



TEST REPORT

Report Number	: TZ0200250301FRF02
Product Name	: All Mode SDR Transceiver
Model/Type reference	: RS-998, ZT7500
FCC ID	: 2AGRS-RS-998
Prepared for	: Quanzhou Risen Electronics Co., Ltd No. 26 Zishan Road, Jiangnan High-tech Industrial Zone, Licheng District, Quanzhou, Fujian, 362000 China

Prepared By	: Shenzhen Tongzhou Testing Co.,Ltd. 1st Floor, Building 1, Haomai High-tech Park, Huating Road 387, Dalang Street, Longhua, Shenzhen, China
Standards	: FCC CFR Title 47 Part 15B, ANSI C63.4: 2014
Date of Test	: 2025-03-14 ~ 2025-04-02
Date of Issue	: 2025-04-02
Prepared by	: Lena Wen
Reviewed by	: Allen Lai
Approved by	: Max Zhang (Authorized Officer)

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**** Report Revise Record ****

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	2025-04-02	Valid	Initial release

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1. GENERAL INFORMATION

1.1. Client Information

Applicant	: Quanzhou Risen Electronics Co., Ltd
Address	: No. 26 Zishan Road, Jiangnan High-tech Industrial Zone, Licheng District, Quanzhou, Fujian, 362000 China
Manufacturer	: Quanzhou Risen Electronics Co., Ltd
Address	: No. 26 Zishan Road, Jiangnan High-tech Industrial Zone, Licheng District, Quanzhou, Fujian, 362000 China

1.2. Description of Device (EUT)

Product Name	: All Mode SDR Transceiver
Trade Mark	: Recent, ZASTONE
Model Number	: RS-998, ZT7500
Model Declaration	: Only difference in brand and model name
Test Model	: RS-998
Power Supply	: Input: DC 13.8V
Hardware version	: 6PD7-2127-BMB
Software version	: V 11.0.0(STM)+V 10.0.0(FPGA)

1.3. Wireless Function Tested in this Report

Scanning Receiver	
Operation Frequency	: 30MHz – 750MHz
Modulation Technology	: CW/LSB/USB/AM/NFM/WFM/DIGI

Note 1: Antenna position refer to EUT Photos.

Note 2: the above information was supplied by the applicant.

1.4. EUT configuration

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

supplied by the manufacturer

supplied by the lab

<input type="radio"/>	Adapter	Model:	62012P-50-60
		Input:	AC 100-240V 50/60Hz
		Output:	DC 80V/60A

1.5. Description of Test Facility

FCC

Designation Number: CN1275

Test Firm Registration Number: 167722

Shenzhen Tongzhou Testing Co.,Ltd has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

A2LA

Certificate Number: 5463.01

Shenzhen Tongzhou Testing Co.,Ltd has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

IC

ISED#: 22033

CAB identifier: CN0099

Shenzhen Tongzhou Testing Co.,Ltd has been listed by Innovation, Science and Economic Development Canada to perform electromagnetic emission measurement.

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.4 and CISPR 16-1-4:2010

1.6. Statement of the Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. To CISPR 16 – 4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements” and is documented in the Shenzhen Tongzhou Testing Co.,Ltd's quality system acc. To DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

1.7. Measurement Uncertainty

Test Item		Uncertainty	Note
Radiation Uncertainty(9KHz~30MHz)	:	±3.26dB	(1)
Radiation Uncertainty(30MHz~1000MHz)	:	±3.92dB	(1)
Radiation Uncertainty(1GHz~40GHz)	:	±5.62dB	(1)
Conduction Uncertainty	:	±2.71dB	(1)
Unwanted Emissions, conducted	:	±1.3dB	(1)

(1). This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

1.8. Description of Test Modes

The EUT has been tested under operating condition.

Worst-case mode and channel used for 150 kHz-30 MHz power line conducted emissions was the mode and channel with the highest output power, which was determined to be **receiver in middle channel**.

Worst-case mode and channel used for 9kHz-1000 MHz radiated emissions was the mode and channel with the highest output power, that was determined to be **receiver in middle channel**.

2. TEST METHODOLOGY

All measurements contained in this report were conducted with ANSI C63.4-2014, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

The radiated testing was performed at an antenna-to-EUT distance of 3 meters. All radiated and conducted emissions measurement was performed at Shenzhen Tongzhou Testing Co.,Ltd

2.1. EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

2.2. EUT Exercise

The EUT was operated in the engineering mode to fix the RX frequency that was for the purpose of the measurements.

2.3. Test Sample

Sample ID	Description
TZ0200250301-1#	Engineer sample – continuous receiving

3. SYSTEM TEST CONFIGURATION

3.1. Justification

The system was configured for testing in a continuous receiver condition.

3.2. Special Accessories

No.	Equipment	Manufacturer	Model No.	Serial No.	Length	shielded/ unshielded	Notes
/	/	/	/	/	/	/	/

3.3. Block Diagram/Schematics

Please refer to the related document

3.4. Equipment Modifications

Shenzhen Tongzhou Testing Co.,Ltd has not done any modification on the EUT.

3.5. Test Setup

Please refer to the test setup photo.

4. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Sample ID	Result
§15.107	Conduction Emission	TZ0200250301-1#	Compliant
§15.109	Radiated Emission	TZ0200250301-1#	Compliant
§15.111	Antenna Conducted Power for receivers	TZ0200250301-1#	Compliant
§15.121(b)	Scanning receivers and frequency converters used with scanning receivers	TZ0200250301-1#	Note 1

Note 1: Scanning receivers cannot receive any signals from the Cellular Radiotelephone Service frequency band.

Remark: The measurement uncertainty is not included in the test result.

5. TEST RESULT

5.1. Radiated Emissions Measurement

5.1.1. Standard Applicable

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

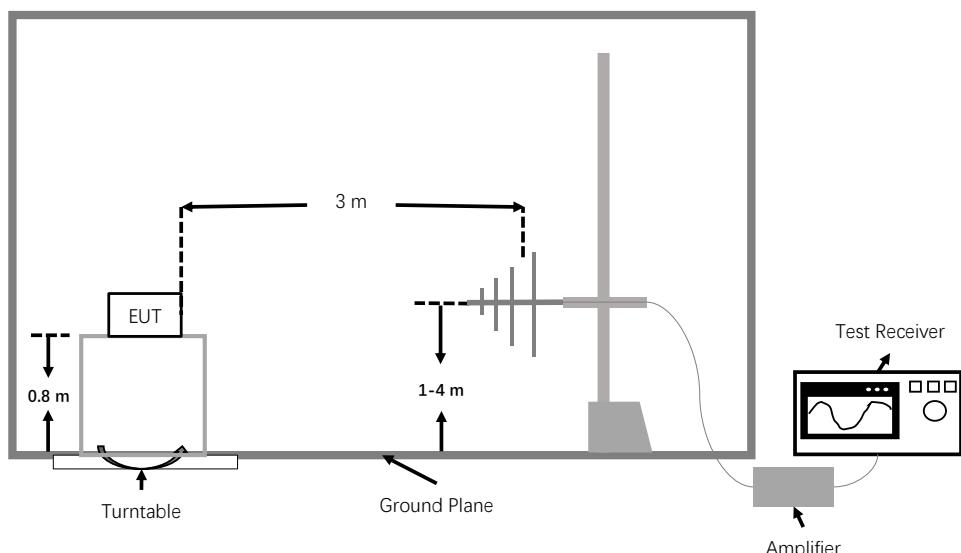
5.1.2. Measuring Instruments and Setting

The following table is the setting of spectrum analyzer and receiver.

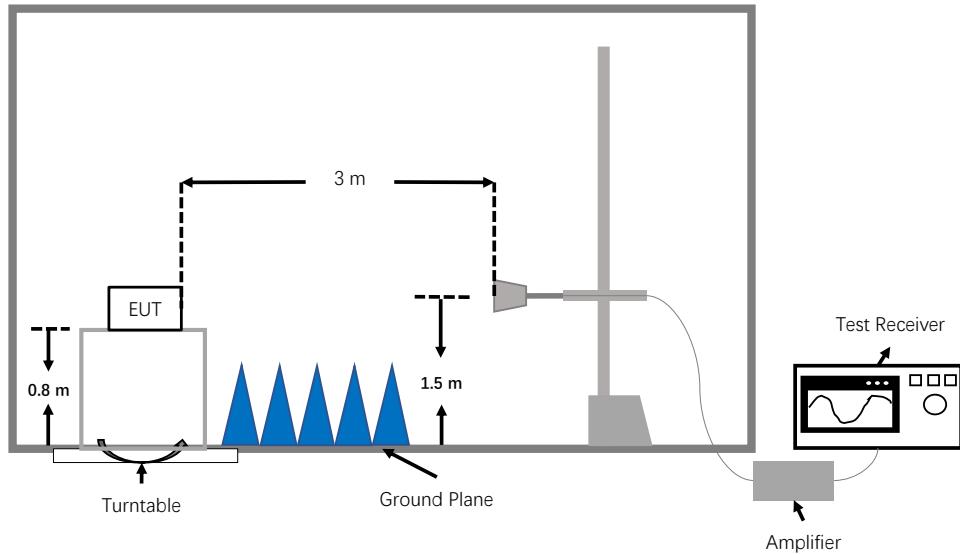
Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	5 th carrier harmonic
RB / VB (Emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 3 MHz for Average
RB / VB (Emission in non-restricted band)	1MHz / 1MHz for Peak, 1 MHz / 3 MHz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB/VB 200Hz/1KHz for QP/AVG
Start ~ Stop Frequency	150kHz~30MHz / RB/VB 9kHz/30KHz for QP/AVG
Start ~ Stop Frequency	30MHz~1000MHz / RB/VB 120kHz/1MHz for QP

5.1.3. Block Diagram of Test Setup



Radiated Emission Test Set-Up, Frequency below 1000MHz



Radiated Emission Test Set-Up, Frequency above 1000MHz

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

5.1.4. Test Procedures

1) Sequence of testing 30 MHz to 1 GHz

Setup:

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 3 meter.
- The EUT was set into operation.

Premeasurement:

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna is polarized vertical and horizontal.
- The antenna height changes from 1 to 3 meter.
- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

Final measurement:

- The final measurement will be performed with minimum the six highest peaks.
- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position ($\pm 45^\circ$) and antenna movement between 1 and 4 meter.
- The final measurement will be done with QP detector with an EMI receiver.
- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

2) Sequence of testing 1 GHz to 40 GHz

Setup:

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a rotatable table with 0.8 m height is used.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 3 meter.
- The EUT was set into operation.

Premeasurement:

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna is polarized vertical and horizontal.
- The antenna height scan range is 1 meter to 2.5 meter.
- At each turntable position and antenna polarization the analyzer sweeps with peak detection to find the maximum of all emissions.

Final measurement:

- The final measurement will be performed with minimum the six highest peaks.
- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position ($\pm 45^\circ$) and antenna movement between 1 and 4 meters. This procedure is repeated for both antenna polarizations.
- The final measurement will be done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and Average detector.
- The final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

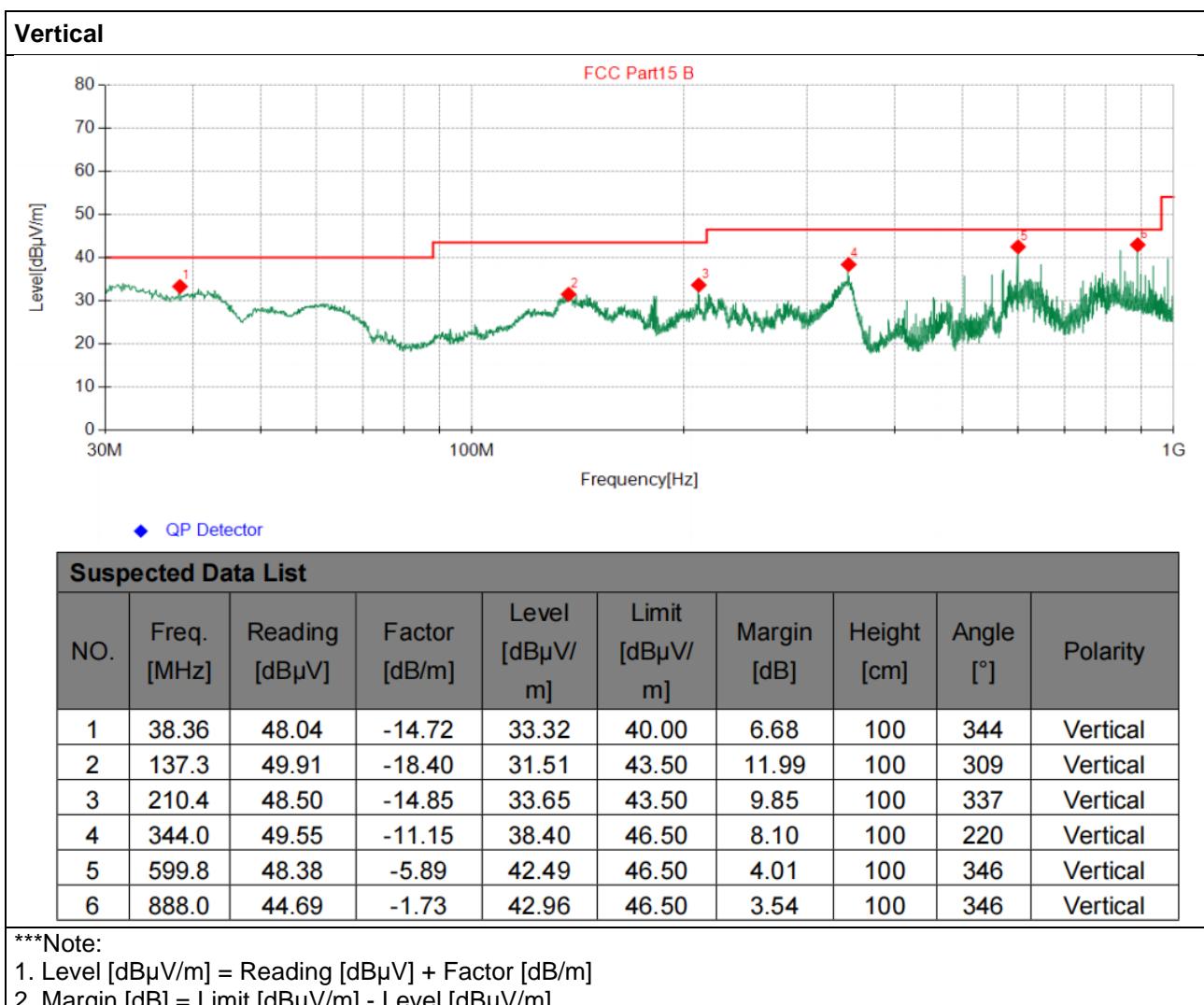
5.1.5. EUT Operation during Test

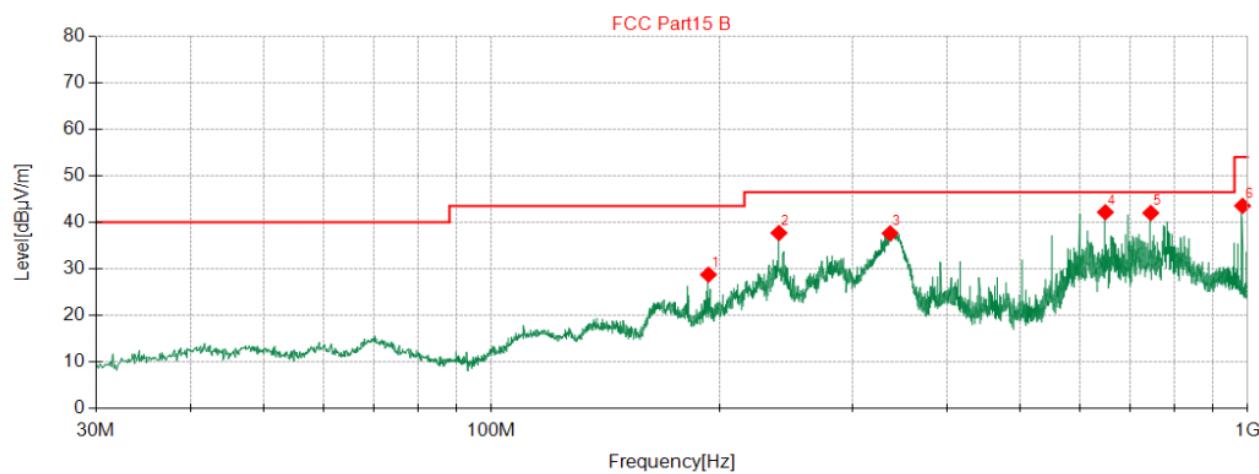
The EUT was programmed to be in continuously receiving mode.

5.1.6. Test Results

Results of Radiated Emissions (30MHz~1GHz)

Temperature	22.5°C	Humidity	56%
Test Engineer	Tony Luo	Configurations	Receiver Mode
Test Voltage	DC 13.8V by DC power source with a 120V/60Hz input	/	/



Horizontal**Suspected Data List**

NO.	Freq. [MHz]	Reading [dB μ V]	Factor [dB/m]	Level [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	193.5	44.87	-16.09	28.78	43.50	14.72	100	34	Horizontal
2	239.8	51.91	-14.18	37.73	46.50	8.77	100	15	Horizontal
3	336.5	49.45	-11.80	37.65	46.50	8.85	100	304	Horizontal
4	648.0	47.17	-4.99	42.18	46.50	4.32	100	15	Horizontal
5	744.0	45.73	-3.71	42.02	46.50	4.48	100	15	Horizontal
6	983.8	43.61	-0.06	43.55	54.00	10.45	100	44	Horizontal

***Note:

1. Level [dB μ V/m] = Reading [dB μ V] + Factor [dB/m]2. Margin [dB] = Limit [dB μ V/m] - Level [dB μ V/m]

Results for Radiated Emissions (1GHz to 5GHz)

Temperature	24°C	Humidity	55.2%
Test Engineer	Tony Luo	Configurations	Receiver mode
Test Voltage	DC 13.8V by DC power source with a 120V/60Hz input	/	/

Remark: Measured all modes and recorded worst case.

Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (KHz)	Height (cm)	Pol	Azimuth (deg)
1177.12	41.57	---	74	32.43	100	1000	100	V	325
1354.37	41.64	---	74	32.36	100	1000	100	V	234
2565.32	46.59	---	74	27.41	100	1000	100	H	284
2446.17	46.43	---	74	27.57	100	1000	100	H	311
9027.04	48.91	---	74	25.09	100	1000	100	V	237
5326.27	47.35	---	74	26.65	100	1000	100	H	26

Notes:

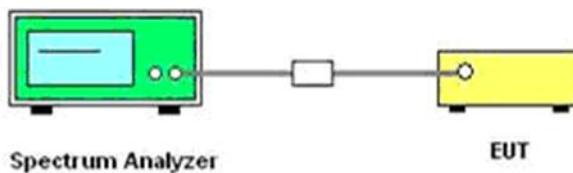
1. Measuring frequencies from 9 KHz - 10th harmonic or 26.5GHz (which is less), No emission found between lowest internal used/generated frequency to 30MHz.
2. Radiated emissions measured in frequency range from 9 KHz ~10th harmonic or 26.5GHz (which is less) were made with an instrument using Peak detector mode.
3. Data of measurement within this frequency range shown “---” in the table above means the reading of emissions are attenuated more than 30dB below the permissible limits or the field strength is too small to be measured.
4. Level = Reading + Ant. Fac - Pre. Fac. + Cab. Loss. Margin = Limit – Level.

5.2. Antenna Conducted Power for Receivers

5.2.1. Standard Applicable

In addition to the radiated emission limits, receivers that operate (tune) in the frequency range 30 to 960 MHz and CB receivers that provide terminals for the connection of an external receiving antenna may be tested to demonstrate compliance with the provisions of §15.109 with the antenna terminals shielded and terminated with a resistive termination equal to the impedance specified for the antenna, provided these receivers also comply with the following: With the receiver antenna terminal connected to a resistive termination equal to the impedance specified or employed for the antenna, the power at the antenna terminal at any frequency within the range of measurements specified in §15.33 shall not exceed 2.0 nanowatts.

5.2.2. Block Diagram of Test Setup



5.2.3. Test Procedures

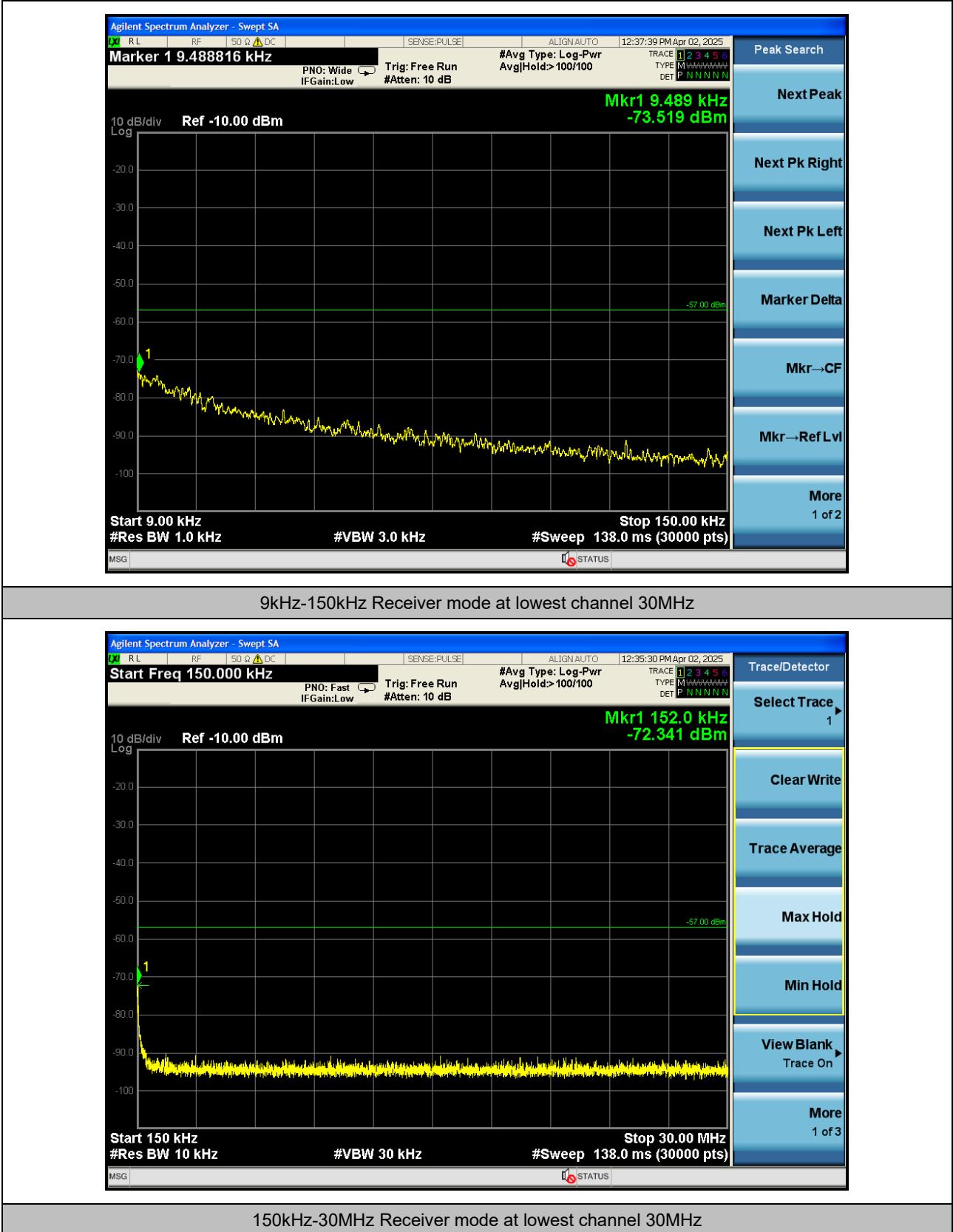
The antenna input is connected to a spectrum analyzer.

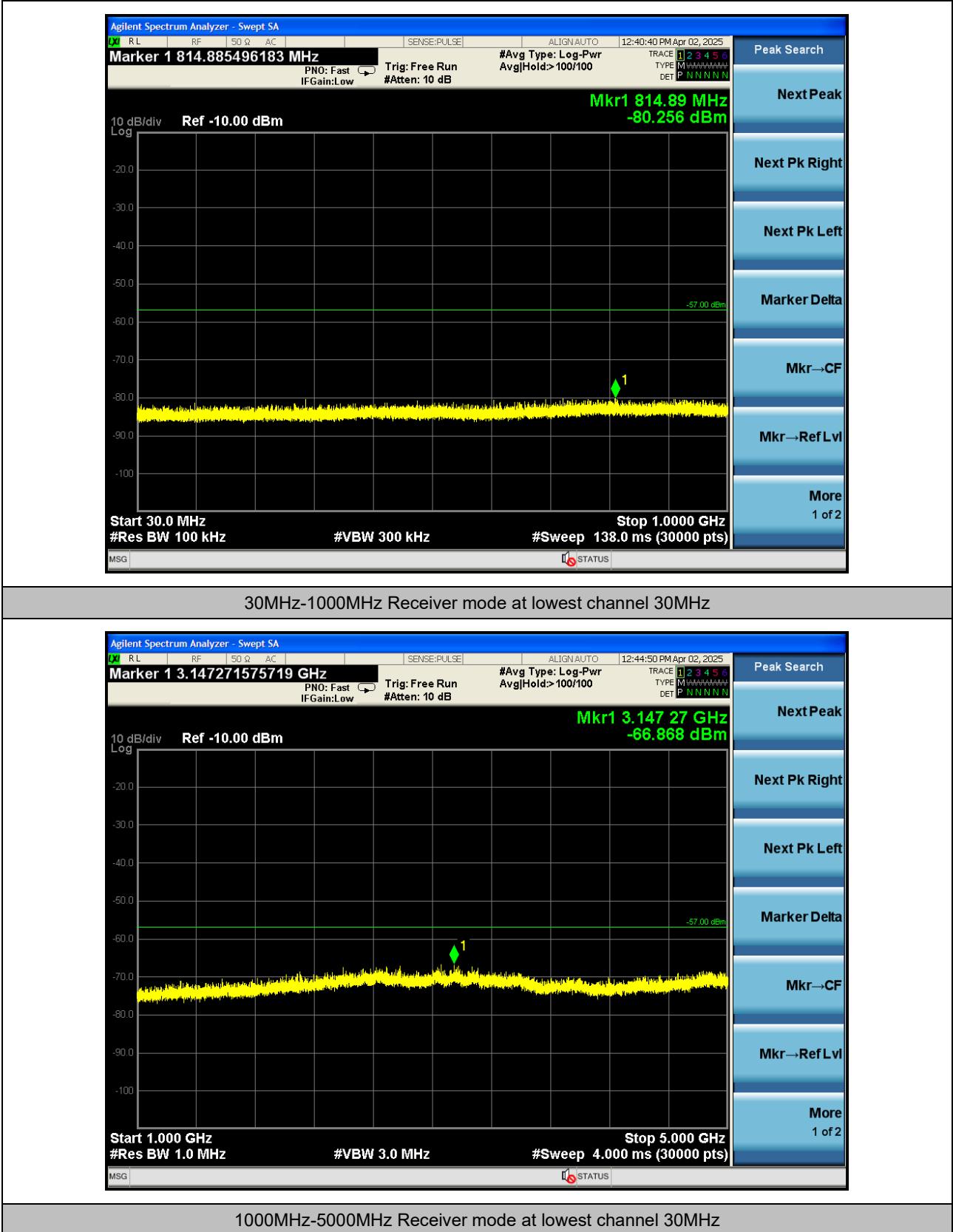
Spectrum analyzer set as follow:

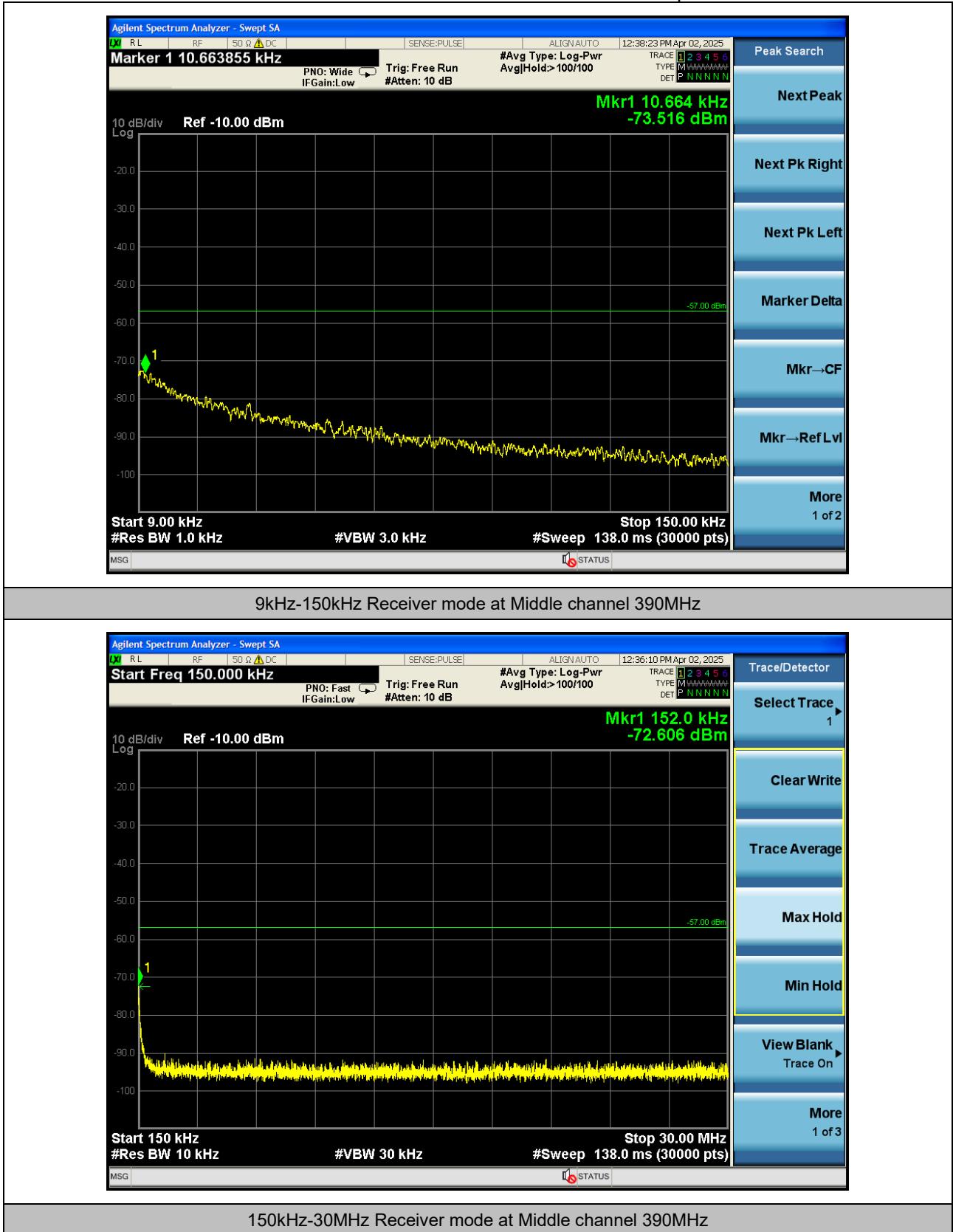
Frequency range	RBW (kHz)	VBW (kHz)
9 kHz ~ 150 kHz	1	3
150 kHz ~ 30 MHz	10	30
30 MHz ~ 1000 MHz	100	300
1000 MHz ~ 5000 MHz	1000	3000

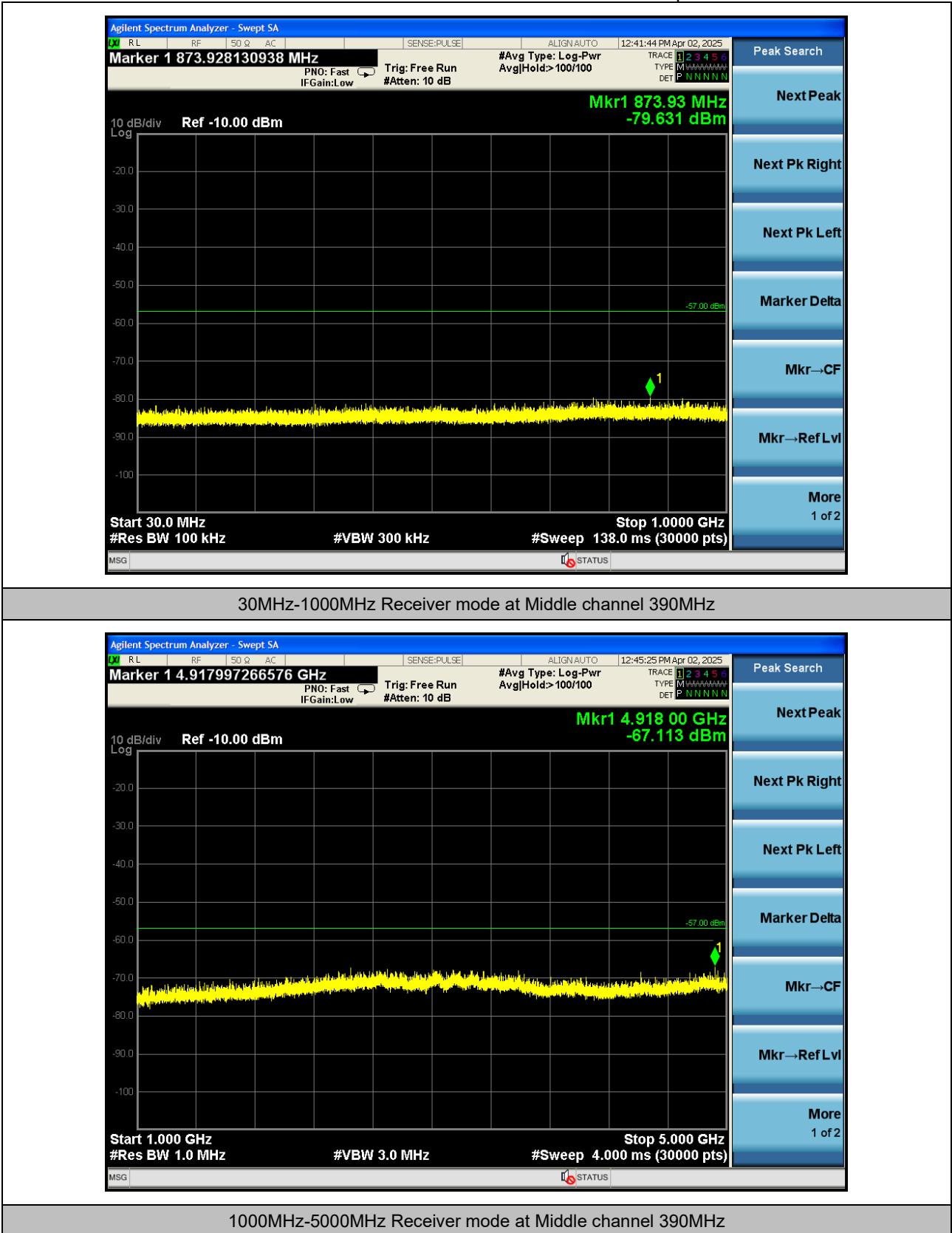
5.2.4. Test Results

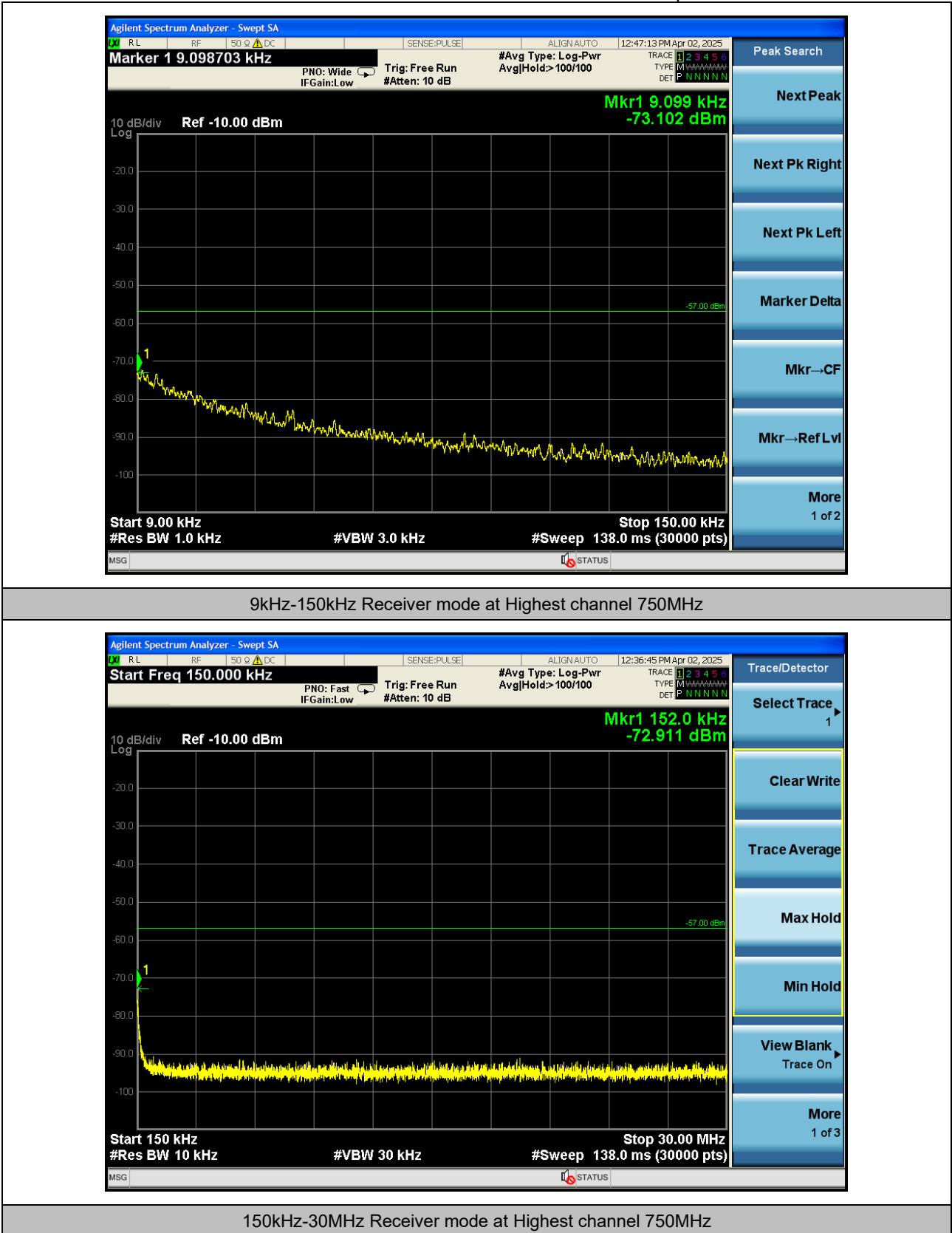
PASS

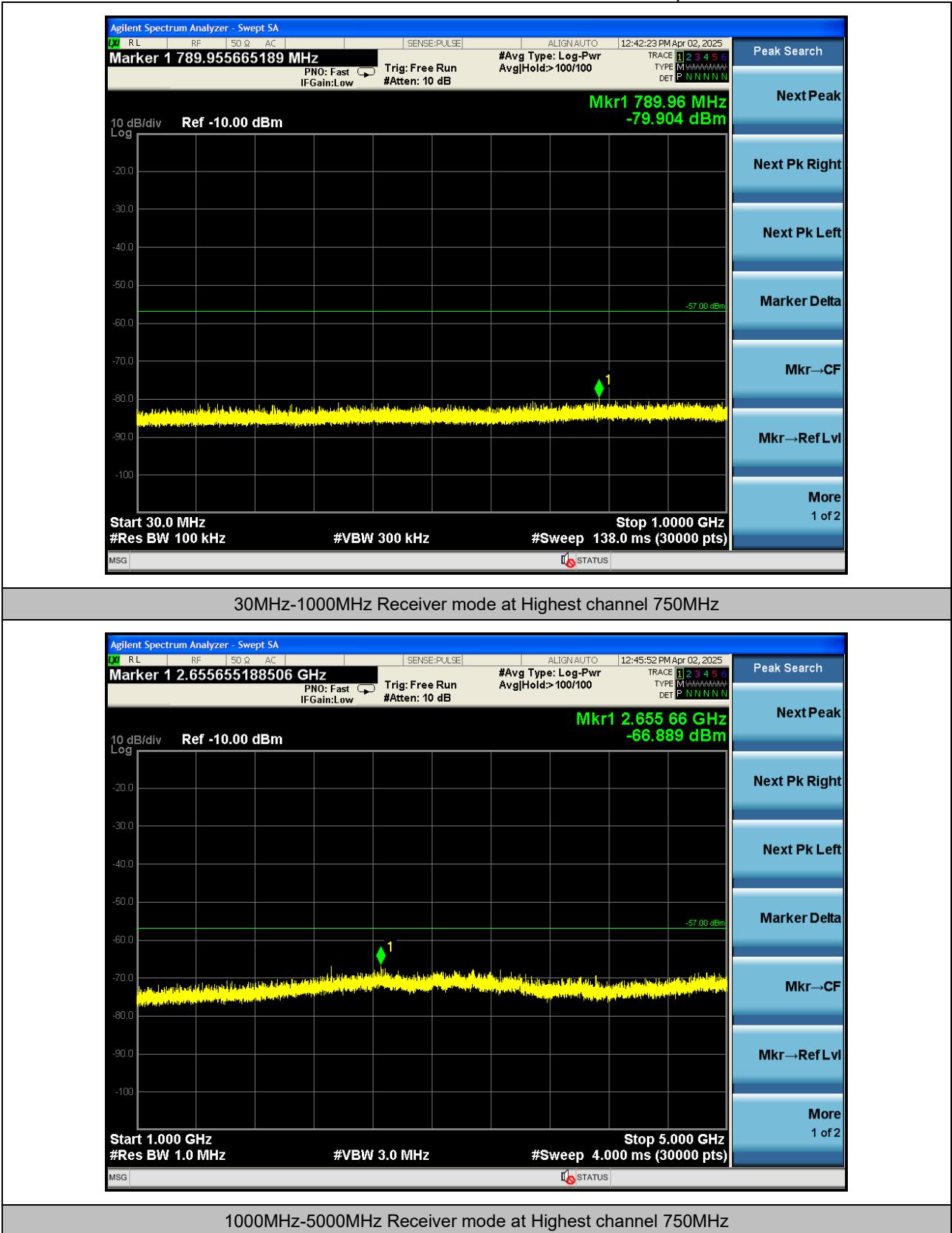












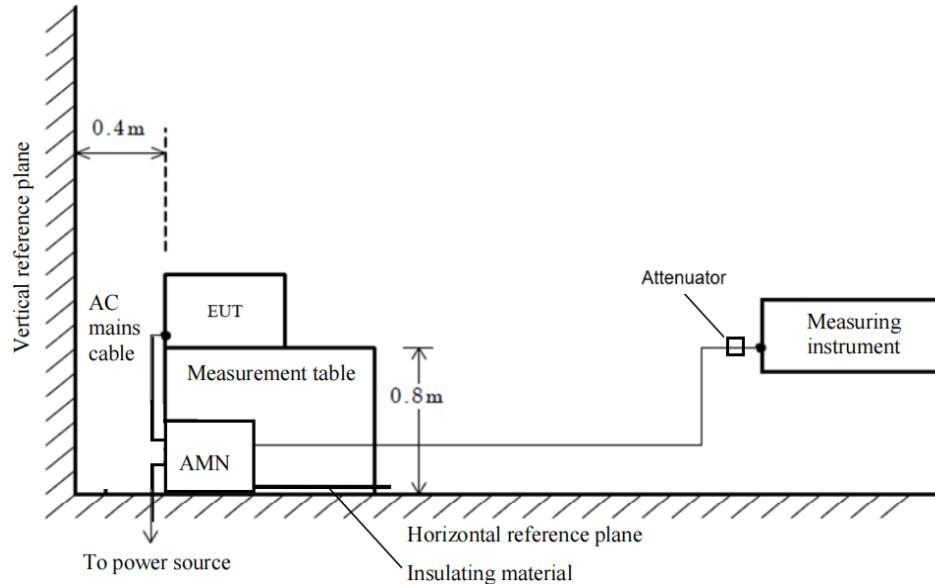
5.3. AC Power line conducted emissions

5.3.1. Standard Applicable

Frequency Range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

* Decreasing linearly with the logarithm of the frequency

5.3.2. Block Diagram of Test Setup



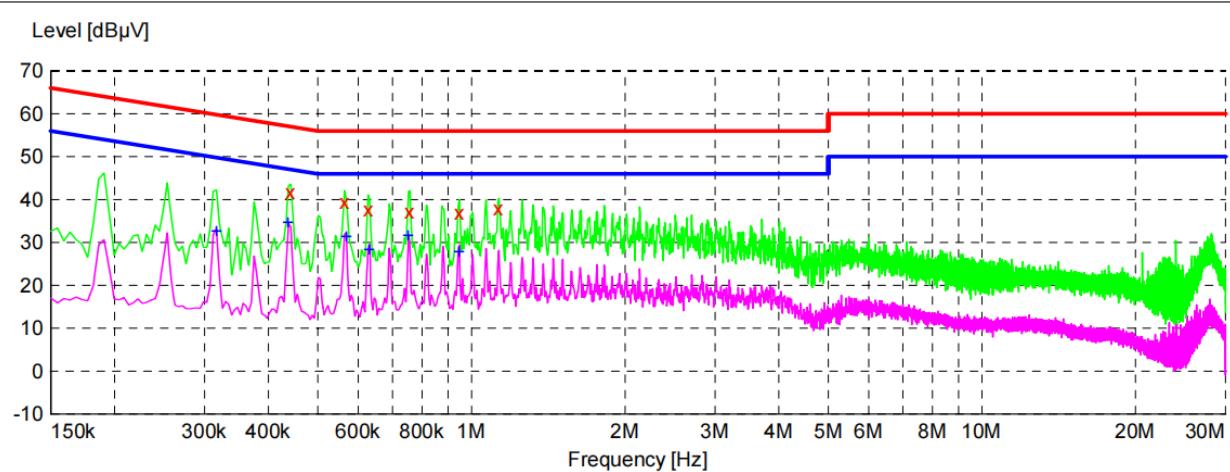
Note: the distance between LISN and Vertical reference plane is 40 cm and the distance between LISN and EUT is 80 cm.

5.3.3. Test Results

Temperature	22.5°C	Humidity	56%
Test Engineer	Allen Lai	Configurations	Receiver mode
Test Voltage	DC 13.8V by DC power source with a 120V/60Hz input	/	/

PASS

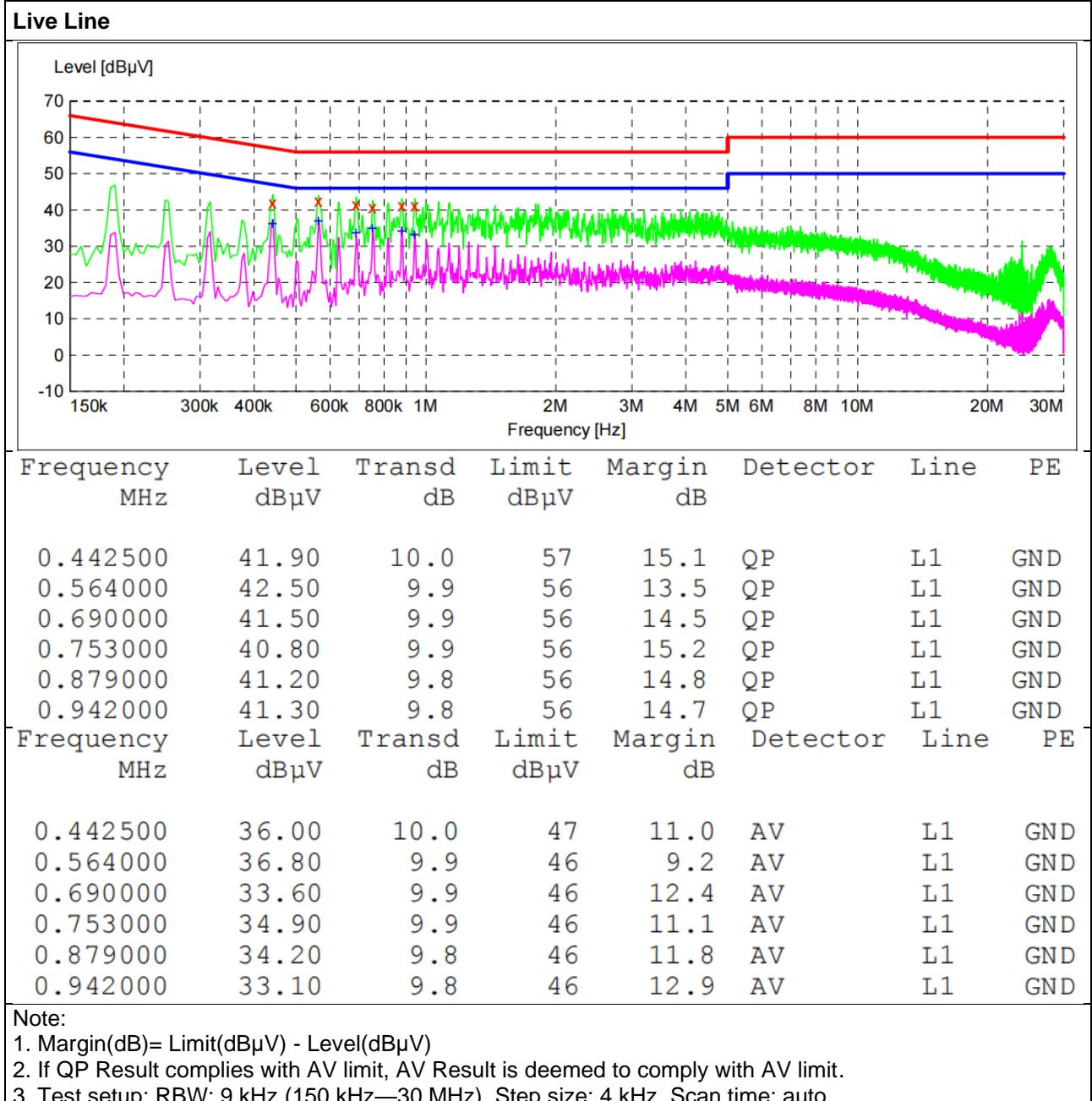
The test data please refer to following page.

Neutral Line

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Detector	Line	PE
0.442500	41.60	10.0	57	15.4	QP	N	GND
0.564000	39.50	9.9	56	16.5	QP	N	GND
0.627000	37.70	9.9	56	18.3	QP	N	GND
0.757500	37.20	9.9	56	18.8	QP	N	GND
0.946500	37.00	9.8	56	19.0	QP	N	GND
1.131000	37.90	9.8	56	18.1	QP	N	GND
Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Detector	Line	PE
0.316500	32.70	10.2	50	17.1	AV	N	GND
0.438000	34.60	10.0	47	12.5	AV	N	GND
0.568500	31.30	9.9	46	14.7	AV	N	GND
0.631500	28.20	9.9	46	17.8	AV	N	GND
0.753000	31.60	9.9	46	14.4	AV	N	GND
0.946500	27.90	9.8	46	18.1	AV	N	GND

Note:

1. Margin(dB)= Limit(dB μ V) - Level(dB μ V)
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 9 kHz (150 kHz—30 MHz), Step size: 4 kHz, Scan time: auto.



6. LIST OF MEASURING EQUIPMENT

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
1	MXA Signal Analyzer	Keysight	N9020A	MY52091623	2024-12-31	2025-12-30
2	Wideband Antenna	schwarzbeck	VULB 9163	958	2022-11-13	2025-11-12
3	Horn Antenna	schwarzbeck	BBHA 9120D	01989	2022-11-13	2025-11-12
4	EMI Test Receiver	R&S	ESCI	100849/003	2024-12-31	2025-12-30
5	Controller	MF	MF7802	N/A	N/A	N/A
6	Amplifier	schwarzbeck	BBV 9743	209	2024-12-31	2025-12-30
7	Amplifier	Tonscend	TSAMP-0518SE	--	2024-12-31	2025-12-30
8	RF Cable(below 1GHz)	HUBER+SUHN ER	RG214	N/A	2024-12-31	2025-12-30
9	RF Cable(above 1GHz)	HUBER+SUHN ER	RG214	N/A	2024-12-31	2025-12-30
10	Artificial Mains	ROHDE & SCHWARZ	ENV 216	101333-IP	2024-12-31	2025-12-30
11	Fixed Attenuator	Mini circuits	BW-S6-2W263A+	N/A	2024-12-31	2025-12-30

Test software used:

Item	Test Software	Manufacturer	Name	Version
1	EMI Test Software	ROHDE & SCHWARZ	ESK1	V1.71
2	RE test software	Tonscend	JS32-RE	V5.0.0.0

7. TEST SETUP PHOTOGRAPHS OF EUT

Please refer to separated files for Test Setup Photos of the EUT.

8. EXTERIOR PHOTOGRAPHS OF EUT

Please refer to separated files for External Photos of the EUT.

9. INTERIOR PHOTOGRAPHS OF EUT

Please refer to separated files for Internal Photos of the EUT.

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