RF – TEST REPORT

- FCC Part 15.247, RSS-247 -

Type / Model Name : PRA 400 (01)

Product Description : Laser Receiver

Applicant : Hilti Corporation

Address : Feldkircherstrasse 100

9494 SCHAAN, LIECHTENSTEIN

Manufacturer : Hilti Corporation

Address : Feldkircherstrasse 100

9494 SCHAAN, LIECHTENSTEIN

Test Result according to the standards listed in clause 1 test standards:	**POSITIVE**

Test Report No. :	**80183254-04 Rev_1**	25. November 2024 Date of issue

Deutsche Akkreditierungsstelle
D-PL-12030-01-03
D-PL-12030-01-04

FCC ID: SDL-PRA4X IC ID: 5228A-PRA4X

Contents

FCC ID: SDL-PRA4X IC ID: 5228A-PRA4X

1 TEST STANDARDS

The tests were performed according to following standards:

FCC Rules and Regulations Part 15, Subpart A - General (March 2024)

Part 15, Subpart A, Section 15.31	Measurement standards
Part 15, Subpart A, Section 15.33	Frequency range of radiated measurements
Part 15, Subpart A, Section 15.35	Measurement detector functions and bandwidths

FCC Rules and Regulations Part 15, Subpart C - Intentional Radiators (March 2024)

Part 15, Subpart C, Section 15.203	Antenna requirement
Part 15, Subpart C, Section 15.204 modifications	External radio frequency power amplifiers and antenna
Part 15, Subpart C, Section 15.205	Restricted bands of operation
Part 15, Subpart C, Section 15.207	Conducted limits
Part 15, Subpart C, Section 15.209	Radiated emission limits, general requirements
Part 15, Subpart C, Section 15.247	Operation within the bands 902 - 928 MHz, 2400 - 2483.5 MHz and 5725 - 5850 MHz

ANSI C63.10: 2013	Testing Unlicensed Wireless Devices
ETSI TR 100 028 V1.3.1: 2001-03,	Electromagnetic Compatibility and Radio Spectrum Matters (ERM); Uncertainties in the Measurement of Mobile Radio Equipment Characteristics—Part 1 and Part 2
KDB 558074 D01 v05r02	Guidance for compliance measurements on DTS; FHSS and hybrid system devices operating under Section 15.247 of the FCC rules, April 2, 2019.

FCC ID: SDL-PRA4X IC ID: 5228A-PRA4X

2 EQUIPMENT UNDER TEST

2.1 Information provided by the Client

Please note, we do not take any responsibility for information provided by the client or his representative which may have an influence on the validity of the test results.

2.2 Sampling

The customer is responsible for the choice of sample. Sample configuration, start-up and operation is carried out by the customer or according his/her instructions.

2.3 General remarks

None.

2.4 Photo documentation of the EUT – Detailed photos see ATTACHMENT A

2.5 Equipment type

BLE device

2.6 Short description of the equipment under test (EUT)

The laser receiver can be used to remotely control the rotating laser and to detect and locate the laser beam.

Number of tested samples:	2
Serial number:	335 (radiated sample) 336 (conducted sample)
Firmware version:	0.1.0-84 (radiated sample) 0.1.0-233 (conducted sample)

2.7 Variants of the EUT

There are no variants.

FCC ID: SDL-PRA4X IC ID: 5228A-PRA4X

2.8 Operation frequency and channel plan

The operating frequency is 2400 MHz to 2483.5 MHz.

Channel No.	Frequency (MHZ)	Channel No.	Frequency (MHZ)
37	2402	18	2442
0	2404	19	2444
1	2406	20	2446
2	2408	21	2448
3	2410	22	2450
4	2412	23	2452
5	2414	24	2454
6	2416	25	2456
7	2418	26	2458
8	2420	27	2460
9	2422	28	2462
10	2424	29	2464
38	2426	30	2466
11	2428	31	2468
12	2430	32	2470
13	2432	33	2472
14	2434	34	2474
15	2436	35	2476
16	2438	36	2478
17	2440	39	2480

Note: The marked frequencies are used for testing.

2.9 Transmit operating modes

The EUT uses GFSK modulation and may provide following data rates:

- 125 kbps (kbps = *kilobits per second)*

2.10 Antenna

The following antenna shall be used with the EUT:

Number	Characteristic	Model number	Plug	Frequency range (GHz)	Gain (dBi)
1	Omni	PCB inverted F antenna	PCB	2.4 – 2.5	1.1

2.11 Power supply system utilised

Power supply voltage, V_{nom} : 3.0 V DC (battery powered)

2.12 Peripheral devices and interface cables

The following peripheral devices and interface cables are connected during the measurements:

- Pin-Adapter 9400-020 V02 Model : Made by applicant
- Notebook Model : HP EliteBook 840

2.13 Determination of worst-case conditions for final measurement

Preliminary tests are performed in all three orthogonal axes of the EUT to locate at which position and at what setting of the EUT produce the maximum of the emissions. For the further measurement the EUT is set in Y position.

The tests are carried out in the following frequency band:

2400 MHz – 2483.5 MHz

For the final test the following channels and test modes are selected:

Wireless system	Available channel	Tested channels	Power setting	Modulation	Modulation type	Data rate
802.15.1	0 - 39	37, 17, 39	8 dBm	DSSS	GFSK	125 kbps

2.13.1 Test jig

No test jig is used.

2.13.2 Test software

The applicant provides a special software that allows enabling a continuous transmission modulated and receiving mode for the test samples.

FCC ID: SDL-PRA4X IC ID: 5228A-PRA4X

3 TEST RESULT SUMMARY

FCC Rule Part	RSS Rule Part	Description	Result
15.207(a)	RSS-Gen, 8.8	AC power line conducted emissions	not applicable
15.247(a)(2)	RSS-247, 6.2.4(1)	-6 dB EBW	passed
15.247(b)(3)	RSS-247, 6.2.4(1)	Maximum peak conducted output power	passed
15.247(b)(4)	-	Defacto limit	passed
15.247(d)	RSS-247, 6.2.4(2)	Out-of-band emission, radiated	passed
15.247(d)	RSS-Gen, 8.9	Emissions in restricted bands	passed
15.247(e)	RSS-247, 6.2.4(1)	PSD	passed
15.35(c)	RSS-Gen, 6.10	Pulsed operation	passed
15.203	RSS-Gen, 6.6	Antenna requirement	passed
-	RSS-Gen, 6.11	Transmitter frequency stability	passed
-	RSS-Gen, 6.6	99 % Bandwidth	passed

The mentioned new RSS Rule Parts in the above table are related to:
RSS-Gen, Issue 5 + Amendment 1 + Amendment 2, March 2019
RSS-247, Issue 3, August 2023

3.1 Revision history of test report

Test report No	Rev.	Issue Date	Changes
80183254-04	0	25 April 2024	Initial test report
	1	25. November 2024	Clause 5: all setup photos extracted to attachment B Clause 4.5.3.2.4: correction of table height

The test report with the highest revision number replaces the previous test reports.

3.2 Final assessment

The equipment under test fulfils the requirements cited in clause 1 test standards.

Date of receipt of test sample : acc. to storage records

Testing commenced on : 17 October 2023

Testing concluded on : 03 January 2024

Checked by:

Klaus Gegenfurtner
I confirm the correctness and integrity of this document
2024.11.25 14:10:21 +01'00'

Klaus Gegenfurtner
Teamleader Radio

Tested by:

I am the author of this document
2024.11.25 09:56:43 +01'00'

Franz-Xaver Schrettenbrunner
Radio Team

FCC ID: SDL-PRA4X IC ID: 5228A-PRA4X

4 TEST ENVIRONMENT

4.1 Address of the test laboratory

CSA Group Bayern GmbH
Ohmstrasse 1-4
94342 STRASSKIRCHEN
GERMANY

4.2 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15 - 35 °C
Humidity:	30 - 60 %
Atmospheric pressure:	86 - 106 kPa

4.3 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. It is noted that the expanded measurement uncertainty corresponds to the measurement results from the standard measurement uncertainty multiplied by the coverage factor k = 2. The true value is located in the corresponding interval with a probability of 95 %. The measurement uncertainty was calculated for all measurements listed in this test report on basis of the ETSI Technical Report TR 100 028 Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 1 and Part 2. The results are documented in the quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
AC Conducted Spurious Emissions	0.15 MHz to 30 MHz	95%	± 3.29 dB
20 dB Bandwidth	Center frequency of EUT	95%	$\pm 2.5 \times 10^{-7}$
99% Occupied Bandwidth	Center frequency of EUT	95%	$\pm 2.5 \times 10^{-7}$
Radiated Spurious Emissions	9 kHz to 30 MHz	95%	± 3.53 dB
Radiated Spurious Emissions	30 MHz to 1000 MHz	95%	± 3.71 dB
Radiated Spurious Emissions	1000 MHz to 10000 MHz	95%	± 2.34 dB
Peak conducted output power	902 MHz to 928 MHz	95%	± 0.35 dB
Conducted Spurious Emissions	9 kHz to 10000 MHz	95%	± 2.15 dB

4.4 Conformity Decision Rule

The applied conformity decision rule is based on ILAC G8:09/2019 clause 4.2.1 Binary Statement for Simple Acceptance Rule (w = 0).
Details can be found in the procedure CSA_B_V50_29.

4.5 Measurement protocol for FCC and ISED

4.5.1 General information

CSA Group Bayern GmbH is recognized as wireless testing laboratory under the CAB identifier:

FCC: DE 0011
ISED: DE0009

4.5.2 General Standard information

The test methods used comply with ANSI C63.10 - "Testing Unlicensed Wireless Devices".

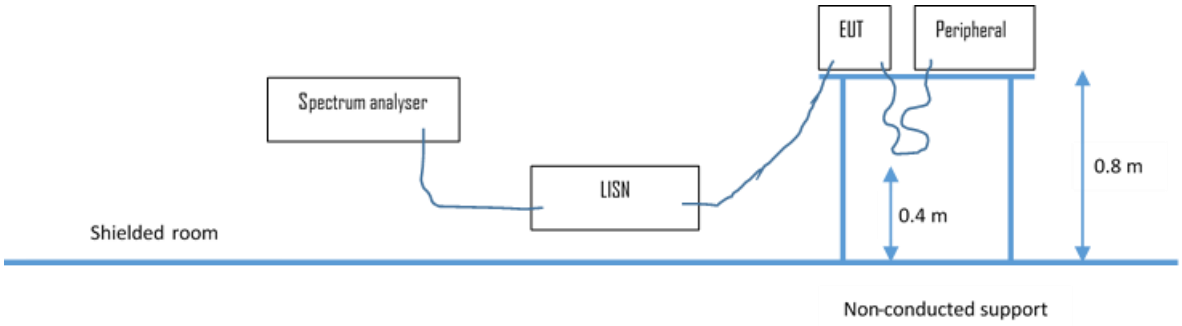
4.5.2.1 Justification

The equipment under test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions.

4.5.3 Details of test procedures

4.5.3.1 Conducted emission

Test setup according ANSI C63.10



The final level, expressed in dBµV, is arrived at by taking the reading directly from the Spectrum analyser. This level is compared to the limit.

To convert between dBµV and µV, the following conversions apply:

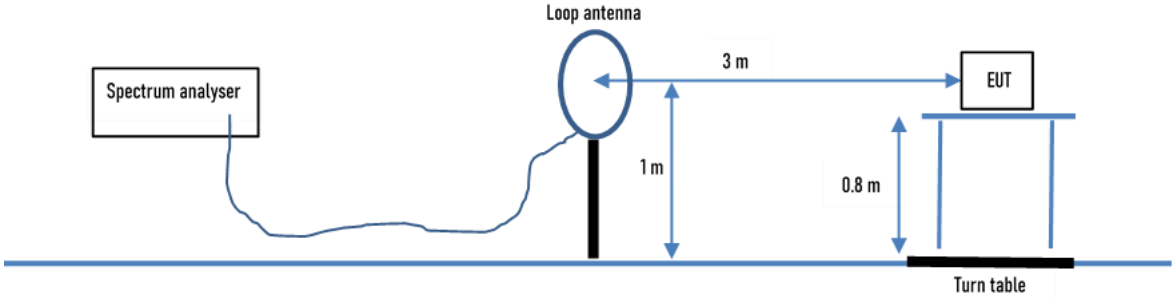
dBµV = 20(log µV)
µV = Inverse log(dBµV/20)

Conducted emissions on the 50 Hz and/or 60 Hz power interface of the EUT are measured in the frequency range of 150 kHz to 30 MHz. The measurements are performed using a receiver, which has CISPR characteristic bandwidth and quasi-peak detection and a Line Impedance Stabilization Network (LISN) with 50 Ω / 50 µH (CISPR 16) characteristics. The receiver is protected by means of an impedance matched pulse limiter connected directly to the RF input. Table top equipment is placed on a non-conducting table 80 centimetres above the floor and is positioned 40 centimetres from the vertical ground plane (wall) of the screen room. If the minimum limit margin appears to be less than 20 dB with a peak mode measurement, the emission is re-measured using a tuned receiver with quasi-peak and average detection and recorded on the data sheets.

FCC ID: SDL-PRA4X **IC ID: 5228A-PRA4X**

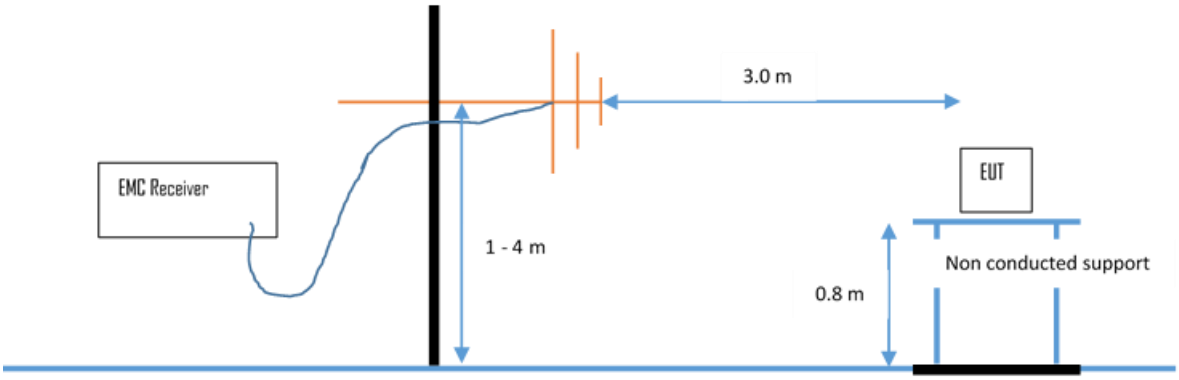
4.5.3.2 Radiated emission

4.5.3.2.1 OATS1 test site (9 kHz - 30 MHz):
Test setup according ANSI C63.10



Emissions from the EUT are measured in the frequency range of 9 MHz to 30 MHz using a tuned receiver and a calibrated loop antenna. Table top equipment is placed on a 1.0 X 1.5 m non-conducting table 80 centimetres above the ground plane. Cables to simulators/testers (if used in this test) are routed through the centre of the table and to a screened room located outside the test area. The antenna is positioned 3, 10 or 30 metres horizontally from the EUT and is repeated vertically. To locate maximum emissions from the test sample the antenna is varied along the site axis and the EUT is rotated 360 degrees.

4.5.3.2.2 OATS1 test site (30 MHz - 1 GHz):
Test setup according ANSI C63.10.



Spurious emissions from the EUT are measured in the frequency range of 30 MHz to 1000 MHz using a tuned receiver and appropriate broadband linearly polarised antennas. Measurements between 30 MHz and 1000 MHz are made with 120 kHz/6 dB bandwidth and quasi-peak detection. Table top equipment is placed on a 1.0 X 1.5 m non-conducting table 80 centimetres above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. Cables to simulators/testers (if used in this test) are routed through the centre of the table and to a screened room located outside the test area. To locate maximum emissions from the test sample the antenna is varied in height from 1 to 4 metres and the EUT is rotated 360 degrees. The final level in dBµV/m is calculated by taking the reading from the EMI receiver (Level dBµV) and adding the correction factors and cable loss factor (dB). The FCC limit is subtracted from this result in order to provide the limit margin listed in the measurement protocol.

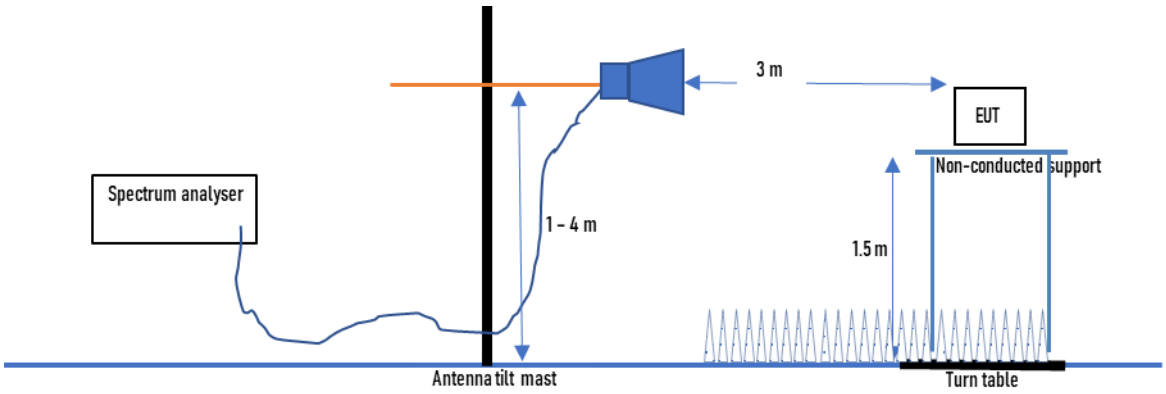
The resolution bandwidth setting:
30 MHz – 1000 MHz: RBW: 120 kHz

Example:

Frequency (MHz)	Level (dBµV)	+	Factor (dB)	=	Level (dBµV/m)	-	Limit (dBµV/m)	=	Delta (dB)
719.0	75.0	+	32.6	=	107.6	-	110.0	=	-2.4

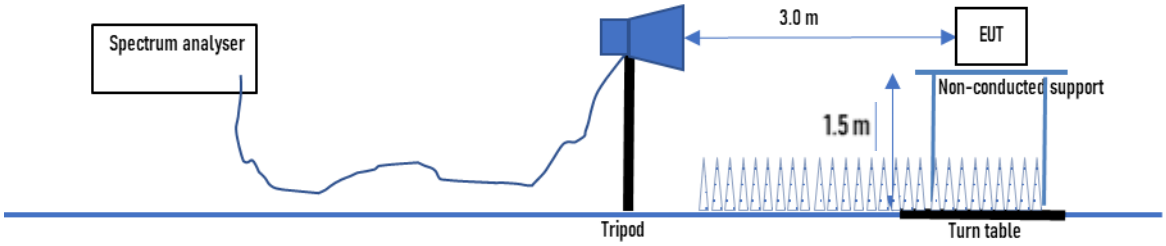
4.5.3.2.3 Anechoic chamber 1 (1000 MHz – 18000 MHz)

Test setup according ANSI C63.10.



Radiated emissions from the EUT are measured in the frequency range 1 GHz up to 18 GHz as specified in 47 CFR Part 15, Subpart A, Section 15.33, using a spectrum analyser and appropriate linearly polarized antennas. Table top equipment is placed on a non-conducting table, 1.5 metre above the ground plane. The turntable is fully covered with the appropriate absorber (Type VHP-12). Any controlling device is positioned such that it does not significantly influence the measurement results. Interconnecting cables that hang closer than 40 cm to the ground plane are folded back and forth in the centre, forming a bundle 30 cm to 40 cm long. Measurements are made in in three orientations of the EUT and the horizontal and vertical polarization planes of measurement antenna in a fully anechoic room. The measurement antenna is adjusted and the EUT orientated to permit the measurement of the maximum emission from the EUT. The conditions determined as worst-case will then be used for the final measurements.

4.5.3.2.4 Anechoic chamber 1 (18 GHz – 40 GHz)



Emissions from the EUT are measured in the frequency range 18 GHz up to 40 GHz as specified in 47 CFR Part 15, Subpart A, Section 15.33, using a spectrum analyser and appropriate linearly polarized antennas. Table top equipment is placed on a non-conducting table, 1.5 metre above the ground plane. The turntable is fully covered with the appropriate absorber (Type VHP-12). Any controlling device is positioned such that it does not significantly influence the measurement results. Interconnecting cables that hang closer than 40 cm to the ground plane are folded back and forth in the centre, forming a bundle 30 cm to 40 cm long. Measurements are made in in three orientations of the EUT and the horizontal and vertical polarization planes of measurement antenna in a fully anechoic room. The measurement antenna is adjusted and the EUT orientated to permit the measurement of the maximum emission from the EUT. The conditions determined as worst-case will then be used for the final measurements. Where appropriate, the test distance may be reduced in order to detect emissions under better uncertainty. The limit is adopted.

FCC ID: SDL-PRA4X IC ID: 5228A-PRA4X

5 TEST CONDITIONS AND RESULTS

5.1 EBW and OBW

For test instruments and accessories used see section 6 Part **MB**.

5.1.1 Description of the test location

Test location: Shielded Room S4

5.1.2 Photo documentation of the test set-up - Detailed photos see ATTACHMENT B

5.1.3 Applicable standard

According to FCC Part 15, Section 15.247(a)(2):
Systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 – 2483.5 MHz and 5725 – 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

5.1.4 Description of Measurement

The bandwidth was measured at an amplitude level reduced from the reference level of a modulated channel by a ratio of -6 dB. The reference level is the level of the highest signal amplitude observed at the transmitter at either the fundamental frequency or the first order modulation products in all typical modes of operation, including the unmodulated carrier, even if atypical. An alternative is to use the bandwidth measurement of the analyser.

Spectrum analyser settings for EBW:
RBW: 100 kHz, VBW: 300 kHz, Detector: Max peak, Sweep time: 5 s, Span: 2 EBW;
Spectrum analyser settings for OBW:
RBW: 1-5% OBW, VBW: 3 RBW, Detector: Max peak, Sweep time: 5 s, Span: 2 OBW;

5.1.5 Test result

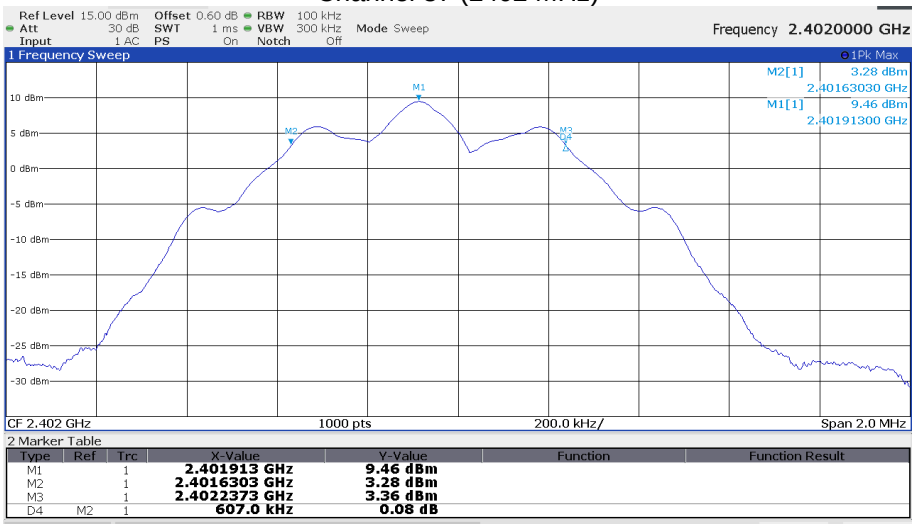
Channel	Centre frequency (MHz)	6 dB bandwidth (kHz)	Minimum limit (kHz)	99 % bandwidth (kHz)	result
37	2402	607.0	500	1049.9	passed
17	2440	602.0	500	1048.9	passed
39	2480	602.0	500	1048.4	passed

The requirements are **FULFILLED.**

Remarks: For detailed test result please see the following test protocols

5.1.6 Test protocols EBW

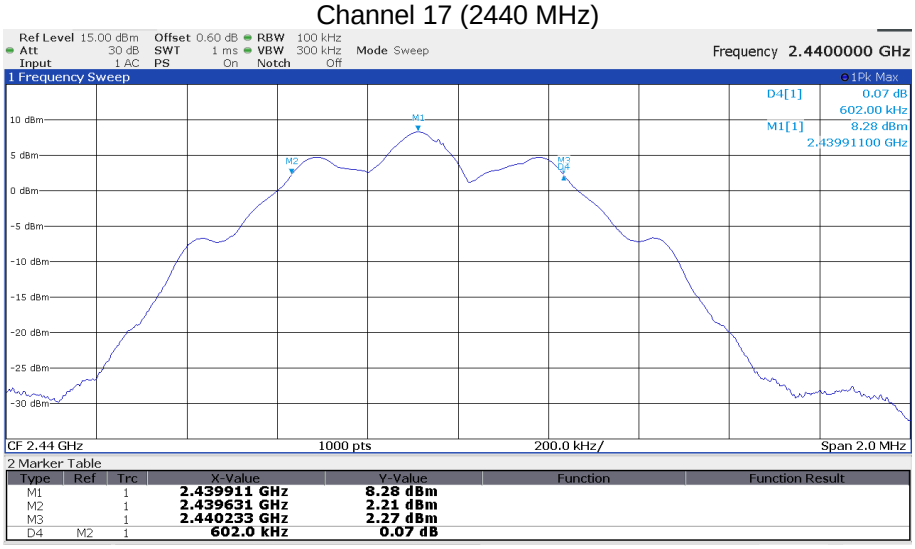
Channel 37 (2402 MHz)



2 Marker Table

Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	2.401913 GHz	9.46 dBm		
M2		1	2.4016303 GHz	3.28 dBm		
M3		1	2.4022373 GHz	3.36 dBm		
D4	M2	1	607.0 kHz	0.08 dB		

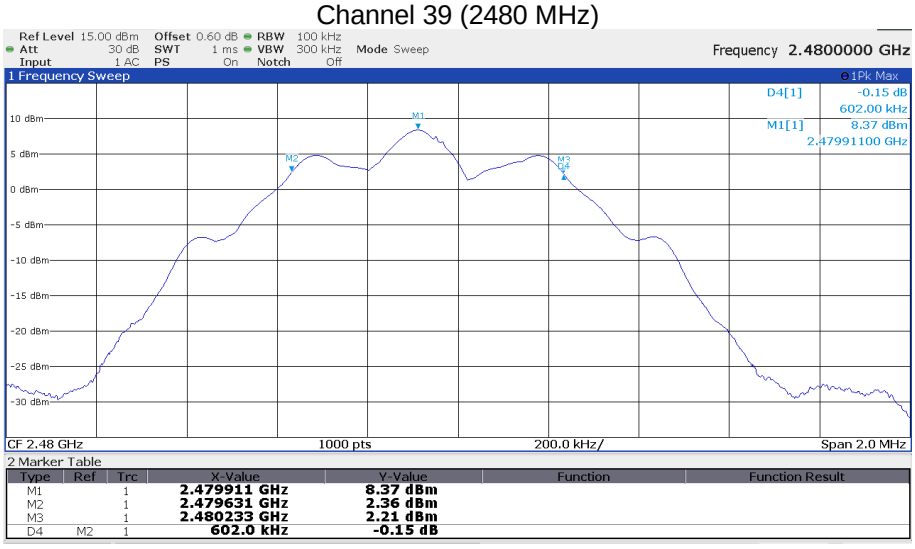
Channel 17 (2440 MHz)



2 Marker Table

Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	2.439911 GHz	8.28 dBm		
M2		1	2.439631 GHz	2.21 dBm		
M3		1	2.440233 GHz	2.27 dBm		
D4	M2	1	602.0 kHz	0.07 dB		

Channel 39 (2480 MHz)

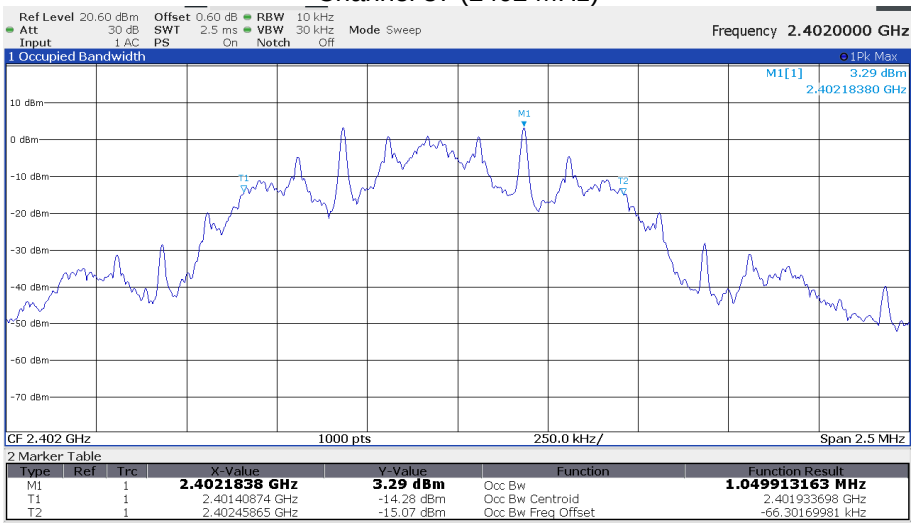


2 Marker Table

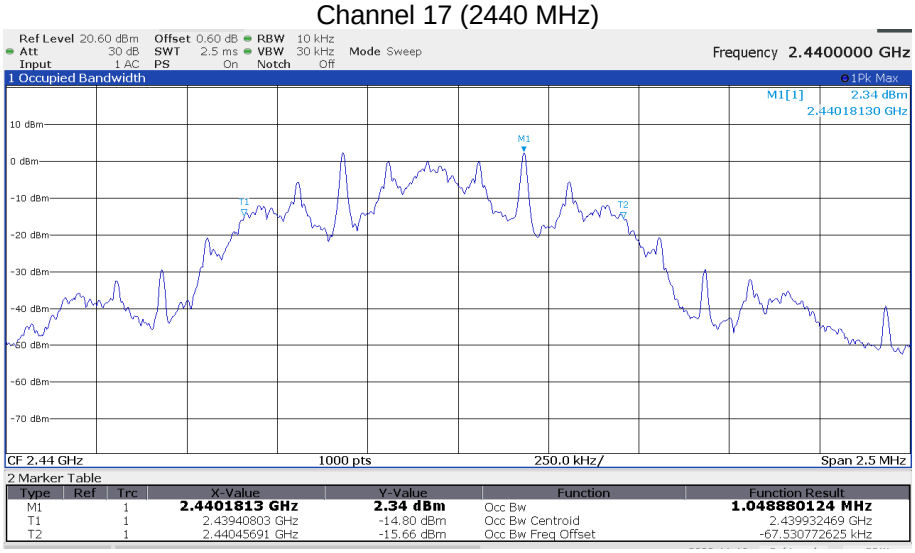
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	2.479911 GHz	8.37 dBm		
M2		1	2.479631 GHz	2.36 dBm		
M3		1	2.480233 GHz	2.21 dBm		
D4	M2	1	602.0 kHz	-0.15 dB		

5.1.7 Test protocols OBW

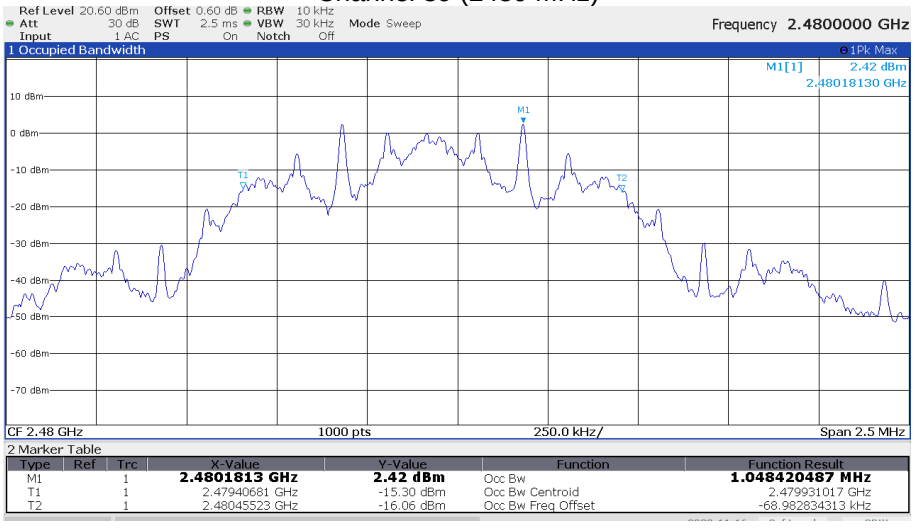
Channel 37 (2402 MHz)



Channel 17 (2440 MHz)



Channel 39 (2480 MHz)



FCC ID: SDL-PRA4X IC ID: 5228A-PRA4X

5.2 Maximum peak conducted and radiated output power

For test instruments and accessories used see section 6 Part **CPC 3**, **CPR 3**.

5.2.1 Description of the test location

Test location: Shielded Room S4

5.2.2 Photo documentation of the test set-up - Detailed photos see ATTACHMENT B

5.2.3 Applicable standard

According to FCC Part 15, Section 15.247(b)(3):
The maximum peak conducted output power of the intentional radiator shall not exceed the following:
For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt.

5.2.4 Description of Measurement

The maximum peak radiated output power is measured using a spectrum analyser following the procedure set out in ANSI C63.10, item 11.9.2.2. The EUT is set in TX continuous mode while measuring. The radiated measurement was performed in terms of fieldstrength. Therefore, the formula set out in ANSI C63.10, item 9.5 (Equation 22) is changed into the following term:

$$E = EIRP - (20*\log_{10}(3)) + 104.7$$

5.2.5 Test result

802.15.1, 125 kbps, TX		Test results conducted				
		P (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)
Lowest frequency: CH37						
T_{nom}	V_{nom}	9.3	1.1	10.4	36.0	-25.6
Middle frequency: CH17						
T_{nom}	V_{nom}	8.5	1.1	9.6	36.0	-26.4
Highest frequency: CH39						
T_{nom}	V_{nom}	8.5	1.1	9.6	36.0	-26.4

802.15.1, 125 kbps, TX		Test results radiated			
		Fieldstrength E (dBµV/m)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)
Lowest frequency: CH37					
T_{nom}	V_{nom}	105.8	10.3	36.0	-25.7
Middle frequency: CH17					
T_{nom}	V_{nom}	105.9	10.4	36.0	-25.6
Highest frequency: CH39					
T_{nom}	V_{nom}	105.8	10.3	36.0	-25.7

FCC ID: SDL-PRA4X IC ID: 5228A-PRA4X

Peak Power Limit according to FCC Part 15, Section 15.247(b)(3):

Frequency (MHz)	Peak Power Limit	
	(dBm)	(W)
902-928	36	4.0
2400-2483.5	**36**	**4.0**
5725-5850	36	4.0

The requirements are **FULFILLED.**

Remarks: None.

5.3 Power spectral density

For test instruments and accessories used see section 6 Part **MB**.

5.3.1 Description of the test location

Test location: Shielded Room S4

5.3.2 Photo documentation of the test set-up - Detailed photos see ATTACHMENT B

5.3.3 Applicable standard

According to FCC Part 15, Section 15.247(e):
For digitally modulated systems, the power spectral density radiated from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the radiated output power shall be used to determine the power spectral density.

5.3.4 Description of Measurement

The measurement is performed using the procedure set out in 11.10 of ANSI C63.10. The power measurement was done as peak power measurement. Therefore, the PKPSD is measured. The max peak was located and with the spectrum analyser and a marker set to peak.

Spectrum analyser settings:
RBW: 3 kHz, VBW: 10 kHz, Detector: Peak, Sweep time: Auto

5.3.5 Test result

Channel	Centre frequency (MHz)	PSD (dBm/ 3 kHz)	PSD limit (dBm/ 3 kHz)	Margin (dB)	result
37	2402	3.1	8.0	-4.9	passed
17	2440	2.4	8.0	-5.6	passed
39	2480	2.3	8.0	-5.7	passed

Power spectral density limit according to FCC Part 15, Section 15.247(e):

Frequency (MHz)	Power spectral density limit (EIRP) (dBm/3 kHz)
2400 - 2483.5	8

The requirements are **FULFILLED.**

Remarks: For detailed test result please see the following test protocols.

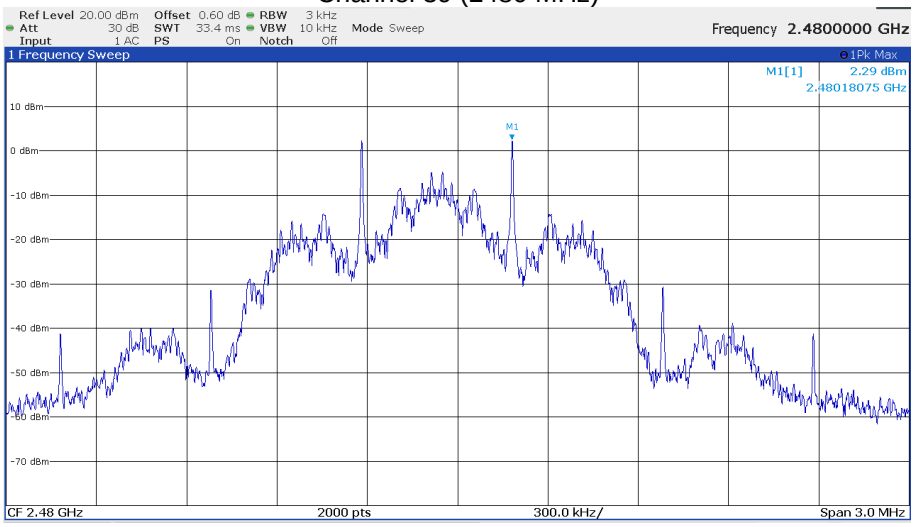
FCC ID: SDL-PRA4X **IC ID: 5228A-PRA4X**

5.3.6 Test protocols

Channel 37 (2402 MHz)

Channel 17 (2440 MHz)

Channel 39 (2480 MHz)



5.4 Radiated emissions in restricted bands

For test instruments and accessories used see section 6 Part **SER 1, SER 2, SER 3**.

5.4.1 Description of the test location

Test location: OATS 1
Test location: Shielded Room S4

Test distance: 3 m

5.4.2 Photo documentation of the test set-up - Detailed photos see ATTACHMENT B

5.4.3 Applicable standard

According to FCC Part 15, Section 15.205(a):
In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limit specified in Section 15.209(a).

5.4.4 Description of Measurement

The restricted bands are measured radiated. The span of the spectrum analyser is set wide enough to capture the restricted band and measure the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products which fall outside of the authorized band of operation. The restricted bands are measured falling emissions into it and the nearest restricted band are checked for emissions also the restricted band for the harmonics of the carrier.

Test receiver settings for SER2:
RBW: 120 MHz, Detector: Quasi peak, Mes. Time: 1 s,

Spectrum analyser settings for SER3:
RBW: 1 MHz, VBW: 3 MHz, Detector: Max. peak, Trace: Max. hold, Sweep: Auto

5.4.5 Test result

f < 1000 MHz

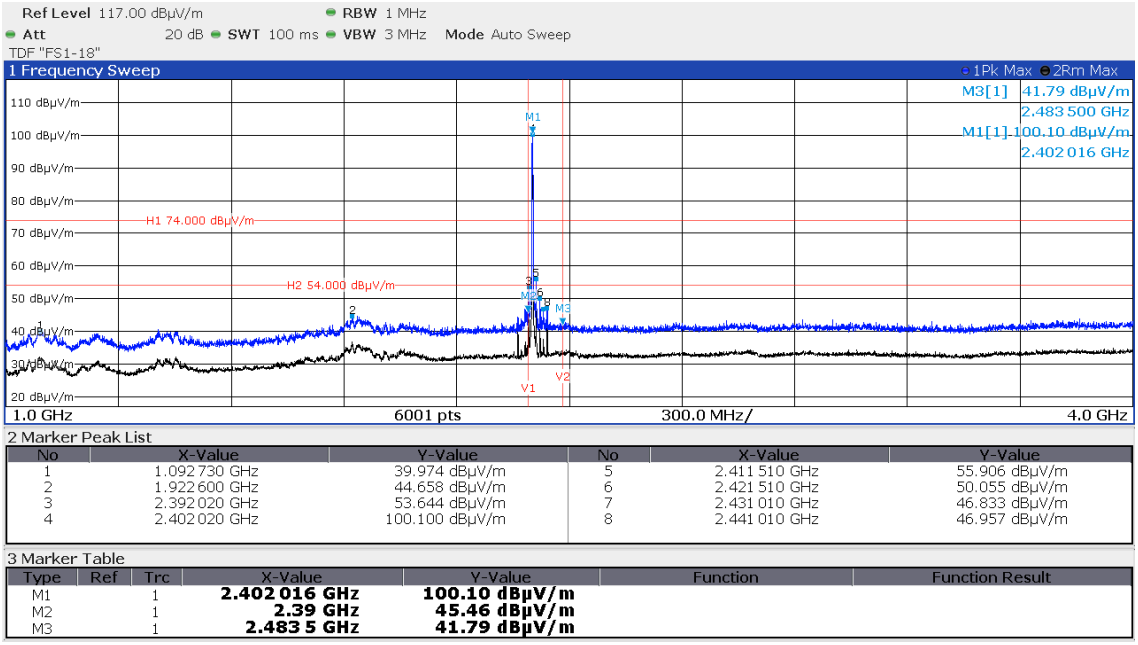
Frequency (MHz)	Reading Vert. (dBµV)	Reading Hor. (dBµV)	Correct. Vert. (dB)	Correct. Hor. (dB)	Level Vert. (dBµV/m)	Level Hor. (dBµV/m)	Limit (dBµV/m)	Dlimit (dB)
136.28	17.6	7.7	18.9	18.1	36.5	25.8	43.5	-7.0
168.39	23.6	20.1	19.2	18.7	42.8	38.8	43.5	-0.7
184.39	22.5	20.0	18.1	17.5	40.6	37.5	43.5	-2.9
200.45	18.2	19.0	17.0	16.5	35.2	35.5	43.5	-8.0
248.55	4.1	5.1	18.7	18.6	22.8	23.7	46.0	-22.3
400.00	3.3	0.9	23.3	23.6	26.6	24.5	46.0	-19.4
700.00	-7.4	-6.3	29.8	30.3	22.4	24.0	46.0	-22.0

Note: Pre-measurements and measurements have shown no emissions in the frequency range from 9 kHz to 30 MHz. Because of the physical dimensions of the EUT, no emissions can occur.

FCC ID: SDL-PRA4X **IC ID: 5228A-PRA4X**

f > 1000 MHz

CH37 horizontal

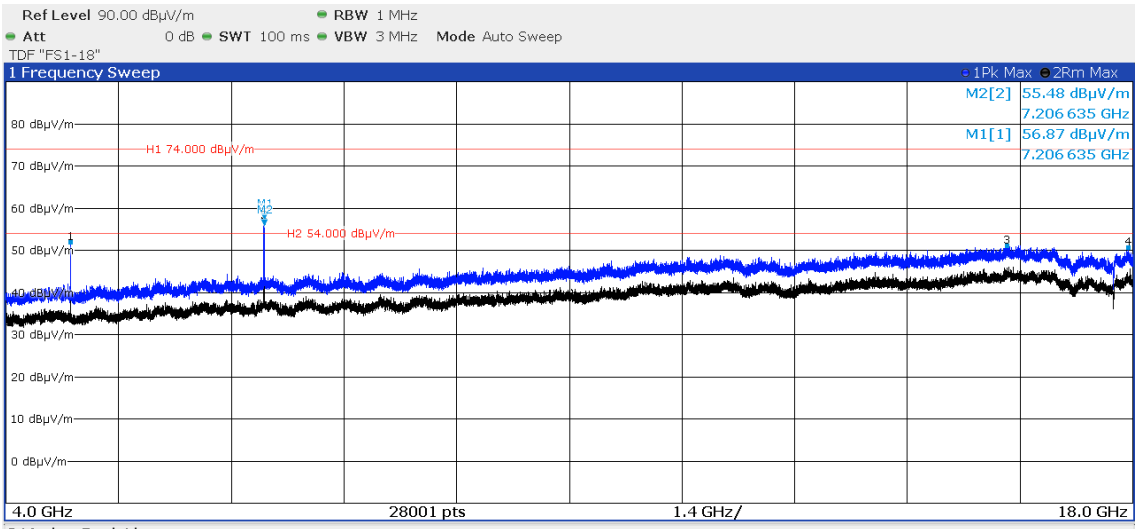


2 Marker Peak List

No	X-Value	Y-Value	No	X-Value	Y-Value
1	1.092 730 GHz	39.974 dBµV/m	5	2.411 510 GHz	55.906 dBµV/m
2	1.922 600 GHz	44.658 dBµV/m	6	2.421 510 GHz	50.055 dBµV/m
3	2.392 020 GHz	53.644 dBµV/m	7	2.431 010 GHz	46.833 dBµV/m
4	2.402 020 GHz	100.100 dBµV/m	8	2.441 010 GHz	46.957 dBµV/m

3 Marker Table

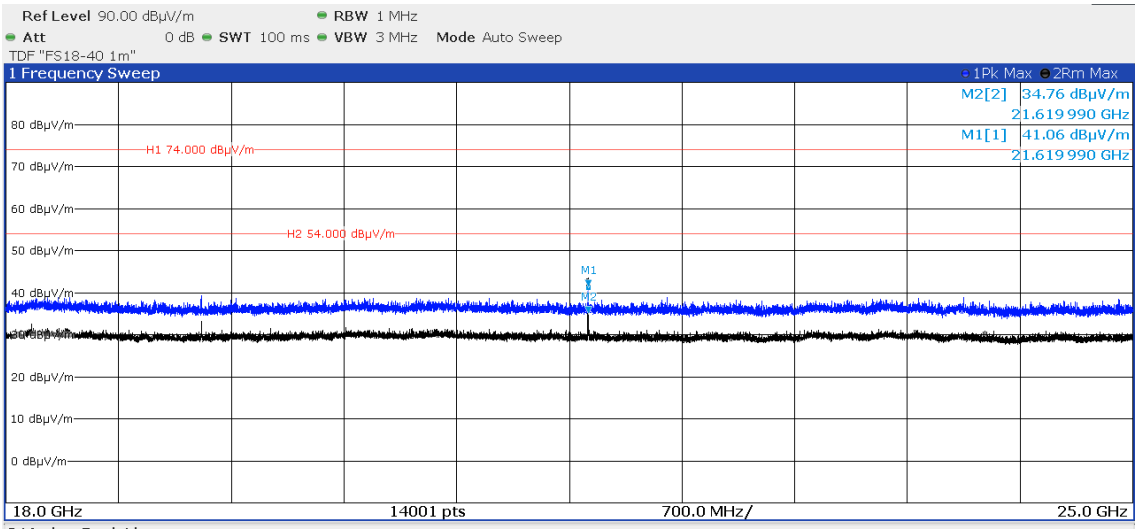
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	**2.402 016 GHz**	**100.10 dBµV/m**		
M2		1	**2.39 GHz**	**45.46 dBµV/m**		
M3		1	**2.483 5 GHz**	**41.79 dBµV/m**		



2 Marker Peak List

No	X-Value	Y-Value	No	X-Value	Y-Value
1	4.803 220 GHz	51.951 dBµV/m	3	16.437 310 GHz	51.146 dBµV/m
2	7.206 640 GHz	56.873 dBµV/m	4	17.941 750 GHz	50.550 dBµV/m

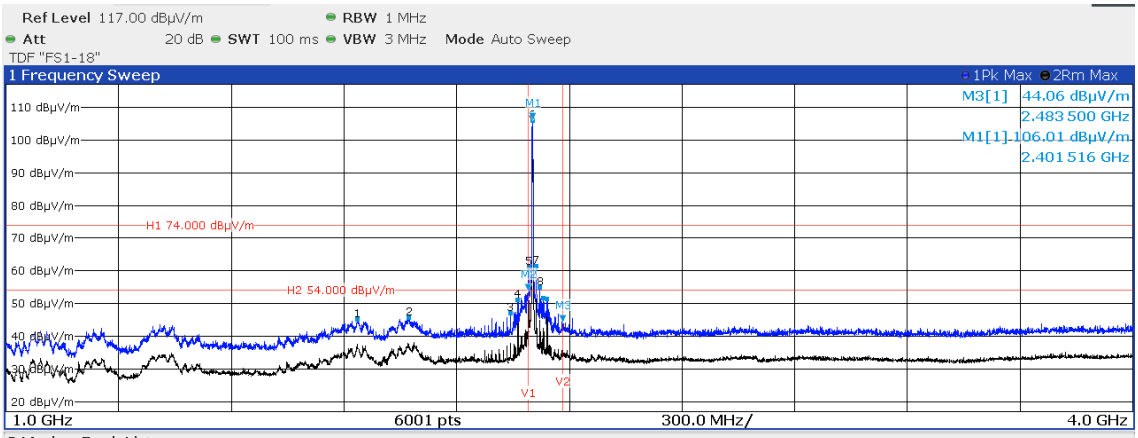
FCC ID: SDL-PRA4X IC ID: 5228A-PRA4X



2 Marker Peak List

No	X-Value	Y-Value	No	X-Value	Y-Value
1	21.619 990 GHz	41.056 dBµV/m			

CH37 vertical



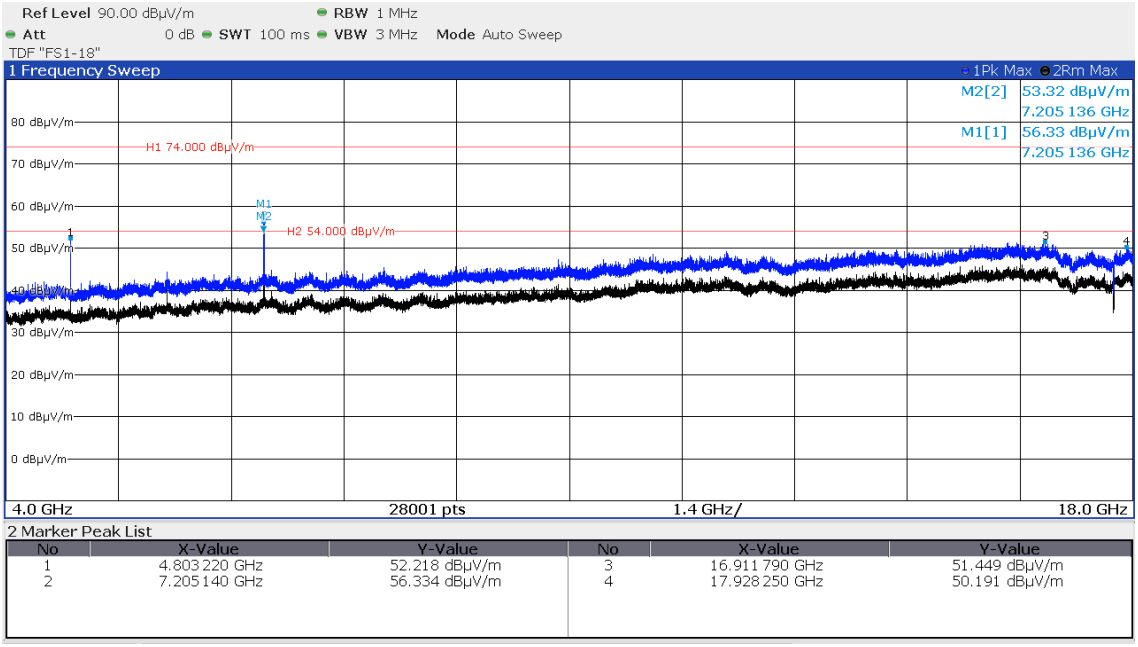
2 Marker Peak List

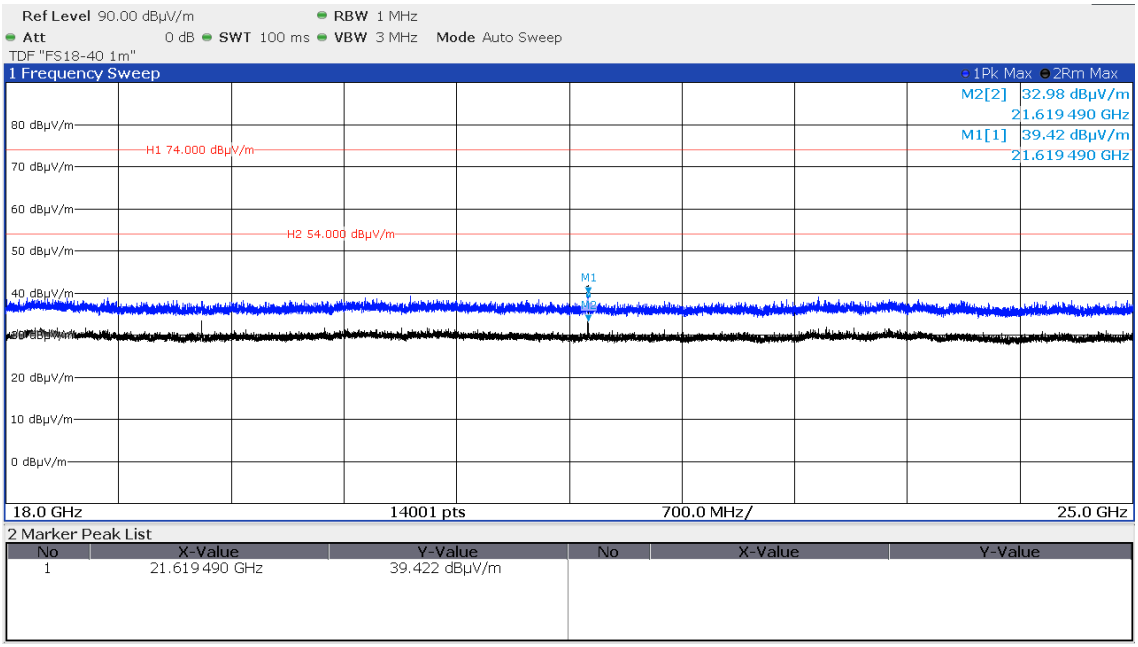
No	X-Value	Y-Value	No	X-Value	Y-Value
1	1.936 090 GHz	45.139 dBµV/m	6	2.401 520 GHz	106.010 dBµV/m
2	2.072 570 GHz	45.699 dBµV/m	7	2.411 510 GHz	61.353 dBµV/m
3	2.343 030 GHz	46.973 dBµV/m	8	2.421 510 GHz	54.878 dBµV/m
4	2.363 020 GHz	51.179 dBµV/m	9	2.431 510 GHz	51.586 dBµV/m
5	2.392 020 GHz	61.149 dBµV/m	10	2.441 010 GHz	51.416 dBµV/m

3 Marker Table

Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	**2.401 516 GHz**	**106.01 dBµV/m**		
M2		1	**2.39 GHz**	**53.53 dBµV/m**		
M3		1	**2.483 5 GHz**	**44.06 dBµV/m**		

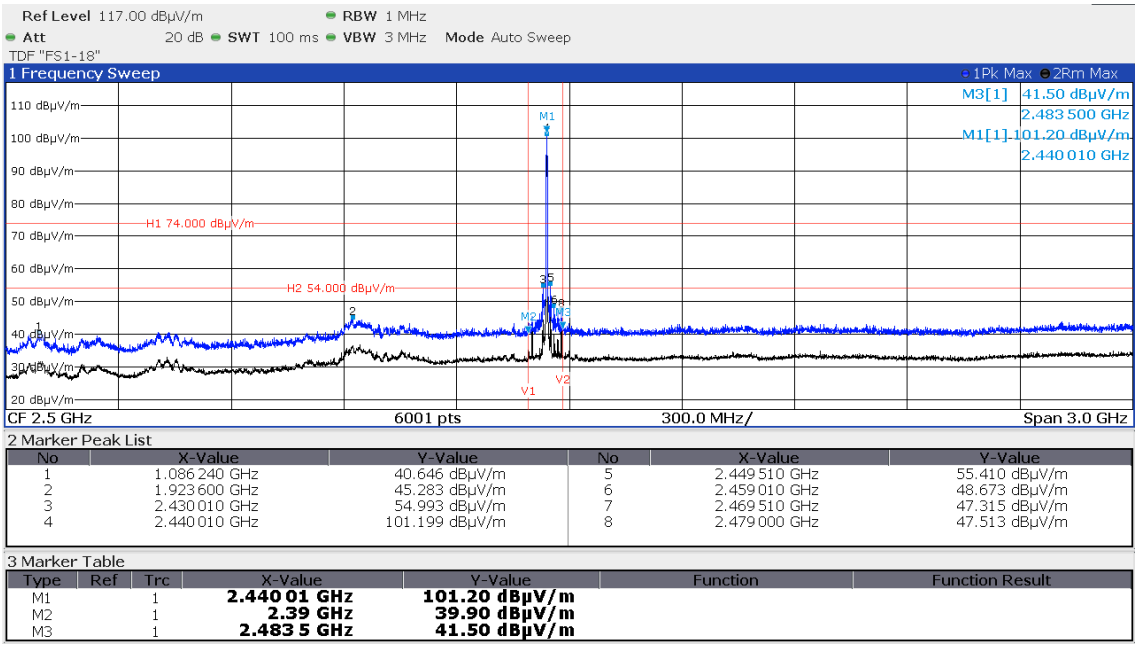
FCC ID: SDL-PRA4X IC ID: 5228A-PRA4X

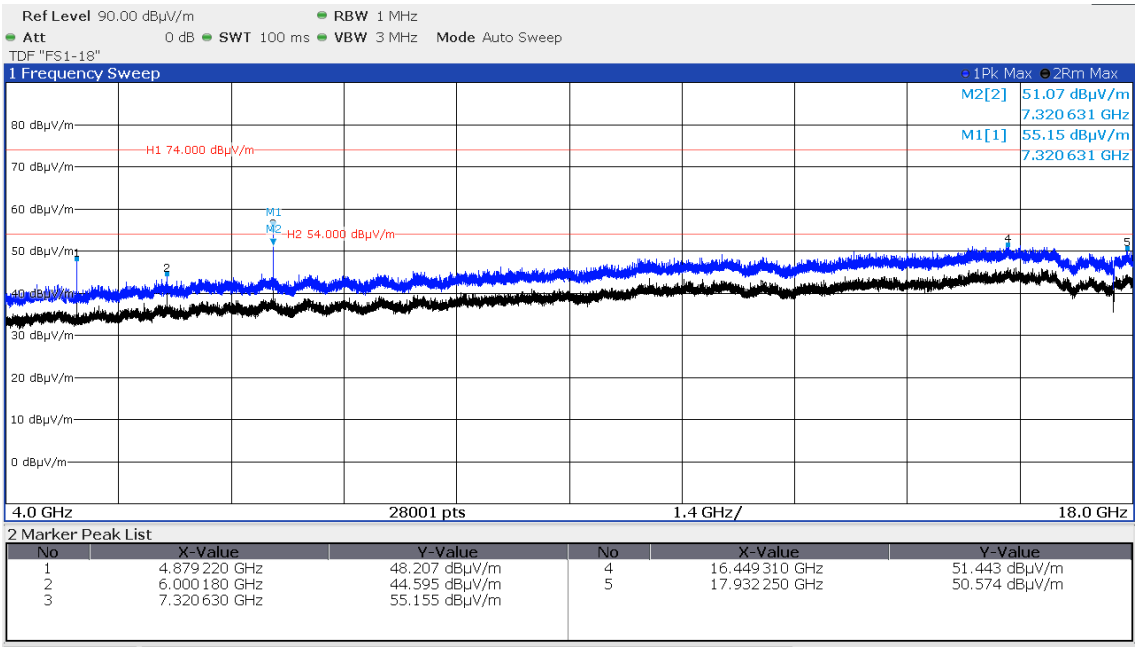




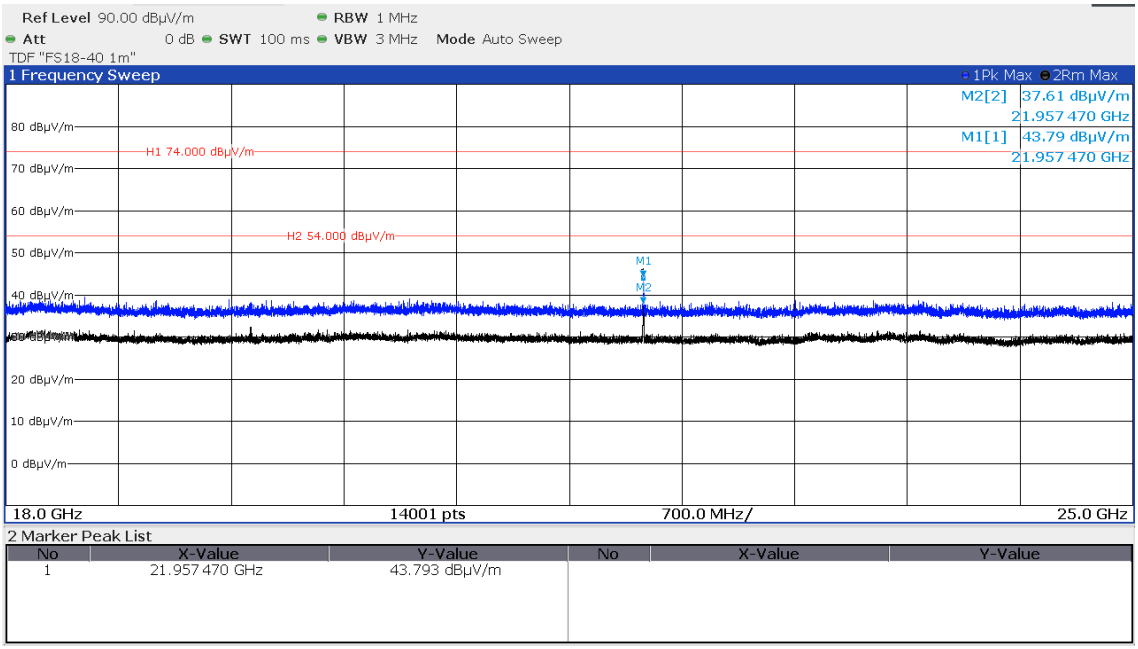
FCC ID: SDL-PRA4X IC ID: 5228A-PRA4X

CH17 horizontal





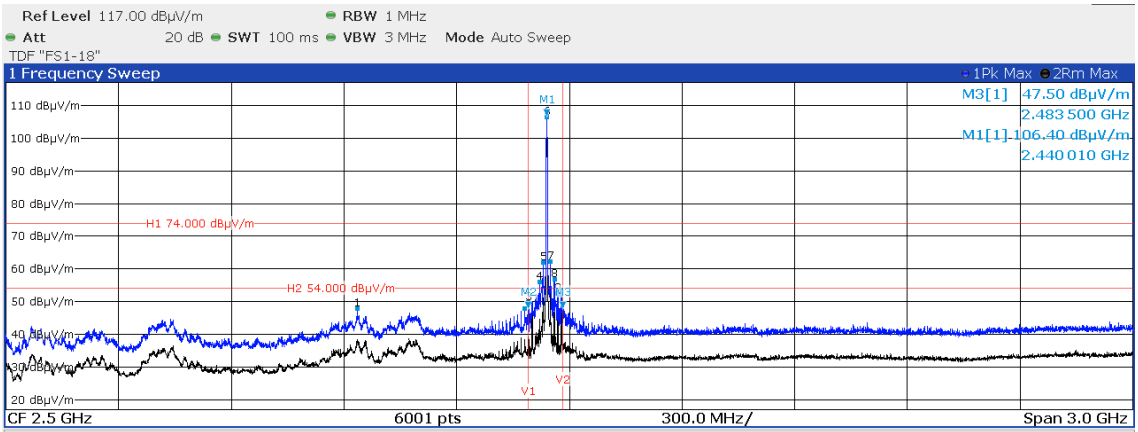
FCC ID: SDL-PRA4X IC ID: 5228A-PRA4X



2 Marker Peak List

No	X-Value	Y-Value	No	X-Value	Y-Value
1	21.957 470 GHz	43.793 dBµV/m			

CH17 vertical



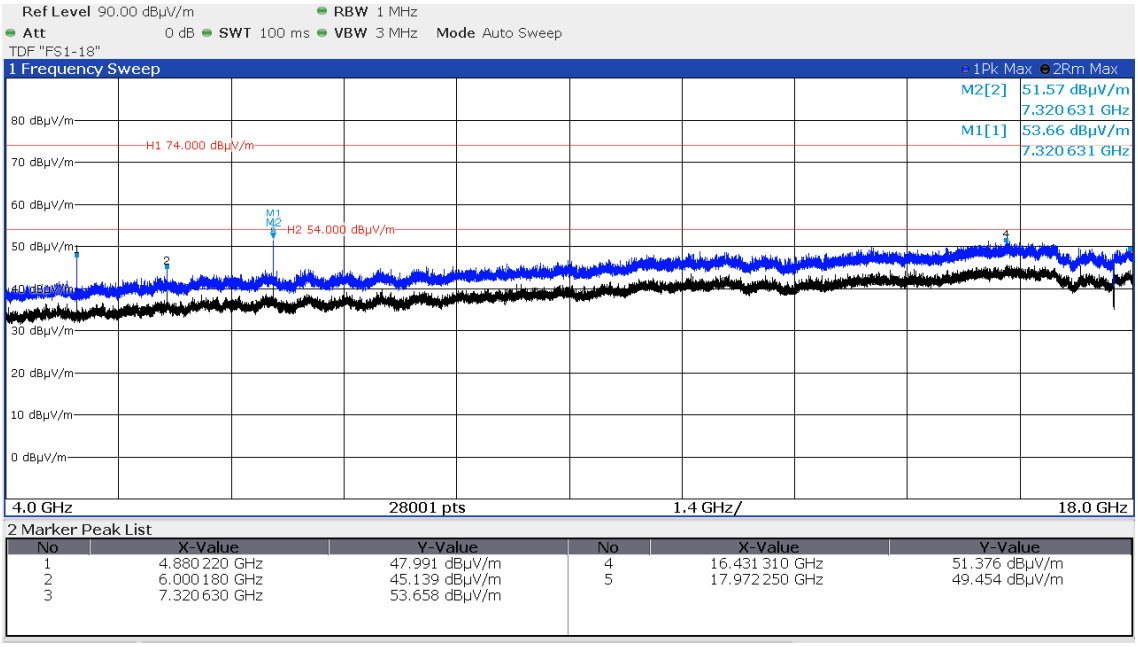
2 Marker Peak List

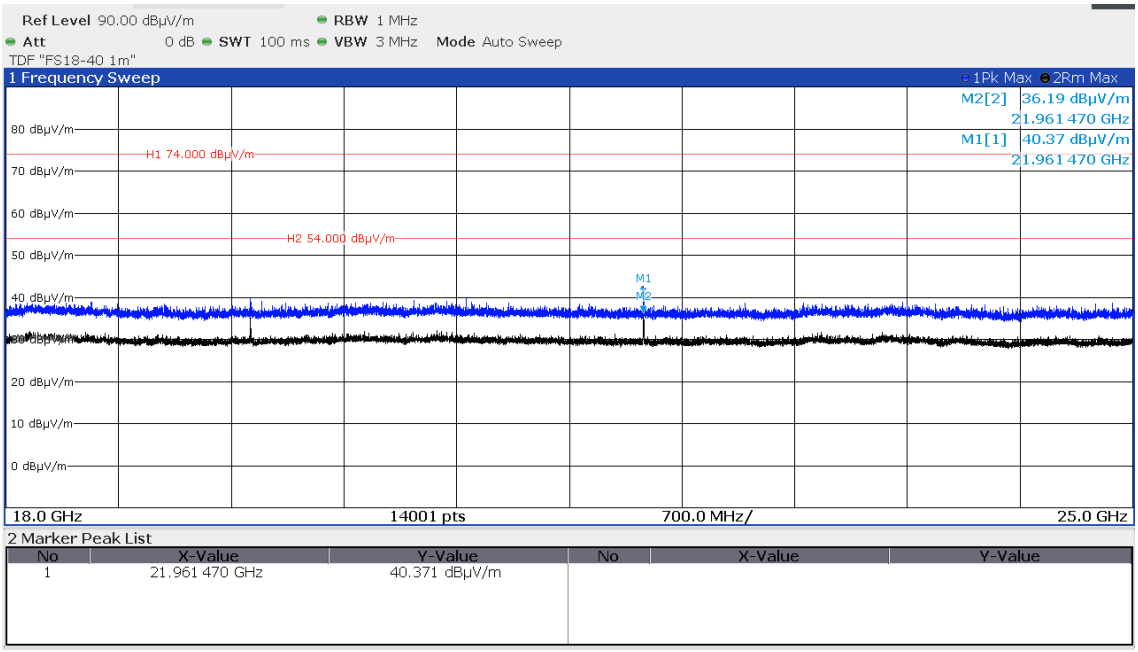
No	X-Value	Y-Value	No	X-Value	Y-Value
1	1.935 090 GHz	47.896 dBµV/m	6	2.440 010 GHz	106.402 dBµV/m
2	2.381 020 GHz	47.920 dBµV/m	7	2.450 010 GHz	62.259 dBµV/m
3	2.391 020 GHz	49.744 dBµV/m	8	2.460 010 GHz	56.757 dBµV/m
4	2.420 510 GHz	56.128 dBµV/m	9	2.469 010 GHz	52.369 dBµV/m
5	2.430 510 GHz	61.913 dBµV/m	10	2.478 500 GHz	52.132 dBµV/m

3 Marker Table

Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	**2.440 01 GHz**	**106.40 dBµV/m**		
M2		1	**2.39 GHz**	**47.51 dBµV/m**		
M3		1	**2.483 5 GHz**	**47.50 dBµV/m**		

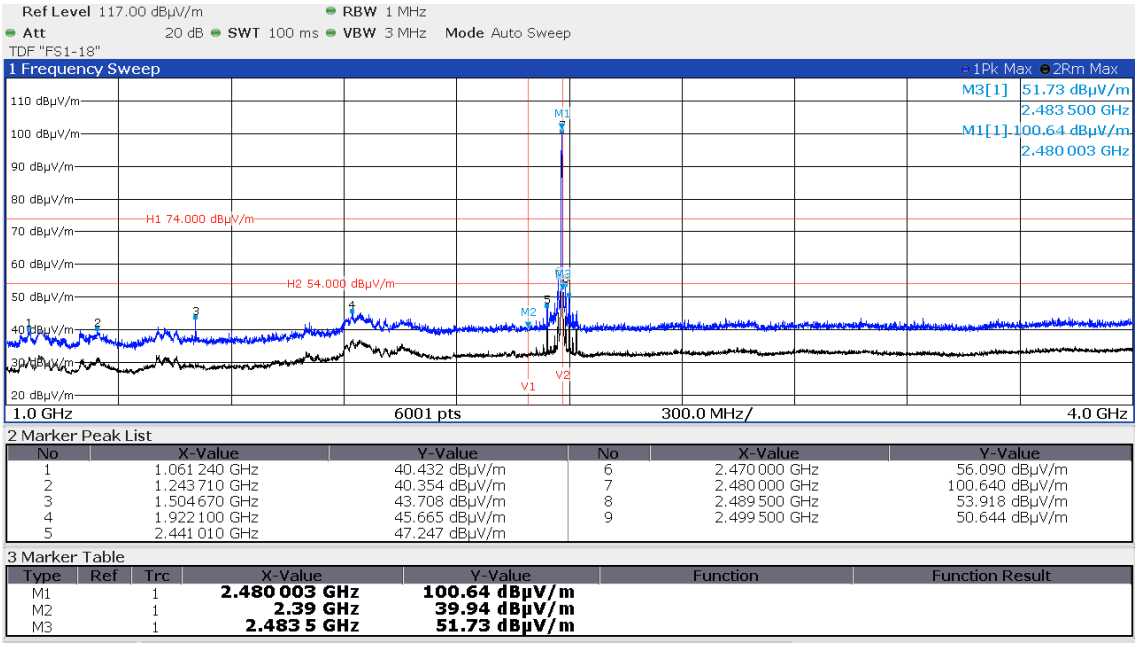
FCC ID: SDL-PRA4X IC ID: 5228A-PRA4X





FCC ID: SDL-PRA4X IC ID: 5228A-PRA4X

CH39 horizontal

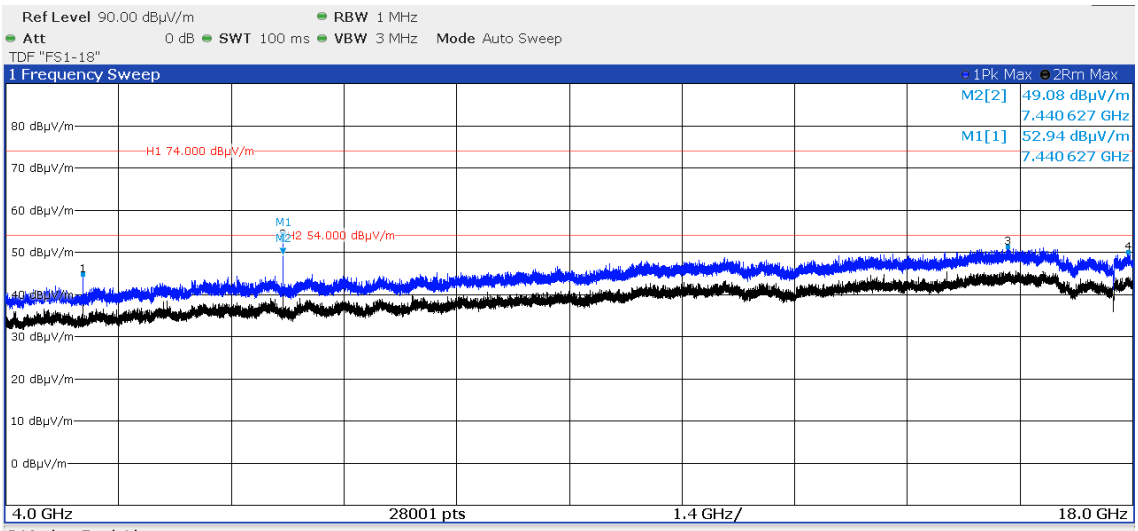


2 Marker Peak List

No	X-Value	Y-Value	No	X-Value	Y-Value
1	1.061 240 GHz	40.432 dBµV/m	6	2.470 000 GHz	56.090 dBµV/m
2	1.243 710 GHz	40.354 dBµV/m	7	2.480 000 GHz	100.640 dBµV/m
3	1.504 670 GHz	43.708 dBµV/m	8	2.489 500 GHz	53.918 dBµV/m
4	1.922 100 GHz	45.665 dBµV/m	9	2.499 500 GHz	50.644 dBµV/m
5	2.441 010 GHz	47.247 dBµV/m			

3 Marker Table

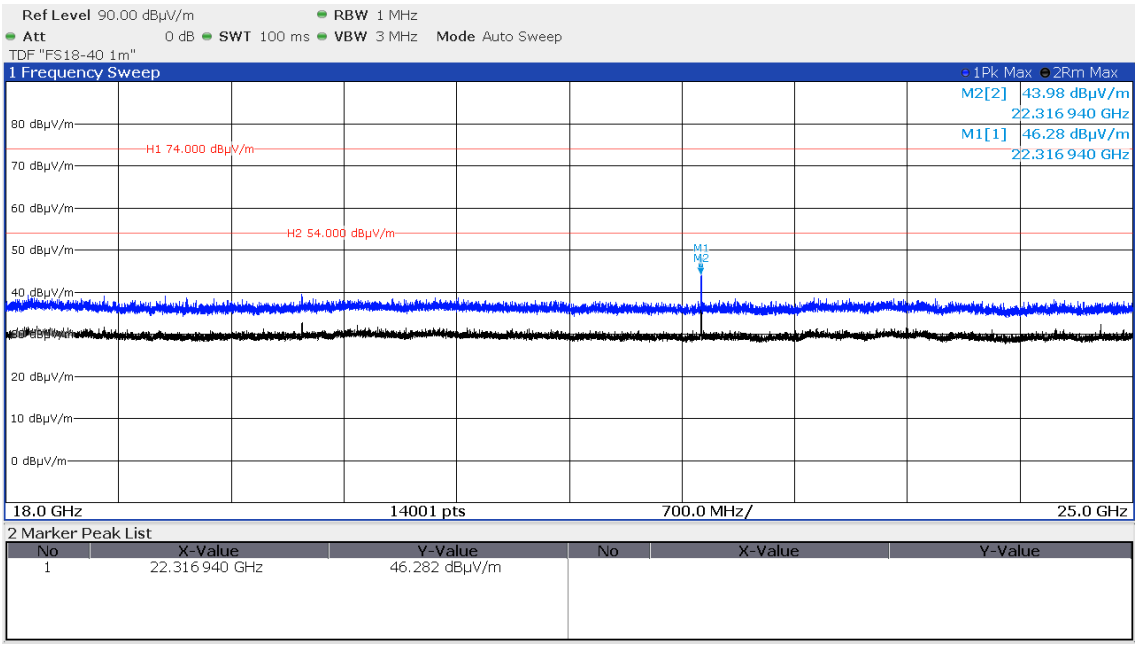
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	**2.480 003 GHz**	**100.64 dBµV/m**		
M2		1	**2.39 GHz**	**39.94 dBµV/m**		
M3		1	**2.483 5 GHz**	**51.73 dBµV/m**		



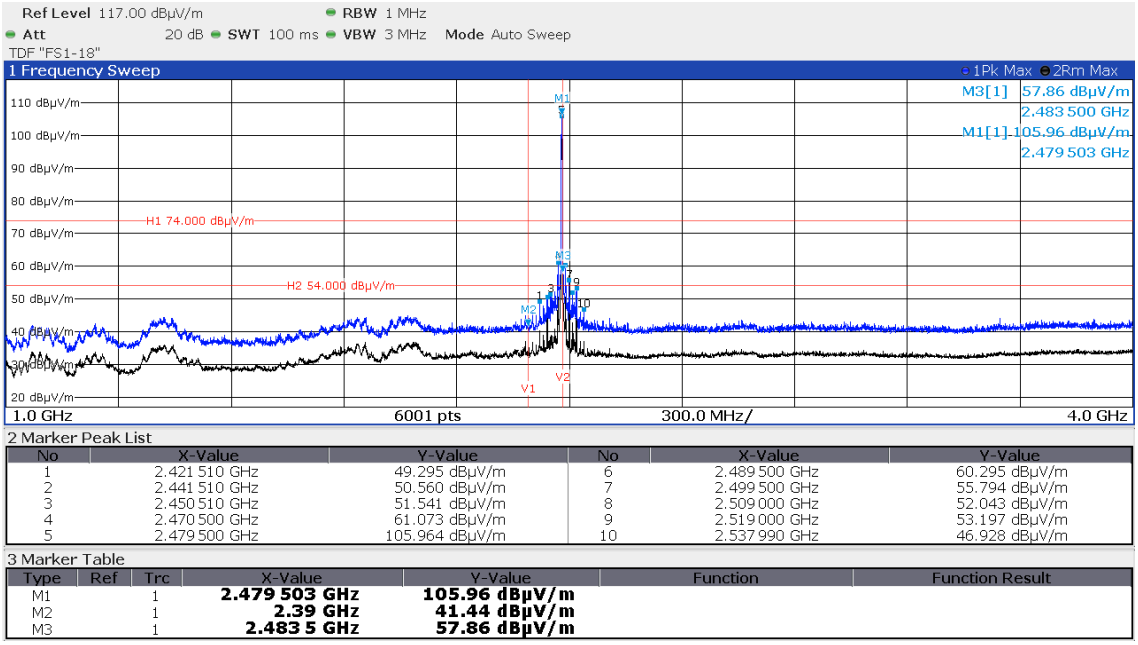
2 Marker Peak List

No	X-Value	Y-Value	No	X-Value	Y-Value
1	4.959 220 GHz	44.745 dBµV/m	3	16.444 310 GHz	51.358 dBµV/m
2	7.440 630 GHz	52.945 dBµV/m	4	17.940 750 GHz	50.076 dBµV/m

FCC ID: SDL-PRA4X IC ID: 5228A-PRA4X

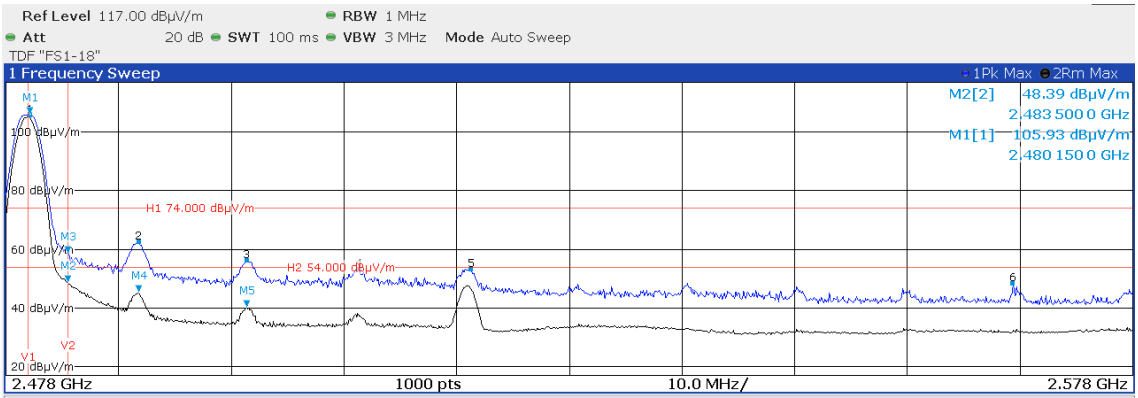


CH39 vertical



A detailed zoom of the right band edge can be seen on the next picture.

FCC ID: SDL-PRA4X IC ID: 5228A-PRA4X

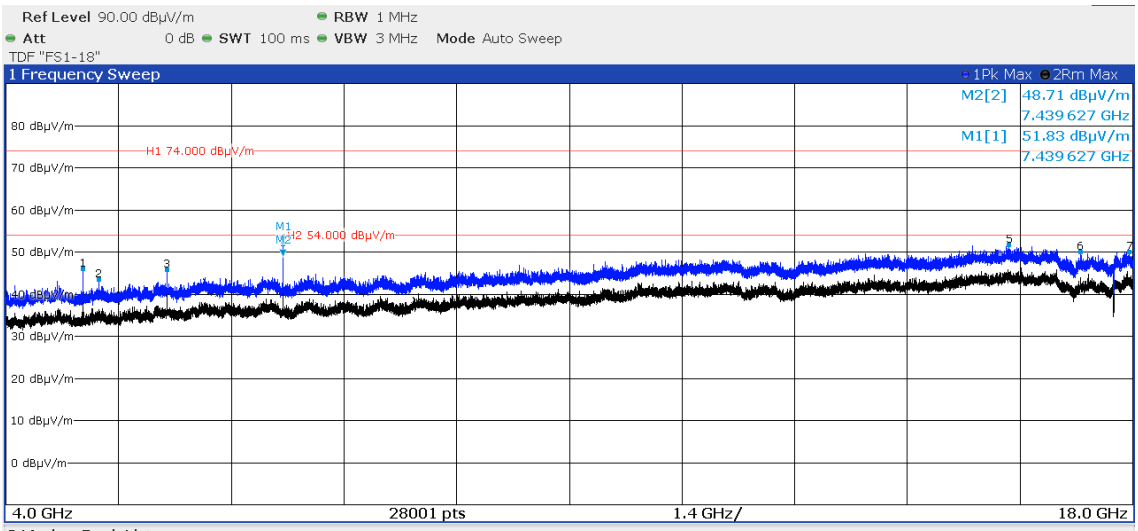


2 Marker Peak List

No	X-Value	Y-Value	No	X-Value	Y-Value
1	2.480 150 GHz	105.934 dBµV/m	4	2.509 350 GHz	53.340 dBµV/m
2	2.489 750 GHz	62.649 dBµV/m	5	2.519 250 GHz	53.343 dBµV/m
3	2.499 350 GHz	56.150 dBµV/m	6	2.567 350 GHz	48.392 dBµV/m

3 Marker Table

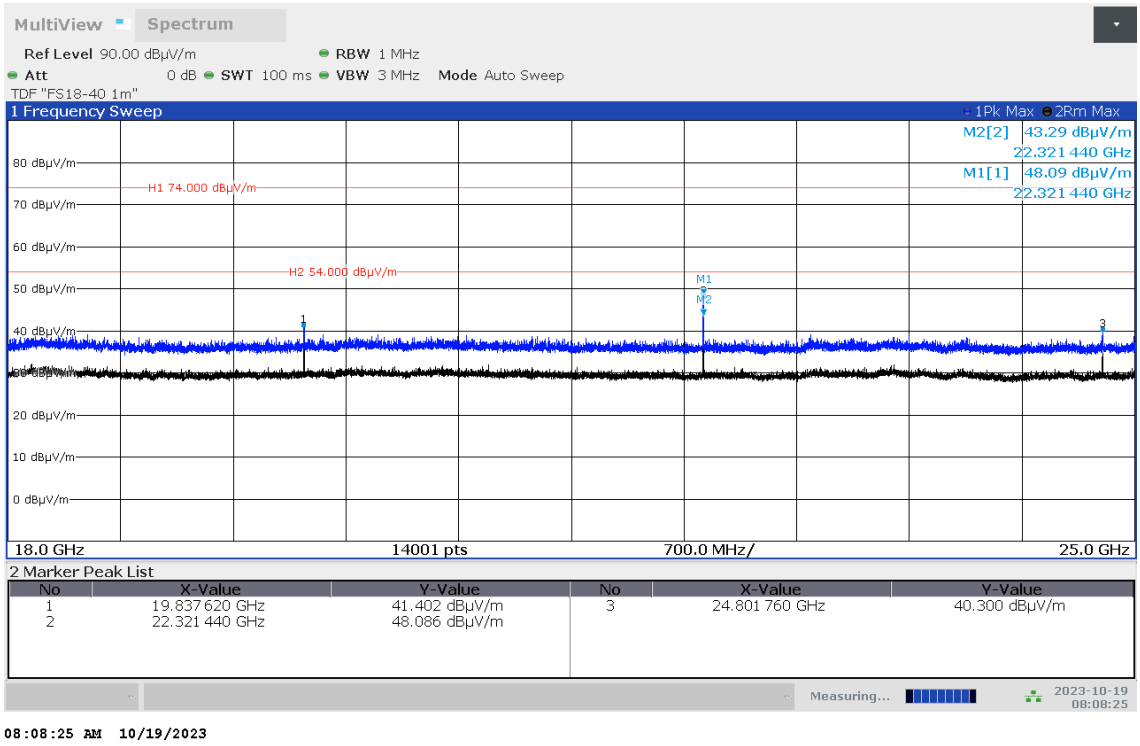
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	**2.480 15 GHz**	**105.93 dBµV/m**		
M2		2	**2.483 5 GHz**	**48.39 dBµV/m**		
M3		1	**2.483 5 GHz**	**58.27 dBµV/m**		
M4		2	**2.489 75 GHz**	**45.09 dBµV/m**		
M5		2	**2.499 35 GHz**	**40.03 dBµV/m**		



2 Marker Peak List

No	X-Value	Y-Value	No	X-Value	Y-Value
1	4.960 220 GHz	46.090 dBµV/m	5	16.461 800 GHz	51.633 dBµV/m
2	5.152 710 GHz	43.510 dBµV/m	6	17.346 270 GHz	49.970 dBµV/m
3	6.000 680 GHz	45.847 dBµV/m	7	17.956 750 GHz	49.911 dBµV/m
4	7.439 630 GHz	51.827 dBµV/m			

FCC ID: SDL-PRA4X **IC ID: 5228A-PRA4X**



08:08:25 AM 10/19/2023

Radiated limits according to FCC Part 15 Section 15.209(a) for spurious emissions which fall in restricted bands:

Frequency	Field strength of spurious emissions		Measurement distance
(MHz)	(µV/m)	dB(µV/m)	(metres)
0.009-0.490	2400/F (kHz)		300
0.490-1.705	24000/F (kHz)		30
1.705-30	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

FCC ID: SDL-PRA4X IC ID: 5228A-PRA4X

Restricted bands of operation:

The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209

MHz	MHz	MHz	GHz
0.090 – 0.110	16.42 – 16.423	399.9 – 410	4.5 – 5.15
0.495 – 0.505	16.69475 – 16.69525	608 – 614	5.35 – 5.46
2.1735 – 2.1905	16.80425 – 16.80475	960 – 1240	7.25 – 7.75
4.125 – 4.128	25.5 – 25.67	1300 – 1427	8.025 – 8.5
4.17725 – 4.17775	37.5 – 38.25	1435 – 1626.5	9.0 – 9.2
4.20725 – 4.20775	73 – 74.6	1645.5 – 1646.5	9.3 – 9.5
6.215 – 6.218	74.8 – 75.2	1660 – 1710	10.6 – 12.7
6.26775 – 6.26825	108 – 121.94	1718.8 – 1722.2	13.25 – 13.4
6.31175 – 6.31225	123 – 138	2200 – 2300	14.47 – 14.5
8.291 – 8.294	149.9 – 150.05	2310 – 2390	15.35 – 16.2
8.362 – 8.366	156.52475 – 156.52525	2483.5 – 2500	17.7 – 21.4
8.37625 – 8.38675	156.7 – 156.9	2690 – 2900	22.01 – 23.12
8.41425 – 8.41475	162.0125 – 167.17	3260 – 3267	23.6 – 24.0
12.29 – 12.293	167.72 – 173.2	3332 – 3339	31.2 – 31.8
12.51975 – 12.52025	240 – 285	3345.8 – 3358	36.43 – 36.5
12.57675 – 12.57725	322 – 335.4	3600 – 4400	Above 38.6

RSS-Gen, Table 6 – Restricted Frequency Bands

MHz	MHz	MHz	GHz
0.090 - 0.110	12.57675 - 12.57725	399.9 - 410	7.250 - 7.750
0.495 - 0.505	13.36 - 13.41	608 - 614	8.025 – 8.500
2.1735 - 2.1905	16.42 - 16.423	960 - 1427	9.0 - 9.2
3.020 - 3.026	16.69475 - 16.69525	1435 - 1626.5	9.3 - 9.5
4.125 - 4.128	16.80425 - 16.80475	1645.5 - 1646.5	10.6 - 12.7
4.17725 - 4.17775	25.5 - 25.67	1660 - 1710	13.25 - 13.4
4.20725 - 4.20775	37.5 - 38.25	1718.8 - 1722.2	14.47 - 14.5
5.677 - 5.683	73 - 74.6	2200 - 2300	15.35 - 16.2
6.215 - 6.218	74.8 - 75.2	2310 - 2390	17.7 - 21.4
6.26775 - 6.26825	108 – 138	2483.5 - 2500	22.01 - 23.12
6.31175 - 6.31225	149.9 - 150.05	2655 - 2900	23.6 - 24.0
8.291 - 8.294	156.52475 - 156.52525	3260 – 3267	31.2 - 31.8
8.362 - 8.366	156.7 - 156.9	3332 - 3339	36.43 - 36.5
8.37625 - 8.38675	162.0125 - 167.17	3345.8 - 3358	Above 38.6
8.41425 - 8.41475	167.72 - 173.2	3500 - 4400	
12.29 - 12.293	240 – 285	4500 - 5150	
12.51975 - 12.52025	322 - 335.4	5350 - 5460	

The requirements are **FULFILLED.**

Remarks: The measurement was performed up to the 10th harmonic.

5.5 Spurious emissions

For test instruments and accessories used see section 6 Part **SEC 1-3**.

5.5.1 Description of the test location

Test location: Shielded Room S4

5.5.2 Photo documentation of the test set-up - Detailed photos see ATTACHMENT B

5.5.3 Applicable standard

According to FCC Part 15, Section 15.247(d):
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

5.5.4 Description of Measurement

The radiated power of the spurious emission from the EUT is measured in a test setup following the procedures set out in ANSI C63.10. If the emission level of the EUT in peak mode complies with the average limit is 20 dB lower, then testing will be stopped and peak values of the EUT will be reported, otherwise the emission will be measured in average mode again and reported.

Test receiver settings for SER2:
RBW: 120 MHz, Detector: Quasi peak, Mes. Time: 1 s,

Spectrum analyser settings for SER3:
RBW: 100 kHz, VBW: 300 kHz, Detector: Max. peak, Trace: Max. hold, Sweep: Auto

5.5.5 Test result

Limit according to FCC Part 15, Section 15.247(d) for emissions falling not in restricted bands:
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. Attenuation below the general limits specified in Section 15.209(a) is not required.

Frequency (MHz)	Spurious emission limit
Below 1000	20 dB below the highest level of the desired power
Above 1000	20 dB below the highest level of the desired power

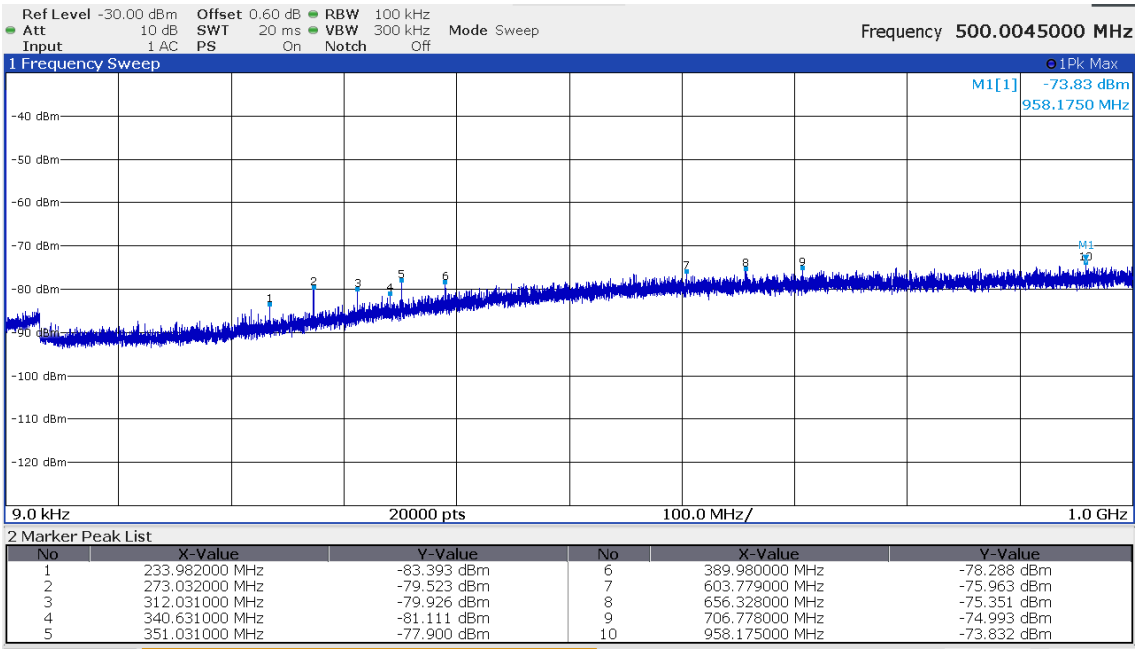
The requirements are **FULFILLED.**

Remarks: For detailed test result please see the following test protocols.

FCC ID: SDL-PRA4X IC ID: 5228A-PRA4X

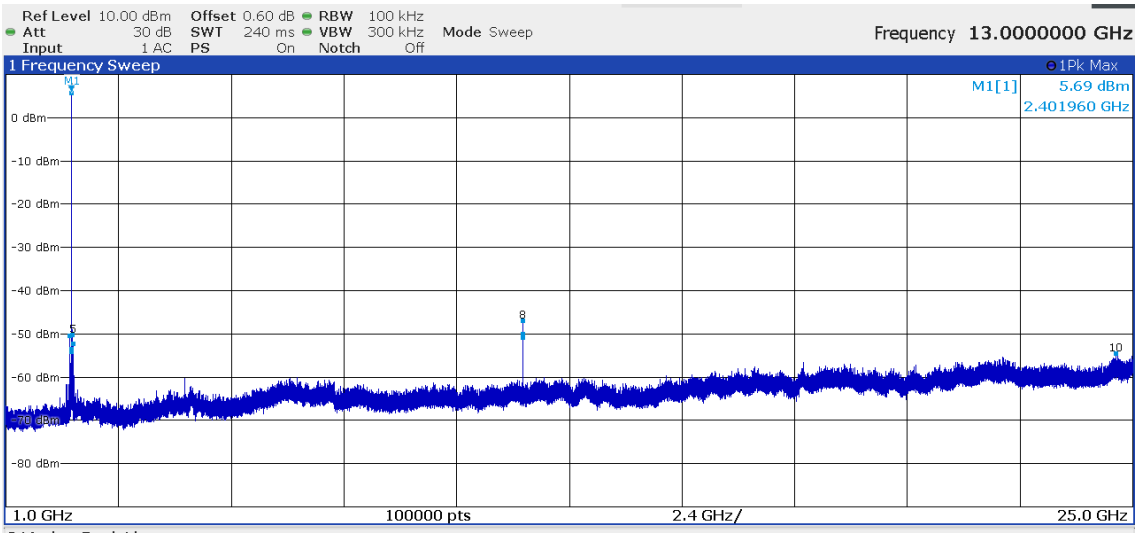
5.5.6 Test protocols

CH37



2 Marker Peak List

No	X-Value	Y-Value	No	X-Value	Y-Value
1	233.982000 MHz	-83.393 dBm	6	389.980000 MHz	-78.288 dBm
2	273.032000 MHz	-79.523 dBm	7	603.779000 MHz	-75.963 dBm
3	312.031000 MHz	-79.926 dBm	8	656.328000 MHz	-75.351 dBm
4	340.631000 MHz	-81.111 dBm	9	706.778000 MHz	-74.993 dBm
5	351.031000 MHz	-77.900 dBm	10	958.175000 MHz	-73.832 dBm

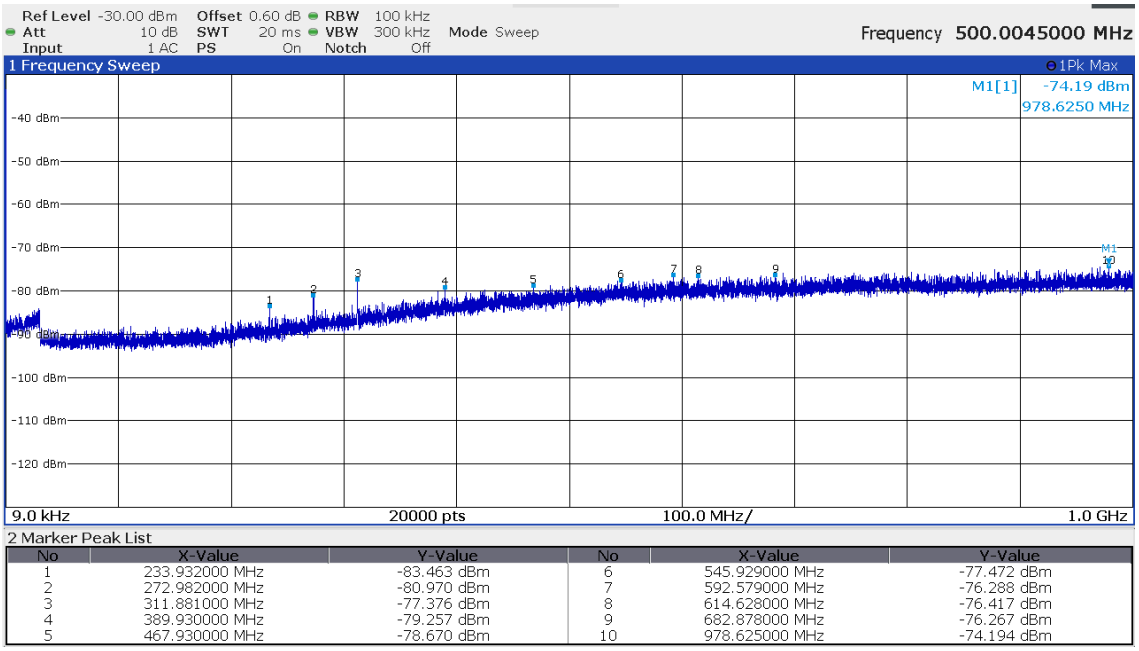


2 Marker Peak List

No	X-Value	Y-Value	No	X-Value	Y-Value
1	2.362840 GHz	-50.492 dBm	6	2.441080 GHz	-52.215 dBm
2	2.389720 GHz	-53.620 dBm	7	12.008440 GHz	-50.034 dBm
3	2.393320 GHz	-54.076 dBm	8	12.009640 GHz	-47.030 dBm
4	2.401960 GHz	5.687 dBm	9	12.010840 GHz	-50.838 dBm
5	2.421400 GHz	-50.309 dBm	10	24.649720 GHz	-54.571 dBm

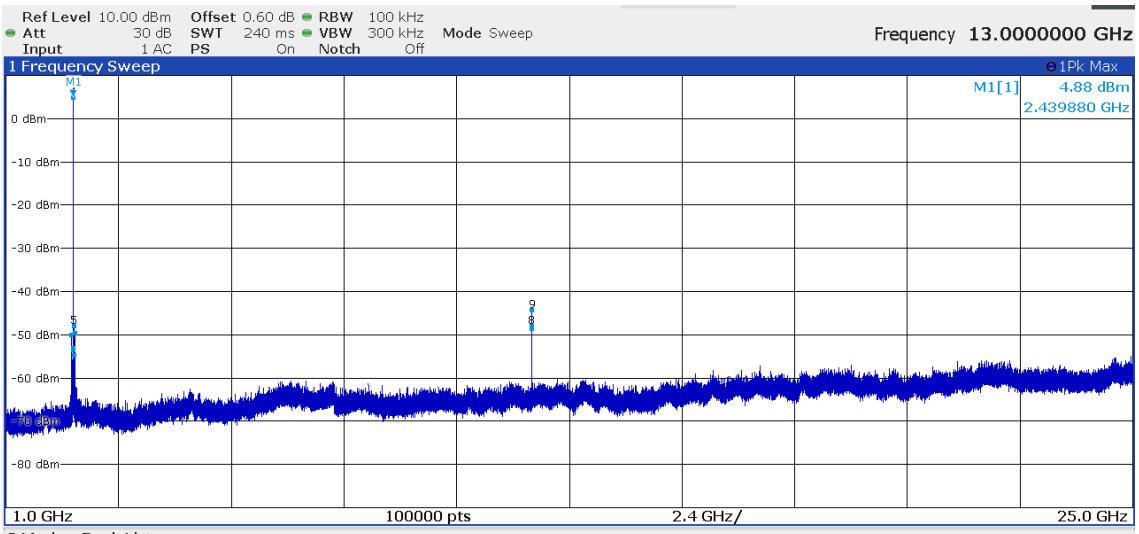
FCC ID: SDL-PRA4X IC ID: 5228A-PRA4X

CH17



2 Marker Peak List

No	X-Value	Y-Value	No	X-Value	Y-Value
1	233.932000 MHz	-83.463 dBm	6	545.929000 MHz	-77.472 dBm
2	272.982000 MHz	-80.970 dBm	7	592.579000 MHz	-76.288 dBm
3	311.881000 MHz	-77.376 dBm	8	614.628000 MHz	-76.417 dBm
4	389.930000 MHz	-79.257 dBm	9	682.878000 MHz	-76.267 dBm
5	467.930000 MHz	-78.670 dBm	10	978.625000 MHz	-74.194 dBm

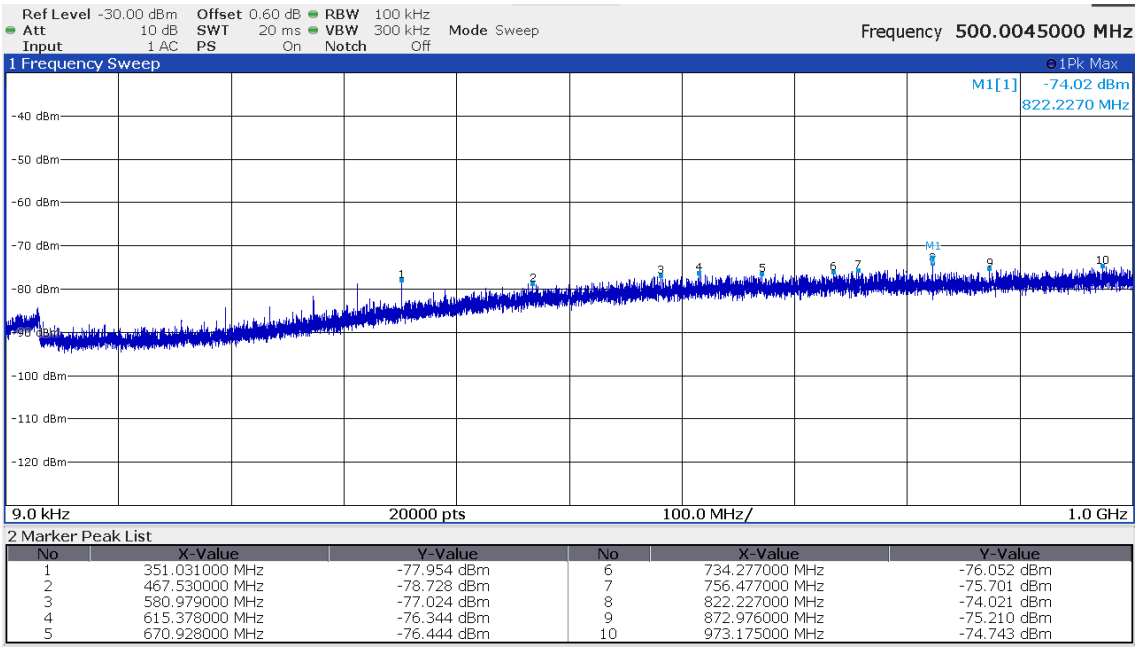


2 Marker Peak List

No	X-Value	Y-Value	No	X-Value	Y-Value
1	2.400760 GHz	-50.092 dBm	6	2.448520 GHz	-54.755 dBm
2	2.428840 GHz	-53.529 dBm	7	2.478760 GHz	-49.628 dBm
3	2.431480 GHz	-53.050 dBm	8	12.198280 GHz	-47.932 dBm
4	2.439880 GHz	4.876 dBm	9	12.199480 GHz	-44.401 dBm
5	2.444920 GHz	-48.000 dBm	10	12.200920 GHz	-48.509 dBm

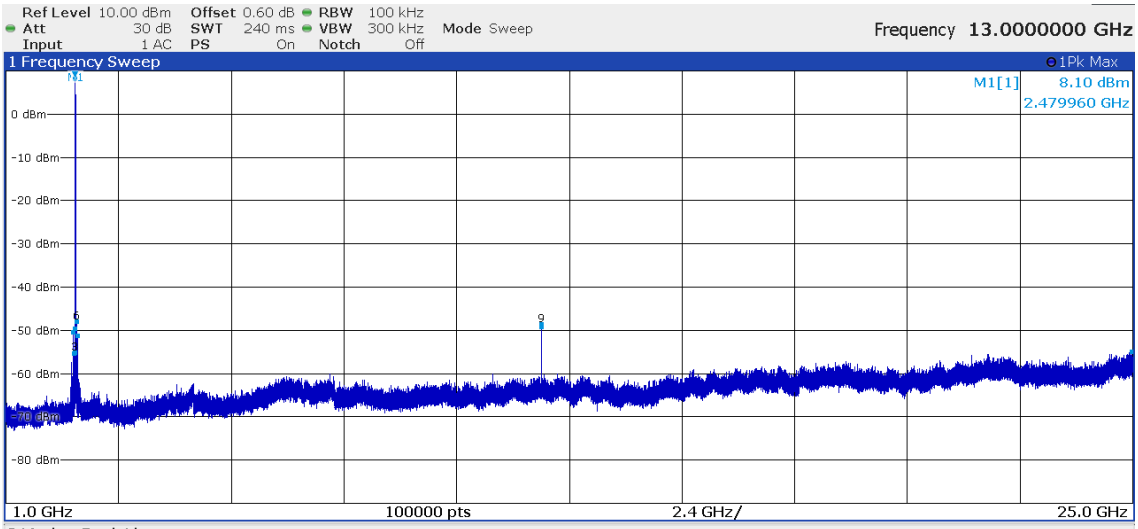
FCC ID: SDL-PRA4X IC ID: 5228A-PRA4X

CH39



2 Marker Peak List

No	X-Value	Y-Value	No	X-Value	Y-Value
1	351.031000 MHz	-77.954 dBm	6	734.277000 MHz	-76.052 dBm
2	467.530000 MHz	-78.728 dBm	7	756.477000 MHz	-75.701 dBm
3	580.979000 MHz	-77.024 dBm	8	822.227000 MHz	-74.021 dBm
4	615.378000 MHz	-76.344 dBm	9	872.976000 MHz	-75.210 dBm
5	670.928000 MHz	-76.444 dBm	10	973.175000 MHz	-74.743 dBm

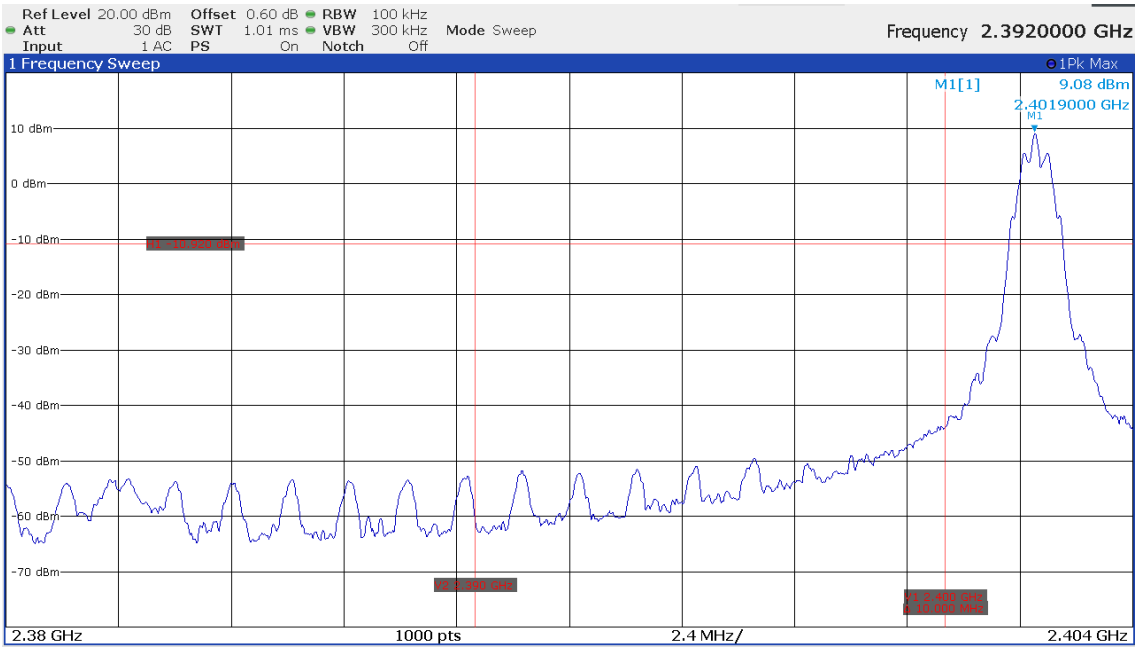


2 Marker Peak List

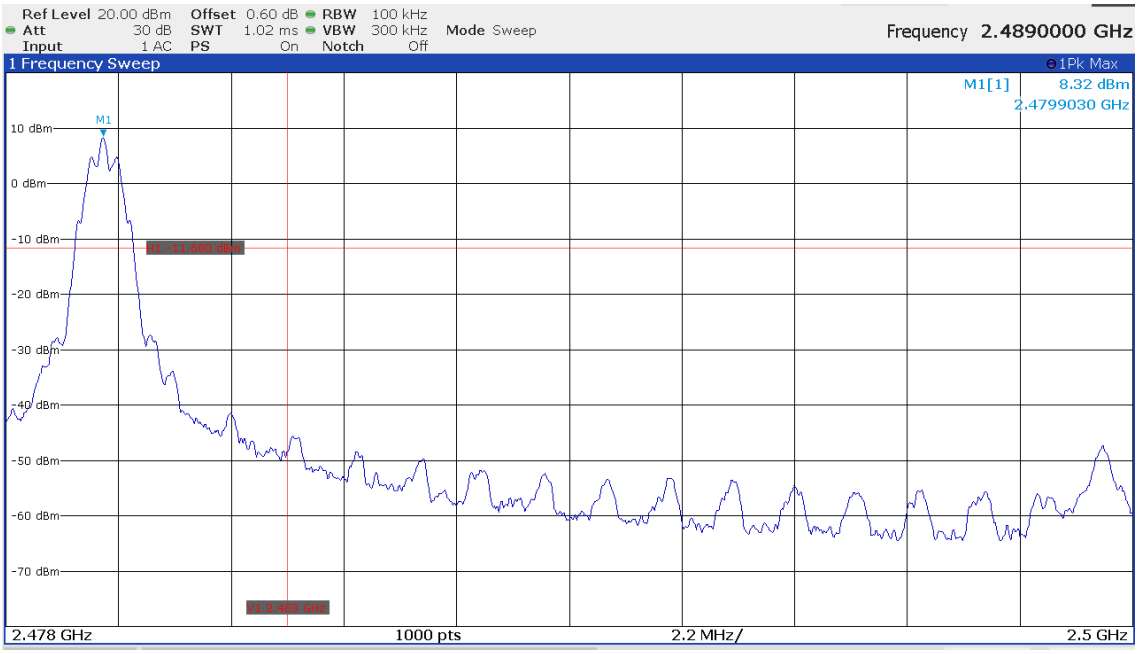
No	X-Value	Y-Value	No	X-Value	Y-Value
1	2.440840 GHz	-50.532 dBm	6	2.499400 GHz	-48.036 dBm
2	2.460520 GHz	-55.426 dBm	7	2.518840 GHz	-51.340 dBm
3	2.462680 GHz	-55.091 dBm	8	12.398440 GHz	-49.314 dBm
4	2.473960 GHz	-49.639 dBm	9	12.400840 GHz	-48.693 dBm
5	2.479960 GHz	8.099 dBm	10	24.984760 GHz	-55.003 dBm

FCC ID: SDL-PRA4X **IC ID: 5228A-PRA4X**

Band edge left CH37



Band edge right CH39



5.6 Antenna application

For test instruments and accessories used see section 6 Part **CPC 3**.

5.6.1 Description of the test location

Test location: NONE

5.6.2 Applicable standard

According to FCC Part 15C, Section 15.203:
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit that broken antennas can be replaced by the user, but the use of a standard antenna jack is prohibited.

The EUT has an integrated antenna. No other antenna can be used with the device.

The supplied antenna meets the requirements of part 15.203 and 15.204.

Remarks: None.

FCC ID: SDL-PRA4X IC ID: 5228A-PRA4X

5.7 Transmitter frequency stability

For test instruments and accessories used see section 6 Part **FE**.

5.7.1 Description of the test location

Test location: AREA4

5.7.2 Photo documentation of the test set-up - Detailed photos see ATTACHMENT B

5.7.3 Applicable standard

According to RSS-GEN, clause 6.11:
Frequency stability is a measure of frequency drift due to temperature and supply voltage variations, with reference to the frequency measured at an appropriate reference temperature and the rated supply voltage.

5.7.4 Description of Measurement

The OBW is measured with a spectrum analyser in a climatic chamber. The centroid frequency is noted.

Spectrum analyser settings for OBW:
RBW: 1-5% OBW, VBW: 3 RBW, Detector: Max peak, Sweep time: 5 s, Span: 2 OBW;

5.7.5 Test result

channel	Temp.	$f_{centroid}$ [MHz]	Deviation [MHz]	Deviation [%]
37	+20 °C	2401.945	0.055	< 0.1
	-20 °C	2401.933	0.067	< 0.1
	+50 °C	2401.920	0.080	< 0.1
17	+20 °C	2439.932	0.068	< 0.1
	-20 °C	2439.944	0.056	< 0.1
	+50 °C	2439.919	0.081	< 0.1
39	+20 °C	2479.931	0.069	< 0.1
	-20 °C	2479.943	0.057	< 0.1
	+50 °C	2479.917	0.083	< 0.1

Limit according to RSS-GEN, clause 8.11:
If the frequency stability of the licence-exempt radio apparatus is not specified in the applicable RSS, the fundamental emissions of the radio apparatus should be kept within at least the central 80% of its permitted operating frequency band in order to minimize the possibility of out-of-band operation. In addition, its occupied bandwidth shall be entirely outside the restricted bands and the prohibited TV bands of 54-72 MHz, 76-88 MHz, 174-216 MHz, and 470-602 MHz, unless otherwise indicated.

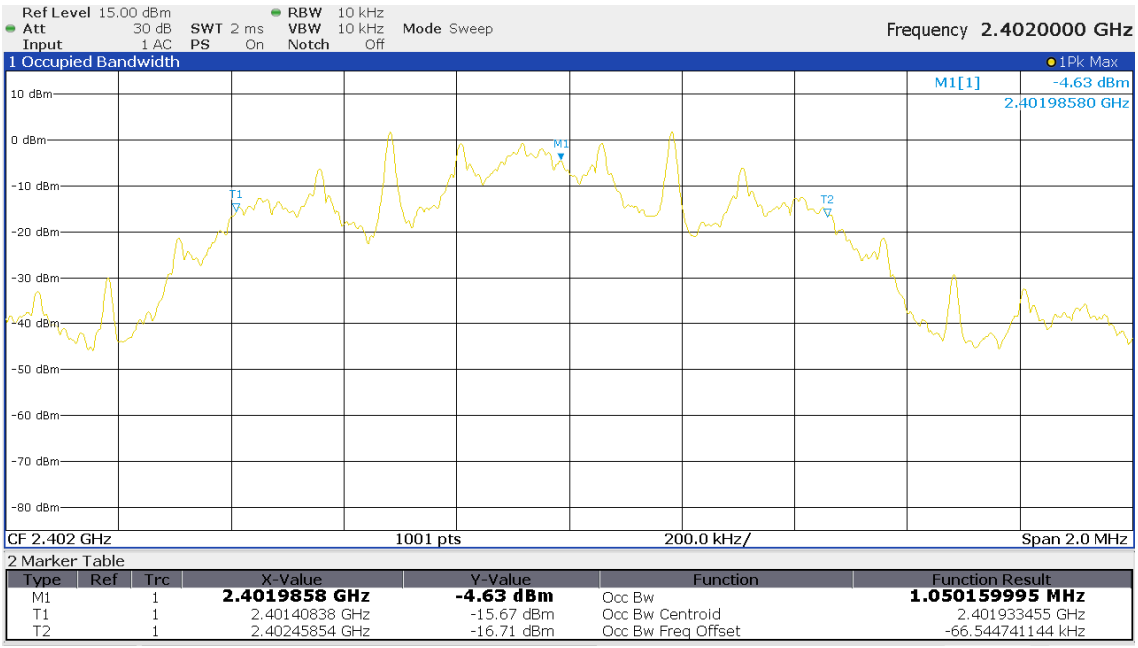
The requirements are **FULFILLED.**

Remarks: For detailed test result please see the following test protocols.

5.7.6 Test protocols

T_{nom}

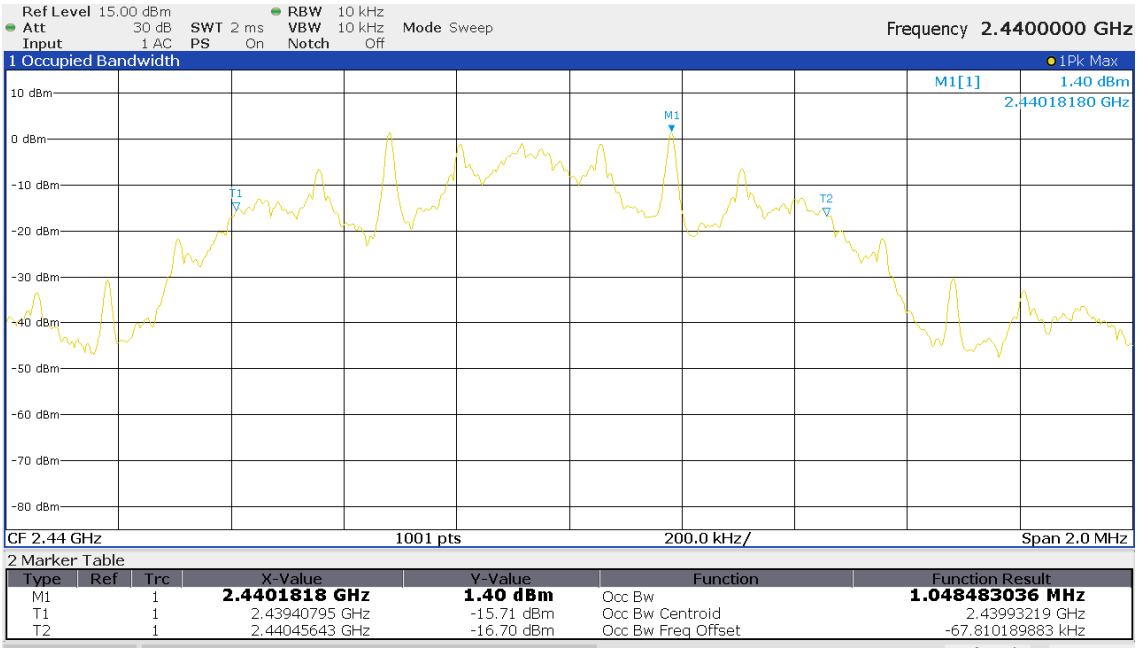
CH37



2 Marker Table

Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	**2.4019858 GHz**	**-4.63 dBm**	Occ Bw	**1.050159995 MHz**
T1		1	2.40140838 GHz	-15.67 dBm	Occ Bw Centroid	2.401933455 GHz
T2		1	2.40245854 GHz	-16.71 dBm	Occ Bw Freq Offset	-66.544741144 kHz

CH17

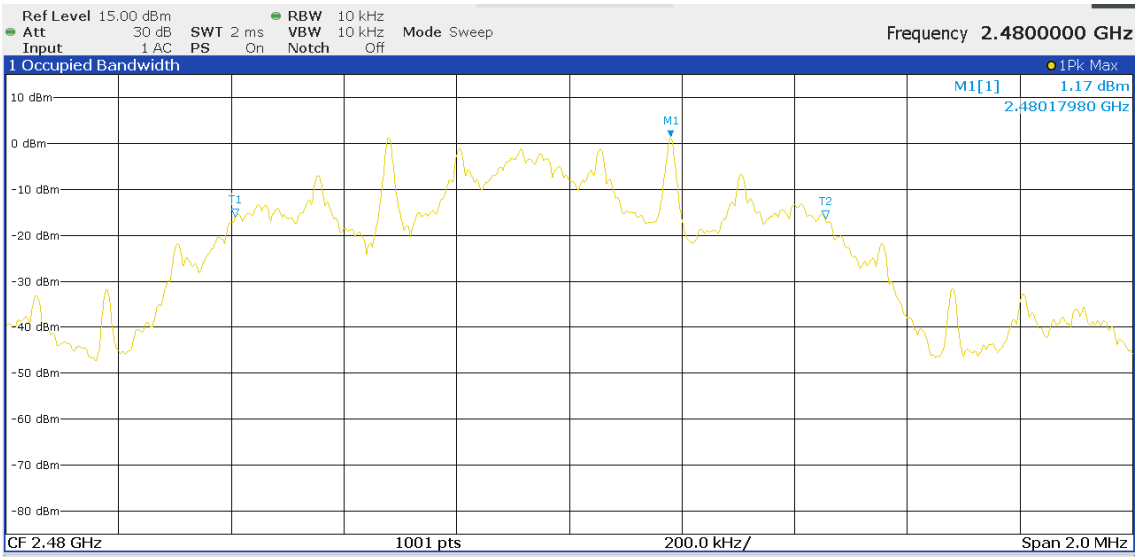


2 Marker Table

Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	**2.4401818 GHz**	**1.40 dBm**	Occ Bw	**1.048483036 MHz**
T1		1	2.43940795 GHz	-15.71 dBm	Occ Bw Centroid	2.43993219 GHz
T2		1	2.44045643 GHz	-16.70 dBm	Occ Bw Freq Offset	-67.810189883 kHz

FCC ID: SDL-PRA4X IC ID: 5228A-PRA4X

CH39

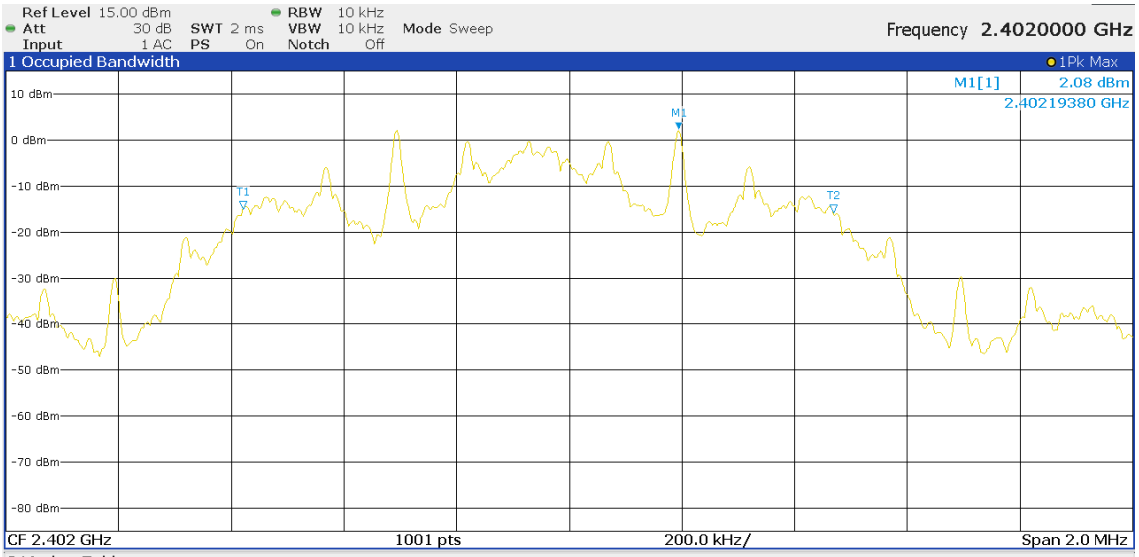


2 Marker Table

Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	**2.4801798 GHz**	**1.17 dBm**	Occ Bw	**1.047792984 MHz**
T1		1	2.47940668 GHz	-15.94 dBm	Occ Bw Centroid	2.479930581 GHz
T2		1	2.48045448 GHz	-16.40 dBm	Occ Bw Freq Offset	-69.418994277 kHz

T_{min}

CH37

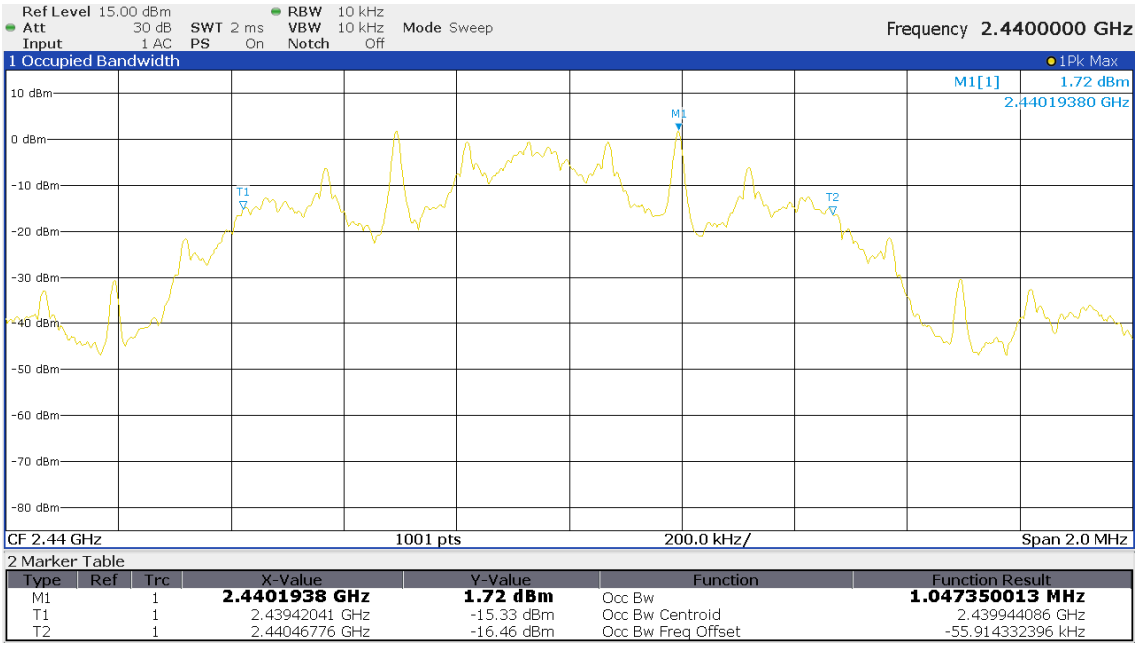


2 Marker Table

Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	**2.4021938 GHz**	**2.08 dBm**	Occ Bw	**1.047543819 MHz**
T1		1	2.40142077 GHz	-15.05 dBm	Occ Bw Centroid	2.401944544 GHz
T2		1	2.40246832 GHz	-15.79 dBm	Occ Bw Freq Offset	-55.455807522 kHz

FCC ID: SDL-PRA4X IC ID: 5228A-PRA4X

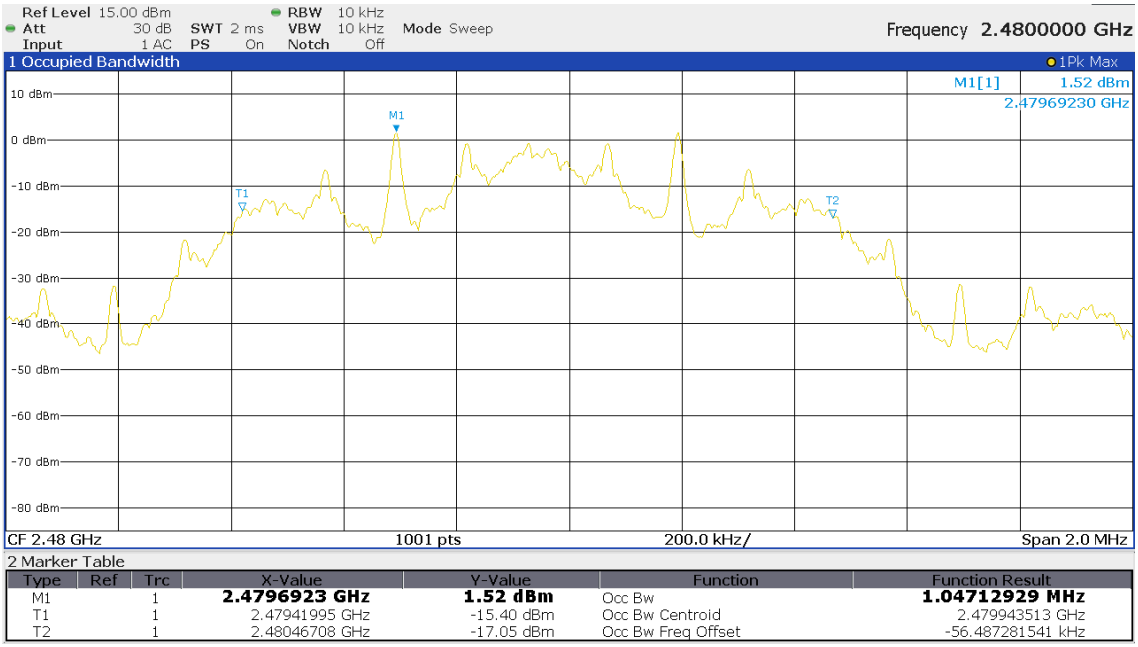
CH17



2 Marker Table

Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	**2.4401938 GHz**	**1.72 dBm**	Occ Bw	**1.047350013 MHz**
T1		1	2.43942041 GHz	-15.33 dBm	Occ Bw Centroid	2.439944086 GHz
T2		1	2.44046776 GHz	-16.46 dBm	Occ Bw Freq Offset	-55.914332396 kHz

CH39



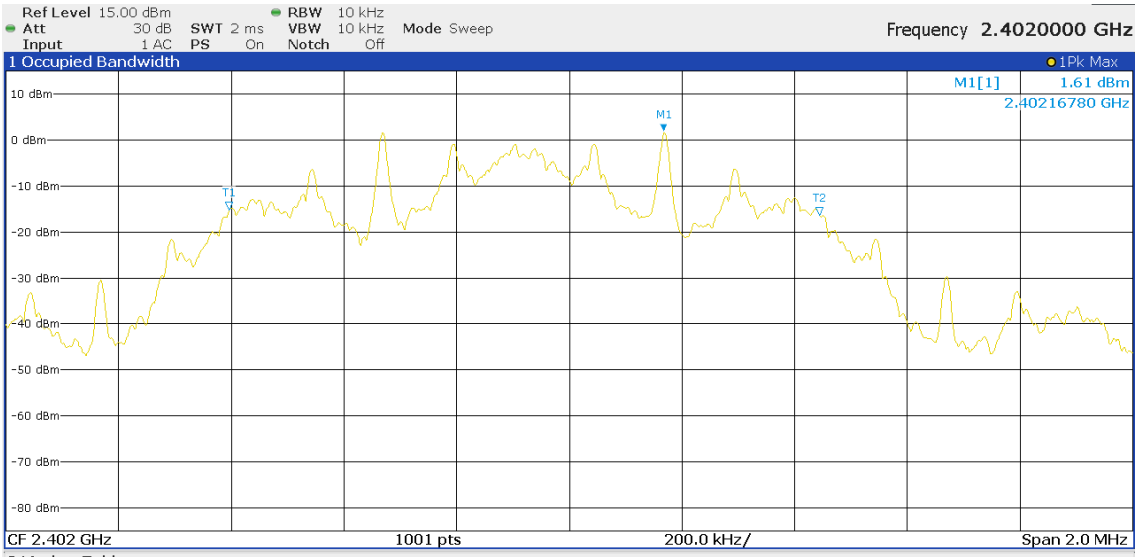
2 Marker Table

Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	**2.4796923 GHz**	**1.52 dBm**	Occ Bw	**1.04712929 MHz**
T1		1	2.47941995 GHz	-15.40 dBm	Occ Bw Centroid	2.479943513 GHz
T2		1	2.48046708 GHz	-17.05 dBm	Occ Bw Freq Offset	-56.487281541 kHz

FCC ID: SDL-PRA4X IC ID: 5228A-PRA4X

T_{max}

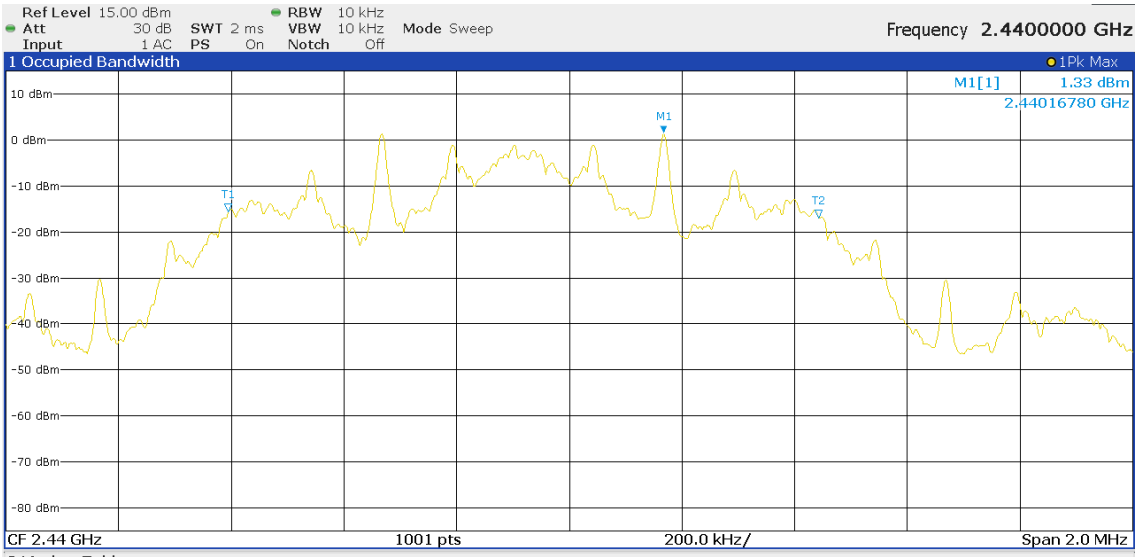
CH37



2 Marker Table

Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	**2.4021678 GHz**	**1.61 dBm**	Occ Bw	**1.048770795 MHz**
T1		1	2.4013957 GHz	-15.18 dBm	Occ Bw Centroid	2.401920089 GHz
T2		1	2.40244447 GHz	-16.40 dBm	Occ Bw Freq Offset	-79.911327023 kHz

CH17

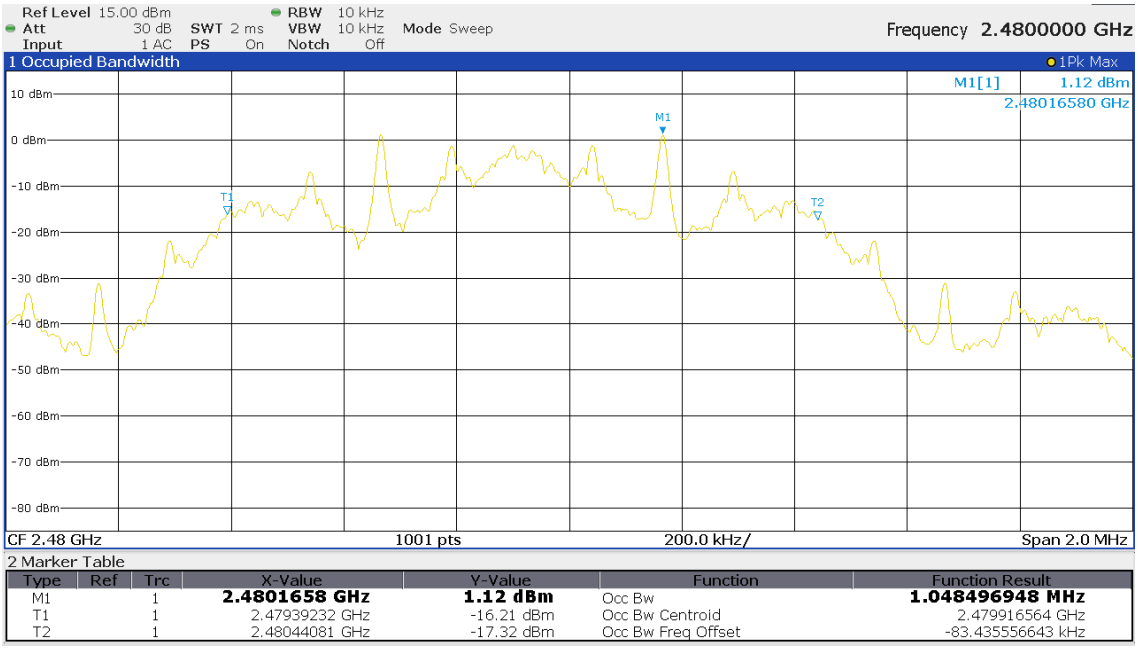


2 Marker Table

Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	**2.4401678 GHz**	**1.33 dBm**	Occ Bw	**1.048403761 MHz**
T1		1	2.43939436 GHz	-15.73 dBm	Occ Bw Centroid	2.439918563 GHz
T2		1	2.44044276 GHz	-17.07 dBm	Occ Bw Freq Offset	-81.436900629 kHz

FCC ID: SDL-PRA4X IC ID: 5228A-PRA4X

CH39



2 Marker Table

Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	**2.4801658 GHz**	**1.12 dBm**	Occ Bw	**1.048496948 MHz**
T1		1	2.47939232 GHz	-16.21 dBm	Occ Bw Centroid	2.479916564 GHz
T2		1	2.48044081 GHz	-17.32 dBm	Occ Bw Freq Offset	-83.435556643 kHz

FCC ID: SDL-PRA4X IC ID: 5228A-PRA4X

6 USED TEST EQUIPMENT AND ACCESSORIES

All test instruments used are calibrated and verified regularly. The calibration history is available on request.

Test ID	Model Type	Equipment No.	Next Calib.	Last Calib.	Next Verif.	Last Verif.
CPC 3	ESW26	02-02/03-17-002	08/03/2024	08/03/2023		
CPR 3	ESW26	02-02/03-17-002	08/03/2024	08/03/2023		
	AMF-6D-01002000-22-10P	02-02/17-15-004				
	3117	02-02/24-05-009	12/07/2024	12/07/2023		
	BAM 4.5-P	02-02/50-17-024				
	NCD	02-02/50-17-025				
	KK-SF106-2X11N-6,5M	02-02/50-18-016				
	18N-20	02-02/50-21-009	28/05/2024	28/11/2023		
	BAT-EMC 2023.0.8.0	02-02/68-13-001				
FE	ESW26	02-02/03-17-002	08/03/2024	08/03/2023		
	WK-340/40	02-02/45-05-001	27/07/2024	27/07/2023	23/08/2024	23/02/2024
MB	ESW26	02-02/03-17-002	08/03/2024	08/03/2023		
SEC 1-3	ESW26	02-02/03-17-002	08/03/2024	08/03/2023		
SER 1	ESCI	02-02/03-05-005	15/12/2024	15/12/2023		
	HFH 2 - Z 2	02-02/24-15-001				
	NW-2000-NB	02-02/50-05-113				
	KK-EF393/U-16N-21N20 m	02-02/50-12-018				
	KK-SD_7/8-2X21N-33,0M	02-02/50-15-028				
SER 2	ESVS 30	02-02/03-05-006	27/07/2024	27/07/2023		
	VULB 9168	02-02/24-05-005	20/04/2024	20/04/2023	03/05/2024	03/05/2023
	NW-2000-NB	02-02/50-05-113				
	KK-EF393/U-16N-21N20 m	02-02/50-12-018				
	KK-SD_7/8-2X21N-33,0M	02-02/50-15-028				
	50F-003 N 3 dB	02-02/50-21-010				
SER 3	ESW26	02-02/03-17-002	08/03/2024	08/03/2023		
	AFS5-12001800-18-10P-6	02-02/17-06-002				
	AFS4-01000400-10-10P-4	02-02/17-13-002				
	AMF-4F-04001200-15-10P	02-02/17-13-003				
	LNA-40-18004000-33-5P	02-02/17-20-002				
	311702-02/24-05-009	12/07/2024	12/07/2023			
	BBHA 9170	02-02/24-05-013	21/03/2026	21/03/2023	22/01/2025	22/01/2024
	Sucoflex N-2000-SMA	02-02/50-05-075				
	KMS116-GL140SE-KMS116-	02-02/50-20-026				

SER 1 measurements were performed after 15/12/2023.