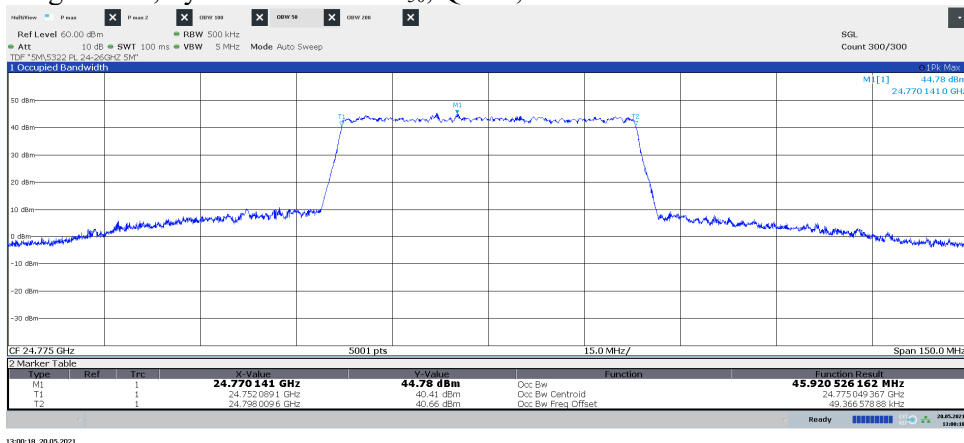
Diagram 1.1, Symbolic name: BH₅₀, QPSK, Horizontal:Diagram 1.2, Symbolic name: BH₅₀, QPSK, Vertical:

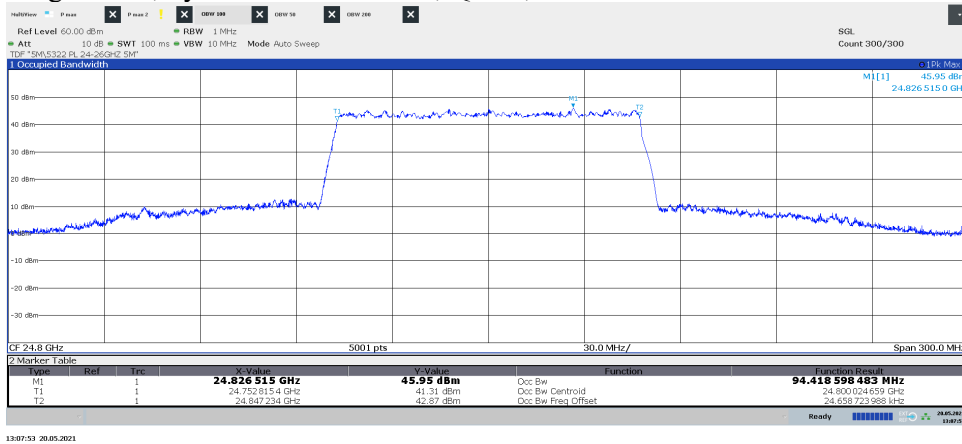
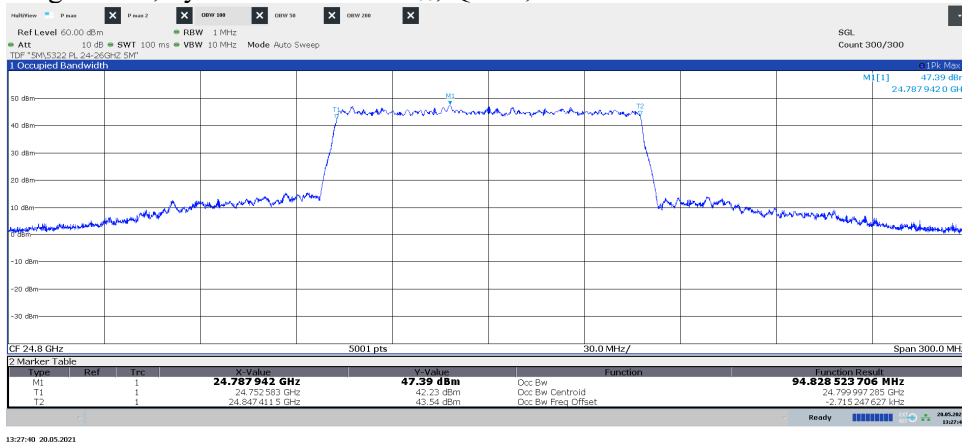
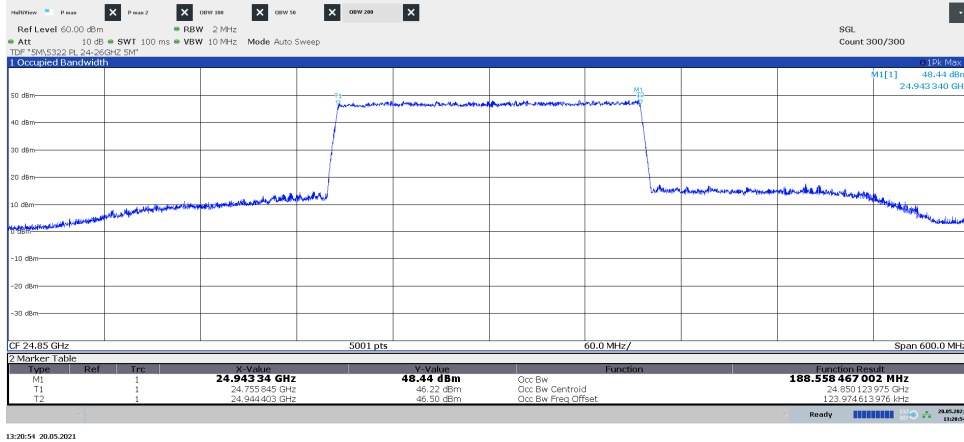
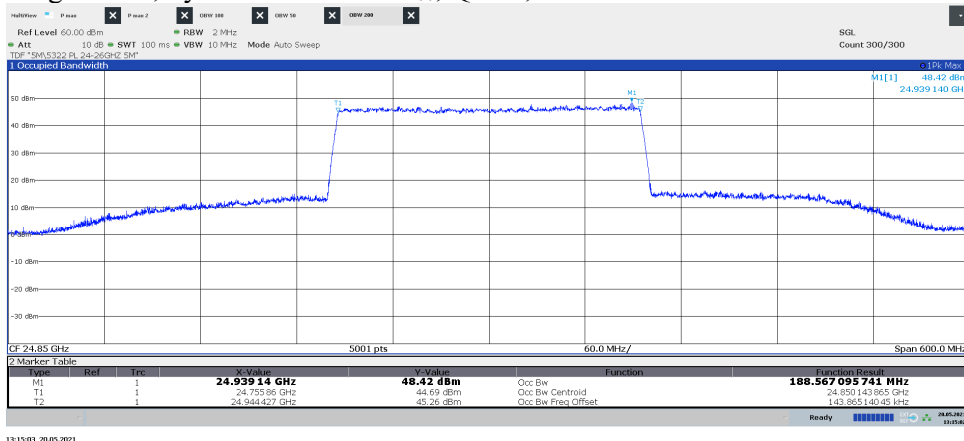
Diagram 1.3, Symbolic name: BH₁₀₀, QPSK, Horizontal:Diagram 1.4, Symbolic name: BH₁₀₀, QPSK, Vertical:

Diagram 1.5, Symbolic name: BH₂₀₀, QPSK, Horizontal:

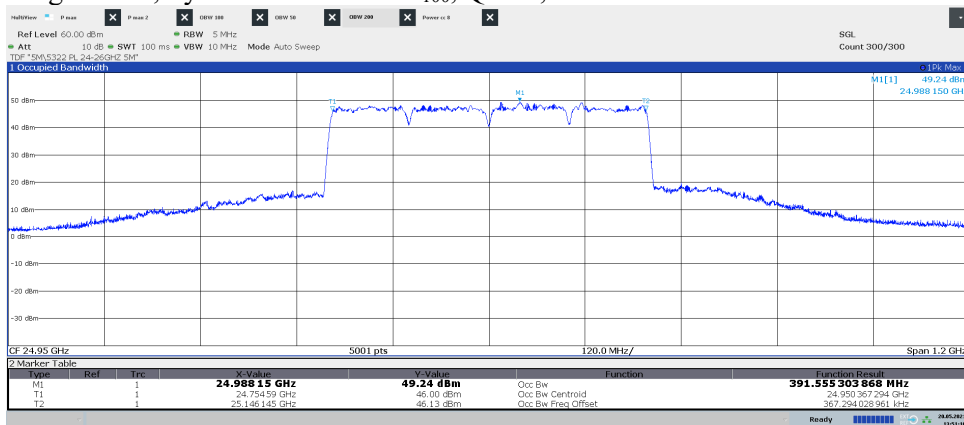
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Diagram 1.6, Symbolic name: BH₂₀₀, QPSK, Vertical:

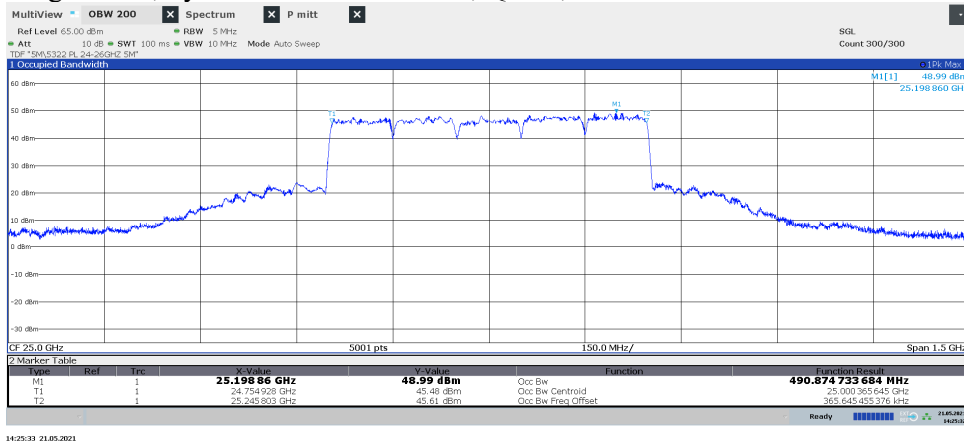
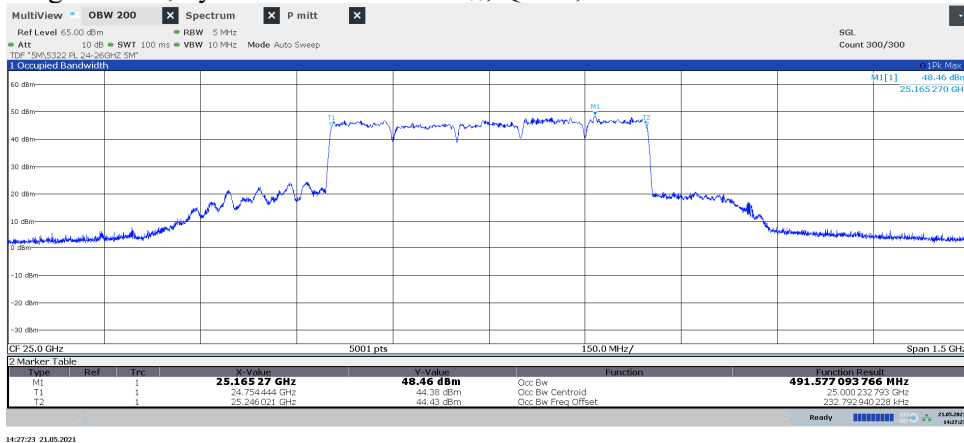
13:15:03 20.05.2021

Diagram 1.7, Symbolic name: BH4₁₀₀, QPSK, Horizontal:

13:47:47 20.05.2021

Diagram 1.8, Symbolic name: BH4₁₀₀, QPSK, Vertical:

13:51:10 20.05.2021

Diagram 1.9, Symbolic name: CAH5₁₀₀, QPSK, Horizontal:Diagram 1.10, Symbolic name: CAH5₁₀₀, QPSK, Vertical::

Field strength of spurious radiation measurements according to CFR 47 §30.203

Date	Temperature	Humidity
2021-05-25	23 °C ± 3 °C	26 % ± 5 %
2021-05-26	22 °C ± 3 °C	28 % ± 5 %
2021-05-27	23 °C ± 3 °C	25 % ± 5 %
2021-05-28	23 °C ± 3 °C	27 % ± 5 %
2021-05-31	25 °C ± 3 °C	28 % ± 5 %
2021-06-01	23 °C ± 3 °C	25 % ± 5 %
2021-06-02	24 °C ± 3 °C	25 % ± 5 %
2021-06-03	24 °C ± 3 °C	25 % ± 5 %
2021-06-04	24 °C ± 3 °C	26 % ± 5 %
2021-06-10	23 °C ± 3 °C	25 % ± 5 %

The measurements were performed with both horizontal and vertical polarization of the antenna. The measurement was performed with a RBW of 1 MHz. The antenna distance and test object height in the different frequency ranges is described below.

In the test range from 40 – 100 GHz

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

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

For 40 – 60 GHz D was 3.0m and for 60 – 100 GHz D was 1.0m.

In the test range from 30MHz – 40 GHz a substitution measurement defined in 3GPP TR 37.842 chapter 10.3.1.1.2 was used to get the actual correction factor (Transducer factor A-D in the figure 1 below) with a Network analyzer (ZNB 40).

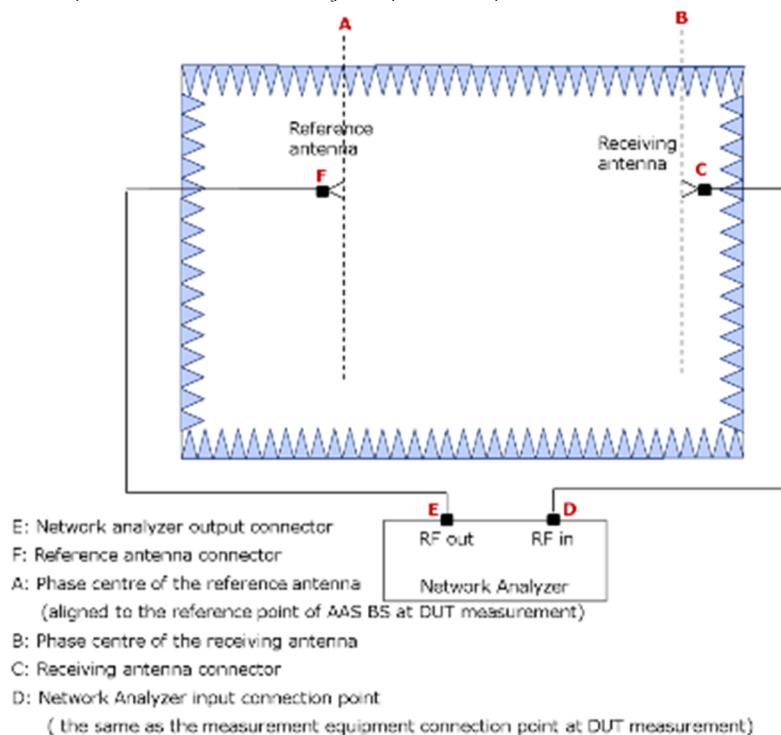


Figure 1: Indoor Anechoic Chamber calibration system setup for EIRP

Stage 1 - Calibration:

- 1) Connect the reference antenna and the receiving antenna to the measurement RF out port and RF in port of the network analyzer, respectively, as shown in figure 1.
- 2) Install the reference antenna with its *beam peak direction* and the height of its phase centre aligned with the receiving antenna.
- 3) Set the centre frequency of the network analyzer to the carrier centre frequency of the tested signal for EIRP measurement of the EUT and measure $LF_{EIRP, E \rightarrow D}$, which is equivalent to $20\log|S_{21}|$ (dB) obtained by the network analyzer:
 $LF_{EIRP, E \rightarrow D}$: Pathloss between E and D in figure 1.
- 4) Measure the cable loss, $LF_{EIRP, E \rightarrow F}$ between the reference antenna connector and the network analyzer connector:
 $LF_{EIRP, E \rightarrow F}$: Cable loss between E and F in figure 1.
- 5) Calculate the calibration value between A and D with the following formula:
 $L_{EIRP_cal, A \rightarrow D} = LF_{EIRP, E \rightarrow D} + G_{REF_ANT_EIRP, A \rightarrow F} - LF_{EIRP, E \rightarrow F}$.
 $L_{EIRP_cal, A \rightarrow D}$: Calibration value between A and D in figure 1. Was implemented in the spectrum analyzer as a transducer.
 $G_{REF_ANT_EIRP, A \rightarrow F}$: Antenna gain of the reference antenna.

Stage 2 - Measurement:

- 6) Uninstall the reference antenna and install the EUT with the manufacturer declared coordinate system reference point in the same place as the phase centre of the reference antenna. The manufacturer declared coordinate system orientation of the EUT is set to be aligned with the testing system.
- 7) Measure the mean power, $P_{R_EUT_EIRP, D}$, D in figure 1.
- 8) Calculate the EIRP with the following formula:

$$EIRP = P_{R_EUT_EIRP, D} + L_{EIRP_cal, A \rightarrow D}$$

The measurement procedure was as the following:

- 1) An EIRP pre-scan with the measurement antenna in horizontal and vertical polarization is performed with RMS detector and Max Hold on the spectrum analyzer. The turn table was slowly rotating from 0-360 degrees.
- 2) EIRP spurious radiation on frequencies closer than 10 dB to the TRP limit in the pre-scan a manual search for maximum response was done.
- 3) If the recorded EIRP value was above the TRP limit, a TRP measurement was done according to KDB 842590 D01 chapter 4.4. Overview of the methods.
 - a) Two Cut method according to KDB 842590 D01 chapter 4.4.2.2
 - i. EUT set in vertical orientation
 - ii. EIRP measurement samples with horizontal and vertical polarization of the measurement antenna. Angular step size based on frequency and dimension of the EUT
 - iii. EUT set in horizontal orientation
 - iv. EIRP measurement samples with horizontal and vertical polarization of the measurement antenna. Angular step size based on frequency and dimension of the EUT.
 - v. $TRP = EIRP$ measurement samples averaged $\pm \Delta TRP$.
(ΔTRP = Margin factor based on grid selection).

- b) Two Cut method when pattern multiplication is applicable and used according to KDB 842590 D01 chapter 4.4.2.3
 - i. EUT set in vertical orientation
 - ii. EIRP measurement samples with horizontal and vertical polarization of the measurement antenna. Angular step size based on frequency and dimension of the EUT
 - iii. EUT set in horizontal orientation
 - iv. EIRP measurement samples with horizontal and vertical polarization of the measurement antenna. Angular step size based on frequency and dimension of the EUT.
 - v. TRP is calculated using the formula in Appendix E of KDB 842590 D01
- c) EIRP to Conducted Power Conversion in Band Edge Using Antenna Gain according to KDB 842590 D01 chapter 4.4.2.5
 - i. Convert each radiated measurement to conducted power/BW using the equations:
 $\text{Conducted Power level (dBm) at any frequency/BW} = \text{Measured EIRP level (dBm)/BW} - \text{EUT antenna Gain (dBi)}$
 - ii. Sum the radiated power Horizontal and Vertical polarisations for total conducted power level/BW.
 - iii. Evaluate the pass/fail decision by comparing total conducted power level/BW against the applicable TRP limit.
- d) Spherical Grid Method, according to KDB 842590 D01 chapter 4.4.2.4
 - i. EUT set in horizontal orientation bottom of the EUT to the right.
 - ii. EIRP measurement samples with horizontal and vertical polarization of the measurement antenna. Angular step size of the turn table was 15 degrees from 0 – 165 degrees and 195 – 360 degrees. In cone of radiation 165 – 195 degrees the step size of the turn table was 1 degree.
 - iii. EUT was changed in 15 degrees step from horizontal bottom right to horizontal bottom to the left (twelve steps). Step ii. was repeated for all twelve steps.
 - iv. TRP was calculated according to Appendix B in KDB 842590 D01.

Measurement equipment

	RISE number
Anechoic chamber, Hertz	BX50194
R&S FSW 43	902 073
R&S ESU 40	901 385
R&S ZNB 40	BX50051
RF Cable VNA-calibration	BX50189
RF Cable VNA-calibration	BX50190
RF Cable	BX50192
RF Cable	BX81423
RF Cable	KWP04236
RF Cable	503 681
RF Cable FSW-B21	BX62069
RF Cable FSW-B21	BX62073
Attenuator 20 dB	BX90205
Bilog antenna Schaffner 6143A	504079
EMCO Horn Antenna 3115	502 175
EMCO Horn Antenna 3115	902 212
EMCO Horn Antenna 3116	503 279
Flann STD Gain Horn Antenna 20240-20	KWP02600
Flann STD Gain Horn Antenna 22240-20	KWP02601
Flann STD Gain Horn Antenna 24240-20	BX92414
Flann STD Gain Horn Antenna 26240-20	BX92416
Flann STD Gain Horn Antenna 27240-20	BX92417
Mixer FS-Z60	BX90566
Mixer FS-Z90	BX90567
Mixer FS-Z110	BX81425
µComp Nordic, Low Noise Amplifier	901 544
Miteq, Low Noise Amplifier	503 278
Temperature and humidity meter, Testo 615	503 498

EAB Measurement equipment

Calibrated at RISE before testing.

	S/N
Eravant SCF-21306340-SFSF-B3 Bandpass filter	04881-01
Eravant SCF-34312340-KFKF-B3 Bandpass filter	04876-01

Results

Evaluation of spurious emissions have been done in several beam directions, including extreme settings both in azimuth and elevation planes. Results have shown that Beam index 0/Boresight can represent worst case.

The diagrams represents worst case configurations (Beam index 0 /Boresight) for each frequency range.

Diagram	Symbolic name	Config mode	Pol	Frequency range	Measurement method	“Early exit?”
2.1a	BH ₅₀	2	Hor	30-1000 MHz	Pre scan Max hold EIRP	Yes
2.1b	BH ₅₀	2	Ver	30-1000 MHz	Pre scan Max hold EIRP	Yes
2.2a	BT ₈₅₀	1	Hor	30-1000 MHz	Pre scan Max hold EIRP	Yes
2.2b	BT ₈₅₀	1	Ver	30-1000 MHz	Pre scan Max hold EIRP	Yes
2.3a	BMT ₈₅₀	0	Hor	30-1000 MHz	Pre scan Max hold EIRP	Yes
2.3b	BMT ₈₅₀	0	Ver	30-1000 MHz	Pre scan Max hold EIRP	Yes
2.4a	BH ₅₀	2	Hor	1-18 GHz	Pre scan Max hold EIRP	Yes
2.4b	BH ₅₀	2	Ver	1-18 GHz	Pre scan Max hold EIRP	Yes
2.5a	BT ₈₅₀	1	Hor	1-18 GHz	Pre scan Max hold EIRP	Yes
2.5b	BT ₈₅₀	1	Ver	1-18 GHz	Pre scan Max hold EIRP	Yes
2.6a	BMT ₈₅₀	0	Hor	1-18 GHz	Pre scan Max hold EIRP	Yes
2.6b	BMT ₈₅₀	0	Ver	1-18 GHz	Pre scan Max hold EIRP	Yes
2.7a	TimL ₅₀	2	Hor	18-23 GHz 23-23.5 GHz 23.5-24 GHz	Pre scan Max hold EIRP	No Yes ² Yes ³
2.7b	TimL ₅₀	2	Ver	18-23 GHz 23-23.5 GHz 23.5-24 GHz	Pre scan Max hold EIRP	No Yes ² Yes ³
2.7c	TimL ₅₀	2	Hor/ Ver	22.8-22.9 GHz	Two cut TRP	Compliant to TRP limit
2.8a	BH ₅₀	2	Hor	18-23.3 GHz 23.3-24 GHz	Pre scan Max hold EIRP	Yes ¹ No
2.8b	BH ₅₀	2	Ver	18-23.3 GHz 23.3-24 GHz	Pre scan Max hold EIRP	Yes ¹ No
2.8c	BH ₅₀	2	Hor/ Ver	23.86-23.96 GHz	Two cut TRP	Compliant to TRP limit
2.9a	BimL ₅₀	2	Hor	18-23.4GHz 23.4-24 GHz	Pre scan Max hold EIRP	Yes ¹ No
2.9b	BimL ₅₀	2	Ver	18-23.4GHz 23.4-24 GHz	Pre scan Max hold EIRP	Yes ¹ No
2.9c	BimL ₅₀	2	Hor/ Ver	23.4-24 GHz	Two cut TRP	Compliant to TRP limit
2.9d	BimL ₅₀	2	Hor	23.6-24 GHz	Pre scan Max hold EIRP	No
2.9e	BimL ₅₀	2	Ver	23.6-24 GHz	Pre scan Max hold EIRP	No
2.9f	BimL ₅₀	2	Hor/ Ver	23.6-24GHz	Spherical grid Method TRP	Compliant to TRP limit*

¹⁾ Compliant (5x LO) to TRP limit based on Lower EIRP compared to TimL₅₀ (Diagram 2.7)

²⁾ Compliant to TRP limit based on Lower EIRP compared to BH₅₀ (Diagram 2.8)

³⁾ Compliant to TRP limit based on Lower EIRP compared to BimL₅₀ (Diagram 2.9)

*) Compliant to proposed rule change in FR Document Number: 2021-10536, Table 1—WRC-19 Resolution 750 Unwanted Emissions Permitted Within Any 200 Megahertz in the 23.6-24 GHz Passive Band “Current TRP limit IMT Base Stations: -33dBW”

Diagram	Symbolic name	Config mode	Pol	Frequency range	Measurement method	“Early exit?”
2.10a	BT8 ₅₀	1	Hor	18-24 GHz	Pre scan Max hold EIRP	Yes ^{1,2}
2.10b	BT8 ₅₀	1	Ver	18-24 GHz	Pre scan Max hold EIRP	Yes ^{1,2}
2.11a	BMT8 ₅₀	0	Hor	18-24 GHz	Pre scan Max hold EIRP	Yes ¹
2.11b	BMT8 ₅₀	0	Ver	18-24 GHz	Pre scan Max hold EIRP	Yes
2.12a	BL ₅₀	2	Hor	24-26.5 GHz	Pre scan Max hold EIRP	No
2.12b	BL ₅₀	2	Ver	24-26.5 GHz	Pre scan Max hold EIRP	No
2.12c	BL ₅₀	2	Hor	24-24.25 GHz	Pre scan Max average EIRP	Yes ^{4,5}
2.12d	BL ₅₀	2	Ver	24-24.25 GHz	Pre scan Max average EIRP	Yes ^{4,5}
2.13a	BimL ₅₀	2	Hor	24-26.5 GHz	Pre scan Max hold EIRP	No
2.13b	BimL ₅₀	2	Ver	24-26.5 GHz	Pre scan Max hold EIRP	No
2.13c	BimL ₅₀	2	Hor	24-24.25 GHz	Pre scan Max average EIRP	Yes ^{4,5}
2.13d	BimL ₅₀	2	Ver	24-24.25 GHz	Pre scan Max average EIRP	Yes ^{4,5}
2.13e	BimL ₅₀	2	Hor/ Ver	24-24.25 GHz	Pattern multiplication TRP	Compliant to TRP limit
2.14a	TL ₅₀	2	Hor	24-26.5 GHz	Pre scan Max hold EIRP	No
2.14b	TL ₅₀	2	Ver	24-26.5 GHz	Pre scan Max hold EIRP	No
2.14c	TL ₅₀	2	Hor	24.45-25.4 GHz	Pre scan Max average EIRP	Yes ⁴
2.14d	TL ₅₀	2	Ver	24.45-25.4 GHz	Pre scan Max average EIRP	Yes ⁴
2.15a	TimL ₅₀	2	Hor	24-26.5 GHz	Pre scan Max hold EIRP	No
2.15b	TimL ₅₀	2	Ver	24-26.5 GHz	Pre scan Max hold EIRP	No
2.15c	TimL ₅₀	2	Hor	24.45-25.4 GHz	Pre scan Max average EIRP	Yes ⁴
2.15d	TimL ₅₀	2	Ver	24.45-25.4 GHz	Pre scan Max average EIRP	Yes ⁴
2.16a	BH ₅₀	2	Hor	24-26.5 GHz	Pre scan Max hold EIRP	No
2.16b	BH ₅₀	2	Ver	24-26.5 GHz	Pre scan Max hold EIRP	No
2.16c	BH ₅₀	2	Hor	24-24.75 GHz	Pre scan Max average EIRP	Yes ⁴
2.16d	BH ₅₀	2	Ver	24-24.75 GHz	Pre scan Max average EIRP	Yes ⁴
2.17a	BimH ₅₀	2	Hor	24-26.5 GHz	Pre scan Max hold EIRP	No
2.17b	BimH ₅₀	2	Ver	24-26.5 GHz	Pre scan Max hold EIRP	No
2.17c	BimH ₅₀	2	Hor	24-24.75 GHz	Pre scan Max average EIRP	Yes ^{4,6}
2.17d	BimH ₅₀	2	Ver	24-24.75 GHz	Pre scan Max average EIRP	Yes ^{4,6}

¹⁾ Compliant (5x LO) to TRP limit based on Lower EIRP compared to TimL₅₀ (Diagram 2.7)

²⁾ Compliant to TRP limit based on Lower EIRP compared to BH₅₀ (Diagram 2.8)

⁴⁾ Calculated conducted power based on antenna gain below limit

⁵⁾ Compliant to TRP limit based on Lower EIRP compared to BimL₅₀ (Diagram 2.13)

⁶⁾ Compliant to TRP limit based on Lower EIRP compared to TimH₅₀ (Diagram 2.19)

Diagram	Symbolic name	Config mode	Pol	Frequency range	Measurement method	“Early exit?”
2.18a	TH ₅₀	2	Hor	24-26.5 GHz	Pre scan Max hold EIRP	No
2.18b	TH ₅₀	2	Ver	24-26.5 GHz	Pre scan Max hold EIRP	No
2.18c	TH ₅₀	2	Hor	25.25-26.5 GHz	Pre scan Max average EIRP	Yes ^{4,6}
2.18d	TH ₅₀	2	Ver	25.25-26.5 GHz	Pre scan Max average EIRP	Yes ^{4,6}
2.19a	TimH ₅₀	2	Hor	24-26.5 GHz	Pre scan Max hold EIRP	No
2.19b	TimH ₅₀	2	Ver	24-26.5 GHz	Pre scan Max hold EIRP	No
2.19c	TimH ₅₀	2	Hor	25.25-26.5 GHz	Pre scan Max average EIRP	No
2.19d	TimH ₅₀	2	Ver	25.25-26.5 GHz	Pre scan Max average EIRP	No
2.19e	TimH ₅₀	2	Hor/ Ver	25.25-26.2 GHz	Pattern multiplication TRP	Compliant to TRP limit
2.20a	BT8 ₅₀	1	Hor	24-26.5 GHz	Pre scan Max average EIRP	No
2.20b	BT8 ₅₀	1	Ver	24-26.5 GHz	Pre scan Max average EIRP	No
2.20c	BT8 ₅₀	1	Hor	24-24.25 GHz	Pre scan Max average EIRP	Yes ^{4,5}
2.20d	BT8 ₅₀	1	Ver	24-24.25 GHz	Pre scan Max average EIRP	Yes ^{4,5}
2.20e	BT8 ₅₀	1	Hor	25.25-26.5 GHz	Pre scan Max average EIRP	Yes ^{4,6}
2.20f	BT8 ₅₀	1	Ver	25.25-26.5 GHz	Pre scan Max average EIRP	Yes ^{4,6}
2.21a	BMT8 ₅₀	0	Hor	24-26.5 GHz	Pre scan Max average EIRP	No
2.21b	BMT8 ₅₀	0	Ver	24-26.5 GHz	Pre scan Max average EIRP	No
2.21c	BMT8 ₅₀	0	Hor	24-24.25 GHz	Pre scan Max average EIRP	Yes ^{4,5}
2.21d	BMT8 ₅₀	0	Ver	24-24.25 GHz	Pre scan Max average EIRP	Yes ^{4,5}
2.21e	BMT8 ₅₀	0	Hor	25.25-26.5 GHz	Pre scan Max average EIRP	Yes ^{4,6}
2.21f	BMT8 ₅₀	0	Ver	25.25-26.5 GHz	Pre scan Max average EIRP	Yes ^{4,6}

⁴⁾ Calculated conducted power based on antenna gain below limit

⁵⁾ Compliant to TRP limit based on Lower EIRP compared to BimL₅₀ (Diagram 2.13)

⁶⁾ Compliant to TRP limit based on Lower EIRP compared to TimH₅₀ (Diagram 2.19)

Diagram	Symbolic name	Config mode	Pol	Frequency range	Measurement method	“Early exit?”
2.22a	BL ₅₀	2	Hor	26.5-28 GHz	Pre scan Max hold EIRP	Yes
2.22b	BL ₅₀	2	Ver	26.5-28 GHz	Pre scan Max hold EIRP	Yes
2.23a	BT ₈₅₀	1	Hor	26.5-28 GHz	Pre scan Max hold EIRP	Yes
2.23b	BT ₈₅₀	1	Ver	26.5-28 GHz	Pre scan Max hold EIRP	Yes
2.24a	BMT ₈₅₀	0	Hor	26.5-28 GHz	Pre scan Max hold EIRP	Yes
2.24b	BMT ₈₅₀	0	Ver	26.5-28 GHz	Pre scan Max hold EIRP	Yes
2.25a	TH ₅₀	2	Hor	28-40 GHz	Pre scan Max hold EIRP	Yes
2.25b	TH ₅₀	2	Ver	28-40 GHz	Pre scan Max hold EIRP	Yes
2.26a	BT ₈₅₀	1	Hor	28-40 GHz	Pre scan Max hold EIRP	Yes
2.26b	BT ₈₅₀	1	Ver	28-40 GHz	Pre scan Max hold EIRP	Yes
2.27a	BMT ₈₅₀	0	Hor	28-40 GHz	Pre scan Max hold EIRP	Yes
2.27b	BMT ₈₅₀	0	Ver	28-40 GHz	Pre scan Max hold EIRP	Yes
2.28a	BH ₅₀	2	Hor	40-60 GHz	Pre scan Max hold EIRP	Yes
2.28b	BH ₅₀	2	Ver	40-60 GHz	Pre scan Max hold EIRP	Yes
2.29a	BT ₈₅₀	1	Hor	40-60 GHz	Pre scan Max hold EIRP	Yes
2.29b	BT ₈₅₀	1	Ver	40-60 GHz	Pre scan Max hold EIRP	Yes
2.30a	BMT ₈₅₀	0	Hor	40-60 GHz	Pre scan Max hold EIRP	Yes
2.30b	BMT ₈₅₀	0	Ver	40-60 GHz	Pre scan Max hold EIRP	Yes
2.31a	BH ₅₀	2	Hor	60-75 GHz	Pre scan Max hold EIRP	Yes
2.31b	BH ₅₀	2	Ver	60-75 GHz	Pre scan Max hold EIRP	Yes
2.32a	BT ₈₅₀	1	Hor	60-75 GHz	Pre scan Max hold EIRP	Yes
2.32b	BT ₈₅₀	1	Ver	60-75 GHz	Pre scan Max hold EIRP	Yes
2.33a	BMT ₈₅₀	0	Hor	60-75 GHz	Pre scan Max hold EIRP	Yes
2.33b	BMT ₈₅₀	0	Ver	60-75 GHz	Pre scan Max hold EIRP	Yes
2.34a	BH ₅₀	2	Hor	75-90 GHz	Pre scan Max hold EIRP	Yes
2.34b	BH ₅₀	2	Ver	75-90 GHz	Pre scan Max hold EIRP	Yes
2.35a	BT ₈₅₀	1	Hor	75-90 GHz	Pre scan Max hold EIRP	Yes
2.35b	BT ₈₅₀	1	Ver	75-90 GHz	Pre scan Max hold EIRP	Yes
2.36a	BMT ₈₅₀	0	Hor	75-90 GHz	Pre scan Max hold EIRP	Yes
2.36b	BMT ₈₅₀	0	Ver	75-90 GHz	Pre scan Max hold EIRP	Yes
2.37a	BH ₅₀	2	Hor	90-100 GHz	Pre scan Max hold EIRP	Yes
2.37b	BH ₅₀	2	Ver	90-100 GHz	Pre scan Max hold EIRP	Yes
2.38a	BT ₈₅₀	1	Hor	90-100 GHz	Pre scan Max hold EIRP	Yes
2.38b	BT ₈₅₀	1	Ver	90-100 GHz	Pre scan Max hold EIRP	Yes
2.39a	BMT ₈₅₀	0	Hor	90-100 GHz	Pre scan Max hold EIRP	Yes
2.39b	BMT ₈₅₀	0	Ver	90-100 GHz	Pre scan Max hold EIRP	Yes

Measurement uncertainty: 30 – 1000 MHz 3.1 dB
1 – 18 GHz, 3.0 dB
18 – 40 GHz, 3.1 dB
40 – 60 GHz, 2.27 dB
60 – 75 GHz, 2.70 dB
75 – 110 GHz, 4.24 dB

Limits

CFR 47 §30.203 Emission limits.

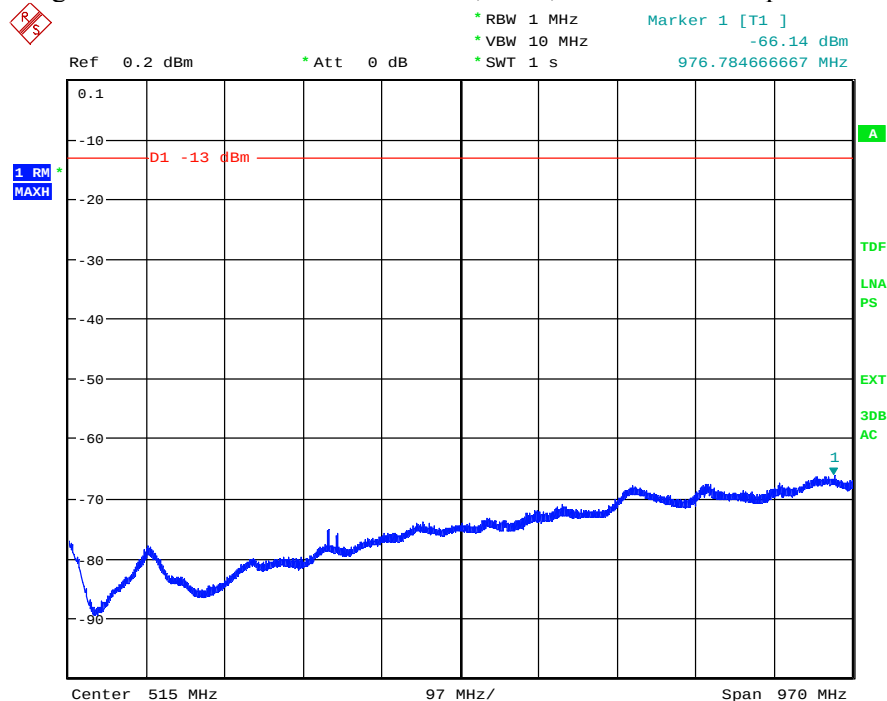
(a) The conductive power or the total radiated power of any emission outside a licensee's frequency block shall be -13 dBm/MHz or lower. However, in the bands immediately outside and adjacent to the licensee's frequency block, having a bandwidth equal to 10 percent of the channel bandwidth, the conductive power or the total radiated power of any emission shall be -5 dBm/MHz or lower.

(b)(1) Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater.

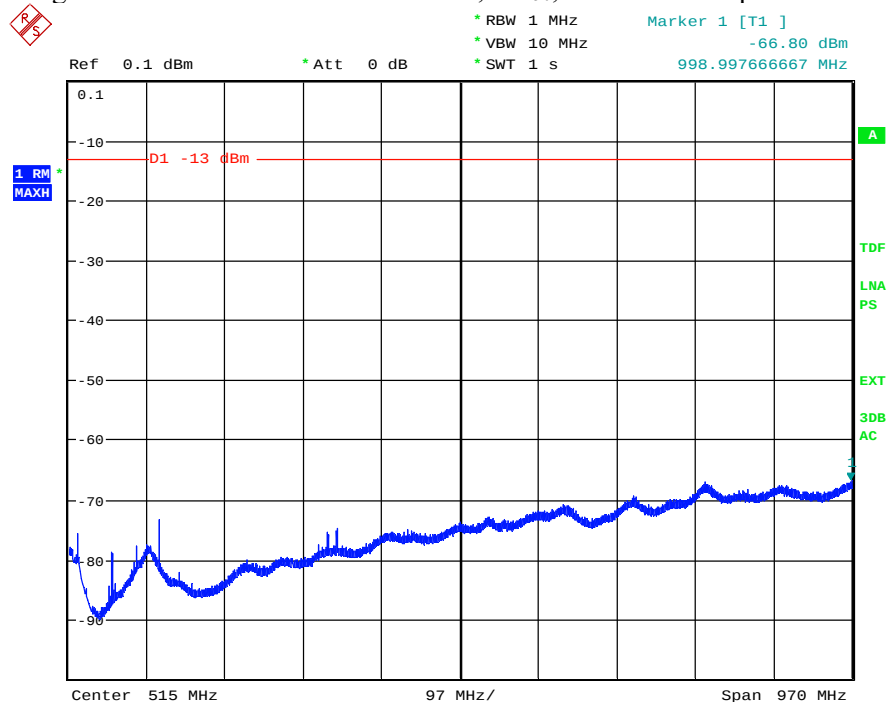
(2) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the licensee's frequency block edges as the design permits.

(3) The measurements of emission power can be expressed in peak or average values.

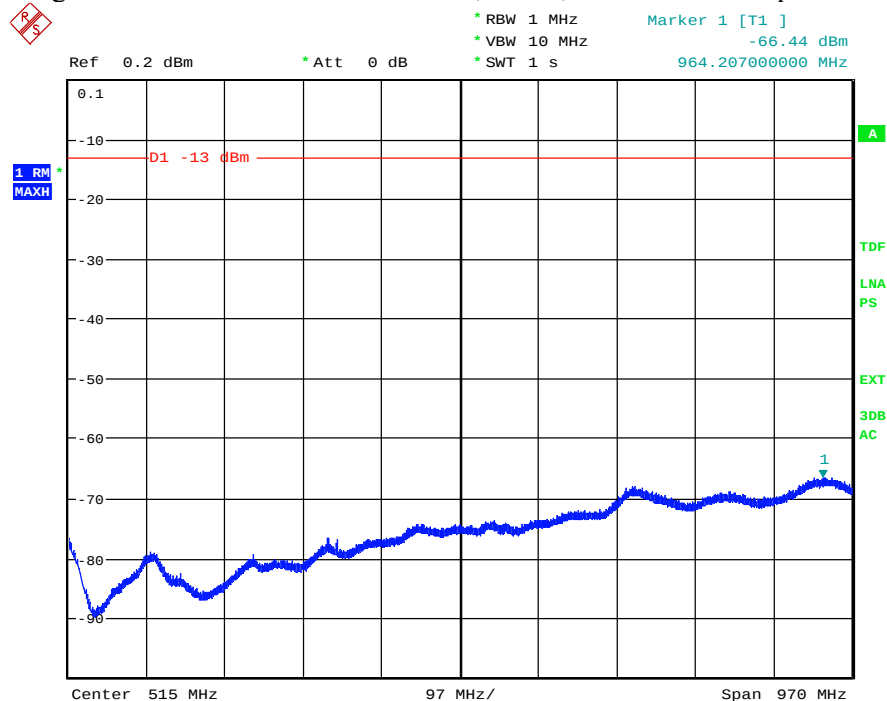
Complies?	Yes
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Diagram 2.1a: Pre scan 30 – 1000 MHz, BH₅₀, EIRP Horizontal polarization

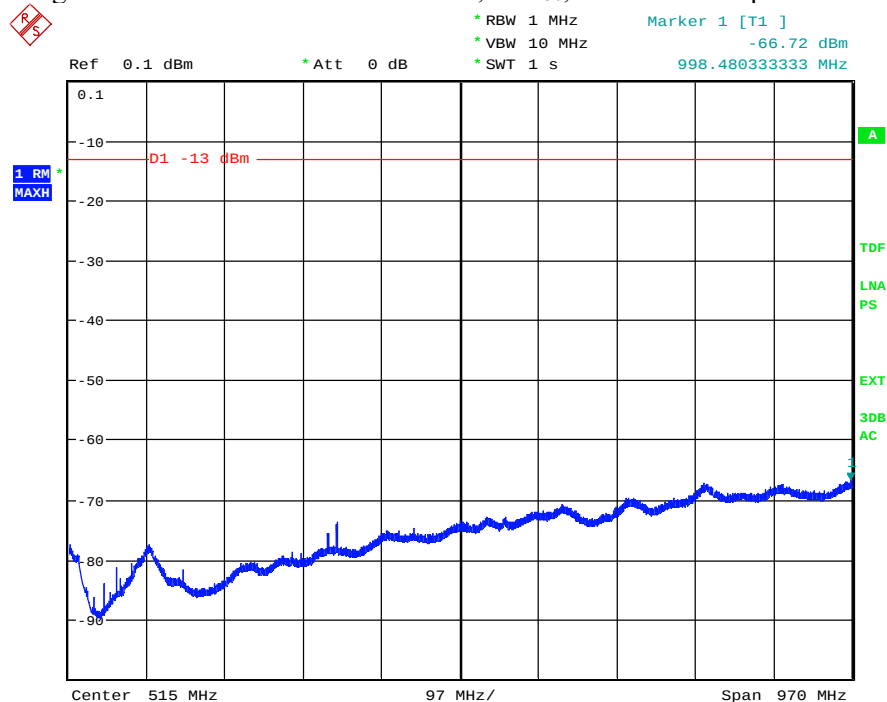
Date: 2.JUN.2021 11:10:37

Diagram 2.1b: Pre scan 30 – 1000 MHz, BH₅₀, EIRP Vertical polarization

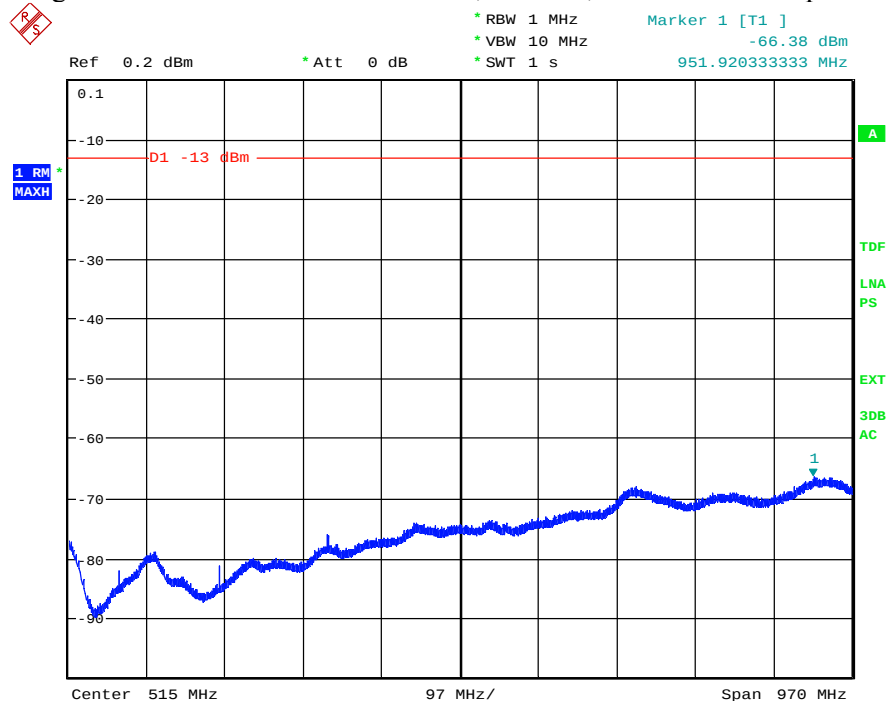
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Diagram 2.2a: Pre scan 30 – 1000 MHz, BT8₅₀, EIRP Horizontal polarization

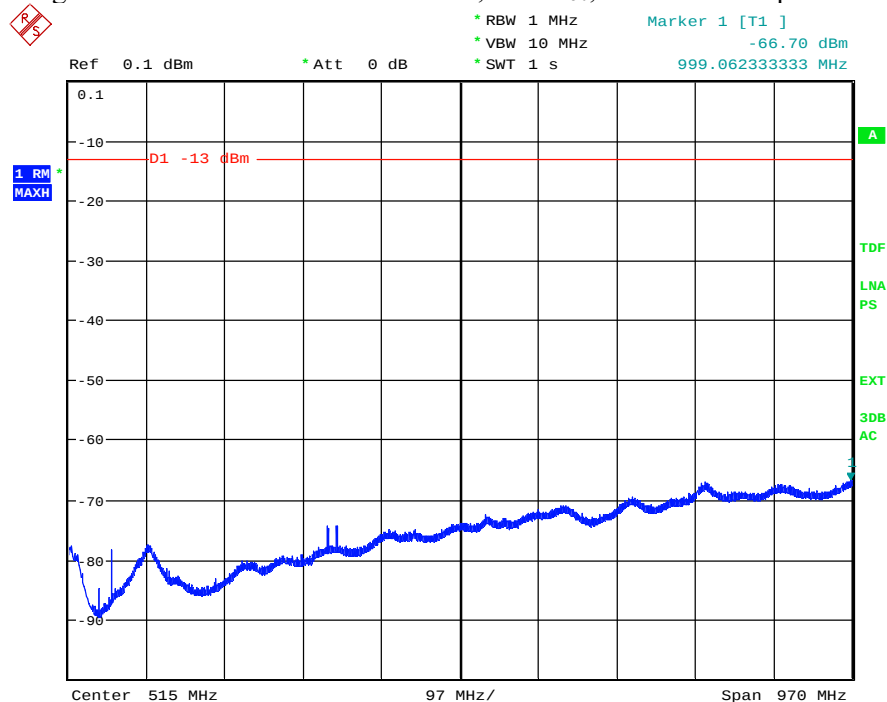
Date: 2.JUN.2021 11:18:58

Diagram 2.2b: Pre scan 30 – 1000 MHz, BT8₅₀, EIRP Vertical polarization

Date: 2.JUN.2021 11:17:36

Diagram 2.3a: Pre scan 30 – 1000 MHz, BMT8₅₀, EIRP Horizontal polarization

Date: 2. JUN. 2021 11:25:24

Diagram 2.3b: Pre scan 30 – 1000 MHz, BMT8₅₀, EIRP Vertical polarization

Date: 2. JUN. 2021 11:27:56

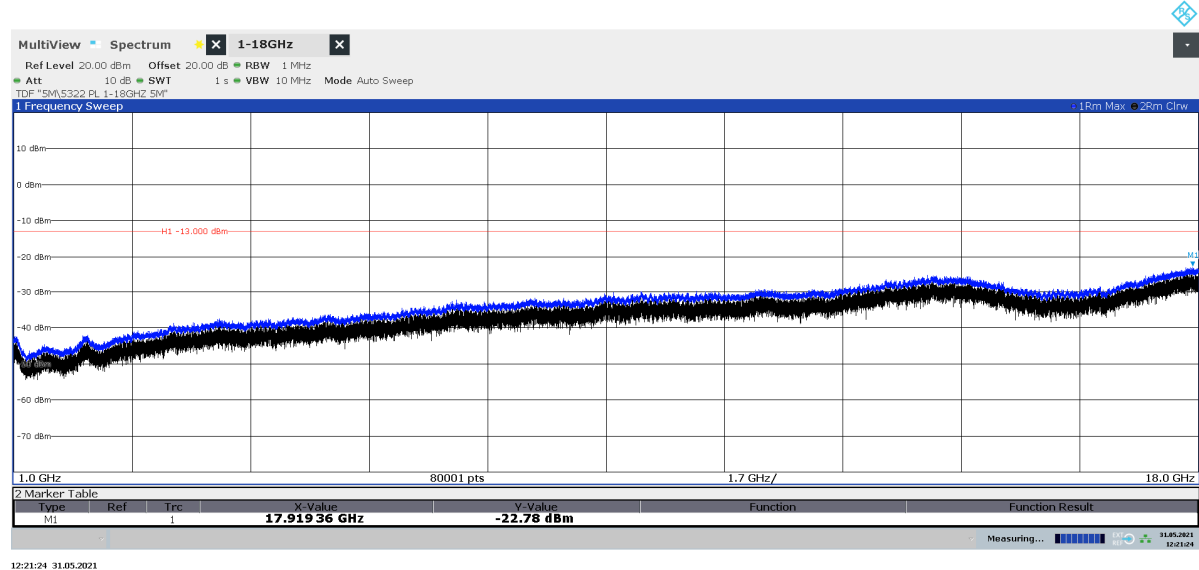
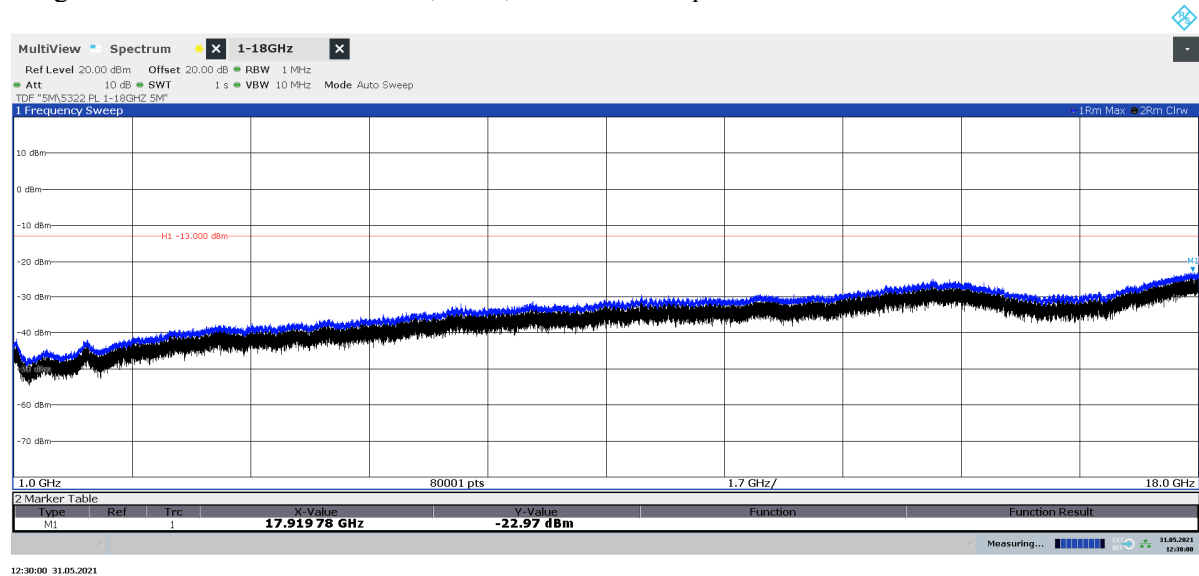
Diagram 2.4a: Pre scan 1 – 18 GHz, BH₅₀, EIRP Horizontal polarizationDiagram 2.4b: Pre scan 1 – 18 GHz, BH₅₀, EIRP Vertical polarization

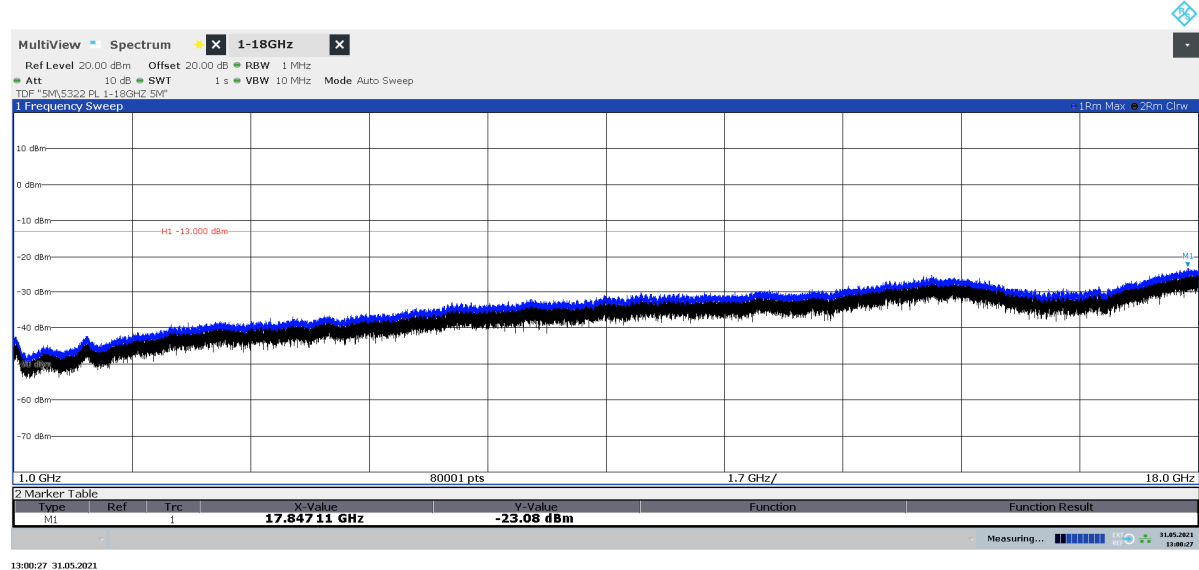
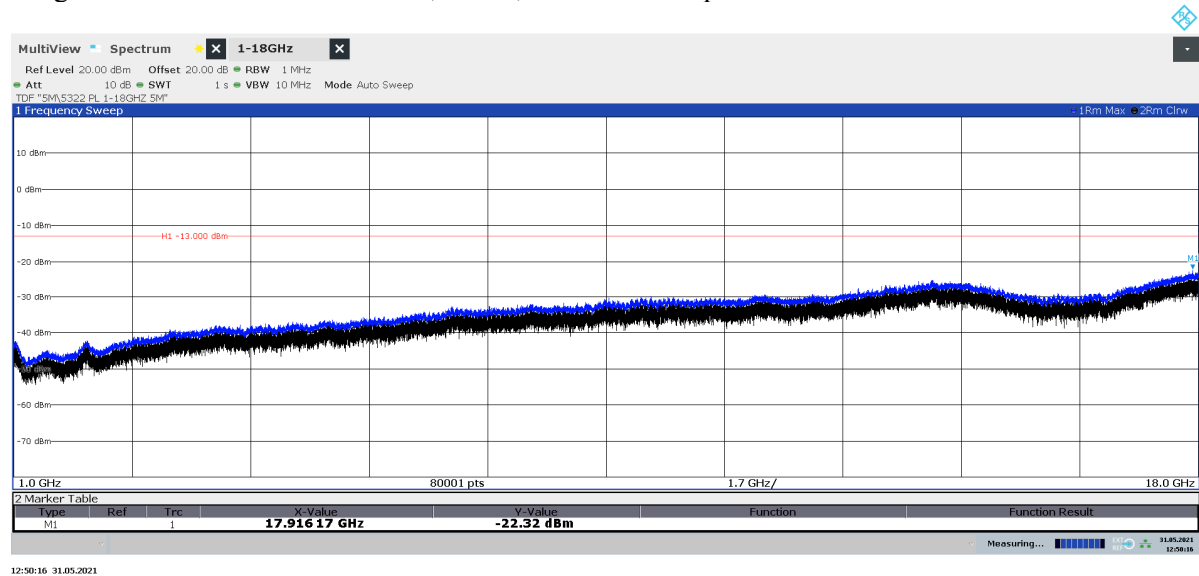
Diagram 2.5a: Pre scan 1 – 18 GHz, BT8₅₀, EIRP Horizontal polarizationDiagram 2.5b: Pre scan 1 – 18 GHz, BT8₁₀, EIRP Vertical polarization

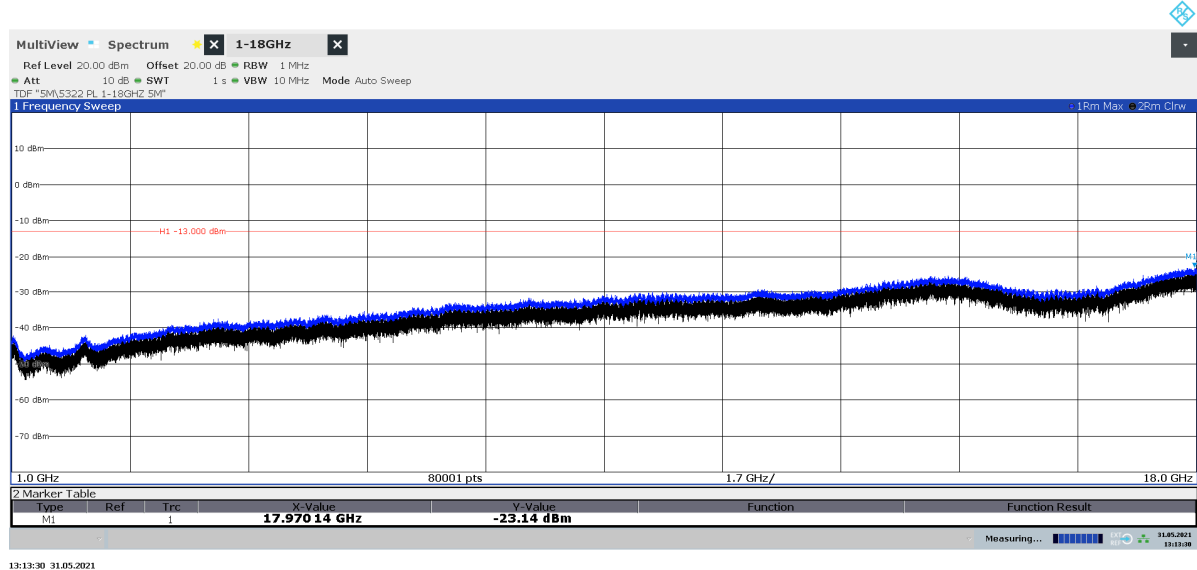
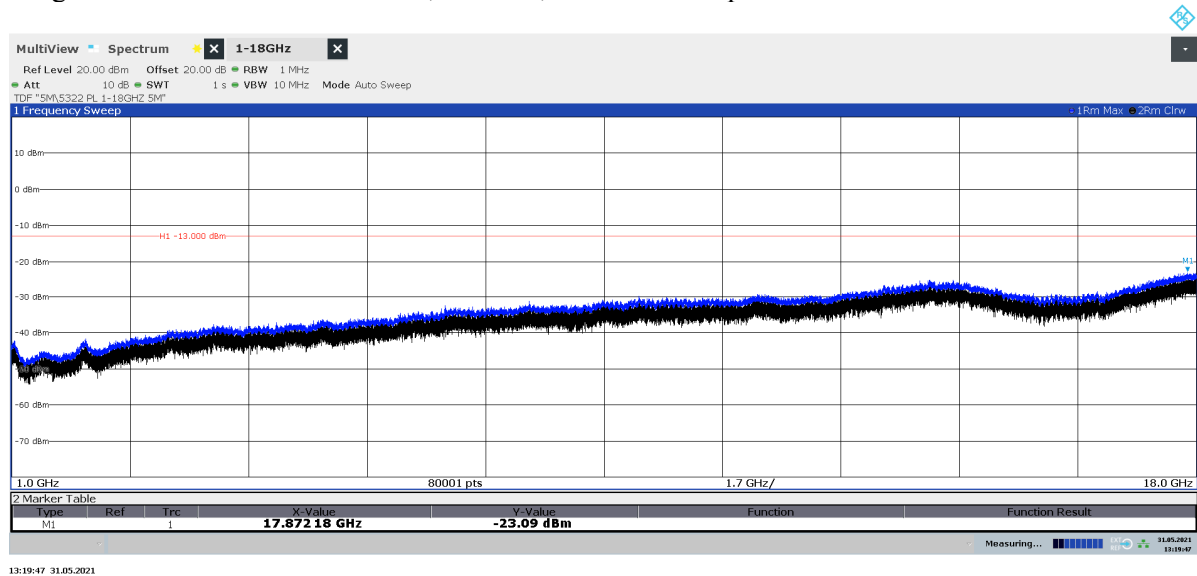
Diagram 2.6a: Pre scan 1 – 18 GHz, BMT₅₀, EIRP Horizontal polarizationDiagram 2.6b: Pre scan 1 – 18 GHz, BMT₈₅₀, EIRP Vertical polarization

Diagram 2.7a: Pre scan 18 – 24 GHz, TimL₅₀, EIRP Horizontal polarization
See diagram 2.7c for TRP result

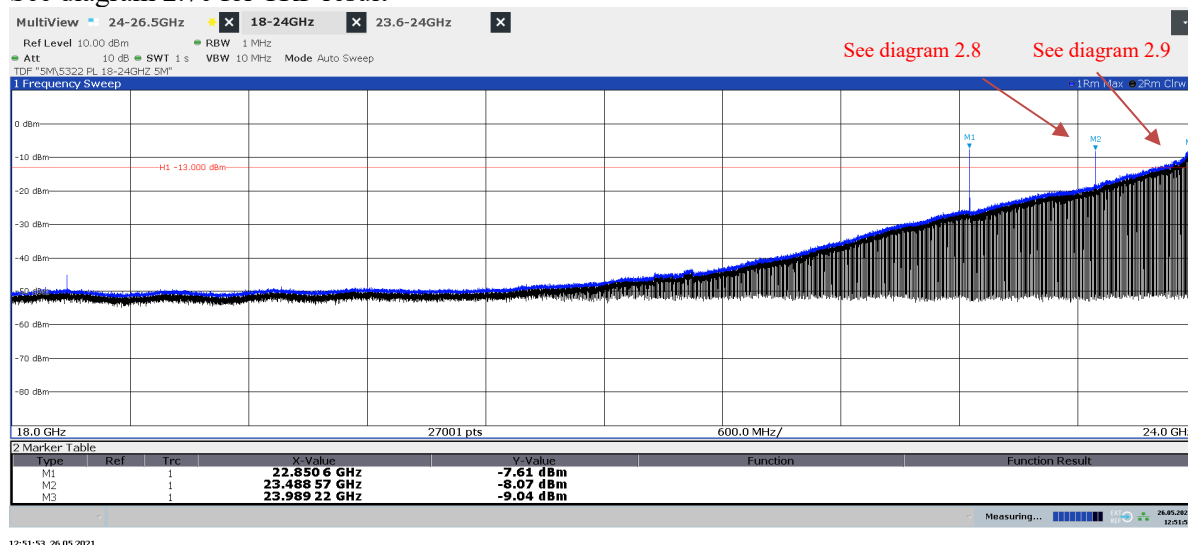


Diagram 2.7b: Pre scan 18 – 24 GHz, TimL₅₀, EIRP Vertical polarization
See diagram 2.7c for TRP result

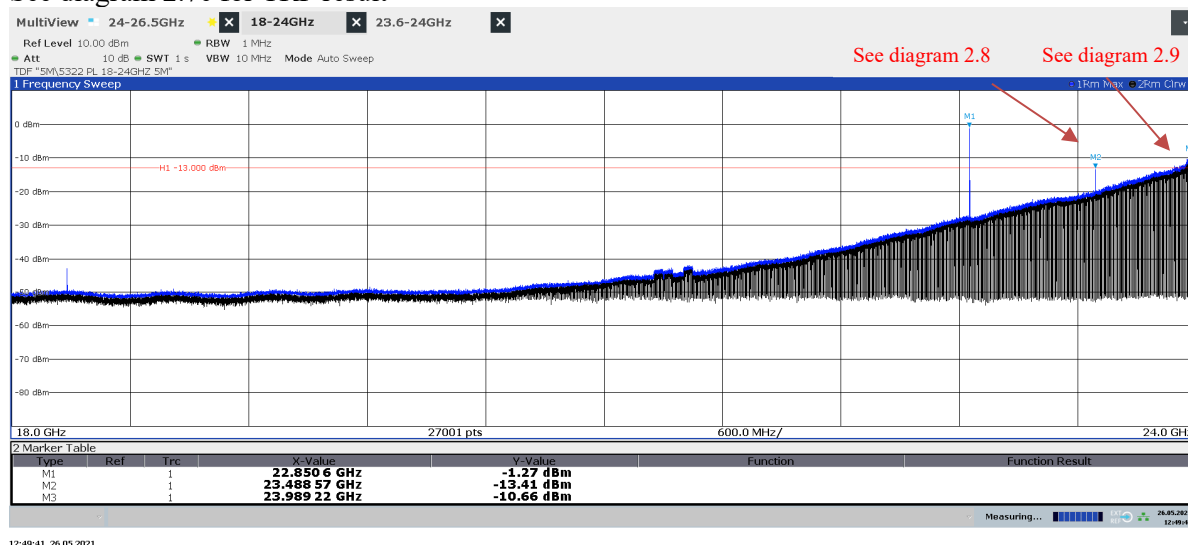


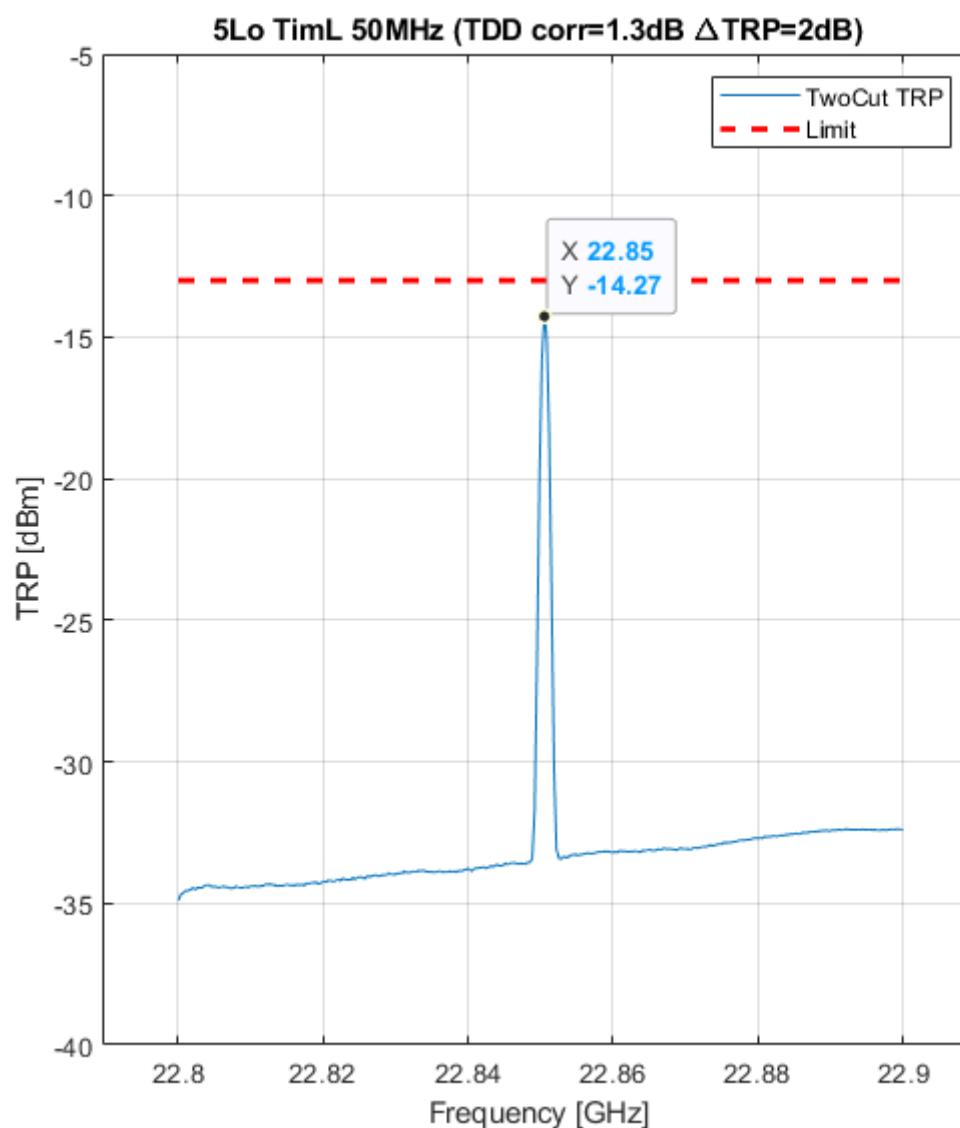
Diagram 2.7c: Two cut TRP 22.8 – 22.9 GHz, TimL₅₀

Diagram 2.8a: Pre scan 18 – 24 GHz, BH₅₀, EIRP Horizontal polarization
See diagram 2.8c for TRP result

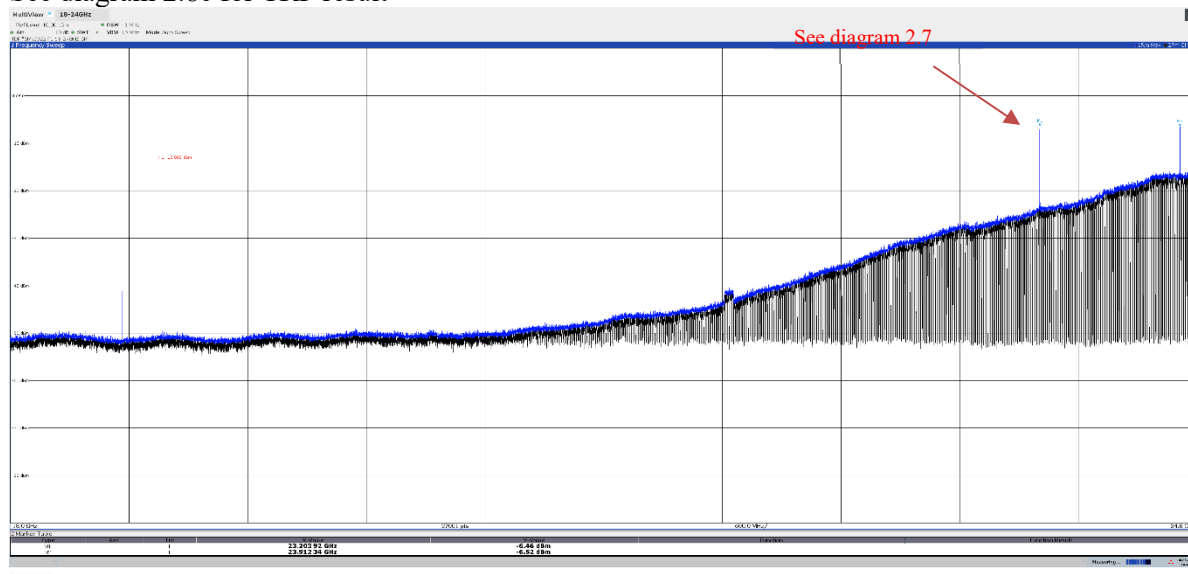


Diagram 2.8b: Pre scan 18 – 24 GHz, BH₅₀, EIRP Vertical polarization
See diagram 2.8c for TRP result

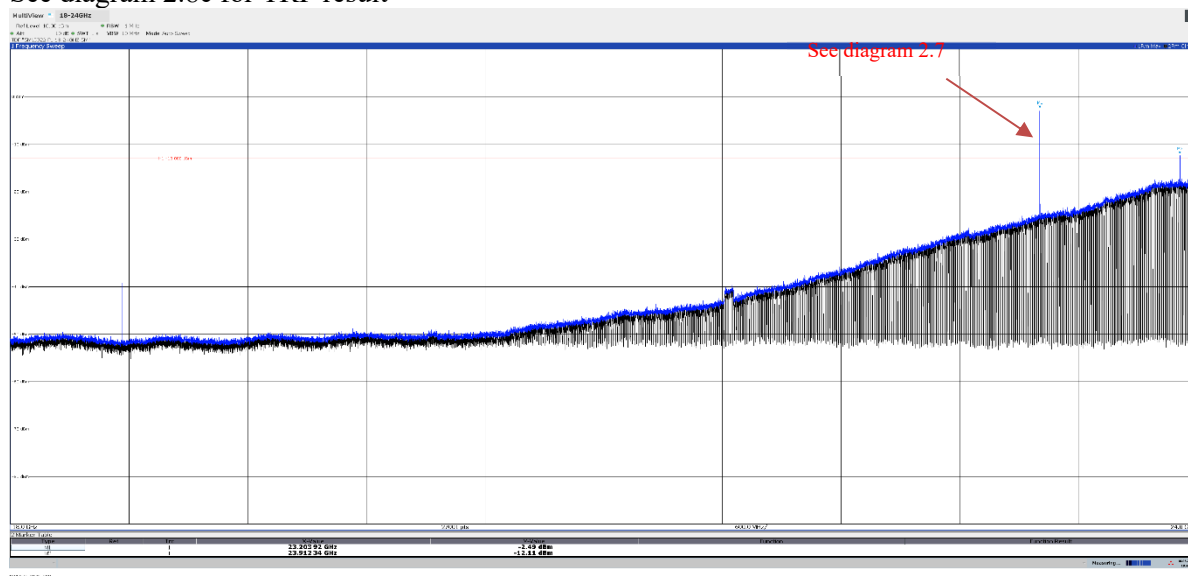


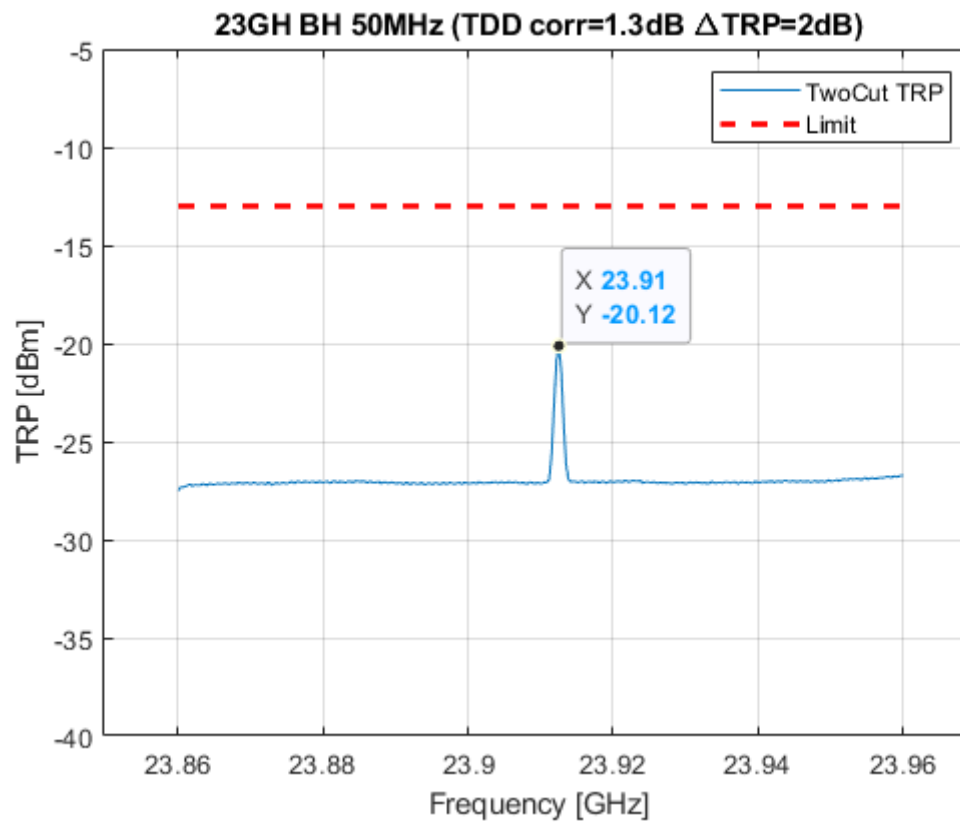
Diagram 2.8c: Two cut TRP 23.86 – 23.96 GHz, BH₅₀

Diagram 2.9a: Pre scan 18 – 24 GHz, BimL₅₀, EIRP Horizontal polarization
See diagram 2.9c for TRP result

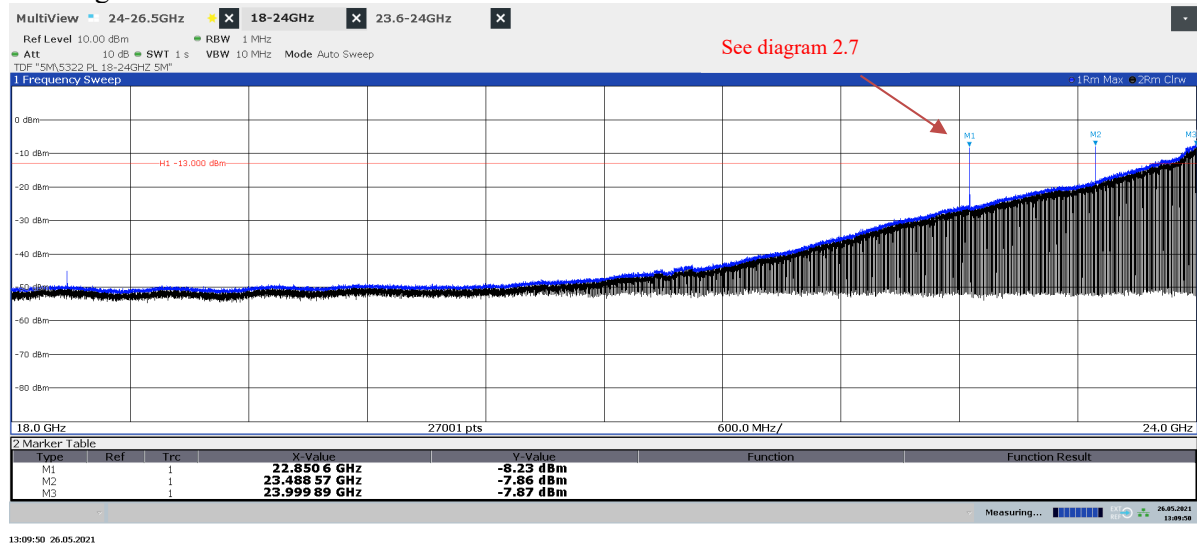


Diagram 2.9b: Pre scan 18 – 24 GHz, BimL₅₀, EIRP Vertical polarization
See diagram 2.9c for TRP result

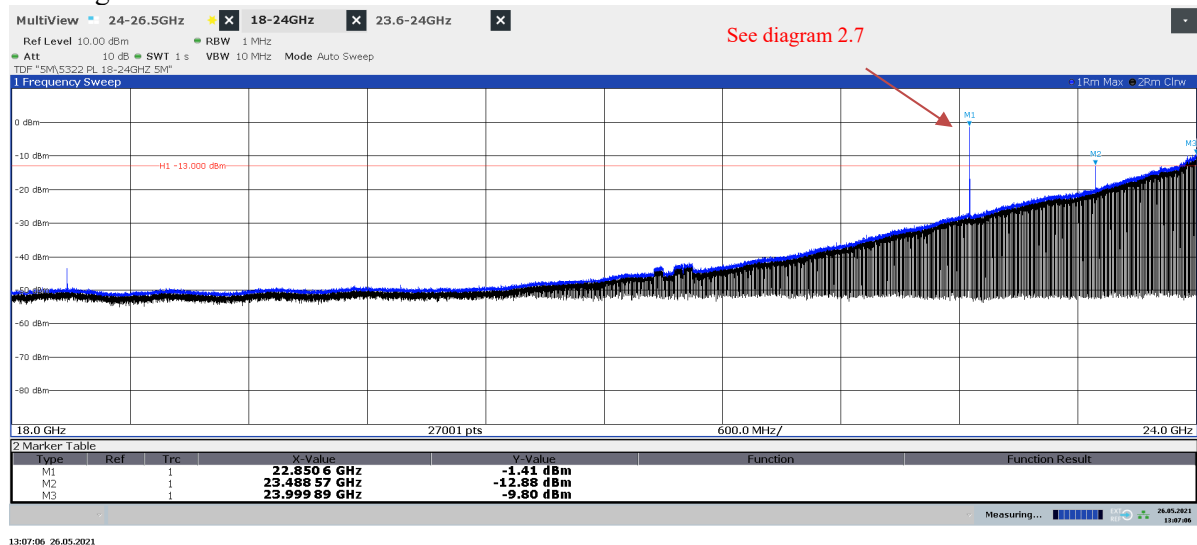


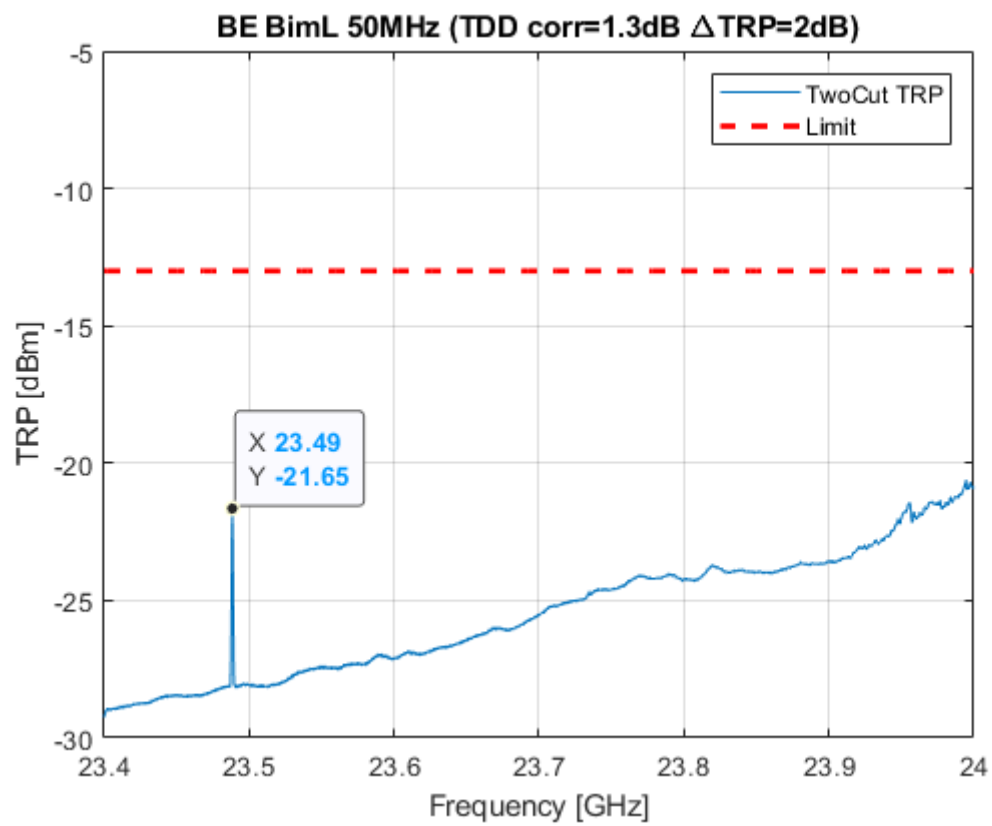
Diagram 2.9c: Two cut TRP 23.4 – 24 GHz, BimL₅₀

Diagram 2.9d: Pre scan Channel power 200MHz 23.6 – 24 GHz, BimL₅₀, EIRP Horizontal polarization

See diagram 2.9f for TRP result

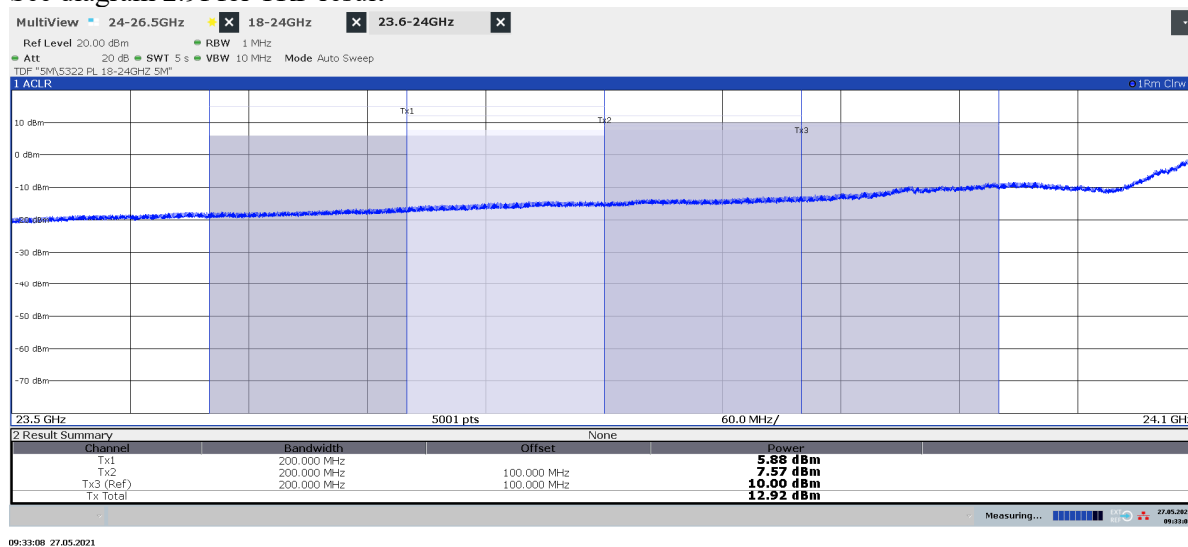


Diagram 2.9e: Pre scan Channel power 200MHz 23.6 – 24 GHz, BimL₅₀, EIRP Vertical polarization

See diagram 2.9f for TRP result

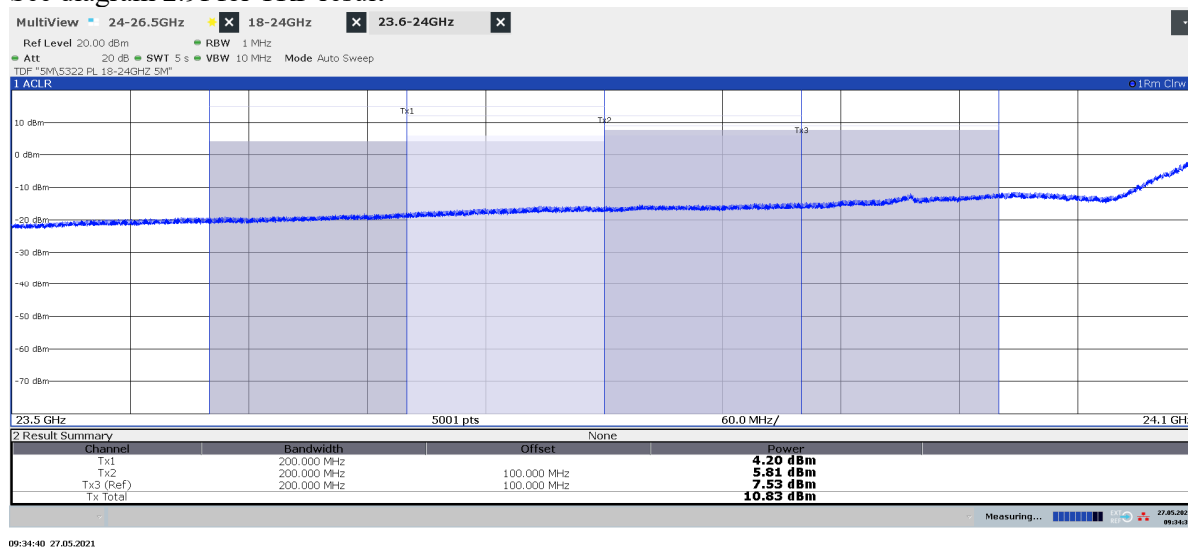
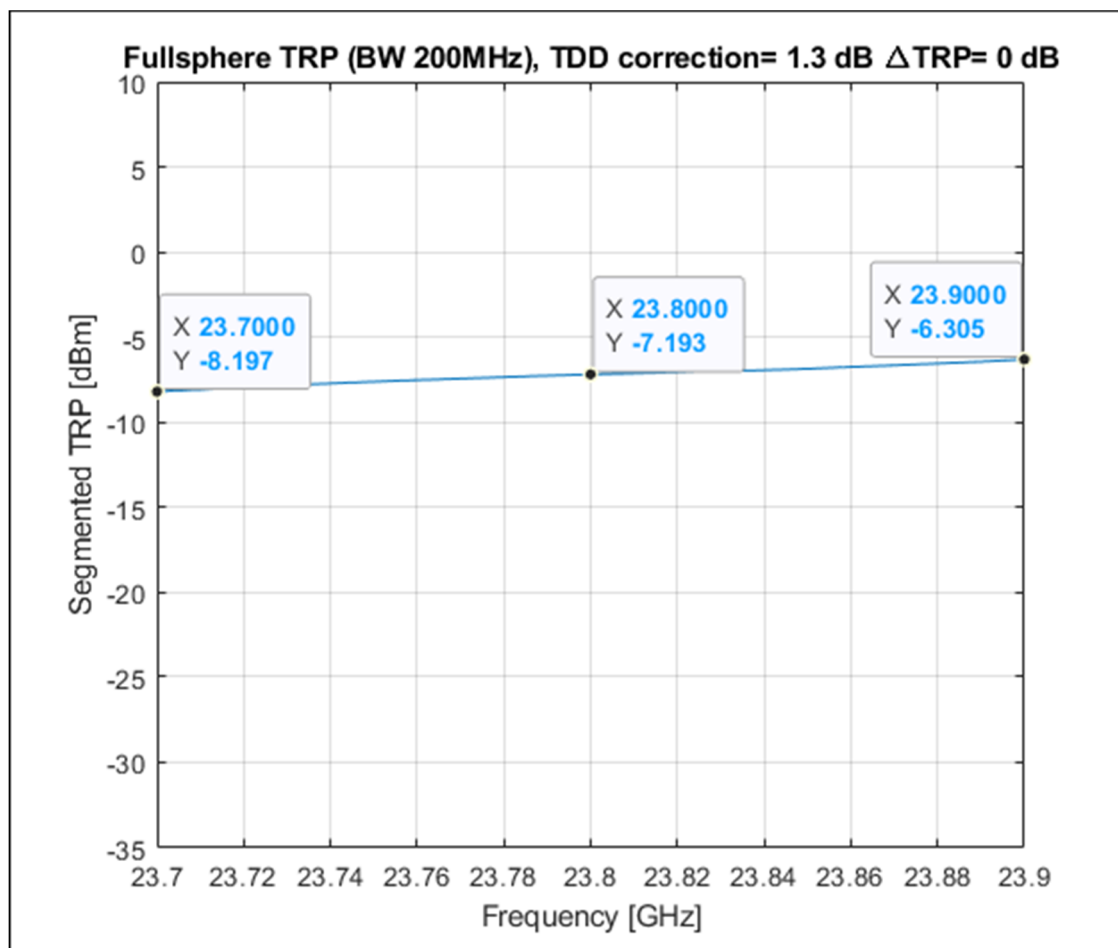
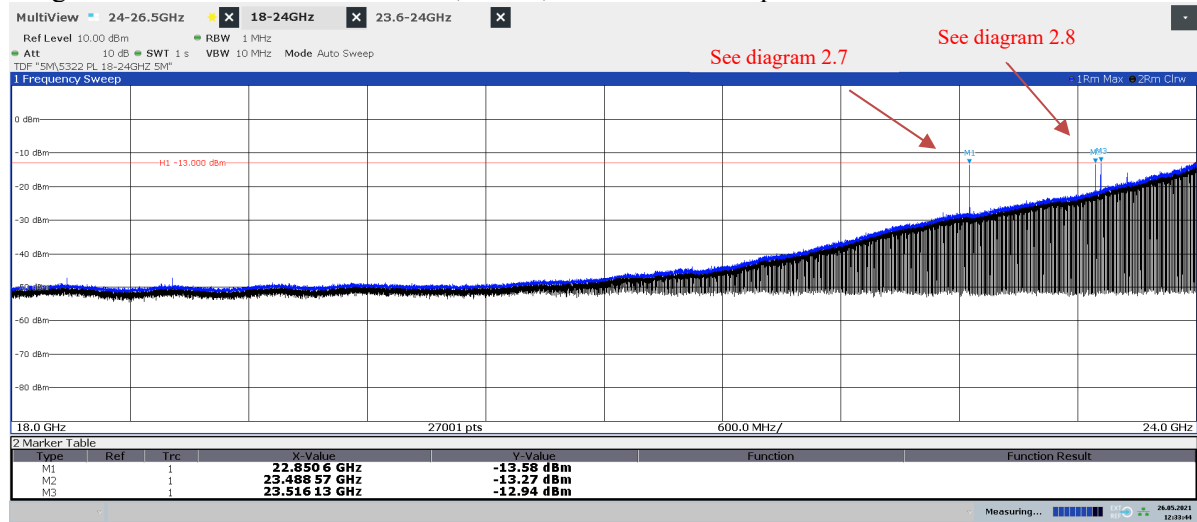


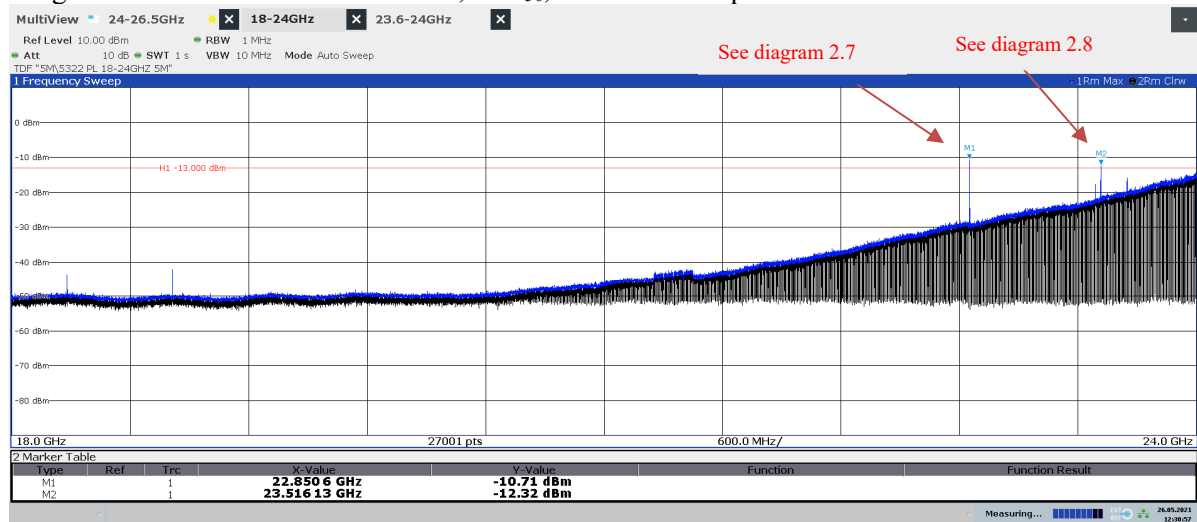
Diagram 2.9f: Spherical grid Method TRP Channel power 200MHz 23.6 – 24 GHz, BimL₅₀

Proposed rule change in FR Document Number: 2021-10536, Table 1—WRC-19 Resolution 750
Unwanted Emissions Permitted Within Any 200 Megahertz in the 23.6-24 GHz Passive Band

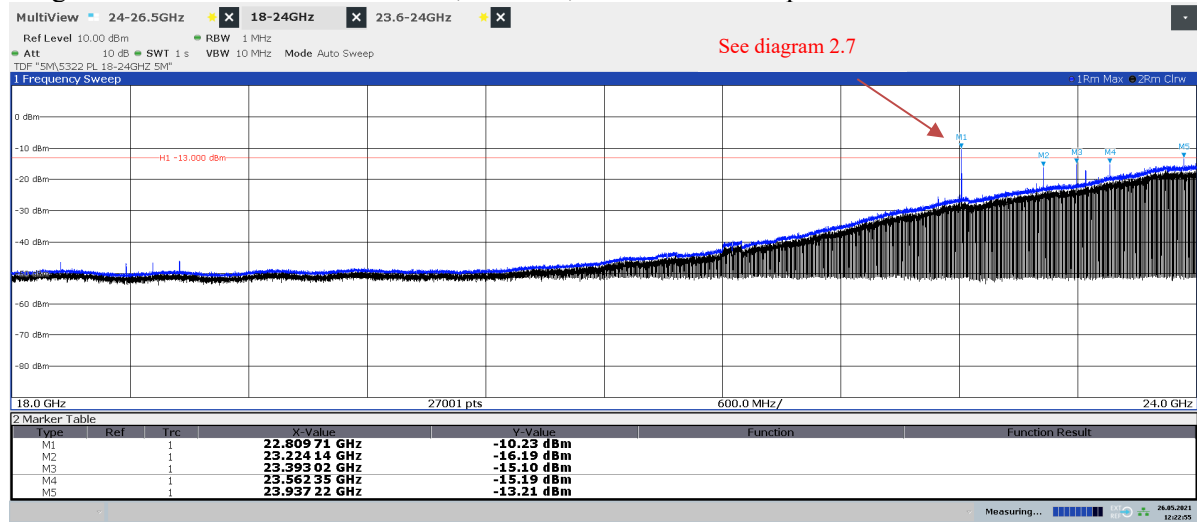
Freq [GHz]	Power TRP [dBW] Channel power 200MHz	Current TRP limit IMT Base Stations [dBW]
23.7	-38.197	-33
23.8	-37.193	-33
23.9	-36.305	-33

Diagram 2.10a: Pre scan 18 – 24 GHz, BT₈₅₀, EIRP Horizontal polarization

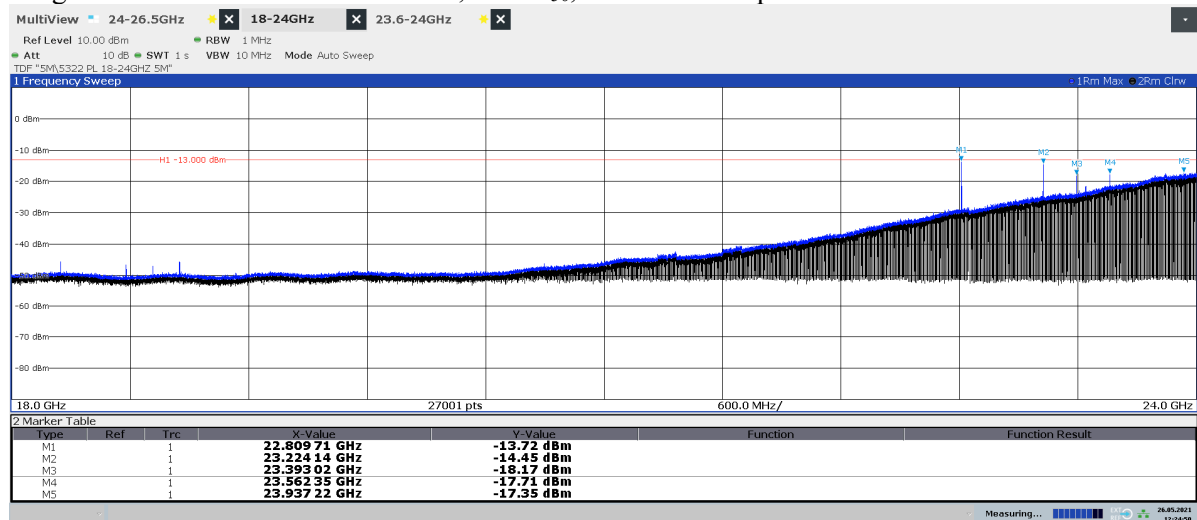
12:33:44 26.05.2021

Diagram 2.10b: Pre scan 18 – 24 GHz, BT₈₅₀, EIRP Vertical polarization

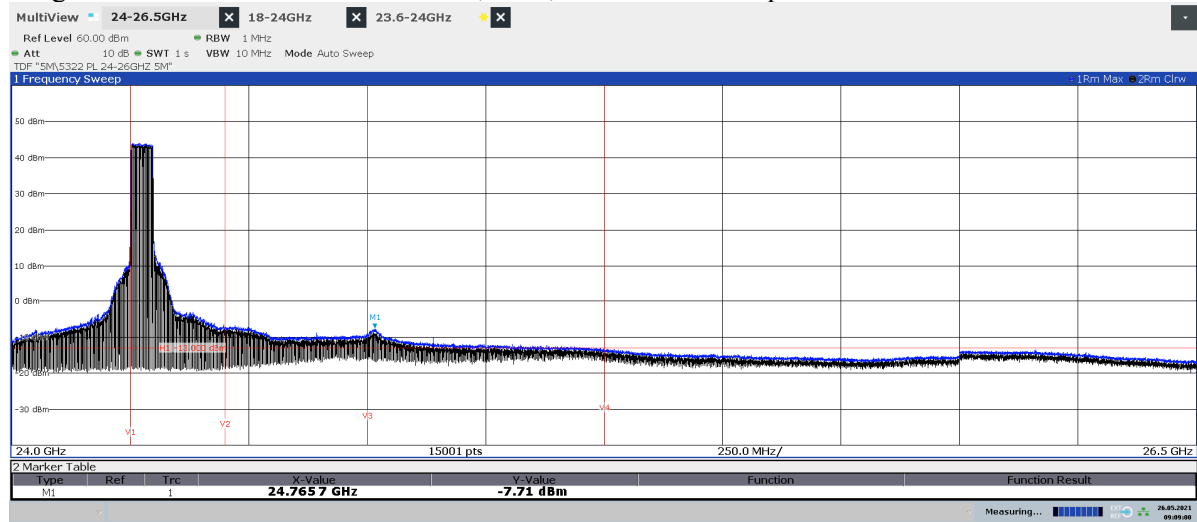
12:30:58 26.05.2021

Diagram 2.11a: Pre scan 18 – 24 GHz, BMT8₅₀, EIRP Horizontal polarization

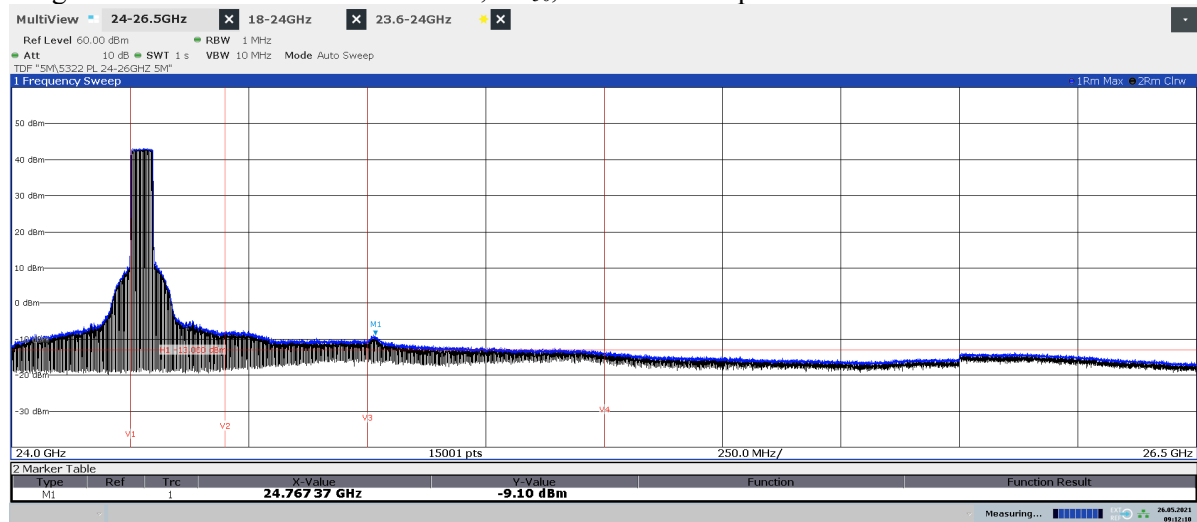
12:22:56 26.05.2021

Diagram 2.11b: Pre scan 18 – 24 GHz, BMT8₅₀, EIRP Vertical polarization

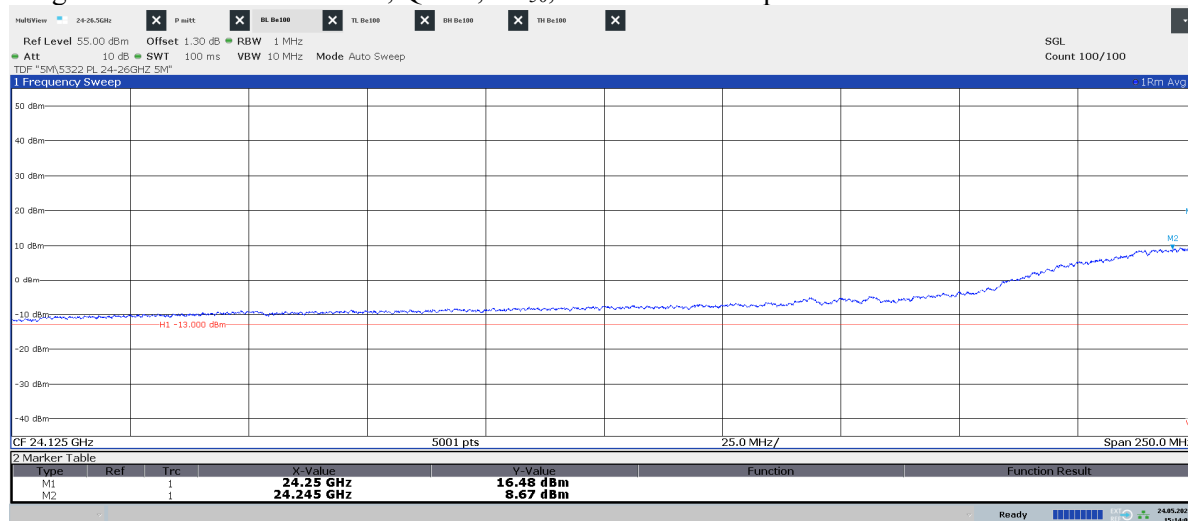
12:24:50 26.05.2021

Diagram 2.12a: Pre scan 24 – 26.5 GHz, BL₅₀, EIRP Horizontal polarization

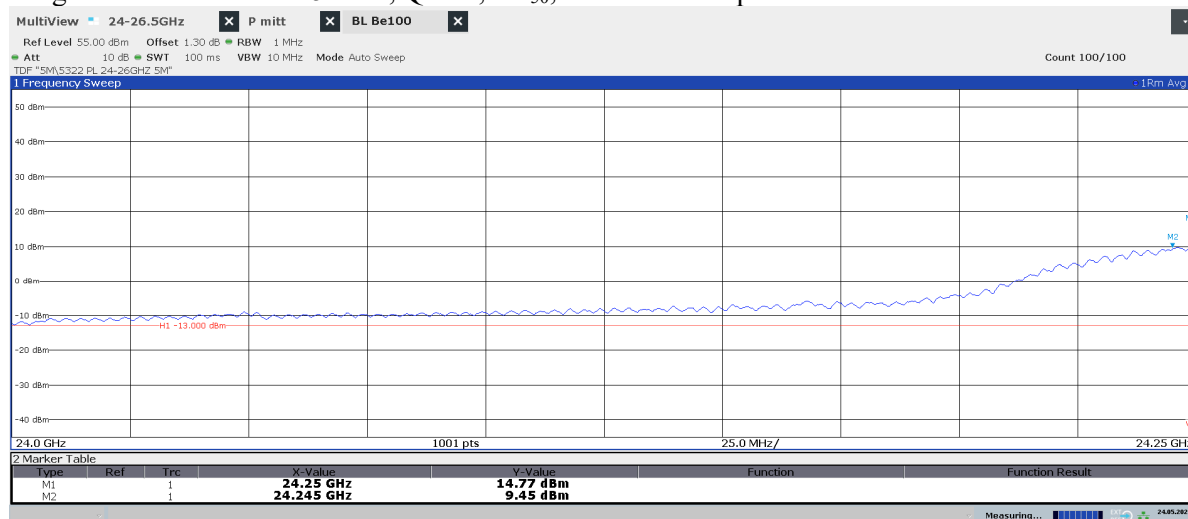
09:09:00 26.05.2021

Diagram 2.12b: Pre scan 24 – 26.5 GHz, BL₅₀, EIRP Vertical polarization

09:12:10 26.05.2021

Diagram 2.12c: 24 – 24.25 GHz, QPSK, BL₅₀, EIRP Horizontal polarization

15:14:03 24.05.2021

Diagram 2.12d: 24 – 24.25 GHz, QPSK, BL₅₀, EIRP Vertical polarization

16:44:26 24.05.2021

Power EIRP for 24.25 GHz Hor/ Ver [dBm]	Power EIRP for 24.245 GHz Hor/ Ver [dBm]	Antenna Gain Hor/ Ver [dBi]	Total conducted power/BW for 24.25 GHz (Limit -5 dBm) [dBm]/ Verdict	Total conducted power/BW for 24.245 GHz (Limit -13 dBm) [dBm]/ Verdict
16.48/ 14.77	8.67/ 9.45	30.88/ 30.69	-12.08/ Pass	-18.08/ Pass

Diagram 2.13a: Pre scan 24 – 26.5 GHz, BimL₅₀, EIRP Horizontal polarization
See diagram 2.13e for TRP result

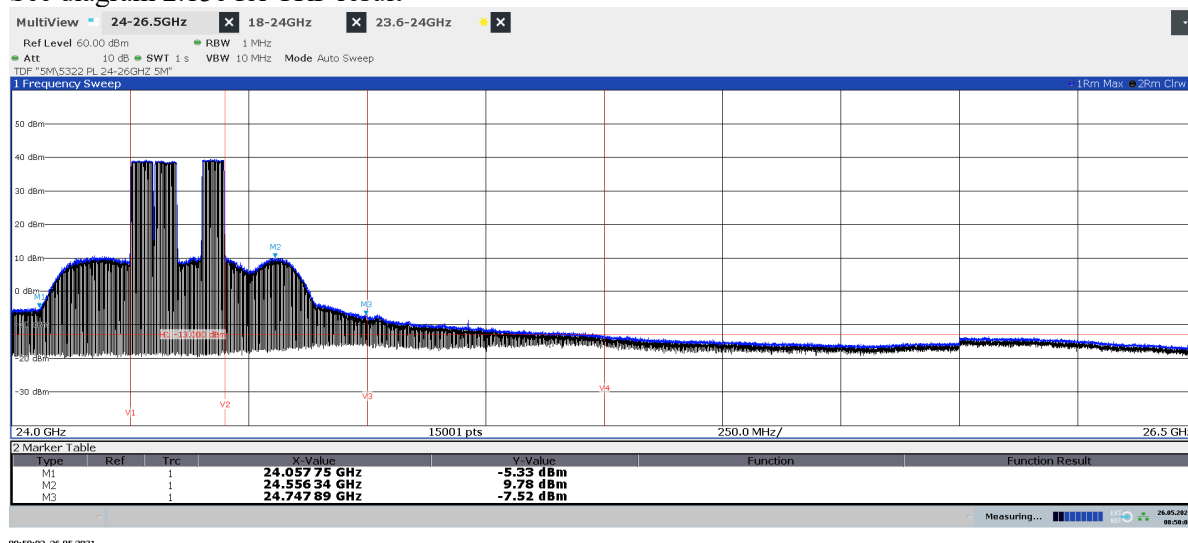
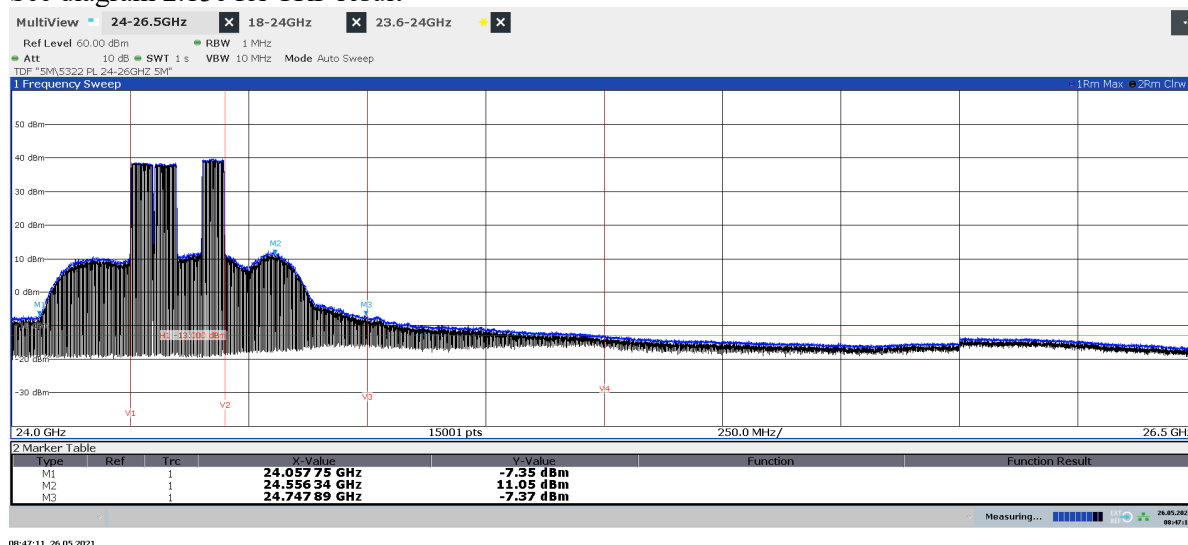
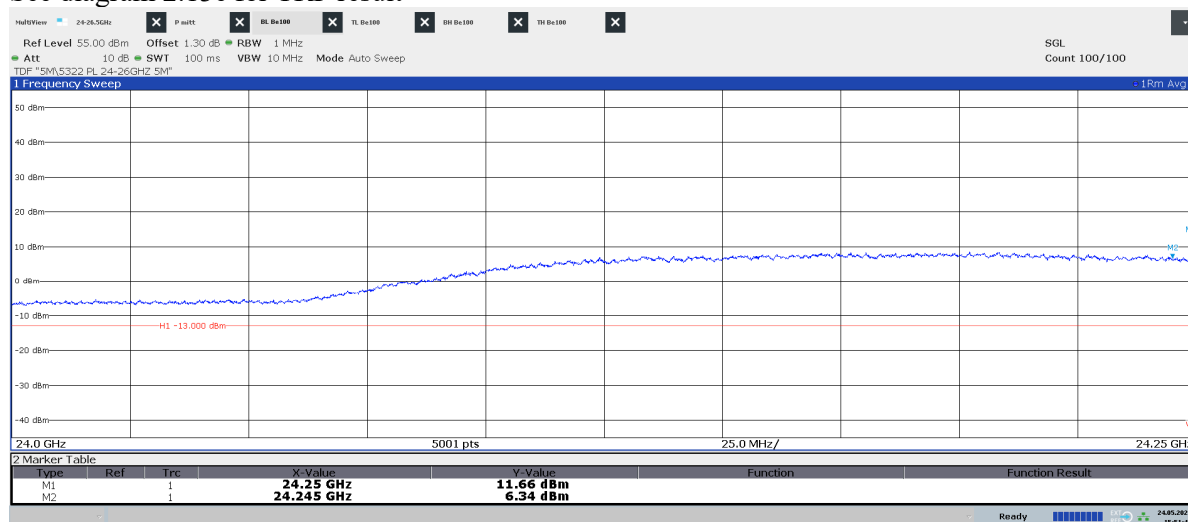


Diagram 2.13b: Pre scan 24 – 26.5 GHz, BimL₅₀, EIRP Vertical polarization
See diagram 2.13e for TRP result



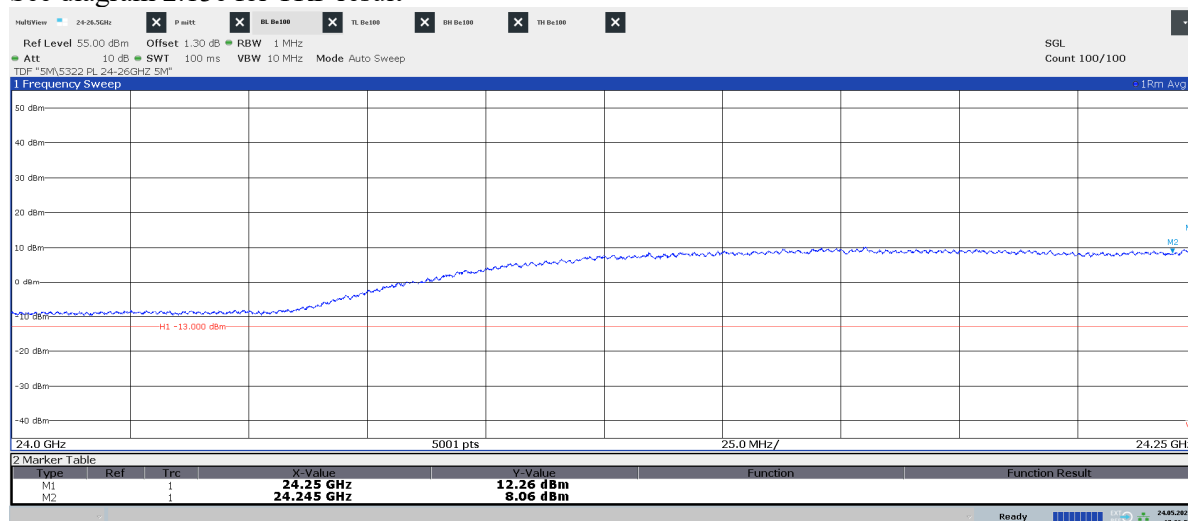
Freq [GHz]	Power Hor/ Ver [dBm]	Antenna Gain Hor/ Ver [dBi]	Total conducted power/BW (Limit -13 dBm) [dBm]/ Verdict
24.556	9.78/ 11.05	30.88/ 30.77	-17.35/ Pass

Diagram 2.13c: 24 – 24.25 GHz, QPSK, BimL₅₀, EIRP Horizontal polarization
See diagram 2.13e for TRP result



15:51:43 24.05.2021

Diagram 2.13d: 24 – 24.25 GHz, QPSK, BimL₅₀, EIRP Vertical polarization
See diagram 2.13e for TRP result



17:06:56 24.05.2021

Power EIRP for 24.25 GHz Hor/ Ver [dBm]	Power EIRP for 24.245 GHz Hor/ Ver [dBm]	Antenna Gain Hor/ Ver [dBi]	Total conducted power/BW for 24.25 GHz (Limit -5 dBm) [dBm]/ Verdict	Total conducted power/BW for 24.245 GHz (Limit -13 dBm) [dBm]/ Verdict
11.66/ 12.26	6.34/ 8.06	30.88/ 30.69	-15.80/ Pass	-20.47/ Pass

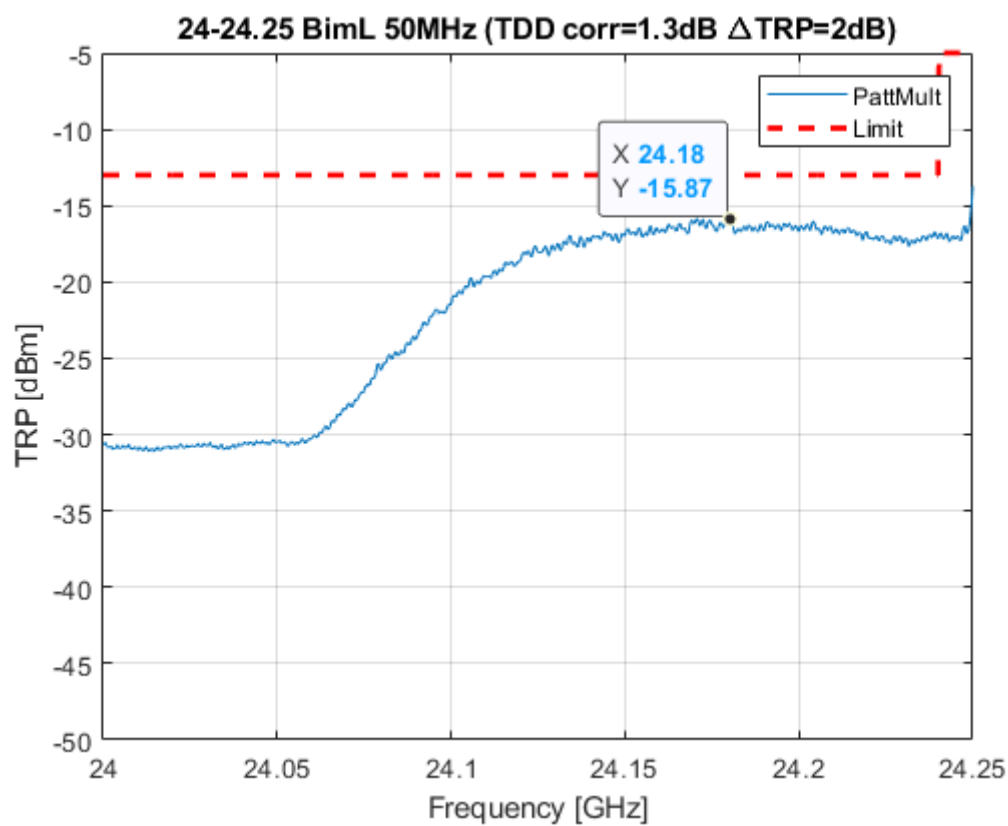
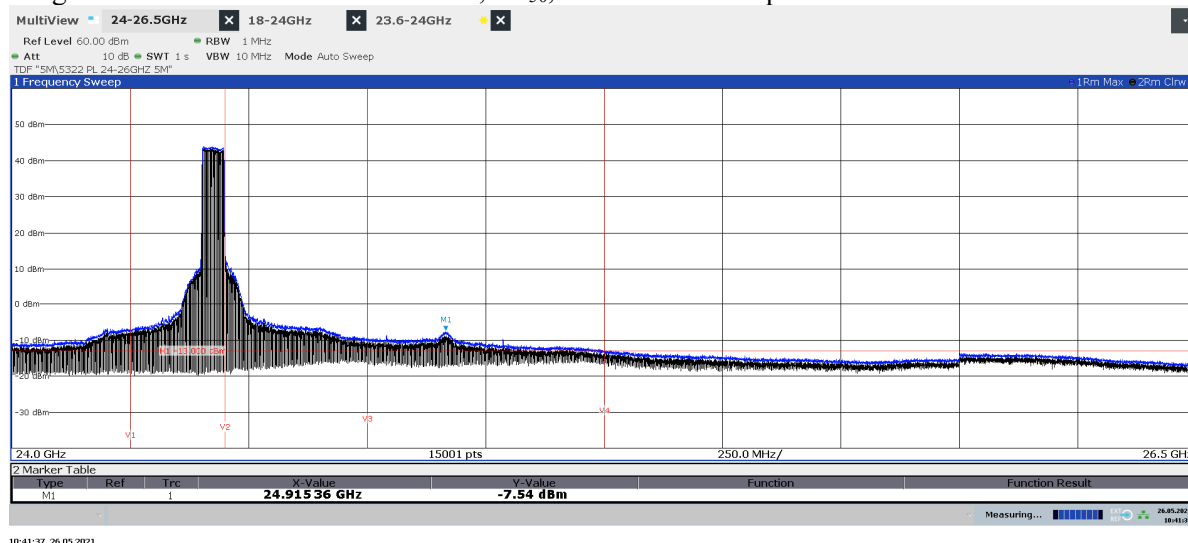
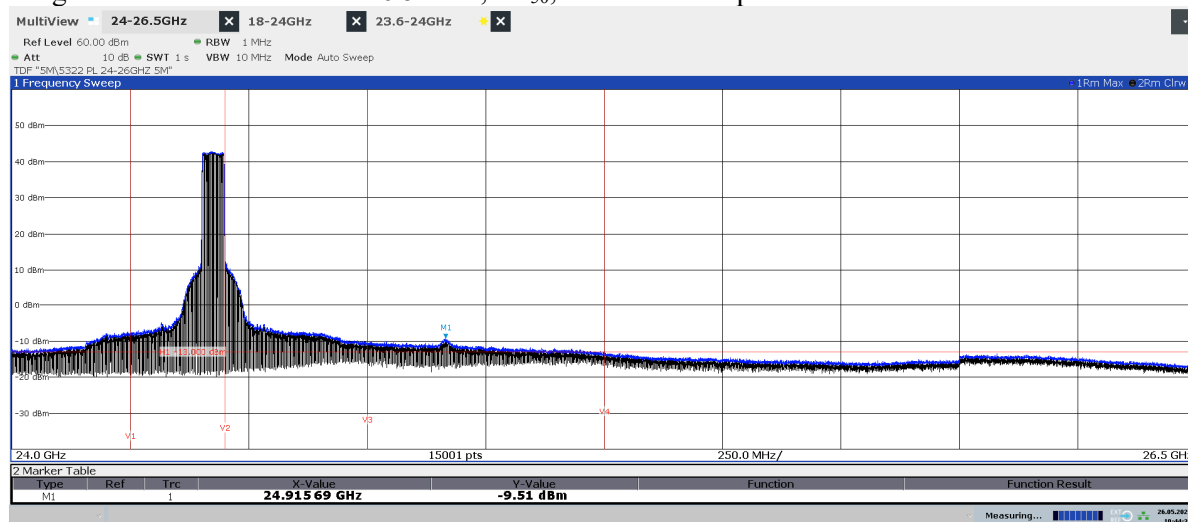
Diagram 2.13e: Pattern multiplication TRP 24 – 24.25 GHz, BimL₅₀

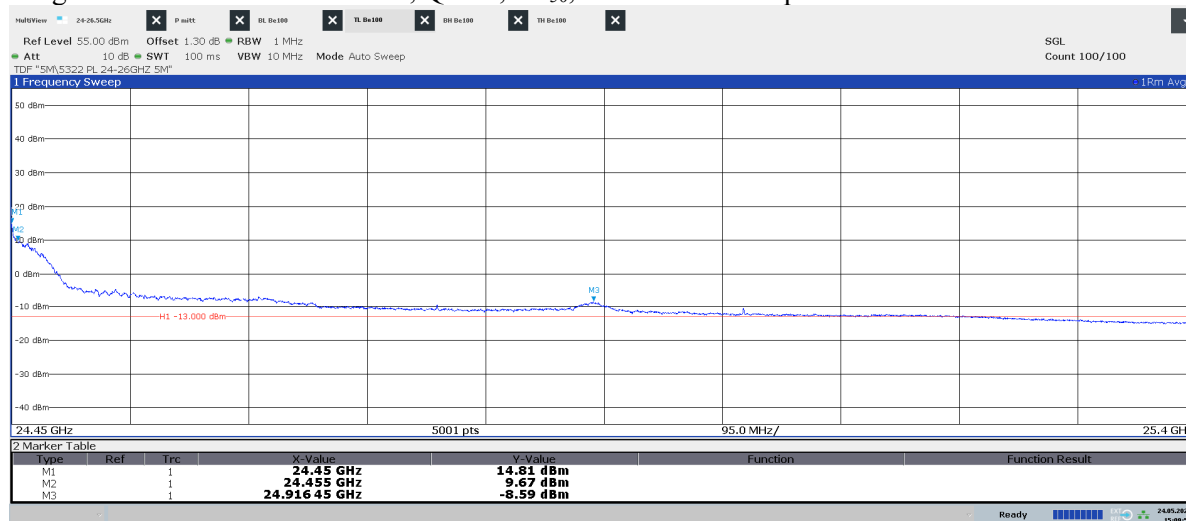
Diagram 2.14a: Pre scan 24 – 26.5 GHz, TL₅₀, EIRP Horizontal polarization

10:41:37 26.05.2021

Diagram 2.14b: Pre scan 24 – 26.5 GHz, TL₅₀, EIRP Vertical polarization

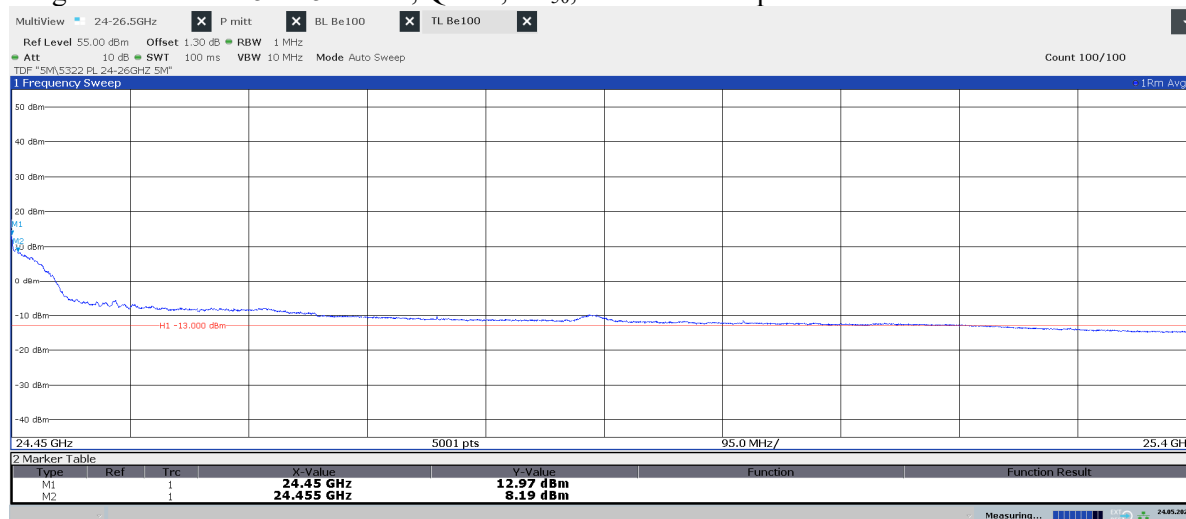
10:44:34 26.05.2021

Diagram 2.14c: 24.45 – 25.4 GHz, QPSK, TL₅₀, EIRP Horizontal polarization



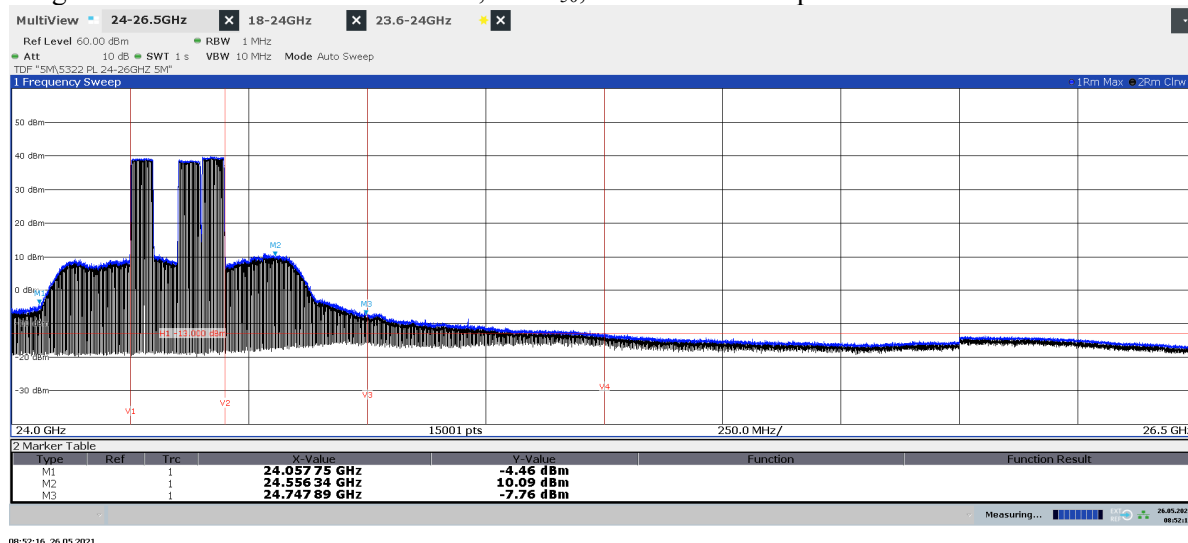
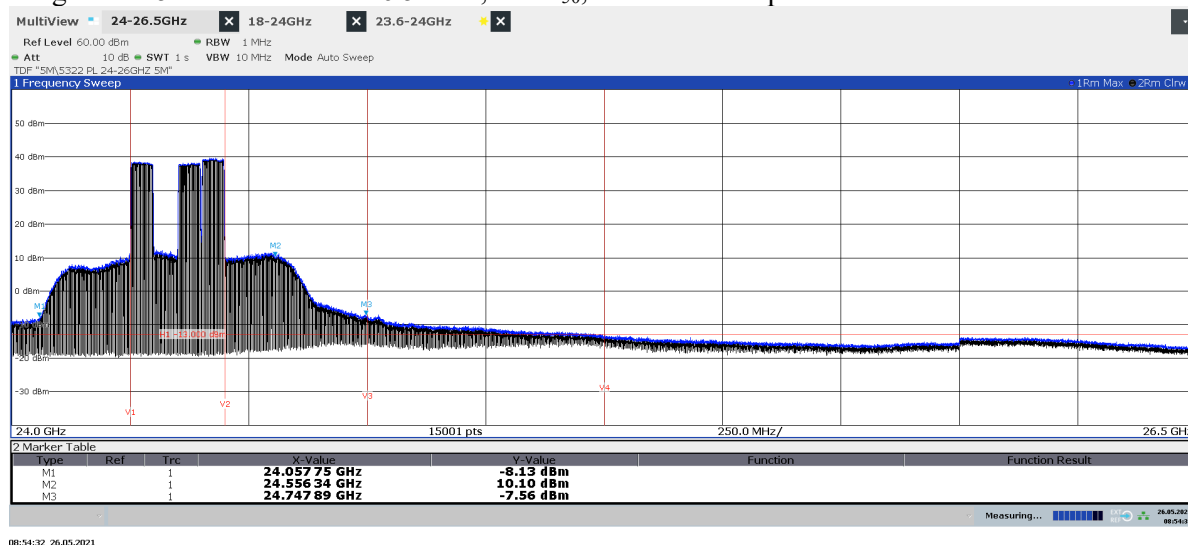
15:09:59 24.05.2021

Diagram 2.14d: 24.45 – 25.4 GHz, QPSK, TL₅₀, EIRP Vertical polarization

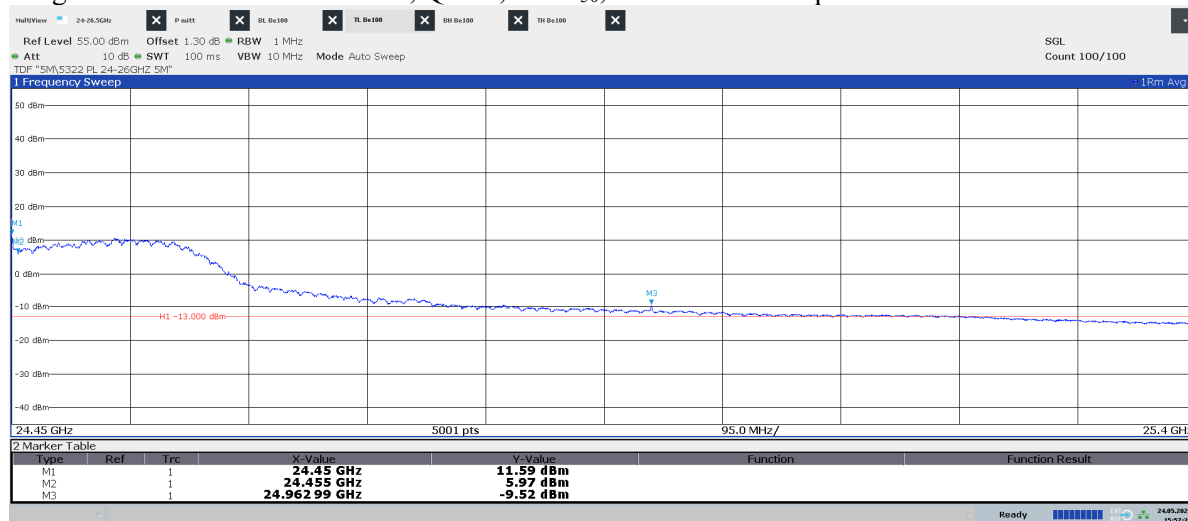


14:02:19 24.05.2021

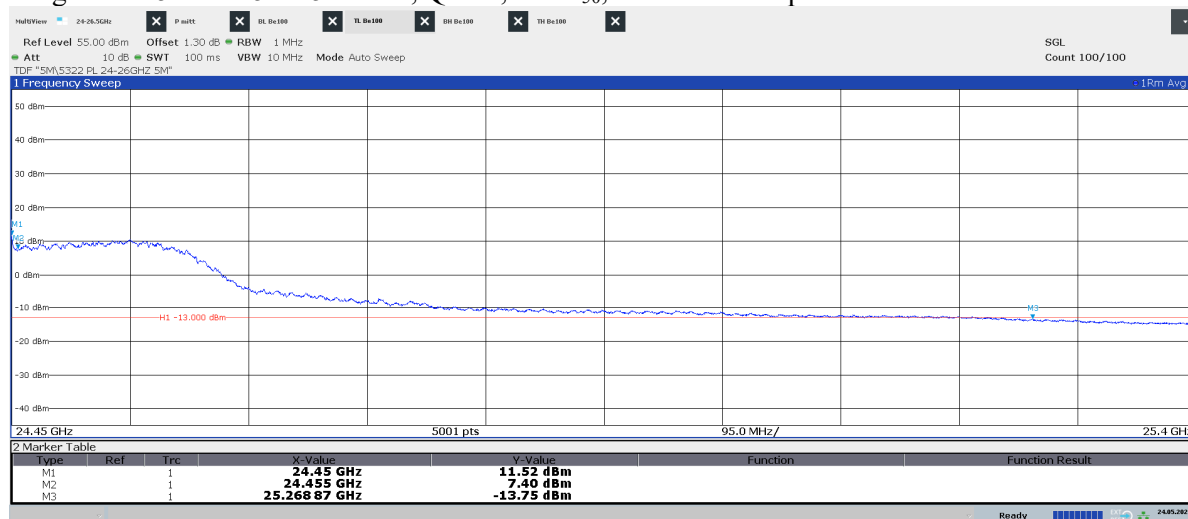
Power EIRP for 24.45 GHz Hor/ Ver [dBm]	Power EIRP for 24.455 GHz Hor/ Ver [dBm]	Antenna Gain Hor/ Ver [dBi]	Total conducted power/BW for 24.45 GHz (Limit -5 dBm) [dBm]/ Verdict	Total conducted power/BW for 24.455 GHz (Limit -13 dBm) [dBm]/ Verdict
14.81/ 12.97	9.67/ 8.19	30.88/ 30.77	-13.84/ Pass	-18.83/ Pass

Diagram 2.15a: Pre scan 24 – 26.5 GHz, TimL₅₀, EIRP Horizontal polarizationDiagram 2.15b: Pre scan 24 – 26.5 GHz, TimL₅₀, EIRP Vertical polarization

Freq [GHz]	Power Hor/ Ver [dBm]	Antenna Gain Hor/ Ver [dBi]	Total conducted power/BW (Limit -13 dBm) [dBm]/ Verdict
24.556	10.09/ 10.10	30.88/ 30.77	-18.83/ Pass

Diagram 2.15c: 24.45 – 25.4 GHz, QPSK, TimL₅₀, EIRP Horizontal polarization

15:57:38 24.05.2021

Diagram 2.15d: 24.45 – 25.4 GHz, QPSK, TimL₅₀, EIRP Vertical polarization

17:02:18 24.05.2021

Power EIRP for 24.45 GHz Hor/ Ver [dBm]	Power EIRP for 24.455 GHz Hor/ Ver [dBm]	Antenna Gain Hor/ Ver [dBi]	Total conducted power/BW for 24.45 GHz (Limit -5 dBm) [dBm]/ Verdict	Total conducted power/BW for 24.455 GHz (Limit -13 dBm) [dBm]/ Verdict
11.59/ 11.52	5.97/ 7.40	30.88/ 30.77	-16.26/ Pass	-21.06/ Pass

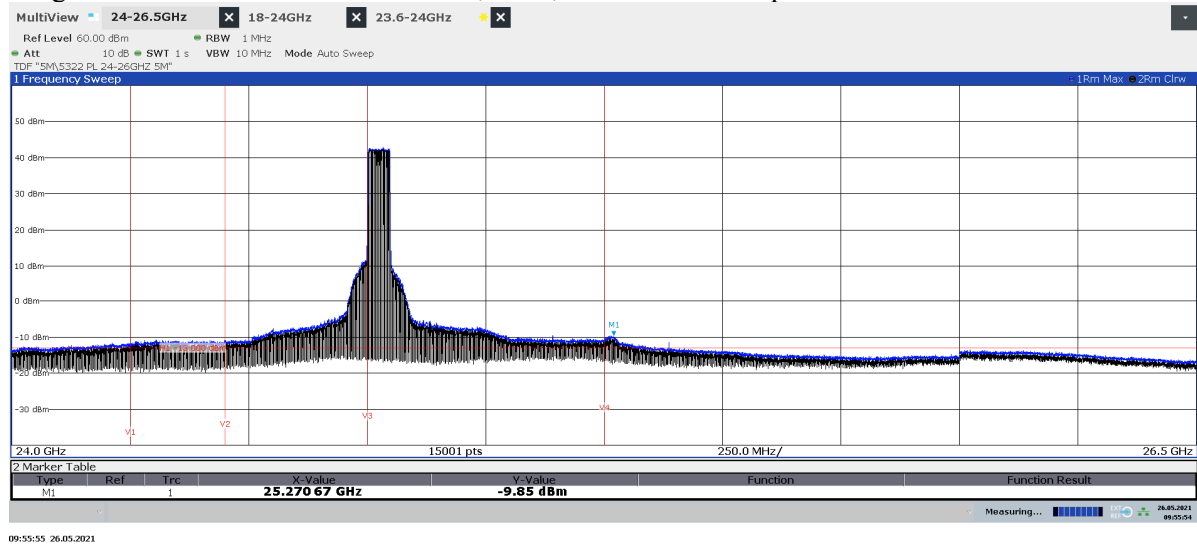
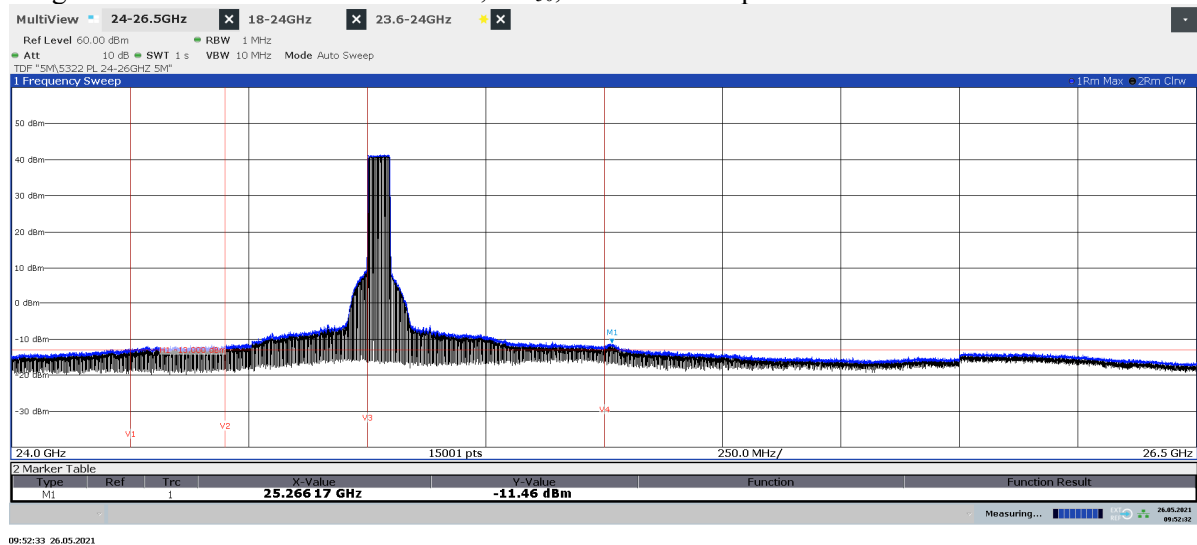
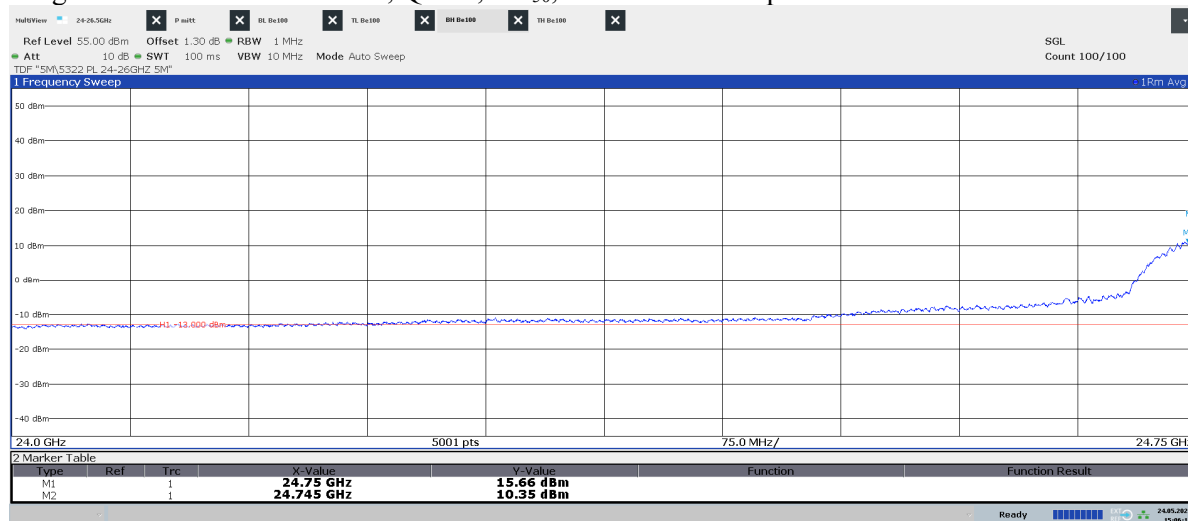
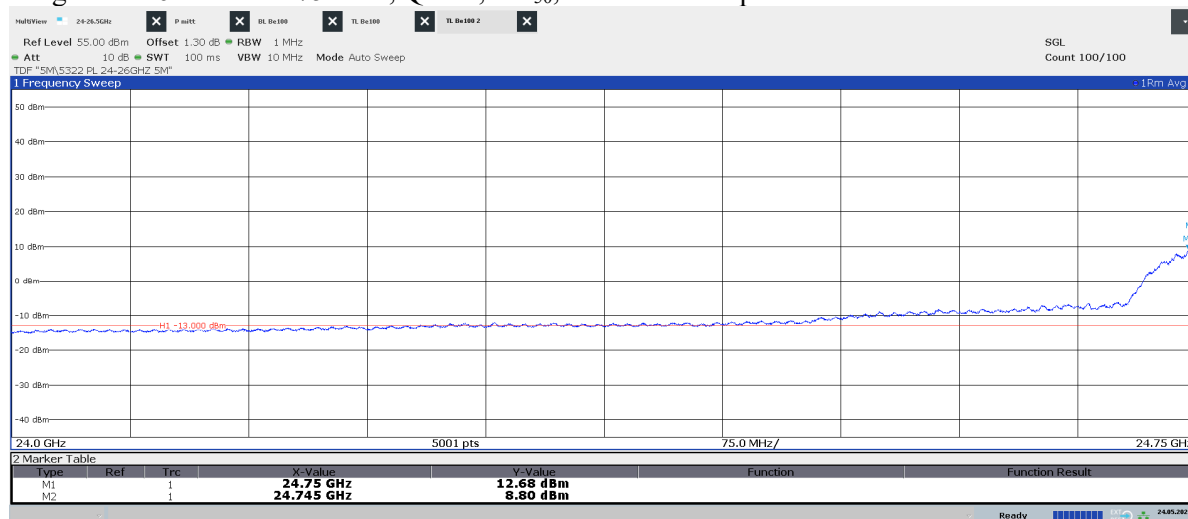
Diagram 2.16a: Pre scan 24 – 26.5 GHz, BH₅₀, EIRP Horizontal polarizationDiagram 2.16b: Pre scan 24 – 26.5 GHz, BH₅₀, EIRP Vertical polarization

Diagram 2.16c: 24 – 24.75 GHz, QPSK, BH₅₀, EIRP Horizontal polarization

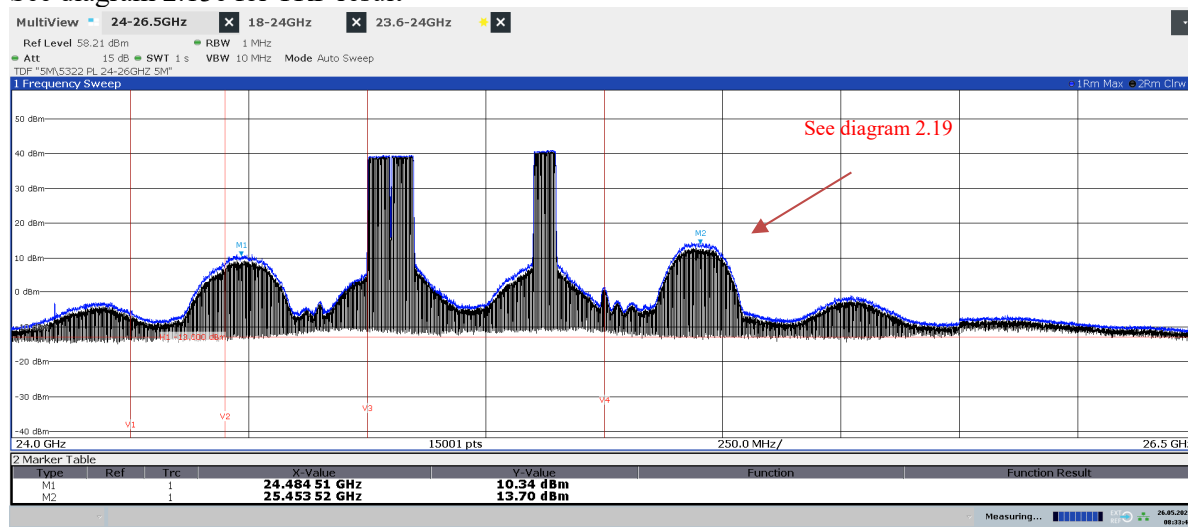
15:06:13 24.05.2021

Diagram 2.16d: 24 – 24.75 GHz, QPSK, BH₅₀, EIRP Vertical polarization

14:31:56 24.05.2021

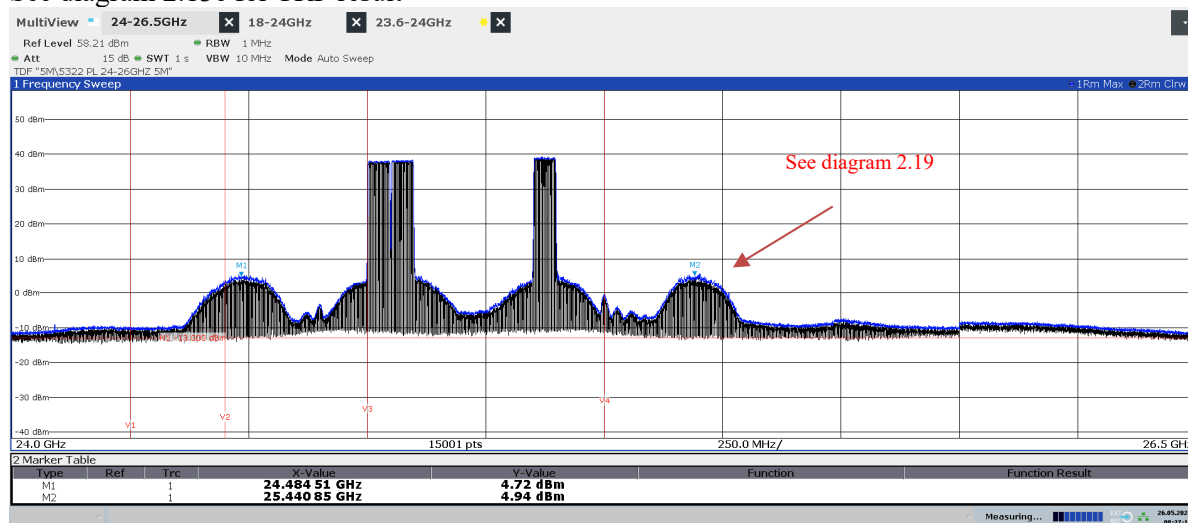
Power EIRP for 24.75 GHz Hor/ Ver [dBm]	Power EIRP for 24.745 GHz Hor/ Ver [dBm]	Antenna Gain Hor/ Ver [dBi]	Total conducted power/BW for 24.75 GHz (Limit -5 dBm) [dBm]/ Verdict	Total conducted power/BW for 24.745 GHz (Limit -13 dBm) [dBm]/ Verdict
15.66/ 12.68	10.35/ 8.80	31.05/ 31.00	-13.60/ Pass	-18.38/ Pass

Diagram 2.17a: Pre scan 24 – 26.5 GHz, BimH₅₀, EIRP Horizontal polarization
See diagram 2.13e for TRP result



08:33:41 26.05.2021

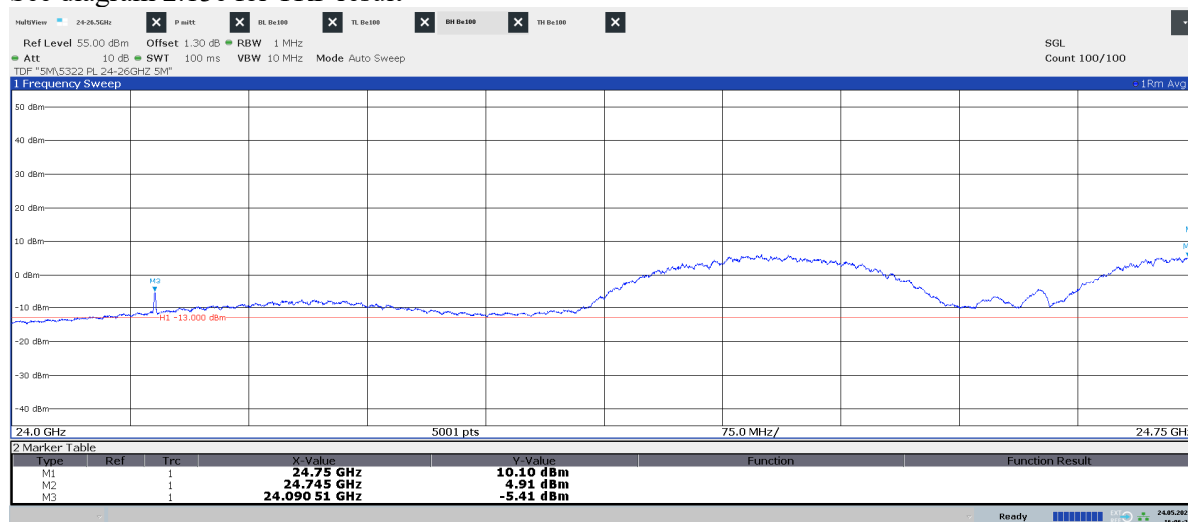
Diagram 2.17b: Pre scan 24 – 26.5 GHz, BimH₅₀, EIRP Vertical polarization
See diagram 2.13e for TRP result



08:37:10 26.05.2021

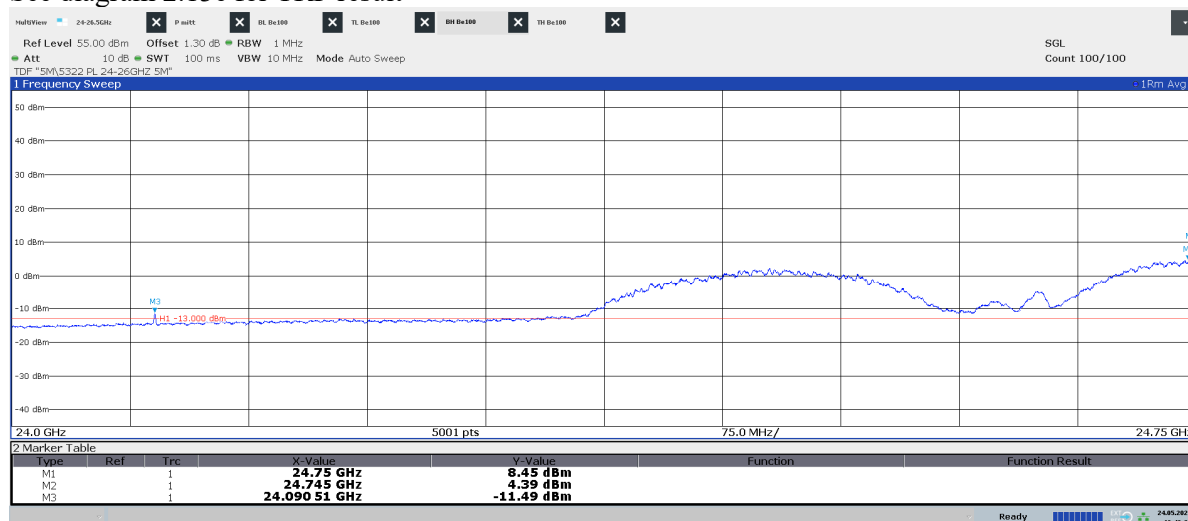
Freq [GHz]	Power Hor/ Ver [dBm]	Antenna Gain Hor/ Ver [dBi]	Total conducted power/BW (Limit -13 dBm) [dBm]/ Verdict
24.484	10.34/ 4.94	30.88/ 30.77	-19.41/ Pass

Diagram 2.17c: 24 – 24.75 GHz, QPSK, BimH₅₀, EIRP Horizontal polarization
See diagram 2.13e for TRP result



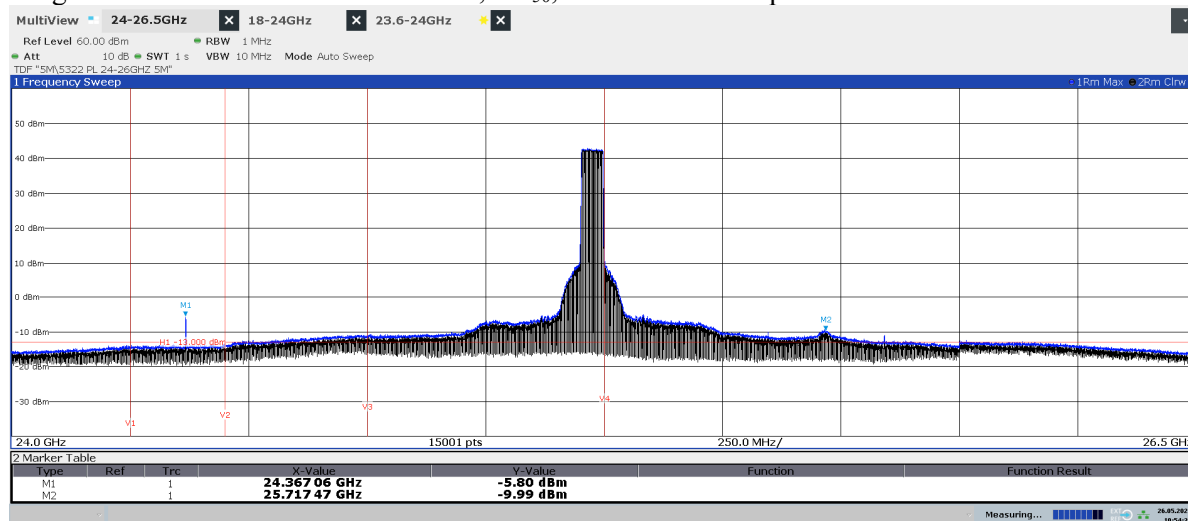
16:06:32 24.05.2021

Diagram 2.17d: 24 – 24.75 GHz, QPSK, BimH₅₀, EIRP Vertical polarization
See diagram 2.13e for TRP result

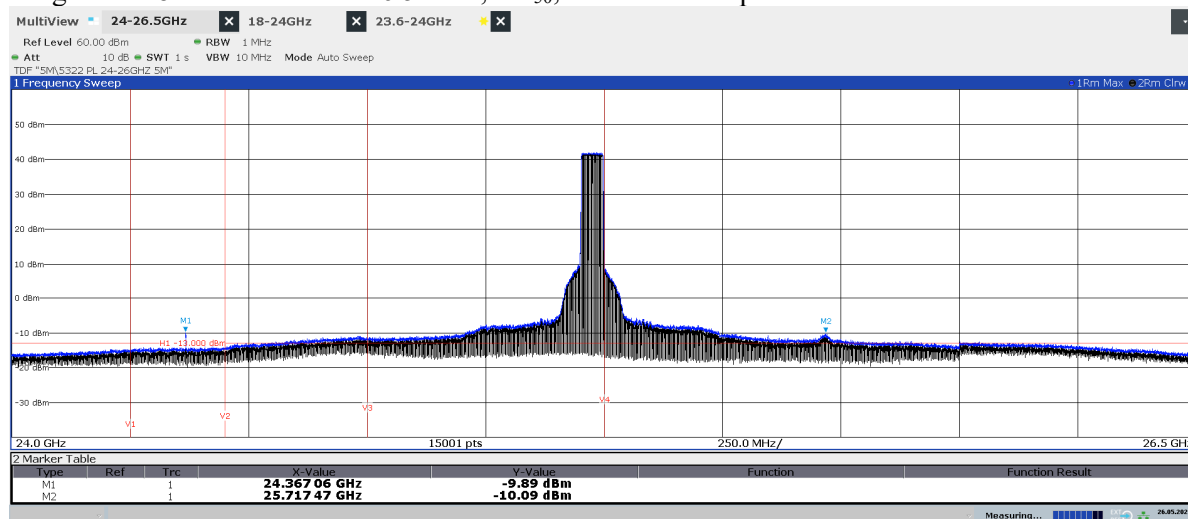


16:46:32 24.05.2021

Power EIRP for 24.75 GHz Hor/ Ver [dBm]	Power EIRP for 24.745 GHz Hor/ Ver [dBm]	Antenna Gain Hor/ Ver [dBi]	Total conducted power/BW for 24.75 GHz (Limit -5 dBm) [dBm]/ Verdict	Total conducted power/BW for 24.745 GHz (Limit -13 dBm) [dBm]/ Verdict
10.10/ 8.45	4.91/ 4.39	31.05/ 31.00	-18.67/ Pass	-23.36/ Pass

Diagram 2.18a: Pre scan 24 – 26.5 GHz, TH₅₀, EIRP Horizontal polarization

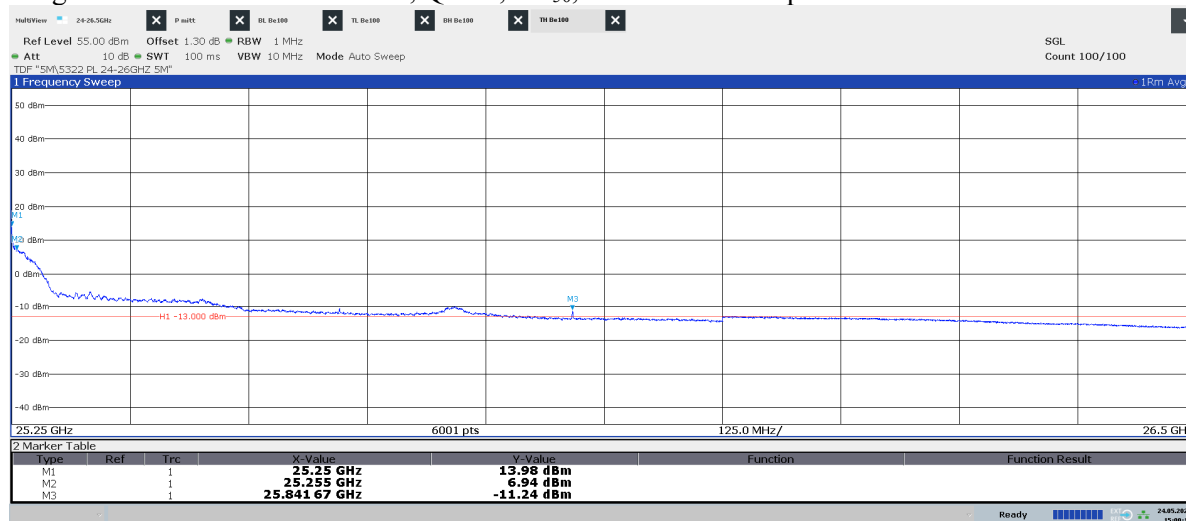
10:54:33 26.05.2021

Diagram 2.18b: Pre scan 24 – 26.5 GHz, TH₅₀, EIRP Vertical polarization

10:51:05 26.05.2021

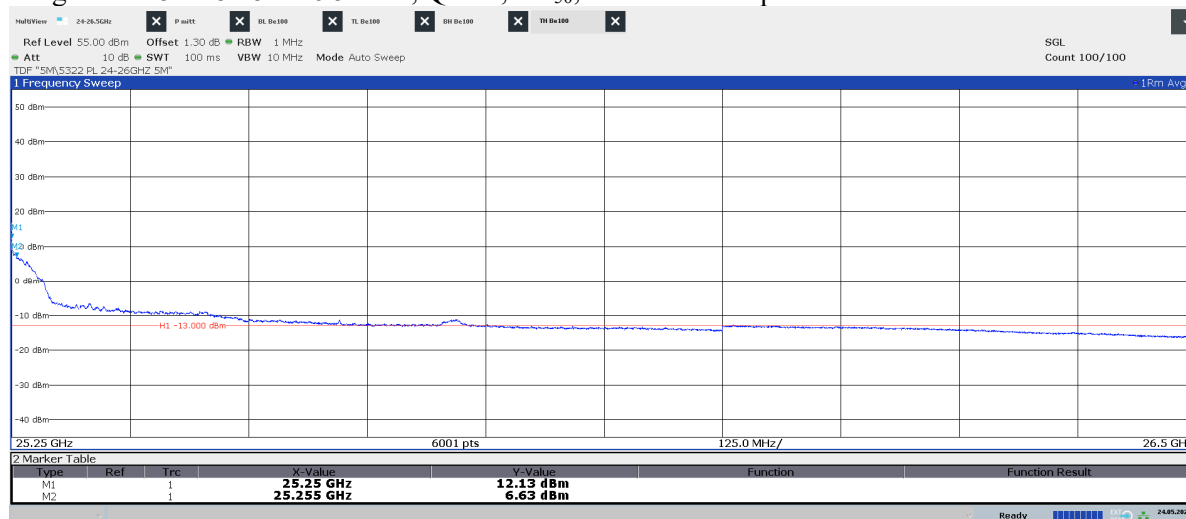
Freq [GHz]	Power Hor/ Ver [dBm]	Antenna Gain Hor/ Ver [dBi]	Total conducted power/BW (Limit -13 dBm) [dBm]/ Verdict
24.367	-5.80/ -9.89	30.88/ 30.77	-35.22/ Pass

Diagram 2.18c: 25.25 – 26.5 GHz, QPSK, TH₅₀, EIRP Horizontal polarization



15:00:10 24.05.2021

Diagram 2.18d: 25.25 – 26.5 GHz, QPSK, TH₅₀, EIRP Vertical polarization



14:54:54 24.05.2021

Power EIRP for 25.25 GHz Hor/ Ver [dBm]	Power EIRP for 25.255 GHz Hor/ Ver [dBm]	Antenna Gain Hor/ Ver [dBi]	Total conducted power/BW for 25.25 GHz (Limit -5 dBm) [dBm]/ Verdict	Total conducted power/BW for 25.255 GHz (Limit -13 dBm) [dBm]/ Verdict
13.98/ 12.13	6.94/ 6.63	31.23/ 31.27	-15.08/ Pass	-21.45/ Pass

Diagram 2.19a: Pre scan 24 – 26.5 GHz, TimH₅₀, EIRP Horizontal polarization
See diagram 2.19e for TRP result

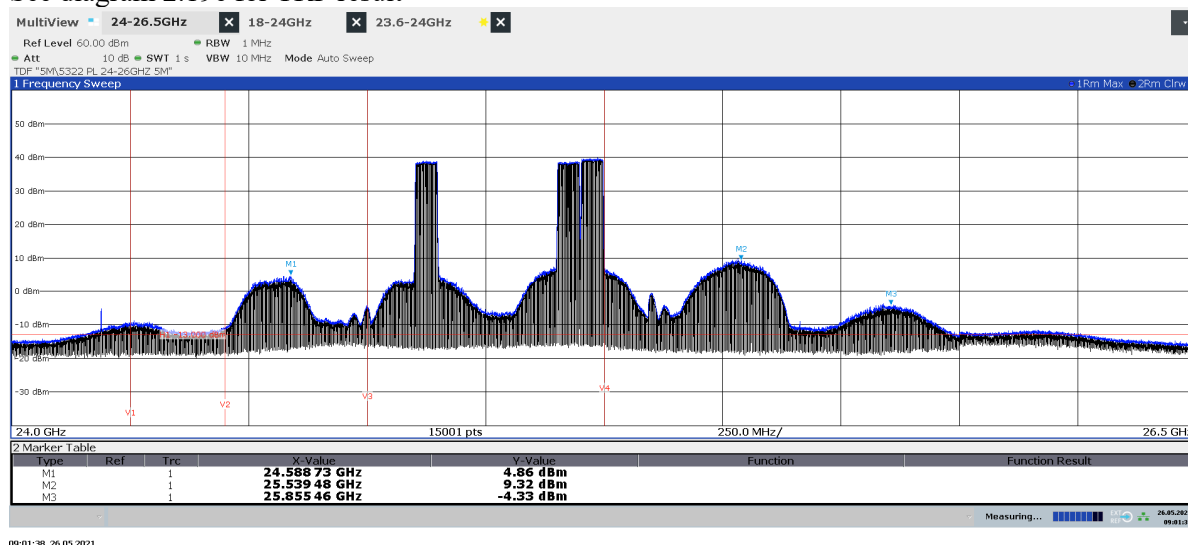
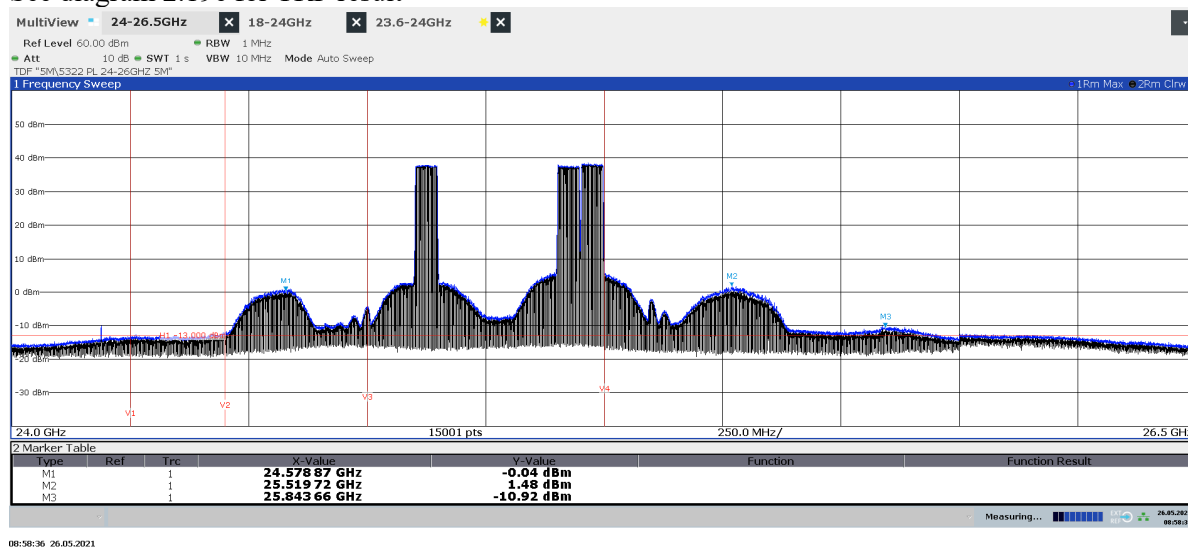
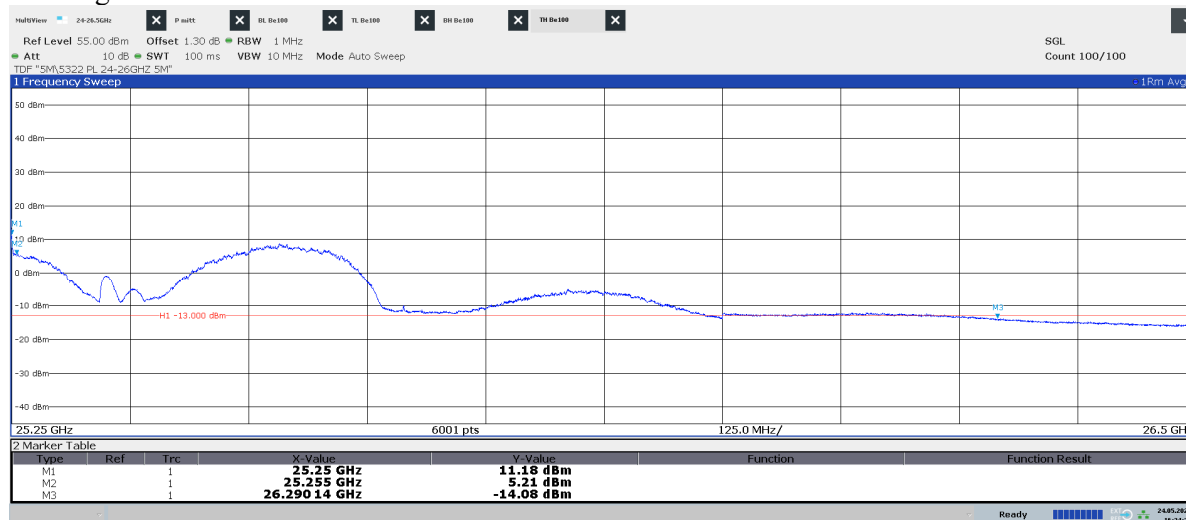


Diagram 2.19b: Pre scan 24 – 26.5 GHz, TimH₅₀, EIRP Vertical polarization
See diagram 2.19e for TRP result



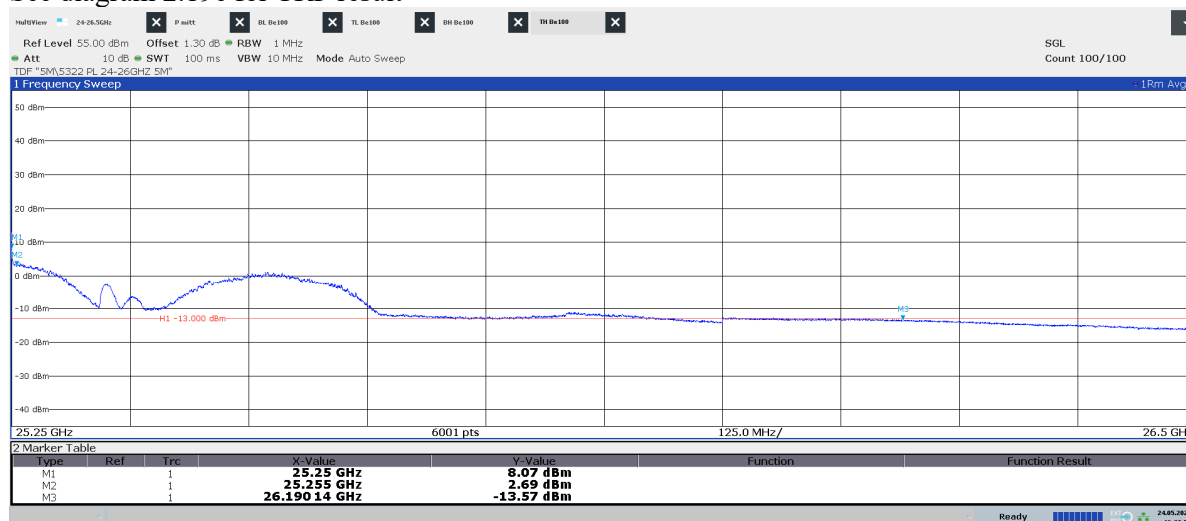
Freq [GHz]	Power Hor/ Ver [dBm]	Antenna Gain Hor/ Ver [dBi]	Total conducted power/BW (Limit -13 dBm) [dBm]/ Verdict
24.588	4.86/ -0.04	30.88/ 30.77	-24.78/ Pass

Diagram 2.19c: 25.25 – 26.5 GHz, QPSK, TimH₅₀, EIRP Horizontal polarization
See diagram 2.19e for TRP result



16:24:38 24.05.2021

Diagram 2.19d: 25.25 – 26.5 GHz, QPSK, TimH₅₀, EIRP Vertical polarization
See diagram 2.19e for TRP result



16:33:56 24.05.2021

Power EIRP for 25.25 GHz Hor/ Ver [dBm]	Power EIRP for 25.255 GHz Hor/ Ver [dBm]	Antenna Gain Hor/ Ver [dBi]	Total conducted power/BW for 25.25 GHz (Limit -5 dBm) [dBm]/ Verdict	Total conducted power/BW for 25.255 GHz (Limit -13 dBm) [dBm]/ Verdict
11.18/ 8.07	5.21/ 2.69	31.23/ 31.27	-18.34/ Pass	-24.10/ Pass

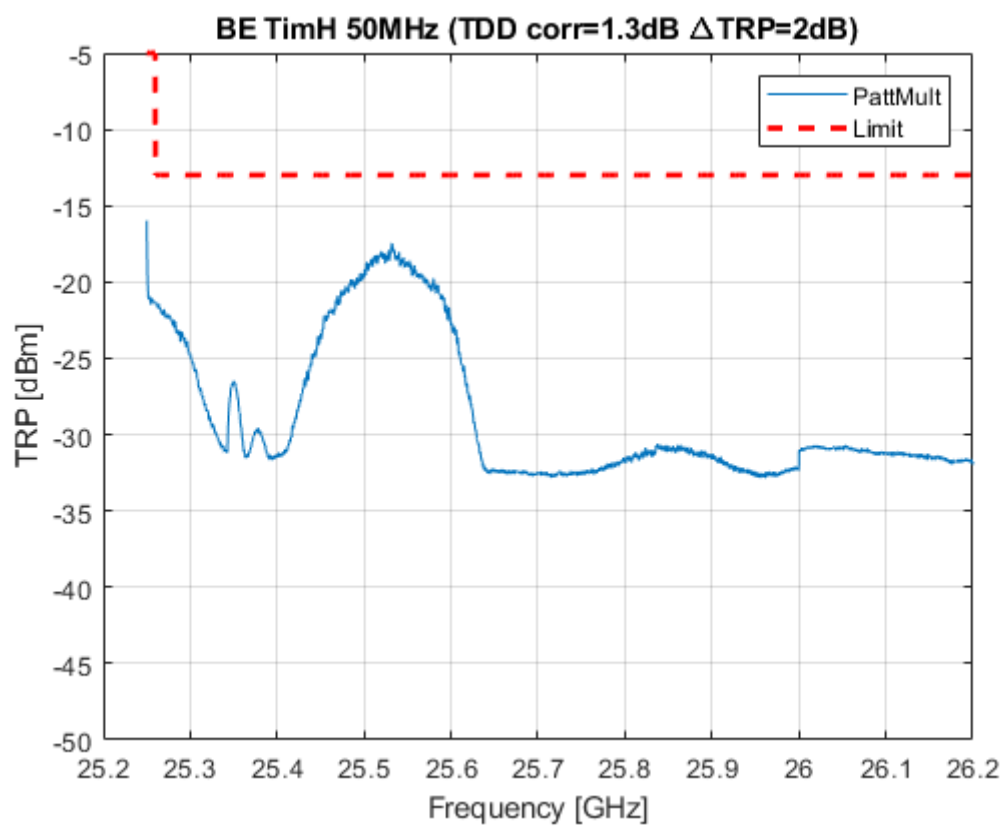
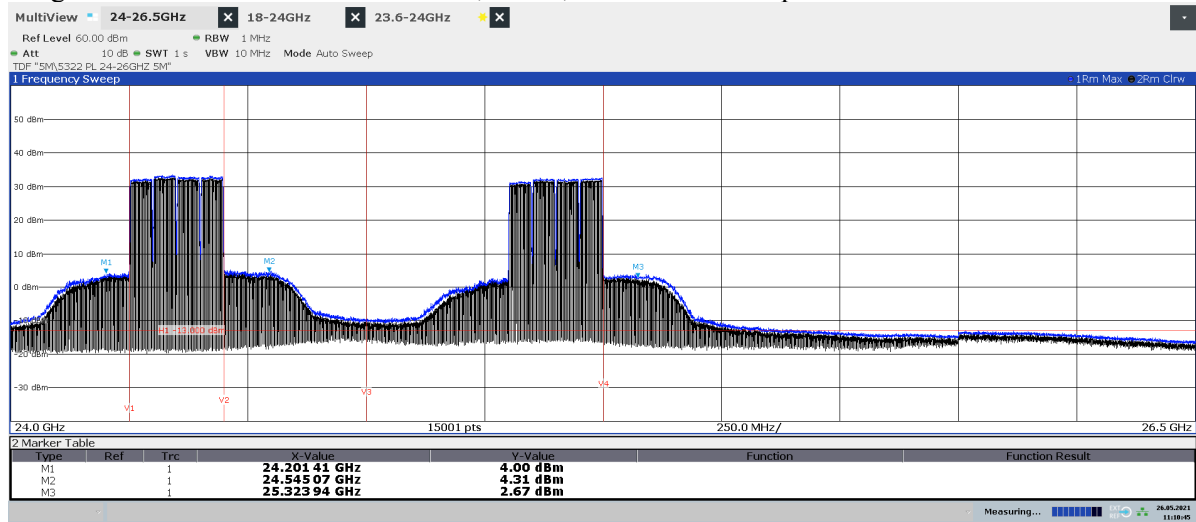
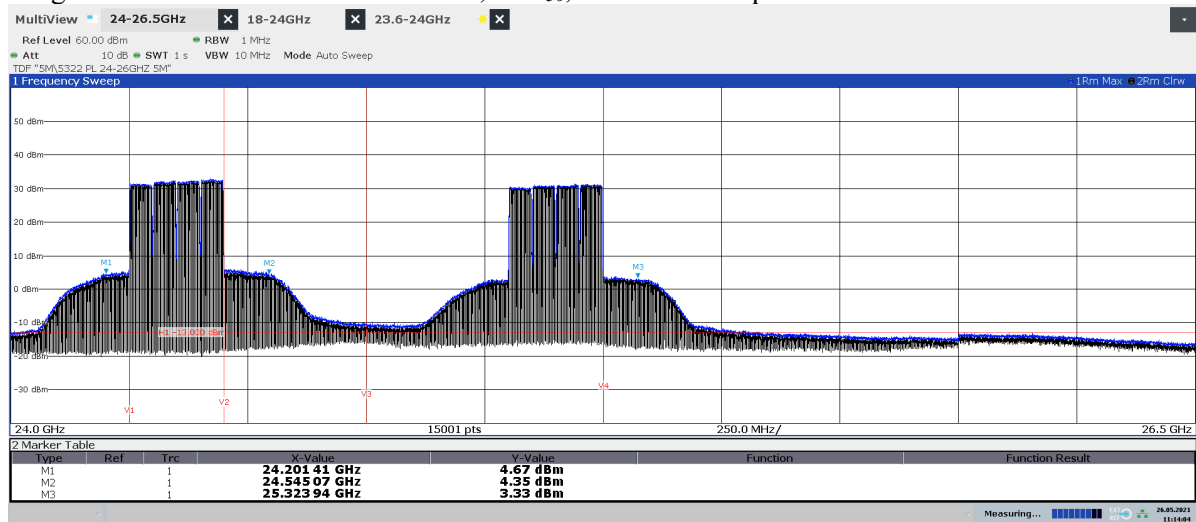
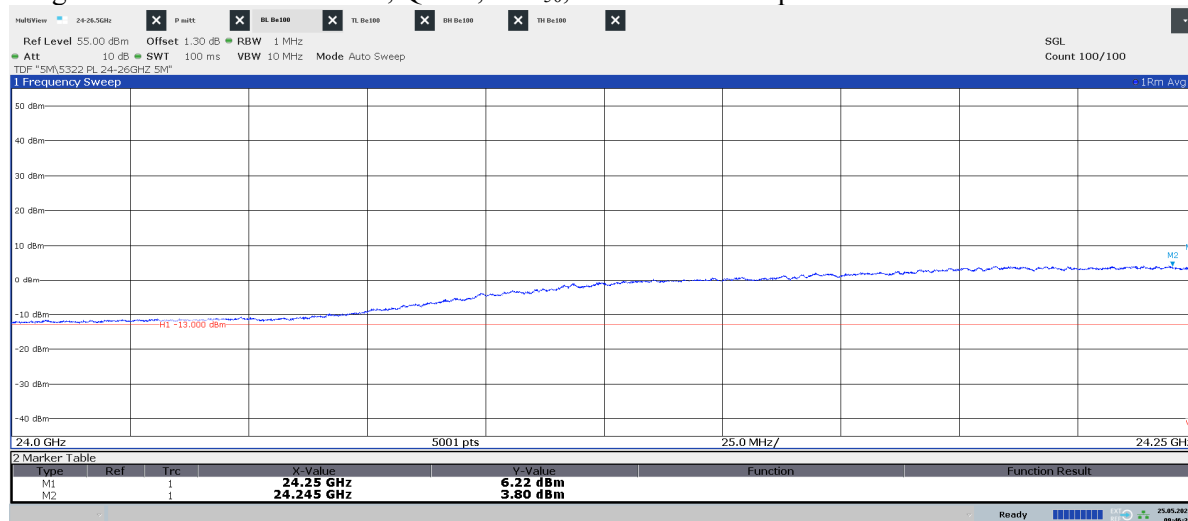
Diagram 2.19e: Pattern multiplication TRP 25.25 – 26.2 GHz, TimH₅₀

Diagram 2.20a: Pre scan 24 – 26.5 GHz, BT8₅₀, EIRP Horizontal polarization

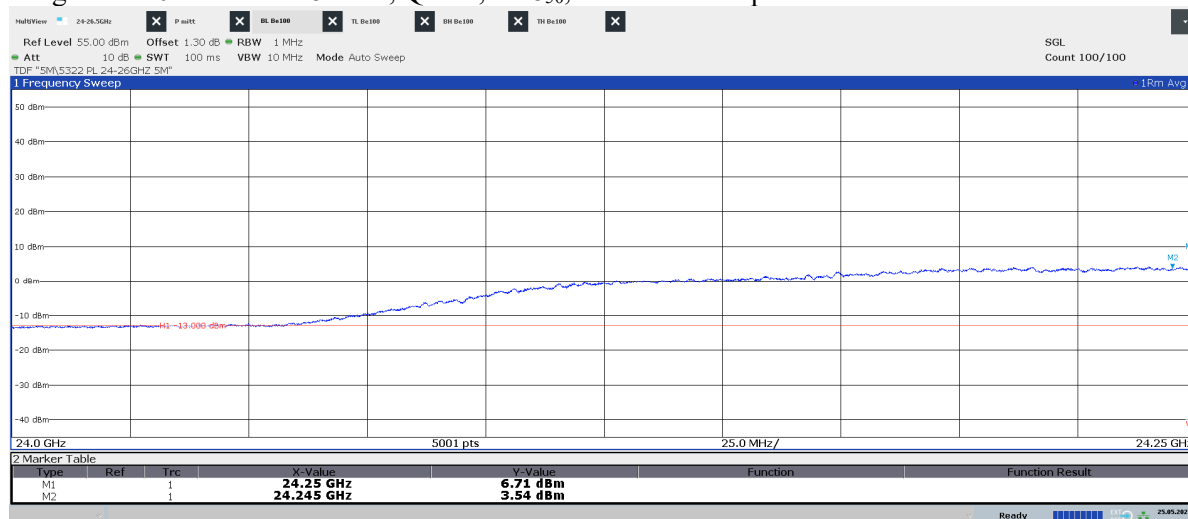
11:10:45 26.05.2021

Diagram 2.20b: Pre scan 24 – 26.5 GHz, BT8₅₀, EIRP Vertical polarization

11:14:04 26.05.2021

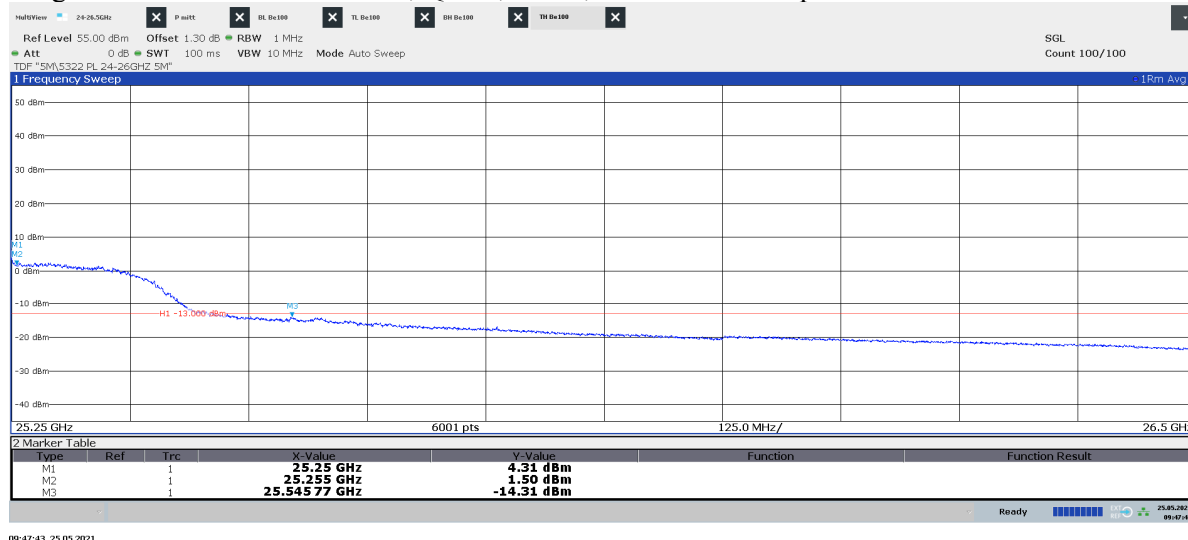
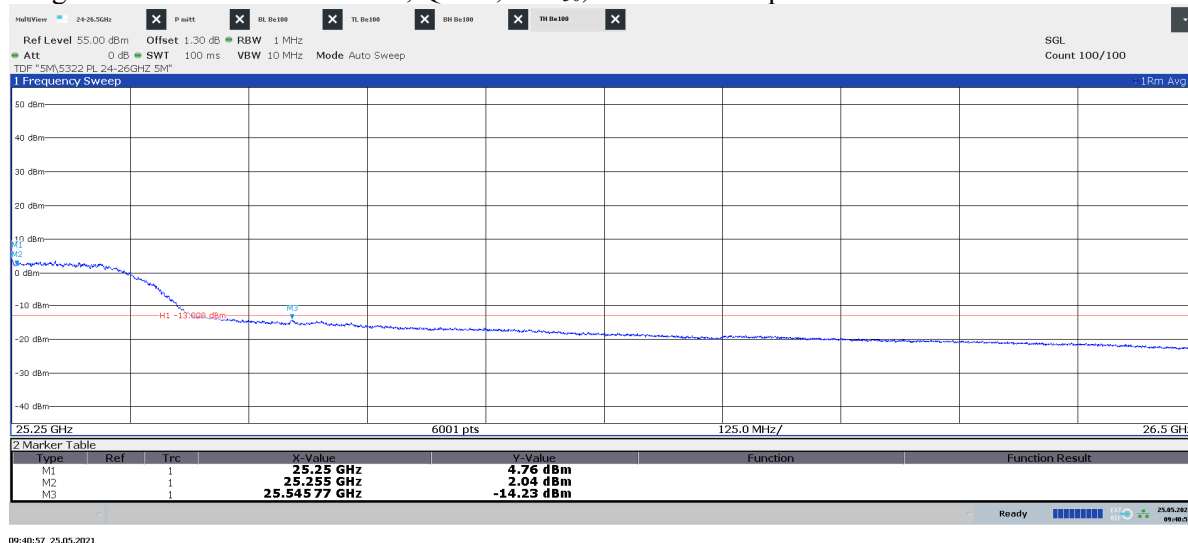
Diagram 2.20c: 24 – 24.25 GHz, QPSK, BT8₅₀, EIRP Horizontal polarization

09:46:38 25.05.2021

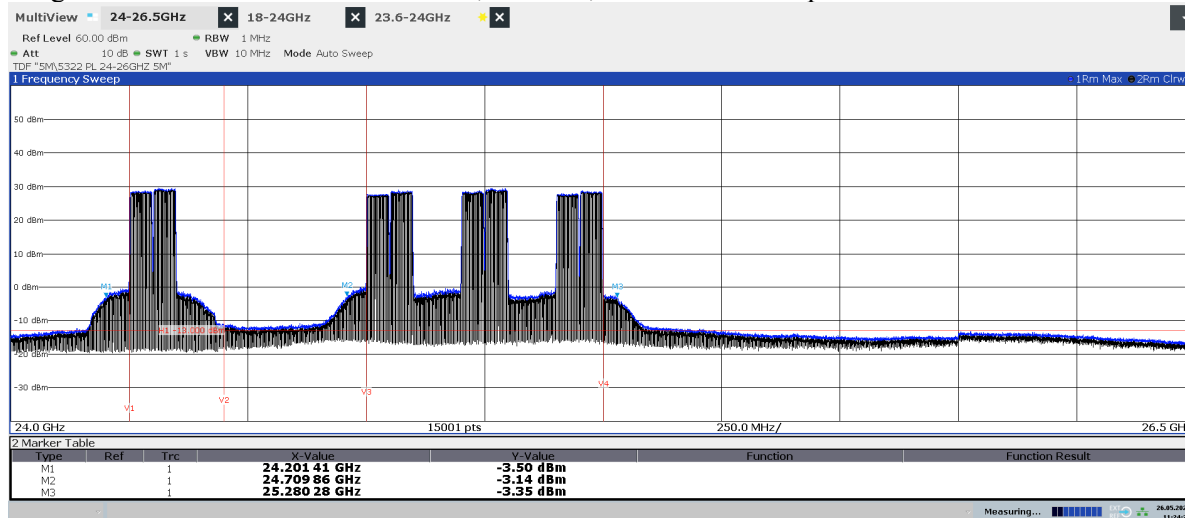
Diagram 2.20d: 24 – 24.25 GHz, QPSK, BT8₅₀, EIRP Vertical polarization

09:39:35 25.05.2021

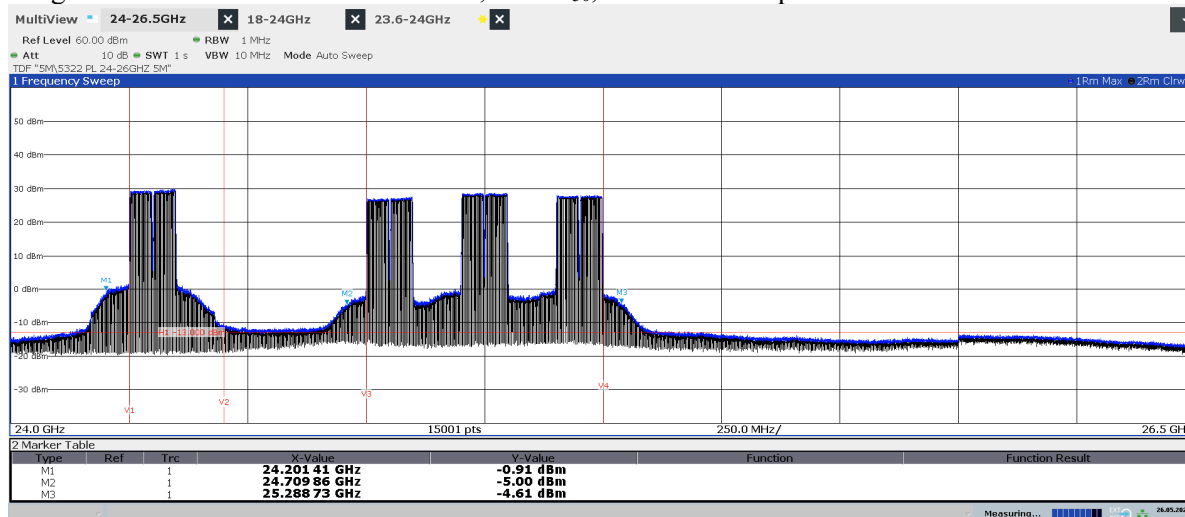
Power EIRP for 24.25 GHz Hor/ Ver [dBm]	Power EIRP for 24.245 GHz Hor/ Ver [dBm]	Antenna Gain Hor/ Ver [dBi]	Total conducted power/BW for 24.25 GHz (Limit -5 dBm) [dBm]/ Verdict	Total conducted power/BW for 24.245 GHz (Limit -13 dBm) [dBm]/ Verdict
6.22/ 6.71	3.80/ 3.54	28.01/ 28.03	-18.54/ Pass	-21.34/ Pass

Diagram 2.20e: 25.25 – 26.5 GHz, QPSK, BT8₅₀, EIRP Horizontal polarizationDiagram 2.20f: 25.25 – 26.5 GHz, QPSK, BT8₅₀, EIRP Vertical polarization

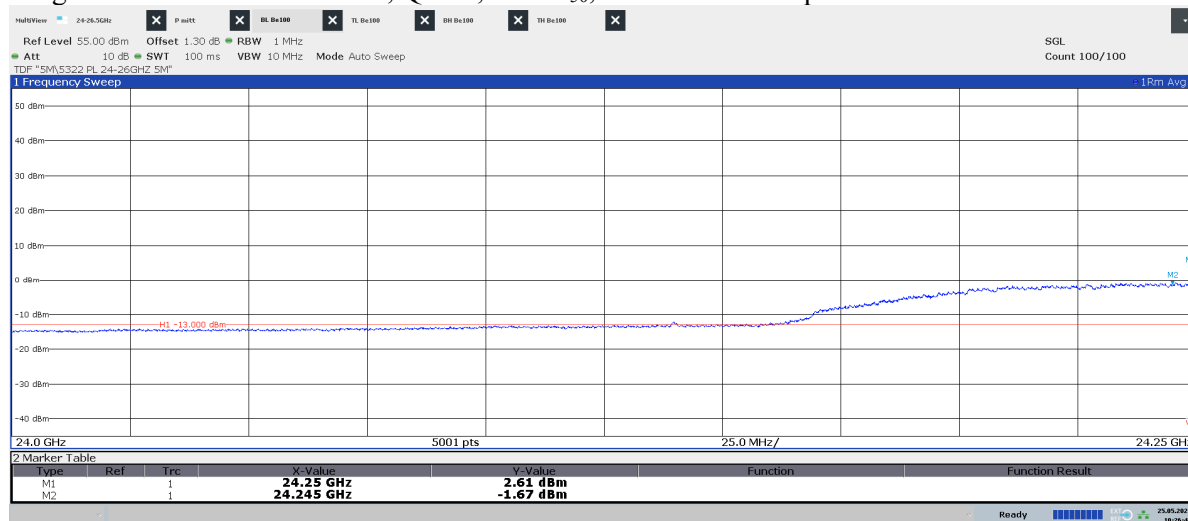
Power EIRP for 25.25 GHz Hor/ Ver [dBm]	Power EIRP for 25.255 GHz Hor/ Ver [dBm]	Antenna Gain Hor/ Ver [dBi]	Total conducted power/BW for 25.25 GHz (Limit -5 dBm) [dBm]/ Verdict	Total conducted power/BW for 25.255 GHz (Limit -13 dBm) [dBm]/ Verdict
4.31/ 4.76	1.5/ 2.04	28.29/ 28.20	-20.69/ Pass	-23.45/ Pass

Diagram 2.21a: Pre scan 24 – 26.5 GHz, BMT8₅₀, EIRP Horizontal polarization

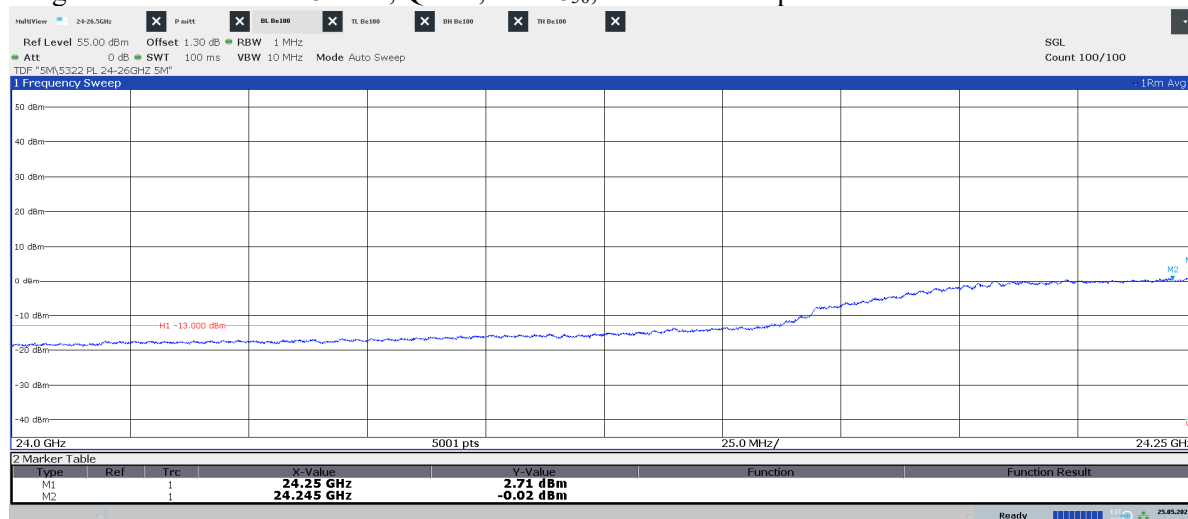
11:24:29 26.05.2021

Diagram 2.21b: Pre scan 24 – 26.5 GHz, BMT8₅₀, EIRP Vertical polarization

11:21:57 26.05.2021

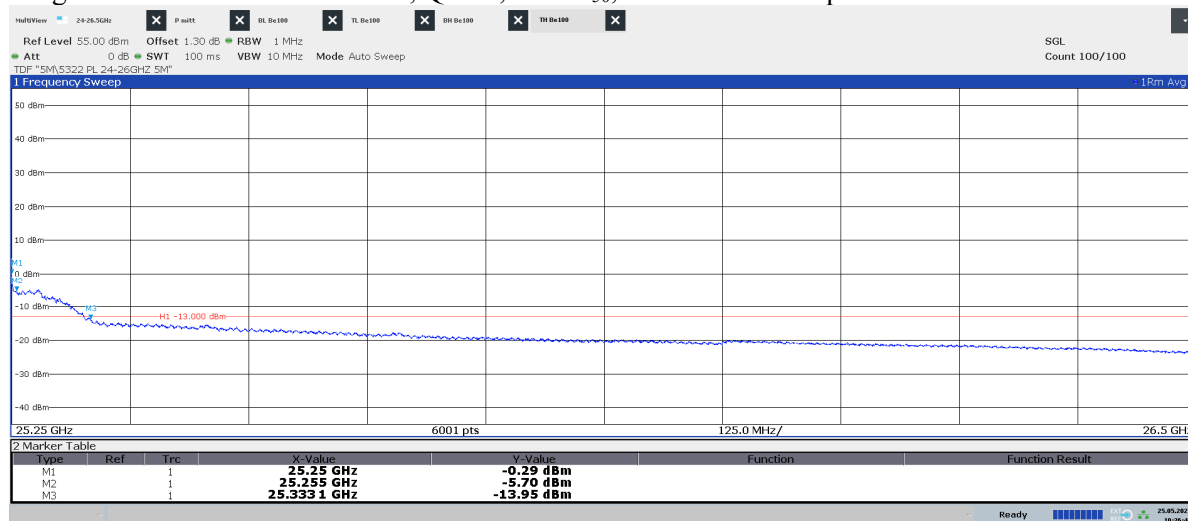
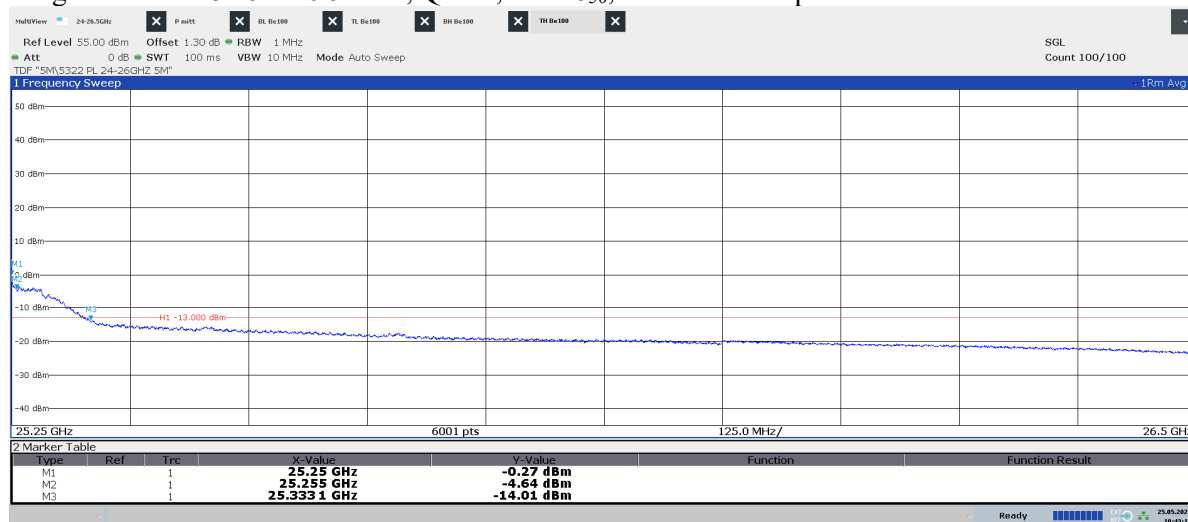
Diagram 2.21c: 24 – 24.25 GHz, QPSK, BMT8₅₀, EIRP Horizontal polarization

10:26:47 25.05.2021

Diagram 2.21d: 24 – 24.25 GHz, QPSK, BMT8₅₀, EIRP Vertical polarization

10:42:29 25.05.2021

Power EIRP for 24.25 GHz Hor/ Ver [dBm]	Power EIRP for 24.245 GHz Hor/ Ver [dBm]	Antenna Gain Hor/ Ver [dBi]	Total conducted power/BW for 24.25 GHz (Limit -5 dBm) [dBm]/ Verdict	Total conducted power/BW for 24.245 GHz (Limit -13 dBm) [dBm]/ Verdict
2.61/ 2.71	-1.67/ -0.02	25.25/ 25.03	-19.47/ Pass	-22.87/ Pass

Diagram 2.21e: 25.25 – 26.5 GHz, QPSK, BMT8₅₀, EIRP Horizontal polarizationDiagram 2.21f: 25.25 – 26.5 GHz, QPSK, BMT8₅₀, EIRP Vertical polarization

Power EIRP for 25.25 GHz Hor/ Ver [dBm]	Power EIRP for 25.255 GHz Hor/ Ver [dBm]	Antenna Gain Hor/ Ver [dBi]	Total conducted power/BW for 25.25 GHz (Limit -5 dBm) [dBm]/ Verdict	Total conducted power/BW for 25.255 GHz (Limit -13 dBm) [dBm]/ Verdict
-0.29/ -0.27	-5.70/ -4.64	24.95/ 25.06	-22.27/ Pass	-27.14/ Pass

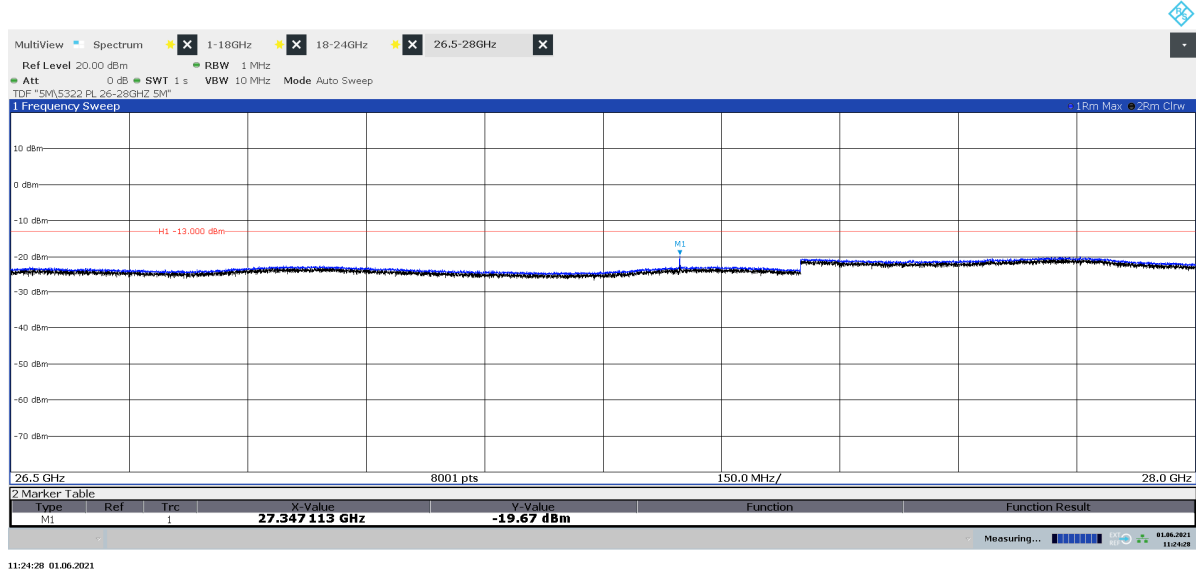
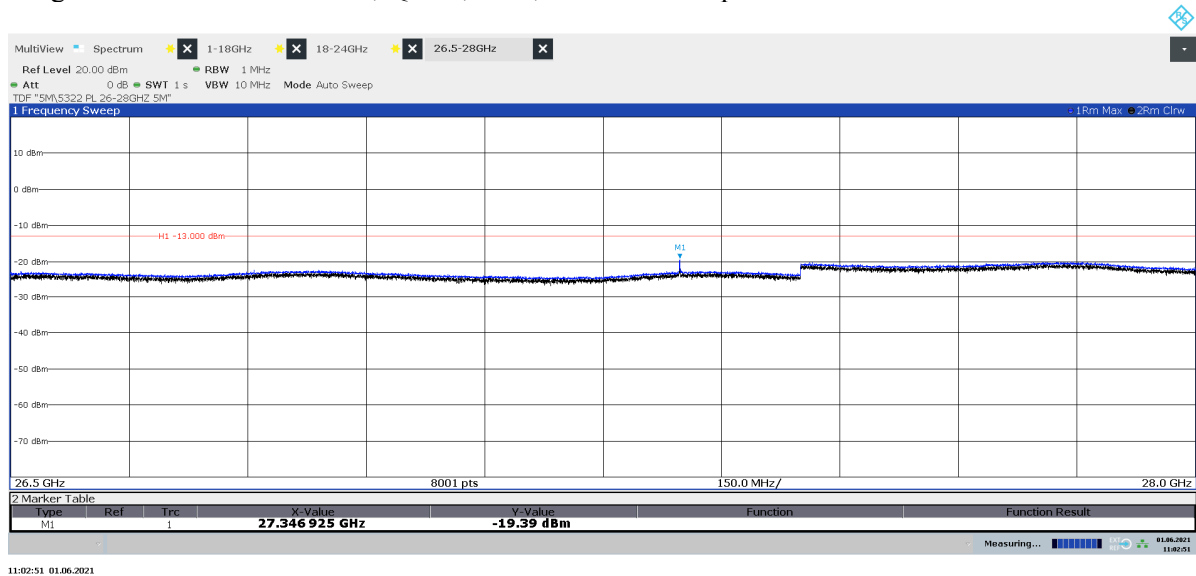
Diagram 2.22a: 26.5 – 28 GHz, QPSK, BL₅₀, EIRP Horizontal polarizationDiagram 2.22b: 26.5 – 28 GHz, QPSK, BL₅₀, EIRP Vertical polarization

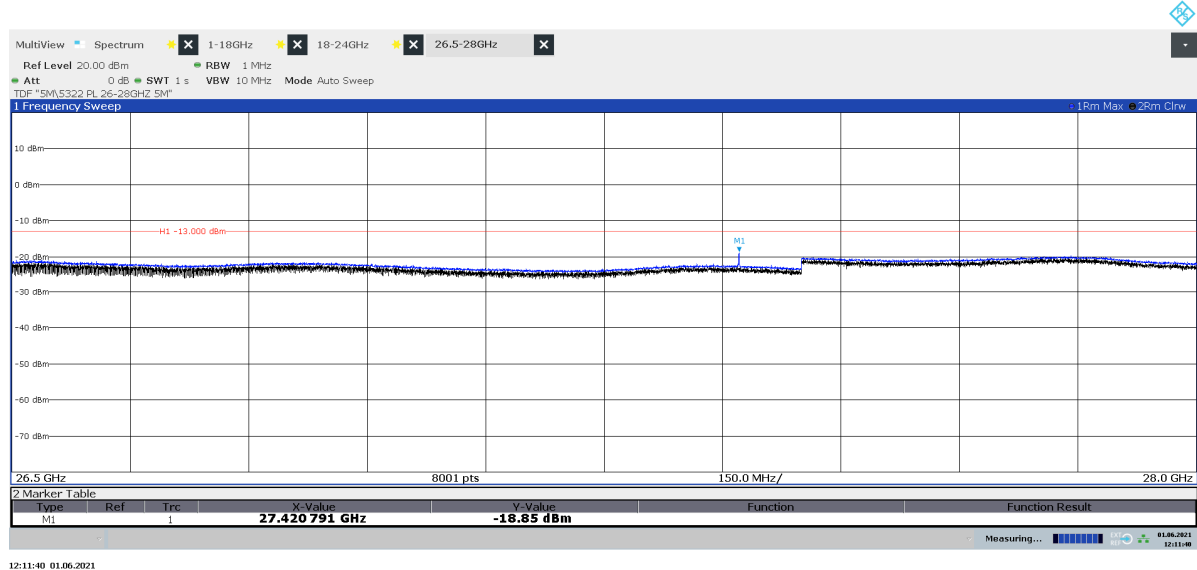
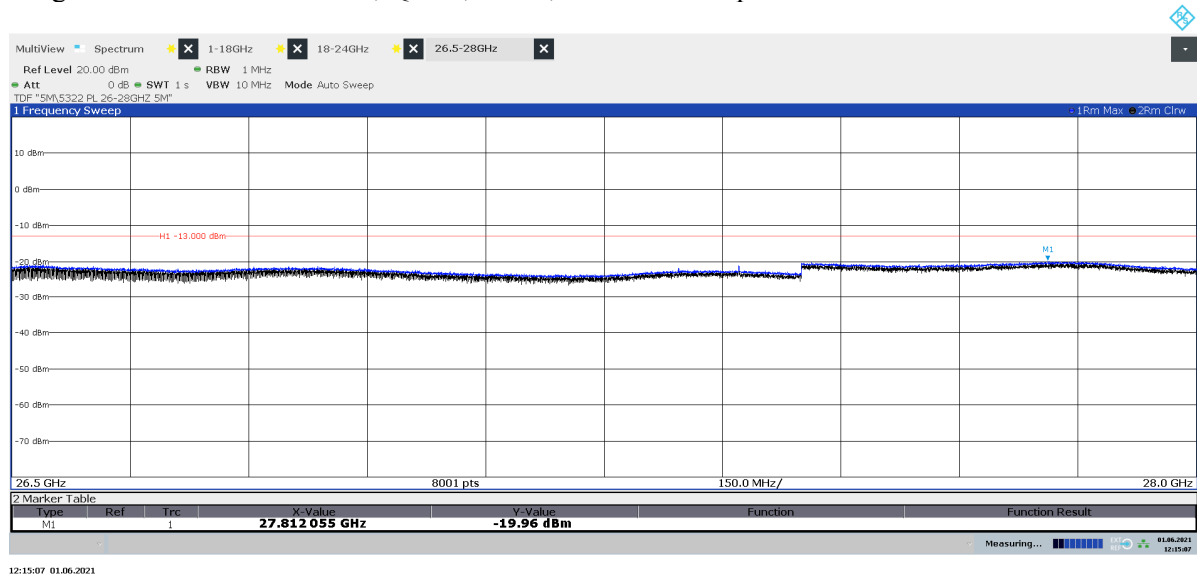
Diagram 2.23a: 26.5 – 28 GHz, QPSK, BT8₅₀, EIRP Horizontal polarizationDiagram 2.23b: 26.5 – 28 GHz, QPSK, BT8₅₀, EIRP Vertical polarization

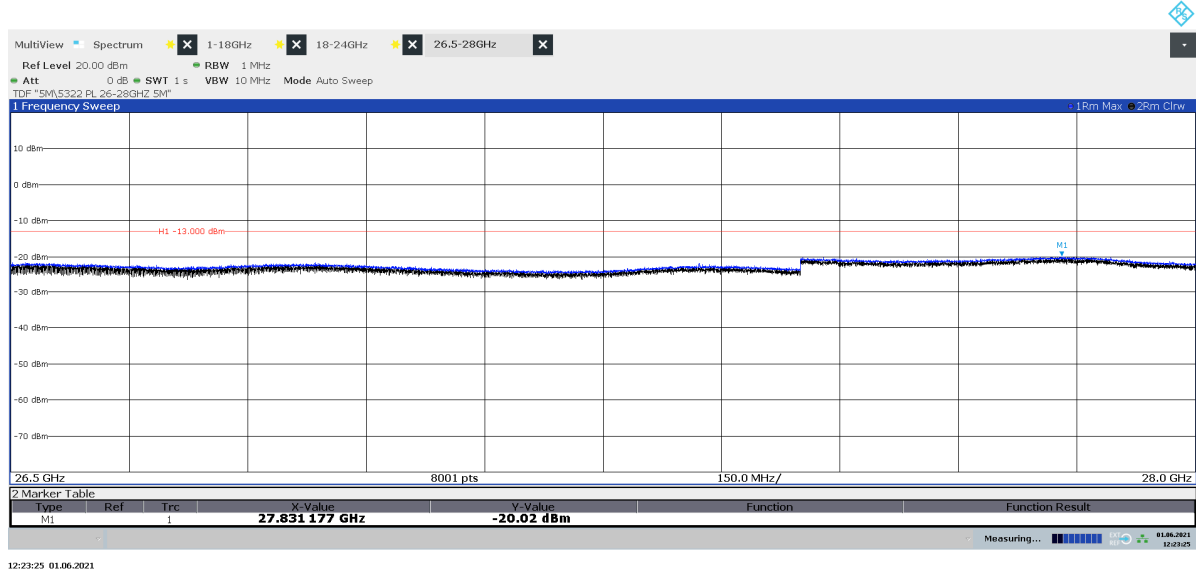
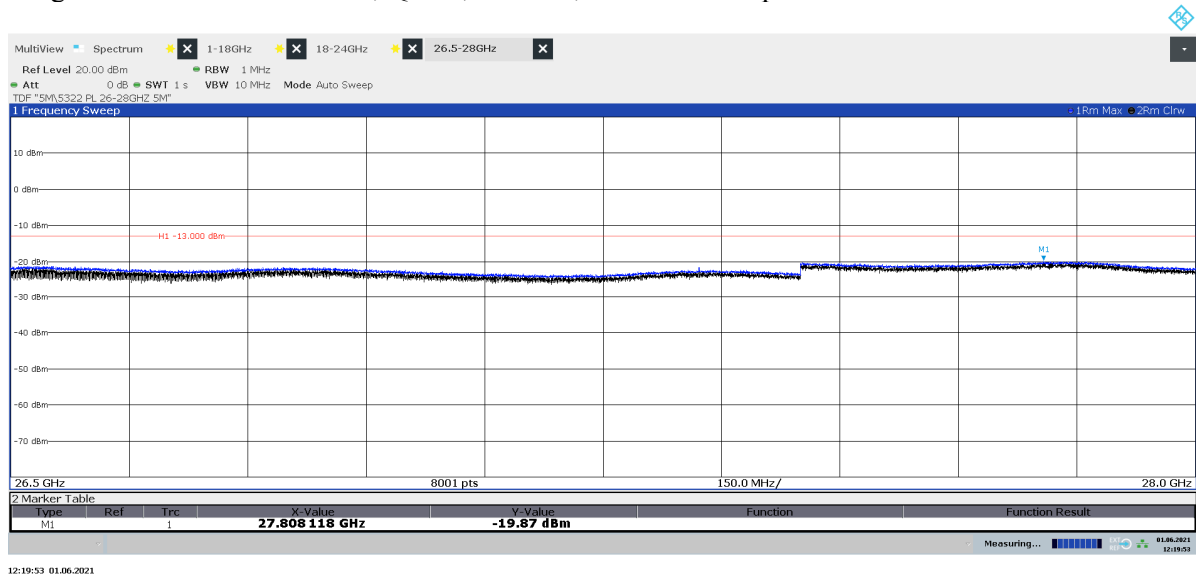
Diagram 2.24a: 26.5 – 28 GHz, QPSK, BMT8₅₀, EIRP Horizontal polarizationDiagram 2.24b: 26.5 – 28 GHz, QPSK, BMT8₅₀, EIRP Vertical polarization

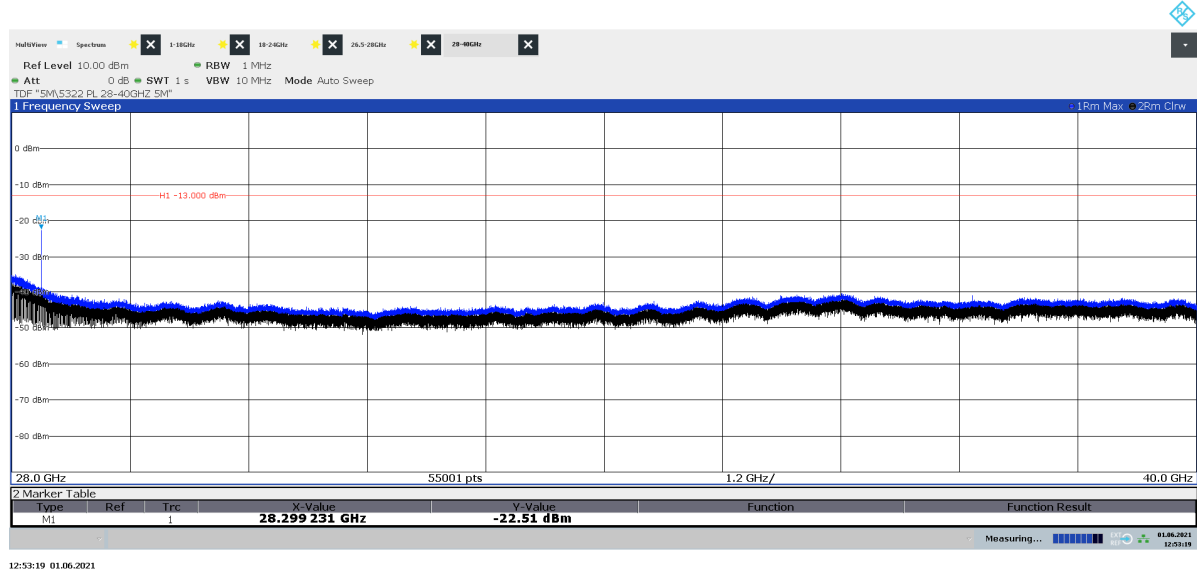
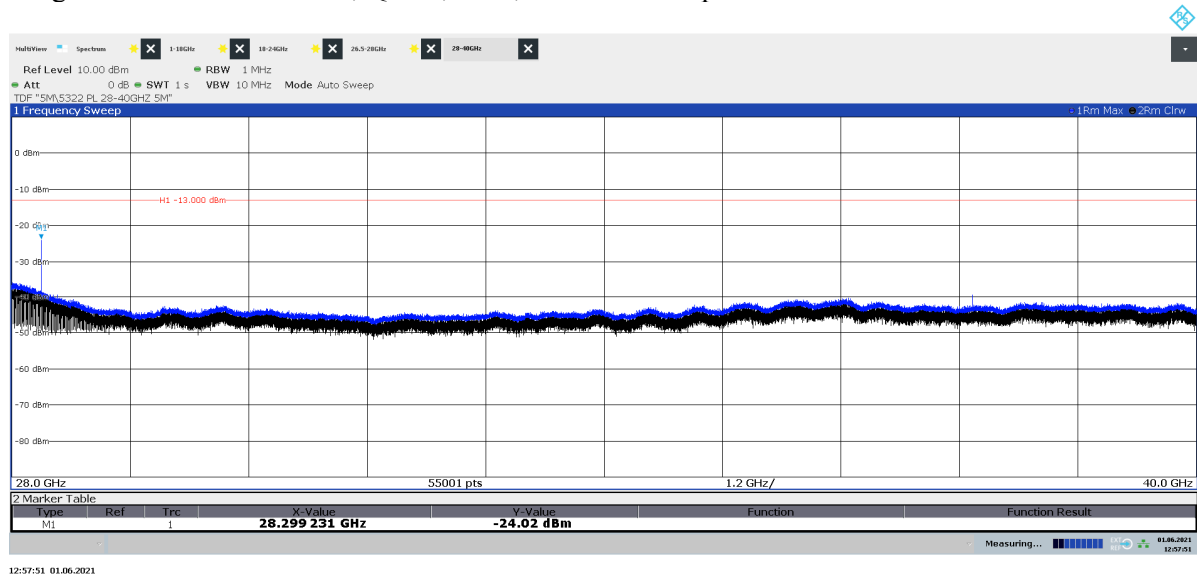
Diagram 2.25a: 28 – 40 GHz, QPSK, TH₅₀, EIRP Horizontal polarizationDiagram 2.25b: 28 – 40 GHz, QPSK, TH₅₀, EIRP Vertical polarization

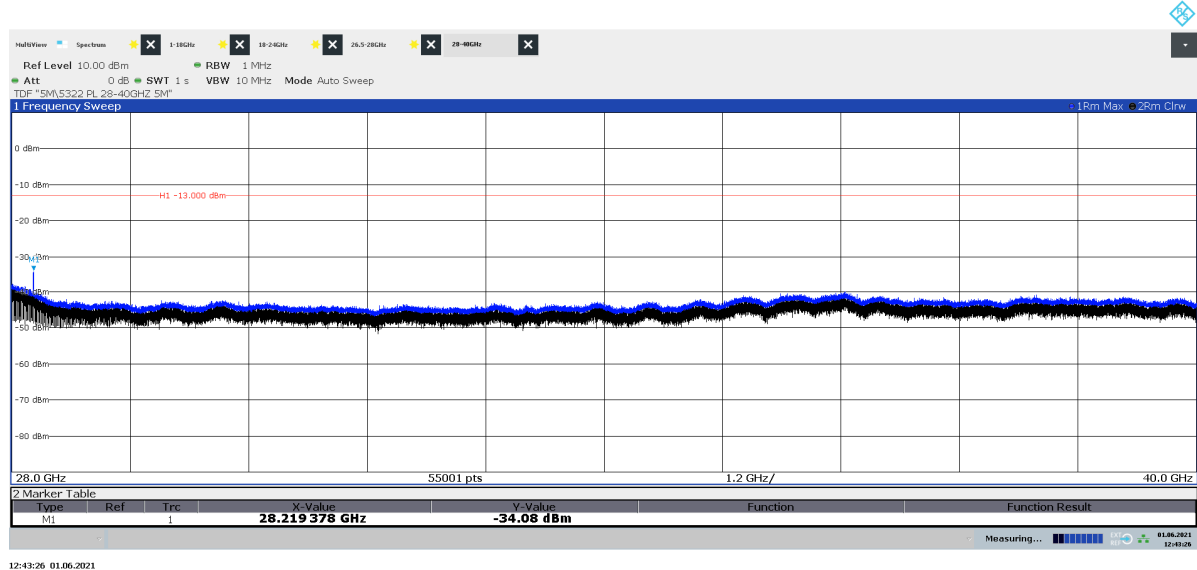
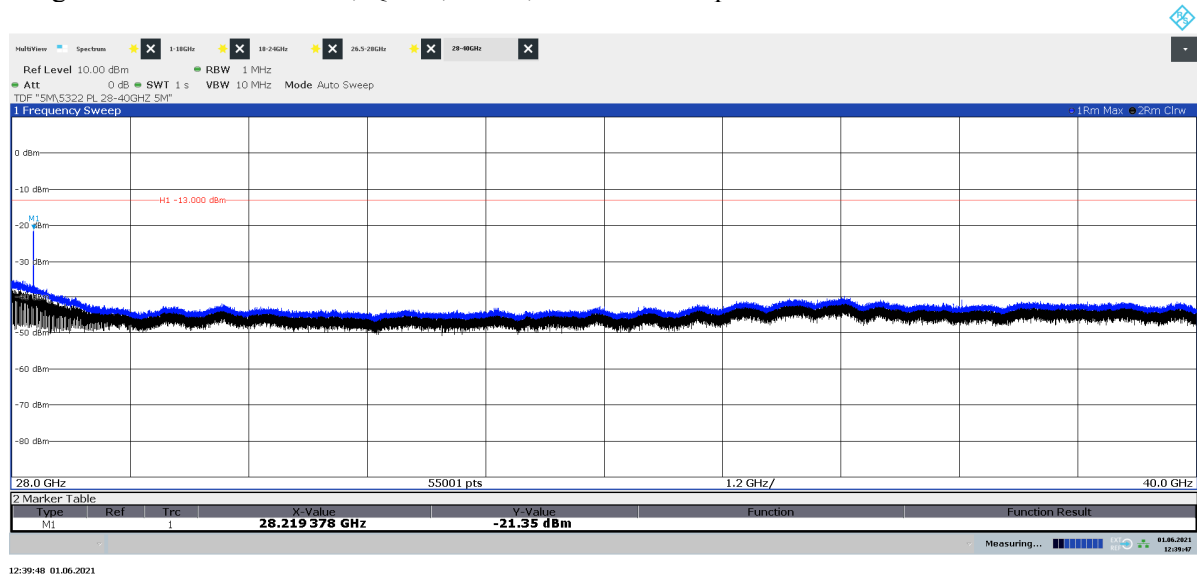
Diagram 2.26a: 28 – 40 GHz, QPSK, BT8₅₀, EIRP Horizontal polarizationDiagram 2.26b: 28 – 40 GHz, QPSK, BT8₅₀, EIRP Vertical polarization

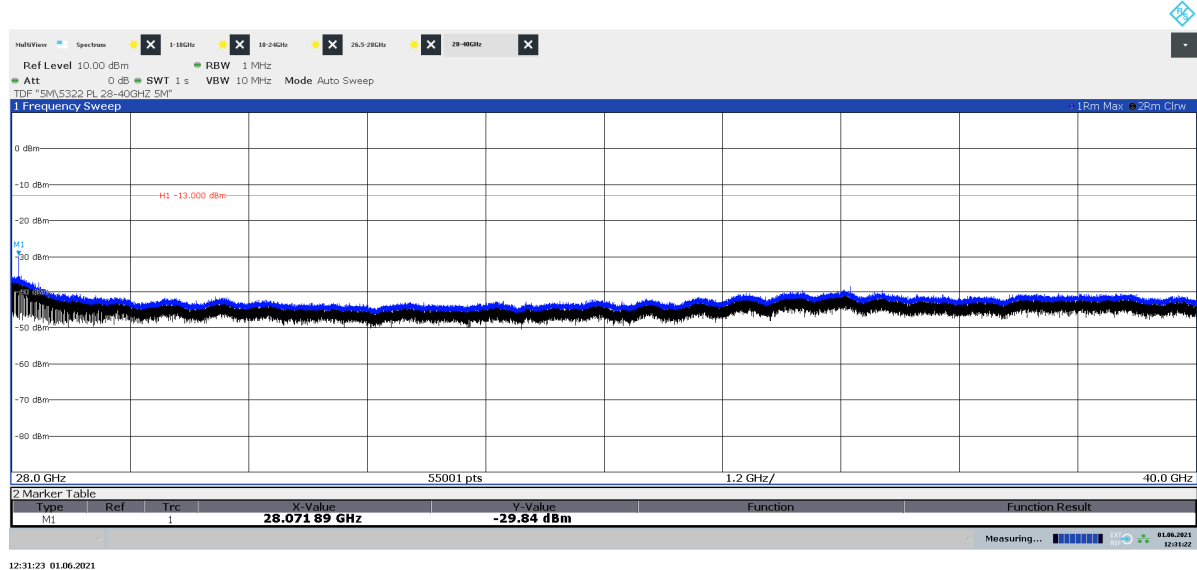
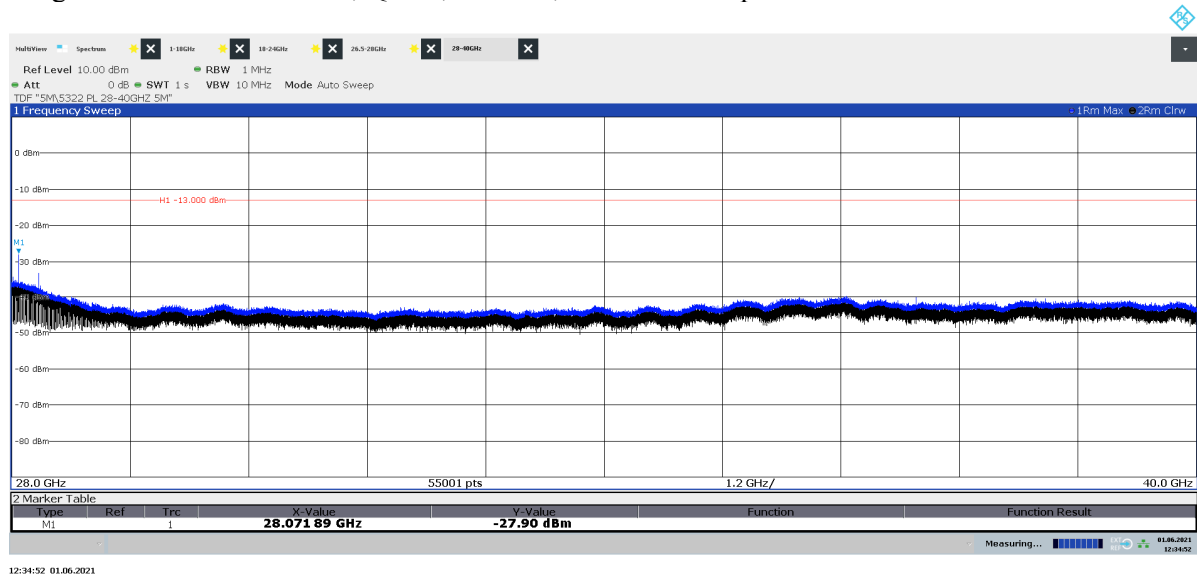
Diagram 2.27a: 28 – 40 GHz, QPSK, BMT8₅₀, EIRP Horizontal polarizationDiagram 2.27b: 28 – 40 GHz, QPSK, BMT8₅₀, EIRP Vertical polarization

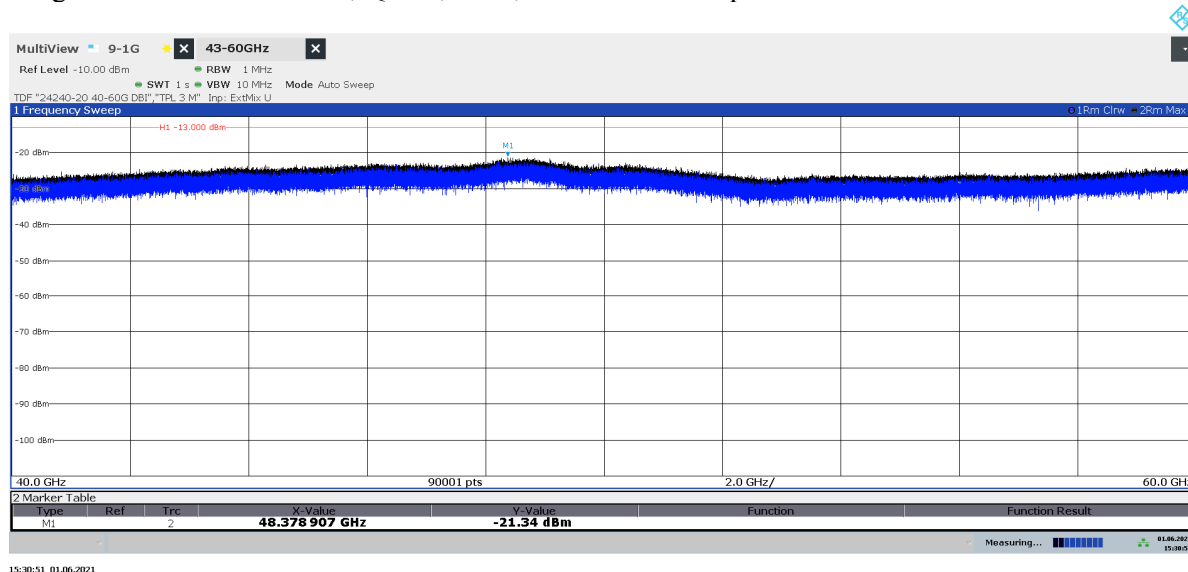
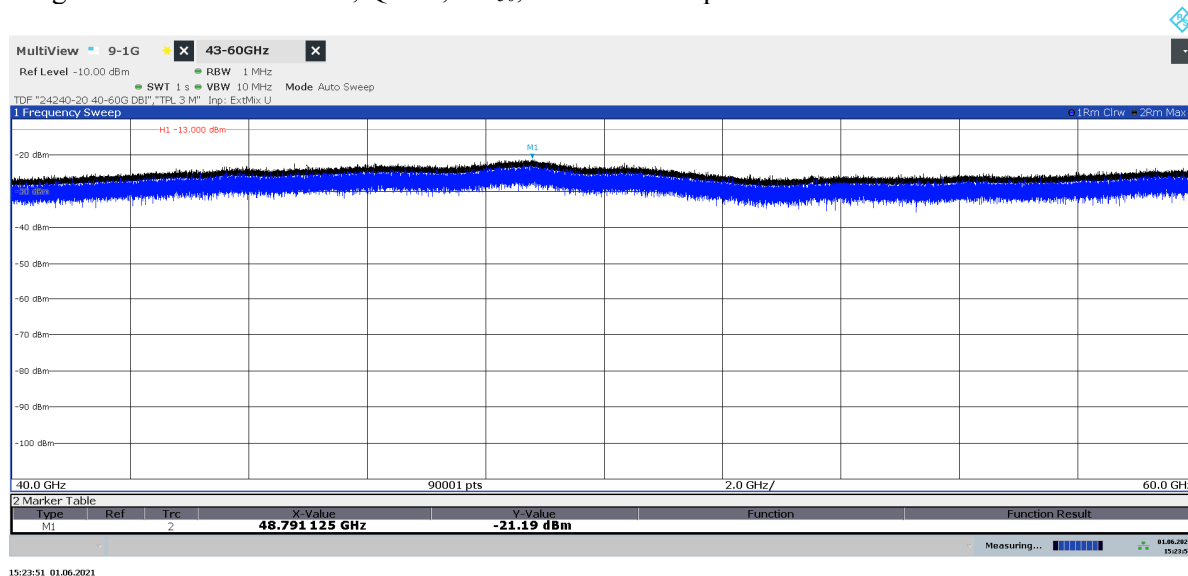
Diagram 2.28a: 40 – 60 GHz, QPSK, BH₅₀, EIRP Horizontal polarizationDiagram 2.28b: 40 – 60 GHz, QPSK, BH₅₀, EIRP Vertical polarization

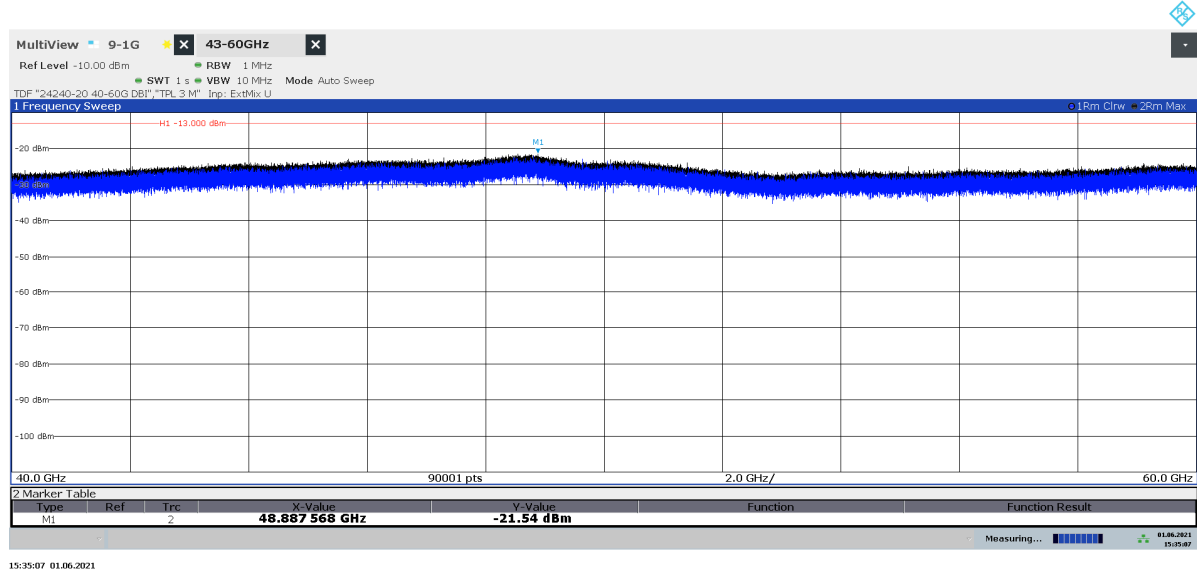
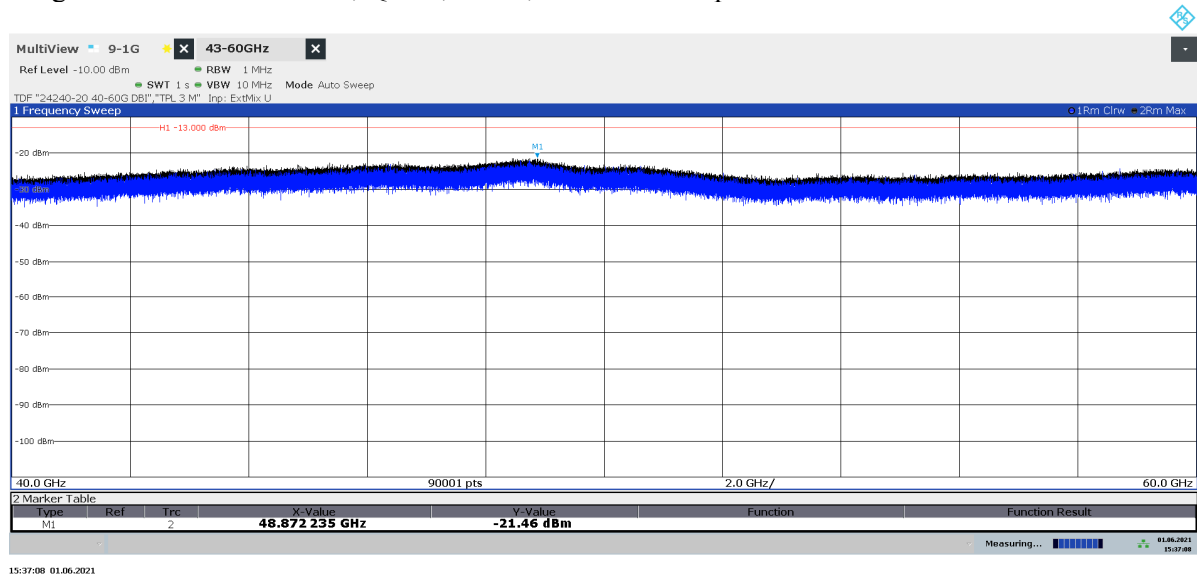
Diagram 2.29a: 40 – 60 GHz, QPSK, BT8₅₀, EIRP Horizontal polarizationDiagram 2.29b: 40 – 60 GHz, QPSK, BT8₅₀, EIRP Vertical polarization

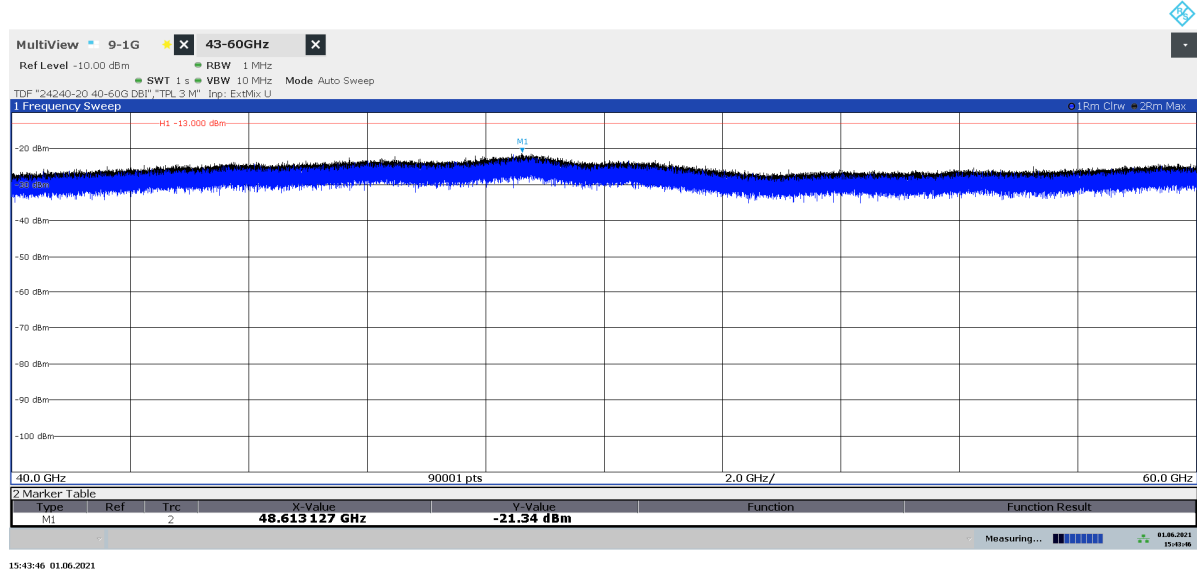
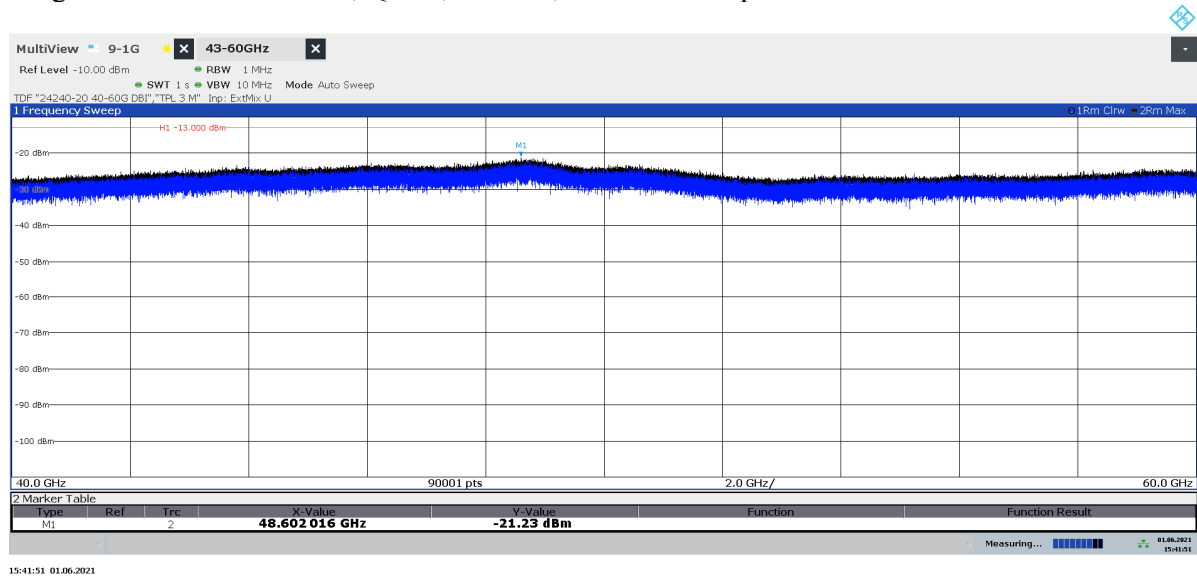
Diagram 2.30a: 40 – 60 GHz, QPSK, BMT8₅₀, EIRP Horizontal polarizationDiagram 2.30b: 40 – 60 GHz, QPSK, BMT8₅₀, EIRP Vertical polarization

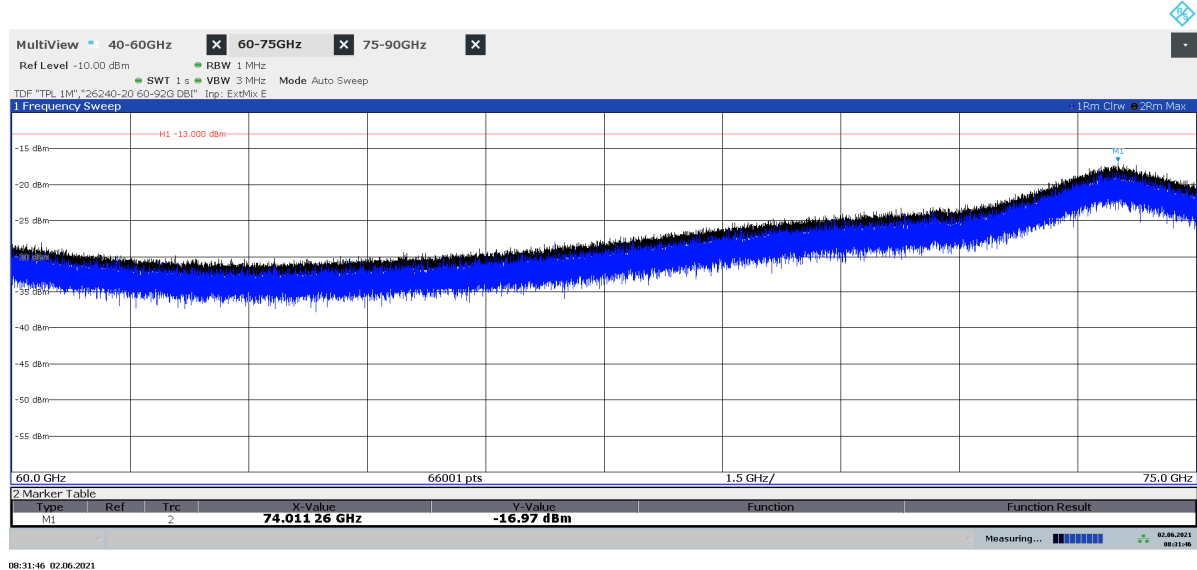
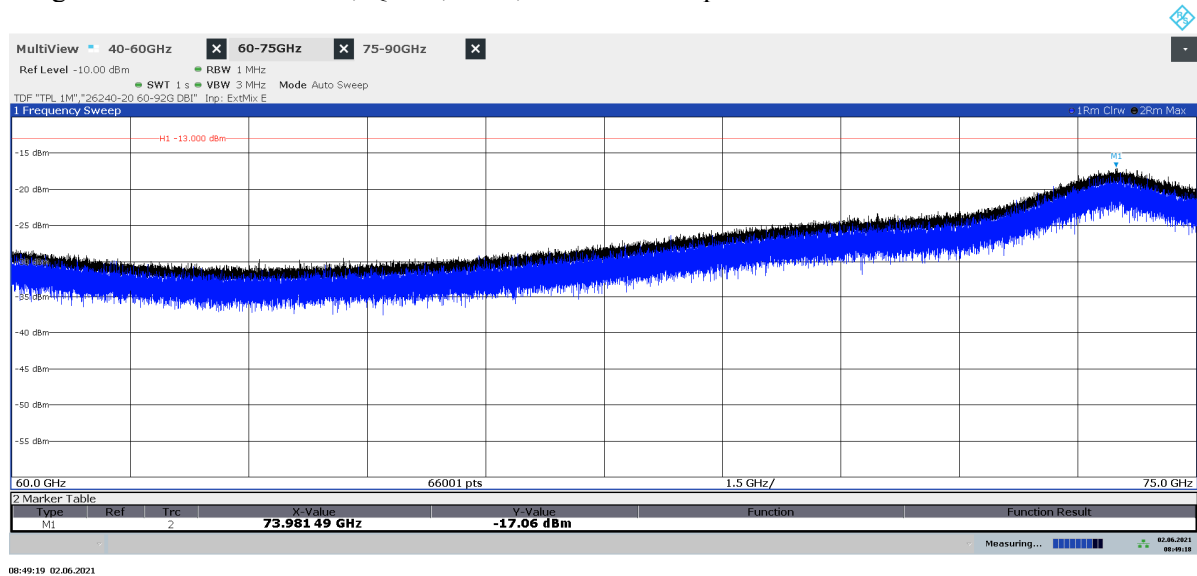
Diagram 2.31a: 60 – 75 GHz, QPSK, BH₅₀, EIRP Horizontal polarizationDiagram 2.31b: 60 – 75 GHz, QPSK, BH₅₀, EIRP Vertical polarization

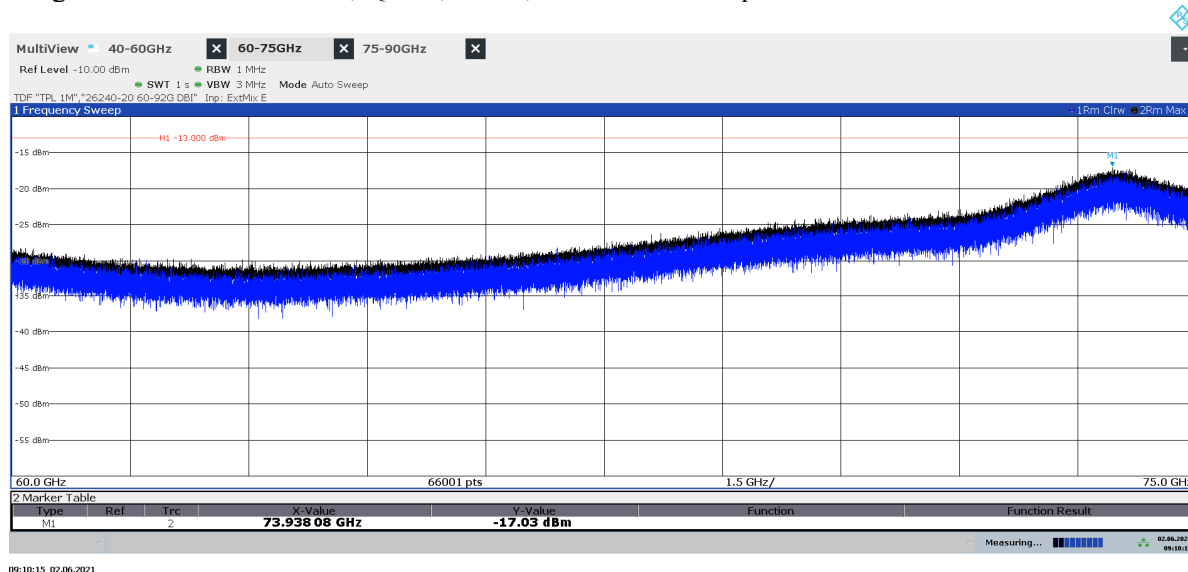
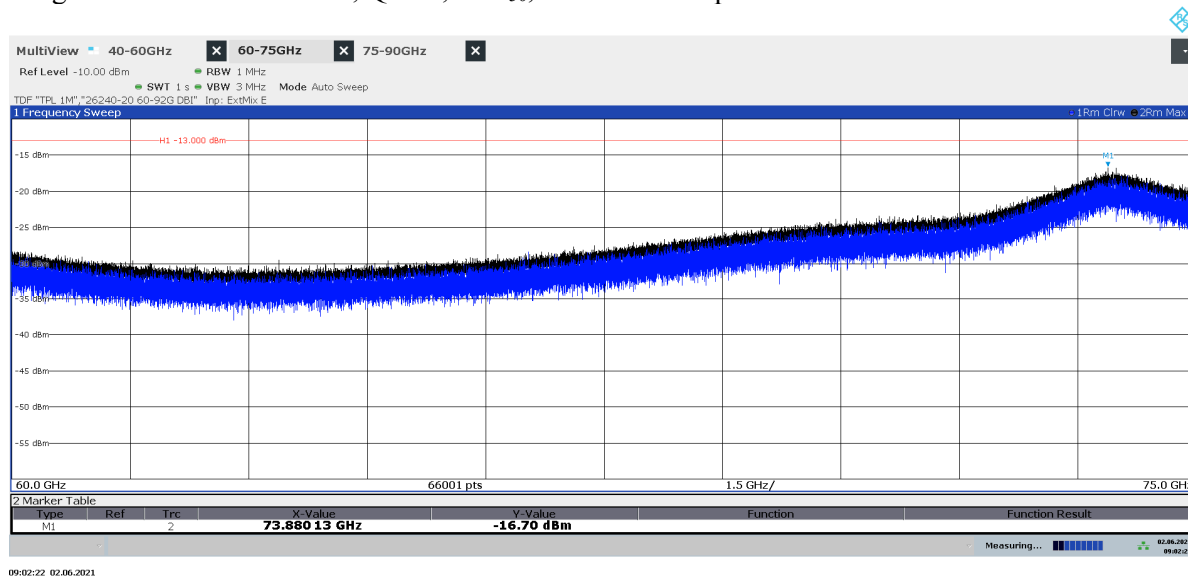
Diagram 2.32a: 60 – 75 GHz, QPSK, BT8₅₀, EIRP Horizontal polarizationDiagram 2.32b: 60 – 75 GHz, QPSK, BT8₅₀, EIRP Vertical polarization

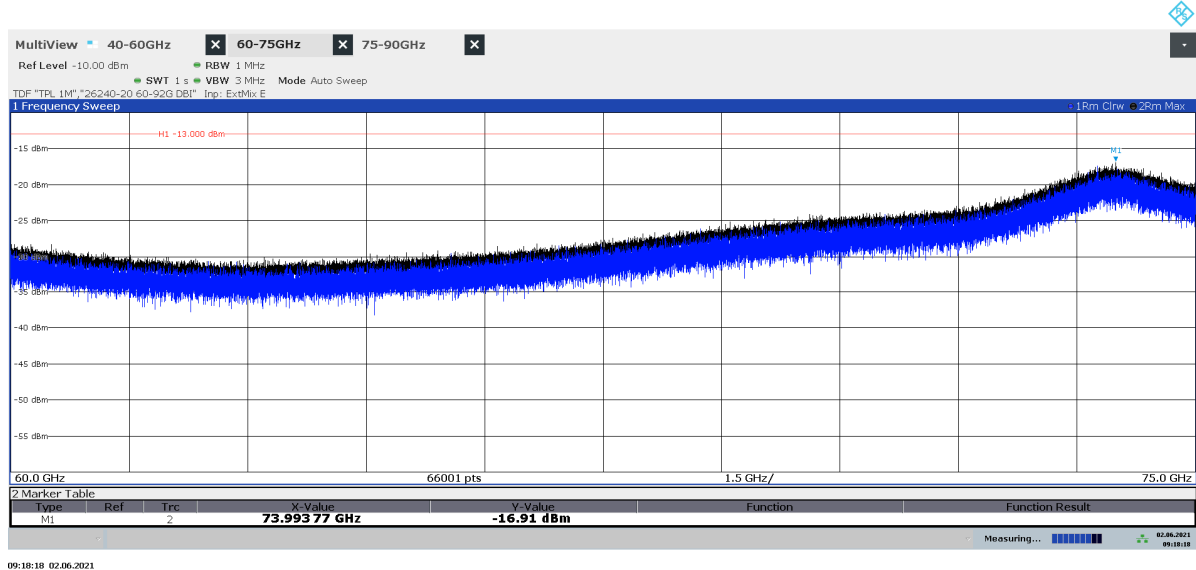
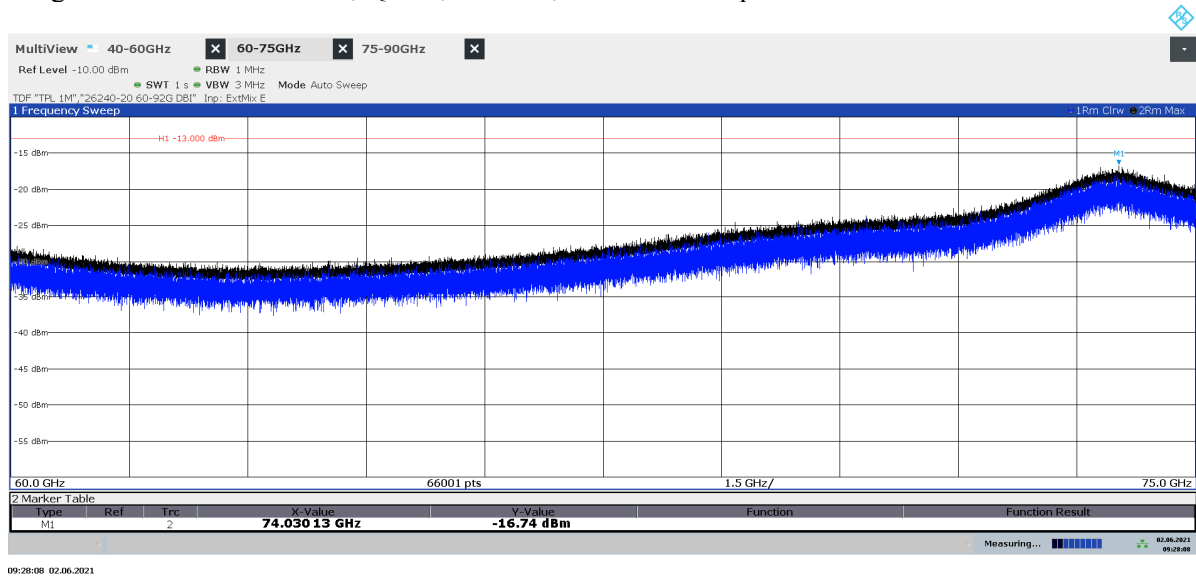
Diagram 2.33a: 60 – 75 GHz, QPSK, BMT8₅₀, EIRP Horizontal polarizationDiagram 2.33b: 60 – 75 GHz, QPSK, BMT8₅₀, EIRP Vertical polarization

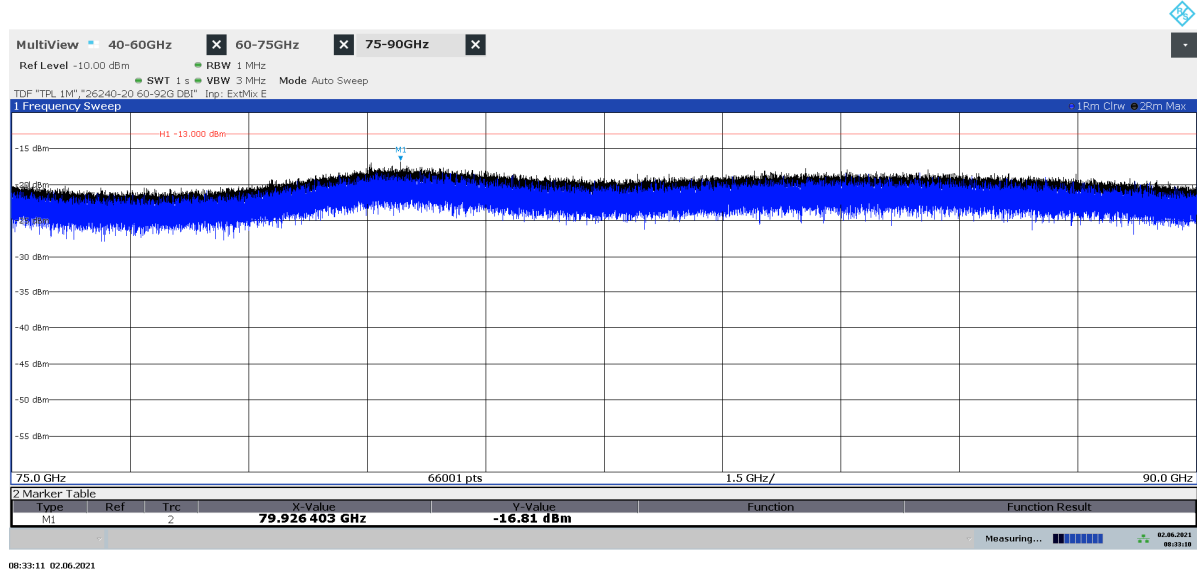
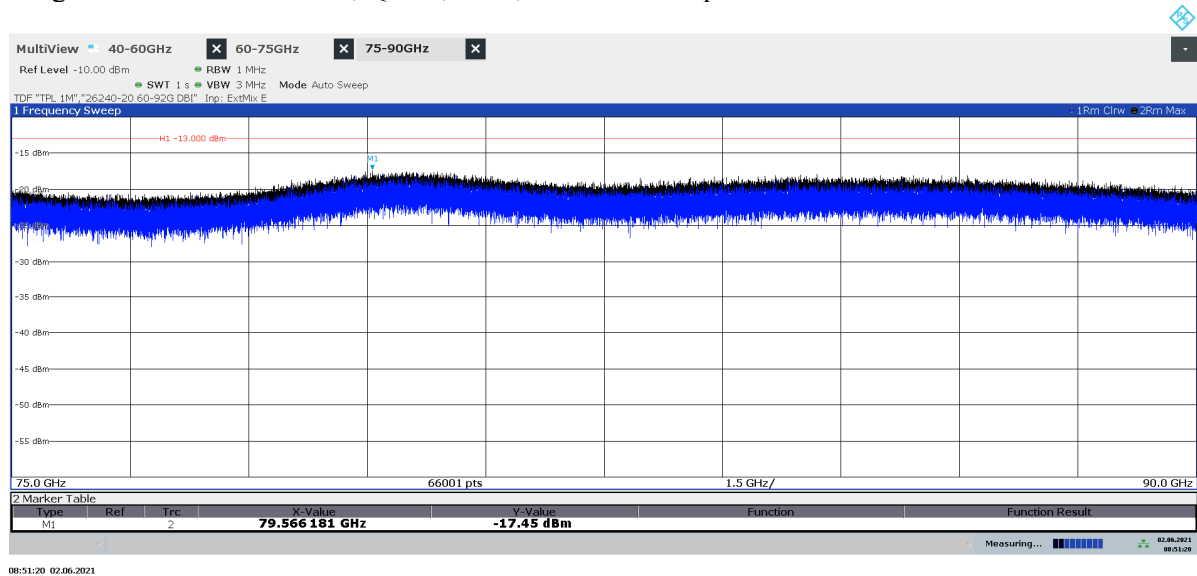
Diagram 2.34a: 75 – 90 GHz, QPSK, BH₅₀, EIRP Horizontal polarizationDiagram 2.34b: 75 – 90 GHz, QPSK, BH₅₀, EIRP Vertical polarization

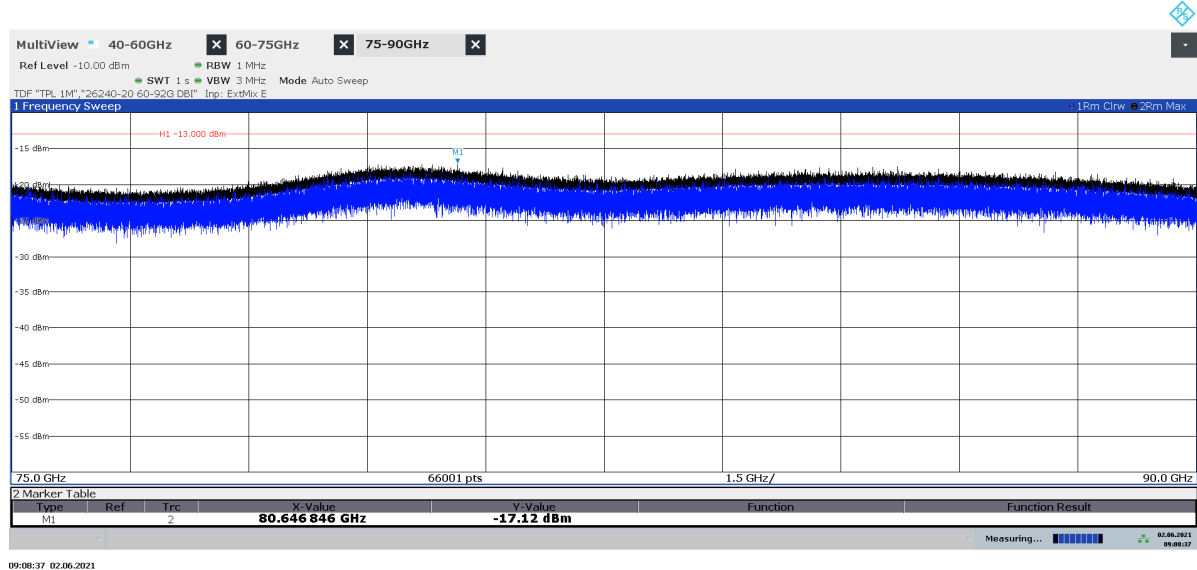
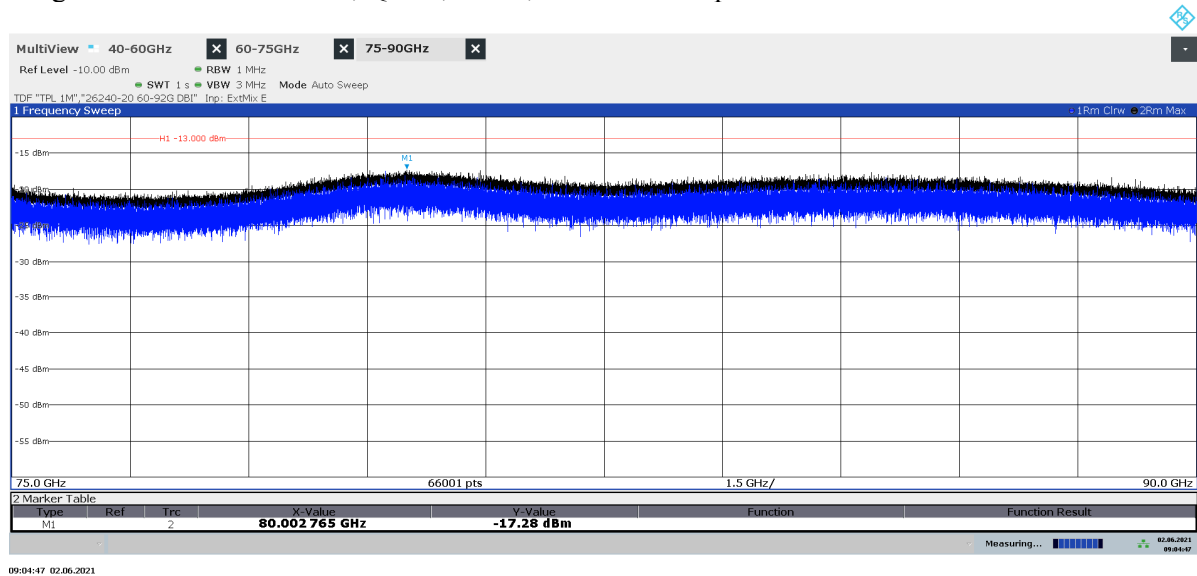
Diagram 2.35a: 75 – 90 GHz, QPSK, BT8₅₀, EIRP Horizontal polarizationDiagram 2.35b: 75 – 90 GHz, QPSK, BT8₅₀, EIRP Vertical polarization

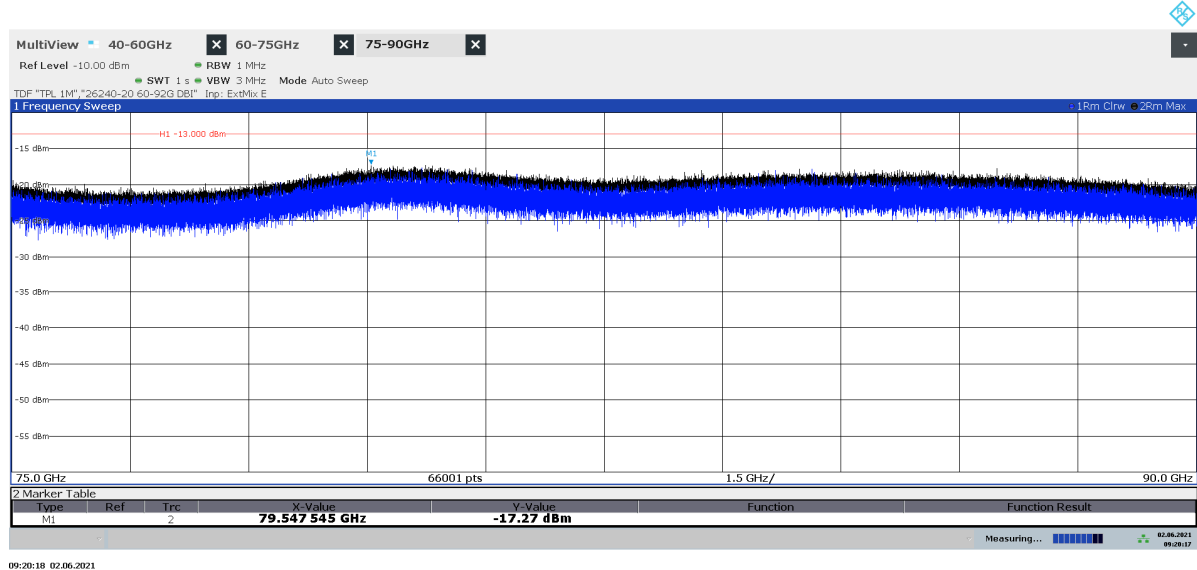
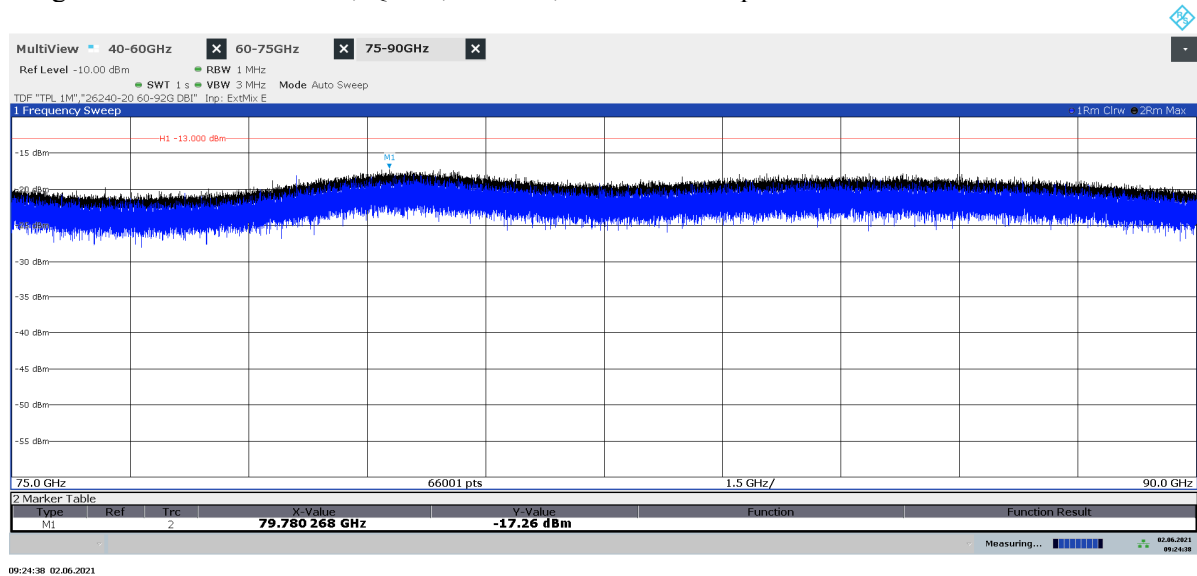
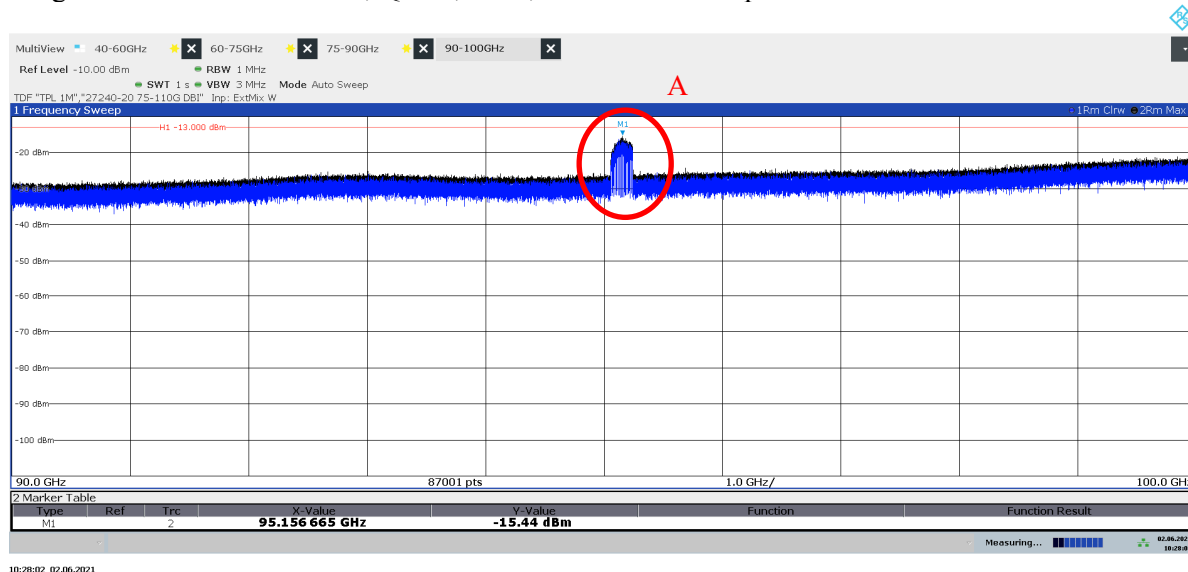
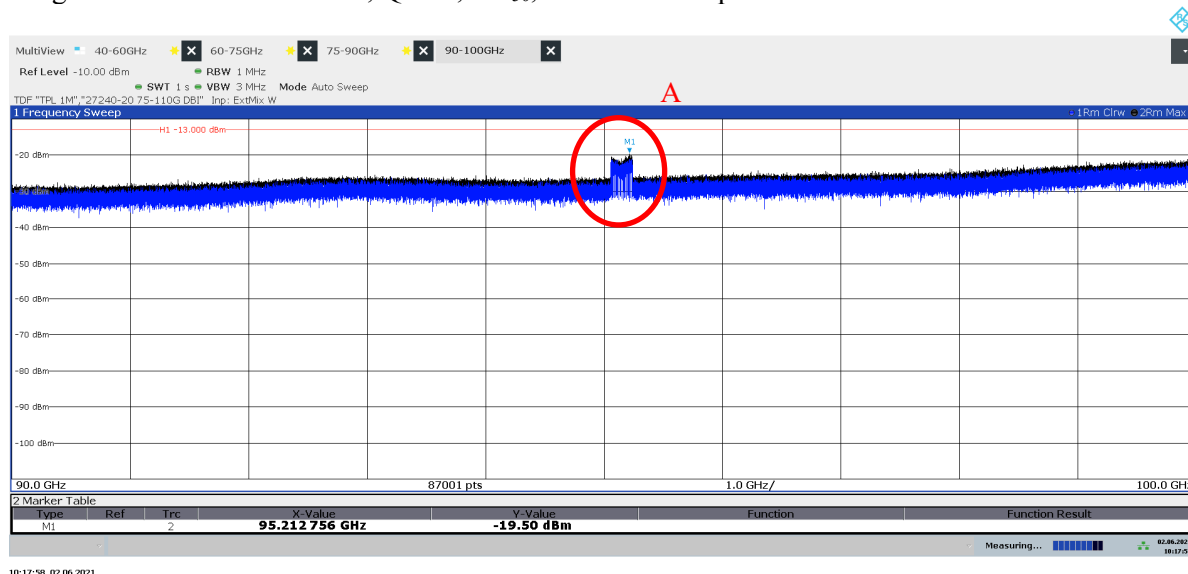
Diagram 2.36a: 75 – 90 GHz, QPSK, BMT8₅₀, EIRP Horizontal polarizationDiagram 2.36b: 75 – 90 GHz, QPSK, BMT8₅₀, EIRP Vertical polarization

Diagram 2.37a: 90 – 100 GHz, QPSK, BH₅₀, EIRP Horizontal polarizationDiagram 2.37b: 90 – 100 GHz, QPSK, BH₅₀, EIRP Vertical polarization

- A) "False signals" originating from unwanted mixer products between LO signal generated by the spectrum analyser and the high field strength from the EUT are marked with red circle.

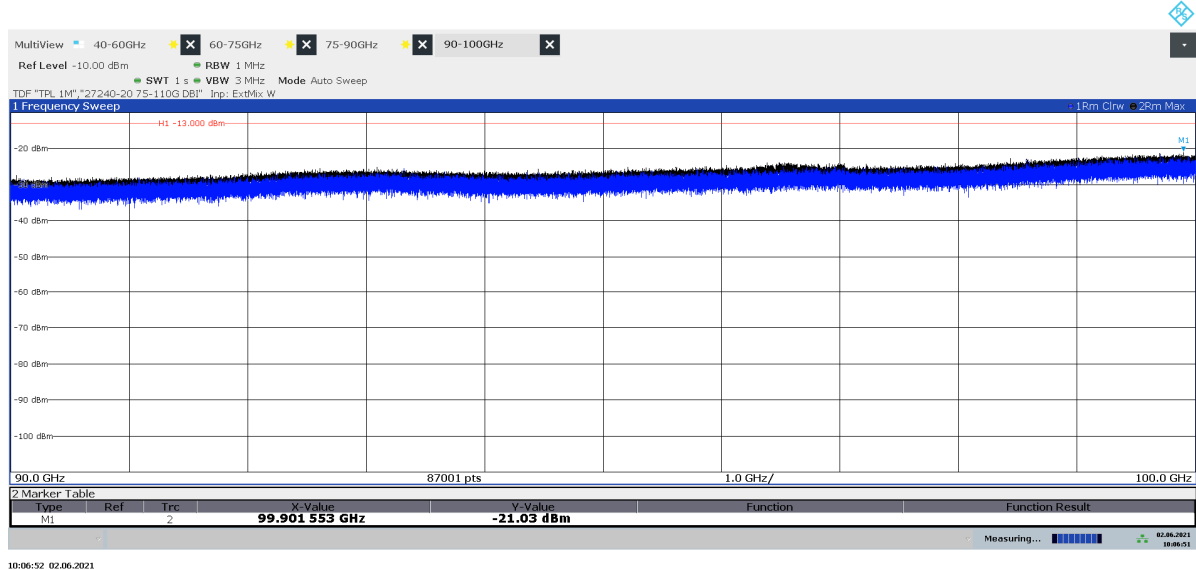
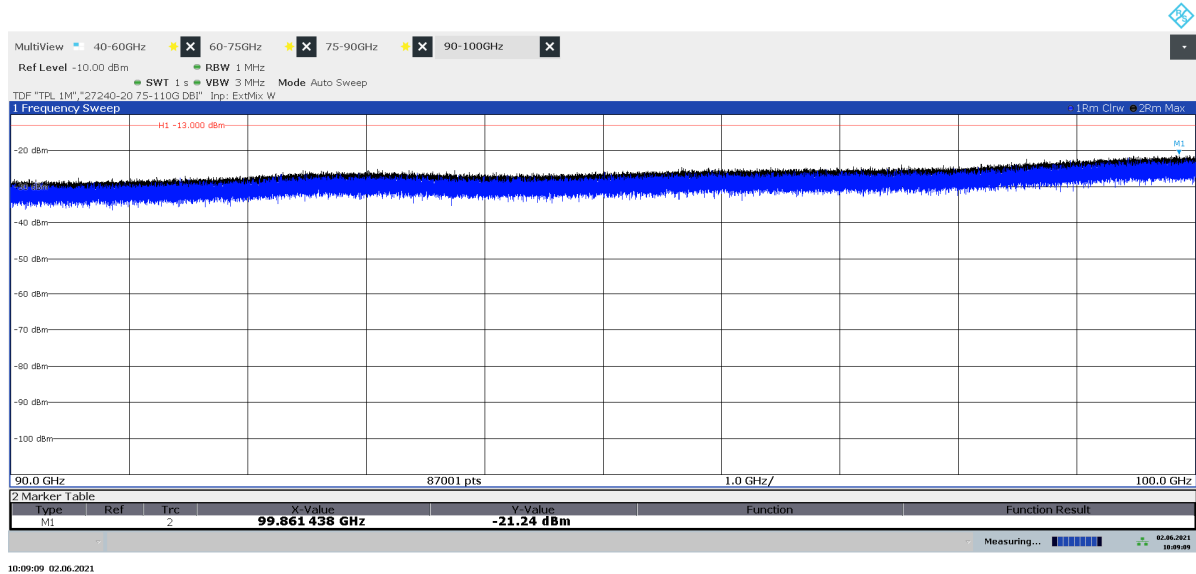
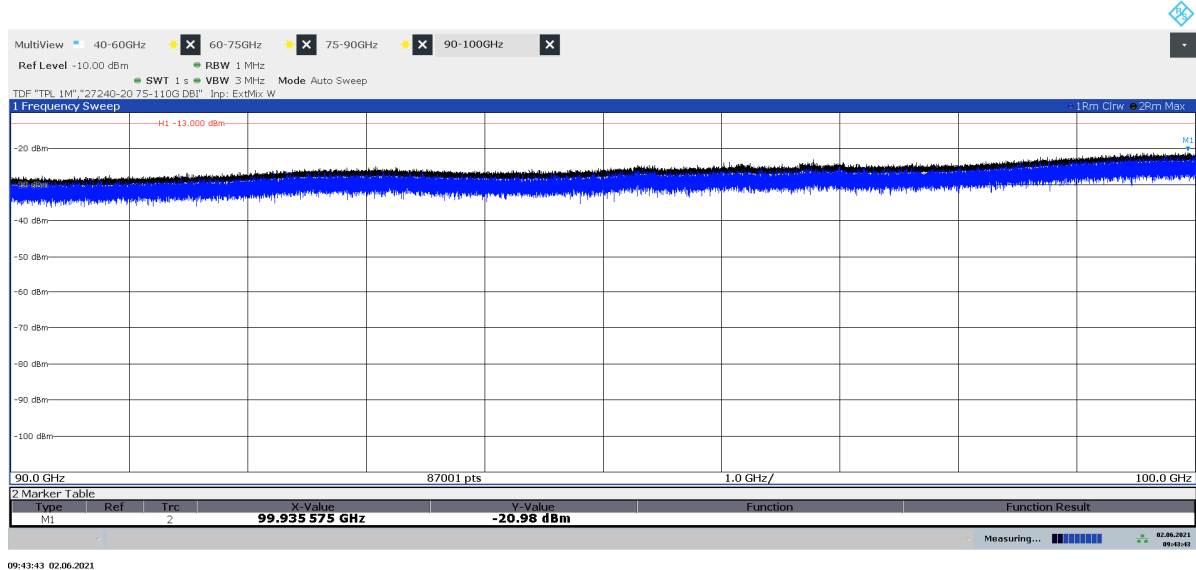
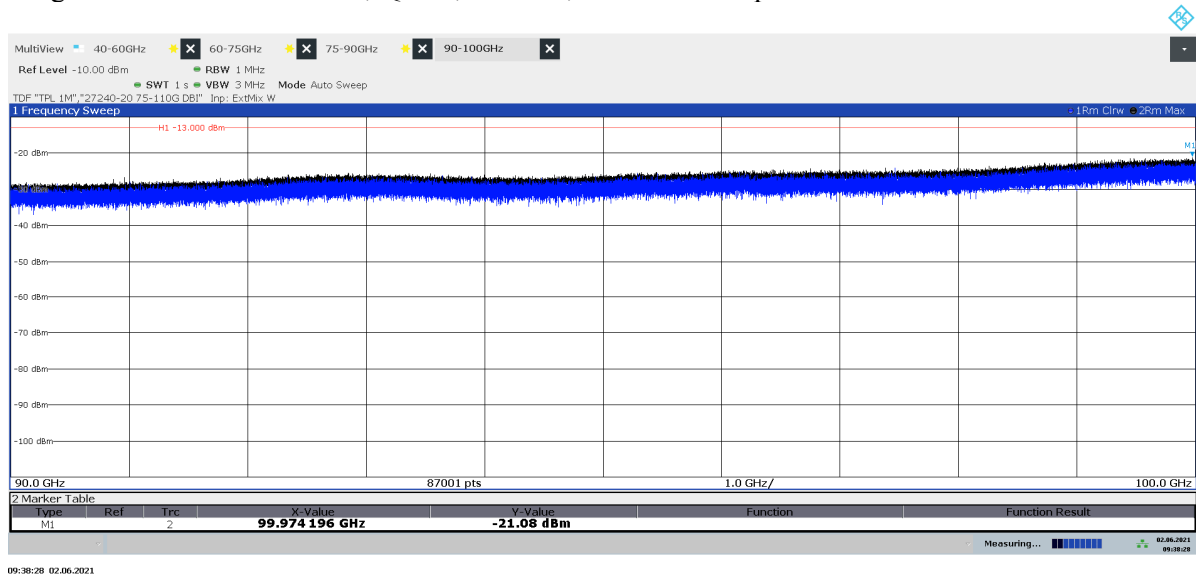
Diagram 2.38a: 90 – 100 GHz, QPSK, BT₈₅₀, EIRP Horizontal polarizationDiagram 2.38b: 90 – 100 GHz, QPSK, BT₈₅₀, EIRP Vertical polarization

Diagram 2.39a: 90 – 100 GHz, QPSK, BMT8₅₀, EIRP Horizontal polarizationDiagram 2.39b: 90 – 100 GHz, QPSK, BMT8₅₀, EIRP Vertical polarization

Frequency stability measurements according to 47 CFR §2.1055

Date	Temperature (test equipment)	Humidity (test equipment)
2022-02-10	23 °C ± 3 °C	25 % ± 5 %
2022-02-11	23 °C ± 3 °C	25 % ± 5 %
2022-02-14	23 °C ± 3 °C	20 % ± 5 %

Test set-up and procedure

The measurements were made per definition in ANSI C63.26, 5.6.

A temperature chamber with a RF transparent door was used and a measurement antenna was aligned outside the temperature chamber. The option NR 5G downlink measurements K144 in the spectrum analyser was used to demodulate the signal and report the frequency error.

Measurement equipment	RISE number
R&S FSW 43	902 073
RF Cable	BX50236
EMCO Horn Antenna 3116	503 279
Temperature Chamber	503 360
Testo 635, temperature and humidity meter	504 203
Multimeter Fluke 87	502 190

Nominal transmitter frequency was 24300 MHz (BL) with a bandwidth of 100 MHz.

Test conditions		Frequency error (Hz)
Supply voltage DC (V)	Temp. (°C)	
40.8	+20	-47
55.2	+20	-52
48.0	+20	-48
48.0	+30	-55
48.0	+40	-62
48.0	+50	-70
48.0	+10	-76
48.0	0	+86
48.0	-10	-36
48.0	-20	-92
48.0	-30	-91
Maximum freq. error (Hz)		92
Measurement uncertainty		$< \pm 1 \times 10^{-7}$

Remark

The frequency stability performance is sufficient to ensure that the fundamental emission stays within the authorized frequency band.

End of report.

Verification

Transaction 09222115557467084142

Document

P110766-F30-rev1

Main document

92 pages

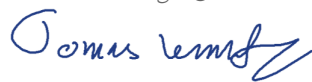
Initiated on 2022-04-12 13:51:54 CEST (+0200) by Tomas Lennhager (TL)

Finalised on 2022-04-12 14:55:30 CEST (+0200)

Signing parties

Tomas Lennhager (TL)

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Signed 2022-04-12 13:53:37 CEST (+0200)

Daniel Lundgren (DL)

daniel.lundgren@ri.se



Signed 2022-04-12 14:55:30 CEST (+0200)

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