



EMI - TEST REPORT

- FCC 15.247 -

Type / Model Name : RRU 1400

Product Description : RFID UHF Reader 902-928 MHz

Applicant : Kathrein Sachsen GmbH

Address : Lindenstrasse 3

09241 Mühlau, Germany

Manufacturer : Kathrein Sachsen GmbH

Address : Lindenstrasse 3

09241 Mühlau, Germany

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

POSITIVE

Test Report No. : 80086331-03 Rev_1

27. September 2021

Date of issue



Deutsche
Akkreditierungsstelle
D-PL-12030-01-04

The test report merely corresponds to the test sample.
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1 TEST STANDARDS

The tests were performed according to following standards:

FCC Rules and Regulations Part 15, Subpart A - General (August, 2021)

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 B - Unintentional Radiators (August, 2021)

Part 15, Subpart B, Section 15.107	AC Line conducted emissions,
Part 15, Subpart B, Section 15.109	Radiated emissions, general requirements

FCC Rules and Regulations Part 15, Subpart C - Intentional Radiators (August, 2021)

Part 15, Subpart C, Section 15.203	Antenna requirement
Part 15, Subpart C, Section 15.204	External radio frequency power amplifiers and antenna modifications
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

FCC Rules and Regulations Part 1, Subpart I - Procedures Implementing the National Environmental Policy Act of 1969

Part 1, Subpart I, Section 1.1310	Radiofrequency radiation exposure limits
Part 1, Subpart 2, Section 2.1093	Radiofrequency radiation exposure evaluation: portable device

ANSI C63.10: 2013 Testing Unlicensed Wireless Devices

ANSI C95.1:2005 IEEE Standard for Safety Levels with respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz

CISPR 16-4-2: 2003 Uncertainty in EMC measurement

2 SUMMARY

GENERAL REMARKS:

The frequency range was scanned from 9 kHz to 10 GHz.

All emissions not reported in this test report were more than 10 dB below the specified limit.

The EuT is a frequency hopping system using 52 channels in the frequency band from 902 to 928 MHz.

The device transmits to each antenna in turn (not all at the same time). This function is controlled via software from the manufacturer and can not be changed from the user.

The Reader was tested as a system with different antennas and with original antenna cable which was supplied by manufacturer.

For detailed information about the model and the antenna please refer to the user manual or technical documentation from the manufacturer.

The EuT is declared as Class B digital device.

It is not possible to set the EuT only in receiving mode.

FINAL ASSESSMENT:

The equipment under test **fulfills** the EMI requirements cited in clause 1 test standards.

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

Testing commenced on : 12. July 2021

Testing concluded on : 26. August 2021

Checked by:

Tested by:

 Klaus Gegenfurtner
2021.09.27
13:30:42 +02'00'

Gegenfurtner Klaus
Teamleader Radio

 Markus Huber
2021.09.27
13:16:46 +02'00'

Huber Markus

FCC ID: WJ9-RRU1400

3 EQUIPMENT UNDER TEST

3.1 Photo documentation of the EUT – Detailed photos see Attachment A

3.2 Power supply system utilised

Power supply voltage: : Primary: 100-240 V / 50-60 Hz / 1 ϕ , 24.0 V DC
Secondary: 24.0 V / DC

3.3 Short description of the EUT

The device is a UHF RFID reader. The UHF RFID Reader can read active and passive Tags in the frequency range from 902 to 928 MHz.

Number of tested samples: 1
Serial number: G0O3026983

EUT operation mode:

The equipment under test was operated during the measurement under the following conditions:

- TAG reading mode supplying max. 30.0 dBm
- Tx mode unmodulated at CH1, CH2, CH25, CH51, CH52
- Tx mode modulated at CH1, CH2, CH25, CH51, CH52
- Standby mode

EUT configuration:

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

- Test software Model: Supplied by manufacturer
- Lap Top Model: Supplied by CSA Group Bayern GmbH
- Antenna Model: See point 4.6
- Power supply Model : GE18I24-P1J, S/N OFB9452668
- Model:
- Model:
- customer specific cables

4 TEST ENVIRONMENT

4.1 Address of the test laboratory

**CSA Group Bayern GmbH
Ohmstrasse 1-4
94342 STRASSKIRCHEN
GERMANY**

4.2 Statement regarding the usage of logos in test reports

The accreditation and notification body logos displayed in this test report are only valid for standards listed in the accreditation or notification scope of CSA Group Bayern GmbH.

4.3 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

4.4 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 acc. to CISPR 16-4-2 / 11.2003 „Uncertainties, statistics and limit modelling – Uncertainty in EMC measurements“ and is documented in the quality system acc. to DIN EN ISO/IEC 17025. For all measurements shown in this report, the measurement uncertainty of the test laboratory, CSA Group Bayern GmbH, is below the measurement uncertainty as defined by CISPR. Therefore, no special measures must be taken into consideration with regard to the limits according to CISPR. 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.

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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%	± 2.5 × 10 ⁻⁷
99% Occupied Bandwidth	Center frequency of EuT	95%	± 2.5 × 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
Radiated power of the fundamental wave	Center frequency of EuT	95%	± 3.71 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

4.5 Measurement Protocol for FCC, VCCI and AUSTEL

4.5.1 GENERAL INFORMATION

4.5.1.1 Justification

The Equipment Under Test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral using the appropriate impedance characteristic or left unterminated. Where appropriate, cables are manually manipulated with respect to each other thus obtaining maximum disturbances from the unit.

4.5.1.1 General information

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

FCC: DE 0011

FCC ID: WJ9-RRU1400**4.6 Determination of worst case measurement conditions**

Tests were performed with following antenna type and power supply:

Customer declared following antenna types as representative models:

- Antenna:
 - WIRA-30-circular-FCC, 52010087
 - WRA 6060 Antenna Unit, 52010424
 - MIRA-100-circular-FCC, 52010083
 - WRA 7070 Antenna Unit, 52010334
 - WIRA-40-linear-FCC, 52010252

- Power Setting: Standby
- Power setting: 30.0 dBm
- Power setting: 23.0 dBm

- Power supply: Mean Well GE18I24
S/N: OFB9452668

- PoE switch: MOXA, INJ-24-T
P/N: 3093015000072
S/N: TAFIB1024690
MN: INJ-24-T

The spurious radiated emission measurement (9 kHz up to 1 GHz) was only performed with antenna WIRA-40-linear-FCC (52010252) and power setting 23.0 dBm. The spurious radiated emission measurement (1GHz up to 10 GHz) was performed with:

- WIRA-40-linear-FCC (52010252) and power setting 23.0 dBm
- MIRA-100-circular-FCC, 52010083 and power setting 30.0 dBm
- ⇒ The test report shows only the emissions from the measurement with the WIRA-40-linear-FCC (52010252) and power setting 23.0 dBm.
- ⇒ Pre measurement in the chamber shows that this configuration is the worst case configuration for the relevant spurious emission test.

To find out the worst case setting for the UHF reader for each test, pre tests were performed with different reader settings which are shown in the table "EuT operation mode".

To keep the test report clear and simple, the tests were carried out and documented in this test report only with these worst case settings.

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4.6.1 Functionality of device

Declared by manufacturer:

Example for a Hopping sequence for Kathrein UHF RFID Devices. The channel spacing is 500 kHz, the center frequency of the first channel is 902.25MHz. The occupancy time is 400ms for each slot, the slot frequency is determined randomly each time before the slot is used.

Slot Number	Channel Number	Frequency (MHz)	Slot Number	Channel Number	frequency (MHz)
1	21	912.25	27	3	903.25
2	44	923.75	28	39	921.25
3	25	914.25	29	24	913.75
4	36	919.75	30	16	909.75
5	27	915.25	31	51	927.25
6	29	916.25	32	26	914.75
7	35	919.25	33	4	903.75
8	49	926.25	34	47	925.25
9	6	904.75	35	18	910.75
10	46	924.75	36	40	921.75
11	19	911.25	37	11	907.25
12	20	911.75	38	48	925.75
13	45	924.25	39	7	905.25
14	22	912.75	40	12	907.75
15	30	916.75	41	23	913.25
16	8	905.75	42	13	908.25
17	42	922.75	43	31	917.25
18	52	927.75	44	2	902.75
19	14	908.75	45	1	902.25
20	37	920.25	46	43	923.25
21	41	922.25	47	50	926.75
22	17	910.25	48	33	918.25
23	5	904.25	49	34	918.75
24	10	906.75	50	32	917.75
25	15	909.25	51	28	915.75
26	38	920.75	52	9	906.25

5 TEST CONDITIONS AND RESULTS

5.1 Conducted emissions

For test instruments and accessories used see section 6 Part A 4.

5.1.1 Description of the test location

Test location: Shielded Room S2

5.1.2 Photo documentation of the test set-up - see Attachment C

5.1.3 Applicable standard

According to FCC Part 15C, Section 15.207(a):

Except as shown in paragraphs (b) and (c) of this Section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency

5.1.4 Description of Measurement

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. 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 emissions are remeasured using a tuned receiver with quasi-peak and average detection and recorded.

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

$$\text{dB}\mu\text{V} = 20 \log \mu\text{V}$$

$$\mu\text{V} = 10^{(\text{dB}\mu\text{V}/20)}$$

5.1.5 Test result

Frequency range: 0.15 MHz - 30 MHz
Min. limit margin 10.27 dB at 0.507 MHz (Tag reading mode, UHF RFID Antenna 52010334)

The requirements are **FULFILLED**.

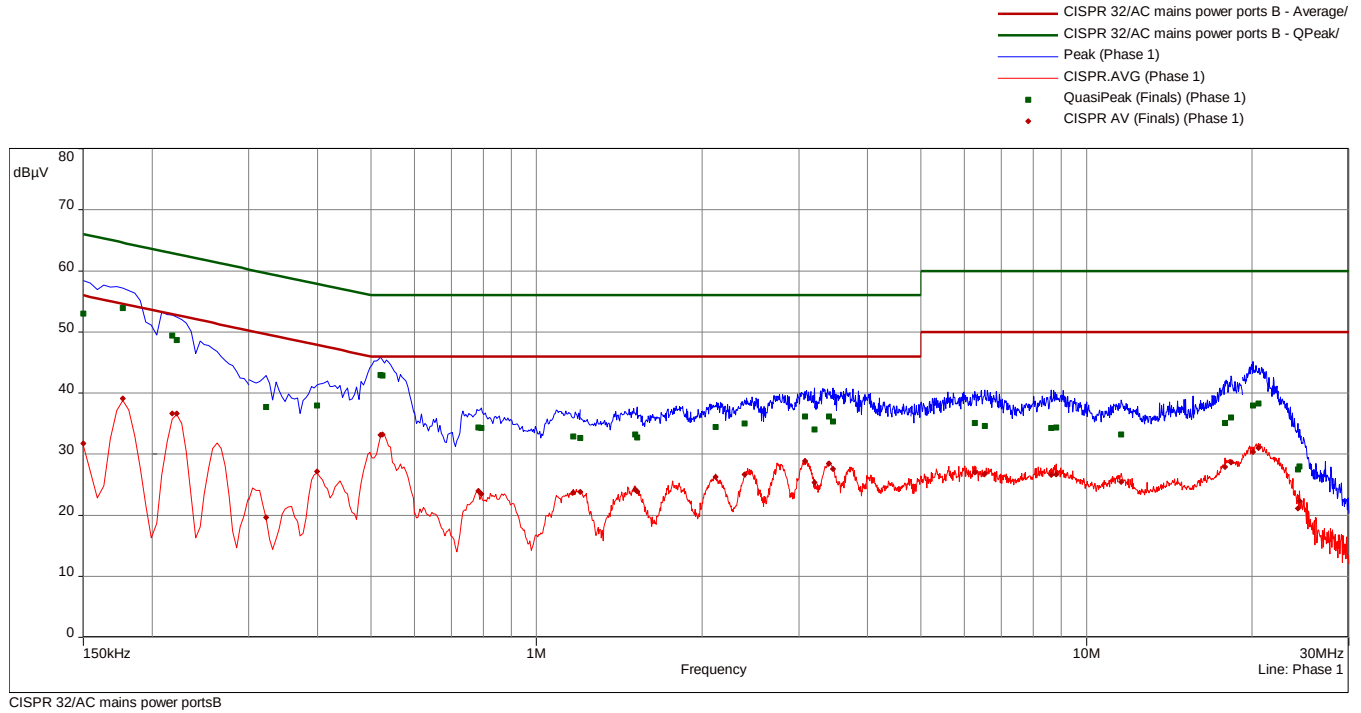
Remarks: For detailed test result please refer to following test protocols.

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5.1.6 Test protocol

Test point L1
Operation mode: Tag reading mode
Remarks: Mid Range Antenna 52010083

Result: Passed



freq	SR	QP	margin	limit	AV	margin	limit	line	RBW	Measure time	corr
MHz		dBμV	dB	dBμV	dBμV	dB	dBμV		Hz	sec	dB
0.15	1	53.01	-12.99	66.00	31.76	-24.24	56.00	Phase 1	9k	1.00	10.09
0.177	1	53.88	-10.75	64.63	39.13	-15.49	54.63	Phase 1	9k	1.00	10.10
0.2175	1	49.38	-13.54	62.91	36.66	-16.25	52.91	Phase 1	9k	1.00	10.11
0.222	1	48.64	-14.11	62.74	36.68	-16.06	52.74	Phase 1	9k	1.00	10.11
0.3225	2	37.74	-21.90	59.64	19.67	-29.97	49.64	Phase 1	9k	1.00	10.14
0.399	2	37.92	-19.95	57.87	27.16	-20.71	47.87	Phase 1	9k	1.00	10.15
0.5205	2	42.98	-13.02	56.00	33.14	-12.86	46.00	Phase 1	9k	1.00	10.16
0.525	2	42.83	-13.17	56.00	33.19	-12.81	46.00	Phase 1	9k	1.00	10.16
0.7845	3	34.38	-21.62	56.00	23.94	-22.06	46.00	Phase 1	9k	1.00	10.19
0.7935	3	34.29	-21.71	56.00	23.45	-22.55	46.00	Phase 1	9k	1.00	10.19
1.167	3	32.87	-23.13	56.00	23.72	-22.28	46.00	Phase 1	9k	1.00	10.23
1.2	3	32.65	-23.35	56.00	23.80	-22.20	46.00	Phase 1	9k	1.00	10.23
1.5105	4	33.18	-22.82	56.00	24.25	-21.75	46.00	Phase 1	9k	1.00	10.27
1.524	4	32.73	-23.27	56.00	23.88	-22.12	46.00	Phase 1	9k	1.00	10.27
2.118	4	34.41	-21.59	56.00	26.26	-19.74	46.00	Phase 1	9k	1.00	10.28
2.388	4	35.01	-20.99	56.00	26.67	-19.33	46.00	Phase 1	9k	1.00	10.31

FCC ID: WJ9-RRU1400

freq	SR	QP	margin	limit	AV	margin	limit	line	RBW	Measure time	corr
MHz		dBμV	dB	dBμV	dBμV	dB	dBμV		Hz	sec	dB
3.0795	5	36.18	-19.82	56.00	28.89	-17.11	46.00	Phase 1	9k	1.00	10.35
3.201	5	34.02	-21.98	56.00	25.35	-20.65	46.00	Phase 1	9k	1.00	10.35
3.4035	5	36.15	-19.85	56.00	28.49	-17.51	46.00	Phase 1	9k	1.00	10.35
3.462	5	35.32	-20.68	56.00	27.57	-18.43	46.00	Phase 1	9k	1.00	10.35
6.2625	6	35.13	-24.87	60.00	26.98	-23.02	50.00	Phase 1	9k	1.00	10.55
6.528	6	34.64	-25.36	60.00	26.72	-23.28	50.00	Phase 1	9k	1.00	10.56
8.634	6	34.25	-25.75	60.00	26.58	-23.42	50.00	Phase 1	9k	1.00	10.68
8.8095	6	34.36	-25.64	60.00	26.67	-23.33	50.00	Phase 1	9k	1.00	10.69
11.5575	7	33.25	-26.75	60.00	25.43	-24.57	50.00	Phase 1	9k	1.00	10.89
17.853	7	35.12	-24.88	60.00	27.88	-22.12	50.00	Phase 1	9k	1.00	11.36
18.2985	7	35.98	-24.02	60.00	28.62	-21.38	50.00	Phase 1	9k	1.00	11.38
20.064	8	37.96	-22.04	60.00	30.38	-19.62	50.00	Phase 1	9k	1.00	11.46
20.532	8	38.25	-21.75	60.00	31.00	-19.00	50.00	Phase 1	9k	1.00	11.49
24.2355	8	27.51	-32.49	60.00	21.08	-28.92	50.00	Phase 1	9k	1.00	11.65
24.402	8	27.99	-32.01	60.00	22.30	-27.70	50.00	Phase 1	9k	1.00	11.66

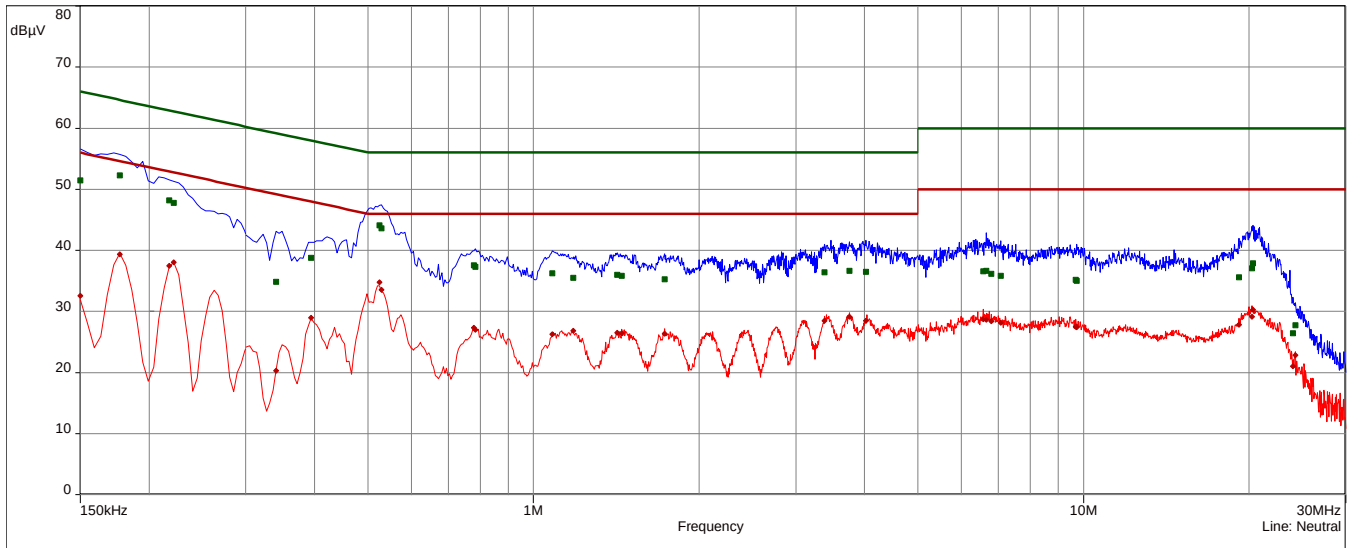
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FCC ID: WJ9-RRU1400

Test point N
Operation mode: Tag reading mode
Remarks: Mid Range Antenna 52010083

Result: Passed

- CISPR 32/AC mains power ports B - Average/
- CISPR 32/AC mains power ports B - QPeak/
- Peak (Neutral)
- CISPR.AVG (Neutral)
- QuasiPeak (Finals) (Neutral)
- CISPR AV (Finals) (Neutral)



CISPR 32/AC mains power portsB

freq	SR	QP	margin	limit	AV	margin	limit	line	RBW	Measure time	corr
MHz		dBμV	dB	dBμV	dBμV	dB	dBμV		Hz	sec	dB
0.15	9	51.49	-14.51	66.00	32.58	-23.42	56.00	Neutral	9k	1.00	10.09
0.177	9	52.30	-12.33	64.63	39.39	-15.24	54.63	Neutral	9k	1.00	10.11
0.2175	9	48.18	-14.73	62.91	37.50	-15.42	52.91	Neutral	9k	1.00	10.13
0.222	9	47.74	-15.00	62.74	38.07	-14.67	52.74	Neutral	9k	1.00	10.13
0.3405	10	34.88	-24.32	59.19	20.29	-28.90	49.19	Neutral	9k	1.00	10.15
0.3945	10	38.78	-19.18	57.97	28.98	-18.98	47.97	Neutral	9k	1.00	10.15
0.525	10	44.12	-11.88	56.00	34.76	-11.24	46.00	Neutral	9k	1.00	10.16
0.5295	10	43.64	-12.36	56.00	33.58	-12.42	46.00	Neutral	9k	1.00	10.16
0.78	11	37.52	-18.48	56.00	27.33	-18.67	46.00	Neutral	9k	1.00	10.19
0.7845	11	37.34	-18.66	56.00	26.99	-19.01	46.00	Neutral	9k	1.00	10.19
1.0815	11	36.23	-19.77	56.00	26.25	-19.75	46.00	Neutral	9k	1.00	10.21
1.1805	11	35.51	-20.49	56.00	26.87	-19.13	46.00	Neutral	9k	1.00	10.23
1.4205	12	35.97	-20.03	56.00	26.47	-19.53	46.00	Neutral	9k	1.00	10.26
1.4475	12	35.85	-20.15	56.00	26.45	-19.55	46.00	Neutral	9k	1.00	10.26
1.731	12	35.27	-20.73	56.00	26.36	-19.64	46.00	Neutral	9k	1.00	10.27
3.381	13	36.38	-19.62	56.00	28.49	-17.51	46.00	Neutral	9k	1.00	10.35
3.7545	13	36.68	-19.32	56.00	29.15	-16.85	46.00	Neutral	9k	1.00	10.37
4.0245	13	36.49	-19.51	56.00	28.51	-17.49	46.00	Neutral	9k	1.00	10.39
6.582	14	36.55	-23.45	60.00	28.68	-21.32	50.00	Neutral	9k	1.00	10.54
6.654	14	36.62	-23.38	60.00	28.63	-21.37	50.00	Neutral	9k	1.00	10.55
6.8025	14	36.20	-23.80	60.00	28.36	-21.64	50.00	Neutral	9k	1.00	10.56

FCC ID: WJ9-RRU1400

freq	SR	QP	margin	limit	AV	margin	limit	line	RBW	Measure time	corr
MHz		dBμV	dB	dBμV	dBμV	dB	dBμV		Hz	sec	dB
7.068	14	35.84	-24.16	60.00	28.14	-21.86	50.00	Neutral	9k	1.00	10.57
9.6855	15	35.17	-24.83	60.00	27.49	-22.51	50.00	Neutral	9k	1.00	10.66
9.7305	15	35.05	-24.95	60.00	27.40	-22.60	50.00	Neutral	9k	1.00	10.66
19.167	15	35.61	-24.39	60.00	27.79	-22.21	50.00	Neutral	9k	1.00	11.22
20.2575	16	37.02	-22.98	60.00	29.11	-20.89	50.00	Neutral	9k	1.00	11.25
20.3295	16	37.90	-22.10	60.00	30.25	-19.75	50.00	Neutral	9k	1.00	11.25
24.06	16	26.45	-33.55	60.00	21.04	-28.96	50.00	Neutral	9k	1.00	11.26
24.276	16	27.70	-32.30	60.00	22.87	-27.13	50.00	Neutral	9k	1.00	11.26

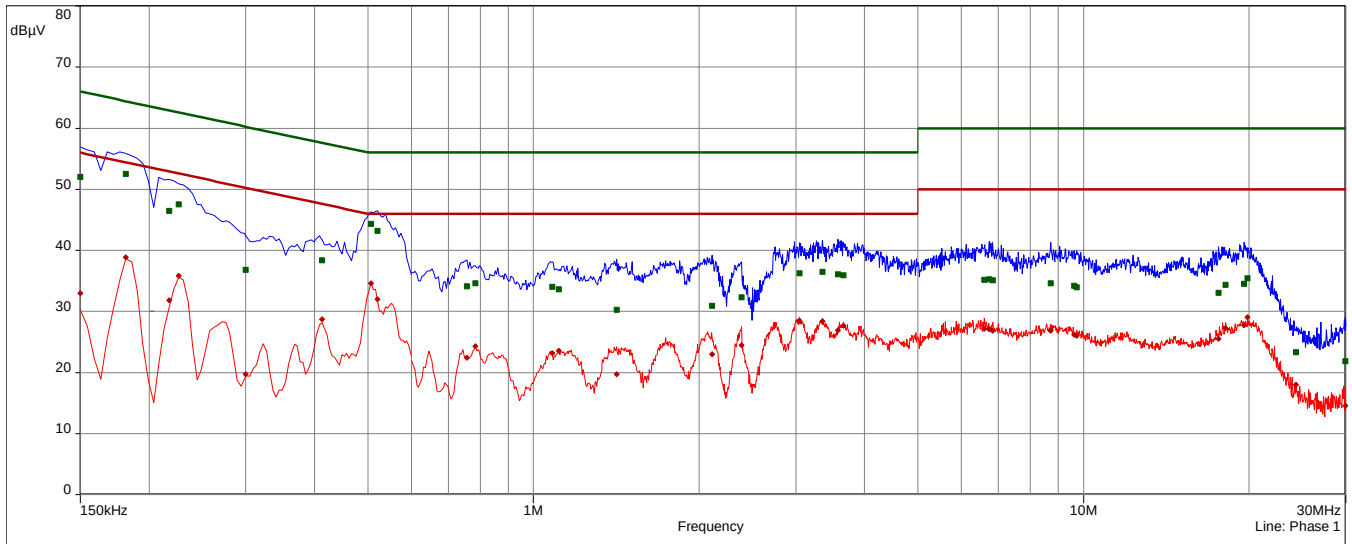
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FCC ID: WJ9-RRU1400

Test point L1
Operation mode: Tag reading mode
Remarks: UHF RFID Antenna 52010334

Result: Passed

- CISPR 32/AC mains power ports B - Average/
- CISPR 32/AC mains power ports B - QPeak/
- Peak (Phase 1)
- CISPR.AVG (Phase 1)
- QuasiPeak (Finals) (Phase 1)
- CISPR AV (Finals) (Phase 1)



CISPR 32/AC mains power portsB

freq	SR	QP	margin	limit	AV	margin	limit	line	RBW	Measure time	corr
MHz		dBµV	dB	dBµV	dBµV	dB	dBµV		Hz	sec	dB
0.15	1	52.04	-13.96	66.00	32.97	-23.03	56.00	Phase 1	9k	1.00	10.09
0.1815	1	52.49	-11.93	64.42	38.86	-15.56	54.42	Phase 1	9k	1.00	10.10
0.2175	1	46.44	-16.48	62.91	31.79	-21.13	52.91	Phase 1	9k	1.00	10.11
0.2265	1	47.51	-15.06	62.58	35.86	-16.71	52.58	Phase 1	9k	1.00	10.11
0.3	2	36.78	-23.47	60.24	19.71	-30.54	50.24	Phase 1	9k	1.00	10.14
0.4125	2	38.41	-19.19	57.60	28.68	-18.92	47.60	Phase 1	9k	1.00	10.16
0.507	2	44.33	-11.67	56.00	34.65	-11.35	46.00	Phase 1	9k	1.00	10.16
0.5205	2	43.17	-12.83	56.00	31.95	-14.05	46.00	Phase 1	9k	1.00	10.16
0.7575	3	34.14	-21.86	56.00	22.41	-23.59	46.00	Phase 1	9k	1.00	10.19
0.7845	3	34.63	-21.37	56.00	24.31	-21.69	46.00	Phase 1	9k	1.00	10.19
1.0815	3	34.06	-21.94	56.00	23.15	-22.85	46.00	Phase 1	9k	1.00	10.21
1.113	3	33.61	-22.39	56.00	23.54	-22.46	46.00	Phase 1	9k	1.00	10.22
1.416	4	30.29	-25.71	56.00	19.75	-26.25	46.00	Phase 1	9k	1.00	10.26
2.1135	4	30.93	-25.07	56.00	23.03	-22.97	46.00	Phase 1	9k	1.00	10.28
2.388	4	32.34	-23.66	56.00	24.47	-21.53	46.00	Phase 1	9k	1.00	10.31
3.048	5	36.25	-19.75	56.00	28.50	-17.50	46.00	Phase 1	9k	1.00	10.35
3.354	5	36.53	-19.47	56.00	28.41	-17.59	46.00	Phase 1	9k	1.00	10.35
3.579	5	36.11	-19.89	56.00	26.95	-19.05	46.00	Phase 1	9k	1.00	10.36
3.66	5	35.94	-20.06	56.00	27.68	-18.32	46.00	Phase 1	9k	1.00	10.37

FCC ID: WJ9-RRU1400

freq	SR	QP	margin	limit	AV	margin	limit	line	RBW	Measure time	corr
MHz		dBμV	dB	dBμV	dBμV	dB	dBμV		Hz	sec	dB
6.5955	6	35.22	-24.78	60.00	27.20	-22.80	50.00	Phase 1	9k	1.00	10.57
6.744	6	35.28	-24.72	60.00	27.11	-22.89	50.00	Phase 1	9k	1.00	10.59
6.843	6	35.08	-24.92	60.00	26.80	-23.20	50.00	Phase 1	9k	1.00	10.59
8.7195	6	34.60	-25.40	60.00	26.83	-23.17	50.00	Phase 1	9k	1.00	10.69
9.627	7	34.16	-25.84	60.00	26.17	-23.83	50.00	Phase 1	9k	1.00	10.72
9.726	7	33.97	-26.03	60.00	26.00	-24.00	50.00	Phase 1	9k	1.00	10.73
17.5965	7	33.05	-26.95	60.00	25.50	-24.50	50.00	Phase 1	9k	1.00	11.35
18.1095	7	34.39	-25.61	60.00	27.25	-22.75	50.00	Phase 1	9k	1.00	11.37
19.5735	8	34.55	-25.45	60.00	27.73	-22.27	50.00	Phase 1	9k	1.00	11.44
19.857	8	35.40	-24.60	60.00	29.07	-20.93	50.00	Phase 1	9k	1.00	11.45
24.3525	8	23.31	-36.69	60.00	17.98	-32.02	50.00	Phase 1	9k	1.00	11.66
29.9685	8	21.83	-38.17	60.00	14.53	-35.47	50.00	Phase 1	9k	1.00	11.72

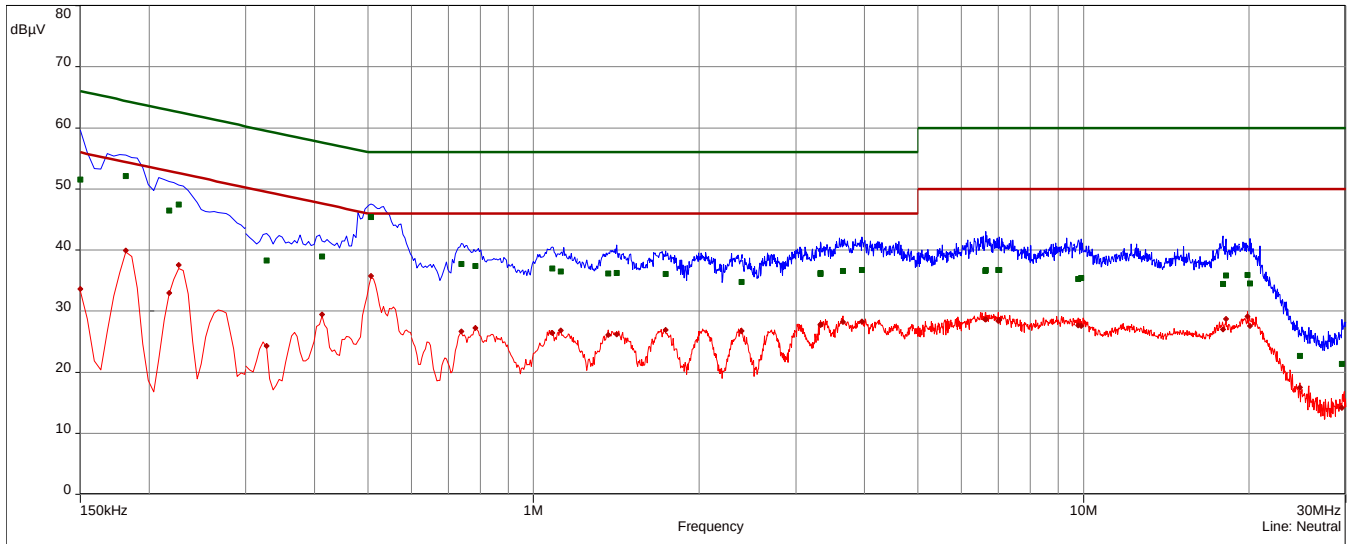
The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test results without the written permission of the test laboratory.

FCC ID: WJ9-RRU1400

Test point: N
Operation mode: Tag reading mode
Remarks: UHF RFID Antenna 52010334

Result: Passed

- CISPR 32/AC mains power ports B - Average/
- CISPR 32/AC mains power ports B - QPeak/
- Peak (Neutral)
- CISPR.AVG (Neutral)
- QuasiPeak (Finals) (Neutral)
- CISPR AV (Finals) (Neutral)



CISPR 32/AC mains power portsB

freq	SR	QP	margin	limit	AV	margin	limit	line	RBW	Measure time	corr
MHz		dBμV	dB	dBμV	dBμV	dB	dBμV		Hz	sec	dB
0.15	9	51.56	-14.44	66.00	33.63	-22.37	56.00	Neutral	9k	1.00	10.09
0.1815	9	52.14	-12.28	64.42	39.88	-14.53	54.42	Neutral	9k	1.00	10.11
0.2175	9	46.48	-16.43	62.91	33.01	-19.90	52.91	Neutral	9k	1.00	10.13
0.2265	9	47.42	-15.15	62.58	37.59	-14.99	52.58	Neutral	9k	1.00	10.13
0.327	10	38.27	-21.25	59.53	24.30	-25.23	49.53	Neutral	9k	1.00	10.15
0.4125	10	38.94	-18.65	57.60	29.42	-18.18	47.60	Neutral	9k	1.00	10.16
0.507	10	45.41	-10.59	56.00	35.73	-10.27	46.00	Neutral	9k	1.00	10.16
0.7395	11	37.74	-18.26	56.00	26.68	-19.32	46.00	Neutral	9k	1.00	10.19
0.7845	11	37.35	-18.65	56.00	27.21	-18.79	46.00	Neutral	9k	1.00	10.19
1.0815	11	36.98	-19.02	56.00	26.45	-19.55	46.00	Neutral	9k	1.00	10.21
1.122	11	36.49	-19.51	56.00	26.82	-19.18	46.00	Neutral	9k	1.00	10.22
1.3665	12	36.18	-19.82	56.00	26.08	-19.92	46.00	Neutral	9k	1.00	10.25
1.416	12	36.28	-19.72	56.00	26.18	-19.82	46.00	Neutral	9k	1.00	10.26
1.74	12	36.08	-19.92	56.00	26.88	-19.12	46.00	Neutral	9k	1.00	10.28

FCC ID: WJ9-RRU1400

freq	SR	QP	margin	limit	AV	margin	limit	line	RBW	Measure time	corr
MHz		dBμV	dB	dBμV	dBμV	dB	dBμV		Hz	sec	dB
2.388	12	34.80	-21.20	56.00	26.77	-19.23	46.00	Neutral	9k	1.00	10.31
3.3225	13	36.22	-19.78	56.00	27.77	-18.23	46.00	Neutral	9k	1.00	10.35
3.327	13	36.10	-19.90	56.00	27.81	-18.19	46.00	Neutral	9k	1.00	10.35
3.6555	13	36.59	-19.41	56.00	28.21	-17.79	46.00	Neutral	9k	1.00	10.36
3.957	13	36.75	-19.25	56.00	28.30	-17.70	46.00	Neutral	9k	1.00	10.38
6.6315	14	36.60	-23.40	60.00	28.64	-21.36	50.00	Neutral	9k	1.00	10.55
6.6405	14	36.72	-23.28	60.00	28.60	-21.40	50.00	Neutral	9k	1.00	10.55
7.005	14	36.75	-23.25	60.00	28.39	-21.61	50.00	Neutral	9k	1.00	10.57
7.0275	14	36.69	-23.31	60.00	28.52	-21.48	50.00	Neutral	9k	1.00	10.57
9.789	15	35.28	-24.72	60.00	27.69	-22.31	50.00	Neutral	9k	1.00	10.66
9.897	15	35.46	-24.54	60.00	27.61	-22.39	50.00	Neutral	9k	1.00	10.67
17.952	15	34.43	-25.57	60.00	26.98	-23.02	50.00	Neutral	9k	1.00	11.17
18.159	15	35.86	-24.14	60.00	28.69	-21.31	50.00	Neutral	9k	1.00	11.17
19.857	16	35.94	-24.06	60.00	29.15	-20.85	50.00	Neutral	9k	1.00	11.24
20.064	16	34.54	-25.46	60.00	27.58	-22.42	50.00	Neutral	9k	1.00	11.25
24.7485	16	22.69	-37.31	60.00	17.52	-32.48	50.00	Neutral	9k	1.00	11.26
29.5365	16	21.37	-38.63	60.00	14.18	-35.82	50.00	Neutral	9k	1.00	11.09

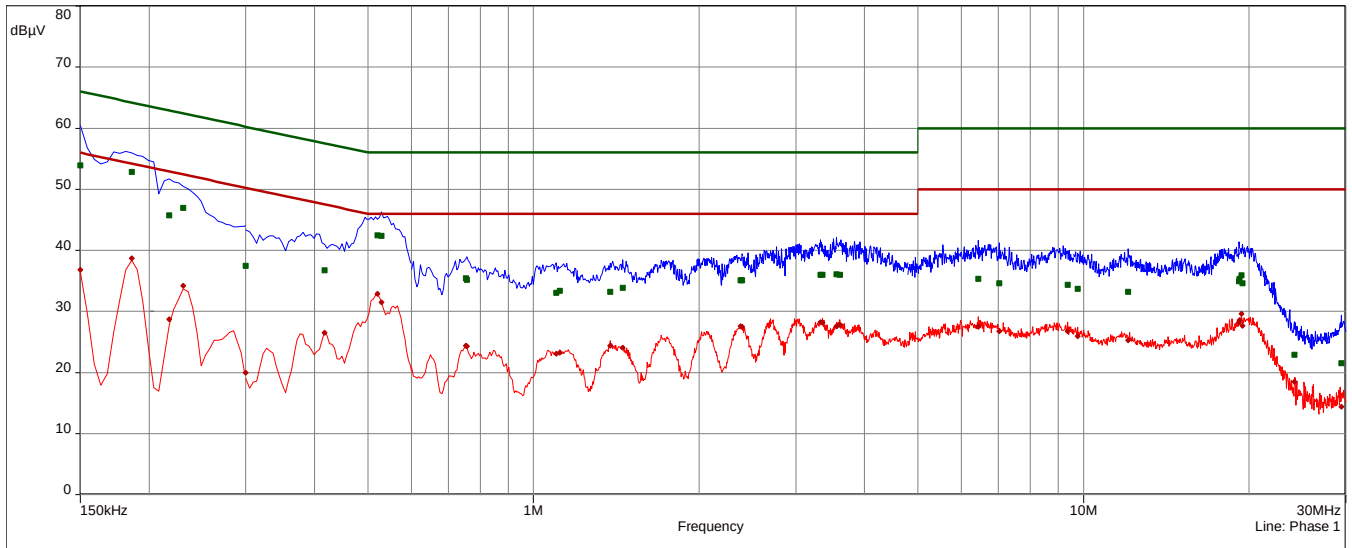
The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test results without the written permission of the test laboratory.

FCC ID: WJ9-RRU1400

Test point L1
Operation mode: Tag reading mode
Remarks: UHF RFID Antenna 52010424

Result: Passed

- CISPR 32/AC mains power ports B - Average/
- CISPR 32/AC mains power ports B - QPeak/
- Peak (Phase 1)
- CISPR.AVG (Phase 1)
- QuasiPeak (Finals) (Phase 1)
- CISPR AV (Finals) (Phase 1)



CISPR 32/AC mains power portsB

freq	SR	QP	margin	limit	AV	margin	limit	line	RBW	Measure time	corr
MHz		dBμV	dB	dBμV	dBμV	dB	dBμV		Hz	sec	dB
0.15	1	53.92	-12.08	66.00	36.79	-19.21	56.00	Phase 1	9k	1.00	10.09
0.186	1	52.86	-11.35	64.21	38.68	-15.54	54.21	Phase 1	9k	1.00	10.10
0.2175	1	45.72	-17.19	62.91	28.75	-24.17	52.91	Phase 1	9k	1.00	10.11
0.231	1	46.97	-15.45	62.41	34.22	-18.20	52.41	Phase 1	9k	1.00	10.12
0.3	2	37.48	-22.77	60.24	19.93	-30.31	50.24	Phase 1	9k	1.00	10.14
0.417	2	36.77	-20.74	57.51	26.49	-21.01	47.51	Phase 1	9k	1.00	10.16
0.5205	2	42.44	-13.56	56.00	32.91	-13.09	46.00	Phase 1	9k	1.00	10.16
0.5295	2	42.35	-13.65	56.00	31.53	-14.47	46.00	Phase 1	9k	1.00	10.16
0.753	3	35.40	-20.60	56.00	24.41	-21.59	46.00	Phase 1	9k	1.00	10.19
0.7575	3	35.20	-20.80	56.00	24.31	-21.69	46.00	Phase 1	9k	1.00	10.19
1.0995	3	33.04	-22.96	56.00	23.09	-22.91	46.00	Phase 1	9k	1.00	10.22
1.1175	3	33.41	-22.59	56.00	23.26	-22.74	46.00	Phase 1	9k	1.00	10.22
1.38	4	33.24	-22.76	56.00	24.41	-21.59	46.00	Phase 1	9k	1.00	10.25
1.452	4	33.88	-22.12	56.00	24.08	-21.92	46.00	Phase 1	9k	1.00	10.26
2.379	4	35.11	-20.89	56.00	27.54	-18.46	46.00	Phase 1	9k	1.00	10.31
2.397	4	35.06	-20.94	56.00	27.53	-18.47	46.00	Phase 1	9k	1.00	10.31
3.3225	5	36.00	-20.00	56.00	28.22	-17.78	46.00	Phase 1	9k	1.00	10.35
3.354	5	35.97	-20.03	56.00	28.17	-17.83	46.00	Phase 1	9k	1.00	10.35
3.552	5	36.09	-19.91	56.00	27.54	-18.46	46.00	Phase 1	9k	1.00	10.35
3.6105	5	36.02	-19.98	56.00	27.85	-18.15	46.00	Phase 1	9k	1.00	10.36

FCC ID: WJ9-RRU1400

freq	SR	QP	margin	limit	AV	margin	limit	line	RBW	Measure time	corr
MHz		dBμV	dB	dBμV	dBμV	dB	dBμV		Hz	sec	dB
7.023	6	34.60	-25.40	60.00	26.77	-23.23	50.00	Phase 1	9k	1.00	10.60
9.354	6	34.33	-25.67	60.00	26.78	-23.22	50.00	Phase 1	9k	1.00	10.71
9.762	7	33.69	-26.31	60.00	25.97	-24.03	50.00	Phase 1	9k	1.00	10.73
12.066	7	33.24	-26.76	60.00	25.26	-24.74	50.00	Phase 1	9k	1.00	10.94
19.167	7	34.92	-25.08	60.00	28.21	-21.79	50.00	Phase 1	9k	1.00	11.43
19.1985	7	35.35	-24.65	60.00	28.57	-21.43	50.00	Phase 1	9k	1.00	11.43
19.3845	8	35.94	-24.06	60.00	29.60	-20.40	50.00	Phase 1	9k	1.00	11.44
19.4475	8	34.61	-25.39	60.00	27.66	-22.34	50.00	Phase 1	9k	1.00	11.44
24.213	8	22.94	-37.06	60.00	18.48	-31.52	50.00	Phase 1	9k	1.00	11.65
29.451	8	21.55	-38.45	60.00	14.40	-35.60	50.00	Phase 1	9k	1.00	11.71

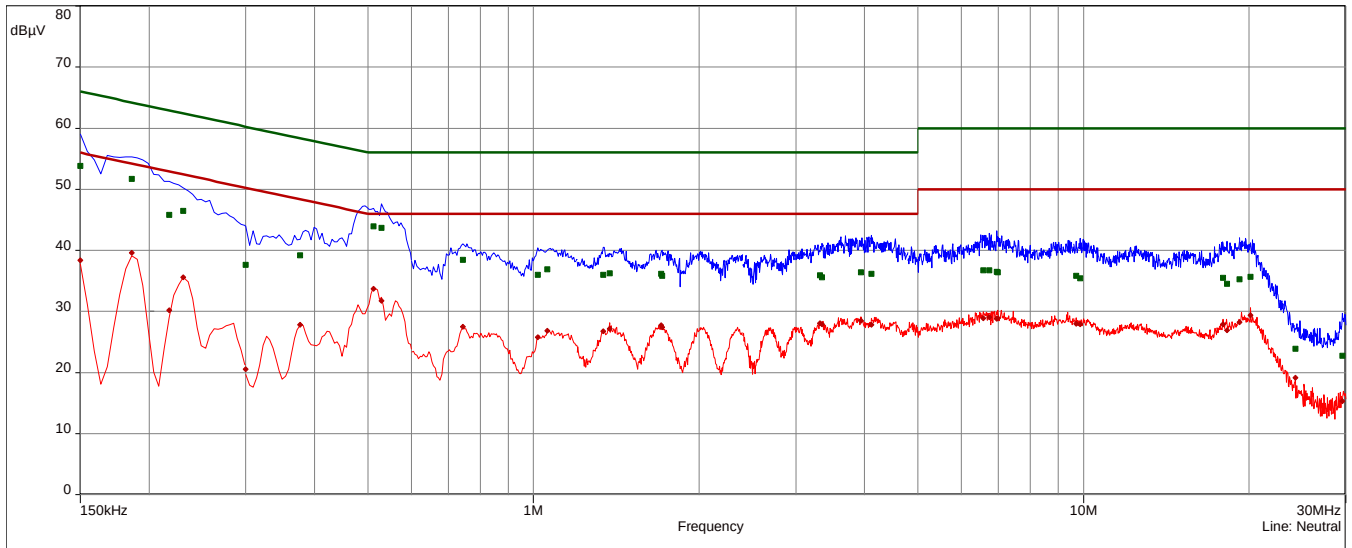
The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test results without the written permission of the test laboratory.

FCC ID: WJ9-RRU1400

Test point N
Operation mode: Tag reading mode
Remarks: UHF RFID Antenna 52010424

Result: Passed

- CISPR 32/AC mains power ports B - Average/
- CISPR 32/AC mains power ports B - QPeak/
- Peak (Neutral)
- CISPR.AVG (Neutral)
- QuasiPeak (Finals) (Neutral)
- CISPR AV (Finals) (Neutral)



freq	SR	QP	margin	limit	AV	margin	limit	line	RBW	Measure time	corr
MHz		dBμV	dB	dBμV	dBμV	dB	dBμV		Hz	sec	dB
0.15	9	53.83	-12.17	66.00	38.35	-17.65	56.00	Neutral	9k	1.00	10.09
0.186	9	51.73	-12.48	64.21	39.58	-14.63	54.21	Neutral	9k	1.00	10.12
0.2175	9	45.82	-17.09	62.91	30.15	-22.76	52.91	Neutral	9k	1.00	10.13
0.231	9	46.44	-15.98	62.41	35.59	-16.82	52.41	Neutral	9k	1.00	10.13
0.3	10	37.65	-22.59	60.24	20.55	-29.69	50.24	Neutral	9k	1.00	10.14
0.3765	10	39.15	-19.20	58.36	27.78	-20.57	48.36	Neutral	9k	1.00	10.15
0.5115	10	43.92	-12.08	56.00	33.74	-12.26	46.00	Neutral	9k	1.00	10.16
0.5295	10	43.69	-12.31	56.00	31.74	-14.26	46.00	Neutral	9k	1.00	10.16
0.744	11	38.47	-17.53	56.00	27.52	-18.48	46.00	Neutral	9k	1.00	10.19
1.0185	11	36.00	-20.00	56.00	25.80	-20.20	46.00	Neutral	9k	1.00	10.21
1.059	11	36.93	-19.07	56.00	26.81	-19.19	46.00	Neutral	9k	1.00	10.21
1.3395	12	35.97	-20.03	56.00	26.72	-19.28	46.00	Neutral	9k	1.00	10.25
1.3755	12	36.24	-19.76	56.00	27.13	-18.87	46.00	Neutral	9k	1.00	10.25
1.7085	12	36.19	-19.81	56.00	27.72	-18.28	46.00	Neutral	9k	1.00	10.27
1.713	12	35.84	-20.16	56.00	27.43	-18.57	46.00	Neutral	9k	1.00	10.27
3.318	13	35.88	-20.12	56.00	28.03	-17.97	46.00	Neutral	9k	1.00	10.35
3.345	13	35.61	-20.39	56.00	27.89	-18.11	46.00	Neutral	9k	1.00	10.35
3.939	13	36.43	-19.57	56.00	28.46	-17.54	46.00	Neutral	9k	1.00	10.38
4.119	13	36.15	-19.85	56.00	27.86	-18.14	46.00	Neutral	9k	1.00	10.40

FCC ID: WJ9-RRU1400

freq	SR	QP	margin	limit	AV	margin	limit	line	RBW	Measure time	corr
MHz		dBμV	dB	dBμV	dBμV	dB	dBμV		Hz	sec	dB
6.573	14	36.70	-23.30	60.00	28.86	-21.14	50.00	Neutral	9k	1.00	10.54
6.744	14	36.72	-23.28	60.00	29.05	-20.95	50.00	Neutral	9k	1.00	10.56
6.951	14	36.52	-23.48	60.00	28.82	-21.18	50.00	Neutral	9k	1.00	10.57
6.9825	14	36.41	-23.59	60.00	28.85	-21.15	50.00	Neutral	9k	1.00	10.57
9.7035	15	35.85	-24.15	60.00	27.96	-22.04	50.00	Neutral	9k	1.00	10.66
9.87	15	35.41	-24.59	60.00	27.87	-22.13	50.00	Neutral	9k	1.00	10.67
17.925	15	35.48	-24.52	60.00	27.93	-22.07	50.00	Neutral	9k	1.00	11.17
18.2355	15	34.55	-25.45	60.00	26.95	-23.05	50.00	Neutral	9k	1.00	11.18
19.2	16	35.25	-24.75	60.00	28.25	-21.75	50.00	Neutral	9k	1.00	11.22
20.1405	16	35.68	-24.32	60.00	29.41	-20.59	50.00	Neutral	9k	1.00	11.25
24.276	16	23.92	-36.08	60.00	19.13	-30.87	50.00	Neutral	9k	1.00	11.26
29.5545	16	22.77	-37.23	60.00	15.30	-34.70	50.00	Neutral	9k	1.00	11.09

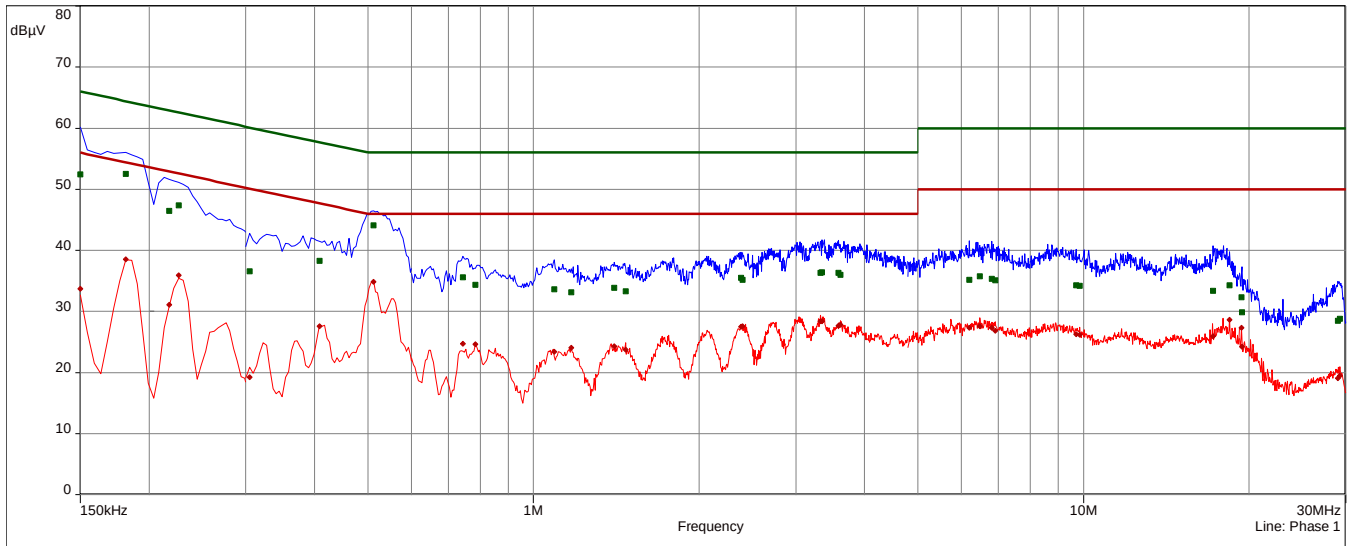
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The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test results without the written permission of the test laboratory.

FCC ID: WJ9-RRU1400

Test point L1
Operation mode: Tag reading mode
Remarks: Wide Range Antenna 52010087

Result: Passed

- CISPR 32/AC mains power ports B - Average/
- CISPR 32/AC mains power ports B - QPeak/
- Peak (Phase 1)
- CISPR.AVG (Phase 1)
- QuasiPeak (Finals) (Phase 1)
- CISPR AV (Finals) (Phase 1)



CISPR 32/AC mains power portsB

freq	SR	QP	margin	limit	AV	margin	limit	line	RBW	Measure time	corr
MHz		dBμV	dB	dBμV	dBμV	dB	dBμV		Hz	sec	dB
0.15	1	52.41	-13.59	66.00	33.74	-22.26	56.00	Phase 1	9k	1.00	10.09
0.1815	1	52.49	-11.93	64.42	38.53	-15.88	54.42	Phase 1	9k	1.00	10.10
0.2175	1	46.46	-16.46	62.91	31.12	-21.79	52.91	Phase 1	9k	1.00	10.11
0.2265	1	47.34	-15.23	62.58	35.89	-16.69	52.58	Phase 1	9k	1.00	10.11
0.3045	2	36.54	-23.58	60.12	19.24	-30.88	50.12	Phase 1	9k	1.00	10.14
0.408	2	38.30	-19.39	57.69	27.56	-20.13	47.69	Phase 1	9k	1.00	10.16
0.5115	2	44.10	-11.90	56.00	34.83	-11.17	46.00	Phase 1	9k	1.00	10.16
0.744	3	35.57	-20.43	56.00	24.69	-21.31	46.00	Phase 1	9k	1.00	10.19
0.7845	3	34.37	-21.63	56.00	24.61	-21.39	46.00	Phase 1	9k	1.00	10.19
1.0905	3	33.60	-22.40	56.00	23.41	-22.59	46.00	Phase 1	9k	1.00	10.22
1.1715	3	33.10	-22.90	56.00	24.07	-21.93	46.00	Phase 1	9k	1.00	10.23
1.4025	4	33.86	-22.14	56.00	24.27	-21.73	46.00	Phase 1	9k	1.00	10.26
1.47	4	33.32	-22.68	56.00	23.70	-22.30	46.00	Phase 1	9k	1.00	10.26
2.3835	4	35.49	-20.51	56.00	27.45	-18.55	46.00	Phase 1	9k	1.00	10.31
2.4	4	35.20	-20.80	56.00	27.55	-18.45	46.00	Phase 1	9k	1.00	10.31
3.327	5	36.37	-19.63	56.00	28.37	-17.63	46.00	Phase 1	9k	1.00	10.35
3.3495	5	36.38	-19.62	56.00	28.41	-17.59	46.00	Phase 1	9k	1.00	10.35
3.588	5	36.30	-19.70	56.00	27.63	-18.37	46.00	Phase 1	9k	1.00	10.36
3.615	5	36.00	-20.00	56.00	27.79	-18.21	46.00	Phase 1	9k	1.00	10.36

FCC ID: WJ9-RRU1400

freq	SR	QP	margin	limit	AV	margin	limit	line	RBW	Measure time	corr
MHz		dBμV	dB	dBμV	dBμV	dB	dBμV		Hz	sec	dB
6.1995	6	35.21	-24.79	60.00	27.29	-22.71	50.00	Phase 1	9k	1.00	10.54
6.483	6	35.75	-24.25	60.00	27.61	-22.39	50.00	Phase 1	9k	1.00	10.56
6.8115	6	35.34	-24.66	60.00	27.34	-22.66	50.00	Phase 1	9k	1.00	10.59
6.915	6	35.07	-24.93	60.00	26.87	-23.13	50.00	Phase 1	9k	1.00	10.60
9.699	7	34.27	-25.73	60.00	26.29	-23.71	50.00	Phase 1	9k	1.00	10.72
9.843	7	34.18	-25.82	60.00	26.21	-23.79	50.00	Phase 1	9k	1.00	10.73
17.2005	7	33.39	-26.61	60.00	25.92	-24.08	50.00	Phase 1	9k	1.00	11.32
18.4425	7	34.27	-25.73	60.00	28.67	-21.33	50.00	Phase 1	9k	1.00	11.39
19.3845	8	32.28	-27.72	60.00	27.32	-22.68	50.00	Phase 1	9k	1.00	11.44
19.4205	8	29.84	-30.16	60.00	24.19	-25.81	50.00	Phase 1	9k	1.00	11.44
29.01	8	28.46	-31.54	60.00	19.05	-30.95	50.00	Phase 1	9k	1.00	11.71
29.235	8	28.79	-31.21	60.00	19.50	-30.50	50.00	Phase 1	9k	1.00	11.71

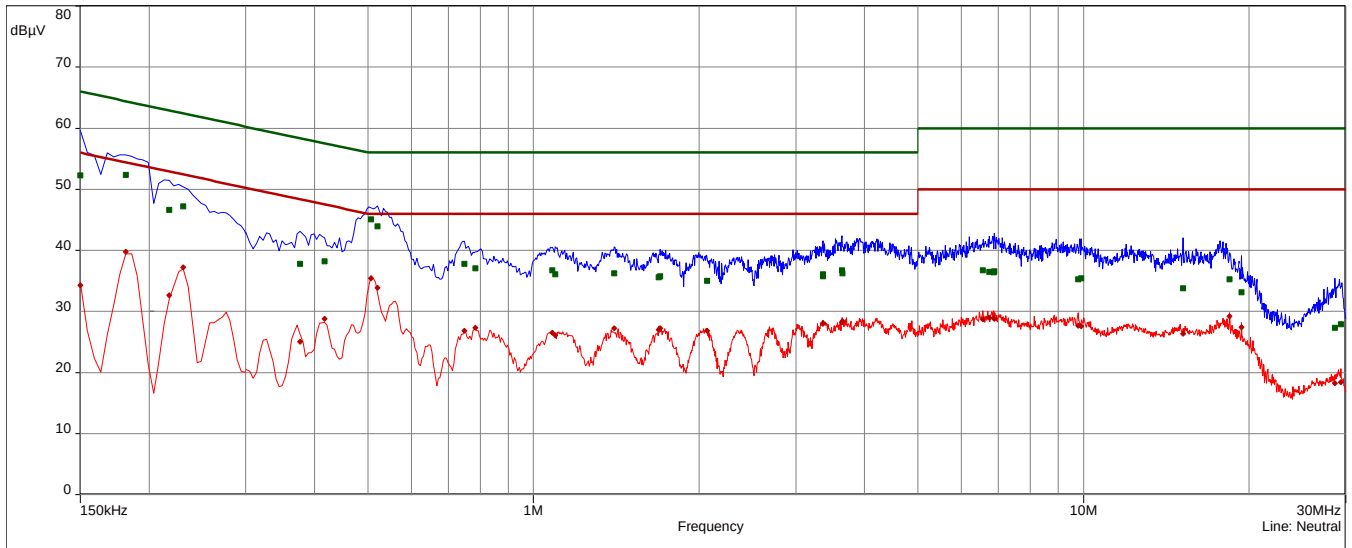
The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test results without the written permission of the test laboratory.

FCC ID: WJ9-RRU1400

Test point N
Operation mode: Tag reading mode
Remarks: Wide Range Antenna 52010087

Result: Passed

— CISPR 32/AC mains power ports B - Average/
— CISPR 32/AC mains power ports B - QPeak/
— Peak (Neutral)
— CISPR.AVG (Neutral)
■ QuasiPeak (Finals) (Neutral)
• CISPR AV (Finals) (Neutral)



CISPR 32/AC mains power portsB

freq	SR	QP	margin	limit	AV	margin	limit	line	RBW	Measure time	corr
MHz		dBμV	dB	dBμV	dBμV	dB	dBμV		Hz	sec	dB
0.15	9	52.26	-13.74	66.00	34.25	-21.75	56.00	Neutral	9k	1.00	10.09
0.1815	9	52.32	-12.09	64.42	39.76	-14.65	54.42	Neutral	9k	1.00	10.11
0.2175	9	46.65	-16.26	62.91	32.68	-20.23	52.91	Neutral	9k	1.00	10.13
0.231	9	47.23	-15.18	62.41	37.22	-15.20	52.41	Neutral	9k	1.00	10.13
0.3765	10	37.77	-20.58	58.36	25.02	-23.34	48.36	Neutral	9k	1.00	10.15
0.417	10	38.22	-19.29	57.51	28.83	-18.68	47.51	Neutral	9k	1.00	10.16
0.507	10	45.06	-10.94	56.00	35.44	-10.56	46.00	Neutral	9k	1.00	10.16
0.5205	10	43.97	-12.03	56.00	33.85	-12.15	46.00	Neutral	9k	1.00	10.16
0.7485	11	37.76	-18.24	56.00	26.85	-19.15	46.00	Neutral	9k	1.00	10.19
0.7845	11	37.04	-18.96	56.00	27.32	-18.68	46.00	Neutral	9k	1.00	10.19
1.0815	11	36.73	-19.27	56.00	26.53	-19.47	46.00	Neutral	9k	1.00	10.21
1.095	11	36.07	-19.93	56.00	26.09	-19.91	46.00	Neutral	9k	1.00	10.22
1.4025	12	36.28	-19.72	56.00	27.23	-18.77	46.00	Neutral	9k	1.00	10.26
1.6905	12	35.57	-20.43	56.00	26.98	-19.02	46.00	Neutral	9k	1.00	10.27
1.6995	12	35.77	-20.23	56.00	27.25	-18.75	46.00	Neutral	9k	1.00	10.27
2.0685	12	34.98	-21.02	56.00	26.88	-19.12	46.00	Neutral	9k	1.00	10.28
3.3585	13	36.09	-19.91	56.00	28.05	-17.95	46.00	Neutral	9k	1.00	10.35
3.363	13	35.79	-20.21	56.00	27.96	-18.04	46.00	Neutral	9k	1.00	10.35
3.6375	13	36.69	-19.31	56.00	28.25	-17.75	46.00	Neutral	9k	1.00	10.36
3.6465	13	36.25	-19.75	56.00	28.38	-17.62	46.00	Neutral	9k	1.00	10.36

FCC ID: WJ9-RRU1400

freq	SR	QP	margin	limit	AV	margin	limit	line	RBW	Measure time	corr
MHz		dBμV	dB	dBμV	dBμV	dB	dBμV		Hz	sec	dB
6.555	14	36.73	-23.27	60.00	28.71	-21.29	50.00	Neutral	9k	1.00	10.54
6.7485	14	36.51	-23.49	60.00	28.94	-21.06	50.00	Neutral	9k	1.00	10.56
6.8655	14	36.38	-23.62	60.00	28.86	-21.14	50.00	Neutral	9k	1.00	10.56
6.879	14	36.61	-23.39	60.00	28.84	-21.16	50.00	Neutral	9k	1.00	10.57
9.78	15	35.29	-24.71	60.00	27.64	-22.36	50.00	Neutral	9k	1.00	10.66
9.915	15	35.46	-24.54	60.00	27.61	-22.39	50.00	Neutral	9k	1.00	10.67
15.1665	15	33.77	-26.23	60.00	26.31	-23.69	50.00	Neutral	9k	1.00	11.01
18.4425	15	35.22	-24.78	60.00	29.20	-20.80	50.00	Neutral	9k	1.00	11.19
19.3845	16	33.15	-26.85	60.00	27.42	-22.58	50.00	Neutral	9k	1.00	11.23
28.6815	16	27.33	-32.67	60.00	18.21	-31.79	50.00	Neutral	9k	1.00	11.13
29.4105	16	27.89	-32.11	60.00	18.41	-31.59	50.00	Neutral	9k	1.00	11.10

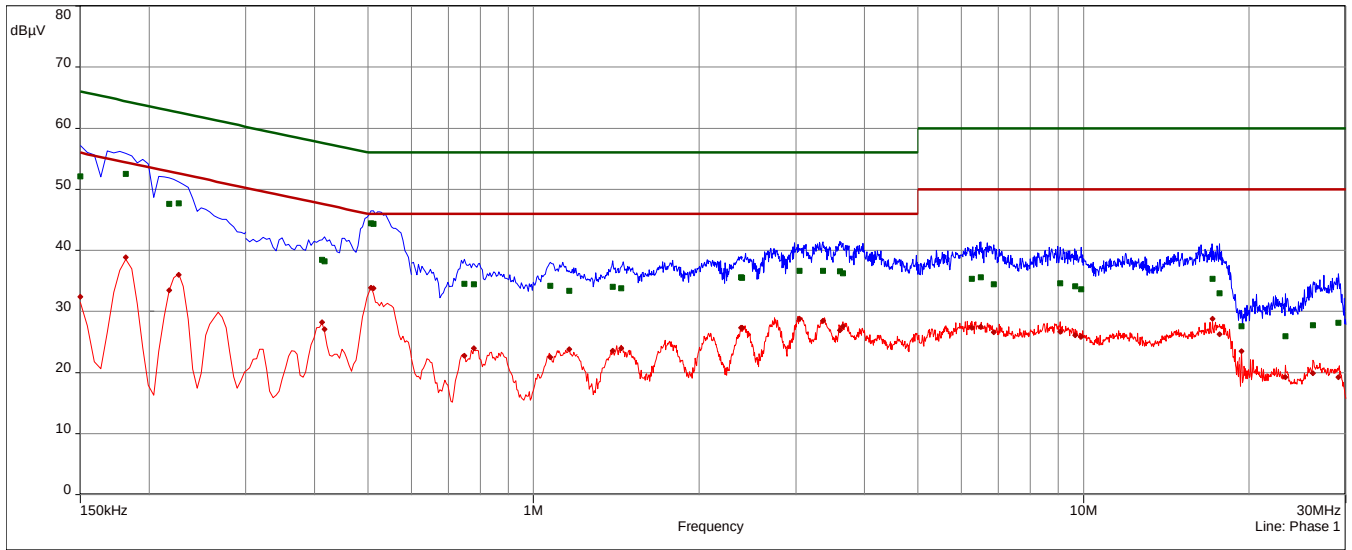
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FCC ID: WJ9-RRU1400

Test point L1
Operation mode: Tag reading mode
Remarks: Wide Range Antenna 52010252

Result: Passed

- CISPR 32/AC mains power ports B - Average/
- CISPR 32/AC mains power ports B - QPeak/
- Peak (Phase 1)
- CISPR.AVG (Phase 1)
- QuasiPeak (Finals) (Phase 1)
- CISPR AV (Finals) (Phase 1)



freq	SR	QP	margin	limit	AV	margin	limit	line	RBW	Measure time	corr
MHz		dBμV	dB	dBμV	dBμV	dB	dBμV		Hz	sec	dB
0.15	1	52.15	-13.85	66.00	32.41	-23.59	56.00	Phase 1	9k	1.00	10.09
0.1815	1	52.53	-11.89	64.42	38.90	-15.52	54.42	Phase 1	9k	1.00	10.10
0.2175	1	47.60	-15.31	62.91	33.43	-19.48	52.91	Phase 1	9k	1.00	10.11
0.2265	1	47.68	-14.90	62.58	36.01	-16.57	52.58	Phase 1	9k	1.00	10.11
0.4125	2	38.47	-19.12	57.60	28.25	-19.35	47.60	Phase 1	9k	1.00	10.16
0.417	2	38.20	-19.31	57.51	27.11	-20.40	47.51	Phase 1	9k	1.00	10.16
0.507	2	44.40	-11.60	56.00	33.88	-12.12	46.00	Phase 1	9k	1.00	10.16
0.5115	2	44.31	-11.69	56.00	33.78	-12.22	46.00	Phase 1	9k	1.00	10.16
0.7485	3	34.51	-21.49	56.00	22.75	-23.25	46.00	Phase 1	9k	1.00	10.19
0.78	3	34.48	-21.52	56.00	23.97	-22.03	46.00	Phase 1	9k	1.00	10.19
1.0725	3	34.18	-21.82	56.00	22.47	-23.53	46.00	Phase 1	9k	1.00	10.21
1.1625	3	33.39	-22.61	56.00	23.78	-22.22	46.00	Phase 1	9k	1.00	10.23
1.3935	4	34.01	-21.99	56.00	23.58	-22.42	46.00	Phase 1	9k	1.00	10.26
1.443	4	33.82	-22.18	56.00	23.95	-22.05	46.00	Phase 1	9k	1.00	10.26
2.3835	4	35.59	-20.41	56.00	27.32	-18.68	46.00	Phase 1	9k	1.00	10.31
2.397	4	35.47	-20.53	56.00	27.33	-18.67	46.00	Phase 1	9k	1.00	10.31
3.048	5	36.67	-19.33	56.00	28.76	-17.24	46.00	Phase 1	9k	1.00	10.35
3.3585	5	36.68	-19.32	56.00	28.46	-17.54	46.00	Phase 1	9k	1.00	10.35
3.606	5	36.55	-19.45	56.00	26.92	-19.08	46.00	Phase 1	9k	1.00	10.36
3.6555	5	36.24	-19.76	56.00	27.61	-18.39	46.00	Phase 1	9k	1.00	10.36

FCC ID: WJ9-RRU1400

freq	SR	QP	margin	limit	AV	margin	limit	line	RBW	Measure time	corr
MHz		dBμV	dB	dBμV	dBμV	dB	dBμV		Hz	sec	dB
6.2625	6	35.35	-24.65	60.00	27.32	-22.68	50.00	Phase 1	9k	1.00	10.55
6.51	6	35.56	-24.44	60.00	27.45	-22.55	50.00	Phase 1	9k	1.00	10.56
6.8745	6	34.46	-25.54	60.00	26.57	-23.43	50.00	Phase 1	9k	1.00	10.59
9.0795	6	34.58	-25.42	60.00	26.64	-23.36	50.00	Phase 1	9k	1.00	10.70
9.6585	7	34.14	-25.86	60.00	26.12	-23.88	50.00	Phase 1	9k	1.00	10.72
9.897	7	33.59	-26.41	60.00	25.85	-24.15	50.00	Phase 1	9k	1.00	10.74
17.169	7	35.32	-24.68	60.00	28.80	-21.20	50.00	Phase 1	9k	1.00	11.32
17.6775	7	32.97	-27.03	60.00	26.25	-23.75	50.00	Phase 1	9k	1.00	11.35
19.3845	8	27.54	-32.46	60.00	23.47	-26.53	50.00	Phase 1	9k	1.00	11.44
23.2995	8	25.92	-34.08	60.00	19.23	-30.77	50.00	Phase 1	9k	1.00	11.61
26.1255	8	27.70	-32.30	60.00	19.88	-30.12	50.00	Phase 1	9k	1.00	11.69
29.055	8	28.17	-31.83	60.00	19.20	-30.80	50.00	Phase 1	9k	1.00	11.71

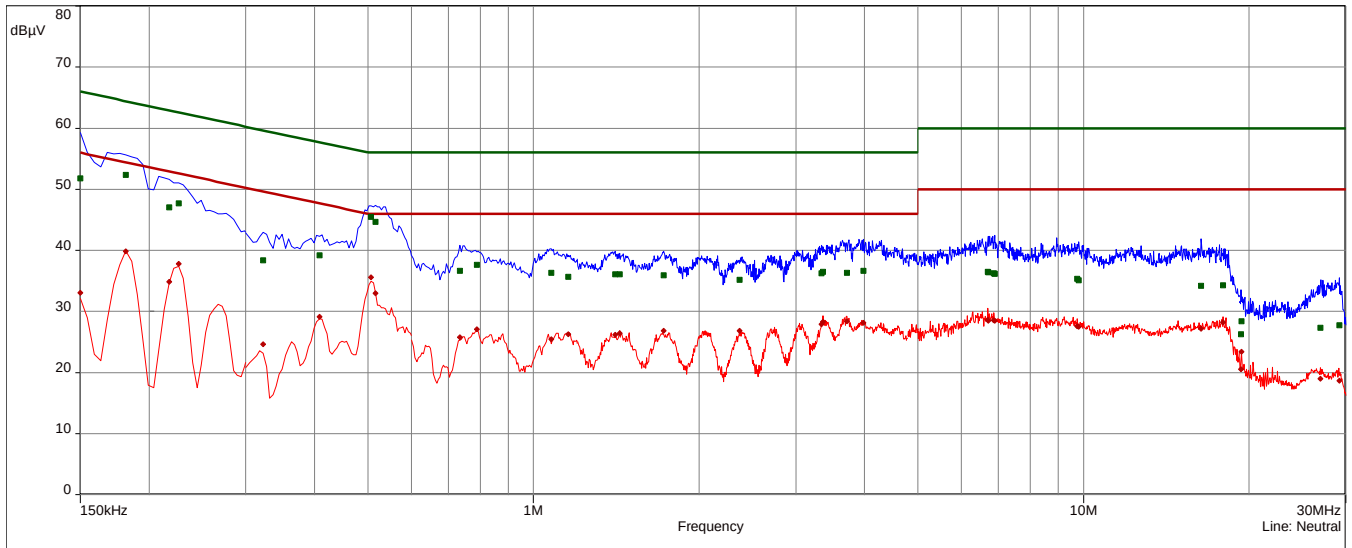
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FCC ID: WJ9-RRU1400

Test point: N
Operation mode: Tag reading mode
Remarks: Wide Range Antenna 52010252

Result: Passed

- CISPR 32/AC mains power ports B - Average/
- CISPR 32/AC mains power ports B - QPeak/
- Peak (Neutral)
- CISPR.AVG (Neutral)
- QuasiPeak (Finals) (Neutral)
- CISPR AV (Finals) (Neutral)



CISPR 32/AC mains power portsB

freq	SR	QP	margin	limit	AV	margin	limit	line	RBW	Measure time	corr
MHz		dBμV	dB	dBμV	dBμV	dB	dBμV		Hz	sec	dB
0.15	9	51.79	-14.21	66.00	33.05	-22.95	56.00	Neutral	9k	1.00	10.09
0.1815	9	52.33	-12.08	64.42	39.81	-14.60	54.42	Neutral	9k	1.00	10.11
0.2175	9	47.04	-15.87	62.91	34.89	-18.02	52.91	Neutral	9k	1.00	10.13
0.2265	9	47.68	-14.90	62.58	37.79	-14.79	52.58	Neutral	9k	1.00	10.13
0.3225	10	38.40	-21.25	59.64	24.62	-25.02	49.64	Neutral	9k	1.00	10.14
0.408	10	39.23	-18.46	57.69	29.16	-18.53	47.69	Neutral	9k	1.00	10.16
0.507	10	45.49	-10.51	56.00	35.58	-10.42	46.00	Neutral	9k	1.00	10.16
0.516	10	44.67	-11.33	56.00	32.97	-13.03	46.00	Neutral	9k	1.00	10.16
0.735	11	36.68	-19.32	56.00	25.78	-20.22	46.00	Neutral	9k	1.00	10.19
0.789	11	37.62	-18.38	56.00	27.08	-18.92	46.00	Neutral	9k	1.00	10.19
1.077	11	36.30	-19.70	56.00	25.46	-20.54	46.00	Neutral	9k	1.00	10.21
1.158	11	35.69	-20.31	56.00	26.27	-19.73	46.00	Neutral	9k	1.00	10.22
1.407	12	36.10	-19.90	56.00	26.19	-19.81	46.00	Neutral	9k	1.00	10.26
1.434	12	36.11	-19.89	56.00	26.42	-19.58	46.00	Neutral	9k	1.00	10.26
1.7265	12	35.95	-20.05	56.00	26.82	-19.18	46.00	Neutral	9k	1.00	10.27
2.37	12	35.16	-20.84	56.00	26.83	-19.17	46.00	Neutral	9k	1.00	10.31
3.3405	13	36.28	-19.72	56.00	27.90	-18.10	46.00	Neutral	9k	1.00	10.35
3.363	13	36.46	-19.54	56.00	28.29	-17.71	46.00	Neutral	9k	1.00	10.35
3.7185	13	36.34	-19.66	56.00	28.38	-17.62	46.00	Neutral	9k	1.00	10.37
3.984	13	36.66	-19.34	56.00	28.15	-17.85	46.00	Neutral	9k	1.00	10.38

FCC ID: WJ9-RRU1400

freq	SR	QP	margin	limit	AV	margin	limit	line	RBW	Measure time	corr
MHz		dBμV	dB	dBμV	dBμV	dB	dBμV		Hz	sec	dB
6.6945	14	36.49	-23.51	60.00	28.62	-21.38	50.00	Neutral	9k	1.00	10.55
6.7125	14	36.42	-23.58	60.00	28.46	-21.54	50.00	Neutral	9k	1.00	10.56
6.8745	14	36.25	-23.75	60.00	28.56	-21.44	50.00	Neutral	9k	1.00	10.56
6.906	14	36.18	-23.82	60.00	28.44	-21.56	50.00	Neutral	9k	1.00	10.57
9.744	15	35.30	-24.70	60.00	27.57	-22.43	50.00	Neutral	9k	1.00	10.66
9.807	15	35.11	-24.89	60.00	27.48	-22.52	50.00	Neutral	9k	1.00	10.66
16.3635	15	34.22	-25.78	60.00	27.16	-22.84	50.00	Neutral	9k	1.00	11.08
17.925	15	34.31	-25.69	60.00	28.21	-21.79	50.00	Neutral	9k	1.00	11.17
19.3485	16	26.26	-33.74	60.00	20.53	-29.47	50.00	Neutral	9k	1.00	11.23
19.3845	16	28.42	-31.58	60.00	23.38	-26.62	50.00	Neutral	9k	1.00	11.23
26.9625	16	27.35	-32.65	60.00	19.00	-31.00	50.00	Neutral	9k	1.00	11.19
29.2215	16	27.77	-32.23	60.00	18.65	-31.35	50.00	Neutral	9k	1.00	11.11

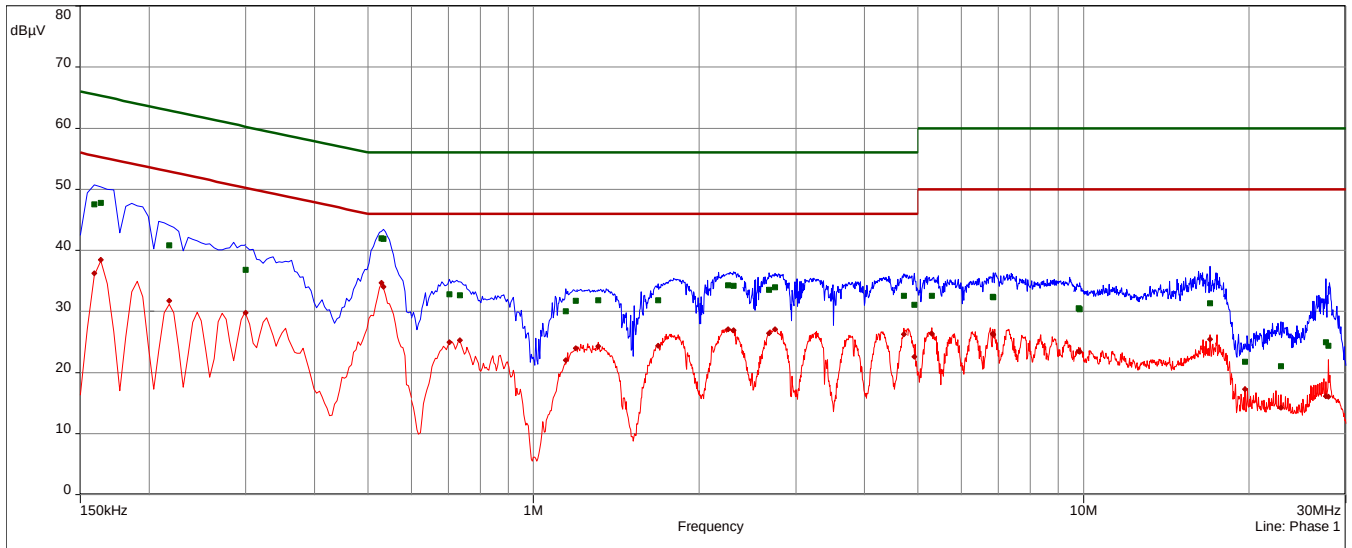
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FCC ID: WJ9-RRU1400

Test point L1
Operation mode: Standby mode
Remarks: Wide Range Antenna 52010252

Result: Passed

- CISPR 32/AC mains power ports B - Average/
- CISPR 32/AC mains power ports B - QPeak/
- Peak (Phase 1)
- CISPR.AVG (Phase 1)
- QuasiPeak (Finals) (Phase 1)
- CISPR AV (Finals) (Phase 1)



CISPR 32/AC mains power portsB

freq	SR	QP	margin	limit	AV	margin	limit	line	RBW	Measure time	corr
MHz		dBµV	dB	dBµV	dBµV	dB	dBµV		Hz	sec	dB
0.159	1	47.51	-18.01	65.52	36.24	-19.28	55.52	Phase 1	9k	1.00	10.10
0.1635	1	47.80	-17.49	65.28	38.48	-16.80	55.28	Phase 1	9k	1.00	10.10
0.2175	1	40.82	-22.09	62.91	31.76	-21.15	52.91	Phase 1	9k	1.00	10.11
0.3	2	36.78	-23.47	60.24	29.79	-20.46	50.24	Phase 1	9k	1.00	10.14
0.5295	2	41.95	-14.05	56.00	34.71	-11.29	46.00	Phase 1	9k	1.00	10.16
0.534	2	41.87	-14.13	56.00	34.00	-12.00	46.00	Phase 1	9k	1.00	10.16
0.7035	3	32.78	-23.22	56.00	24.92	-21.08	46.00	Phase 1	9k	1.00	10.19
0.735	3	32.66	-23.34	56.00	25.26	-20.74	46.00	Phase 1	9k	1.00	10.19
1.1445	3	30.04	-25.96	56.00	22.02	-23.98	46.00	Phase 1	9k	1.00	10.22
1.194	3	31.77	-24.23	56.00	23.98	-22.02	46.00	Phase 1	9k	1.00	10.23
1.3125	4	31.80	-24.20	56.00	24.28	-21.72	46.00	Phase 1	9k	1.00	10.25
1.686	4	31.84	-24.16	56.00	24.40	-21.60	46.00	Phase 1	9k	1.00	10.27
2.2575	4	34.30	-21.70	56.00	27.11	-18.89	46.00	Phase 1	9k	1.00	10.30
2.3115	4	34.22	-21.78	56.00	26.89	-19.11	46.00	Phase 1	9k	1.00	10.30
2.679	5	33.53	-22.47	56.00	26.45	-19.55	46.00	Phase 1	9k	1.00	10.33
2.751	5	33.99	-22.01	56.00	27.05	-18.95	46.00	Phase 1	9k	1.00	10.34

FCC ID: WJ9-RRU1400

freq	SR	QP	margin	limit	AV	margin	limit	line	RBW	Measure time	corr
MHz		dBμV	dB	dBμV	dBμV	dB	dBμV		Hz	sec	dB
4.713	5	32.58	-23.42	56.00	26.28	-19.72	46.00	Phase 1	9k	1.00	10.43
4.9305	6	31.12	-24.88	56.00	22.54	-23.46	46.00	Phase 1	9k	1.00	10.44
5.304	6	32.56	-27.44	60.00	26.38	-23.62	50.00	Phase 1	9k	1.00	10.47
6.843	6	32.43	-27.57	60.00	26.36	-23.64	50.00	Phase 1	9k	1.00	10.59
6.861	6	32.28	-27.72	60.00	26.14	-23.86	50.00	Phase 1	9k	1.00	10.59
9.8115	7	30.50	-29.50	60.00	23.50	-26.50	50.00	Phase 1	9k	1.00	10.73
9.852	7	30.33	-29.67	60.00	23.44	-26.56	50.00	Phase 1	9k	1.00	10.73
16.98	7	31.33	-28.67	60.00	25.43	-24.57	50.00	Phase 1	9k	1.00	11.31
19.668	8	21.79	-38.21	60.00	17.24	-32.76	50.00	Phase 1	9k	1.00	11.44
22.8585	8	21.01	-38.99	60.00	14.25	-35.75	50.00	Phase 1	9k	1.00	11.60
27.588	8	24.98	-35.02	60.00	16.14	-33.86	50.00	Phase 1	9k	1.00	11.70
27.876	8	24.39	-35.61	60.00	16.00	-34.00	50.00	Phase 1	9k	1.00	11.70

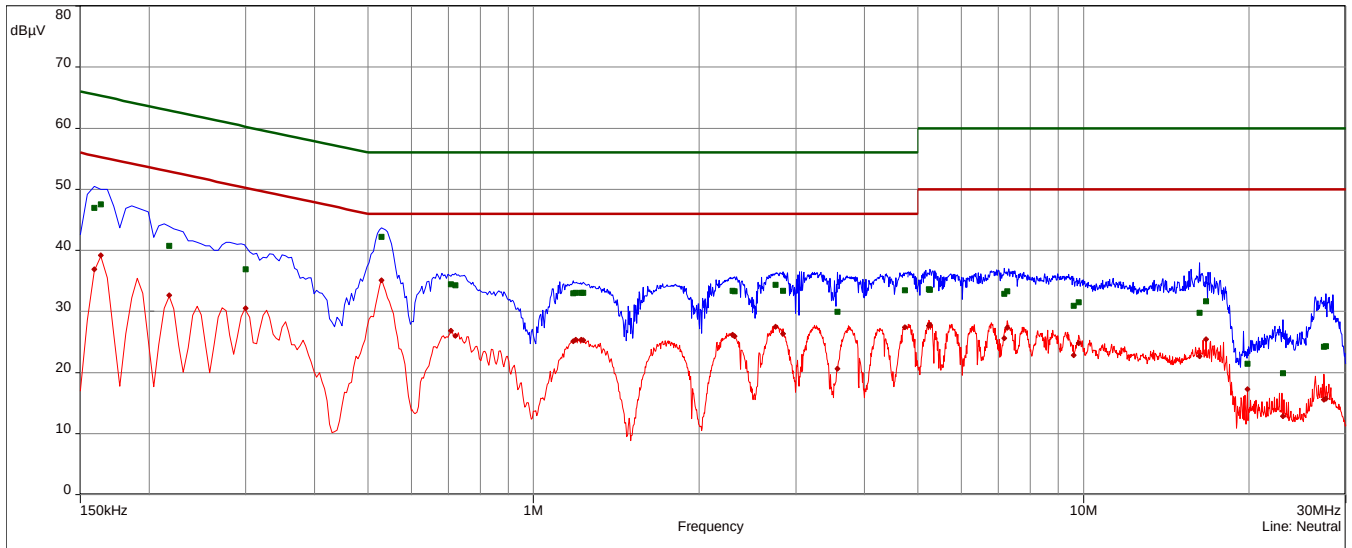
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FCC ID: WJ9-RRU1400

Test point N
Operation mode: Standby mode
Remarks: Wide Range Antenna 52010252

Result: Passed

- CISPR 32/AC mains power ports B - Average/
- CISPR 32/AC mains power ports B - QPeak/
- Peak (Neutral)
- CISPR.AVG (Neutral)
- QuasiPeak (Finals) (Neutral)
- CISPR AV (Finals) (Neutral)



CISPR 32/AC mains power portsB

freq	SR	QP	margin	limit	AV	margin	limit	line	RBW	Measure time	corr
MHz		dBμV	dB	dBμV	dBμV	dB	dBμV		Hz	sec	dB
0.159	9	46.93	-18.59	65.52	36.88	-18.64	55.52	Neutral	9k	1.00	10.10
0.1635	9	47.49	-17.79	65.28	39.20	-16.08	55.28	Neutral	9k	1.00	10.10
0.2175	9	40.76	-22.16	62.91	32.61	-20.30	52.91	Neutral	9k	1.00	10.13
0.3	10	36.87	-23.37	60.24	30.56	-19.69	50.24	Neutral	9k	1.00	10.14
0.5295	10	42.23	-13.77	56.00	35.11	-10.89	46.00	Neutral	9k	1.00	10.16
0.708	11	34.45	-21.55	56.00	26.81	-19.19	46.00	Neutral	9k	1.00	10.19
0.7215	11	34.26	-21.74	56.00	25.98	-20.02	46.00	Neutral	9k	1.00	10.19
1.1805	11	32.98	-23.02	56.00	25.15	-20.85	46.00	Neutral	9k	1.00	10.23
1.194	11	33.09	-22.91	56.00	25.36	-20.64	46.00	Neutral	9k	1.00	10.23
1.2225	12	33.07	-22.93	56.00	25.37	-20.63	46.00	Neutral	9k	1.00	10.23
1.2315	12	33.07	-22.93	56.00	25.26	-20.74	46.00	Neutral	9k	1.00	10.23
2.3025	12	33.38	-22.62	56.00	26.22	-19.78	46.00	Neutral	9k	1.00	10.30
2.3205	12	33.31	-22.69	56.00	25.90	-20.10	46.00	Neutral	9k	1.00	10.30
2.7555	13	34.34	-21.66	56.00	27.51	-18.49	46.00	Neutral	9k	1.00	10.34
2.841	13	33.40	-22.60	56.00	26.35	-19.65	46.00	Neutral	9k	1.00	10.34
3.57	13	29.93	-26.07	56.00	20.63	-25.37	46.00	Neutral	9k	1.00	10.35
4.74	13	33.44	-22.56	56.00	27.40	-18.60	46.00	Neutral	9k	1.00	10.42
5.2365	14	33.59	-26.41	60.00	27.66	-22.34	50.00	Neutral	9k	1.00	10.45
5.259	14	33.56	-26.44	60.00	27.85	-22.15	50.00	Neutral	9k	1.00	10.45

FCC ID: WJ9-RRU1400

freq	SR	QP	margin	limit	AV	margin	limit	line	RBW	Measure time	corr
MHz		dBμV	dB	dBμV	dBμV	dB	dBμV		Hz	sec	dB
7.185	14	32.86	-27.14	60.00	25.58	-24.42	50.00	Neutral	9k	1.00	10.58
7.275	14	33.33	-26.67	60.00	27.34	-22.66	50.00	Neutral	9k	1.00	10.58
9.6045	15	30.94	-29.06	60.00	22.81	-27.19	50.00	Neutral	9k	1.00	10.66
9.8025	15	31.53	-28.47	60.00	24.80	-25.20	50.00	Neutral	9k	1.00	10.66
16.26	15	29.82	-30.18	60.00	22.63	-27.37	50.00	Neutral	9k	1.00	11.07
16.6965	15	31.70	-28.30	60.00	25.47	-24.53	50.00	Neutral	9k	1.00	11.10
19.857	16	21.45	-38.55	60.00	17.24	-32.76	50.00	Neutral	9k	1.00	11.24
23.034	16	19.85	-40.15	60.00	12.87	-37.13	50.00	Neutral	9k	1.00	11.27
27.3495	16	24.19	-35.81	60.00	15.54	-34.46	50.00	Neutral	9k	1.00	11.18
27.5745	16	24.32	-35.68	60.00	15.70	-34.30	50.00	Neutral	9k	1.00	11.17

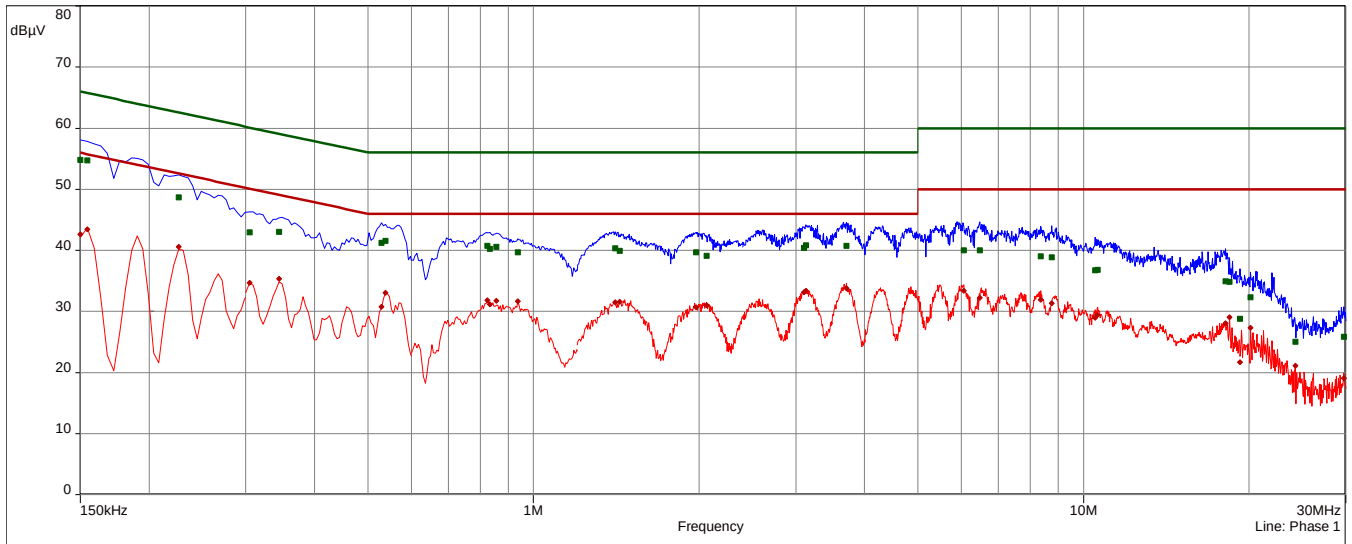
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FCC ID: WJ9-RRU1400

Test point L1
Operation mode: Tag reading mode
Remarks: Wide Range Antenna 52010252 – powered via PoE

Result: Passed

- CISPR 32/AC mains power ports B - Average/
- CISPR 32/AC mains power ports B - QPeak/
- Peak (Phase 1)
- CISPR.AVG (Phase 1)
- QuasiPeak (Finals) (Phase 1)
- CISPR AV (Finals) (Phase 1)



CISPR 32/AC mains power portsB

freq	SR	QP	margin	limit	AV	margin	limit	line	RBW	Measure time	corr
MHz		dBμV	dB	dBμV	dBμV	dB	dBμV		Hz	sec	dB
0.15	1	54.77	-11.23	66.00	42.64	-13.36	56.00	Phase 1	9k	1.00	10.09
0.1545	1	54.73	-11.03	65.75	43.43	-12.33	55.75	Phase 1	9k	1.00	10.10
0.2265	1	48.64	-13.94	62.58	40.62	-11.96	52.58	Phase 1	9k	1.00	10.11
0.3045	2	42.94	-17.18	60.12	34.66	-15.46	50.12	Phase 1	9k	1.00	10.14
0.345	2	43.03	-16.06	59.08	35.32	-13.76	49.08	Phase 1	9k	1.00	10.15
0.5295	2	41.19	-14.81	56.00	30.77	-15.23	46.00	Phase 1	9k	1.00	10.16
0.5385	2	41.58	-14.42	56.00	33.09	-12.91	46.00	Phase 1	9k	1.00	10.16
0.825	3	40.72	-15.28	56.00	31.84	-14.16	46.00	Phase 1	9k	1.00	10.19
0.834	3	40.26	-15.74	56.00	31.16	-14.84	46.00	Phase 1	9k	1.00	10.19
0.8565	3	40.57	-15.43	56.00	31.71	-14.29	46.00	Phase 1	9k	1.00	10.19
0.9375	3	39.71	-16.29	56.00	31.65	-14.35	46.00	Phase 1	9k	1.00	10.20
1.407	4	40.35	-15.65	56.00	31.47	-14.53	46.00	Phase 1	9k	1.00	10.26
1.434	4	39.96	-16.04	56.00	31.60	-14.40	46.00	Phase 1	9k	1.00	10.26
1.974	4	39.71	-16.29	56.00	30.68	-15.32	46.00	Phase 1	9k	1.00	10.27
2.064	4	39.09	-16.91	56.00	31.05	-14.95	46.00	Phase 1	9k	1.00	10.28
3.1065	5	40.46	-15.54	56.00	33.15	-12.85	46.00	Phase 1	9k	1.00	10.35
3.129	5	40.81	-15.19	56.00	33.40	-12.60	46.00	Phase 1	9k	1.00	10.35
3.7095	5	40.74	-15.26	56.00	33.82	-12.18	46.00	Phase 1	9k	1.00	10.37

FCC ID: WJ9-RRU1400

freq	SR	QP	margin	limit	AV	margin	limit	line	RBW	Measure time	corr
MHz		dBμV	dB	dBμV	dBμV	dB	dBμV		Hz	sec	dB
6.0645	6	40.04	-19.96	60.00	33.39	-16.61	50.00	Phase 1	9k	1.00	10.53
6.4785	6	39.98	-20.02	60.00	32.24	-17.76	50.00	Phase 1	9k	1.00	10.56
8.3595	6	39.02	-20.98	60.00	31.94	-18.06	50.00	Phase 1	9k	1.00	10.67
8.7645	6	38.84	-21.16	60.00	31.35	-18.65	50.00	Phase 1	9k	1.00	10.69
10.5045	7	36.74	-23.26	60.00	28.98	-21.02	50.00	Phase 1	9k	1.00	10.79
10.608	7	36.83	-23.17	60.00	29.47	-20.53	50.00	Phase 1	9k	1.00	10.80
18.114	7	34.92	-25.08	60.00	28.07	-21.93	50.00	Phase 1	9k	1.00	11.37
18.4425	7	34.85	-25.15	60.00	29.05	-20.95	50.00	Phase 1	9k	1.00	11.39
19.2675	8	28.80	-31.20	60.00	21.67	-28.33	50.00	Phase 1	9k	1.00	11.43
20.1405	8	32.31	-27.69	60.00	27.32	-22.68	50.00	Phase 1	9k	1.00	11.47
24.276	8	25.04	-34.96	60.00	21.07	-28.93	50.00	Phase 1	9k	1.00	11.65
29.748	8	25.83	-34.17	60.00	19.04	-30.96	50.00	Phase 1	9k	1.00	11.71

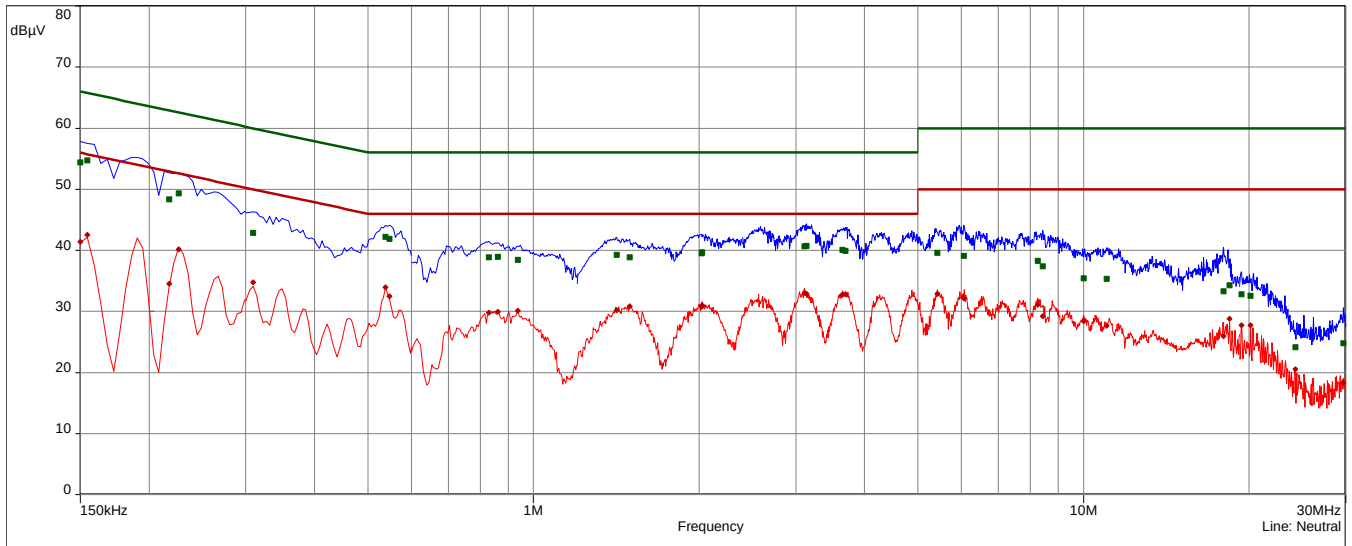
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FCC ID: WJ9-RRU1400

Test point N
Operation mode: Tag reading mode
Remarks: Wide Range Antenna 52010252 – powered via PoE

Result: Passed

- CISPR 32/AC mains power ports B - Average/
- CISPR 32/AC mains power ports B - QPeak/
- Peak (Neutral)
- CISPR.AVG (Neutral)
- QuasiPeak (Finals) (Neutral)
- CISPR AV (Finals) (Neutral)



CISPR 32/AC mains power portsB

freq	SR	QP	margin	limit	AV	margin	limit	line	RBW	Measure time	corr
MHz		dBμV	dB	dBμV	dBμV	dB	dBμV		Hz	sec	dB
0.15	9	54.42	-11.58	66.00	41.40	-14.60	56.00	Neutral	9k	1.00	10.09
0.1545	9	54.71	-11.04	65.75	42.52	-13.23	55.75	Neutral	9k	1.00	10.10
0.2175	9	48.32	-14.60	62.91	34.55	-18.37	52.91	Neutral	9k	1.00	10.13
0.2265	9	49.29	-13.28	62.58	40.17	-12.41	52.58	Neutral	9k	1.00	10.13
0.309	10	42.84	-17.16	60.00	34.79	-15.21	50.00	Neutral	9k	1.00	10.14
0.5385	10	42.19	-13.81	56.00	33.96	-12.04	46.00	Neutral	9k	1.00	10.16
0.5475	10	41.92	-14.08	56.00	32.48	-13.52	46.00	Neutral	9k	1.00	10.16
0.8295	11	38.84	-17.16	56.00	29.75	-16.25	46.00	Neutral	9k	1.00	10.19
0.861	11	38.97	-17.03	56.00	29.92	-16.08	46.00	Neutral	9k	1.00	10.19
0.9375	11	38.48	-17.52	56.00	30.15	-15.85	46.00	Neutral	9k	1.00	10.20
1.416	12	39.29	-16.71	56.00	30.15	-15.85	46.00	Neutral	9k	1.00	10.26
1.497	12	38.85	-17.15	56.00	30.82	-15.18	46.00	Neutral	9k	1.00	10.26
2.0235	12	39.48	-16.52	56.00	30.74	-15.26	46.00	Neutral	9k	1.00	10.27
2.028	12	39.66	-16.34	56.00	31.04	-14.96	46.00	Neutral	9k	1.00	10.27
3.111	13	40.69	-15.31	56.00	33.07	-12.93	46.00	Neutral	9k	1.00	10.35
3.138	13	40.74	-15.26	56.00	32.87	-13.13	46.00	Neutral	9k	1.00	10.35
3.6465	13	40.07	-15.93	56.00	32.72	-13.28	46.00	Neutral	9k	1.00	10.36
3.6915	13	39.93	-16.07	56.00	32.81	-13.19	46.00	Neutral	9k	1.00	10.36
5.43	14	39.56	-20.44	60.00	32.91	-17.09	50.00	Neutral	9k	1.00	10.47

FCC ID: WJ9-RRU1400

freq	SR	QP	margin	limit	AV	margin	limit	line	RBW	Measure time	corr
MHz		dBμV	dB	dBμV	dBμV	dB	dBμV		Hz	sec	dB
6.0555	14	39.13	-20.87	60.00	32.17	-17.83	50.00	Neutral	9k	1.00	10.51
8.2605	14	38.31	-21.69	60.00	31.06	-18.94	50.00	Neutral	9k	1.00	10.62
8.4315	14	37.42	-22.58	60.00	29.18	-20.82	50.00	Neutral	9k	1.00	10.63
10.005	15	35.46	-24.54	60.00	28.36	-21.64	50.00	Neutral	9k	1.00	10.67
11.0175	15	35.31	-24.69	60.00	27.64	-22.36	50.00	Neutral	9k	1.00	10.75
17.9835	15	33.31	-26.69	60.00	25.96	-24.04	50.00	Neutral	9k	1.00	11.17
18.4425	15	34.31	-25.69	60.00	28.80	-21.20	50.00	Neutral	9k	1.00	11.19
19.3845	16	32.83	-27.17	60.00	27.75	-22.25	50.00	Neutral	9k	1.00	11.23
20.1405	16	32.54	-27.46	60.00	27.78	-22.22	50.00	Neutral	9k	1.00	11.25
24.276	16	24.16	-35.84	60.00	20.58	-29.42	50.00	Neutral	9k	1.00	11.26
29.685	16	24.80	-35.20	60.00	18.32	-31.68	50.00	Neutral	9k	1.00	11.09

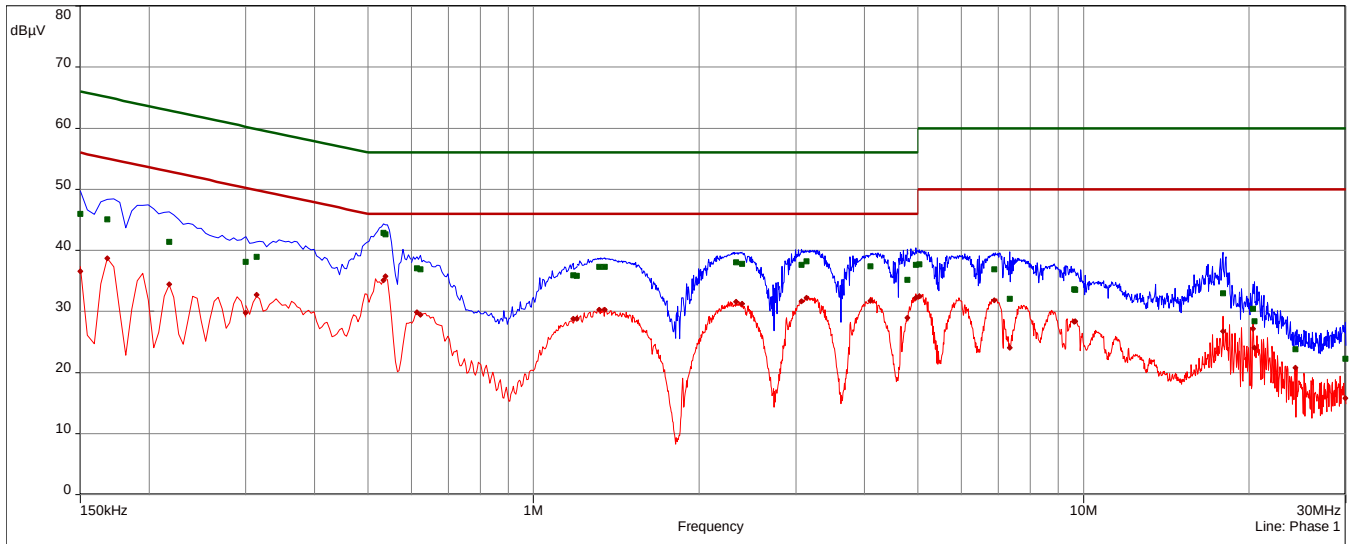
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FCC ID: WJ9-RRU1400

Test point L1
Operation mode: Standby mode
Remarks: Wide Range Antenna 52010252– powered via PoE

Result: Passed

- CISPR 32/AC mains power ports B - Average/
- CISPR 32/AC mains power ports B - QPeak/
- Peak (Phase 1)
- CISPR.AVG (Phase 1)
- QuasiPeak (Finals) (Phase 1)
- CISPR AV (Finals) (Phase 1)



CISPR 32/AC mains power portsB

freq	SR	QP	margin	limit	AV	margin	limit	line	RBW	Measure time	corr
MHz		dBμV	dB	dBμV	dBμV	dB	dBμV		Hz	sec	dB
0.15	1	45.96	-20.04	66.00	36.54	-19.46	56.00	Phase 1	9k	1.00	10.09
0.168	1	45.05	-20.01	65.06	38.73	-16.33	55.06	Phase 1	9k	1.00	10.10
0.2175	1	41.38	-21.53	62.91	34.45	-18.46	52.91	Phase 1	9k	1.00	10.11
0.3	2	38.15	-22.10	60.24	29.82	-20.42	50.24	Phase 1	9k	1.00	10.14
0.3135	2	38.95	-20.93	59.88	32.73	-17.15	49.88	Phase 1	9k	1.00	10.14
0.534	2	42.88	-13.12	56.00	35.10	-10.90	46.00	Phase 1	9k	1.00	10.16
0.5385	2	42.64	-13.36	56.00	35.73	-10.27	46.00	Phase 1	9k	1.00	10.16
0.6135	3	37.04	-18.96	56.00	29.83	-16.17	46.00	Phase 1	9k	1.00	10.17
0.6225	3	36.88	-19.12	56.00	29.42	-16.58	46.00	Phase 1	9k	1.00	10.18
1.1805	3	35.88	-20.12	56.00	28.81	-17.19	46.00	Phase 1	9k	1.00	10.23
1.1985	3	35.82	-20.18	56.00	28.80	-17.20	46.00	Phase 1	9k	1.00	10.23
1.317	4	37.35	-18.65	56.00	30.28	-15.72	46.00	Phase 1	9k	1.00	10.25
1.3485	4	37.34	-18.66	56.00	30.30	-15.70	46.00	Phase 1	9k	1.00	10.25
2.334	4	38.07	-17.93	56.00	31.56	-14.44	46.00	Phase 1	9k	1.00	10.31
2.397	4	37.76	-18.24	56.00	31.26	-14.74	46.00	Phase 1	9k	1.00	10.31
3.0705	5	37.67	-18.33	56.00	31.63	-14.37	46.00	Phase 1	9k	1.00	10.35
3.1335	5	38.18	-17.82	56.00	32.27	-13.73	46.00	Phase 1	9k	1.00	10.35
4.0965	5	37.35	-18.65	56.00	31.76	-14.24	46.00	Phase 1	9k	1.00	10.40
4.785	5	35.21	-20.79	56.00	29.00	-17.00	46.00	Phase 1	9k	1.00	10.43
4.962	6	37.62	-18.38	56.00	32.27	-13.73	46.00	Phase 1	9k	1.00	10.44
5.0295	6	37.73	-22.27	60.00	32.47	-17.53	50.00	Phase 1	9k	1.00	10.45

FCC ID: WJ9-RRU1400

freq	SR	QP	margin	limit	AV	margin	limit	line	RBW	Measure time	corr
MHz		dBμV	dB	dBμV	dBμV	dB	dBμV		Hz	sec	dB
6.8835	6	36.90	-23.10	60.00	31.85	-18.15	50.00	Phase 1	9k	1.00	10.59
7.347	6	32.08	-27.92	60.00	24.09	-25.91	50.00	Phase 1	9k	1.00	10.62
9.618	7	33.66	-26.34	60.00	28.33	-21.67	50.00	Phase 1	9k	1.00	10.72
9.6585	7	33.53	-26.47	60.00	28.36	-21.64	50.00	Phase 1	9k	1.00	10.72
17.925	7	33.01	-26.99	60.00	26.77	-23.23	50.00	Phase 1	9k	1.00	11.37
20.3295	8	30.47	-29.53	60.00	27.13	-22.87	50.00	Phase 1	9k	1.00	11.47
20.469	8	28.43	-31.57	60.00	24.08	-25.92	50.00	Phase 1	9k	1.00	11.48
24.276	8	23.81	-36.19	60.00	20.82	-29.18	50.00	Phase 1	9k	1.00	11.65
29.9325	8	22.29	-37.71	60.00	15.80	-34.20	50.00	Phase 1	9k	1.00	11.71

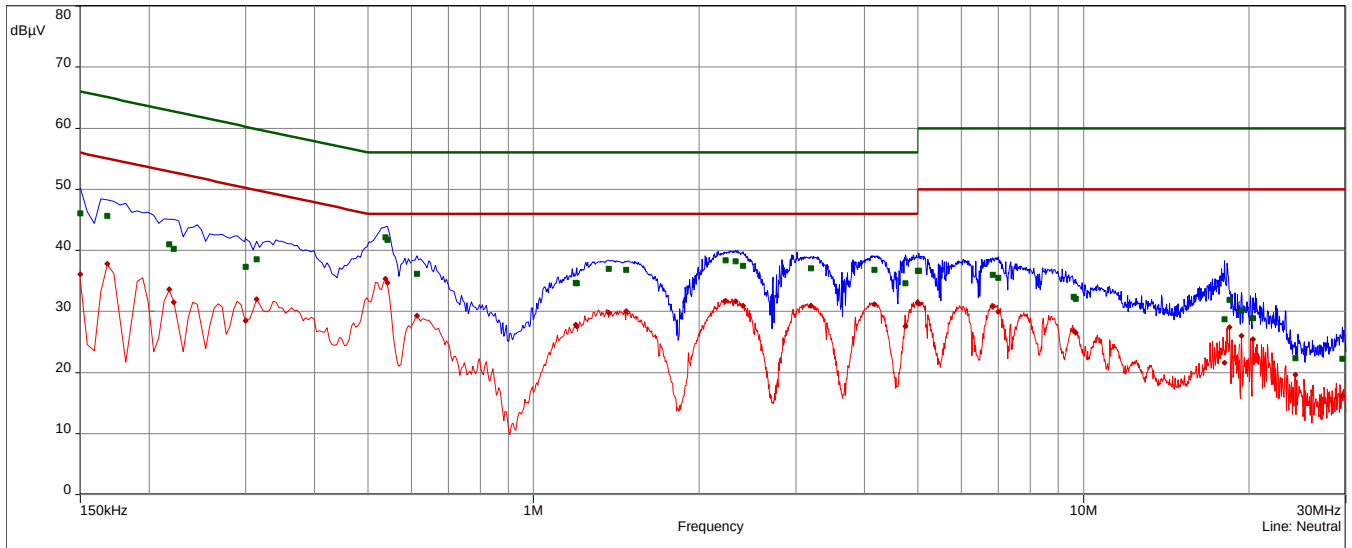
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FCC ID: WJ9-RRU1400

Test point N
Operation mode: Standby mode
Remarks: Wide Range Antenna 52010252 – powered via PoE

Result: Passed

- CISPR 32/AC mains power ports B - Average/
- CISPR 32/AC mains power ports B - QPeak/
- Peak (Neutral)
- CISPR.AVG (Neutral)
- QuasiPeak (Finals) (Neutral)
- CISPR AV (Finals) (Neutral)



CISPR 32/AC mains power portsB

freq	SR	QP	margin	limit	AV	margin	limit	line	RBW	Measure time	corr
MHz		dBμV	dB	dBμV	dBμV	dB	dBμV		Hz	sec	dB
0.15	9	46.09	-19.91	66.00	36.06	-19.94	56.00	Neutral	9k	1.00	10.09
0.168	9	45.63	-19.43	65.06	37.84	-17.22	55.06	Neutral	9k	1.00	10.11
0.2175	9	40.99	-21.92	62.91	33.62	-19.29	52.91	Neutral	9k	1.00	10.13
0.222	9	40.26	-22.48	62.74	31.48	-21.26	52.74	Neutral	9k	1.00	10.13
0.3	10	37.28	-22.96	60.24	28.50	-21.74	50.24	Neutral	9k	1.00	10.14
0.3135	10	38.57	-21.31	59.88	32.01	-17.87	49.88	Neutral	9k	1.00	10.14
0.5385	10	42.11	-13.89	56.00	35.37	-10.63	46.00	Neutral	9k	1.00	10.16
0.543	10	41.75	-14.25	56.00	34.73	-11.27	46.00	Neutral	9k	1.00	10.16
0.6135	11	36.14	-19.86	56.00	29.27	-16.73	46.00	Neutral	9k	1.00	10.17
1.194	11	34.66	-21.34	56.00	27.80	-18.20	46.00	Neutral	9k	1.00	10.23
1.1985	11	34.63	-21.37	56.00	27.56	-18.44	46.00	Neutral	9k	1.00	10.23
1.371	12	36.99	-19.01	56.00	29.81	-16.19	46.00	Neutral	9k	1.00	10.25
1.4745	12	36.81	-19.19	56.00	30.04	-15.96	46.00	Neutral	9k	1.00	10.26
2.235	12	38.33	-17.67	56.00	31.75	-14.25	46.00	Neutral	9k	1.00	10.30
2.3295	12	38.19	-17.81	56.00	31.66	-14.34	46.00	Neutral	9k	1.00	10.31
2.4045	13	37.49	-18.51	56.00	30.94	-15.06	46.00	Neutral	9k	1.00	10.31

FCC ID: WJ9-RRU1400

freq	SR	QP	margin	limit	AV	margin	limit	line	RBW	Measure time	corr
MHz		dBμV	dB	dBμV	dBμV	dB	dBμV		Hz	sec	dB
3.1965	13	37.05	-18.95	56.00	30.94	-15.06	46.00	Neutral	9k	1.00	10.35
4.1685	13	36.80	-19.20	56.00	31.19	-14.81	46.00	Neutral	9k	1.00	10.40
4.7445	13	34.58	-21.42	56.00	27.59	-18.41	46.00	Neutral	9k	1.00	10.42
4.998	14	36.66	-19.34	56.00	31.41	-14.59	46.00	Neutral	9k	1.00	10.44
5.016	14	36.69	-23.31	60.00	31.25	-18.75	50.00	Neutral	9k	1.00	10.44
6.8385	14	35.99	-24.01	60.00	30.79	-19.21	50.00	Neutral	9k	1.00	10.56
7.0005	14	35.48	-24.52	60.00	29.97	-20.03	50.00	Neutral	9k	1.00	10.57
9.6	15	32.40	-27.60	60.00	26.86	-23.14	50.00	Neutral	9k	1.00	10.66
9.672	15	32.08	-27.92	60.00	26.50	-23.50	50.00	Neutral	9k	1.00	10.66
18.042	15	28.71	-31.29	60.00	21.60	-28.40	50.00	Neutral	9k	1.00	11.17
18.4425	15	31.91	-28.09	60.00	27.37	-22.63	50.00	Neutral	9k	1.00	11.19
19.3845	16	30.07	-29.93	60.00	26.00	-24.00	50.00	Neutral	9k	1.00	11.23
20.3295	16	28.85	-31.15	60.00	25.47	-24.53	50.00	Neutral	9k	1.00	11.25
24.276	16	22.35	-37.65	60.00	19.66	-30.34	50.00	Neutral	9k	1.00	11.26
29.559	16	22.23	-37.77	60.00	16.22	-33.78	50.00	Neutral	9k	1.00	11.09

The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test results without the written permission of the test laboratory.
The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test results without the written permission of the test laboratory.

FCC ID: WJ9-RRU1400**5.2 20 dB bandwidth**

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

5.2.1 Description of the test location

Test location: Shielded room S4

5.2.2 Photo documentation of the test set-up – see Attachment C**5.2.3 Applicable standard**

According to FCC Part 15C, Section 15.247(a):

Frequency hopping systems shall have hopping carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

5.2.4 Description of Measurement

The bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio of -20 dB. The reference level is the level of the highest amplitude signal observed from 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.

FCC ID: WJ9-RRU1400

5.2.5 Test result

Power setting 30.0 dBm:

Channel No.	-20 dB Bandwidth below peak (kHz)
CH 1 (902.25 MHz)	51.30
CH 25 (914.75 MHz)	50.40
CH 52 (927.75 MHz)	51.90

Bandwidth limit according to FCC Part15C, Section 15.247(a):

Frequency (MHz)	Hopping channels	Limit -20 dB bandwidth (kHz)
902-928	≥ 50	< 250

The requirements are **FULFILLED**.

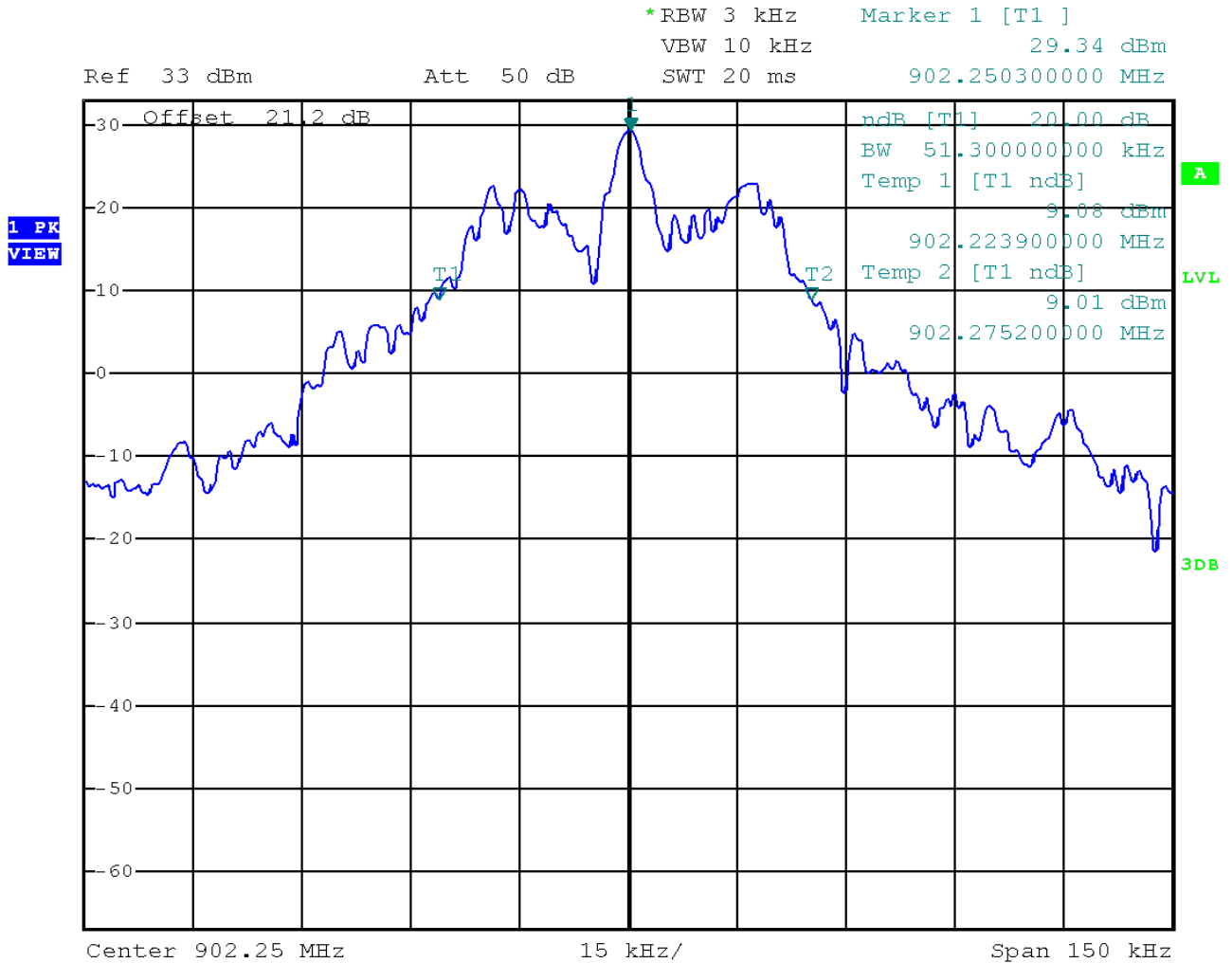
Remarks: For detailed test result please refer to following test protocol.

To represent the worst case, the measurement was performed with max. power setting.

FCC ID: WJ9-RRU1400

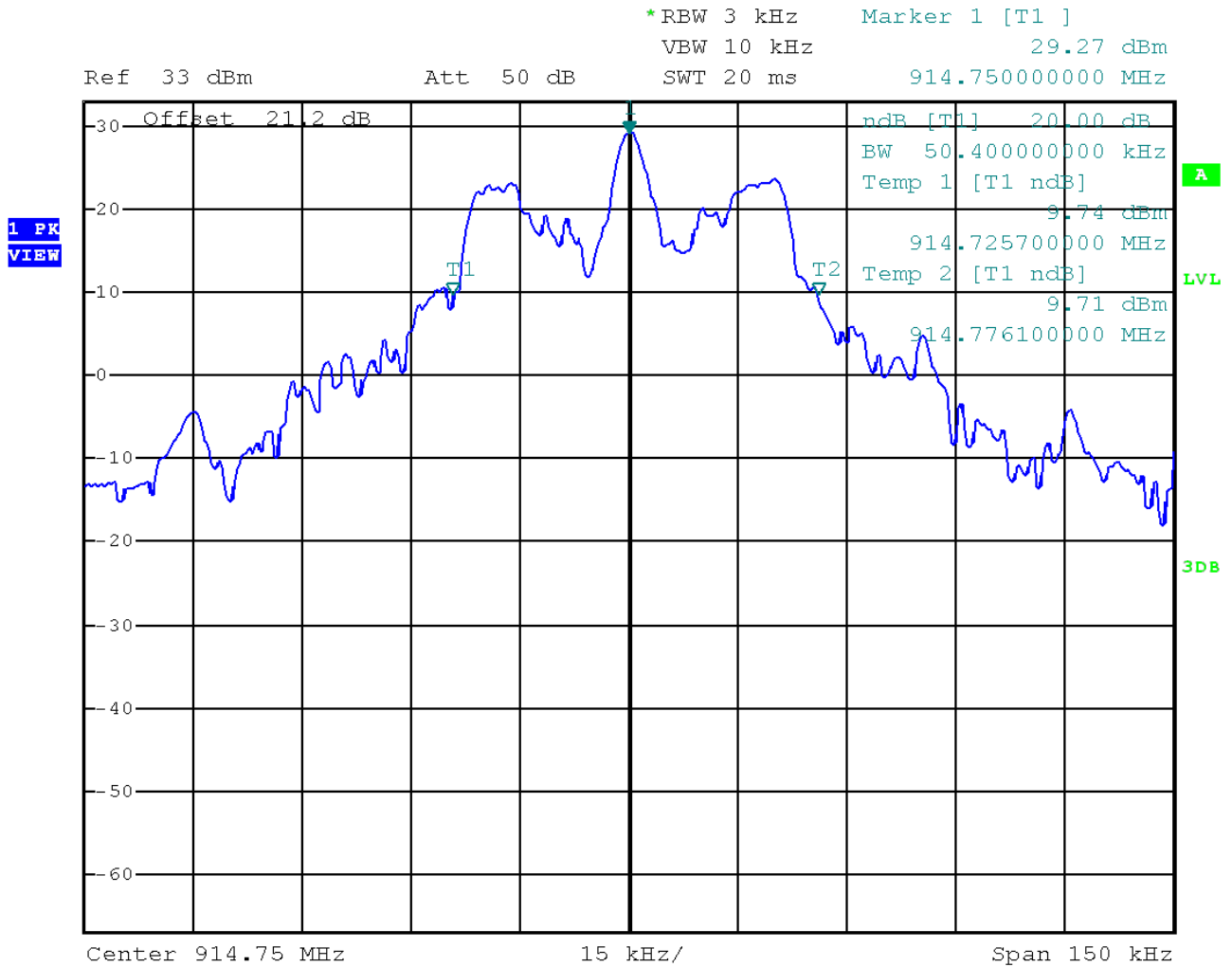
5.2.6 Test protocol

Channel 1
902.25 MHz



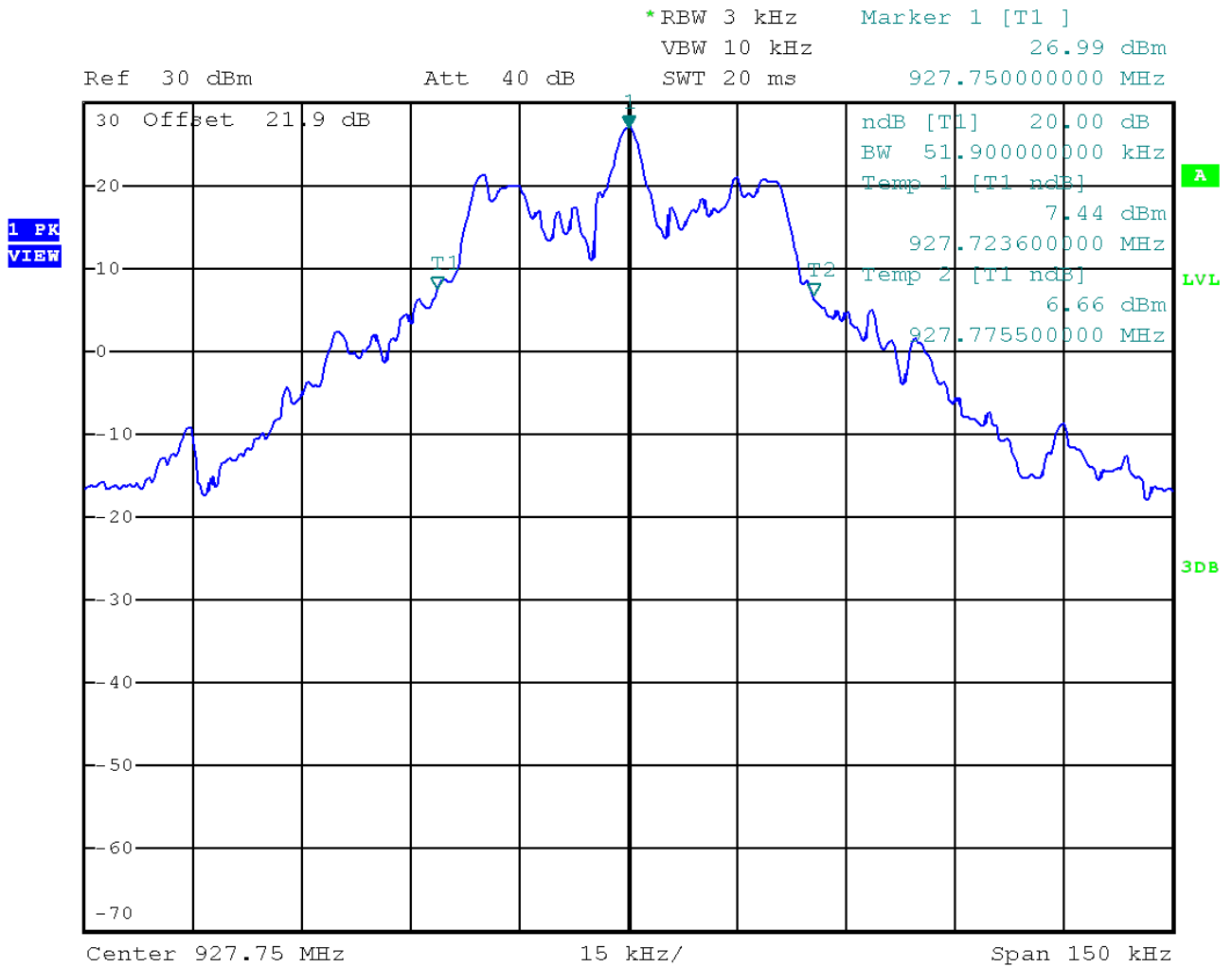
FCC ID: WJ9-RRU1400

Channel 25
914.75 MHz



FCC ID: WJ9-RRU1400

Channel 52
927.75 MHz



FCC ID: WJ9-RRU1400**5.3 Maximum peak conducted output power**

For test instruments and accessories used see section 6 Part CPC 2.

5.3.1 Description of the test location

Test location: Shielded room S4

5.3.2 Photo documentation of the test set-up – see Attachment C**5.3.3 Applicable standard**

According to FCC Part 15C, Section 15.247(b)(2):

For frequency hopping systems operating in the 902-928 MHz band the maximum peak conducted output power shall not exceed the limit of 1 watt for systems employing at least 50 hopping channels.

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

5.3.4 Description of Measurement

A spectrum analyzer is connected to the output of the transmitter via a suitable attenuator while EUT was operating in transmit mode using the assigned frequency.

Spectrum analyser settings:

RBW	300 kHz	Sweep time	5 ms (Auto)
VBW	1 MHz	Power Mode	Max. hold
Detector	Peak	Span	25 0 kHz

FCC ID: WJ9-RRU1400

5.3.5 Test result

- Power setting 30.0 dBm

Channel	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Delta (dB)
1	902.25	29.79	30.0	-0.21
25	914.75	29.36	30.0	-0.64
52	927.75	29.65	30.0	-0.35

- Power setting 23.0 dBm

Channel	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Delta (dB)
1	902.25	21.89	30.0	-8.11
25	914.75	22.26	30.0	-7.74
52	927.75	22.58	30.0	-7.42

Note: Test cable loss and fixed attenuation of 20 dB are included in the analyzer reading (Transducer factor).

Peak Power Limit according to FCC Part 15C, Section 15.247(b)(2):

Frequency (MHz)	Hopping channels	Hop. CH carrier frequ. separation	Peak Power Limit	
			(dBm)	(W)
902-928	≥ 50		30	1.0

The requirements are **FULFILLED**.

Remarks: The conducted output power has been reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Refer to 5.3.5 b.) above.

FCC ID: WJ9-RRU1400**5.4 Spurious RF conducted emissions**

For test instruments and accessories used see section 6 Part **SEC1, SEC2 and SEC3**.

5.4.1 Description of the test location

Test location: Shielded room S4

5.4.2 Photo documentation of the test set-up – see Attachment C**5.4.3 Applicable standard**

According to FCC Part 15C, Section 15.247(d):

In any 100 kHz bandwidth outside the frequency band 902 to 928 MHz, the digitally modulated 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 an radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required.

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

A spectrum analyzer is connected to the output of the transmitter via a suitable attenuator while EUT was operating in transmit mode at the assigned frequency.

Spectrum analyzer settings:

RBW	100 kHz
VBW	300 kHz
Detector	Max. peak
Trace:	Max. hold
Sweep time	auto

FCC ID: WJ9-RRU1400

5.4.5 Test result

Power setting 27.0 dBm

Hopping frequency from 902.75 to 927.25 MHz, max. level 29.43 dBm			
Frequency (GHz)	Peak power * (dBm)	Limit (-20 dB) (dBm)	Delta (dB)
0.24054	-60.46	9.43	-69.89
5.092	-55.19	9.43	-64.62
8.044	-53.90	9.43	-63.33

* Fixed attenuation of 20 dB is included in the Peak power.

The requirements are **FULFILLED**.

Remarks:

All spurious emissions falling in restricted bands have been measured radiated.

For detailed results please refer to following test protocols.

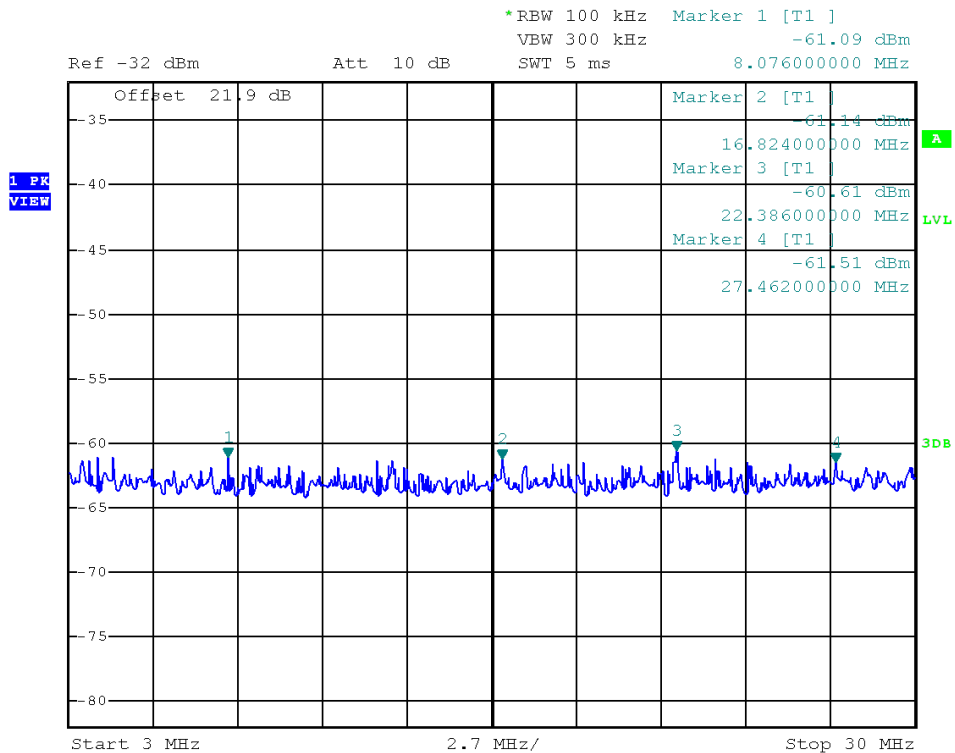
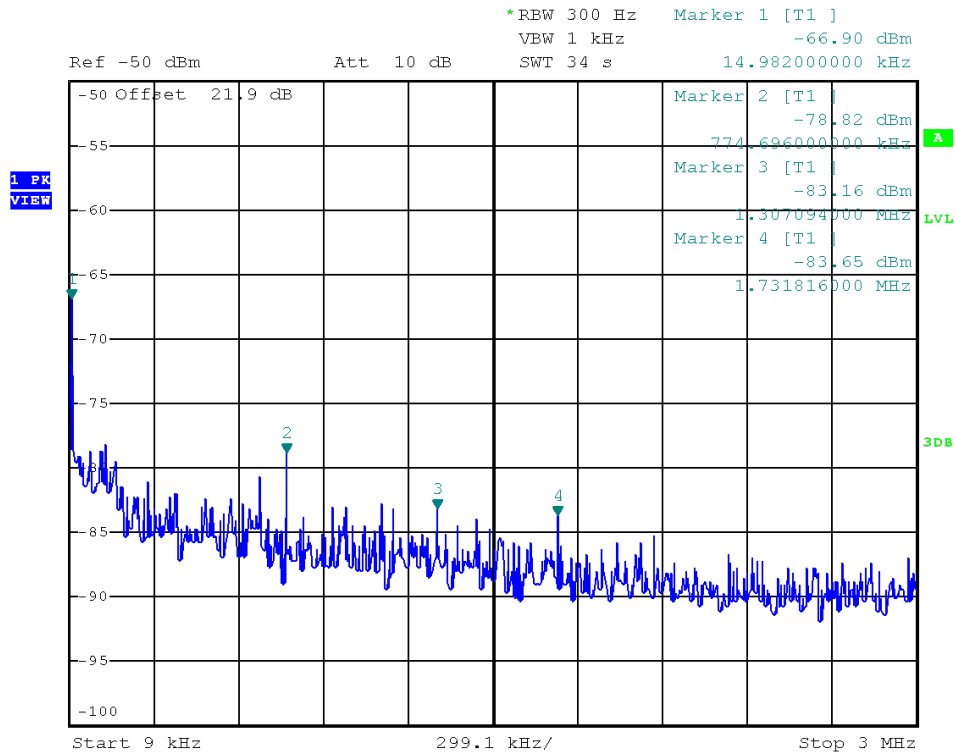
In the frequency range from 9 kHz to 30 MHz no emissions could be measured.

Test was performed in frequency hopping mode from 902.25 to 927.75 MHz.

This mode represents the worst case mode of the EuT.

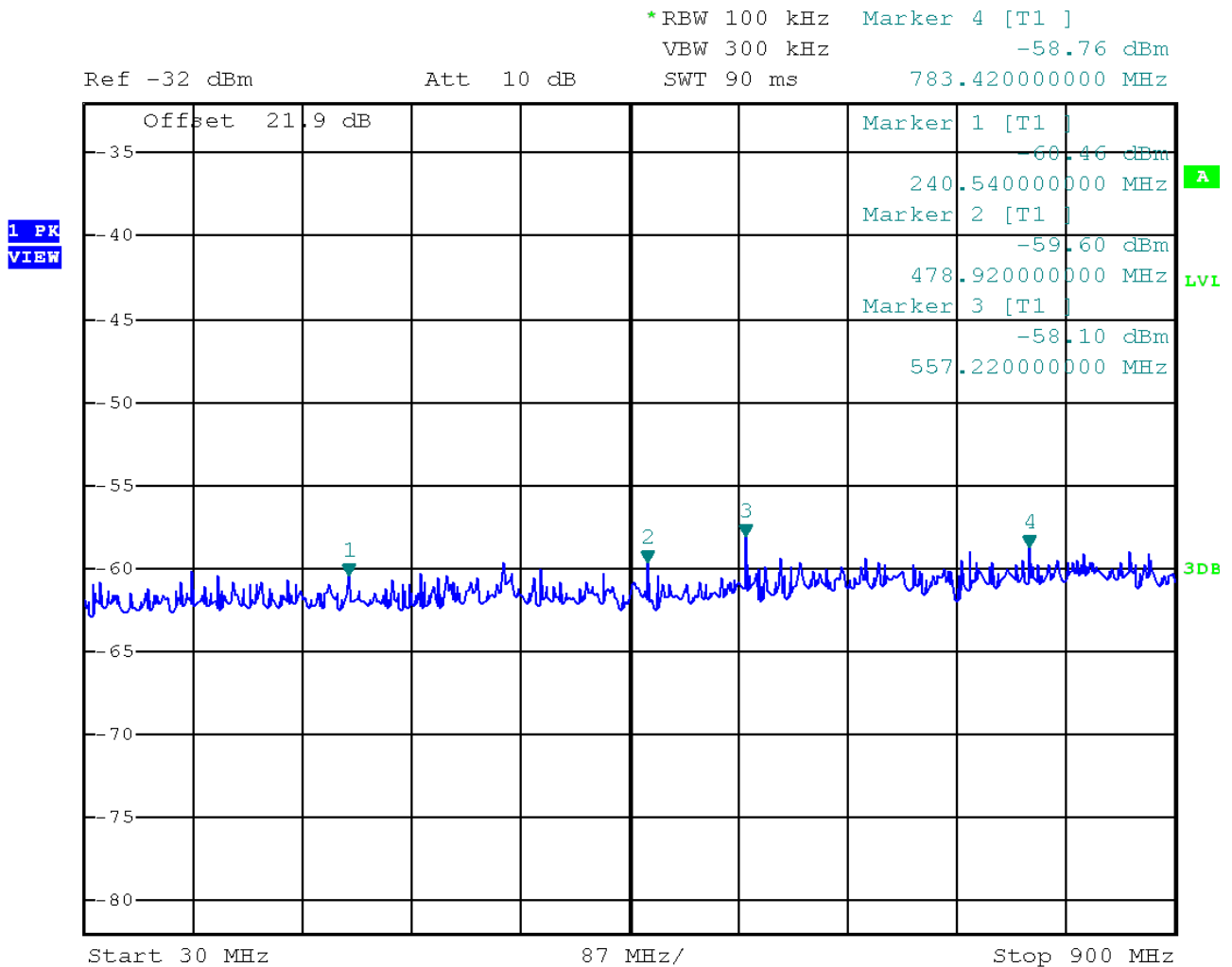
FCC ID: WJ9-RRU1400

Conducted RF emission from 9 kHz to 30 MHz



FCC ID: WJ9-RRU1400

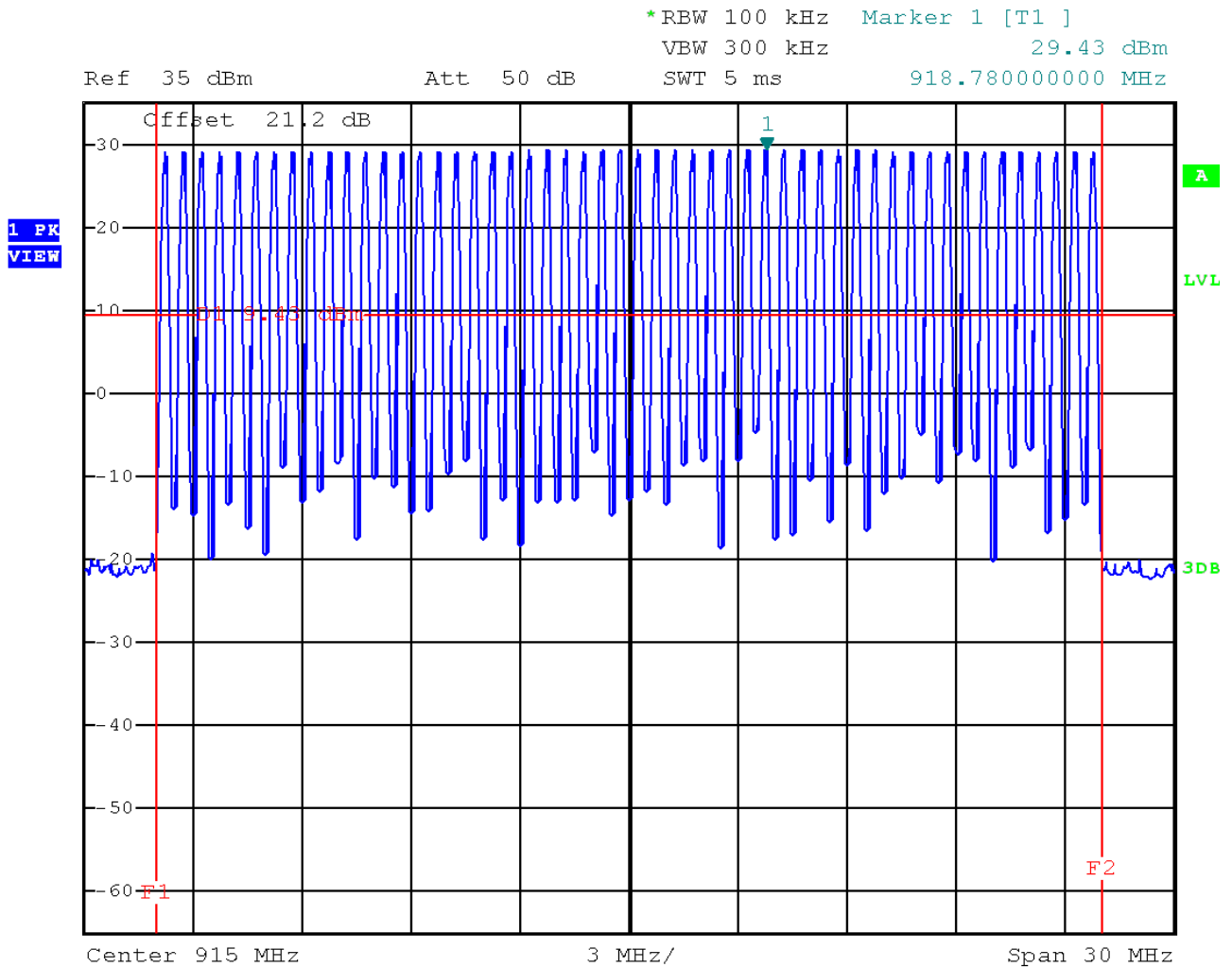
Conducted RF emission from 30 to 1000 MHz



Note: Signal level No.1 is located in restricted band.

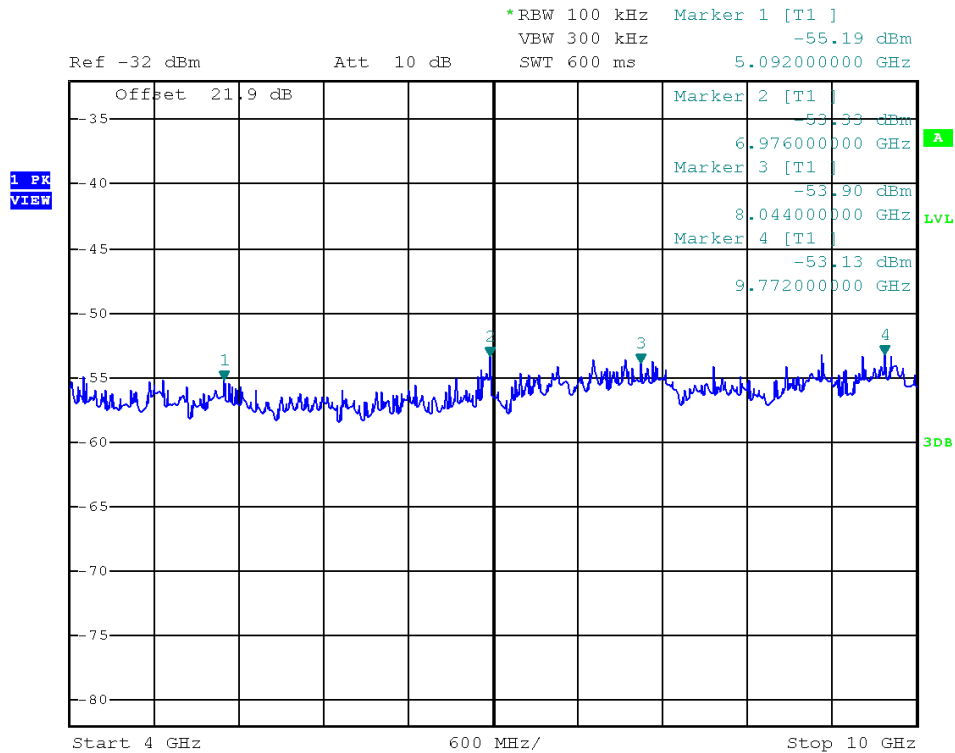
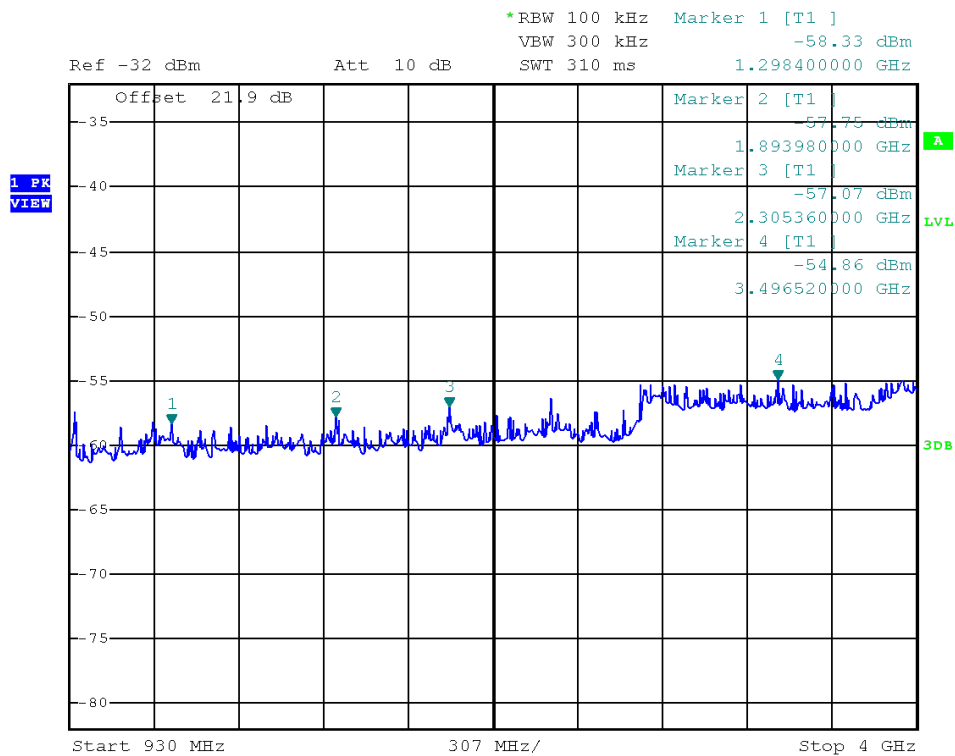
FCC ID: WJ9-RRU1400

Conducted RF emission from 30 to 1000 MHz
(Band edge)



FCC ID: WJ9-RRU1400

Conducted RF emission from 1 to 10 GHz



Note: Signal level No.1 and No.3 are located in restricted band.

5.5 Spurious radiated emissions

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

5.5.1 Description of the test location

Test location: OATS1
Test distance: 3 metres

Test location: Anechoic Chamber A1
Test distance: 3 metres

5.5.2 Photo documentation of the test set-up – see Attachment C:

5.5.3 Applicable standard

According to FCC Part 15, Section 15.247(d):

In any 100 kHz bandwidth outside the frequency bands 902 to 928 MHz, the digitally modulated 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 an radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. 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) (see Section 15.205(c)).

5.5.4 Description of Measurement

Radiated spurious emissions from the EUT are measured in the frequency range of 9 kHz to 1000 MHz using a tuned receiver and appropriate broadband linear polarized antennas. The measurements are made with 120 kHz bandwidth and quasi-peak detection (200 Hz, 9 kHz up to 30 MHz). The EUT was placed on a 1.0 X 1.5 metres non-conducting table 80 centimetres above the ground plane. The set up of the equipment under test will be in accordance to ANSI C63.10. The antenna was positioned 3 metres horizontally from the EUT. To locate maximum emissions from the EUT the antenna is shifted in height from 1 to 4 metres, after the EUT is rotated 360 degrees. The measurement scan is made in horizontal and vertical polarization of the antenna.

For the radiated measurement up from 1 GHz to maximum frequency as specified in Section 15.33, a spectrum analyzer and appropriate linear polarized antennas are used. The EUT is placed on a 1.0 X 1.5 metres non-conducting table 80 centimetres above the ground plane. The set up of the EUT will be in accordance to ANSI C63.10. The antenna was positioned 3 m horizontally from the EUT. To locate maximum emissions the EUT was rotated 360 degrees in the fully anechoic chamber. The measurement scan is made in horizontal and vertical polarization of the antenna. For testing above 1 GHz, 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.

FCC ID: WJ9-RRU1400

5.5.5 Test result

5.5.5.1 Radiated emission test $f < 1$ GHz

- Power setting 23.0 dBm

Frequency [kHz]	L: QP [dBμV]	L: AV [dBμV]	Bandwidth [kHz]	Correct. [dB]	L: QP [dBμV/m]	L: AV [dBμV/m]	Limit [dBμV/m]	Delta [dB]
536.8	24.1	19.7	9.0	20	44.1	39.7	73.0	-33.3
1073.6	23.4	18.0	9.0	20	43.4	38.0	67.0	-29.0
1342.0	21.6	15.9	9.0	20	41.6	35.9	65.0	-29.1

Note: No unwanted emissions from the EuT could be measured in the relevant frequency ranges. Only ambient noises could be detected!

The table shows an extract of the critical values:

- QP detector was used for this measurement:

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)
36.793	10.3	11.8	10.7	10.7	21.0	22.5	40.0	-17.5
60.548	13.6	12.7	12.1	12.1	25.7	24.8	40.0	-14.3
215.632	16.3		13.6		29.9		46.0	-16.1
240.005		12.6		14.9		27.5	46.0	-18.5
325.371	11.5		17.2		28.2		46.0	-17.8
360.256		12.7		18.1		30.8	46.0	-15.2

5.5.5.2 Radiated emission test $f > 1$ GHz

- Power setting 23.0 dBm

Frequency (GHz)	L: PK (dBμV)	L: AV (dBμV)	Bandwidth (kHz)	Correct. (dB)	L: PK (dB(μV/m)	L: AV (dB(μV/m)	Limit AV (dB(μV/m)	Delta (dB)
5.092	39.5	32.7	1000	3.7	43.2	36.4	54.0	-17.6
8.044	40.3	33.4	1000	3.4	43.7	36.8	54.0	-17.2

*) Average values were measured with spectrum analyzer by the following settings

RBW: 1 MHz

VBW: 10 Hz

Sweep: Auto

FCC ID: WJ9-RRU1400

Radiated limits according to FCC Part 15C, Section 15.209(a) for spurious emissions:

Frequency (MHz)	Field strength of spurious emissions		Measurement distance (metres)
	(μ V/m)	dB(μ V/m)	
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

Restricted bands of operation:

The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209: (Refer to section 5.5.5.1)

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

The requirements are **FULFILLED**.

Remarks: During the test the EUT was set into TX continuous mode with normal modulation.

The measurement was performed up to the 10th harmonic (10000 MHz).

Test was performed in frequency hopping mode from 902.75 to 927.25 MHz.

This mode represents the worst case mode of the EuT.

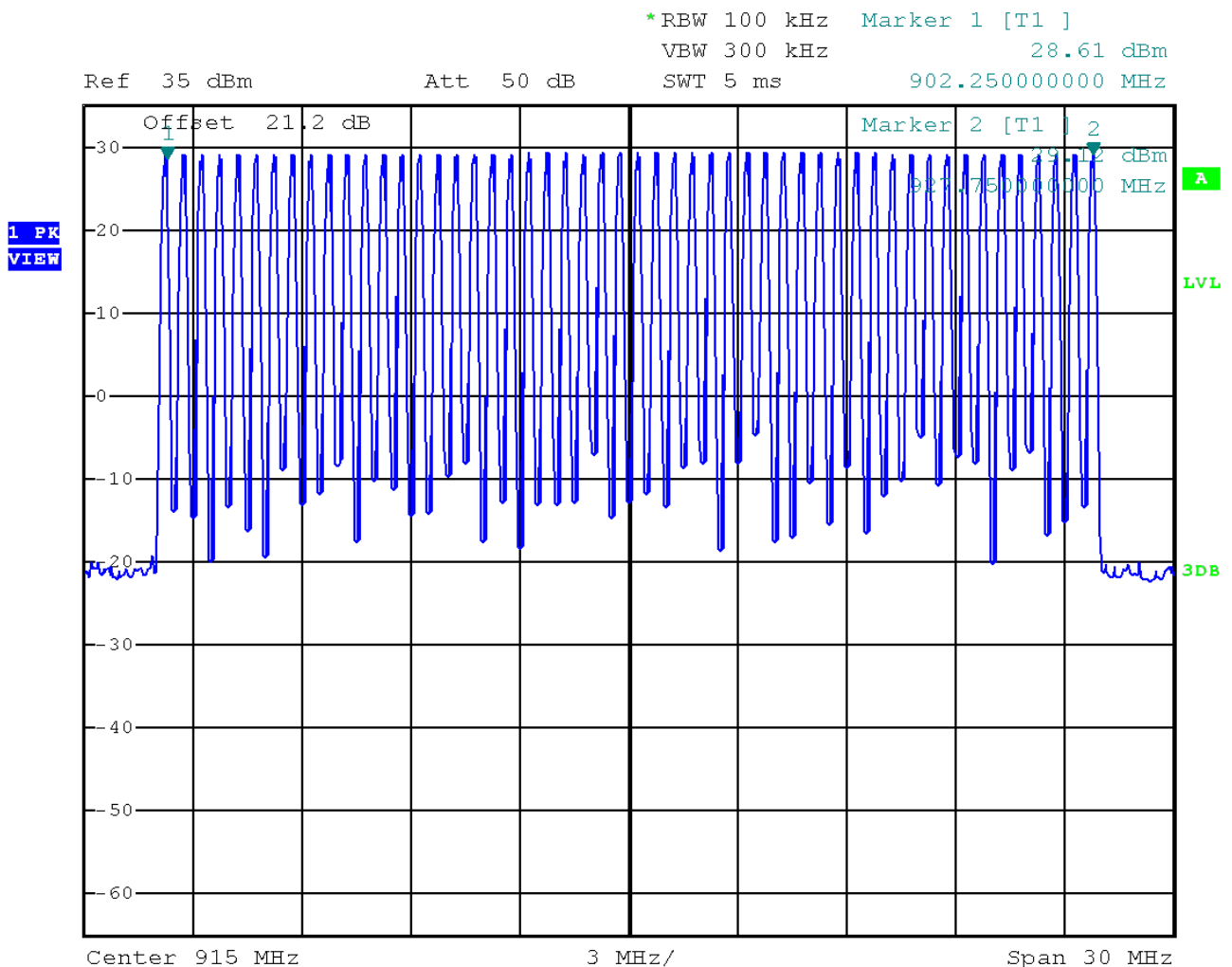
5.6 Hopping sequence

Requirement according to FCC Part 15C, Section 15.247(a):

The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies.

Remarks: The channel is represented by a pseudo-random hopping sequence hopping through the 52
RF-channels.
For detailed information about the hopping sequence, please refer to user manual.

5.6.1 Test protocol



FCC ID: WJ9-RRU1400

5.7 Equal hopping frequency use

Requirement according to FCC Part 15C, Section 15.247(a):
Each frequency must be used equally on the average by each transmitter.

Remarks: The device fulfills the requirement according to FCC Part 15C, Section 15.247(a).

The manufacturer declares in the system manual that this function is controlled via software.

For detailed information about the hopping sequence, please refer to user manual.

5.8 Receiver input bandwidth

Requirement according to FCC Part 15C, Section 15.247(a):
The system receivers shall have input bandwidth that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signal.

Remarks: The receiver bandwidth is equal to the transmitter bandwidth in the 52 hopping channel mode.

(Declared by the manufacturer.)

For detailed information about the hopping sequence, please refer to user manual.

FCC ID: WJ9-RRU1400

5.9 Dwell time

For test instruments and accessories used see section 6 Part DC.

5.9.1 Description of the test location

Test location: Shielded room S4

5.9.2 Photo documentation of the test set-up – see Attachment C

5.9.3 Applicable standard

According to FCC Part 15, Section 15.247(a)(i):

Frequency hopping systems operating in the 902-928 MHz band: The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period.

5.9.4 Description of Measurement

The measurement was done using a spectrum analyser in time domain function and able to store the maximum time of a period. This time period has been stored and added up the appropriate time intervals the hopping system has applied this channel.

5.9.5 Test result

Channel frequency (MHz)	Number of Bursts (in 1 time period)	Dwell time (ms)
914.75	1	400.0

Requirement according to FCC Part15C, Section 15.247(a):

Frequency (MHz)	Hopping channels	time of one period (s)	Limit dwell time, AV (ms)
902-928	≥ 50	20	< 400

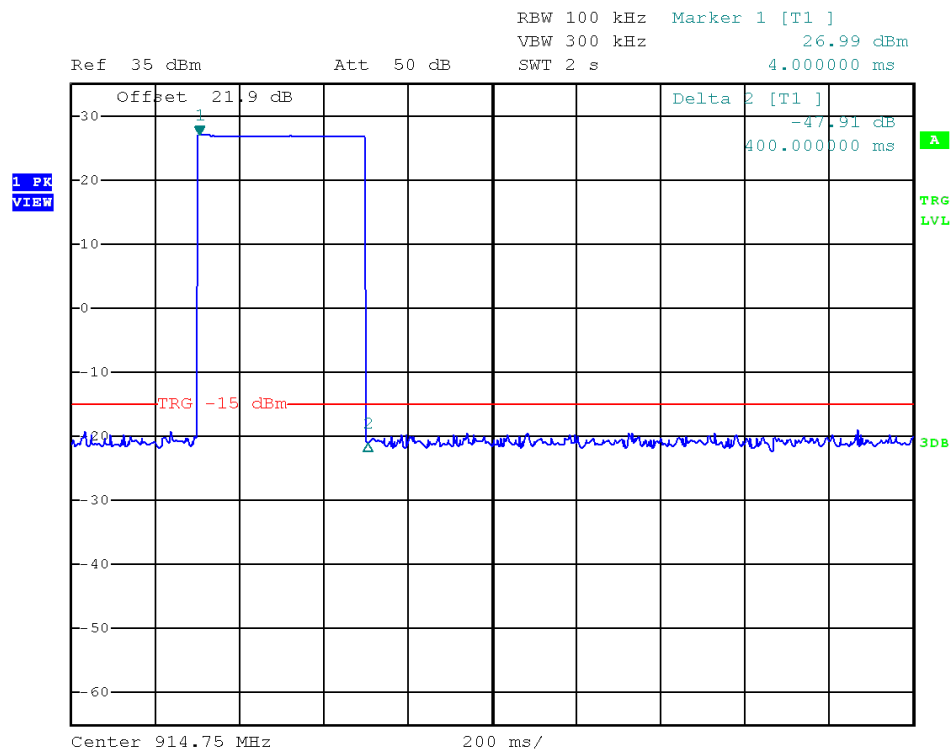
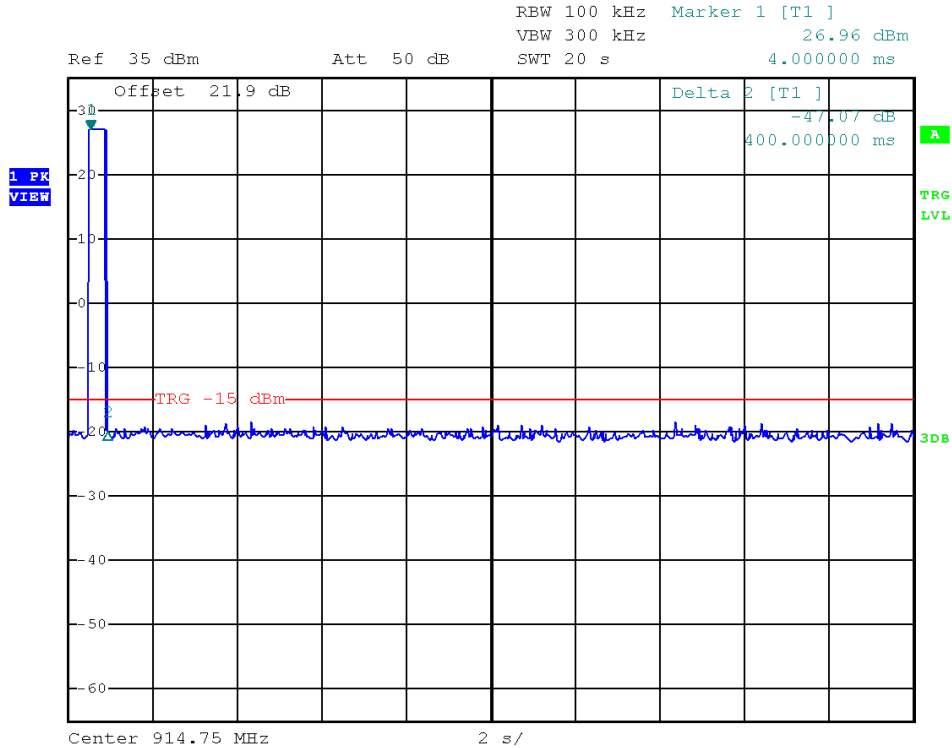
The requirements are **FULFILLED**.

Remarks: For detailed test result please refer to following test protocol.

FCC ID: WJ9-RRU1400

5.9.6 Test protocol

Time of occupancy (Dwell time)



FCC ID: WJ9-RRU1400**5.10 Channel separation**

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

5.10.1 Description of the test location

Test location: Shielded room S4

5.10.2 Photo documentation of the test set-up – see Attachment C:**5.10.3 Applicable standard**

According to FCC Part 15, Section 15.247(a)(1):

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

5.10.4 Description of Measurement

This measurement was done by using a spectrum analyser. The Span of the analyzer was set wide enough to capture 2 frequencies. The result of the channel separation was compared with the 20 dB bandwidth and recorded.

5.10.5 Test result

Channel 1 (MHz)	Channel 2 (MHz)	Channel separation (kHz)
902.25	902.75	500

FCC ID: WJ9-RRU1400

Limit according to FCC Part 15C, Section 15.247(a):

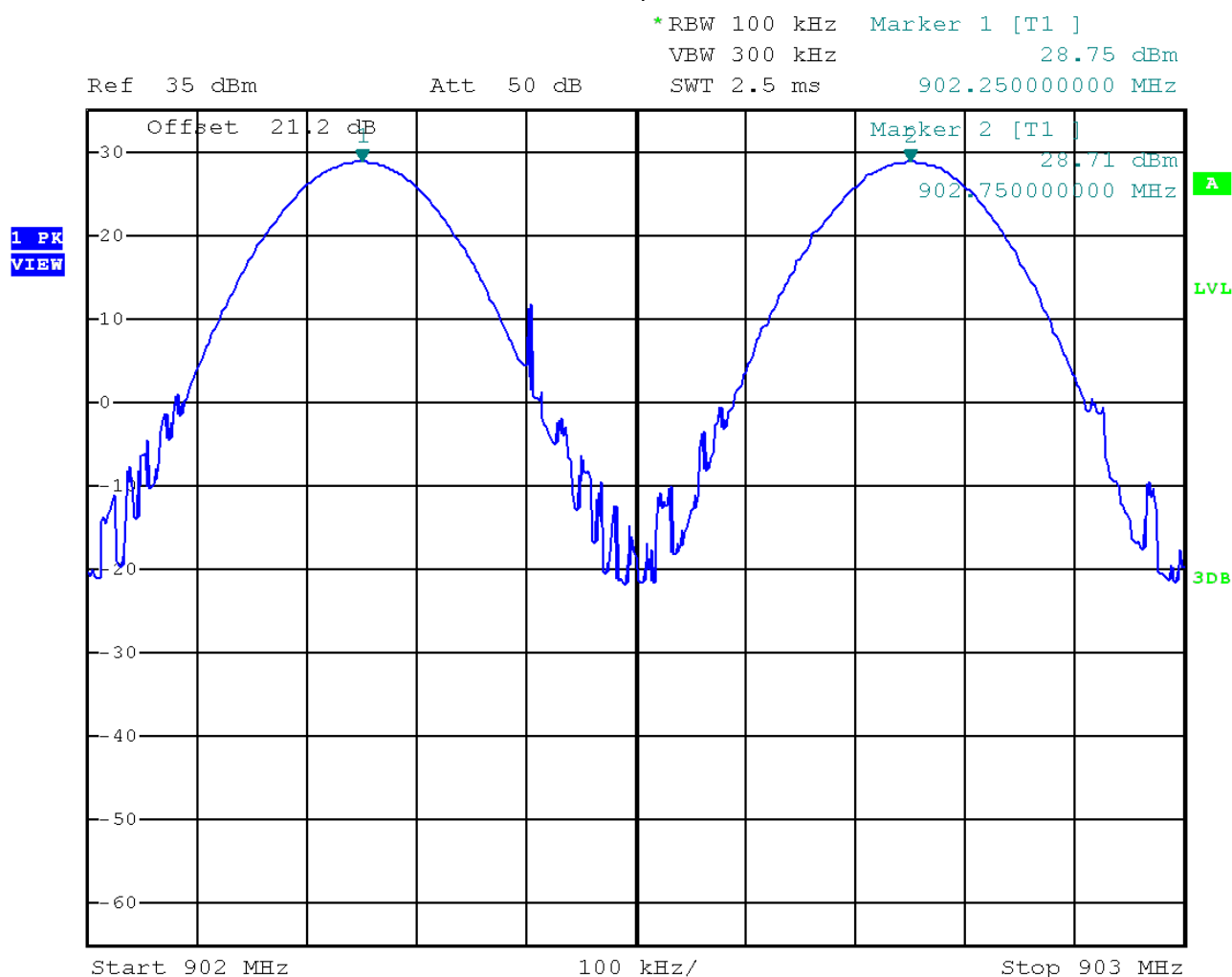
Frequency (MHz)	Hopping channels	Limit channel separation (kHz)
All systems		> 25 kHz or 20 dB bandwidth, which ever is greater
2400-2483.5	≥ 15	

The requirements are **FULFILLED**.

Remarks: For detailed test result please refer to following test protocol.

5.10.6 Test protocol

Channel separation



5.11 Quantity of hopping channels

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

5.11.1 Description of the test location

Test location: Shielded room S4

5.11.2 Photo documentation of the test set-up – see Attachment

5.11.3 Applicable standard

According to FCC Part 15, Section 15.247(a)(1)(i):

For frequency hopping systems operating in the 902-928 MHz band: If the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies.

5.11.4 Description of Measurement

This measurement was done by using a spectrum analyser. The EuT was transmitting at its maximum data rate. The Span of the analyzer was set wide enough to capture the frequency band from 902-928 MHz.

5.11.5 Test result

Hopping channel frequency range	Quantity of hopping channels value	Quantity of hopping channels minimum limit
902-928 MHz	52	50

Limit according to FCC Part 15C, Section 15.247(1):

Frequency range (MHz)	LIMIT (Quantity of Hopping Channels)			
	20dB Bandwidth < 250kHz	20dB Bandwidth > 250kHz	20dB Bandwidth < 1 MHz	20dB Bandwidth > 1MHz
902 - 928	50	25	---	---

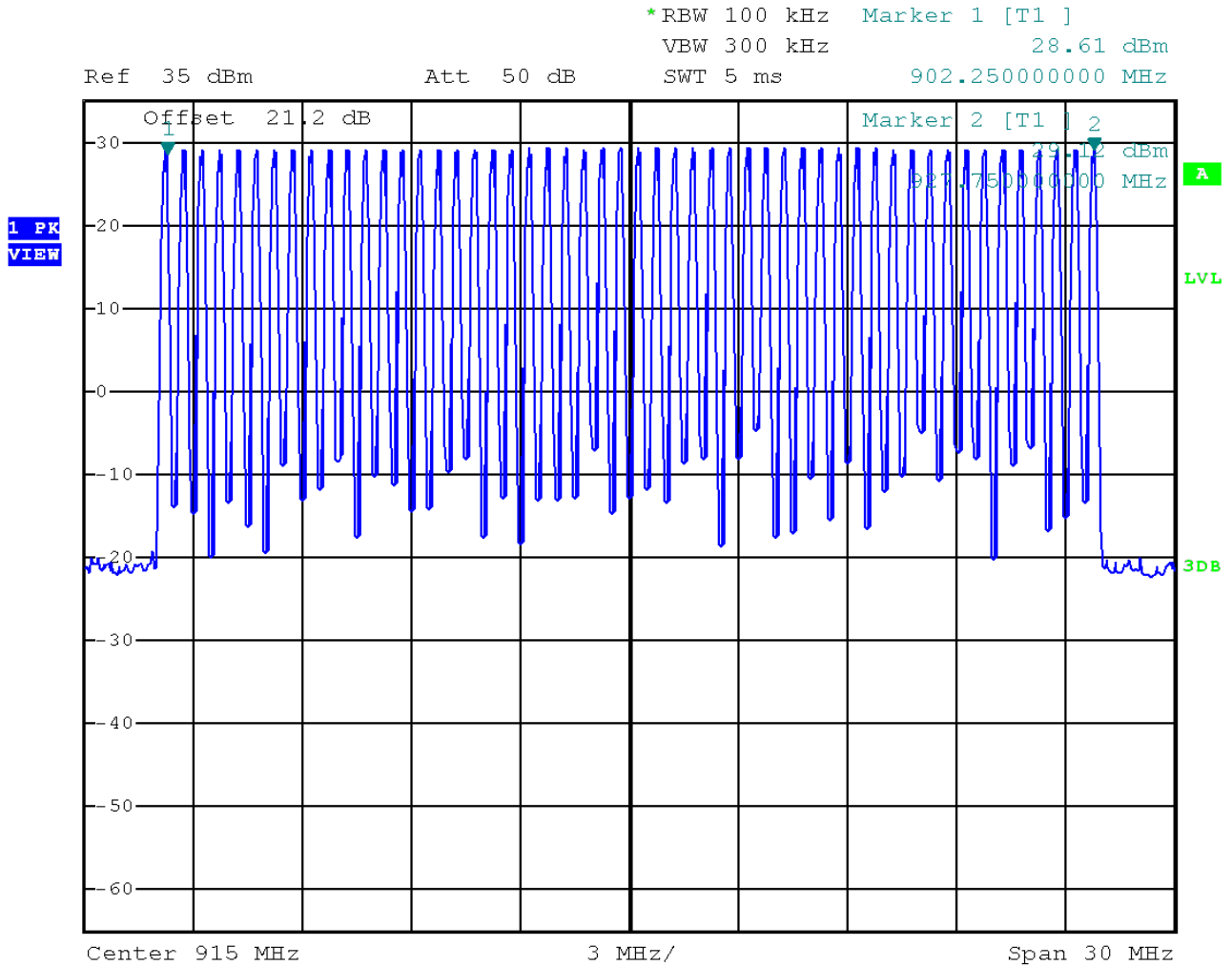
The requirements are **FULFILLED**.

Remarks: For detailed test result please refer to following test protocol.

FCC ID: WJ9-RRU1400

5.11.6 Test protocol

Quantity of hopping channel



FCC ID: WJ9-RRU1400**5.12 Antenna application****5.12.1 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 FAKRA connectors to connect the defined antennas supplied by the manufacturer.

All supplied antennas meet the requirements of part 15.203 and 15.204.

The device will be professionally installed. So it is secured that the proper antenna is employed so that the limits accd. FCC Part 15.247 are not exceeded.

5.12.2 Antenna requirements

According to FCC Part 15C, Section 15.247 (b)(4):

The conducted output power limit specified in paragraph (b) of 15.247 is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from intentional radiator shall be reduced below the stated values in paragraph (b)(1), (b)(2) and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The necessary output power reduction depends on the used antenna type. The value of output power have to be reduced is controlled by firmware of the EUT and will be automatically set by selecting the antenna.

Remarks: For detailed information about the used the antennas please refer to
the user manual or technical documentation from the manufacturer.

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5.13 Maximum permissible exposure (MPE) – See Attachment B

For test instruments and accessories used see section 6 Part **CPC 2**.

5.13.1 Description of the test location

Test location: None

5.13.2 Applicable standard

According to FCC Part 15, Section 15.247(i):

Systems operating under the provisions of this section shall be operated in a manner that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines.

The test methods used comply with ANSI/IEEE C95.1, "IEEE Standard for Safety Levels with respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz".

This test report shows the compliance with the limits for Maximum Permissible Exposure (MPE) specified in FCC Part 1, Section 1.1310 and the criteria to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in FCC Part 1, Section 1.1307(b).

5.13.3 Description of Measurement

The maximum total power input to the antenna has been measured conducted as described in clause 5.3 of this document. Through the Friis transmission formula, the known maximum gain of the antenna and the maximum power, the MPE can be calculated in a defined distance away from the product.

$$\text{Friis transmission formula: } P_d = \frac{P_{out} * G}{4 * \pi * r^2}$$

where

P_d = power density (mW/cm²)

P_{out} = output power to antenna (mW)

G = gain of antenna (linear scale)

r = distance between antenna and observation point (cm)

Remarks: For detailed test result please refer Attachment B.

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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.
A 4	BAT-EMC 3.18.0.26	01-02/68-13-001				
	ESCI	02-02/03-15-001	11/06/2022	11/06/2021		
	ESH 2 - Z 5	02-02/20-05-004	25/10/2021	25/10/2020		
	N-4000-BNC	02-02/50-05-138				
	N-1500-N	02-02/50-05-140				
	ESH 3 - Z 2	02-02/50-05-155	18/11/2021	18/11/2020		
	SP 103 /3.5-60	02-02/50-05-182				
CPC 2	FSP 30	02-02/11-05-001	09/10/2021	09/10/2020		
	18N50W-20dB	02-02/50-19-029				
DC	FSP 30	02-02/11-05-001	09/10/2021	09/10/2020		
	18N50W-20dB	02-02/50-19-029				
MB	FSP 30	02-02/11-05-001	09/10/2021	09/10/2020		
	18N50W-20dB	02-02/50-19-029				
SEC 1-3	FSP 30	02-02/11-05-001	09/10/2021	09/10/2020		
	WHJS 1000-10EE	02-02/50-05-070				
	18N50W-20dB	02-02/50-19-029				
SER 1	ESCI	02-02/03-05-005	11/12/2021	11/12/2020		
	HFH 2 - Z 2	02-02/24-15-001	22/03/2022	22/03/2021		
	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	06/06/2022	06/06/2021		
	VULB 9168	02-02/24-05-005	18/04/2022	18/04/2021		
	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 3	FSP 30	02-02/11-05-001	09/10/2021	09/10/2020		
	AMF-6D-01002000-22-10P	02-02/17-15-004				
	3117	02-02/24-05-009	08/05/2022	08/05/2021		
	18N-20	02-02/50-17-003				
	NMS111-GL200SC01-NMS110	02-02/50-17-012				
	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				