

Prüfbericht-Nr.: Test report no.:	CN218W2O(LP0002-SRD) 001	Auftrags-Nr.: Order no.:	238495752	Seite 1 von 17 Page 1 of 17
Kunden-Referenz-Nr.: Client reference no.:	N/A	Auftragsdatum Order date:	2021-01-14	
Auftraggeber: Client:	華碩電腦股份有限公司 臺北市北投區立德路 15 號 1 樓			
Prüfgegenstand: Test item:	Active Stylus SA301H			
Bezeichnung / Typ-Nr.: Identification / Type no.:	SA301H			
Auftrags-Inhalt: Order content:	NCC LP0002 Test Report (SRD)			
Prüfgrundlage: Test specification:	NCC Low-power Radio-frequency Devices Technology Regulations LP0002 (2020)			
Wareneingangsdatum: Date of sample receipt:	2020-12-08			
Prüfmuster-Nr.: Test sample no.:	A002964360-023			
Prüfzeitraum: Testing period:	2021-01-29			
Ort der Prüfung: Place of testing:	EMC/RF Taipei Testing Site			
Prüflaboratorium: Testing laboratory:	Taipei Testing Laboratories			
Prüfergebnis*: Test result*:	Pass			
überprüft von: reviewed by:			genehmigt von: authorized by:	
Datum: Date:	2021-03-05	Ausstellungsdatum: Issue date:	2021-03-05	
Stellung / Position:	Senior Project Engineer	Stellung / Position:	Senior Project Manager	
Sonstiges / Other:				
Zustand des Prüfgegenstandes bei Anlieferung: Condition of the test item at delivery:		Prüfmuster vollständig und unbeschädigt Test item complete and undamaged		
* Legende:	1 = sehr gut P(ass) = entspricht o.g. Prüfgrundlage(n)	2 = gut F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	3 = befriedigend F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	4 = ausreichend N/A = nicht anwendbar
* Legend:	1 = very good P(ass) = passed a.m. test specification(s)	2 = good F(ail) = failed a.m. test specification(s)	3 = satisfactory F(ail) = failed a.m. test specification(s)	4 = sufficient N/A = not applicable
5 = mangelhaft N/T = nicht getestet				
5 = poor N/T = not tested				
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>				

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TEST SUMMARY

Report Section	NCC Clause	Test Item	Result
5.1.1	LP0002 3.2	Antenna Requirement	Pass
5.1.2	LP0002 3.6	Radiated Spurious Emissions	Pass
-	LP0002 3.3	Mains Conducted Emission	Not Applicable

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

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HISTORY OF THIS TEST REPORT

Report No.	Description	Date Issued
CN218W2O(LP0002-SRD) 001	Original Release	2021-02-04

1. General Remarks

1.1 Complementary Materials

The following attachments are integral parts of this test report:

Appendix A - Test Result of Radiated Spurious Emissions
Appendix SP - Photographs of Test Setup
Appendix EP - Photographs of EUT

Test Specifications
The following standards were applied.

Applied Standard and Test Levels

Radio
NCC Low-power Radio-frequency Devices Technical Regulations LP0002 (2020) (109 年 7 月 1 日)
ANSI C63.10:2013

1.2 Decision Rule of Conformity

The decision rule of conformity of this test report is following the requirements of the requested standard in the quotation, and agreed among testing laboratory and manufacturer (applicant) to exclude the consideration of Measurement Uncertainty, unless it is required by the specific standard.

2. Test Sites

2.1 Test Laboratory

Taipei Testing Laboratories

11F. No.758, Sec. 4, Bade Rd., Songshan Dist.
Taipei City 105
Taiwan (R.O.C.)

2.2 Test Facility

Taipei Testing Laboratories

No.458-18, Sec. 2, Fenliao Rd., Linkou Dist.,
New Taipei City 244
Taiwan (R.O.C.)
FCC Registration No.: 226631
ISED Registration No.: 25563

2.3 Traceability

All measurement equipment calibrations are traceable to NML(Taiwan)/NIST(USA) or where calibration is performed outside Taiwan, to equivalent nationally recognized standards organizations.

2.4 Calibration

Equipment requiring calibration is calibrated periodically in a suitably accredited Calibration Lab. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

2.5 Measurement Uncertainty

All measurement uncertainty values are shown with a coverage factor of $k=2$ to indicate a 95% level of confidence.

Emission Measurement Uncertainty

Parameter	Uncertainty
Radiated Emission (9 kHz ~ 30 MHz)	± 1.15 dB
Radiated Emission (30 MHz ~ 200 MHz)	± 1.32 dB
Radiated Emission (200 MHz ~ 1 GHz)	± 1.31 dB
Mains Conducted Emission	± 1.65 dB

3. General Product Information

3.1 Product Function and Intended Use

The EUT is an Active Stylus SA301H Pen. It contains an 111-489kHz compatible module that can be used to operate a touch-sensitive computer screen.

For details refer to the User Guide, Data Sheet and Circuit Diagram.

3.2 System Details and Ratings

Basic Information of EUT

Item	EUT information
Kind of Equipment/Test Item	Active Stylus SA301H
Type Identification	SA301H
Brand Name	ASUS

Technical Specification of EUT

Item	EUT information
Operating Frequency	111-489kHz
Operation Voltage	5Vdc
Modulation	DPSK
Antenna Information	Refer to 5.1.1
Accessory Device	Refer to 4.3

3.3 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram.

3.4 Submitted Documents

- Circuit Diagram
- Instruction Manual
- Rating Label
- Technical Description

4. Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

The equipment under test (EUT) was configured to measure its maximum emission level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Setup for testing: The EUT will continuously transmit Tx signal after the EUT connect the tablet. When the EUT is taken away from the tablet, it will receive Rx signal continuously.

Test Software	None.
---------------	-------

The samples were used as follows:
A002964360-023 for radiated

Full test was applied on all test modes, but only worst case was shown.

EUT Configure Mode	Applicable To		Description
	Radiated Spurious Emissions	Mains Conducted Emission	
-	√	-	-

Note: "-" means no effect.

Radiated Spurious Emissions

- ☒ Pre-Scan full test was applied on all test modes, but only worst case was shown.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Frequency (kHz)	Tested Frequency (kHz)
Tx / Rx		
-	111-489	111-150, 150-489

Test Condition

Test Item	Ambient Temperature	Relative Humidity	Tested by
Radiated Spurious Emissions	18~20 °C	68~70 %	Eagle Tsai

4.3 Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessories:

Accessory of EUT

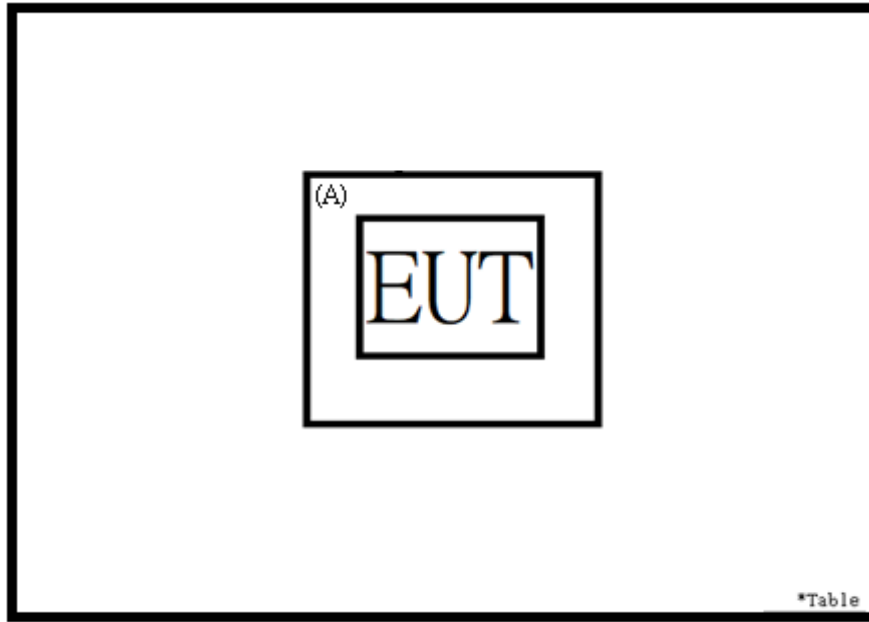
None.

Support Unit

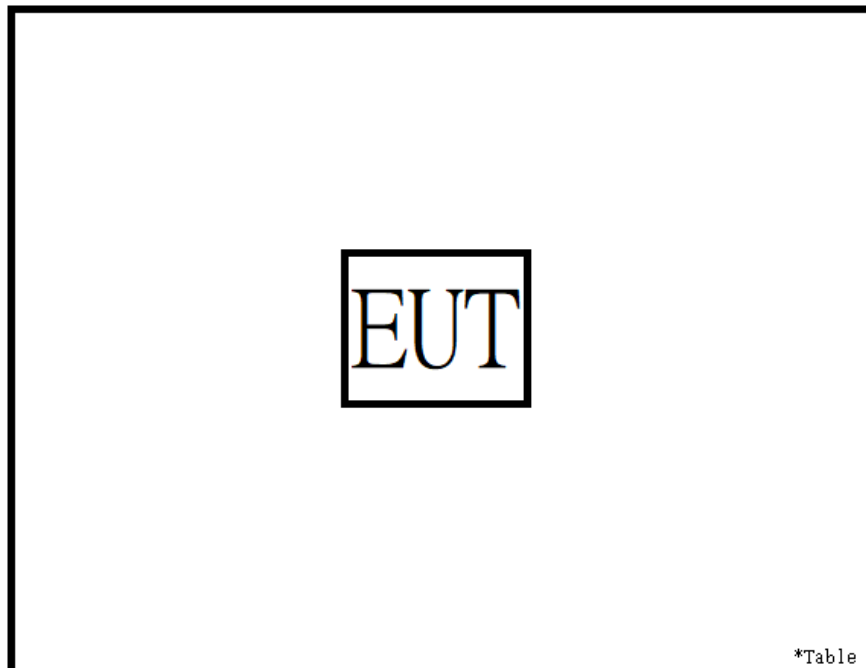
Radiated Test				
No.	Description	Brand	Model	Remark
A	Tablet PC	Lenovo	SVT-SKU-2	-

4.4 Test Setup Diagram

<Radiated Spurious Emissions, Tx Mode>



<Radiated Spurious Emissions, Rx Mode>



5. Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

Requirement Use of approved antennas only

According to the manufacturer declaration, the antenna information is as listed below. The antenna is with no possibility of replacement with a non-approved antenna by the end-user. Therefore, the EUT is considered to comply with this provision.

Brand Name	Model No.	Antenna Type
ASUS	SA301H	Coils Antenna

Refer to EUT photo for details.

5.1.2 Radiated Spurious Emissions

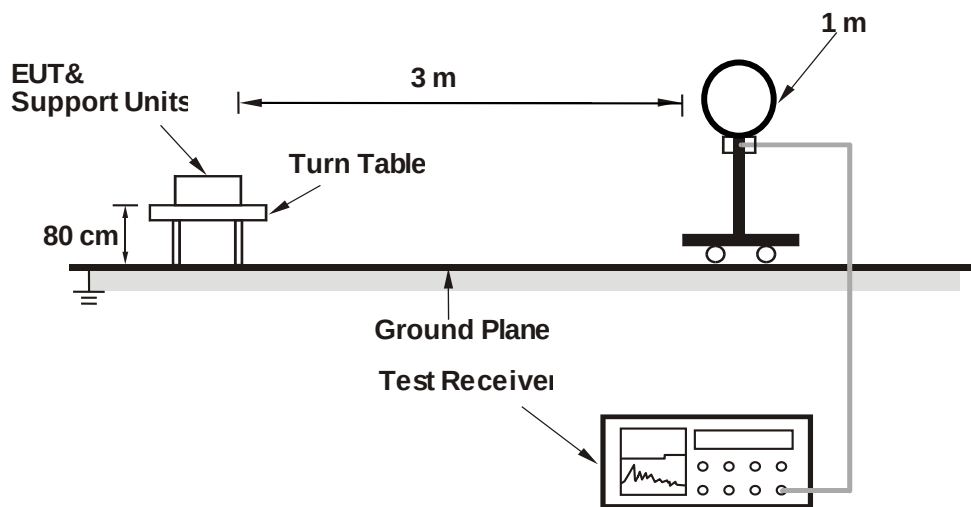
Limit

Radiated emissions must comply with the radiated emission limits specified in LP0002 (2020): 3.6.

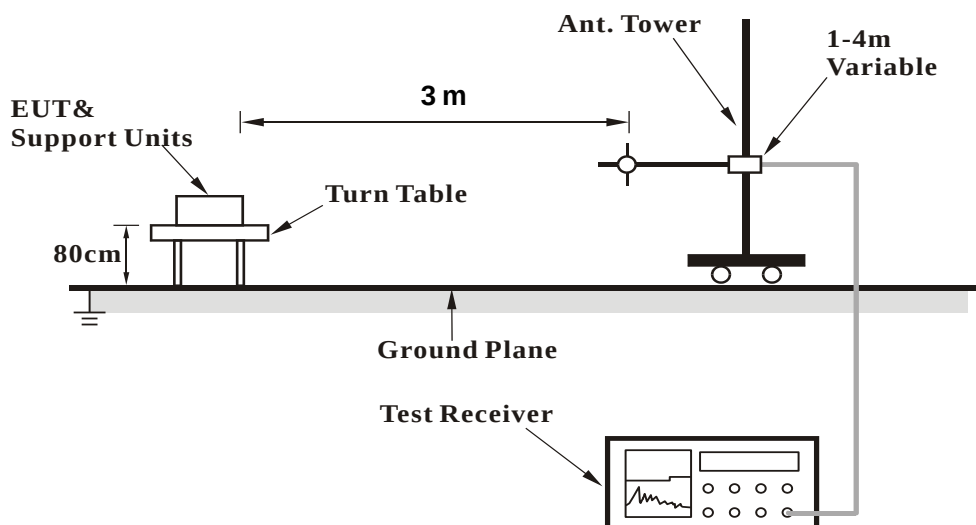
Kind of Test Site 3m Semi-Anechoic Chamber

Test Setup

<Radiated Emissions below 30 MHz>



<Radiated Emissions 30 MHz to 1 GHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).

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Page 15 of 17**Test Instruments**

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date
Receiver	R&S	ESR7	102109	2020/3/30	2021/3/29
Bilog Antenna	SCHWARZBECK	VULB-9168	00950	2021/1/25	2022/1/24
LF-AMP	Agilent	8447D	2727A05146	2020/2/17	2021/2/15
Microwave Cable	HUBER+SUHNER	SUCOFLEX 104EA	800057/4EA	2020/4/22	2021/4/21
Microwave Cable	HUBER+SUHNER	SUCOFLEX 104	802244/4	2020/4/22	2021/4/21
Microwave Cable	HUBER+SUHNER	SUCOFLEX 104	MY37203/4	2020/4/22	2021/4/21
Loop Antenna	SCHWARZBECK	FMZB1513	249	2020/9/17	2021/9/15

Test Procedures**For Radiated Emissions below 30 MHz**

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz at frequency below 30 MHz.
2. All modes of operation were investigated and the worst-case emissions are reported.

For Radiated Emissions above 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30 MHz ~ 1 GHz) / 1.5 meters (for above 1 GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detected function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
2. All modes of operation were investigated and the worst-case emissions are reported.
3. The Radiated Emissions testing was performed in the X, Y and Z axis orientation. The worst-case Axis orientation is recorded in this test report.

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Test Results

Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB)

Level (dBuV/m) = Reading (dBuV) + Factor (dB/m)

The maximum field strength is 41.26dBuV/m@3m.

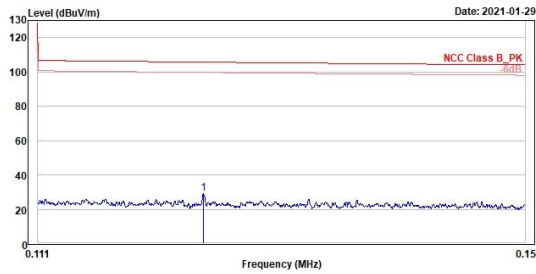
Please refer to Appendix A.

SRD

(Close) 111kHz~150kHz



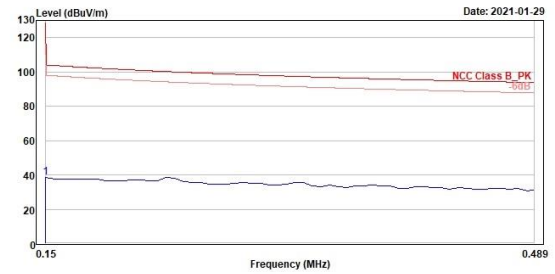
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	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg				
1	0.12	28.97	11.15	17.82	105.71	-76.74	100	158	QP	Close		



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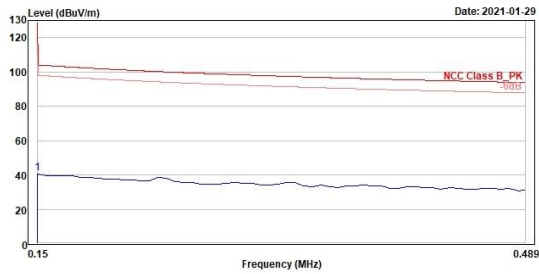
	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg				
1	0.15	38.68	20.78	17.90	104.08	-65.40	100	56	QP	Ground		

SRD

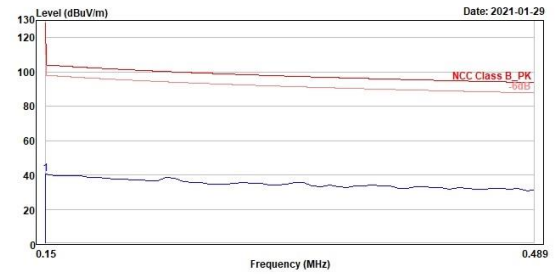
(Open) 150kHz~489kHz



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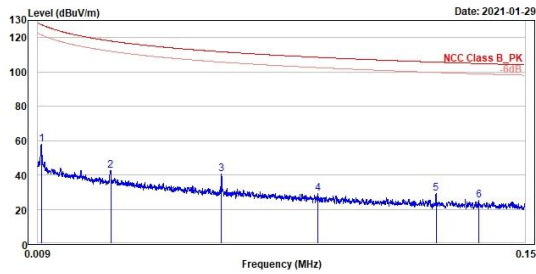
Spurious Emissions, Tx Mode, 9kHz ~ 30MHz

SRD

9kHz~150kHz



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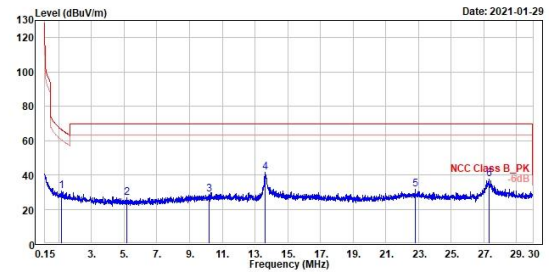


	Freq	Level	Read	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	0.01	57.72	39.98	17.74	127.57	-69.85	100	138	QP	Open	
2	0.03	42.44	23.39	19.05	118.02	-75.58	100	104	QP	Open	
3	0.06	40.71	22.13	18.58	111.73	-71.02	100	142	QP	Open	
4	0.09	29.00	11.03	17.97	100.51	-79.51	100	194	QP	Open	
5	0.12	28.97	11.15	17.82	105.71	-76.74	100	47	QP	Open	
6	0.14	25.14	7.28	17.86	104.89	-79.75	100	98	QP	Open	

150kHz~30MHz



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	Freq	Level	Read	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	1.18	30.87	12.38	18.49	66.19	-35.32	100	340	QP	Open	
2	5.14	26.77	7.77	19.00	69.50	-42.73	100	241	QP	Open	
3	10.18	28.77	8.17	20.60	69.50	-40.73	100	207	QP	Open	
4	13.63	41.40	20.54	20.86	69.50	-20.10	100	110	QP	Open	
5	22.80	31.59	10.04	21.55	69.50	-37.91	100	9	QP	Open	
6	27.33	37.42	15.57	21.85	69.50	-32.08	100	11	QP	Open	

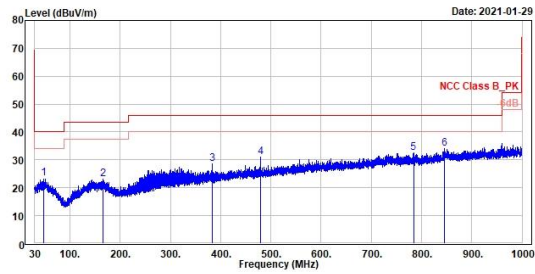
Spurious Emissions, Tx Mode, 30MHz ~ 1GHz

SRD

(Horizontal)



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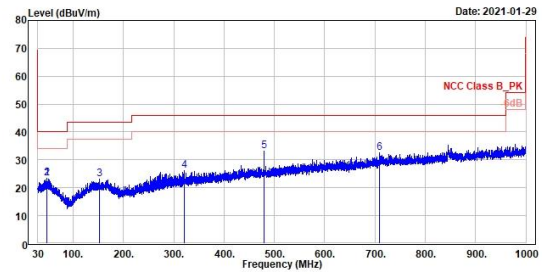


	Freq	Level	Read	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	47.84800	23.40	29.30	-5.90	40.00	-16.60	300	348	QP	vertical	
2	165.31500	23.13	28.94	-5.81	43.50	-20.37	100	243	QP	horizontal	
3	383.95300	28.59	31.85	-3.26	46.00	-17.41	100	358	QP	horizontal	
4	479.69200	30.92	32.79	-1.87	46.00	-15.08	200	199	QP	horizontal	
5	784.07800	32.58	29.72	2.86	46.00	-13.42	100	150	QP	horizontal	
6	844.99400	33.97	30.13	3.84	46.00	-12.03	200	178	QP	horizontal	

(Vertical)



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	Freq	Level	Read	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	47.84800	23.40	29.30	-5.90	40.00	-16.60	100	348	QP	vertical	
2	47.84800	23.40	29.30	-5.90	40.00	-16.60	300	348	QP	vertical	
3	152.41400	22.97	28.90	-5.93	43.50	-20.53	200	276	QP	vertical	
4	320.32100	26.21	30.56	-4.35	46.00	-19.79	200	78	QP	vertical	
5	479.69200	33.20	35.07	-1.87	46.00	-12.80	132	0	QP	vertical	
6	709.38800	32.62	30.93	1.69	46.00	-13.38	200	176	QP	vertical	

Spurious Emissions, Rx Mode, 9kHz ~ 30MHz

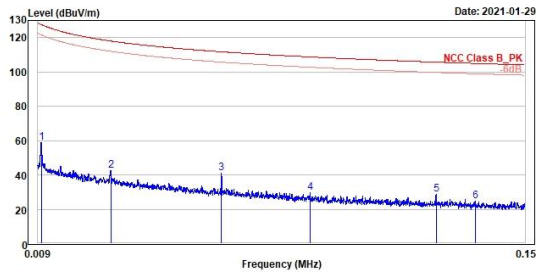
SRD

9kHz~150kHz

150kHz~30MHz



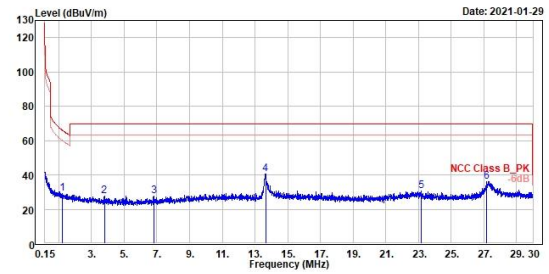
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	Freq	Level	Read	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	0.01002	59.01	41.27	17.74	127.57	-68.56	100	74	QP	Open	
2	0.03012	42.53	23.42	19.05	118.01	-75.48	100	105	QP	Open	
3	0.06213	40.83	22.25	18.58	111.73	-70.90	100	46	QP	Open	
4	0.08779	29.82	11.80	18.02	100.73	-78.91	100	338	QP	Open	
5	0.12428	28.71	10.89	17.82	105.71	-77.00	100	242	QP	Open	
6	0.13556	24.96	7.18	17.86	104.96	-80.00	100	242	QP	Open	



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	Freq	Level	Read	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	1.19475	29.19	10.70	18.49	66.06	-36.87	100	162	QP	Open	
2	3.78573	27.68	8.93	18.75	69.50	-41.82	100	280	QP	Open	
3	6.88058	27.53	7.99	19.54	69.50	-41.97	100	218	QP	Open	
4	13.64817	40.75	19.88	20.87	69.50	-28.75	100	221	QP	Open	
5	23.18823	30.46	8.89	21.57	69.50	-39.04	100	115	QP	Open	
6	27.18216	36.31	14.47	21.84	69.50	-33.19	100	291	QP	Open	

Spurious Emissions, Rx Mode, 30MHz ~ 1GHz

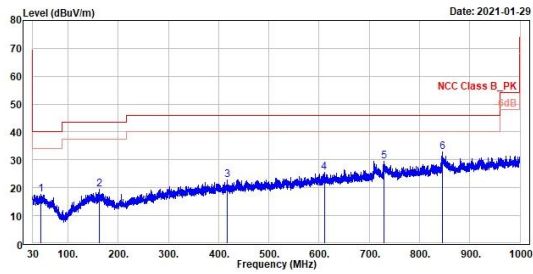
SRD

(Horizontal)

(Vertical)



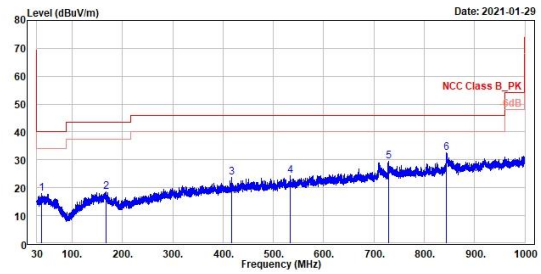
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	Freq	Level	Read	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	45.98800	17.74	23.78	-6.04	40.00	-22.26	200	283	QP	horizontal	
2	165.08400	19.36	25.17	-5.81	43.50	-24.14	100	269	QP	horizontal	
3	417.22400	22.69	25.51	-2.82	46.00	-23.31	300	148	QP	horizontal	
4	610.35100	25.44	24.99	0.45	46.00	-20.56	200	212	QP	horizontal	
5	728.49700	29.54	27.64	1.90	46.00	-16.46	100	317	QP	horizontal	
6	845.77800	32.94	29.18	3.84	46.00	-13.06	156	360	QP	horizontal	



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	Freq	Level	Read	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	39.02100	17.81	24.41	-6.60	40.00	-22.19	200	198	QP	vertical	
2	167.44900	18.52	24.48	-5.96	43.50	-24.98	200	322	QP	vertical	
3	417.98300	23.81	26.60	-2.79	46.00	-22.19	122	360	QP	vertical	
4	533.52700	24.35	25.40	-1.05	46.00	-21.65	350	176	QP	vertical	
5	728.59400	29.44	27.54	1.90	46.00	-16.56	200	279	QP	vertical	
6	844.88000	32.45	28.61	3.84	46.00	-13.55	131	360	QP	vertical	