REPORT

issued by an Accredited Testing Laboratory

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Date	Reference	Page
2021-11-16	P112434-F30	1 (69)

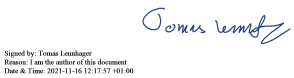
Ericsson AB
Anders Karlsson
BURA DURA RP QRM
Torshamnsgatan 21
164 80 Stockholm

Radio measurements on SM 6705 B261

Product name: SM 6705 B261
Product number: KRK 101 04/1

RISE Research Institutes of Sweden AB
Vehicles and Automation - EMC-IKT

Performed by



Tomas Lennhager

Examined by

Daniel Lundgren

Accred. No. 1002
Testing
ISO/IEC 17025

Summary

Standard Listed part of	Compliant
FCC CFR 47 part 2/ part 30 Subpart C	
2.1046/ 30.202 RF power output	Yes
2.1049 Occupied bandwidth	Yes
2.1053/ 30.204 Field strength of spurious radiation	Yes
2.1055 Frequency stability	Yes

Description of the test object

Equipment:	Radio equipment:, SM 6705 B261 Product number: KRK 101 04/1 containing KRX 101 04/1 Rev. R1B with FCC ID: TA8AKRX10104
Hardware revision state:	R1A
Tested configuration:	3GPP NR TDD
Frequency range:	TX/ RX: 27500 – 28350 MHz
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: Four segments of 200MHz Config mode 1: Two segments of 400 MHz Config mode 2: One segment of 400 MHz
Nominal Output power (EIRP):	59 dBm/ beam and polarization config mode 2 53 dBm/ beam and polarization config mode 1 47 dBm/ beam and polarization config mode 0
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 MHz,100 and 200 MHz/ 120 kHz
Modulations:	QPSK, 16QAM and 64QAM
Emission designators:	45M8W7D, 95M2W7D and 190MW7D
Emission designators Carrier Aggregation:	Maximum 792MW7D (8x 100 MHz)
RF power Tolerance:	+2.4/ -2.0 dB
CPRI Speed	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 parts 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 120 VAC 60 Hz by an external power supply.
Additional connections are documented in the setup drawings for radiated measurements.

Far field distance for power, OBW and Band edge measurements is 4.9 m, based on the EUT antenna dimensions and the highest transmitter frequency (28.35 GHz).

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

Frequency range [GHz]	Far field distance [m]	Measured distance [m]
18 – 26.5	0.73	5
26.5 – 40	0.49	5
40 – 60	0.34	3
60 – 80	0.18	1
80 – 100	0.16	1

Formula for far field distance calculation:

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

References

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

CFR 47 part 30, April 2019
ANSI C63.26-2015
KDB 842590 D01 Upper Microwave Flexible Use Service v01r01
3GPP TS 38.141-2 V15.5.0 (2020-03)
3GPP TR 37.842 V13.3.0 (2020-01)

RISE Measurement equipment

	Calibration Due	RISE number
Anechoic chamber, Hertz	2024-07	BX50194
R&S FSW 43	2022-07	902 073
R&S ESU 26	2022-07	901 553
R&S ZNB 40	2022-08	BX50051
RF Cable VNA-calibration	2022-01	BX50189
RF Cable VNA-calibration	2022-01	BX50190
RF Cable	2022-04	BX50236
RF Cable	2022-10	BX50192
RF Cable	2022-04	KWP04236
RF Cable	2022-05	BX81423
RF Cable	2022-09	503 681
RF Cable FSW-B21	2022-09	BX62069
RF Cable FSW-B21	2022-09	BX62073
Bilog antenna Schaffner 6143A	2024-07	504 079
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	2023-08	BX90566
Mixer FS-Z90	2022-01	BX90567
Mixer FS-Z110	2024-01	BX81425
Miteq, Low Noise Amplifier	2022-01	503 278
EMCO Horn Antenna 3115	2024-07	502 175
EMCO Horn Antenna 3115	2024-11	902 212
EMCO Horn Antenna 3116	2024-06	503 279
µComp Nordic, Low Noise Amplifier	2022-01	901 544
Temperature and humidity meter, Testo 615	2022-06	503 498
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
SWH010 HPF 30-40 GHz	2022-09	ST010619225
SSL036 LPF 26.5 GHz	2022-09	ST012717003

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: 2021-10-05

Manufacturer’s representative

Patrik Hellström, Ericsson AB.

Test engineers

Tomas Lennhager and Björn Skönvall, RISE

Test participant(-s)

None

Test frequencies used for radiated measurements

Config mode 2

Symbolic name	Beam/ Carrier	Frequency Hor/ Ver [MHz]	Comment
BL_{50}	B1/C1	27525.00	50 MHz BW, TX bottom Low block
TL_{50}	B1/C1	27900.00	50 MHz BW, TX Top Low block
BH_{50}	B1/C1	27950.04	50 MHz BW, TX Bottom High block
TH_{50}	B1/C1	28325.04	50 MHz BW, TX Top High block
BL_{100}	B1/C1	27550.08	100 MHz BW, TX bottom Low block
TL_{100}	B1/C1	27874.92	100 MHz BW, TX Top Low block
BH_{100}	B1/C1	27975.00	100 MHz BW, TX Bottom High block
TH_{100}	B1/C1	28300.08	100 MHz BW, TX Top High block
BL_{200}	B1/C1	27600.00	200 MHz BW, TX bottom Low block
$BL2_{100}$	B1/C1 B1/C2	27550.08 27650.04	100 MHz BW, TX 2 carrier Bottom Low band
$BL2_{max50}$	B1/C1 B1/C2	27975.00 28325.04	50 MHz BW, TX 2 carrier Bottom max IBW Low block
$TH2_{50}$	B1/C1 B1/C2	28224.96 28325.04	50 MHz BW, TX 2 carrier Top High Block
$BL4_{100}$	B1/C1 B1/C2 B1/C3 B1/C4	27550.08 27650.04 27750.00 27849.96	100 MHz BW, TX 4 carrier Bottom Low block

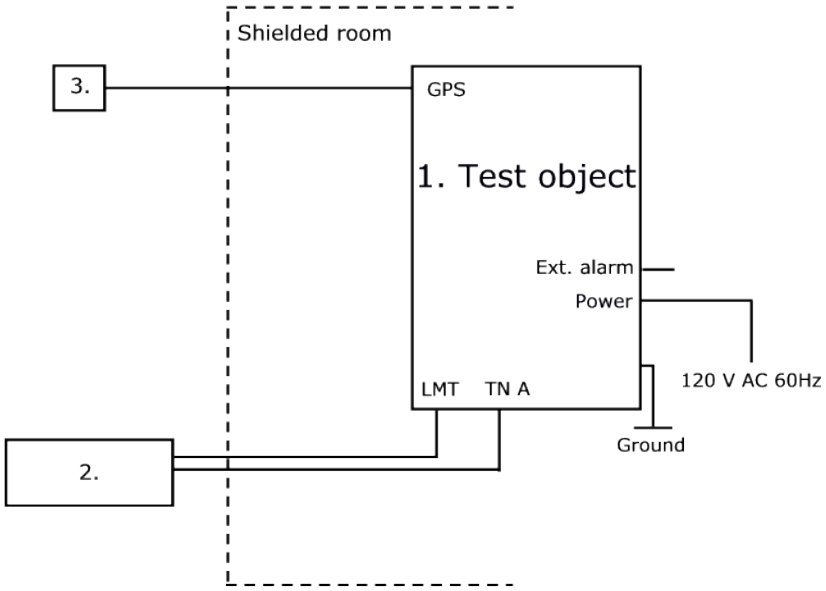
Config mode 1

Symbolic name	Beam/ Carrier	Frequency Hor/ Ver [MHz]	
$M8_{100}$	B1/C1 B1/C2 B1/C3 B1/C4 B2/C1 B2/C2 B2/C3 B2/C4	27575.04 27675.00 27774.96 27875.04 27975.00 28074.96 28175.04 28275.001	100 MHz BW, TX 8 carrier Middle

Config mode 0

Symbolic name	Beam/ Carrier	Frequency Hor/ Ver [MHz]	
$BMT4_{50}$	B1/C1 B2/C1 B3/C1 B4/C1	27525.00 27900.00 27950.04 28325.04	50 MHz BW, Tx 4 carrier Bottom Middle and Top
$BMT8_{50}$	B1/C1 B1/C2 B2/C1 B2/C2 B3/C1 B3/C2 B4/C1 B4/C2	27525.00 27574.92 27849.96 27900.00 27950.04 27999.96 28275.00 28325.04	50 MHz BW, Tx 8 carrier Bottom Middle and Top

Test setup: radiated measurements



Test object:

1.	SM 6705, KRK 101 04/1, rev. R1A, s/n: E23D305158 (E23D305159 only for frequency stability) containing KRX 101 04/1 rev. R1B with FCC ID: TA8AKRX10104 Baseband software: CXP2010174/1, rev. R38A61 Radio Software: CXP 203 0045/1, rev. R10C394

Functional test equipment:

2.	Computer, HP ZBook, BAMS - 1001530471
3.	GPS Active Antenna, KRE 101 2082/1

Interfaces:

Power input 120 VAC 60Hz	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
2021-10-12	23 °C ± 3 °C	20 % ± 5 %
2021-10-18	23 °C ± 3 °C	14 % ± 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 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).

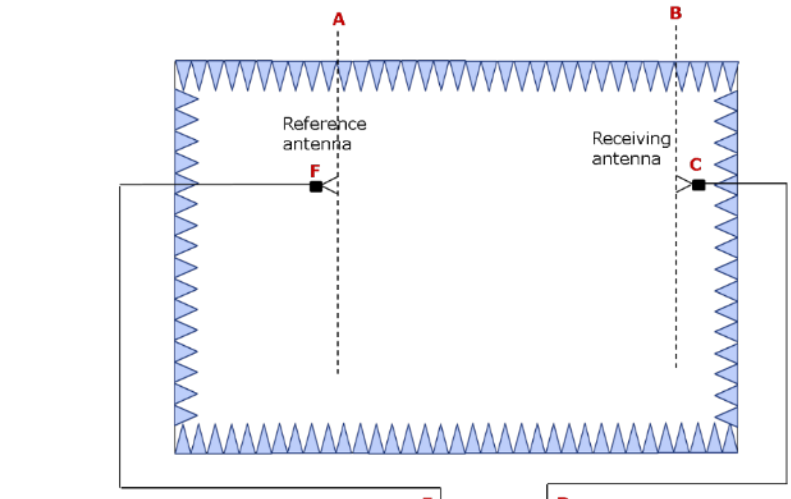


Figure 1: Indoor Anechoic Chamber calibration system setup for EIRP

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 20log|S21| (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:

$LF_{EIRP, E→F}$: Cable loss between E and F in figure 1.

5) Calculate the calibration value between A and D with the following formula:
$L_{EIRP\_cal, A→D} = LF_{EIRP, E→D} + G_{REF\_ANT\_EIRP, A→F} - LF_{EIRP, E→F}$.
$L_{EIRP\_cal, A→D}$: Calibration value between A and D in figure 1. Was implemented in the spectrum analyzer as a transducer.
$G_{REF\_ANT\_EIRP, A→F}$: 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:

$$EIRP = P_{R\_EUT\_EIRP, D} + L_{EIRP\_cal, A→D}$$

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 22240-20	BX92413
RF Cable	KWP04236
Testo 615, temperature and humidity meter	503 498

Measurement uncertainty: 3.3 dB

Results

Single carrier Config mode 2

Beam index 0 Boresight, Carrier Bandwidth 50 MHz, QPSK
Nominal rated output power (EIRP) per Beam: 59 dBm/ Polarization.

	Output power per 100 MHz, EIRP [RMS dBm] Vertical/ Horizontal
Symbolic name	B1/C1
BL_{50}	58.93/ 59.49

Beam index 0 Boresight, Carrier Bandwidth 100 MHz, QPSK
Nominal rated output power (EIRP) per Beam: 59 dBm/ Polarization.

	Output power per 100 MHz, EIRP [RMS dBm] Vertical/ Horizontal
Symbolic name	B1/C1
BL_{100}	59.11/ 59.32
TL_{100}	58.61/ 58.53
TH_{100}	58.89/ 58.90

Beam index 0 Boresight, Carrier Bandwidth 200 MHz, QPSK
Nominal rated output power (EIRP) per Beam: 59 dBm/ Polarization.

	Output power per 100 MHz, EIRP [RMS dBm] Vertical/ Horizontal		
Symbolic name	B1/C1	B1/C1	Total (per 200 MHz)
BL_{200}	56.32/ 56.56	57.16/ 57.52	59.77/ 60.08

Peak to Average Power Ratio – (PAPR)

Symbolic name	B1/C1 [dB]
BL_{50}	9.73
BL_{100}	10.04
BL_{200}	10.10

2-Carrier Config mode 2

Beam index 0 Boresight, Carrier Bandwidth 100 MHz, QPSK
Nominal rated output power (EIRP) per Beam: 59 dBm/ Polarization.

	Output power per 100 MHz, EIRP [RMS dBm] Vertical/ Horizontal		
Symbolic name	B1/C1	B1/C2	Total (per 200 MHz)
$BL2_{100}$	56.18/ 56.49	57.09/ 57.48	59.67/ 60.02

4-Carrier Config mode 2

Beam index 0 Boresight, 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	B1/C1	B1/C2	B1/C3	B1/C4	Total (per 400 MHz)
$BL4_{100}$	52.76/ 53.58	53.13/ 53.65	53.94/ 54.50	54.03/ 54.98	59.52/ 60.24

8-Carrier Config mode 1
Beam index 0 Boresight, Carrier Bandwidth 100 MHz, QPSK
Nominal rated output power (EIRP) per Beam: 53.0 dBm/ Polarization.

	Output power per 100 MHz, EIRP [RMS dBm] Vertical/ Horizontal									
Symbolic name	B1/C1	B1/C2	B1/C3	B1/C4	Total Power Beam 1 (per 400 MHz)	B2/C1	B2/C2	B2/C3	B2/C4	Total power Beam 2 (per 400 MHz)
$M8_{100}$	47.60/ 47.50	47.25/ 47.34	48.20/ 48.32	48.53/ 48.85	53.94/ 54.07	47.77/ 46.75	47.60/ 47.26	48.04/ 47.06	47.91/ 47.26	53.85/ 53.11

4-Carrier Config mode 0

Beam index 0 Boresight, Carrier Bandwidth 50 MHz, QPSK
Nominal rated output power (EIRP) per Beam: 47.0 dBm/ Polarization.

	Output power per 100 MHz, EIRP [RMS dBm] Vertical/ Horizontal			
Symbolic name	B1/C1	B2/C1	B3/C1	B4/C1
$BMT4_{50}$	47.52/ 48.66	47.73/ 47.67	47.95/ 47.62	47.27/ 47.19

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

Occupied bandwidth measurements according to CFR47 §2.1049

Date	Temperature	Humidity
2021-10-12	23 °C ± 3 °C	20 % ± 5 %
2021-10-18	23 °C ± 3 °C	14 % ± 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.

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 22240-20	BX92413
RF Cable	KWP04236
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	BL_{50}	Hor	45.837
1.2	BL_{50}	Ver	45.816

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

Diagram	Symbolic name	Polarization	Occupied BW (99%) [MHz]
1.3	TL_{100}	Hor	95.093
1.4	TL_{100}	Ver	95.156

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

Diagram	Symbolic name	Polarization	Occupied BW (99%) [MHz]
1.5	BL_{200}	Hor	189.504
1.6	BL_{200}	Ver	189.629

Carrier Aggregation, Config mode 1, Bandwidth: 8x 100MHz, Modulation: QPSK

Diagram	Symbolic name	Polarization	Occupied BW (99%) [MHz]
1.7	$M8_{100}$	Hor	791.497
1.8	$M8_{100}$	Ver	791.998

Diagram 1.1, BL_{50}, QPSK, Horizontal:

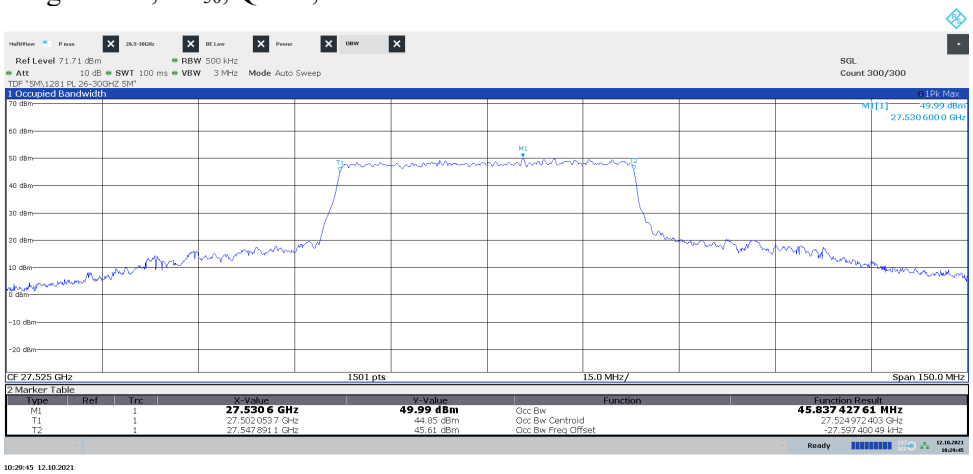


Diagram 1.2, BL_{50}, QPSK, Vertical::

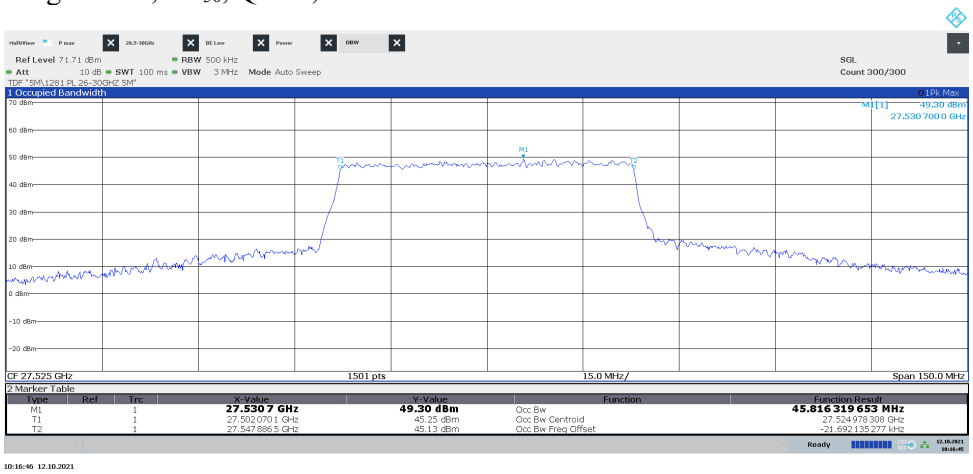


Diagram 1.3, TL_{100}, QPSK, Horizontal:

Diagram 1.4, TL_{100}, QPSK, Vertical::

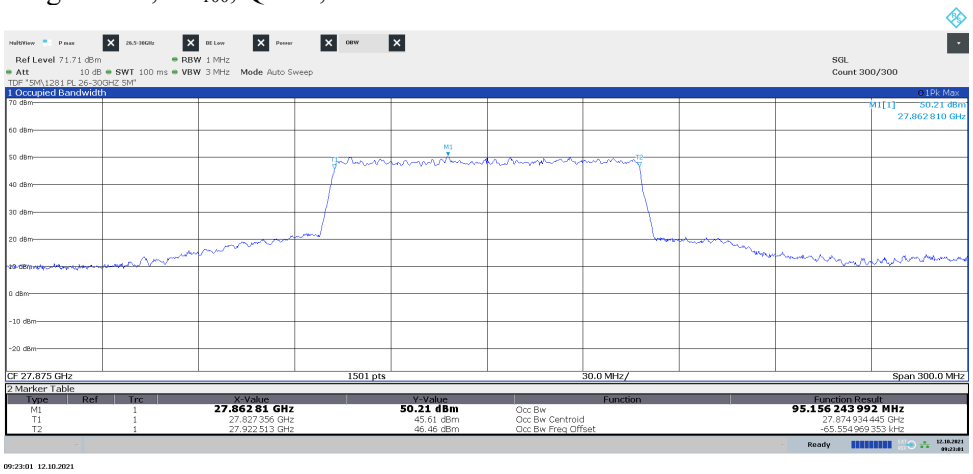


Diagram 1.5, BL_{200}, QPSK, Horizontal:

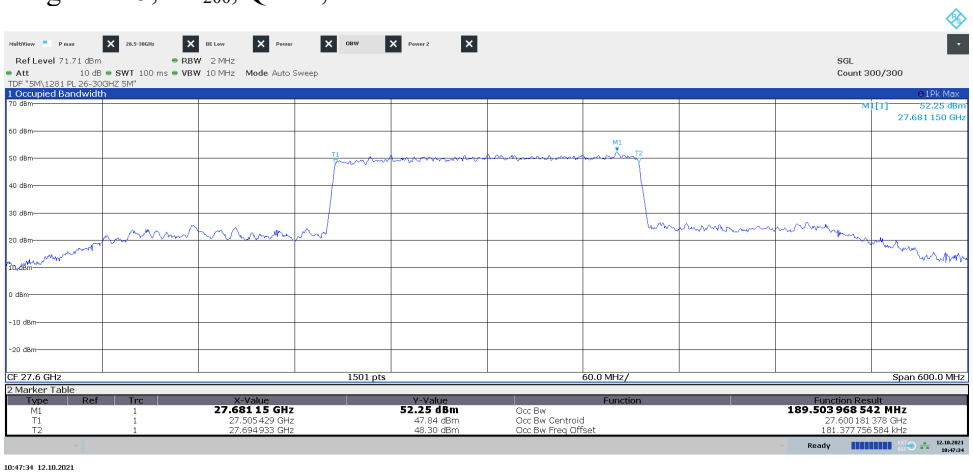


Diagram 1.6, BL_{200}, QPSK, Vertical::

Diagram 1.7, $M8_{100}$, QPSK, Horizontal:

Diagram 1.8, $M8_{100}$, QPSK, Vertical::

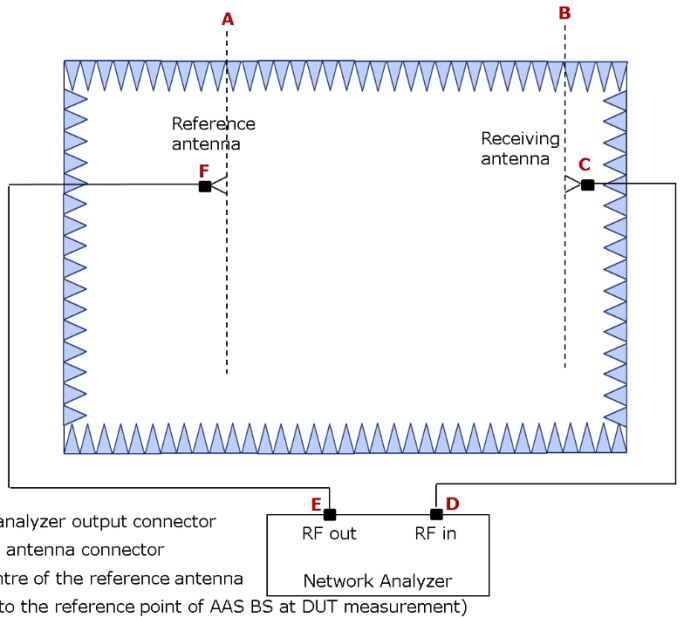
Field strength of spurious radiation measurements according to CFR 47 §30.203

Date	Temperature	Humidity
2021-10-06	23 °C ± 3 °C	40 % ± 5 %
2021-10-07	23 °C ± 3 °C	32 % ± 5 %
2021-10-08	23 °C ± 3 °C	30 % ± 5 %
2021-10-11	23 °C ± 3 °C	26 % ± 5 %
2021-10-18	23 °C ± 3 °C	14 % ± 5 %
2021-10-19	23 °C ± 3 °C	22 % ± 5 %
2021-10-20	23 °C ± 3 °C	41 % ± 5 %
2021-10-21	23 °C ± 3 °C	30 % ± 5 %
2021-10-22	23 °C ± 3 °C	19 % ± 5 %
2021-10-25	23 °C ± 3 °C	23 % ± 5 %
2021-10-26	23 °C ± 3 °C	28 % ± 5 %
2021-10-27	23 °C ± 3 °C	37 % ± 5 %
2021-10-28	23 °C ± 3 °C	36 % ± 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 descried below.

In the test range from 40 – 100 GHz
A propagation loss in free space was calculated. The used formula was
$\gamma = 20\log\left(\frac{4\pi D}{\lambda}\right)$, γ is the propagation loss and D is the antenna distance.
For 40 – 60 GHz *D* was 3.0 m and for 60 – 100 GHz *D* was 1.0 m.

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).



E: Network analyzer output connector
F: Reference antenna connector
A: Phase centre of the reference antenna
(aligned to the reference point of AAS BS at DUT measurement)
B: Phase centre of the receiving antenna
C: Receiving antenna connector
D: Network Analyzer input connection point
(the same as the measurement equipment connection point at DUT measurement)

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 20log|S21| (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+ΔTRP.
        (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:
    Conducted Power level (dBm) at any frequency/BW = Measured EIRP level (dBm)/BW – 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.

Rise Measurement equipment

Measurement equipment	RISE number
Anechoic chamber, Hertz	BX50194
R&S FSW 43	902 073
R&S ESU 26	901 553
R&S ZNB 40	BX50051
EMCO Horn Antenna 3116	503 279
Bilog antenna Schaffner 6143	504 079
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
Miteq, Low Noise Amplifier	503 278
EMCO Horn Antenna 3115	502 175
EMCO Horn Antenna 3115	902 212
µComp Nordic, Low Noise Amplifier	901 544
RF Cable	KWP04236
RF Cable	503 681
RF Cable FSW-B21	BX62069
RF Cable FSW-B21	BX62073
Temperature and humidity meter, Testo 615	503 498

EAB Measurement equipment

Calibrated at RISE before testing

	S/N
SWH010 HPF 30-40 GHz	ST010619225
SSL036 LPF 26.5 GHz	ST012717003

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.
Config mode 2:

Diagram	Symbolic name	Pol	Frequency range	Measurement method	"Early exit?"
2.1a	TL_{50}	Hor	30-1000 MHz	Pre scan Max hold EIRP	Yes
2.1b	TL_{50}	Ver	30-1000 MHz	Pre scan Max hold EIRP	Yes
2.2a	TL_{50}	Hor	1-18 GHz	Pre scan Max hold EIRP	Yes
2.2b	TL_{50}	Ver	1-18 GHz	Pre scan Max hold EIRP	Yes
2.3a	TH_{50}	Hor	18-26.5 GHz	Pre scan Max hold EIRP	No
2.3b	TH_{50}	Ver	18-26.5 GHz	Pre scan Max hold EIRP	No
2.3c	TH_{50}	Hor/Ver	26.11-26-21 GHz	Two cut TRP	Compliant to TRP limit
2.4a	BL_{50}	Hor	26.5-30 GHz	Pre scan Max hold EIRP	No[2]
2.4b	BL_{50}	Ver	26.5-30 GHz	Pre scan Max hold EIRP	No
2.4c	BL_{50}	Hor	26.5-27.51 GHz	Pre scan Max average EIRP	Yes[1,2]
2.4d	BL_{50}	Ver	26.5-27.51 GHz	Pre scan Max average EIRP	Yes[1]
2.5a	$BL2_{max50}$	Hor	26.5-30 GHz	Pre scan Max hold EIRP	No[2]
2.5b	$BL2_{max50}$	Ver	26.5-30 GHz	Pre scan Max hold EIRP	No
2.5c	$BL2_{max50}$	Hor	26.5-27.51 GHz	Pre scan Max average EIRP	No
2.5d	$BL2_{max50}$	Ver	26.5-27.51 GHz	Pre scan Max average EIRP	No
2.5e	$BL2_{max50}$	Hor/Ver	26.7-27.5 GHz	Pattern multiplication TRP	Compliant to TRP limit
2.6a	TL_{50}	Hor	27.625-28.225 GHz	Pre scan Max average EIRP	Yes[1]
2.6b	TL_{50}	Ver	27.625-28.225 GHz	Pre scan Max average EIRP	Yes[1]
2.7a	BH_{50}	Hor	27.625-28.225 GHz	Pre scan Max average EIRP	Yes[1]
2.7b	BH_{50}	Ver	27.625-28.225 GHz	Pre scan Max average EIRP	Yes[1]
2.8a	TH_{50}	Hor	26.5-30 GHz	Pre scan Max hold EIRP	No
2.8b	TH_{50}	Ver	26.5-30 GHz	Pre scan Max hold EIRP	No
2.8c	TH_{50}	Hor	28.34-29.5 GHz	Pre scan Max average EIRP	Yes[1]
2.8d	TH_{50}	Ver	28.34-29.5 GHz	Pre scan Max average EIRP	Yes[1]
2.8e	TH_{50}	Hor/Ver	27.41-27.5 GHz	Two cut TRP	Compliant to TRP limit

[1)] Calculated conducted power based on antenna gain below limit
[2)] Early Exit based on Lower EIRP compared to TH_{50} (Diagram 2.8) for the spurious at 27.46 GHz .

Diagram	Symbolic name	Pol	Frequency range	Measurement method	"Early exit?"
2.9a	$TH2_{50}$	Hor	26.5-30 GHz	Pre scan Max hold EIRP	No[2]
2.9b	$TH2_{50}$	Ver	26.5-30 GHz	Pre scan Max hold EIRP	No[2]
2.9c	$TH2_{50}$	Hor	28.34-29.5 GHz	Pre scan Max average EIRP	No
2.9d	$TH2_{50}$	Ver	28.34-29.5 GHz	Pre scan Max average EIRP	No
2.9e	$TH2_{50}$	Hor/Ver	28.35-28.85 GHz	Pattern multiplication TRP	Compliant to TRP limit
2.10a	BL_{50}	Hor	30-40 GHz	Pre scan Max hold EIRP	No
2.10b	BL_{50}	Ver	30-40 GHz	Pre scan Max hold EIRP	No
2.10c	BL_{50}	Hor/Ver	30.55-30.65 GHz	Two cut TRP	Yes
2.11a	TL_{50}	Hor	40-60 GHz	Pre scan Max hold EIRP	Yes
2.11b	TL_{50}	Ver	40-60 GHz	Pre scan Max hold EIRP	Yes
2.12a	TL_{50}	Hor	60-80 GHz	Pre scan Max hold EIRP	Yes
2.12b	TL_{50}	Ver	60-80 GHz	Pre scan Max hold EIRP	Yes
2.13a	TL_{50}	Hor	80-100 GHz	Pre scan Max hold EIRP	Yes
2.13b	TL_{50}	Ver	80-100 GHz	Pre scan Max hold EIRP	Yes

[1)] Calculated conducted power based on antenna gain below limit.
[2)] Early Exit based on Lower EIRP compared to TH_{50} (Diagram 2.8) for the spurious at 27.46 GHz.

Config mode 1:

Diagram	Symbolic name	Pol	Frequency range	Measurement method	"Early exit?"
2.14a	$M8_{100}$	Hor	30-1000 MHz	Pre scan Max hold EIRP	Yes
2.14b	$M8_{100}$	Ver	30-1000 MHz	Pre scan Max hold EIRP	Yes
2.15a	$M8_{100}$	Hor	1-18 GHz	Pre scan Max hold EIRP	Yes
2.15b	$M8_{100}$	Ver	1-18 GHz	Pre scan Max hold EIRP	Yes
2.16a	$M8_{100}$	Hor	18-26.5 GHz	Pre scan Max hold EIRP	Yes[3]
2.16b	$M8_{100}$	Ver	18-26.5 GHz	Pre scan Max hold EIRP	Yes[3]
2.17a	$M8_{100}$	Hor	26.5-30 GHz	Pre scan Max hold EIRP	Yes[2,4,5]
2.17b	$M8_{100}$	Ver	26.5-30 GHz	Pre scan Max hold EIRP	Yes[4,5]
2.18a	$M8_{100}$	Hor	30-40 GHz	Pre scan Max hold EIRP	Yes
2.18b	$M8_{100}$	Ver	30-40 GHz	Pre scan Max hold EIRP	Yes
2.19a	$M8_{100}$	Hor	40-60 GHz	Pre scan Max hold EIRP	Yes
2.19b	$M8_{100}$	Ver	40-60 GHz	Pre scan Max hold EIRP	Yes
2.20a	$M8_{100}$	Hor	60-80 GHz	Pre scan Max hold EIRP	Yes
2.20b	$M8_{100}$	Ver	60-80 GHz	Pre scan Max hold EIRP	Yes
2.21a	$M8_{100}$	Hor	80-100 GHz	Pre scan Max hold EIRP	Yes
2.21b	$M8_{100}$	Ver	80-100 GHz	Pre scan Max hold EIRP	Yes

[2)] Early Exit based on Lower EIRP compared to TH_{50} (Diagram 2.8) for the spurious at 27.46 GHz.
[3)] Early Exit based on Lower EIRP compared to TH_{50} (Diagram 2.3) for the spurious at 26.16 GHz.
[4)] Early Exit based on Lower EIRP compared to $BL2_{max50}$ (Diagram 2.5).
[5)] Early Exit based on Lower EIRP compared to $TH2_{50}$ (Diagram 2.9).

Config mode 0:

Diagram	Symbolic name	Pol	Frequency range	Measurement method	"Early exit?"
2.22a	$BMT4_{50}$	Hor	30-1000 MHz	Pre scan Max hold EIRP	Yes
2.22b	$BMT4_{50}$	Ver	30-1000 MHz	Pre scan Max hold EIRP	Yes
2.23a	$BMT4_{50}$	Hor	1-18 GHz	Pre scan Max hold EIRP	Yes
2.23b	$BMT4_{50}$	Ver	1-18 GHz	Pre scan Max hold EIRP	Yes
2.24a	$BMT4_{50}$	Hor	18-26.5 GHz	Pre scan Max hold EIRP	Yes[3]
2.24b	$BMT4_{50}$	Ver	18-26.5 GHz	Pre scan Max hold EIRP	Yes[3]
2.25a	$BMT4_{50}$	Hor	26.5-30 GHz	Pre scan Max hold EIRP	Yes[4,5]
2.25b	$BMT4_{50}$	Ver	26.5-30 GHz	Pre scan Max hold EIRP	Yes[4,5]
2.26a	$BMT4_{50}$	Hor	30-40 GHz	Pre scan Max hold EIRP	Yes
2.26b	$BMT4_{50}$	Ver	30-40 GHz	Pre scan Max hold EIRP	Yes
2.27a	$BMT4_{50}$	Hor	40-60 GHz	Pre scan Max hold EIRP	Yes
2.27b	$BMT4_{50}$	Ver	40-60 GHz	Pre scan Max hold EIRP	Yes
2.28a	$BMT4_{50}$	Hor	60-80 GHz	Pre scan Max hold EIRP	Yes
2.28b	$BMT4_{50}$	Ver	60-80 GHz	Pre scan Max hold EIRP	Yes
2.29a	$BMT4_{50}$	Hor	80-100 GHz	Pre scan Max hold EIRP	Yes
2.29b	$BMT4_{50}$	Ver	80-100 GHz	Pre scan Max hold EIRP	Yes

[3)] Early Exit based on Lower EIRP compared to TH_{50} (Diagram 2.3) for the spurious at 26.16 GHz.
[4)] Early Exit based on Lower EIRP compared to $BL2_{max50}$ (Diagram 2.5).
[5)] Early Exit based on Lower EIRP compared to $TH2_{50}$ (Diagram 2.9).

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 – 100 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.

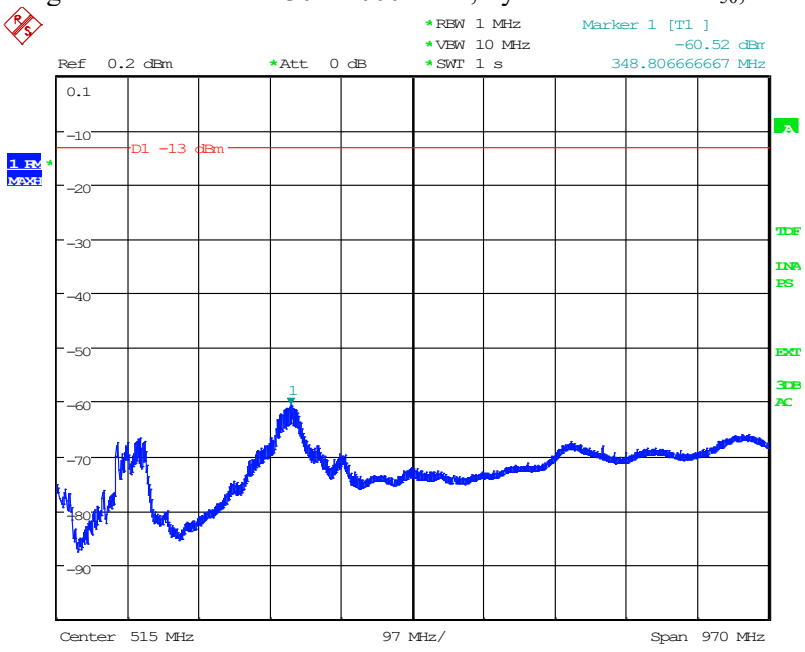
(b)(1) Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater.

(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.

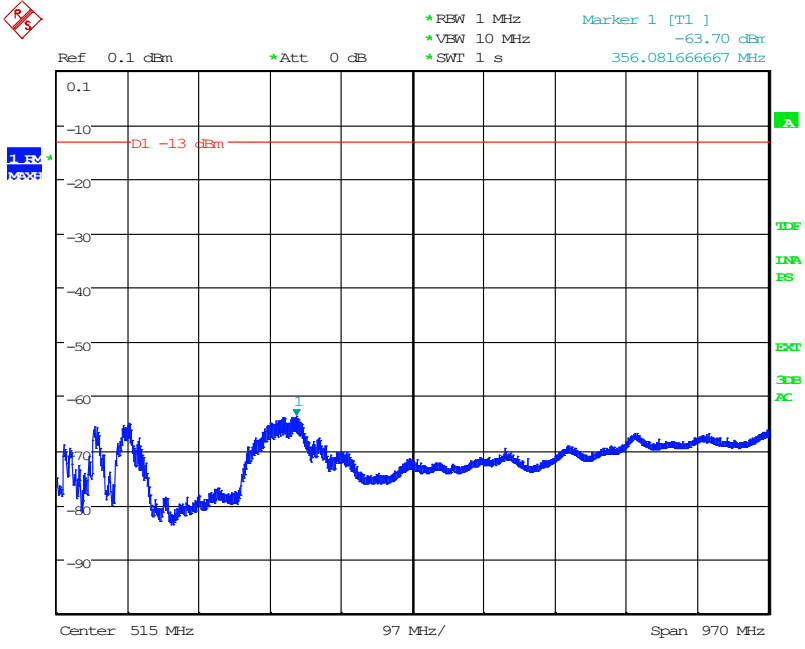
Complies?	Yes

Diagram 2.1a: Pre scan 30 – 1000 MHz, Symbolic name: TL_{50}, EIRP Horizontal polarization



Date: 27.OCT.2021 16:49:54

Diagram 2.1b: Pre scan 30 – 1000 MHz, Symbolic name: TL_{50}, EIRP Vertical polarization



Date: 27.OCT.2021 16:29:59

Diagram 2.2a: Pre scan 1 – 18 GHz, Symbolic name: TL_{50}, EIRP Horizontal polarization

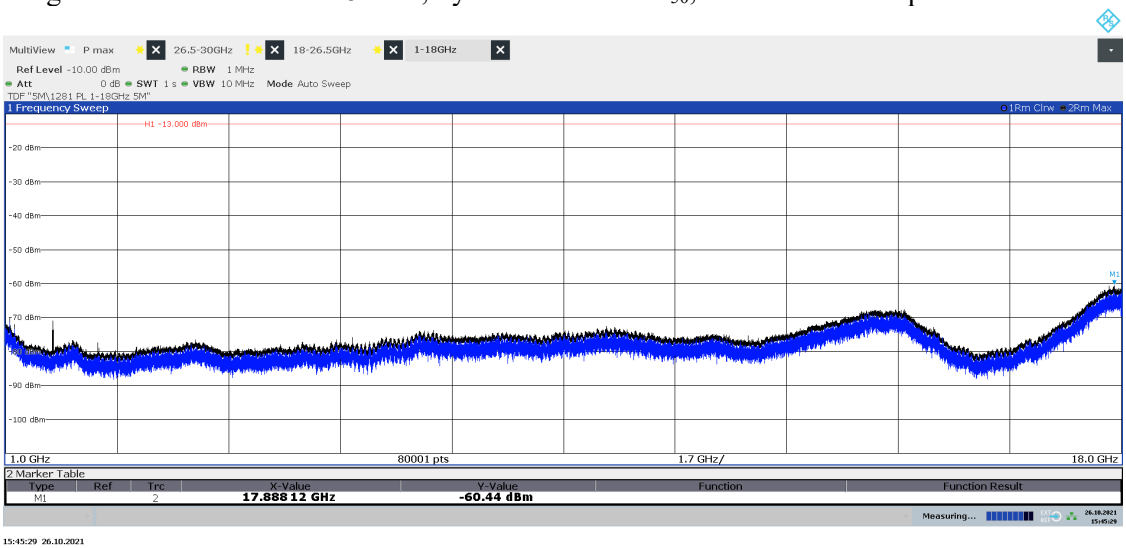


Diagram 2.2b: Pre scan 1 – 18 GHz, Symbolic name: TL_{50}, EIRP Vertical polarization

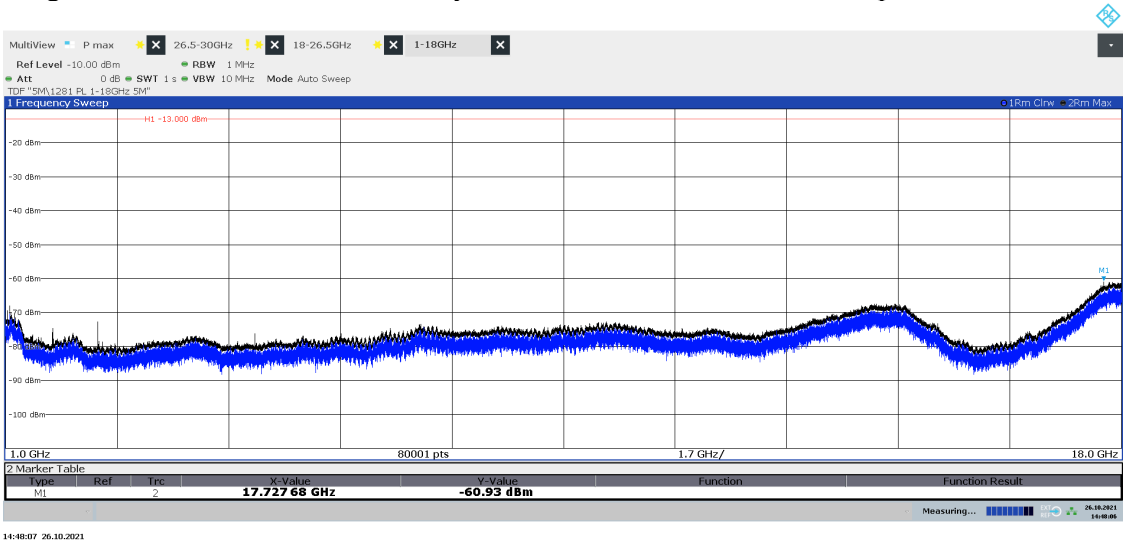


Diagram 2.3a: Pre scan 18 – 26.5 GHz, Symbolic name: TH_{50}, EIRP Horizontal polarization
See diagram 2.3c for TRP result

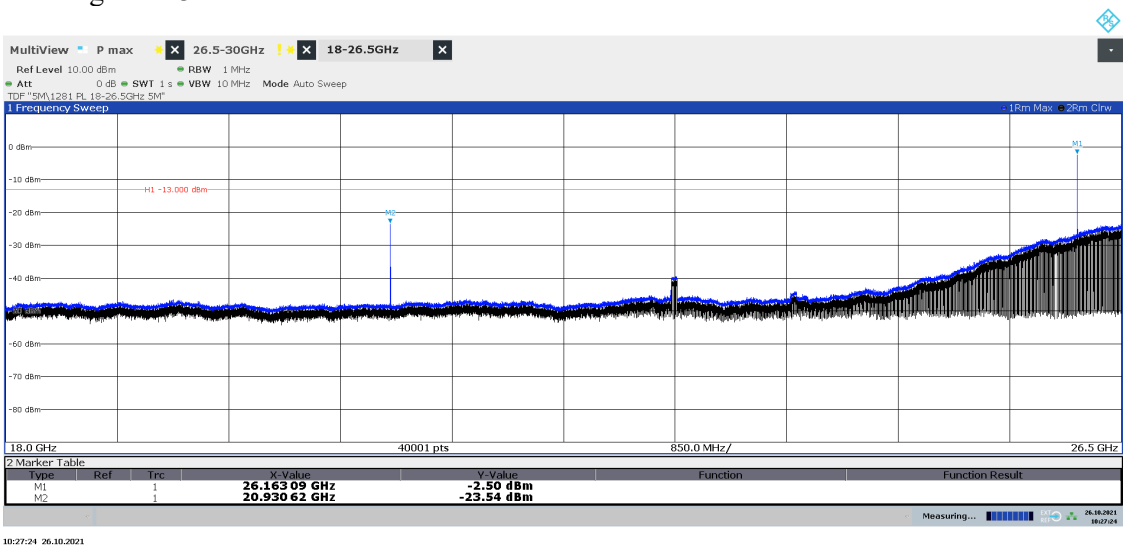


Diagram 2.3b: Pre scan 18 – 26.5 GHz, Symbolic name: TH_{50}, EIRP Vertical polarization
See diagram 2.3c for TRP result

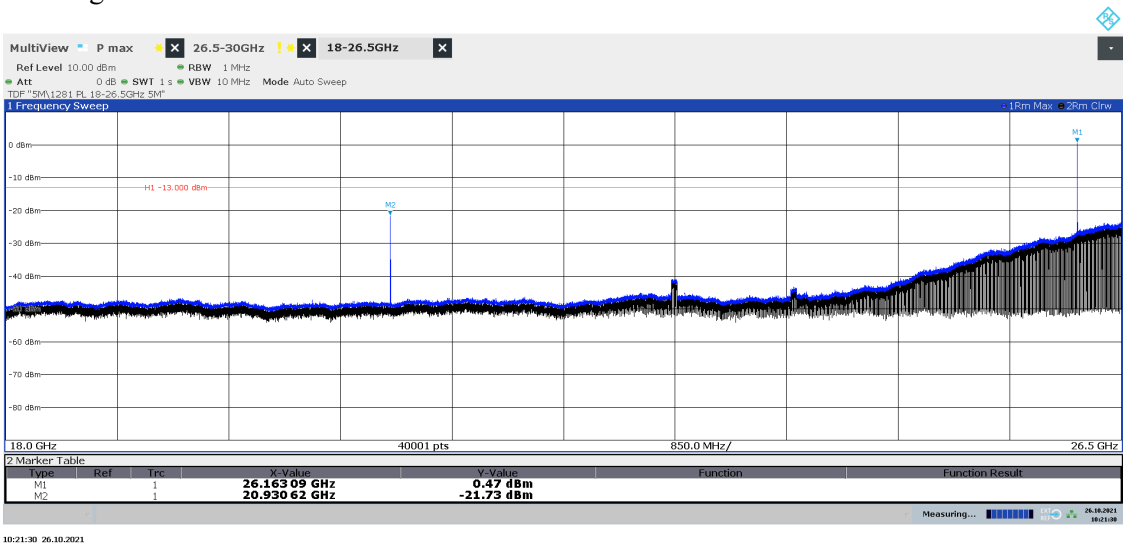


Diagram 2.3c: Two cut TRP 26.11 – 26.21 GHz 5x LO, Symbolic name: TH_{50}

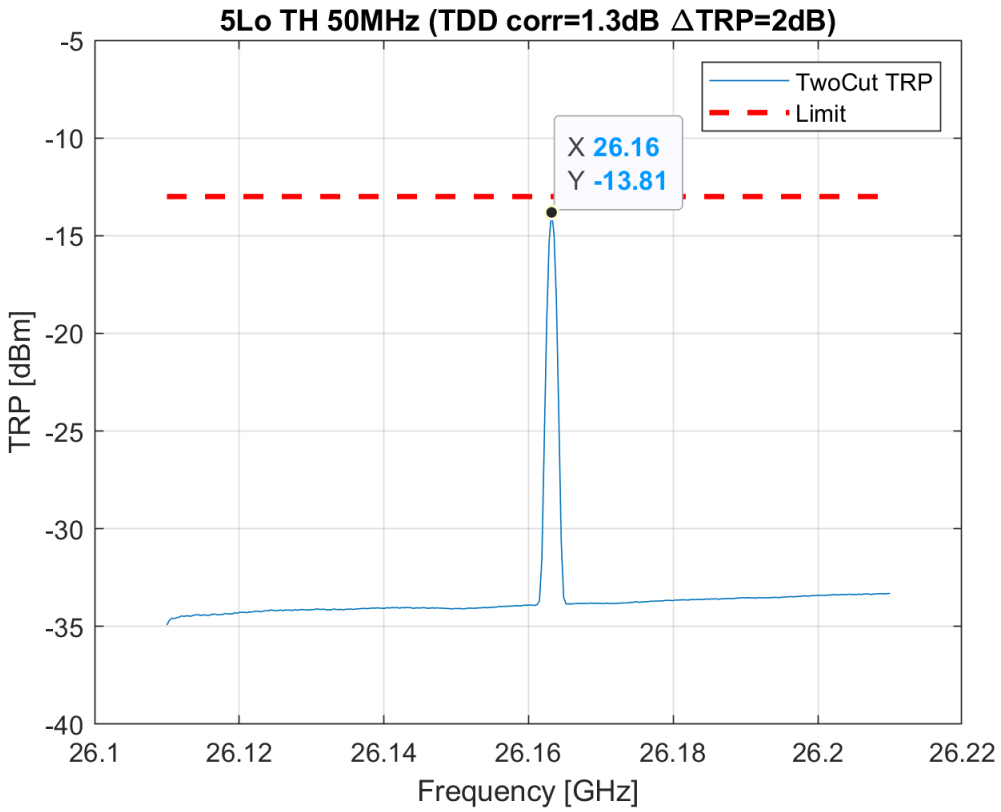


Diagram 2.4a: Pre scan 26.5 – 30.0 GHz, Symbolic name: BL_{50}, EIRP Horizontal polarization

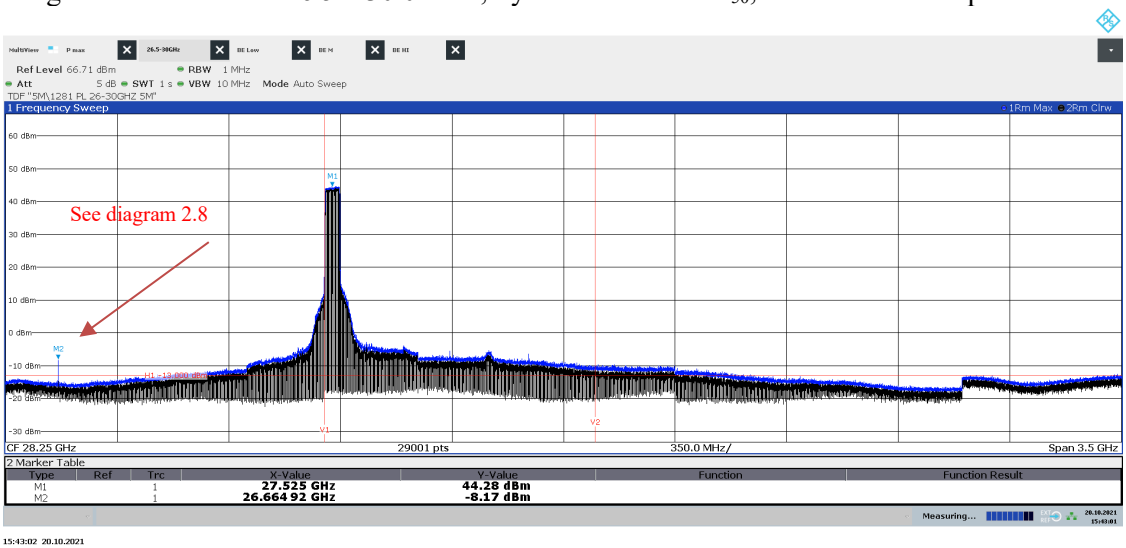


Diagram 2.4b: Pre scan 26.5 – 30.0 GHz, Symbolic name: BL_{50}, EIRP Vertical polarization

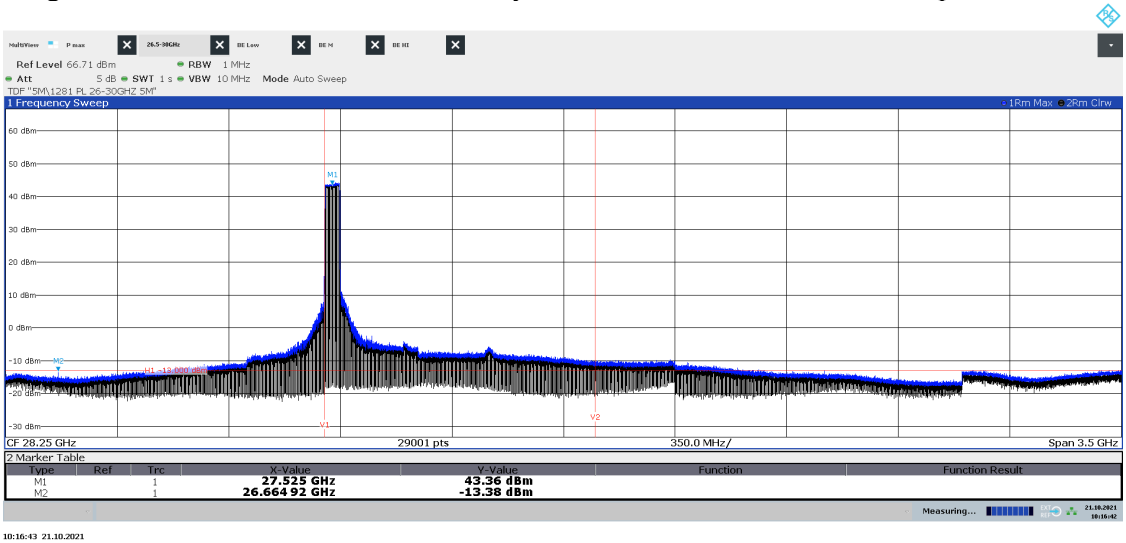


Diagram 2.4c: Pre scan 27.00 – 27.51 GHz, Symbolic name: BL_{50}, EIRP Horizontal polarization

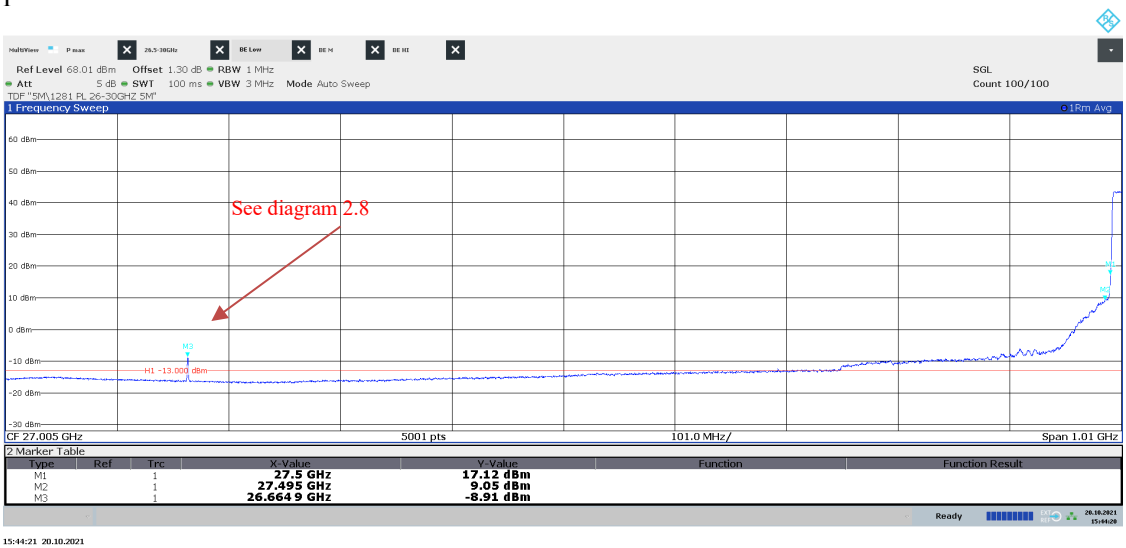


Diagram 2.4d: Pre scan 27.00 – 27.51 GHz, Symbolic name: BL_{50}, EIRP Vertical polarization

Power EIRP for 27.5GHz Hor/ Ver [dBm]	Power EIRP for 27.495 GHz Hor/ Ver [dBm]	Antenna Gain Hor/ Ver [dBi]	Total conducted power/BW for 27.5 GHz (Limit -5 dBm) [dBm]/ Verdict	Total conducted power/BW for 27.495 GHz (Limit -13 dBm) [dBm]/ Verdict
17.12/ 15.95	9.05/ 3.85	31.67/ 31.63	-14.55/ Pass	-22.62/ Pass

Diagram 2.5a: Pre scan 26.5 – 30.0 GHz, Symbolic name: $BL2_{max50}$, EIRP Horizontal polarization
See diagram 2.5e for TRP result

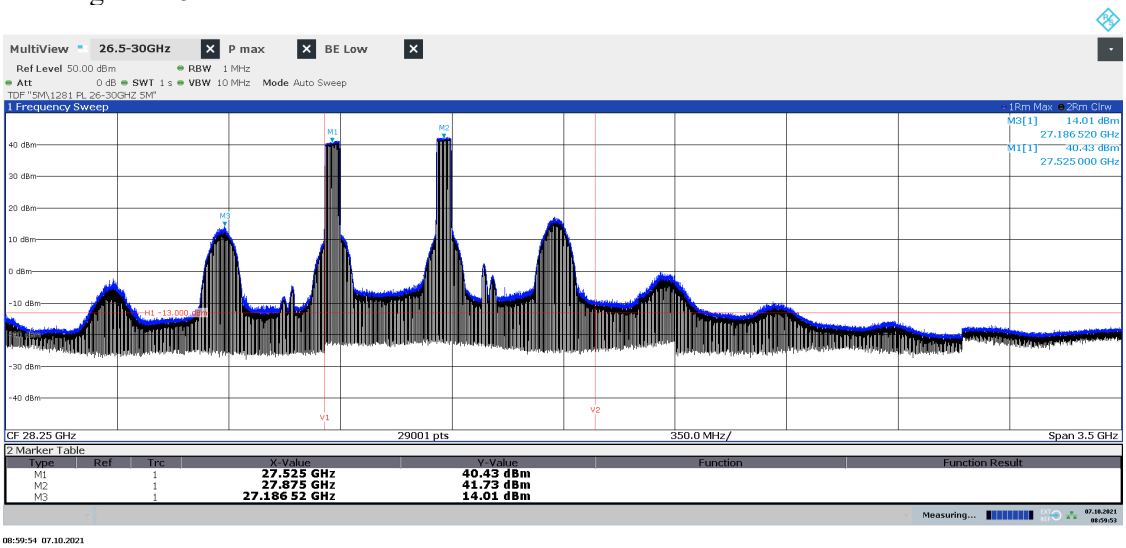


Diagram 2.5b: Pre scan 26.5 – 30.0 GHz, Symbolic name: $BL2_{max50}$, EIRP Vertical polarization
See diagram 2.5e for TRP result

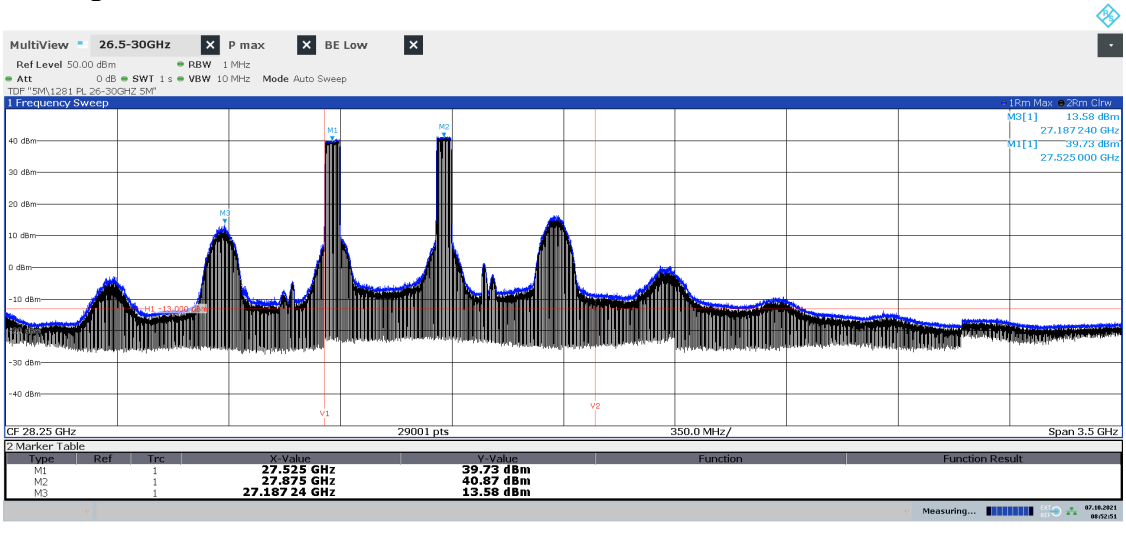


Diagram 2.5c: Pre scan 26.5 – 27.51 GHz, Symbolic name: $BL2_{max50}$, EIRP Horizontal polarization
See diagram 2.5e for TRP result

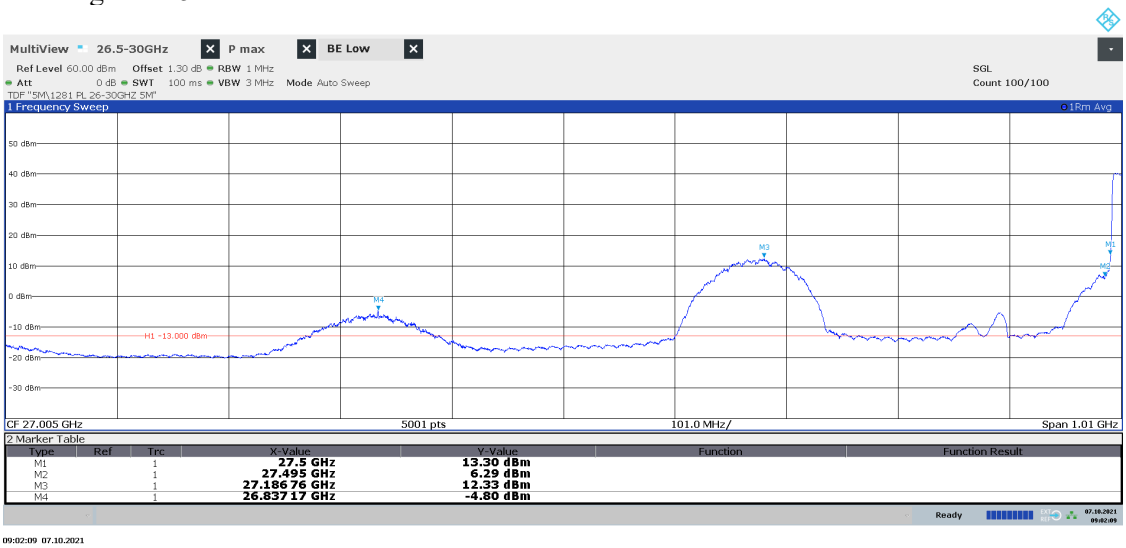
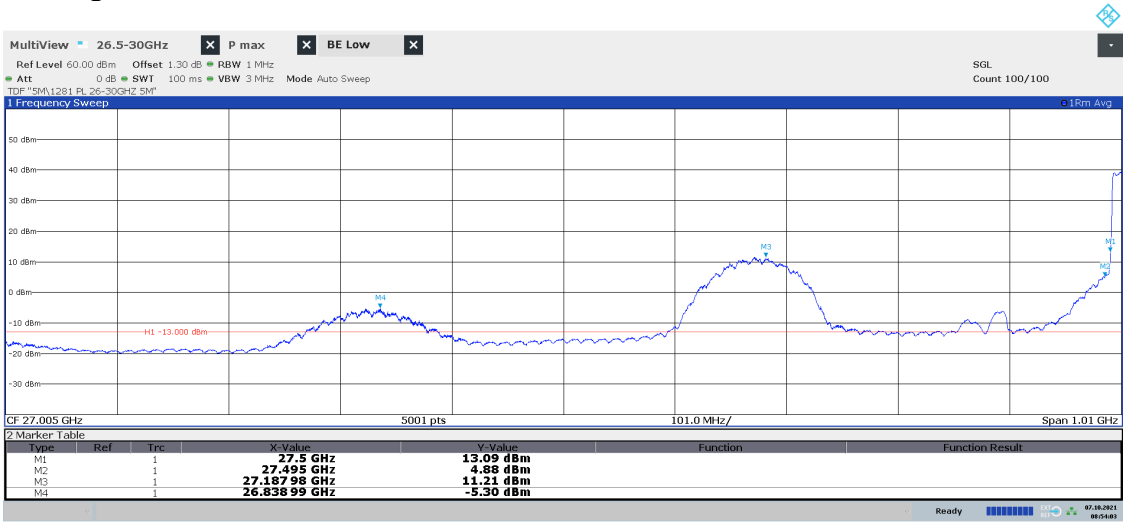


Diagram 2.5d: Pre scan 26.5 – 27.51 GHz, Symbolic name: $BL2_{max50}$, EIRP Vertical polarization
See diagram 2.5e for TRP result



Power EIRP for 27.5GHz Hor/ Ver [dBm]	Power EIRP for 27.495 GHz Hor/ Ver [dBm]	Antenna Gain Hor/ Ver [dBi]	Total conducted power/BW for 27.5 GHz (Limit -5 dBm) [dBm]/ Verdict	Total conducted power/BW for 27.495 GHz (Limit -13 dBm) [dBm]/ Verdict
13.30/ 13.09	6.29/ 4.88	31.67/ 31.63	-18.37/ Pass	-25.38/ Pass

Diagram 2.5e: Pre scan 26.7 – 27.5 GHz, Symbolic name: $BL2_{max50}$, EIRP Vertical polarization

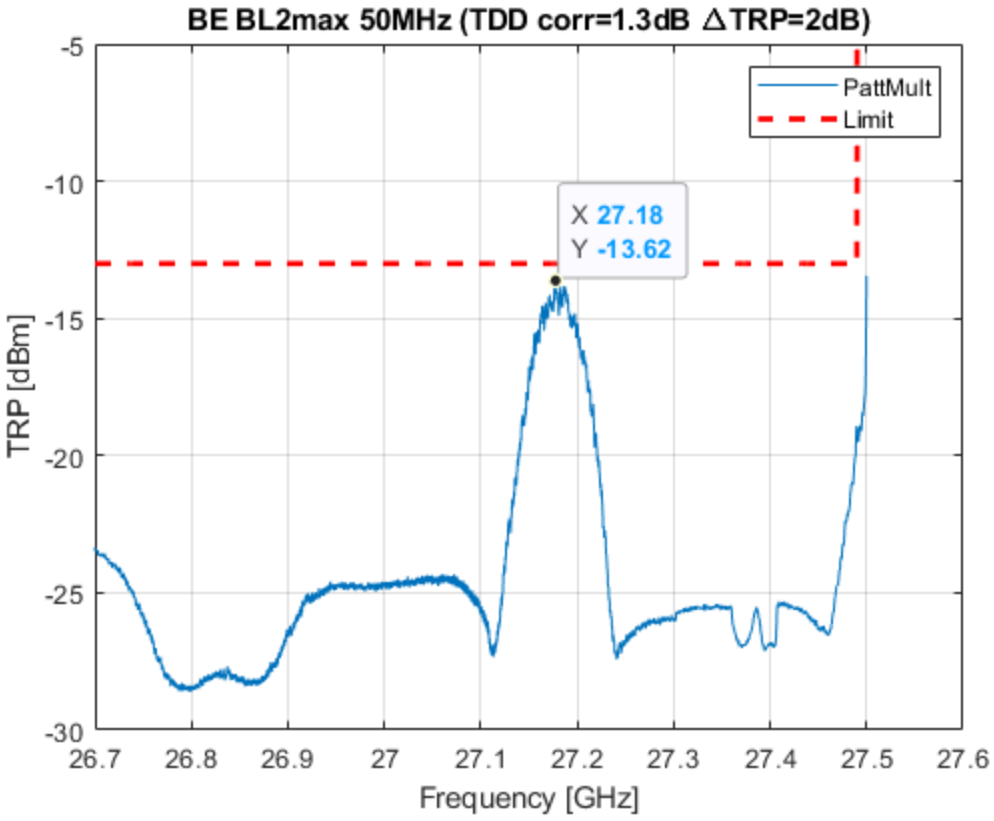


Diagram 2.6a: Pre scan 27.625 – 28.225 GHz, Symbolic name: TL_{50}, EIRP Horizontal polarization

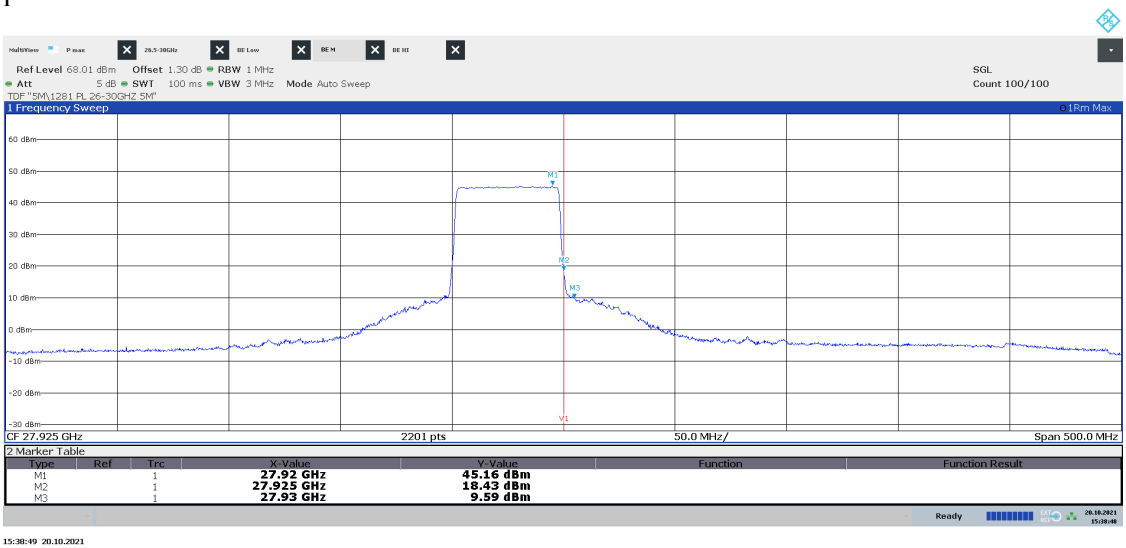


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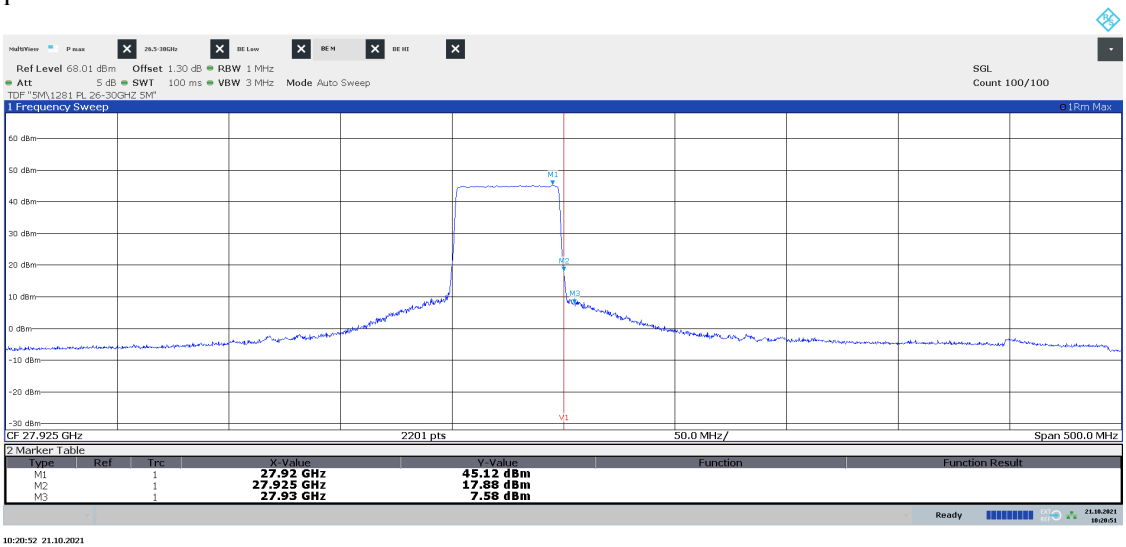
Diagram 2.6b: Pre scan 27.625 – 28.225 GHz, Symbolic name: TL_{50}, EIRP Vertical polarization



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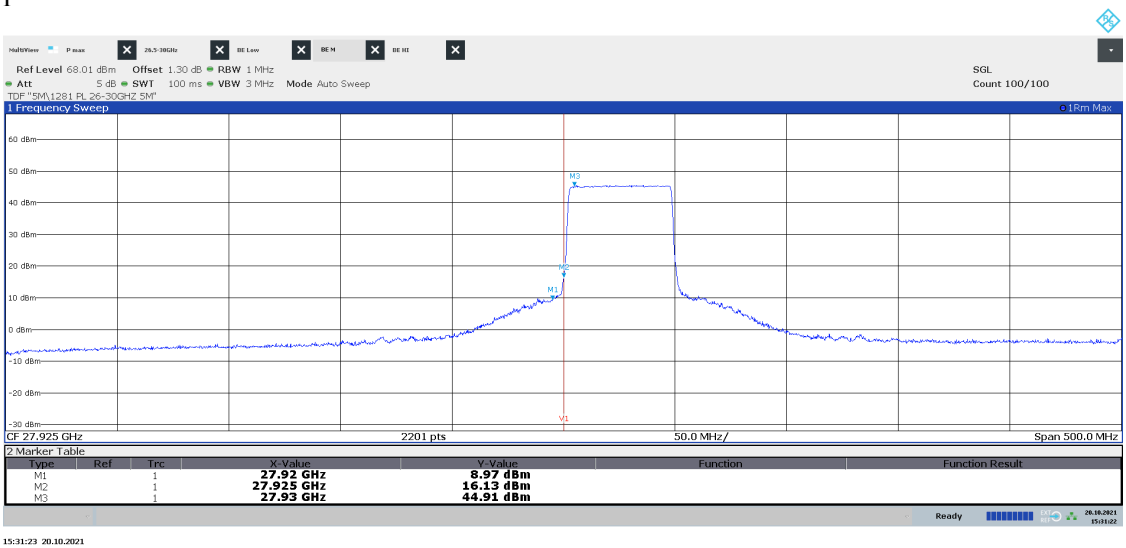
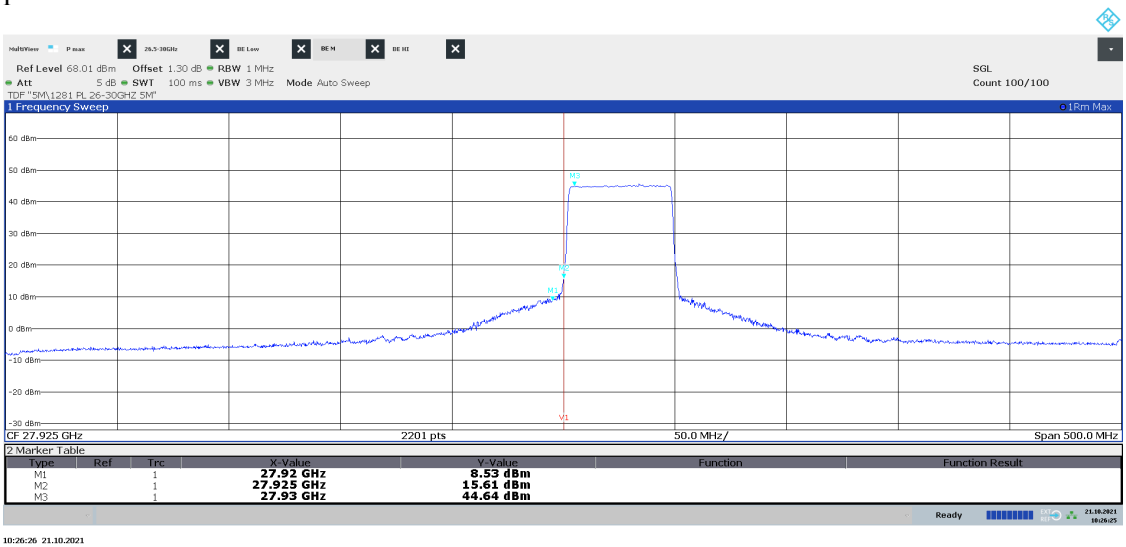
Power EIRP for 27.925 GHz Hor/ Ver [dBm]	Power EIRP for 27.93 GHz Hor/ Ver [dBm]	Antenna Gain Hor/ Ver [dBi]	Total conducted power/BW for 27.925 GHz (Limit -5 dBm) [dBm]/ Verdict	Total conducted power/BW for 27.93 GHz (Limit -13 dBm) [dBm]/ Verdict
18.43/ 17.88	9.59/ 7.58	31.83/ 31.75	-10.62/ Pass	-20.09/ Pass

Diagram 2.7a: Pre scan 27.625 – 28.225 GHz, Symbolic name: BH_{50}, EIRP Horizontal polarization



15:31:23 20.10.2021

Diagram 2.7b: Pre scan 27.625 – 28.225 GHz, Symbolic name: BH_{50}, EIRP Vertical polarization



10:26:26 21.10.2021

Power EIRP for 27.925 GHz Hor/ Ver [dBm]	Power EIRP for 27.92 GHz Hor/ Ver [dBm]	Antenna Gain Hor/ Ver [dBi]	Total conducted power/BW for 27.925 GHz (Limit -5 dBm) [dBm]/ Verdict	Total conducted power/BW for 27.92 GHz (Limit -13 dBm) [dBm]/ Verdict
16.13/ 15.61	8.97/ 8.53	31.83/ 31.75	-12.90/ Pass	-20.03/ Pass

Diagram 2.8a: Pre scan 26.5 – 30.0 GHz, Symbolic name: TH_{50}, EIRP Horizontal polarization
See diagram 2.8e for TRP result

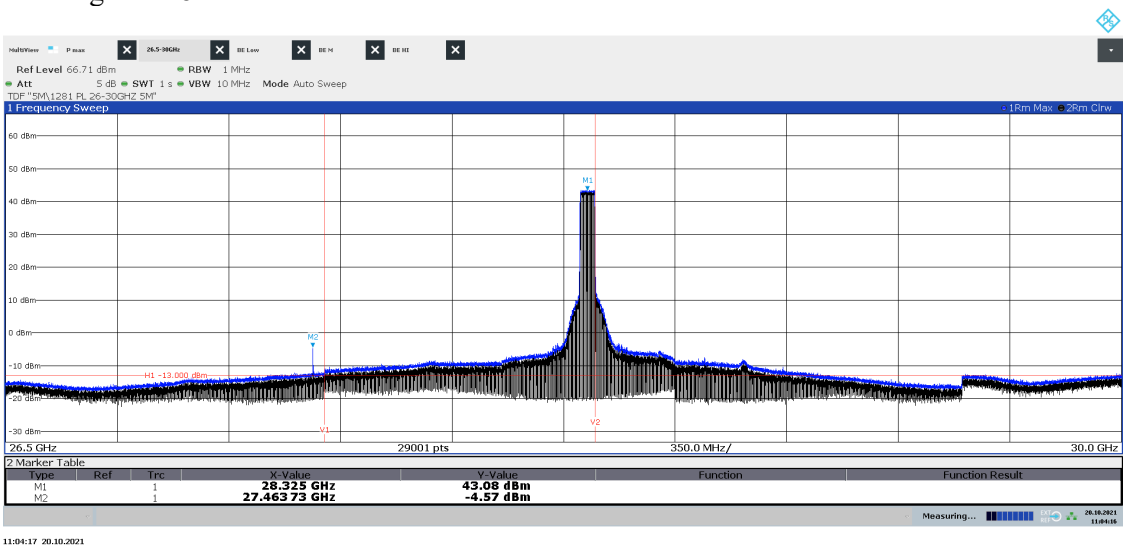


Diagram 2.8b: Pre scan 26.5 – 30.0 GHz, Symbolic name: TH_{50}, EIRP Vertical polarization
See diagram 2.8e for TRP result

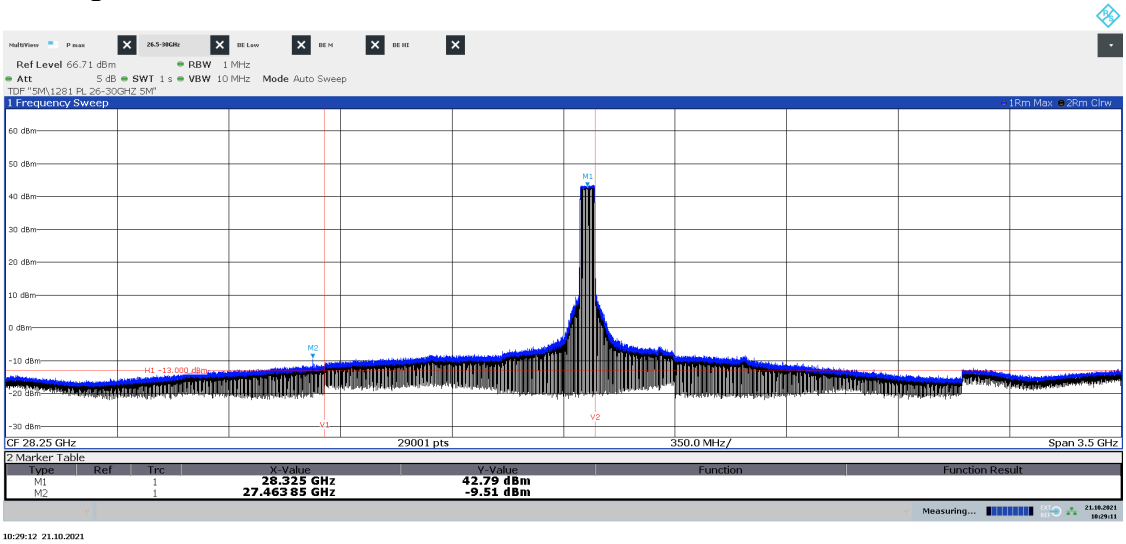


Diagram 2.8c: Pre scan 28.34 – 29.5GHz, Symbolic name: TH_{50}, EIRP Horizontal polarization

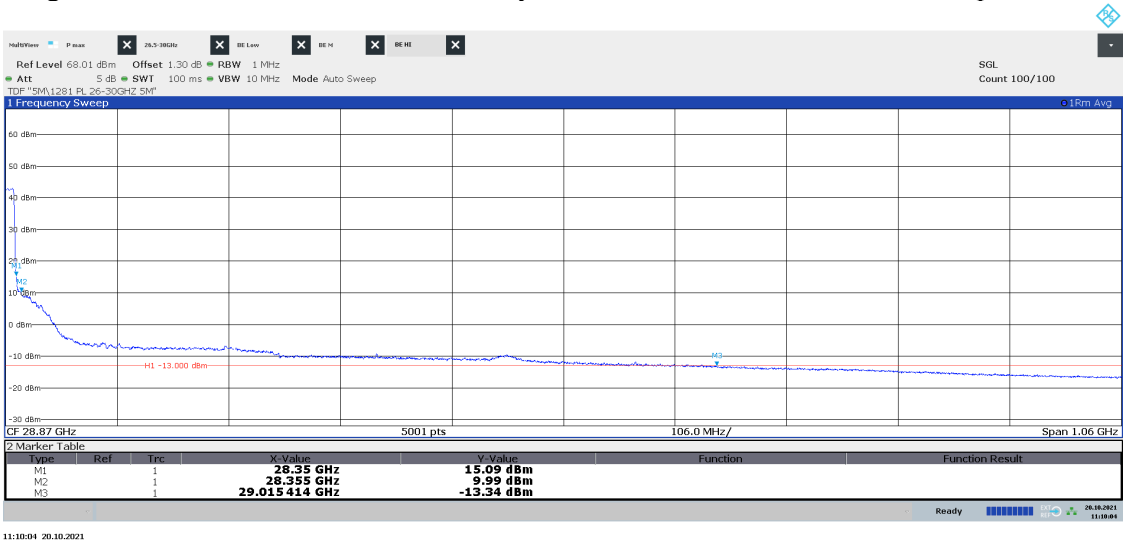
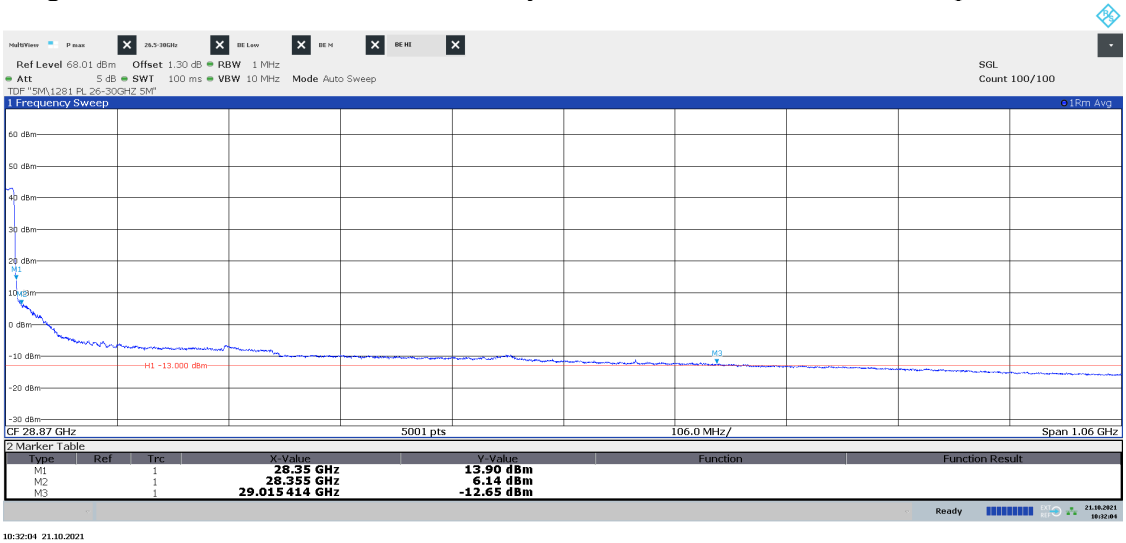


Diagram 2.8d: Pre scan 28.34 – 29.5 GHz, Symbolic name: TH_{50}, EIRP Vertical polarization



Power EIRP for 28.35 GHz Hor/ Ver [dBm]	Power EIRP for 28.355 GHz Hor/ Ver [dBm]	Antenna Gain Hor/ Ver [dBi]	Total conducted power/BW for 28.35 GHz (Limit -5 dBm) [dBm]/ Verdict	Total conducted power/BW for 28.355 GHz (Limit -13 dBm) [dBm]/ Verdict
15.09/ 13.90	9.99/ 6.14	31.95/ 31.92	-14.39/ Pass	-20.45/ Pass

Diagram 2.8e: Pre scan 27.41 – 27.50 GHz, Symbolic name: TH_{50}, EIRP Horizontal polarization

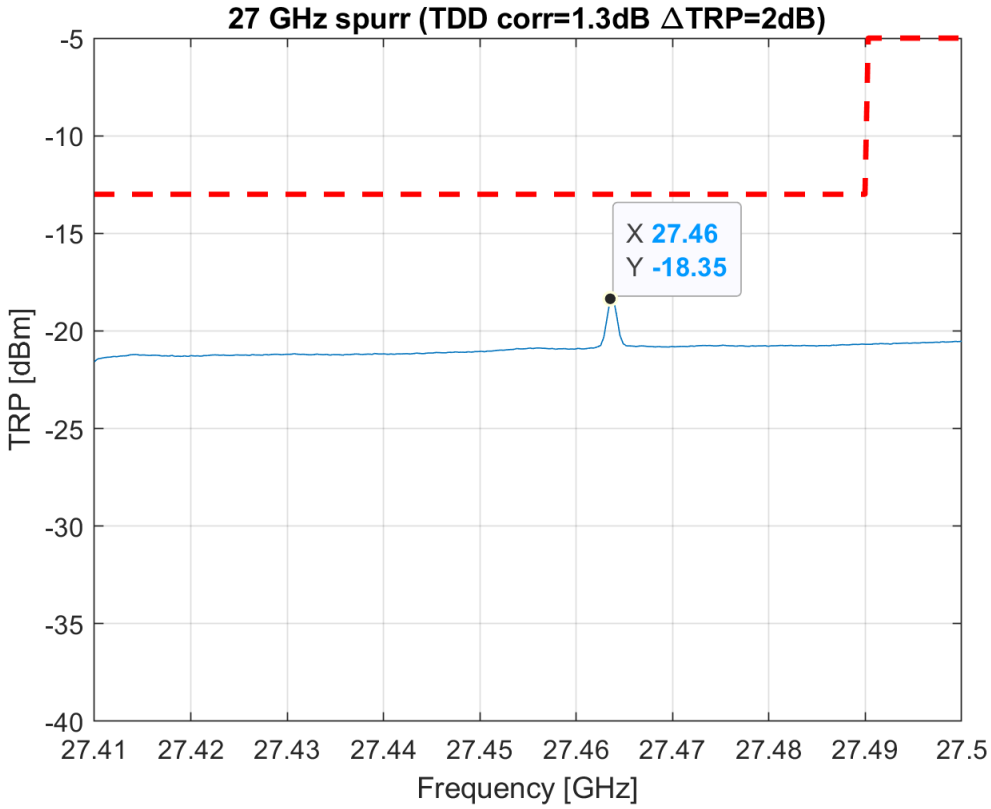


Diagram 2.9a: Pre scan 26.5 – 30 GHz, Symbolic name: $TH2_{50}$, EIRP Horizontal polarization
See diagram 2.9e for TRP result

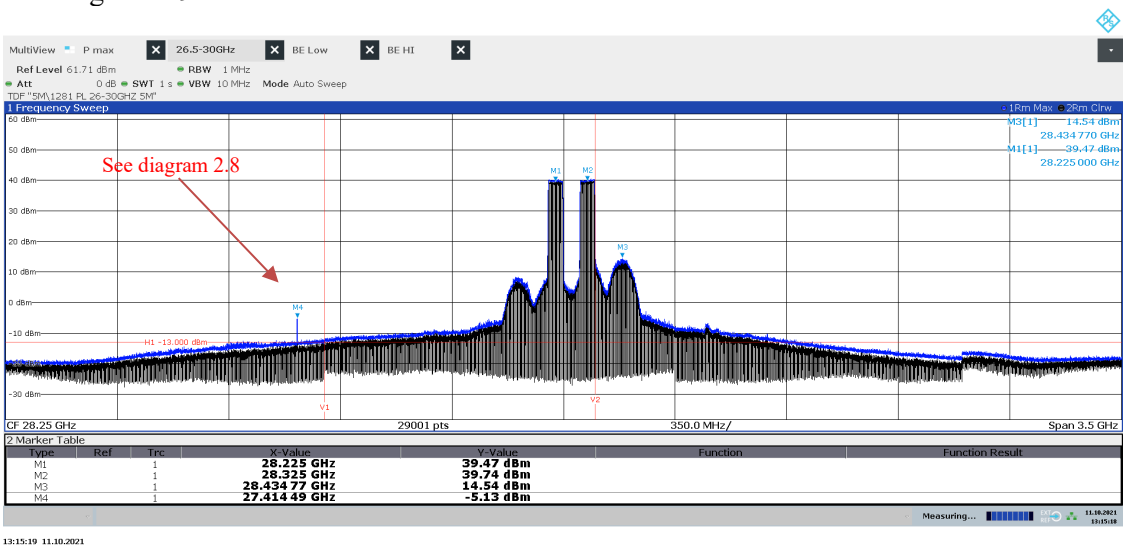


Diagram 2.9b: Pre scan 26.5 – 30 GHz, Symbolic name: $TH2_{50}$, EIRP Vertical polarization
See diagram 2.9e for TRP result

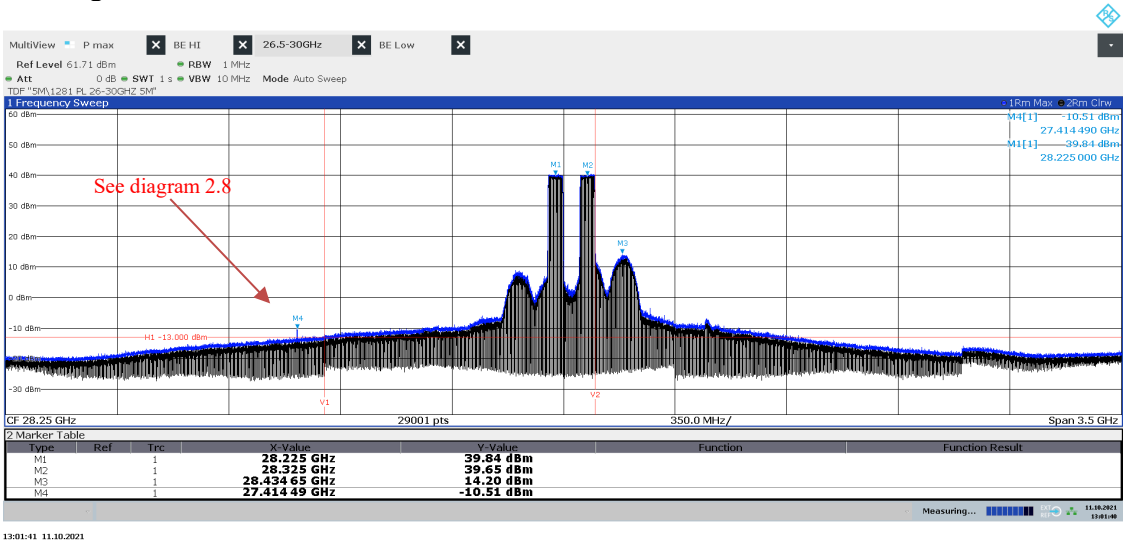


Diagram 2.9c: Pre scan 28.34 – 29.5 GHz, Symbolic name: $TH2_{50}$, EIRP Horizontal polarization
See diagram 2.9e for TRP result

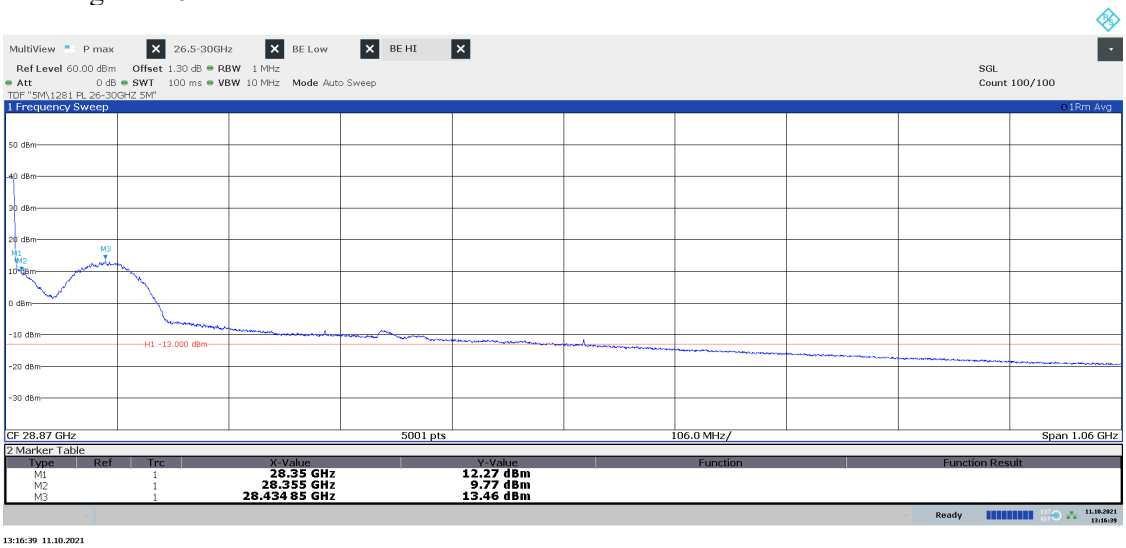
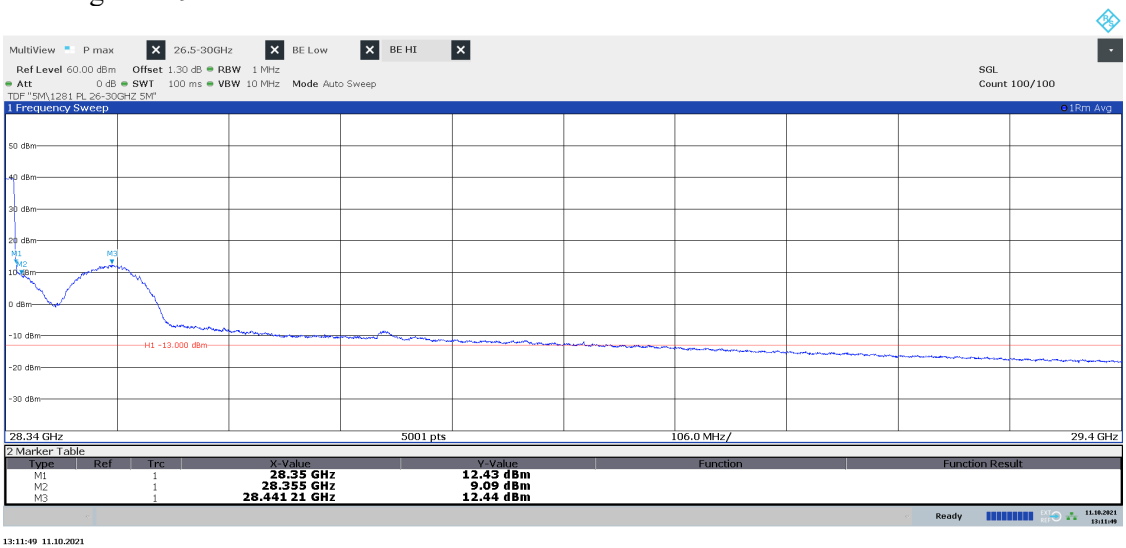


Diagram 2.9d: Pre scan 28.34 – 29.5 GHz, Symbolic name: $TH2_{50}$, EIRP Vertical polarization
See diagram 2.9e for TRP result



Power EIRP for 28.35 GHz Hor/ Ver [dBm]	Power EIRP for 28.355 GHz Hor/ Ver [dBm]	Antenna Gain Hor/ Ver [dBi]	Total conducted power/BW for 28.35 GHz (Limit -5 dBm) [dBm]/ Verdict	Total conducted power/BW for 28.355 GHz (Limit -13 dBm) [dBm]/ Verdict
12.27/ 12.43	9.77/ 9.09	31.95/ 31.92	-16.57/ Pass	-19.48/ Pass

Diagram 2.9e: Pattern multiplication TRP 28.35 – 28.85 GHz, Symbolic name: $Tim3_{50}$

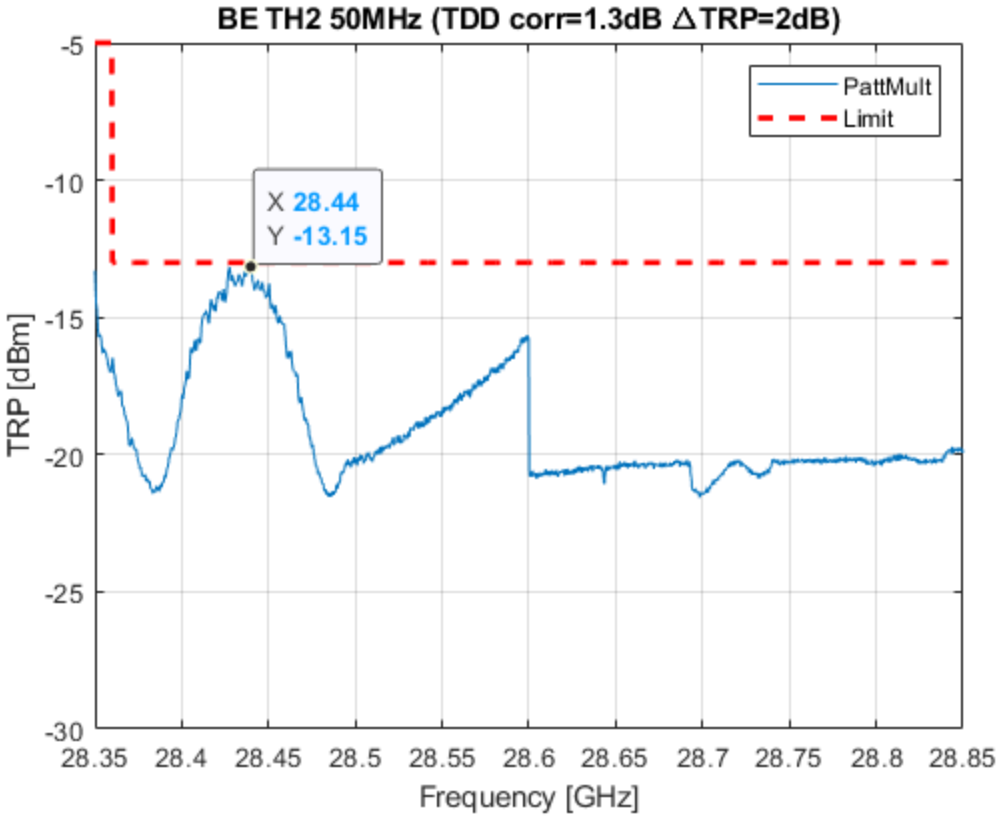


Diagram 2.10a: Pre scan 30 – 40 GHz, Symbolic name: BL_{50}, EIRP Horizontal polarization
See diagram 2.10c for TRP result

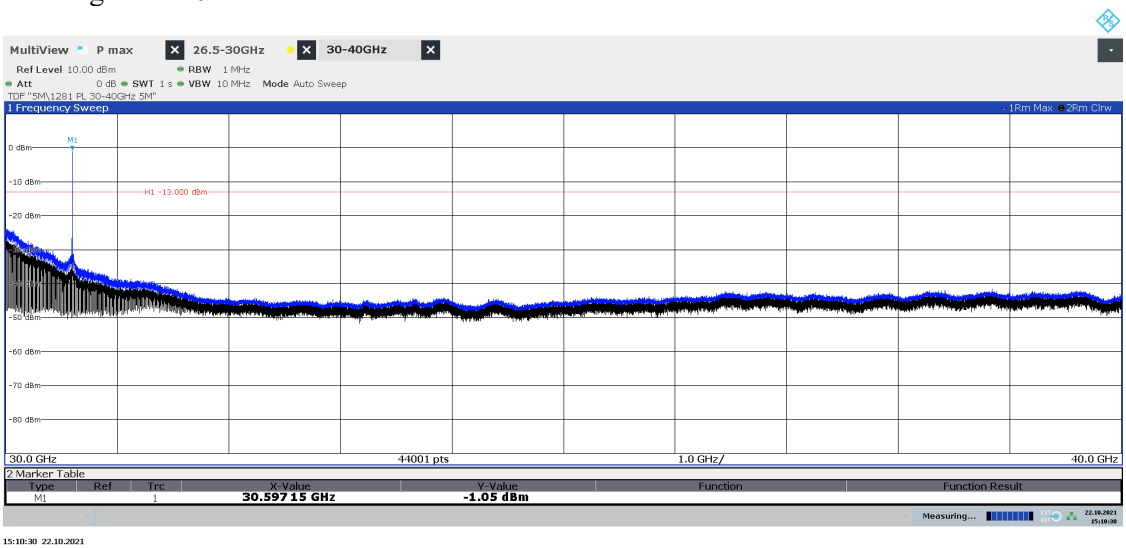


Diagram 2.10b: Pre scan 30 – 40 GHz, Symbolic name: BL_{50}, EIRP Vertical polarization
See diagram 2.10c for TRP result

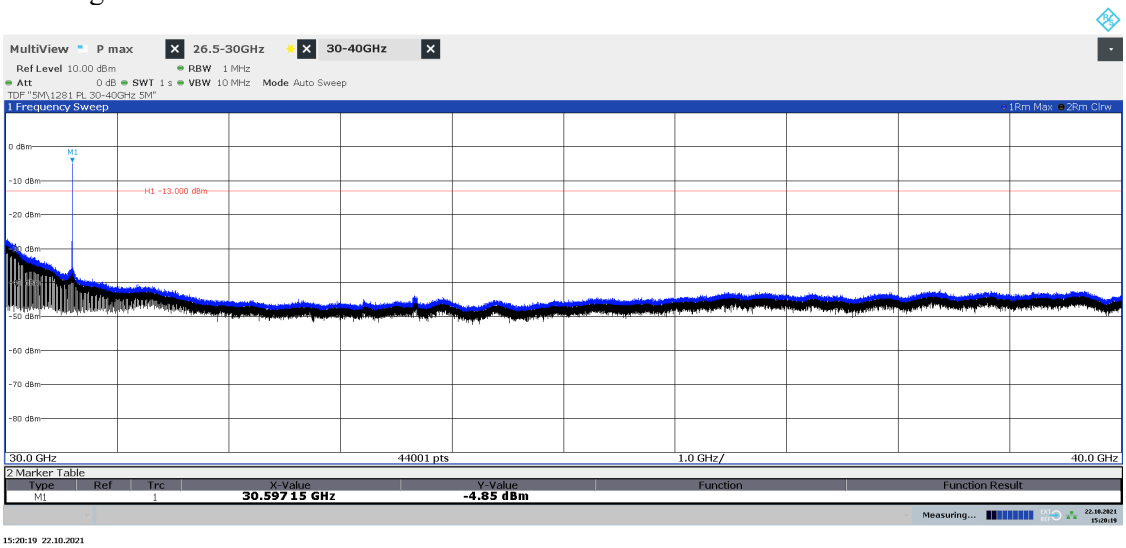


Diagram 2.10c: Two cut TRP 30.571 – 30.671 GHz 6x LO, Symbolic name: BL_{50}

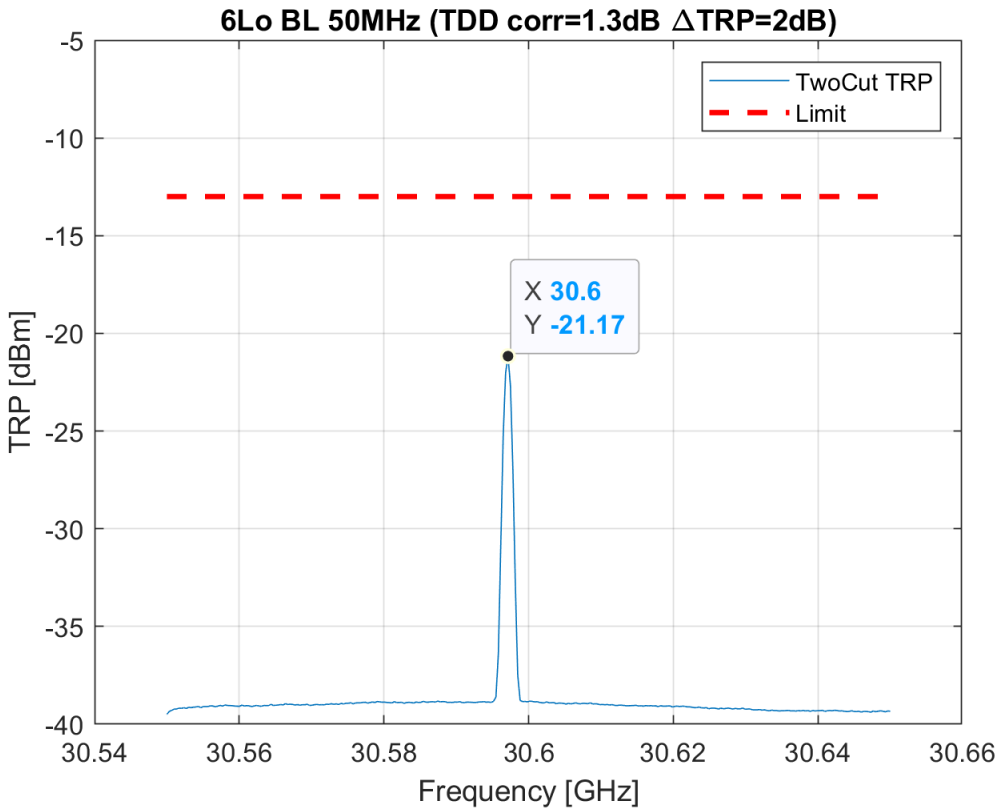


Diagram 2.11a: Pre scan 40 – 60 GHz, Symbolic name: TL_{50}, EIRP Horizontal polarization

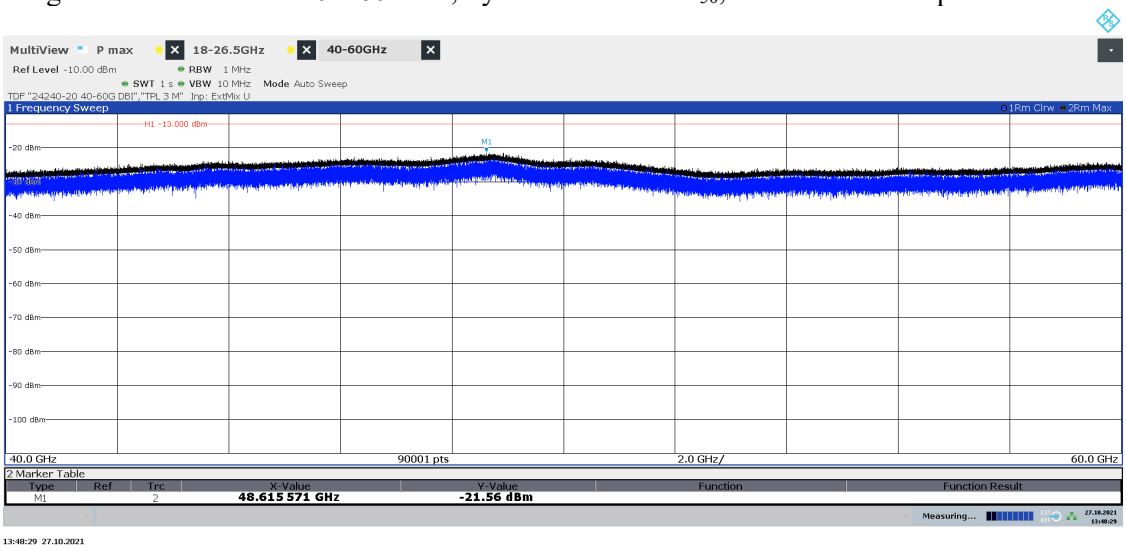


Diagram 2.11b: Pre scan 40 – 60 GHz, Symbolic name: TL_{50}, EIRP Vertical polarization

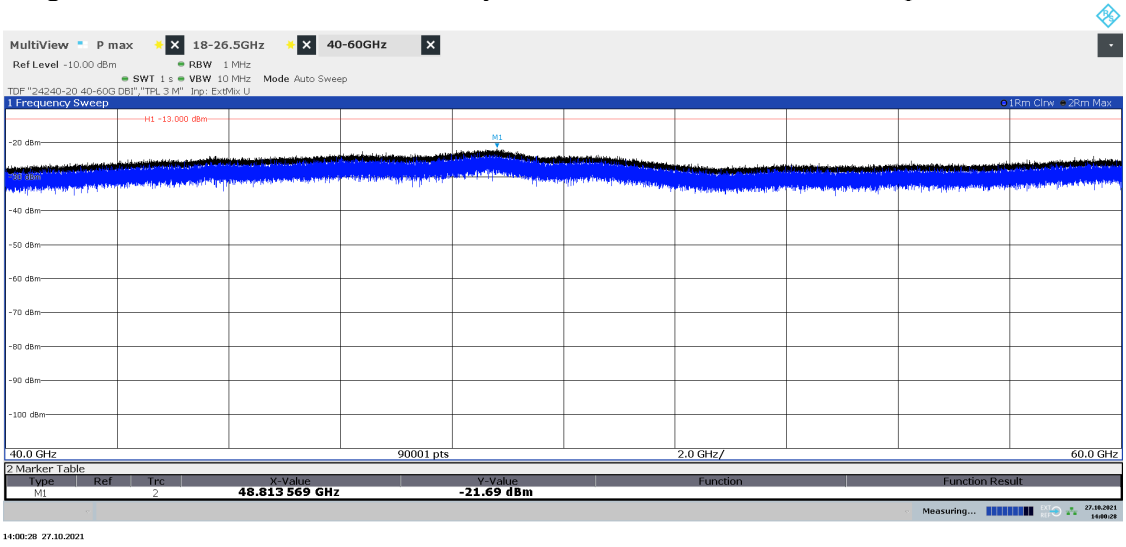


Diagram 2.12a: Pre scan 60 – 80 GHz, Symbolic name: TL_{50}, EIRP Horizontal polarization

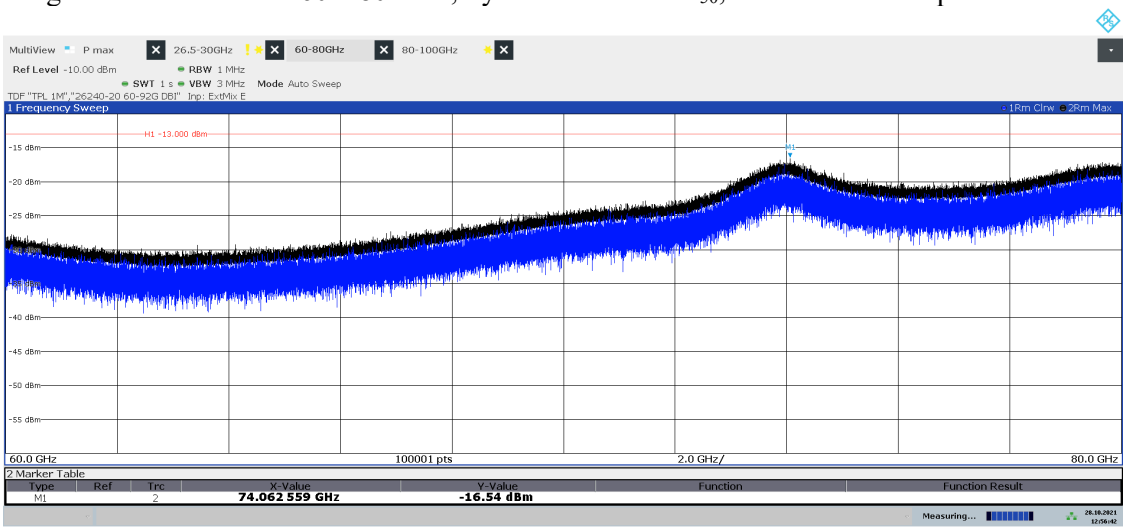


Diagram 2.12b: Pre scan 60 – 80 GHz, Symbolic name: TL_{50}, EIRP Vertical polarization

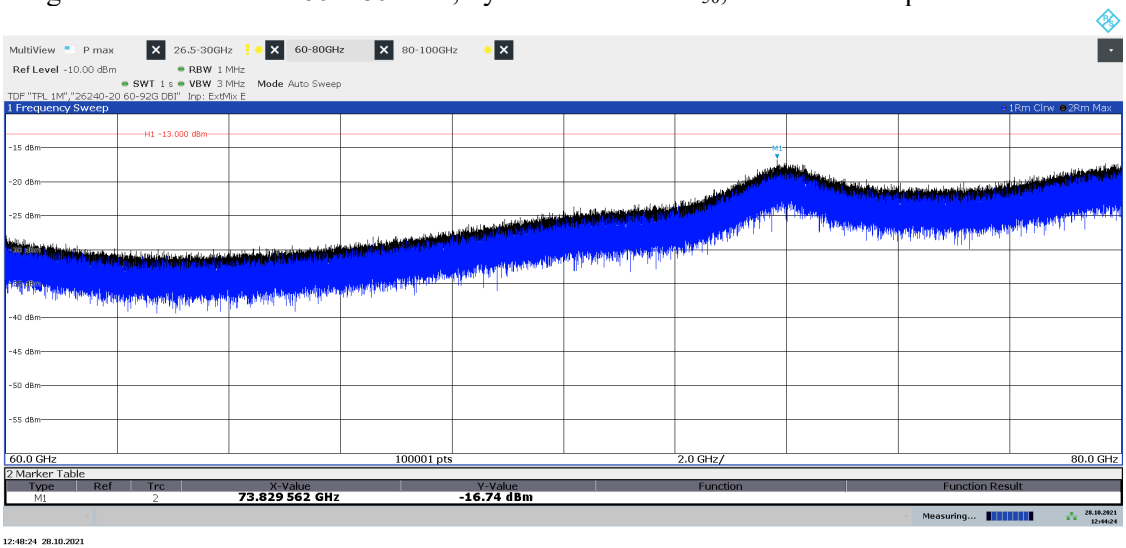


Diagram 2.13a: Pre scan 80 – 100 GHz, Symbolic name: TL_{50}, EIRP Horizontal polarization

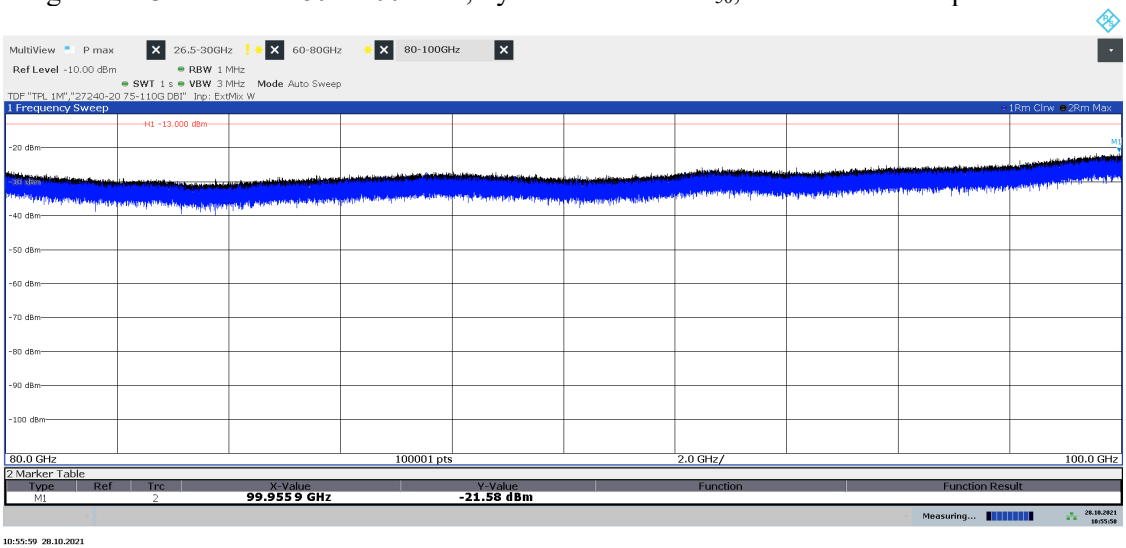


Diagram 2.13b: Pre scan 80 – 100 GHz, Symbolic name: TL_{50}, EIRP Vertical polarization

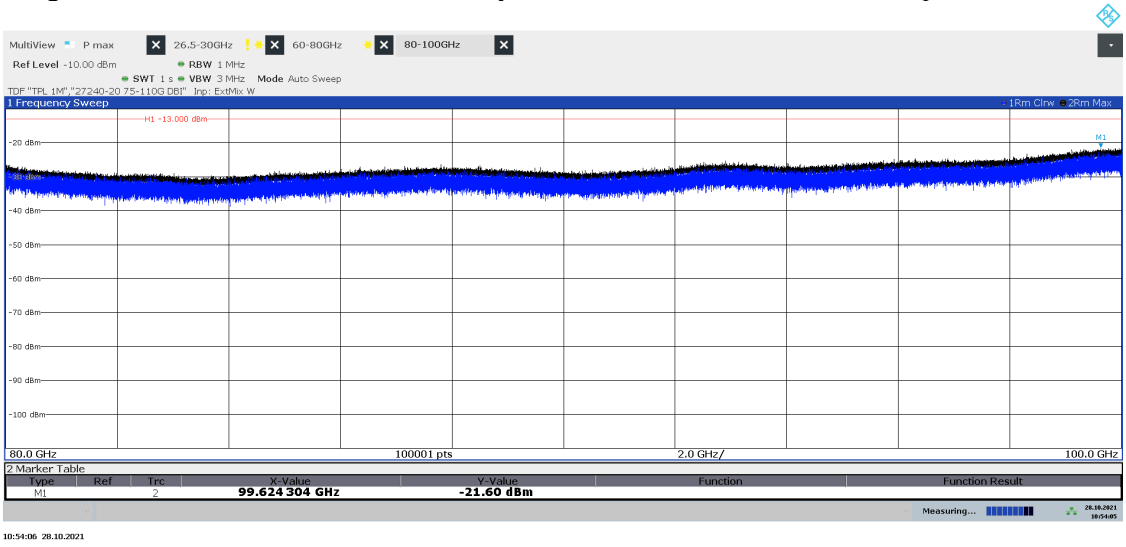


Diagram 2.14a: Pre scan 30 – 1000 MHz, Symbolic name: $M8_{100}$, EIRP Horizontal polarization

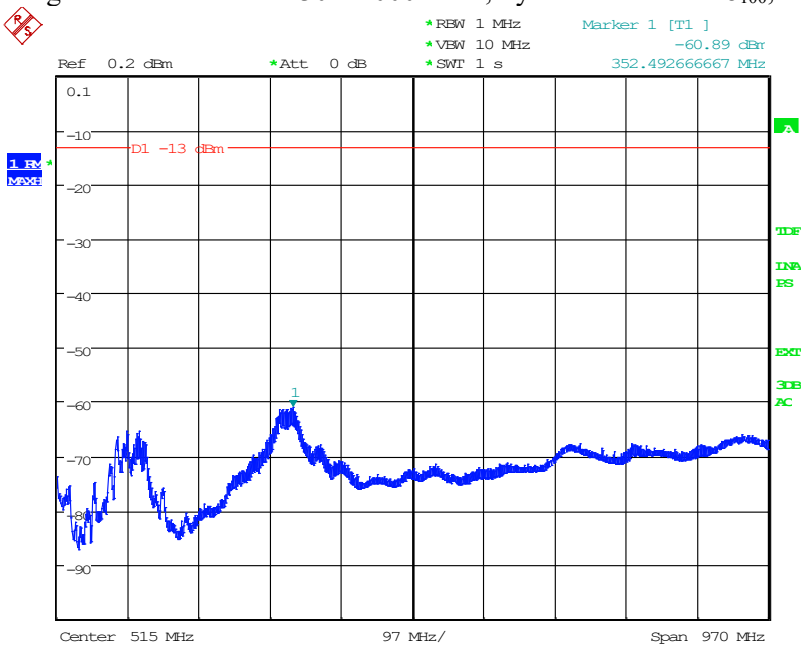


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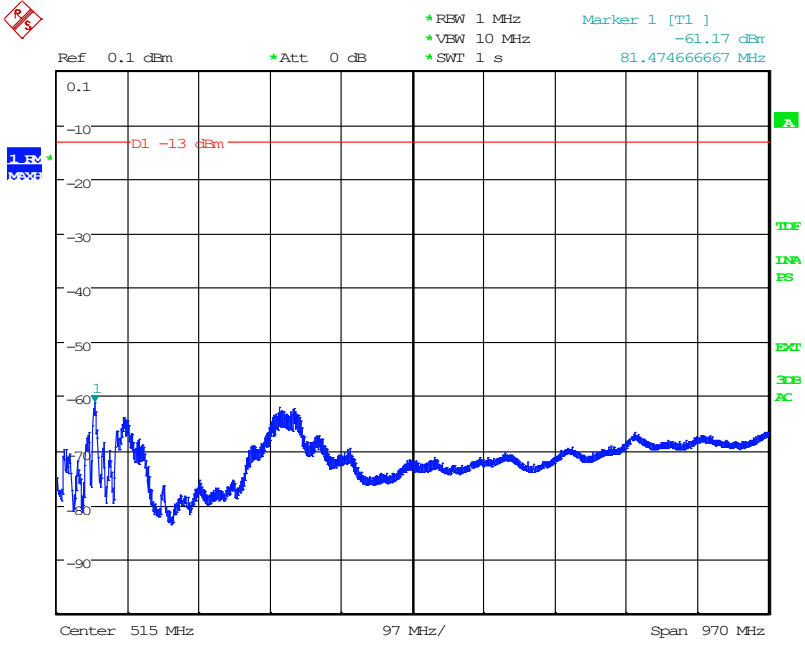
Diagram 2.14b: Pre scan 30 – 1000 MHz, Symbolic name: $M8_{100}$, EIRP Vertical polarization



Date: 27.OCT.2021 15:19:01

Diagram 2.15a: Pre scan 1 – 18 GHz, Symbolic name: $M8_{100}$, EIRP Horizontal polarization

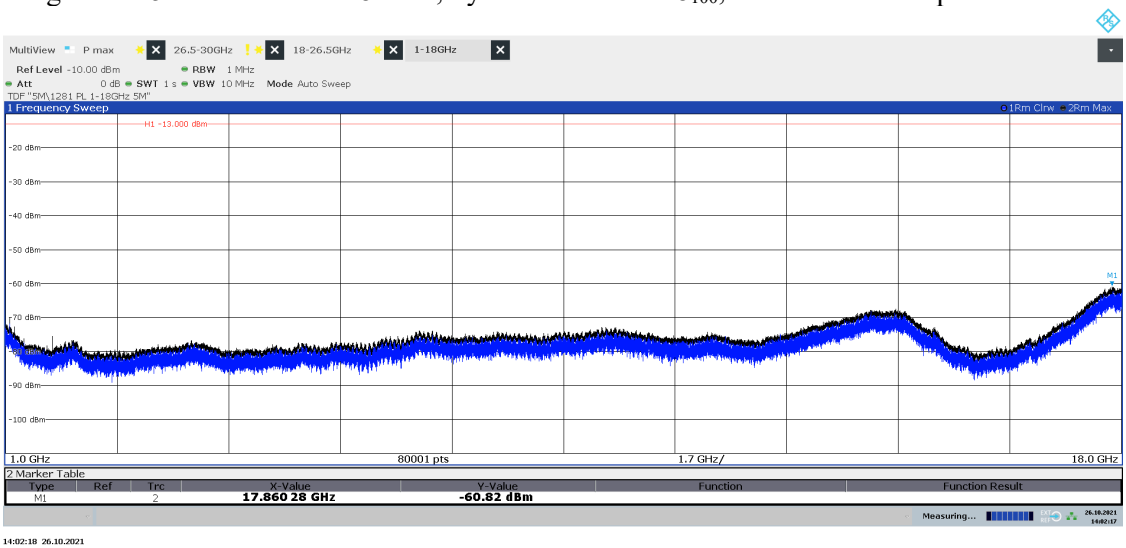


Diagram 2.15b: Pre scan 1 – 18 GHz, Symbolic name: $M8_{100}$, EIRP Vertical polarization

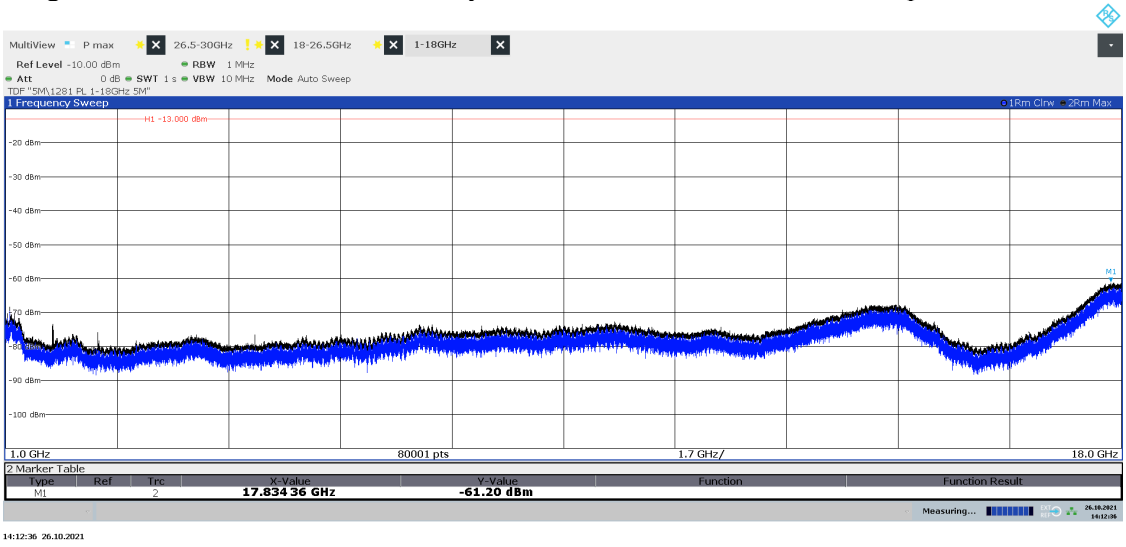


Diagram 2.16a: Pre scan 18 – 26.5 GHz, Symbolic name: $M8_{100}$, EIRP Horizontal polarization

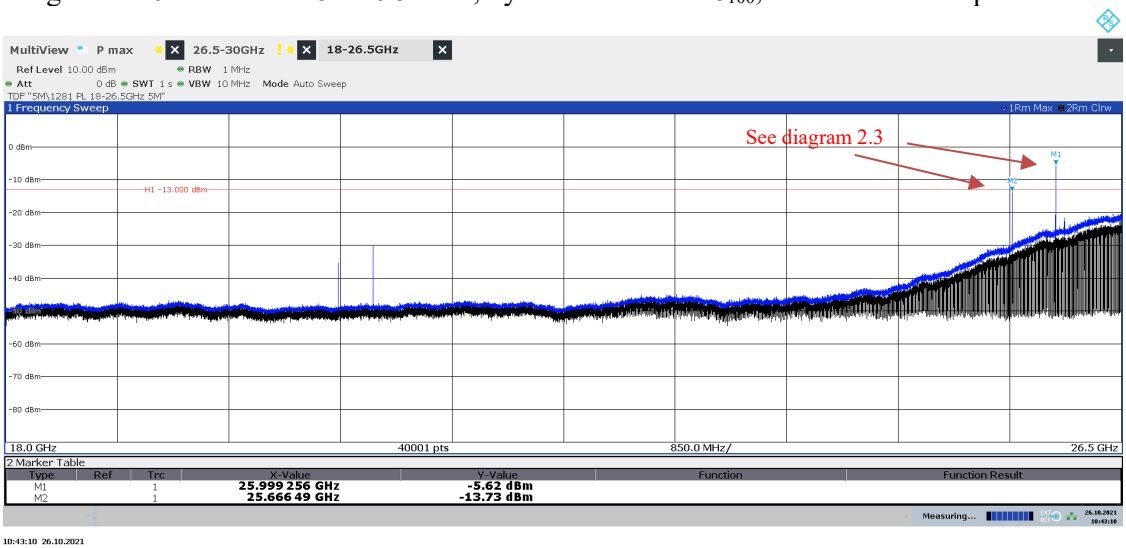


Diagram 2.16: Pre scan 18 – 26.5 GHz, Symbolic name: $M8_{100}$, EIRP Vertical polarization

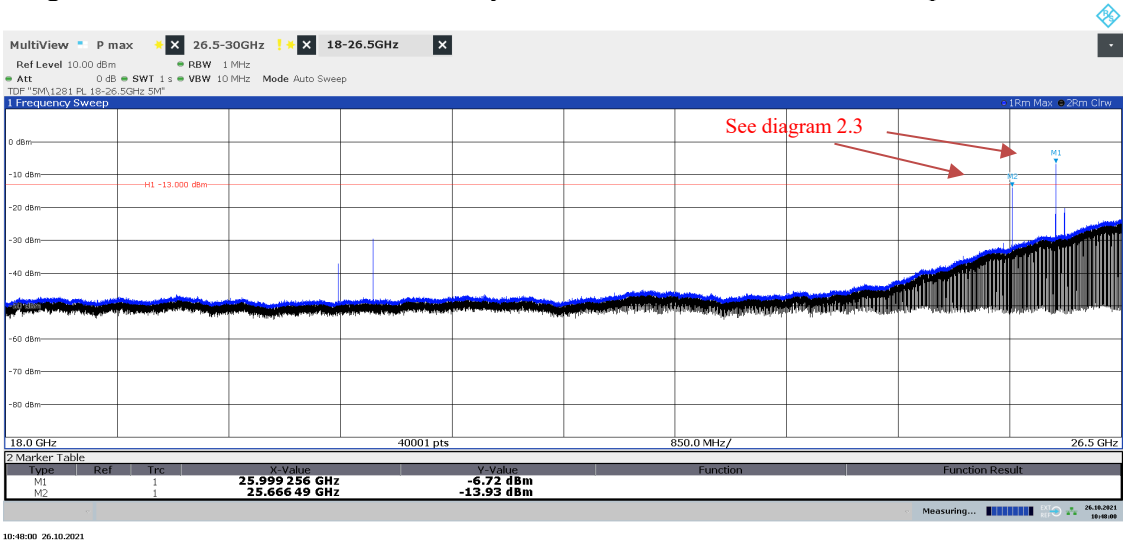


Diagram 2.17a: Pre scan 26.5 – 30.0 GHz, Symbolic name: $M8_{100}$, EIRP Horizontal polarization

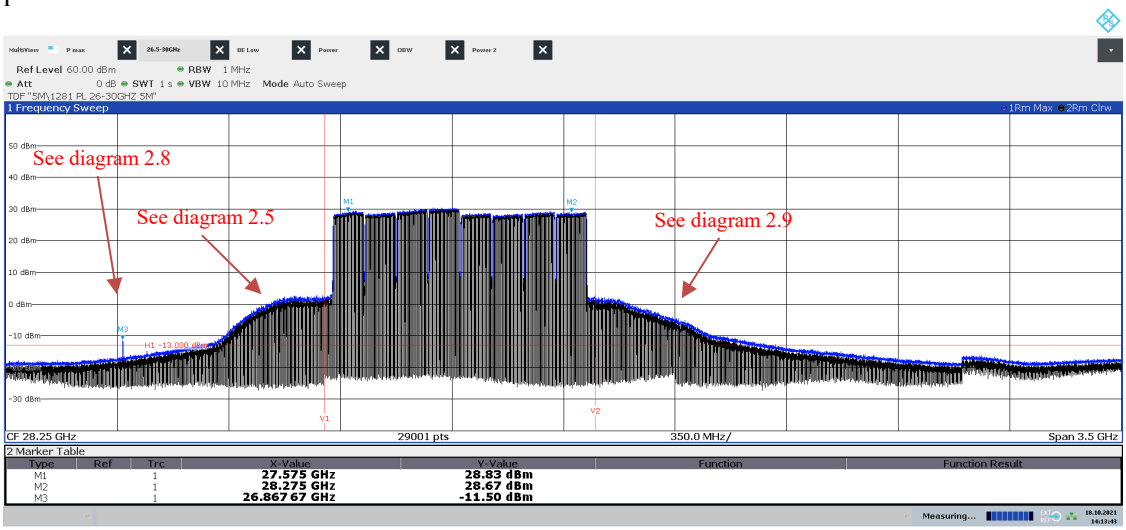


Diagram 2.17b: Pre scan 26.5 – 30.0 GHz, Symbolic name: $M8_{100}$, EIRP Vertical polarization

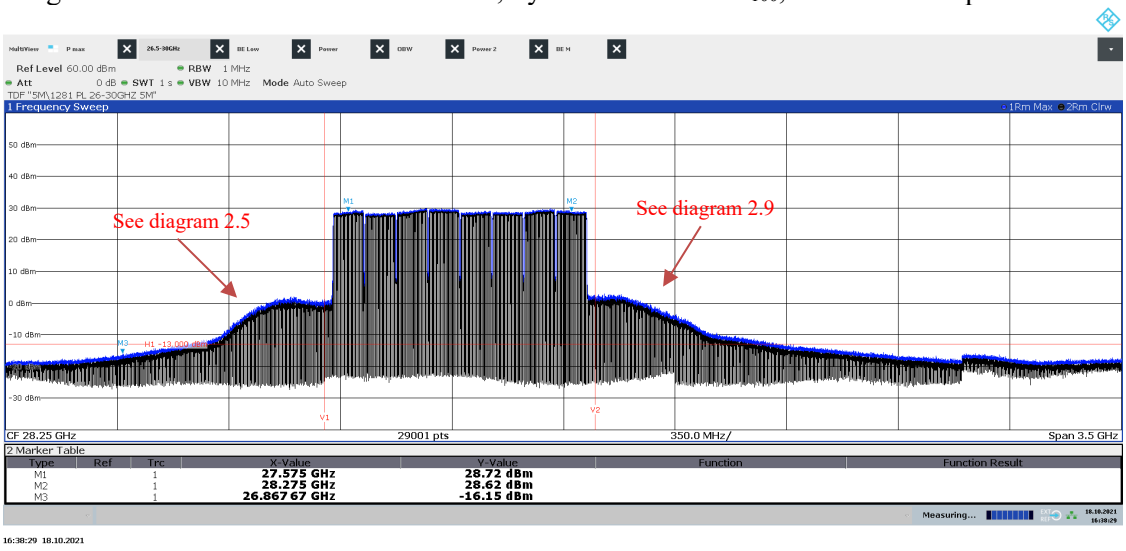


Diagram 2.18a: Pre scan 30 – 40 GHz, Symbolic name: $M8_{100}$, EIRP Horizontal polarization

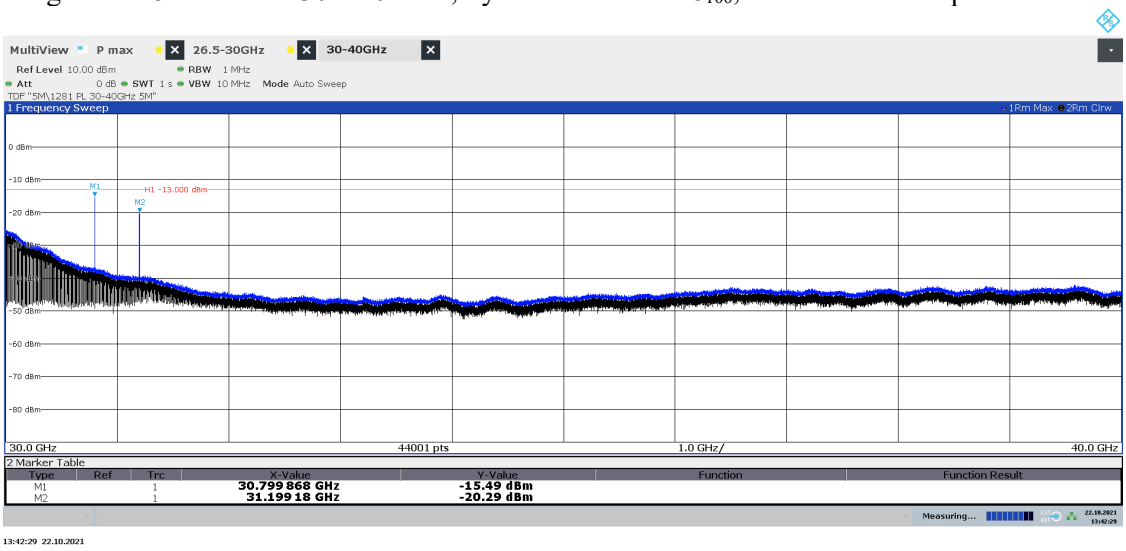


Diagram 2.18b: Pre scan 30 – 40 GHz, Symbolic name: $M8_{100}$, EIRP Vertical polarization

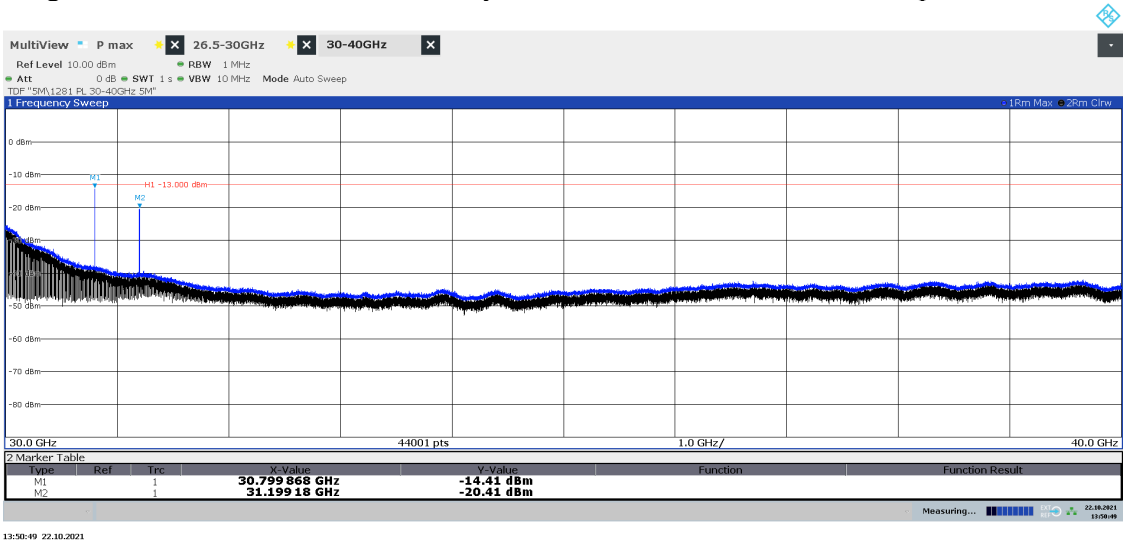


Diagram 2.19a: Pre scan 40 – 60 GHz, Symbolic name: $M8_{100}$, EIRP Horizontal polarization

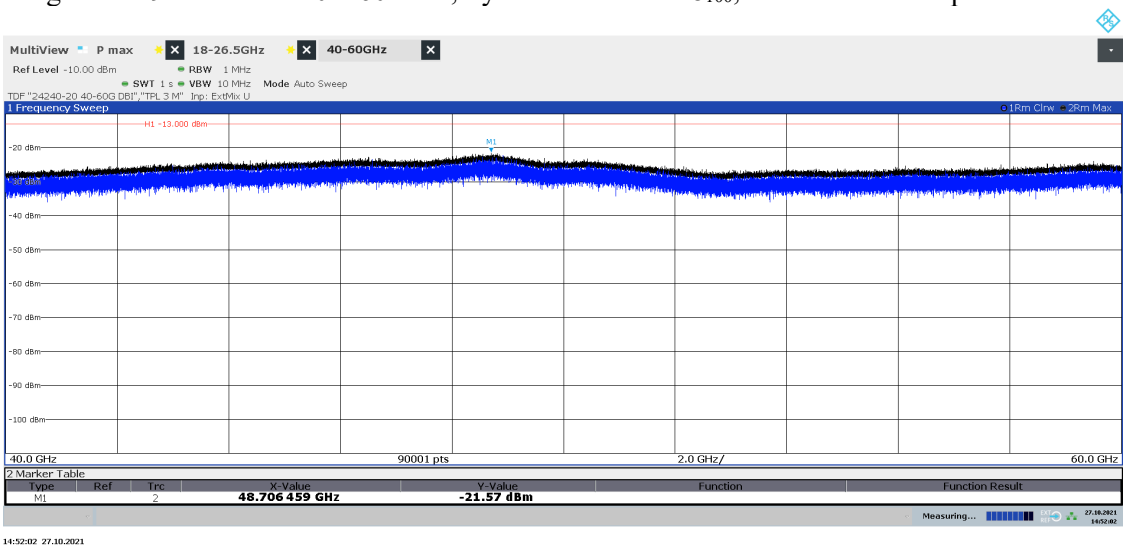


Diagram 2.19b: Pre scan 40 – 60 GHz, Symbolic name: $M8_{100}$, EIRP Vertical polarization

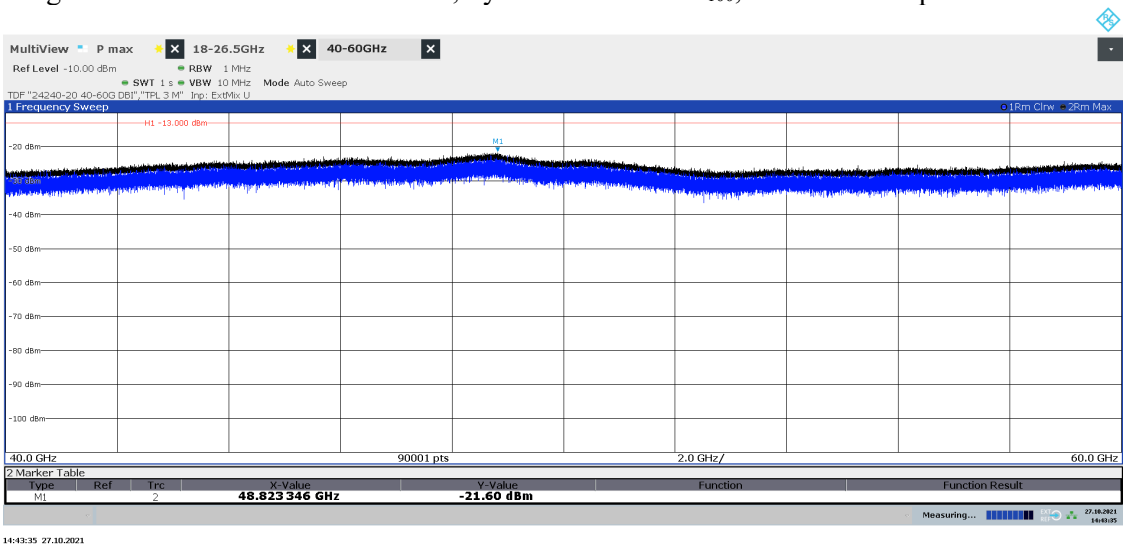


Diagram 2.20a: Pre scan 60 – 80 GHz, Symbolic name: $M8_{100}$, EIRP Horizontal polarization

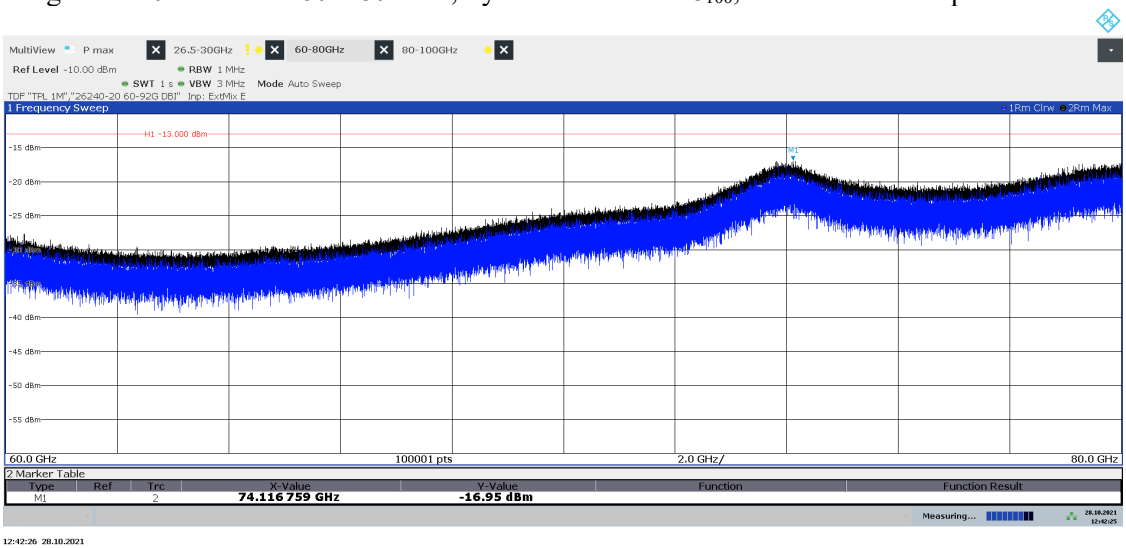


Diagram 2.20b: Pre scan 60 – 80 GHz, Symbolic name: $M8_{100}$, EIRP Vertical polarization

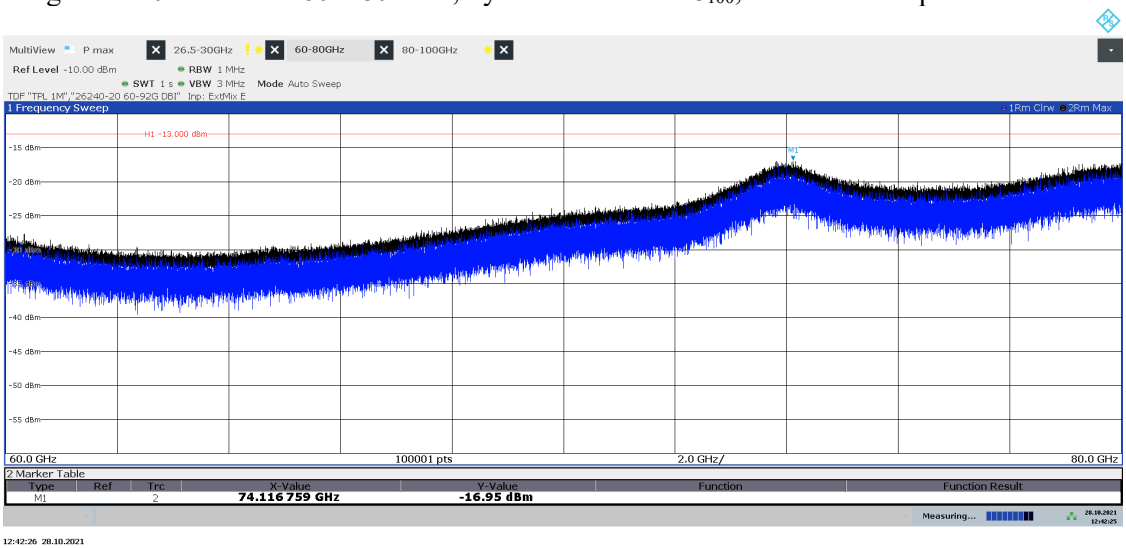


Diagram 2.21a: Pre scan 80 – 100 GHz, Symbolic name: $M8_{100}$, EIRP Horizontal polarization

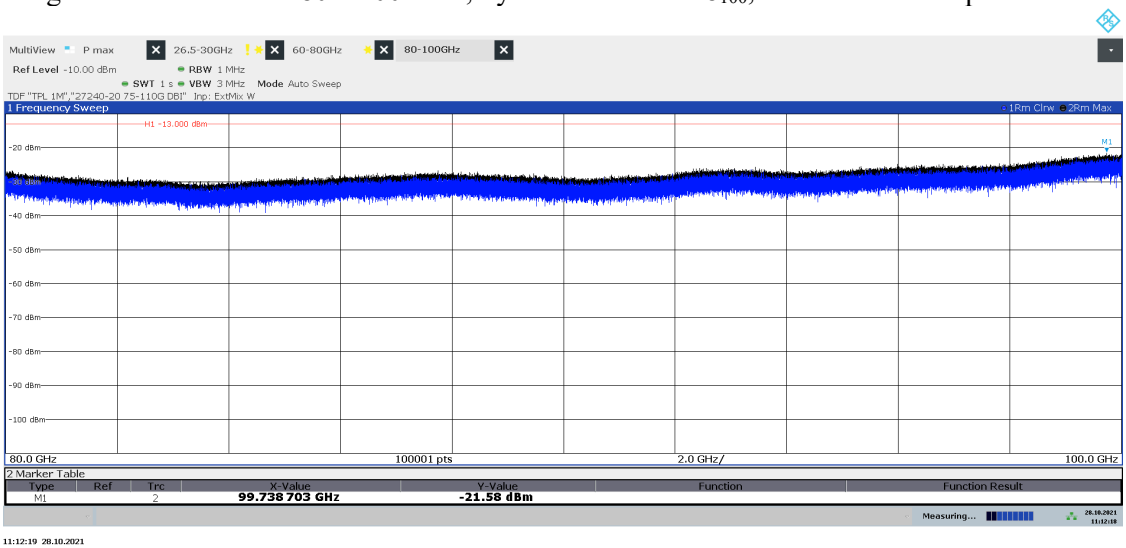


Diagram 2.21b: Pre scan 80 – 100 GHz, Symbolic name: $M8_{100}$, EIRP Vertical polarization

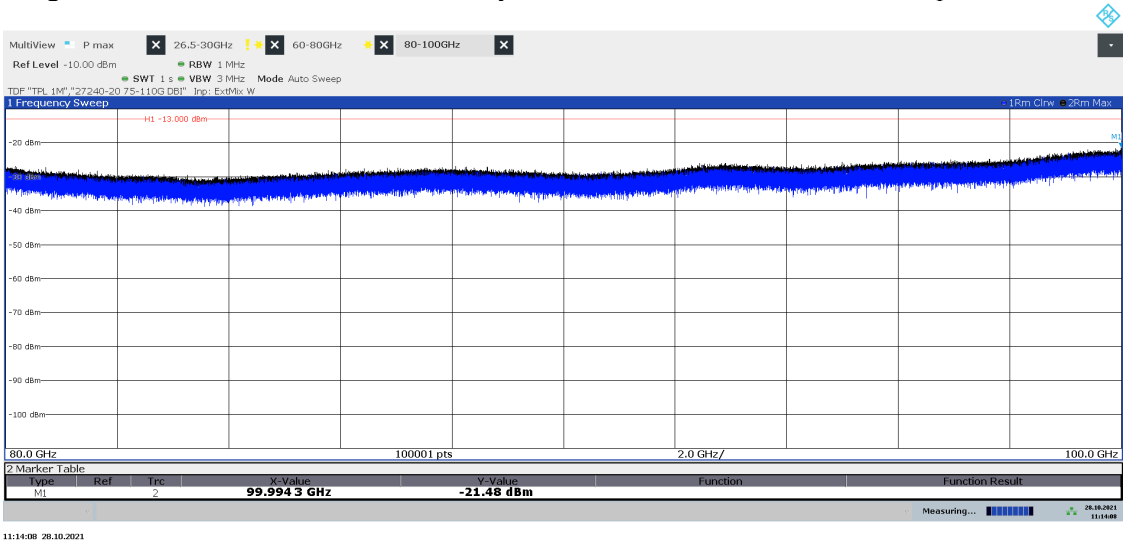


Diagram 2.22a: Pre scan 30 – 1000 MHz, Symbolic name: $BMT4_{50}$, EIRP Horizontal polarization

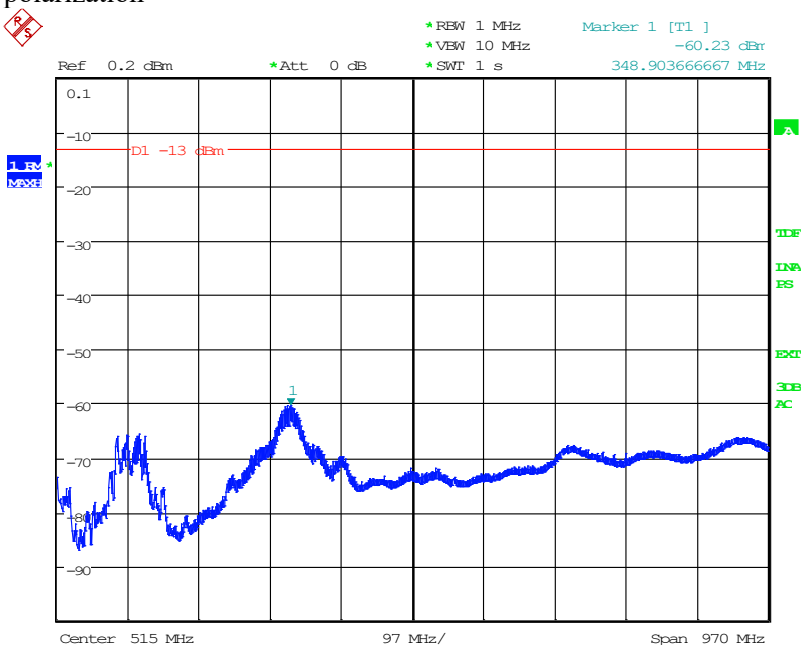


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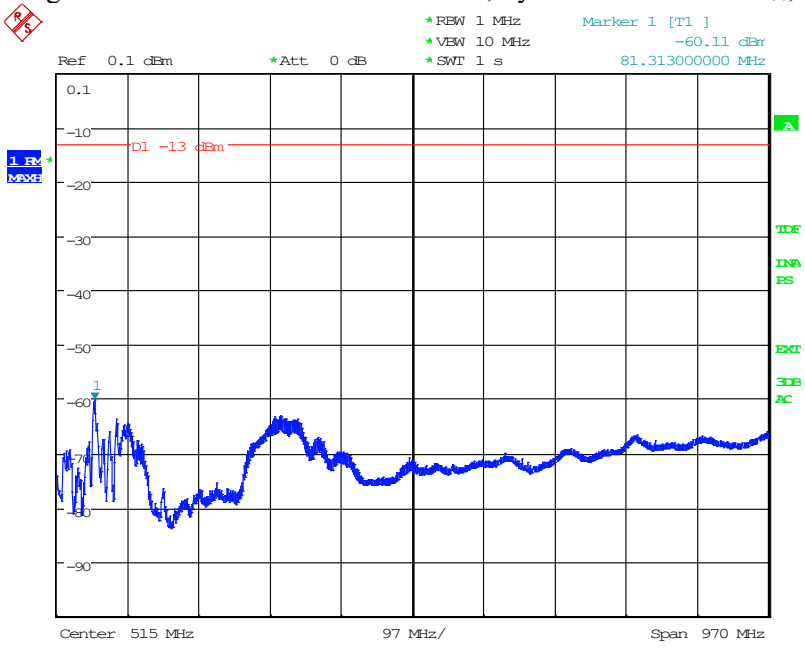
Diagram 2.22b: Pre scan 30 – 1000 MHz, Symbolic name: $BMT4_{50}$, EIRP Vertical polarization



Date: 27.OCT.2021 16:16:44

Diagram 2.23a: Pre scan 1 – 18 GHz, Symbolic name: $BMT4_{50}$, EIRP Horizontal polarization

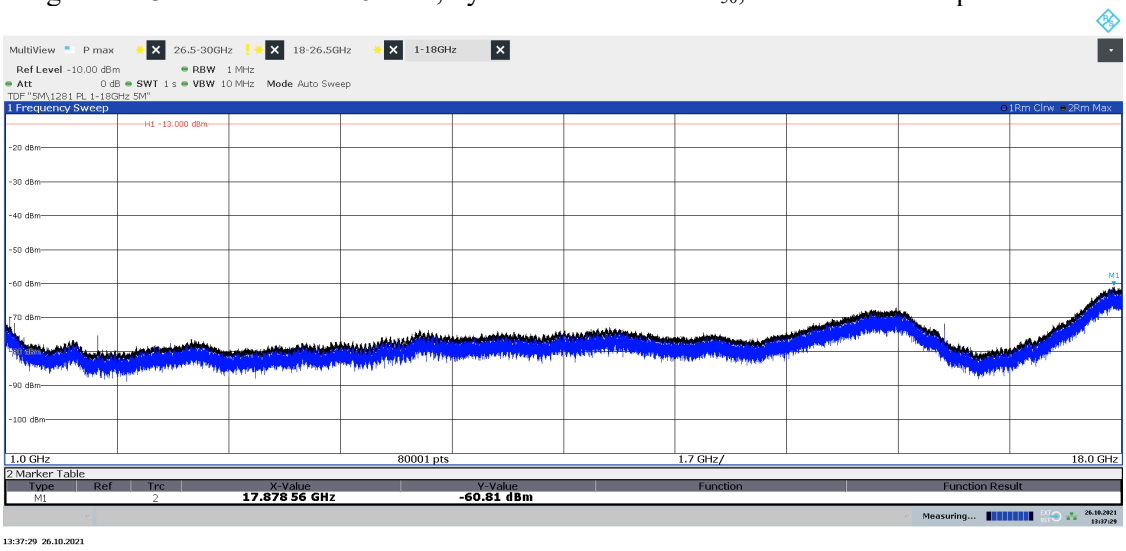


Diagram 2.23b: Pre scan 1 – 18 GHz, Symbolic name: $BMT4_{50}$, EIRP Vertical polarization

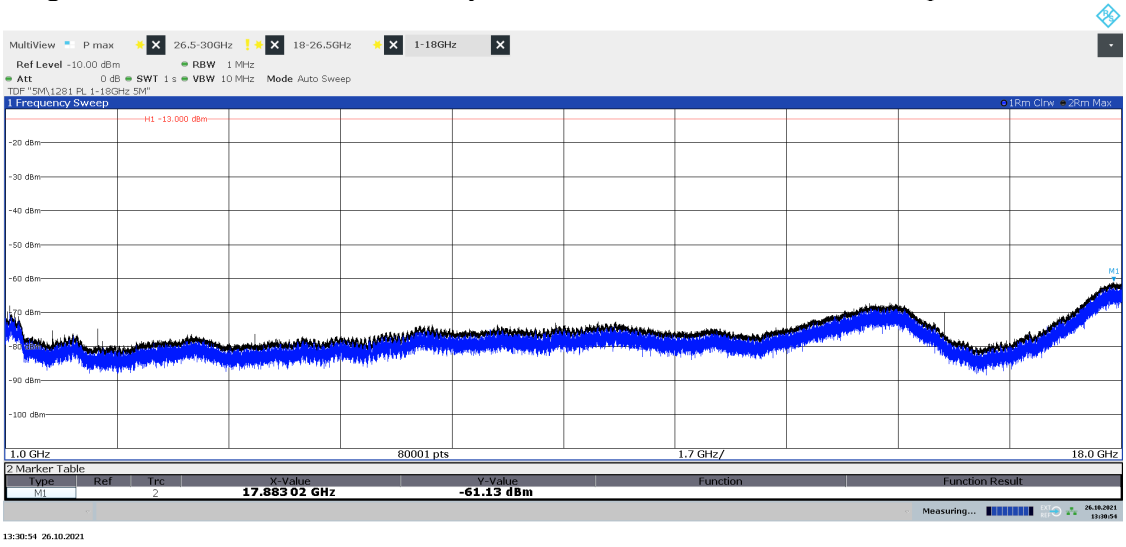


Diagram 2.24a: Pre scan 18 – 26.5 GHz, Symbolic name: $BMT4_{50}$, EIRP Horizontal polarization

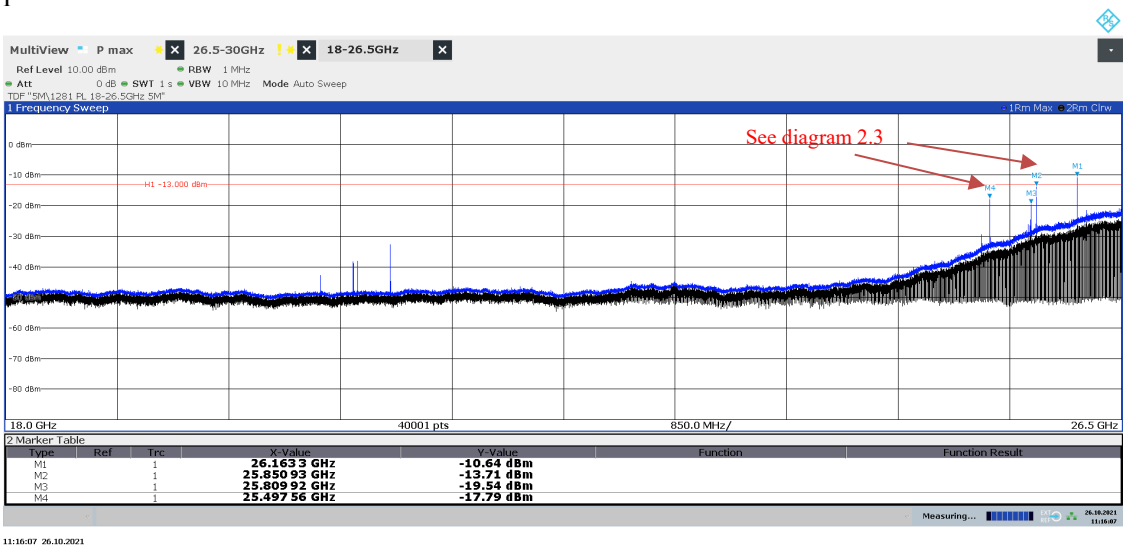


Diagram 2.24: Pre scan 18 – 26.5 GHz, Symbolic name: $BMT4_{50}$, EIRP Vertical polarization

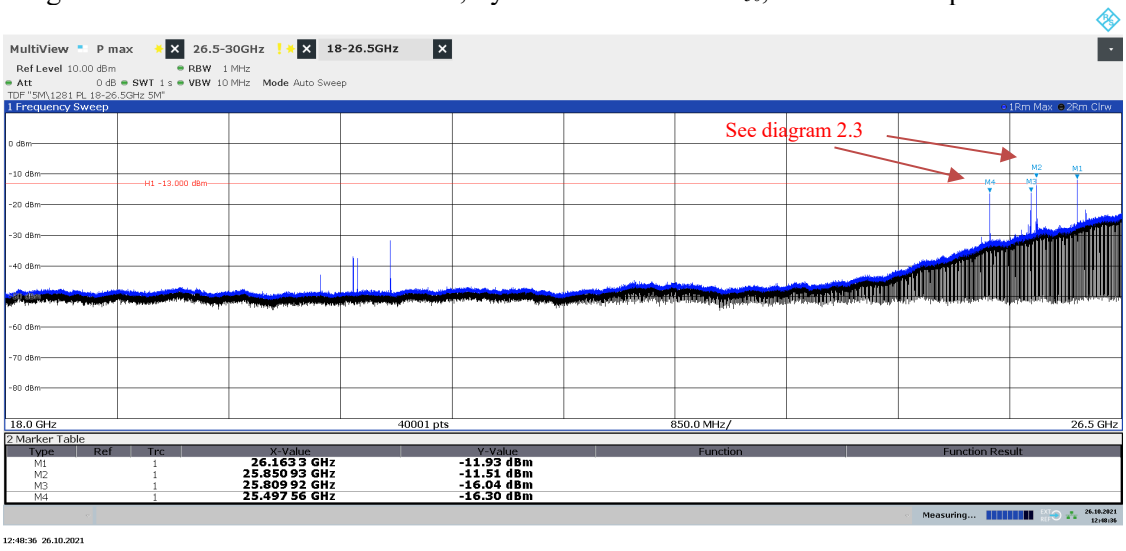


Diagram 2.25a: Pre scan 26.5 – 30.0 GHz, Symbolic name: BMT4$_{50}$, EIRP Horizontal polarization

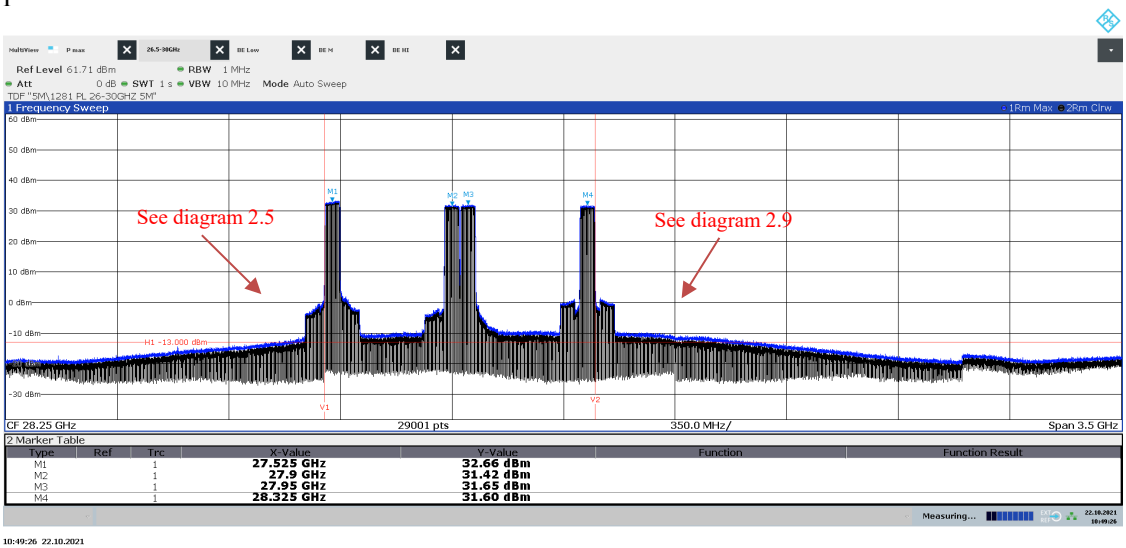


Diagram 2.25b: Pre scan 26.5 – 30.0 GHz, Symbolic name: BMT4$_{50}$, EIRP Vertical polarization

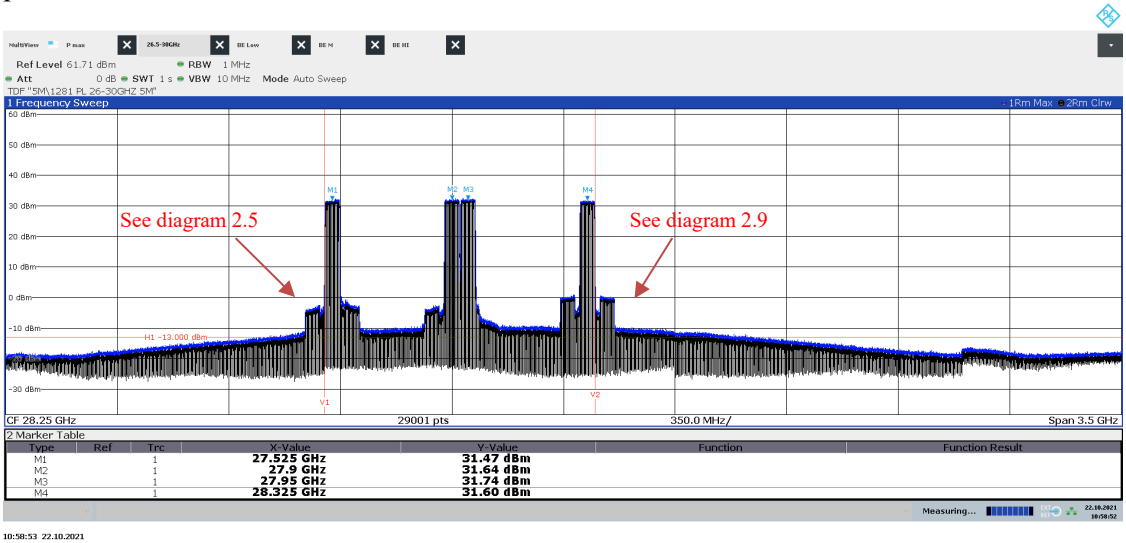


Diagram 2.26a: Pre scan 30 – 40 GHz, Symbolic name: $BMT4_{50}$, EIRP Horizontal polarization

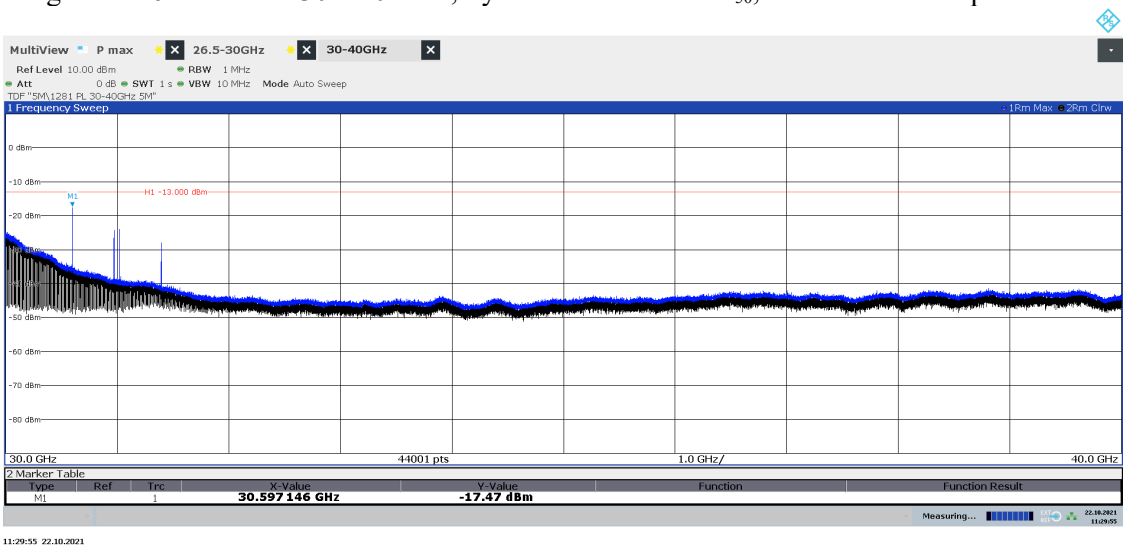


Diagram 2.26b: Pre scan 30 – 40 GHz, Symbolic name: $BMT4_{50}$, EIRP Vertical polarization

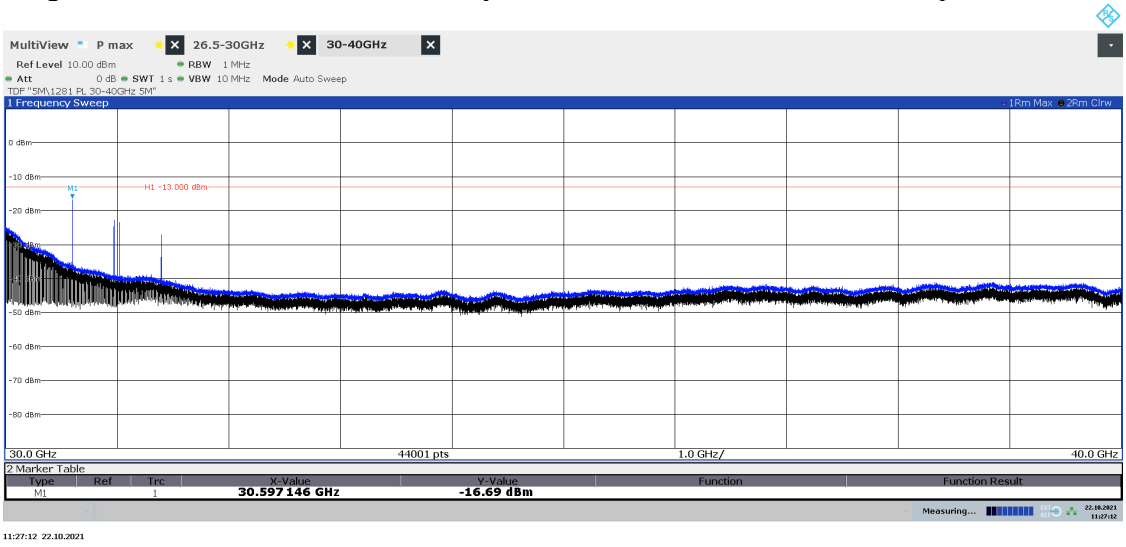


Diagram 2.27a: Pre scan 40 – 60 GHz, Symbolic name: $BMT4_{50}$, EIRP Horizontal polarization

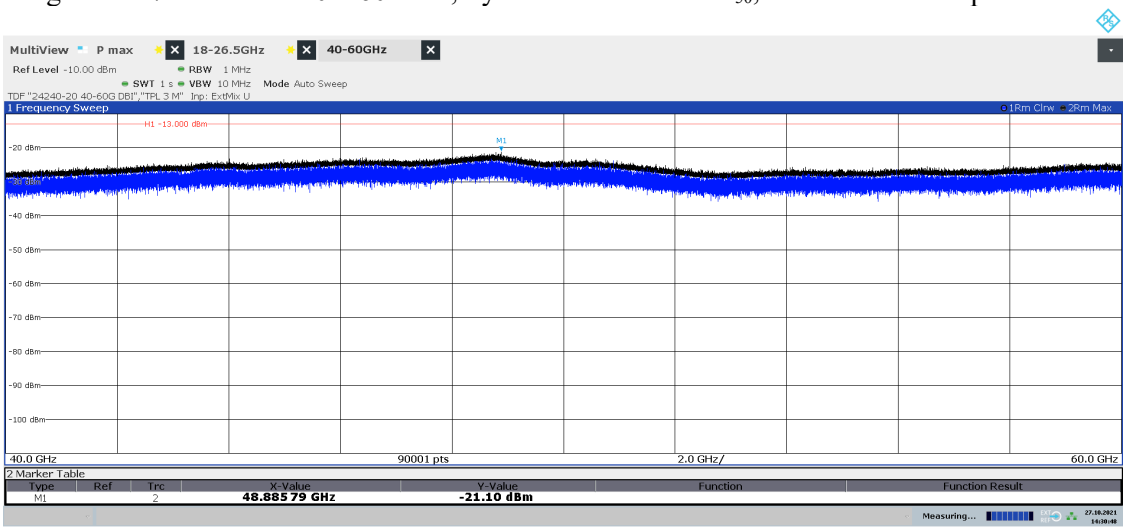


Diagram 2.27b: Pre scan 40 – 60 GHz, Symbolic name: $BMT4_{50}$, EIRP Vertical polarization

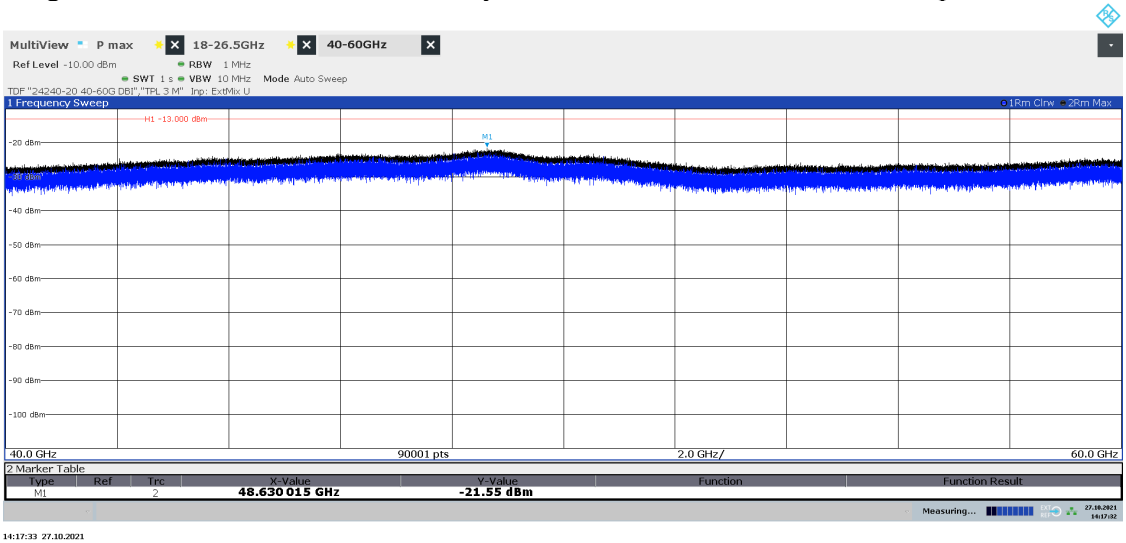


Diagram 2.28a: Pre scan 60 – 80 GHz, Symbolic name: $BMT4_{50}$, EIRP Horizontal polarization

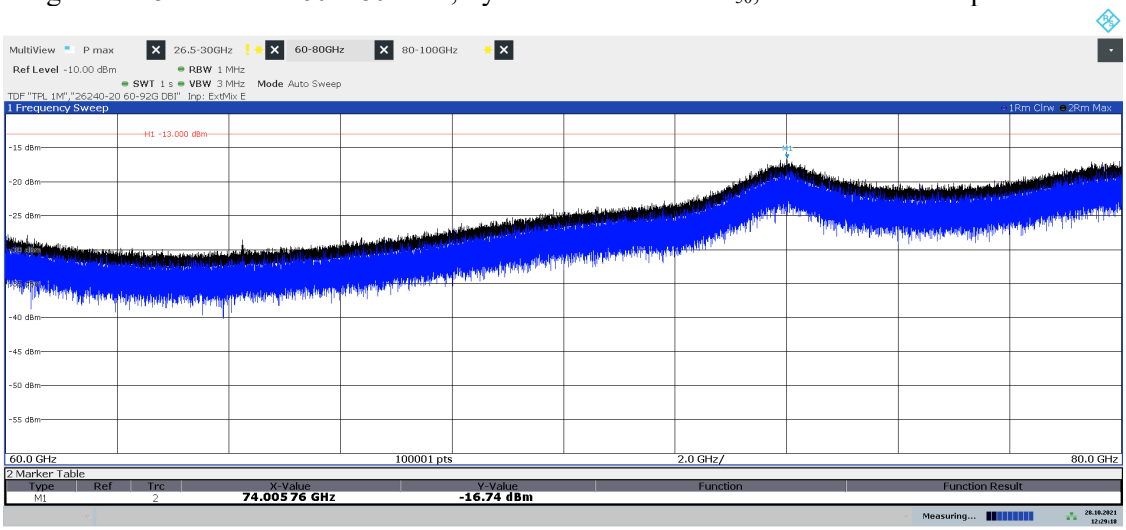


Diagram 2.28b: Pre scan 60 – 80 GHz, Symbolic name: $BMT4_{50}$, EIRP Vertical polarization

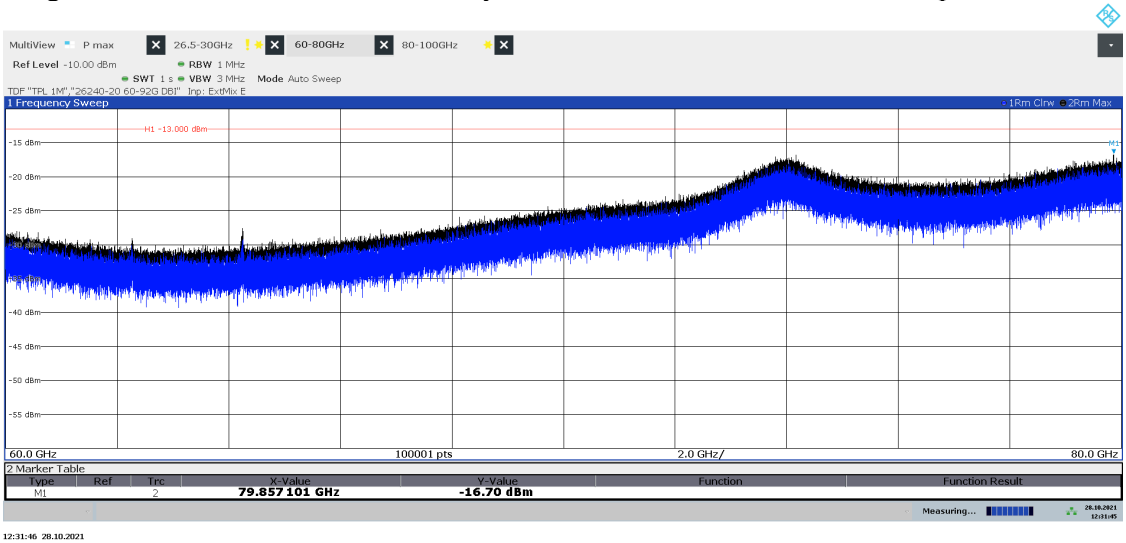


Diagram 2.29a: Pre scan 80 – 100 GHz, Symbolic name: $M8_{100}$, EIRP Horizontal polarization

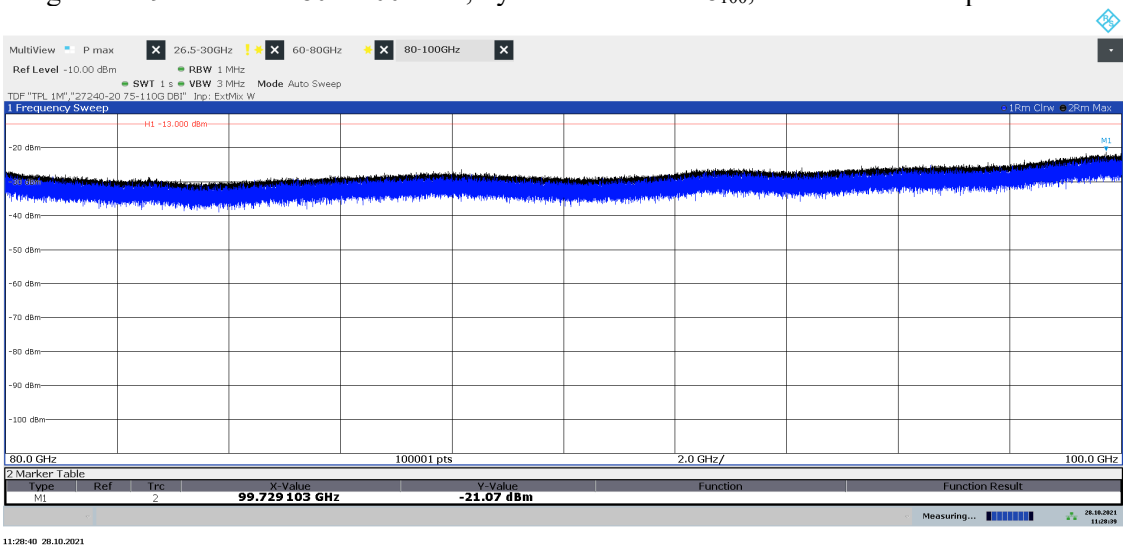
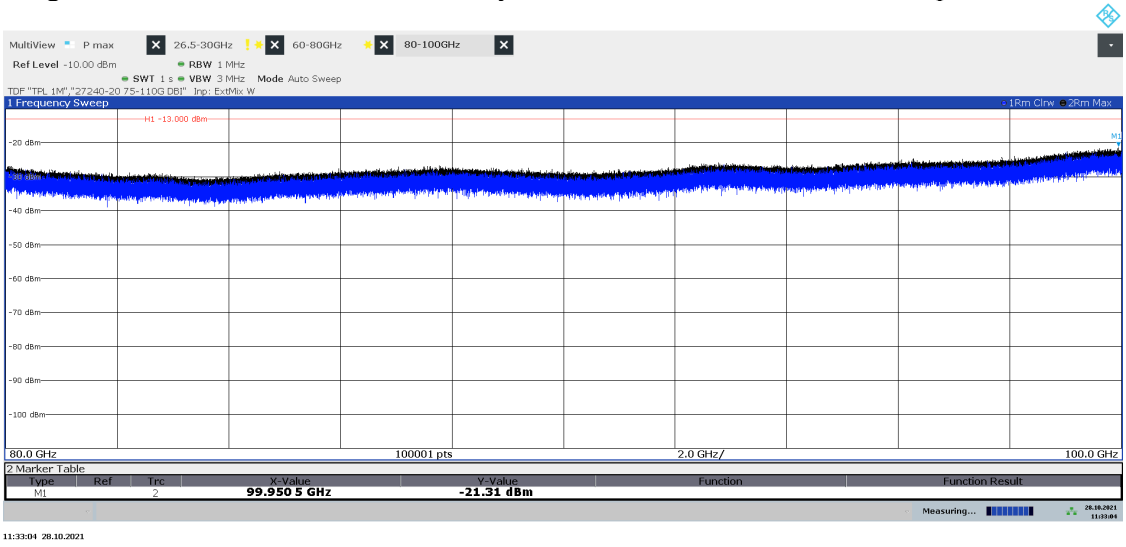


Diagram 2.29b: Pre scan 80 – 100 GHz, Symbolic name: $M8_{100}$, EIRP Vertical polarization



Frequency stability measurements according to 47 CFR 2.1055

Date	Temperature (test equipment)	Humidity (test equipment)
2021-11-04	23 °C ± 3 °C	40 % ± 5 %
2021-11-05	23 °C ± 3 °C	35 % ± 5 %
2021-11-08	23 °C ± 3 °C	30 % ± 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 and a spectrum analyser with NR software 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

Results

Nominal transmitter frequency was 27525 MHz (BL) with a bandwidth of 50 MHz.

Test conditions		Frequency error (Hz)
Supply voltage AC (V)	Temp. (°C)	
102	+20	-60
138	+20	-53
120	+20	-54
120	+30	-50
120	+40	-47
120	+50	-49
120	+10	-42
120	0	+55
120	-10	-41
120	-20	+50
120	-30	-40
Maximum freq. error (Hz)		-60
Measurement uncertainty		$< \pm 1 \times 10^{-7}$

Remark

For the frequency stability measurements, two electrically identical samples were used.

The sample with the serial number: E23D305158 was used in the temperature range
0 °C to 50 °C.
The sample with the serial number: E23D305159 was used in the temperature range
-10 °C to -30 °C.

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

End of report.