

RF MEASUREMENT REPORT

FCC ID: HD5-IH45
Applicant: Honeywell International Inc.
Honeywell Safety and Productivity Solutions
Product: Handheld UHF RFID Reader
Model No.: IH45
Brand Name: Honeywell
FCC Classification: FCC Part 15 Spread Spectrum Transmitter (DSS)
FCC Rule Part(s): Part15 Subpart C (Section 15.247)
Result: Complies
Received Date: 2023-01-13
Test Date: 2023-02-08 ~ 2023-02-26

Reviewed By:

Jame Yuan

Approved By:

Robin Wu



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standards through the calibration of the equipment and evaluated measurement uncertainty herein.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

Revision History

Report No.	Version	Description	Issue Date	Note
2212RSU051-U2	V01	Initial Report	2023-02-26	Valid

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1.4. Product Information

Product Name	Handheld UHF RFID Reader
Model No.	IH45
EUT Identification No.	20230113Sample#04
Bluetooth Specification	BLE Only
RFID Specification	902MHz ~ 928MHz (UHF RFID)
Working Voltage	Power by Li-ion Battery
Accessories	
Home Base	Model No.: CT40-HB Input Power: 12V, 3A Output Power: 5V, 2A
Rechargeable Li-ion Battery	Model No.: BAT-EDA50US Capacitance: 15.2Wh, 4000mAh Rated Voltage: 3.8V
Note: The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.	

1.5. Radio Specification under Test

Frequency Range	902.75 ~ 927.25MHz
Channel Number	50
Type of modulation	ASK
Antenna Type	Panel Antenna
Antenna Gain	4.16dBi

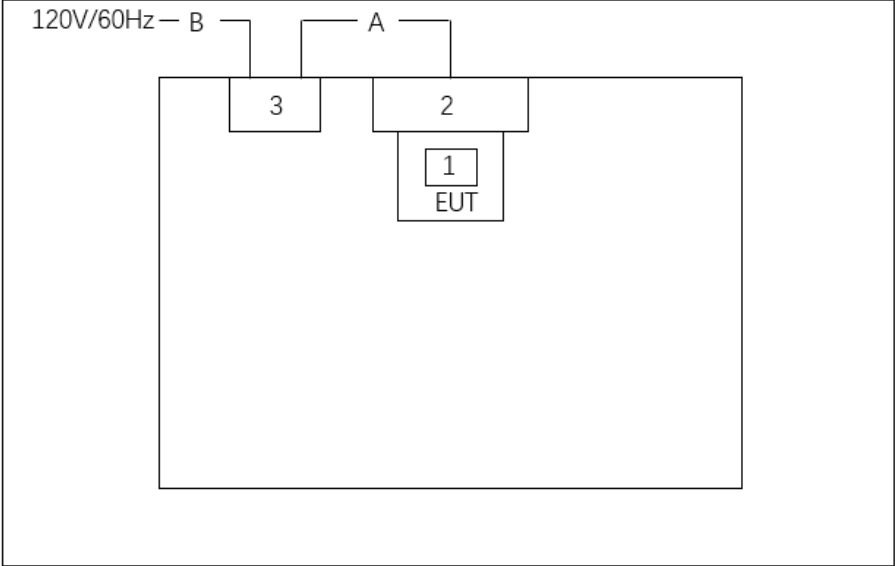
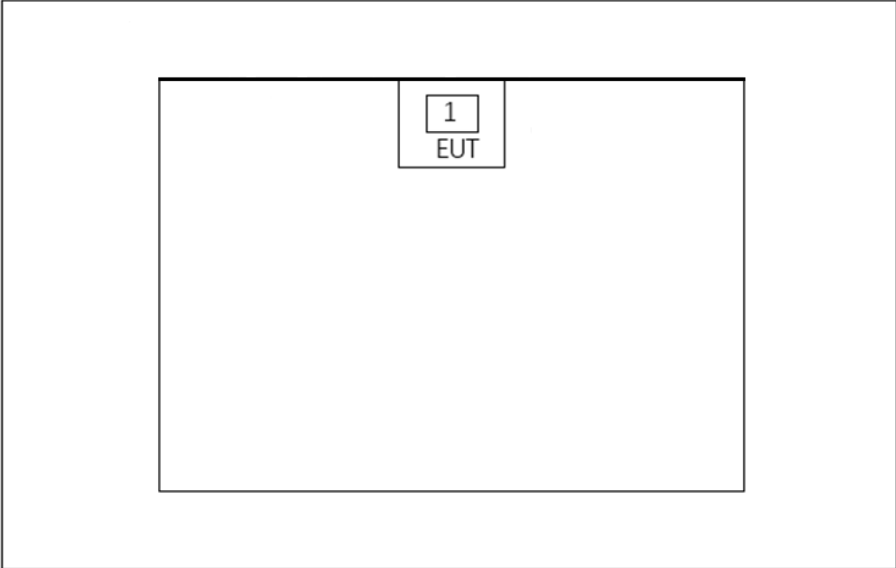
Note: For other features of this EUT, test report will be issued separately.

1.6. Working Frequencies

Channel	Frequency	Channel	Frequency	Channel	Frequency
00	902.75 MHz	01	903.25 MHz	02	903.75 MHz
03	904.25 MHz	04	904.75 MHz	05	905.25 MHz
06	905.75 MHz	07	906.25 MHz	08	906.75 MHz
09	907.25 MHz	10	907.75 MHz	11	908.25 MHz
12	908.75 MHz	13	909.25 MHz	14	909.75 MHz
15	910.25 MHz	16	910.75 MHz	17	911.25 MHz
18	911.75 MHz	19	912.25 MHz	20	912.75 MHz
21	913.25 MHz	22	913.75 MHz	23	914.25 MHz
24	914.75 MHz	25	915.25 MHz	26	915.75 MHz
27	916.25 MHz	28	916.75 MHz	29	917.25 MHz
30	917.75 MHz	31	918.25 MHz	32	918.75 MHz
33	919.25 MHz	34	919.75 MHz	35	920.25 MHz
36	920.75 MHz	37	921.25 MHz	38	921.75 MHz
39	922.25 MHz	40	922.75 MHz	41	923.25 MHz
42	923.75 MHz	43	924.25 MHz	44	924.75 MHz
45	925.25 MHz	46	925.75 MHz	47	926.25 MHz
48	926.75 MHz	49	927.25 MHz	--	--

2. Test Configuration

2.1. Test System Connection Diagram

Connection Diagram - AC Conducted Emissions			
 <p>The diagram shows a 120V/60Hz power source connected to a system. Cable B connects the source to component 3 (Adapter). Cable A connects the source to component 2 (Home Base). Component 1 (Mobile Phone) is connected to component 2. Component 1 is labeled 'EUT' (Equipment Under Test).</p>			
Connection Diagram - Radiated Emission testing			
 <p>The diagram shows component 1 (Mobile Phone) labeled 'EUT' (Equipment Under Test) positioned inside a rectangular area representing the test chamber for radiated emission testing.</p>			
Cable Type		Cable Spec.	Length
A	Power Cable	Non-Shielding	1.2m
B	Power Cable	Non-Shielding	1.5m
Product		Manufacturer	Model No.
1	Mobile Phone	Honeywell	CT45-L0N
2	Home Base	Honeywell	CT40-HB
3	Adapter	SHENZHEN HONOR	ADS-65LSI-12-1 12036E

2.2. Test Software

The test utility software used during testing was “HONRFID”, and the version was 45.23.01.13.1803.

2.3. Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15.247
- KDB 558074 D01v05r02
- ANSI C63.10-2013

2.4. Test Environment Condition

Ambient Temperature	15 ~ 35 °C
Relative Humidity	20 ~75 %RH

3. Antenna Requirement

Excerpt from §15.203 of the FCC Rules/Regulations:

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can 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 antenna of the device is **permanently attached**.
- There are no provisions for connection to an external antenna.

Conclusion:

The unit complies with the requirement of §15.203.

4. Measuring Instrument

Instrument	Manufacturer	Model No.	Asset No.	Cali. Interval	Cali. Due Date	Test Site
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2023-09-29	WZ-AC2
TRILOG Antenna	Schwarzbeck	VULB 9162	MRTSUE06022	1 year	2023-05-20	WZ-AC2
EMI Test Receiver	Agilent	N9038A	MRTSUE06125	1 year	2023-06-04	WZ-AC2
Thermohygrometer	Mingle	ETH529	MRTSUE06170	1 year	2023-11-27	WZ-AC2
Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06171	1 year	2023-10-13	WZ-AC2
Preamplifier	Schwarzbeck	BBV 9718	MRTSUE06176	1 year	2023-05-08	WZ-AC2
Anechoic Chamber	RIKEN	WZ-AC2	MRTSUE06213	1 year	2023-04-21	WZ-AC2
Thermohygrometer	testo	608-H1	MRTSUE11038	1 year	2023-11-01	WZ-AC2
Two-Line V-Network	R&S	ENV216	MRTSUE06002	1 year	2023-06-04	WZ-SR2
Shielding Room	MIX-BEP	WZ-SR2	MRTSUE06215	5 years	2026-12-20	WZ-SR2
Thermohygrometer	testo	608-H1	MRTSUE06404	1 year	2023-06-06	WZ-SR2
EMI Test Receiver	R&S	ESR3	MRTSUE06909	1 year	2023-10-27	WZ-SR2
Signal Analyzer	Keysight	N9010B	MRTSUE06457	1 year	2023-06-04	WZ-SR5
Thermohygrometer	testo	608-H1	MRTSUE06402	1 year	2023-06-06	WZ-SR5
Shielding Room	HUAMING	WZ-SR5	MRTSUE06442	N/A	N/A	WZ-SR5
USB Power Sensor	Keysight	U2021XA	MRTSUE06446	1 year	2023-06-04	WZ-SR5
Attenuator	MVE	MVE2213	MRTSUE11093	1 year	2023-06-09	WZ-SR5

Software	Version	Function
EMI Software	V3.0.0	EMI Test Software
BenchVue Power Meter	2018.1	Power
Controller_MF 7802	1.02	RE Antenna & Turntable

5. Decision Rules and Measurement Uncertainty

5.1. Decision Rules

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4: 2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

5.2. Measurement Uncertainty

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.

AC Conducted Emission Measurement
The maximum measurement uncertainty is evaluated as: 9kHz~150kHz: 3.58dB 150kHz~30MHz: 3.20dB
Radiated Disturbance
The maximum measurement uncertainty is evaluated as: Coaxial: 9kHz~30MHz: 2.59dB Coplanar: 9kHz~30MHz: 2.60dB Horizontal: 30MHz~200MHz: 3.85dB 200MHz~1GHz: 4.36dB 1GHz~10GHz: 4.98dB Vertical: 30MHz~200MHz: 4.06dB 200MHz~1GHz: 5.28dB 1GHz~10GHz: 4.91dB
Spurious Emissions, Conducted
Measuring Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$): 2.30dB
Output Power
Measuring Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$): 2.30dB
Occupied Bandwidth
Measuring Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$): 3.20%

6. Test Result

6.1. Summary

FCC Section(s)	Test Description	Test Condition	Verdict
15.247(a)(1)	20dB Bandwidth	Conducted	Pass
15.247(b)(1)	Peak Transmitter Output Power		Pass
15.247(a)(1)	Channel Separation		Pass
15.247(a)(1)(iii)	Number of Channels		Pass
15.247(a)(1)(iii)	Time of Occupancy		Pass
15.247(d)	Band Edge / Out- of-Band Emissions		Pass
15.205, 15.209	General Field Strength (Restricted Bands and Radiated Emission)	Radiated	Pass
15.207	AC Conducted Emissions 150kHz - 30MHz	Line Conducted	Pass

Notes:

- The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
- For radiated emission test, every axis (X, Y, Z) was also verified. The test results shown in the following sections represent the worst-case emissions.

6.2. Occupied Bandwidth Measurement

6.2.1. Test Limit

The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

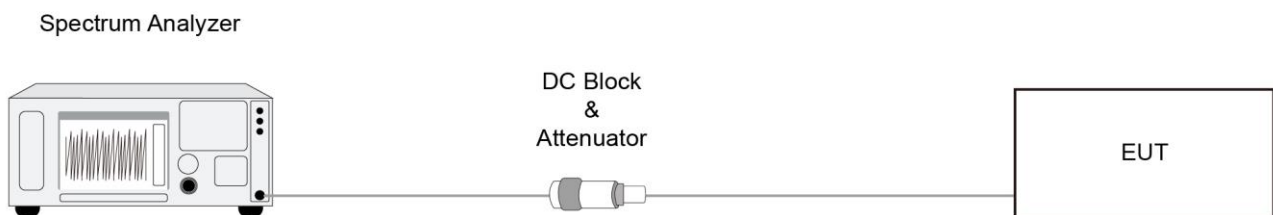
6.2.2. Test Procedure

ANSI C63.10-2013 - Section 6.9.2 (20dB Bandwidth)

6.2.3. Test Setting

1. Set RBW = 1% to 5% of the 20dB bandwidth
2. VBW = approximately three times RBW
3. Span = approximately 2 to 5 times the 20dB bandwidth, centered on a hopping channel
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. Allow the trace to stabilize
8. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission.

6.2.4. Test Setup



6.2.5. Test Result

Refer to Appendix A.2.

6.3. Output Power Measurement

6.3.1. Test Limit

For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels

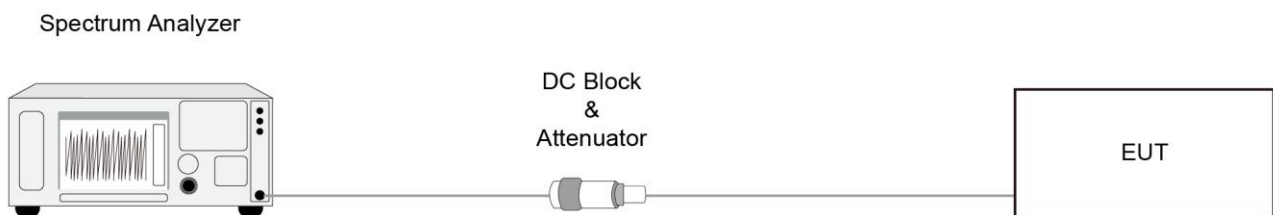
6.3.2. Test Procedure

ANSI C63.10-2013 - Section 7.8.5

6.3.3. Test Setting

1. Set RBW \geq the 20 dB bandwidth of the emission being measured.
2. VBW \geq RBW
3. Span = approximately five times the 20dB bandwidth, centered on a hopping channel
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. Allow the trace to stabilize, Use the marker-to-peak function to set the marker to the peak of the emission.
The indicated level is the peak output power (don't forget added the external attenuation and cable loss)

6.3.4. Test Setup



6.3.5. Test Result

Refer to Appendix A.3.

6.4. Carrier Frequency Separation Measurement

6.4.1. Test Limit

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.

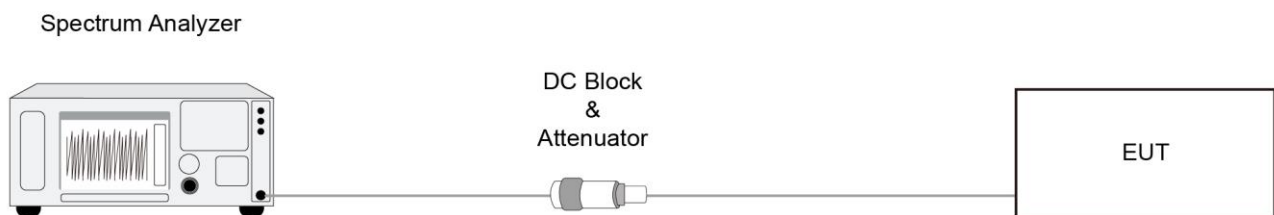
6.4.2. Test Procedure

ANSI C63.10-2013 - Section 7.8.2.

6.4.3. Test Setting

1. Span = wide enough to capture the peaks of two adjacent channels.
2. Start with the RBW set to approximately 30% of the channel spacing; adjust as necessary to best identify the center of each individual channel.
3. $VBW \geq RBW$
4. Sweep time = Auto couple
5. Detector = Peak
6. Trace mode = Max hold
7. Allowed the trace to stabilize
8. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

6.4.4. Test Setup



6.4.5. Test Result

Refer to Appendix A.4.

6.5. Number of Hopping Channels Measurement

6.5.1. Test Limit

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; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies.

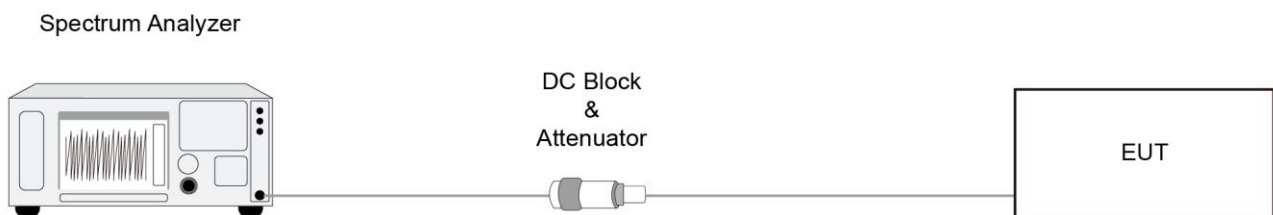
6.5.2. Test Procedure

ANSI C63.10-2013 - Section 7.8.3.

6.5.3. Test Setting

1. Span = the frequency band of operation. Depending on the number of channels the device supports, it may be necessary to divide the frequency range of operation across multiple spans, to allow the individual channels to be clearly seen.
2. To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.
3. VBW \geq RBW
4. Sweep time = Auto couple
5. Detector = Peak
6. Trace mode = Max hold
7. Allow the trace to stabilize

6.5.4. Test Setup



6.5.5. Test Result

Refer to Appendix A.5.

6.6. Time of Occupancy Measurement

6.6.1. Test Limit

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 average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period.

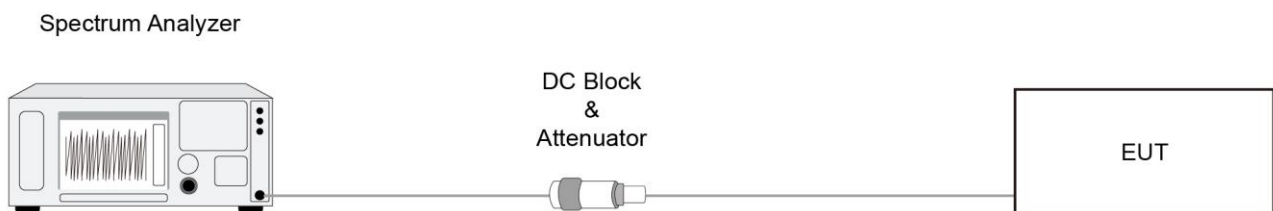
6.6.2. Test Procedure

ANSI C63.10-2013 - Section 7.8.4.

6.6.3. Test Setting

1. Span = zero span, centered on a hopping channel.
2. RBW shall be \leq channel spacing and where possible RBW should be set $\gg 1 / T$, where T is the expected dwell time per channel.
3. VBW \geq RBW
4. Sweep time = as necessary to capture the entire dwell time per hopping channel
5. Detector = Peak
6. Trace mode = max hold
7. Use the marker-delta function to determine the transmit time per hop. If this value varies with different modes of operation (data rate, modulation format, number of hopping channels, etc.), then repeat this test for each variation in transmit time. An oscilloscope may be used instead of a spectrum analyzer. The EUT shall show compliance with the appropriate regulatory limit for the number of hopping channels. A plot of the data shall be included in the test report.

6.6.4. Test Setup



6.6.5. Test Result

Refer to Appendix A.6.

6.7. Band-edge Compliance Measurement

6.7.1. Test Limit

The maximum permissible emission level is 20dBc. Any emissions were lying outside of the emission bandwidth and in authorized band edges to a field strength limit specified in Section 15.209 of the Title 47 CFR.

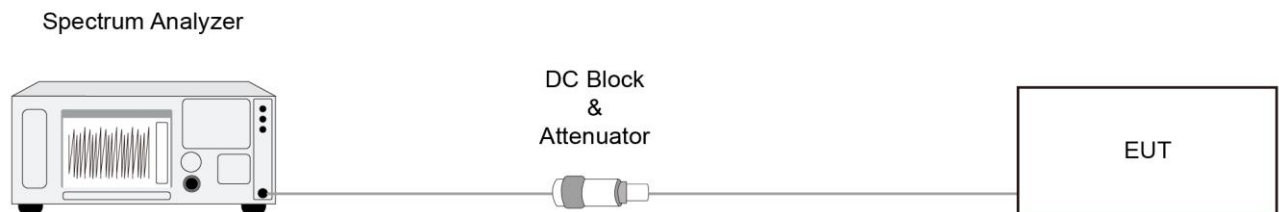
6.7.2. Test Procedure

ANSI C63.10-2013 - Section 6.10.4.

6.7.3. Test Setting

1. Span = wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products which fall outside of the authorized band of operation.
2. RBW = 100kHz
3. VBW = 300kHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize
8. Allow the trace to stabilize. Set the marker on the emission at the band edge, or on the highest modulation product outside of the band, if this level is greater than that at the band edge. Enable the marker-delta function, then use the marker-to-peak function to move the marker to the peak of the in-band emission.

6.7.4. Test Setup



6.7.5. Test Result

Refer to Appendix A.7.

6.8. Conducted Spurious Emissions Measurement

6.8.1. Test Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

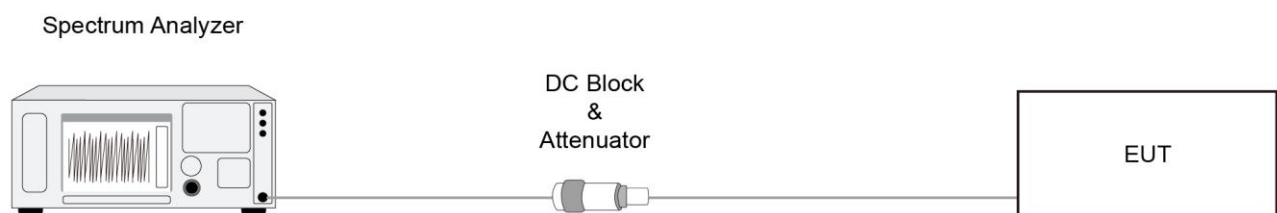
6.8.2. Test Procedure

ANSI C63.10-2013 - Section 7.8.8.

6.8.3. Test Setting

1. Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.
2. RBW = 100KHz
3. VBW = 300KHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize
8. Set the marker on the peak of any spurious emission recorded. The level displayed must comply with the limit specified in this section.

6.8.4. Test Setup



6.8.5. Test Result

Refer to Appendix A.8.

6.9. Radiated Spurious Emission Measurement

6.9.1. Test Limit

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table per Section 15.209.

FCC Part 15 Subpart C Paragraph 15.209		
Frequency [MHz]	Field Strength [uV/m]	Measured Distance [Meters]
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

6.9.2. Test Procedure

ANSI C63.10 Section 6.3 (General Requirements)

ANSI C63.10 Section 6.4 (Standard test method below 30MHz)

ANSI C63.10 Section 6.5 (Standard test method above 30MHz to 1GHz)

ANSI C63.10 Section 6.6 (Standard test method above 1GHz)

6.9.3. Test Setting

Table 1 - RBW as a function of frequency

Frequency	RBW
9 ~ 150 kHz	200 ~ 300 Hz
0.15 ~ 30 MHz	9 ~ 10 kHz
30 ~ 1000 MHz	100 ~ 120 kHz
> 1000 MHz	1 MHz

Quasi-Peak Measurements below 1GHz

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. Span was set greater than 1MHz
3. RBW = as specified in Table 1
4. Detector = CISPR quasi-peak
5. Sweep time = auto couple
6. Trace was allowed to stabilize

Peak Measurements above 1GHz

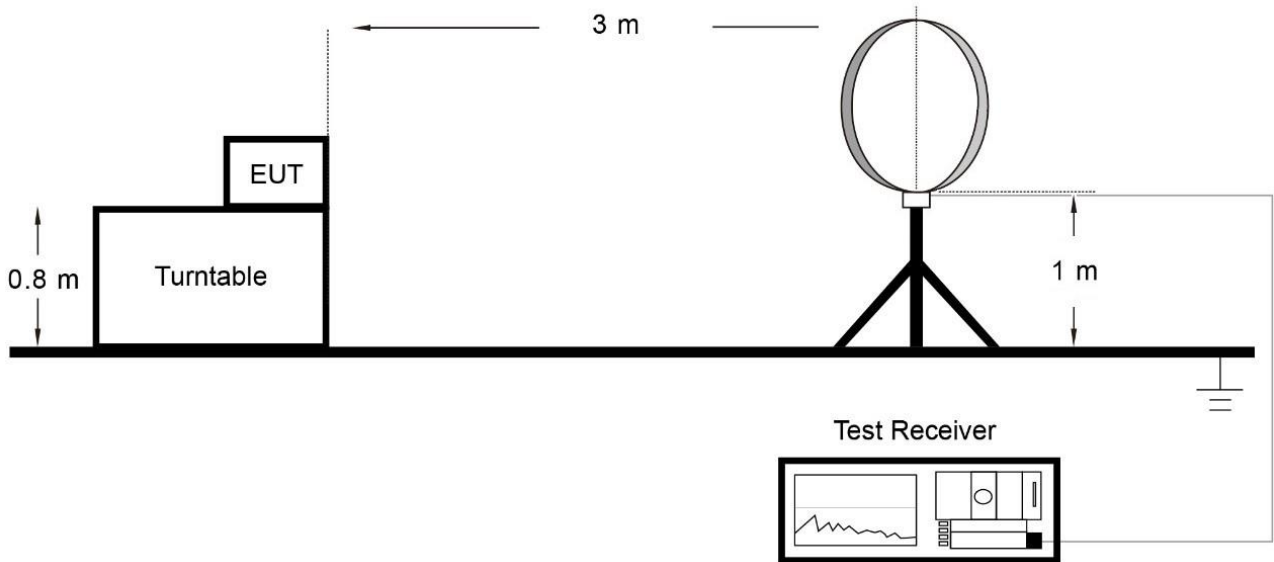
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

Average Measurements above 1GHz (Method VB)

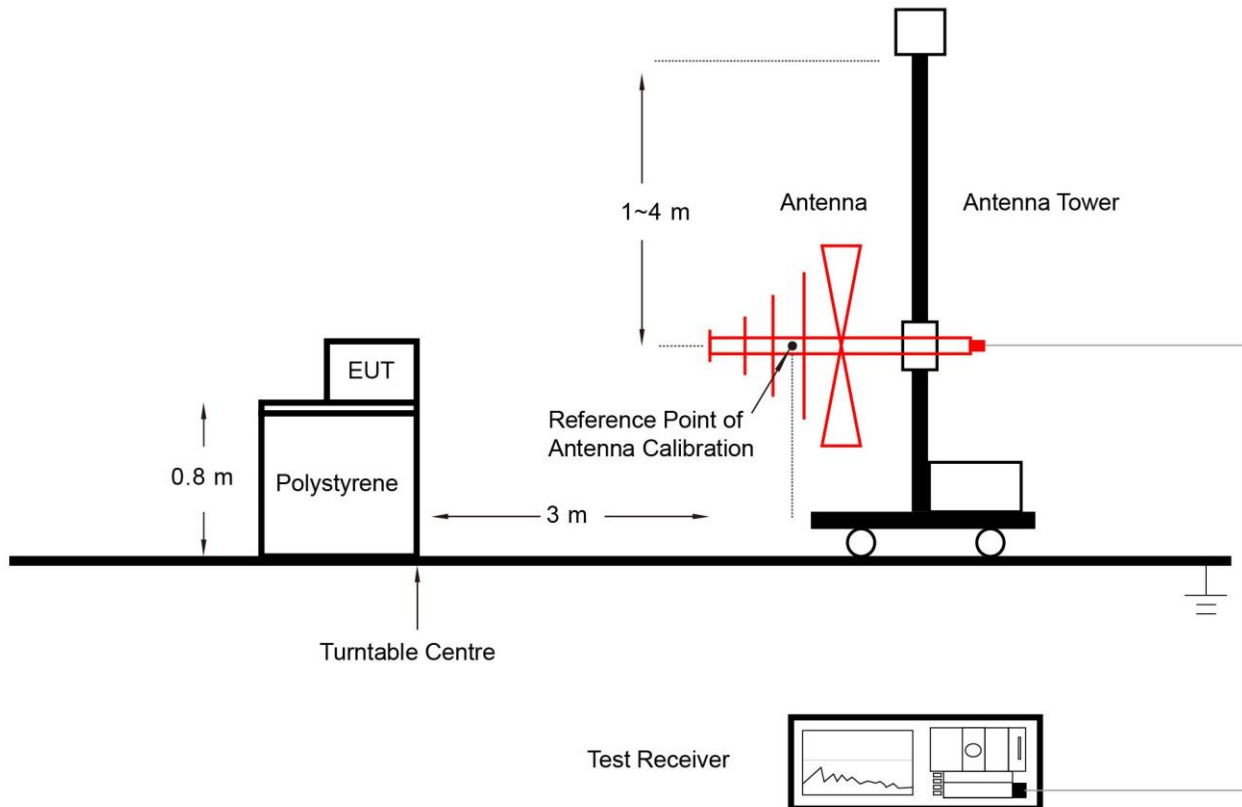
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW; If the EUT is configured to transmit with duty cycle $\geq 98\%$, set VBW = 10 Hz.
If the EUT duty cycle is $< 98\%$, set VBW $\geq 1/T$. T is the minimum transmission duration.
4. Detector = Peak
5. Sweep time = auto
6. Trace mode = max hold
7. Trace was allowed to stabilize

6.9.4. Test Setup

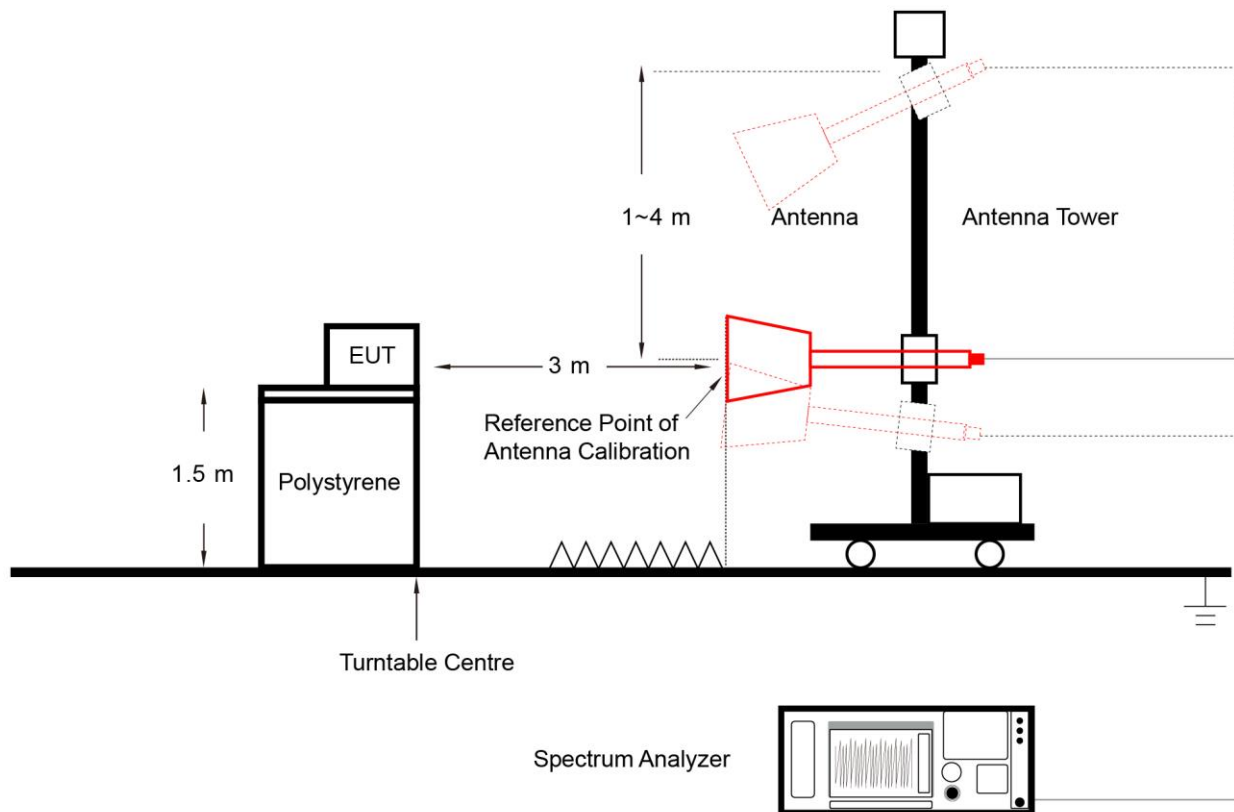
Below 30MHz Test Setup:



Below 1GHz Test Setup:



Above 1GHz Test Setup:



6.9.5. Test Result

Refer to Appendix A.9.

6.10. AC Conducted Emissions Measurement

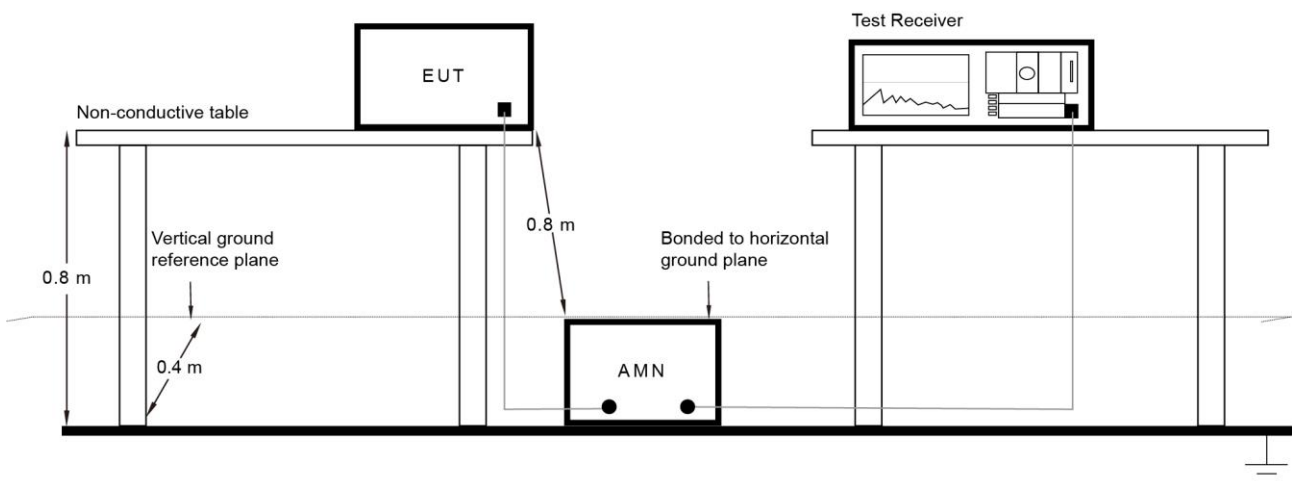
6.10.1. Test Limit

FCC Part 15 Subpart C Paragraph 15.207 Limits		
Frequency (MHz)	QP (dB μ V)	Average (dB μ V)
0.15 - 0.50	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Note 1: The lower limit shall apply at the transition frequencies.

Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

6.10.2. Test Setup



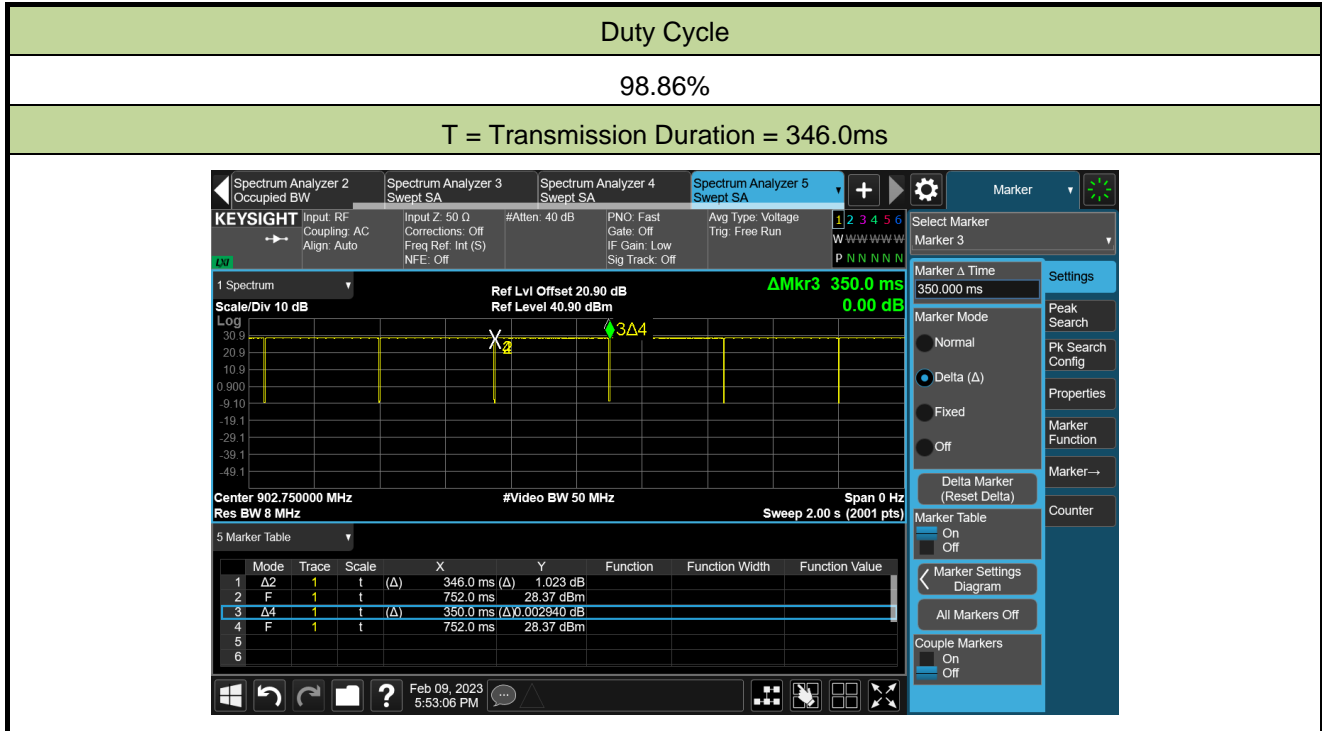
6.10.3. Test Result

Refer to Appendix A.10.

Appendix A - Test Result

A.1 Duty Cycle Test Result

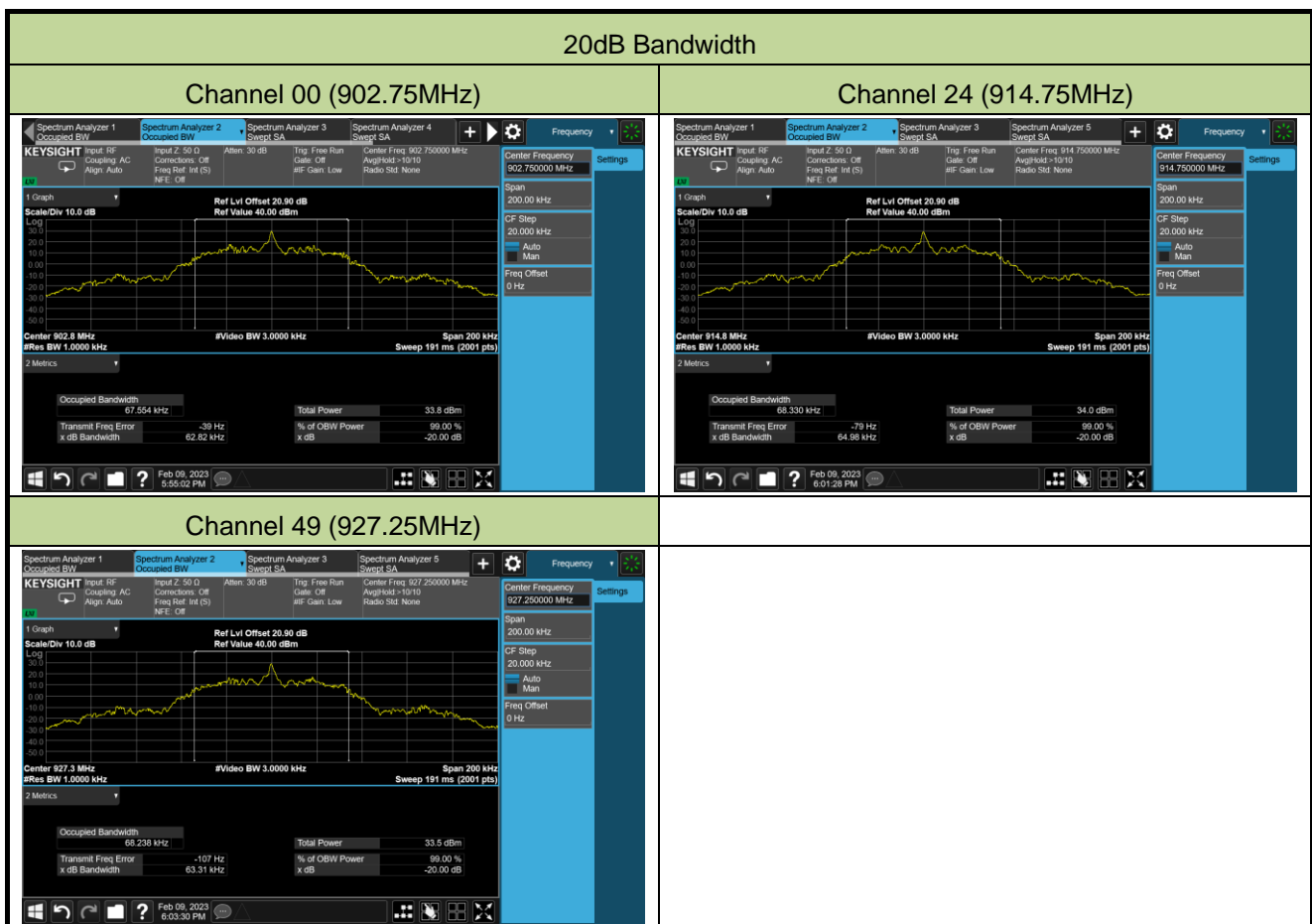
Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2023-02-09		



A.2 20dB Bandwidth Test Result

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2023-02-09		

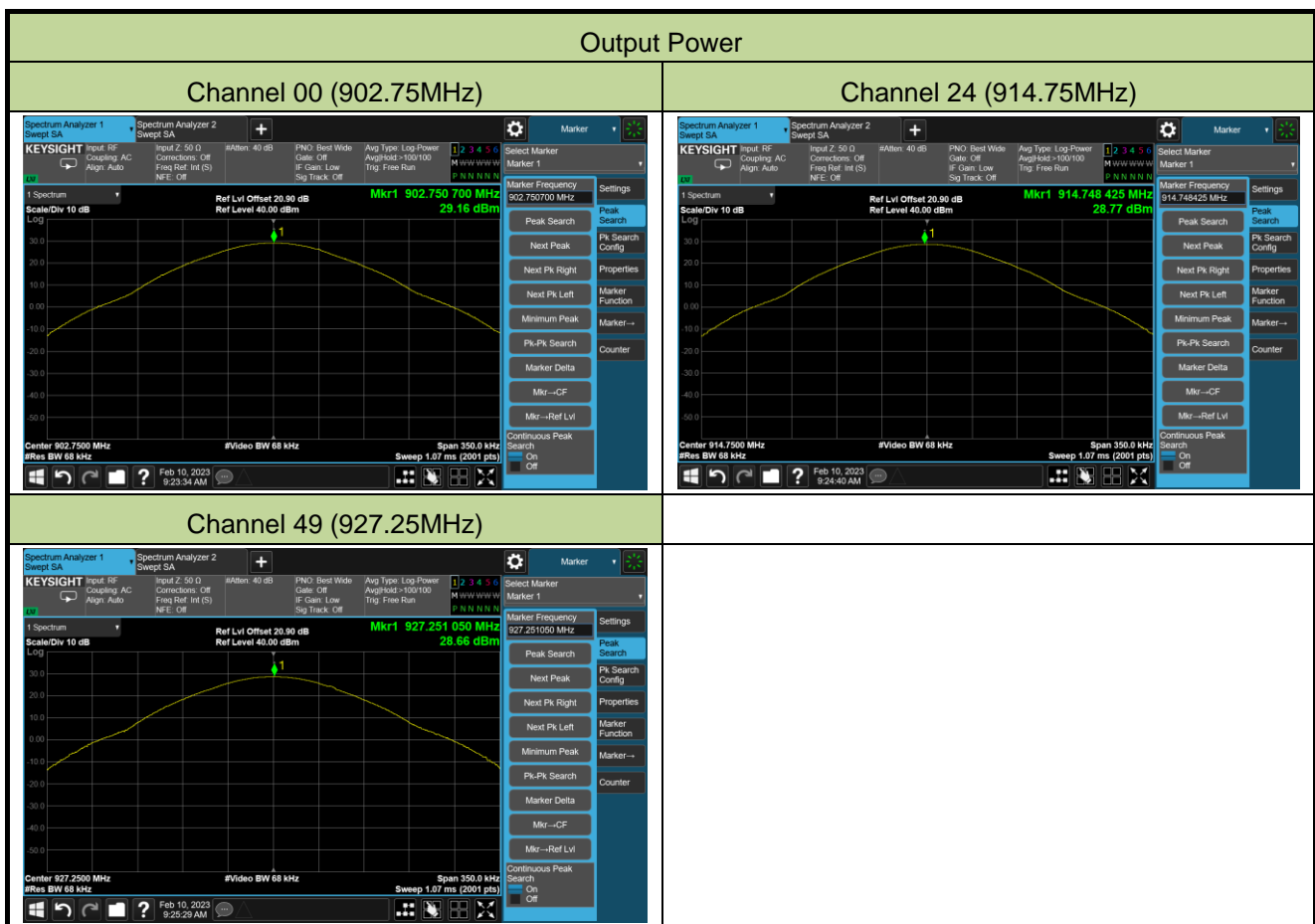
Channel No.	Frequency (MHz)	20dB Bandwidth (kHz)	Limit (kHz)
00	902.75	62.82	≤ 500
24	914.75	64.98	≤ 500
49	927.25	63.31	≤ 500



A.3 Output Power Test Result

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2023-02-10		

Channel No.	Frequency (MHz)	Output Power (dBm)	Limit (dBm)
00	902.75	29.16	≤ 30.00
24	914.75	28.77	≤ 30.00
49	927.25	28.66	≤ 30.00



Test Result of Average Output Power (Reporting Only)

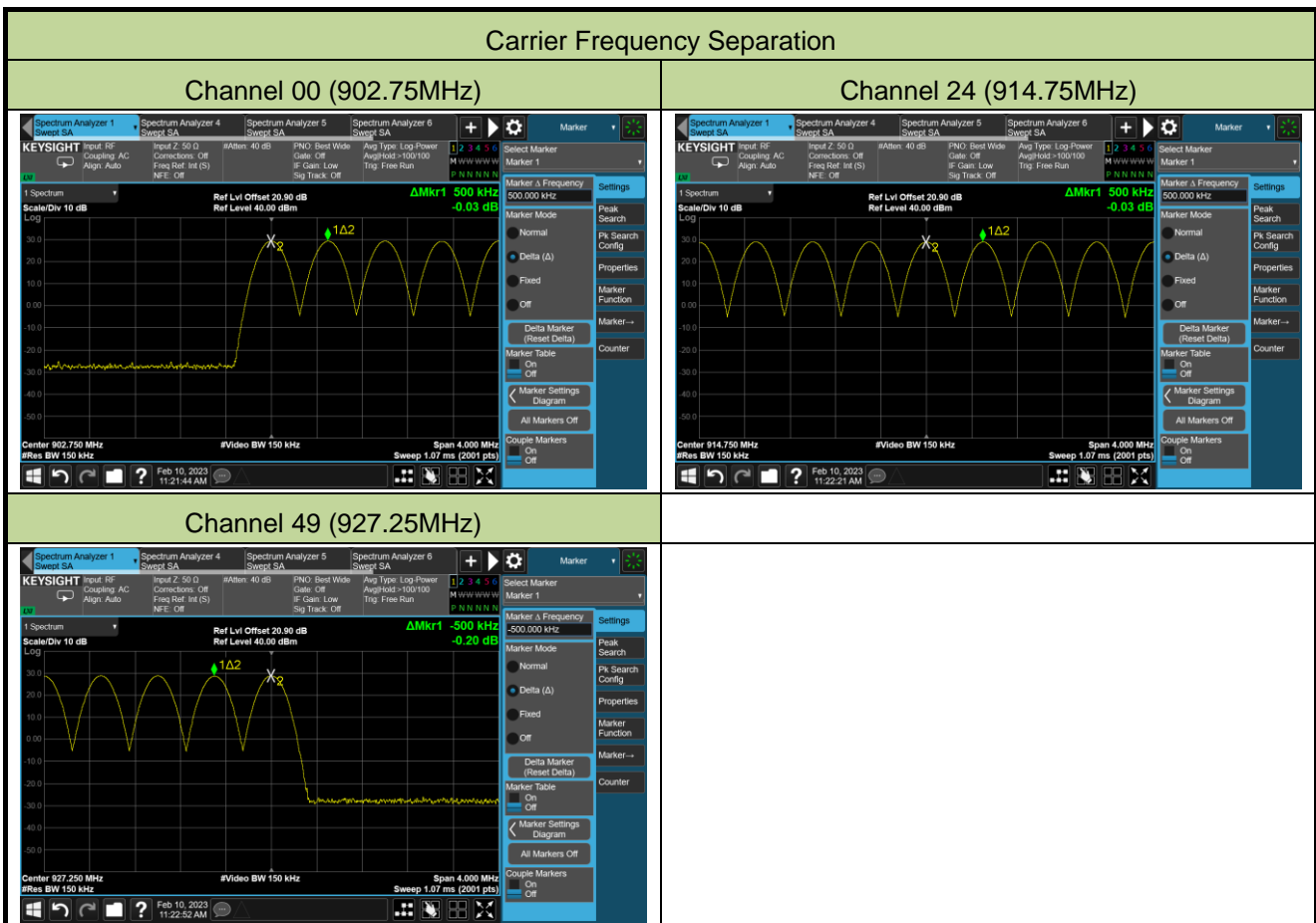
Channel No.	Frequency (MHz)	Output Power (dBm)	Limit (dBm)
00	902.75	28.89	≤ 30.00
24	914.75	28.59	≤ 30.00
49	927.25	28.46	≤ 30.00

A.4 Carrier Frequency Separation Test Result

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2023-02-10		

Channel No.	Frequency (MHz)	Carrier Frequency Separation (kHz)	Limit (kHz)	Result
00	902.75	500	≥ 62.82	Pass
24	914.75	500	≥ 64.98	Pass
49	927.25	500	≥ 63.31	Pass

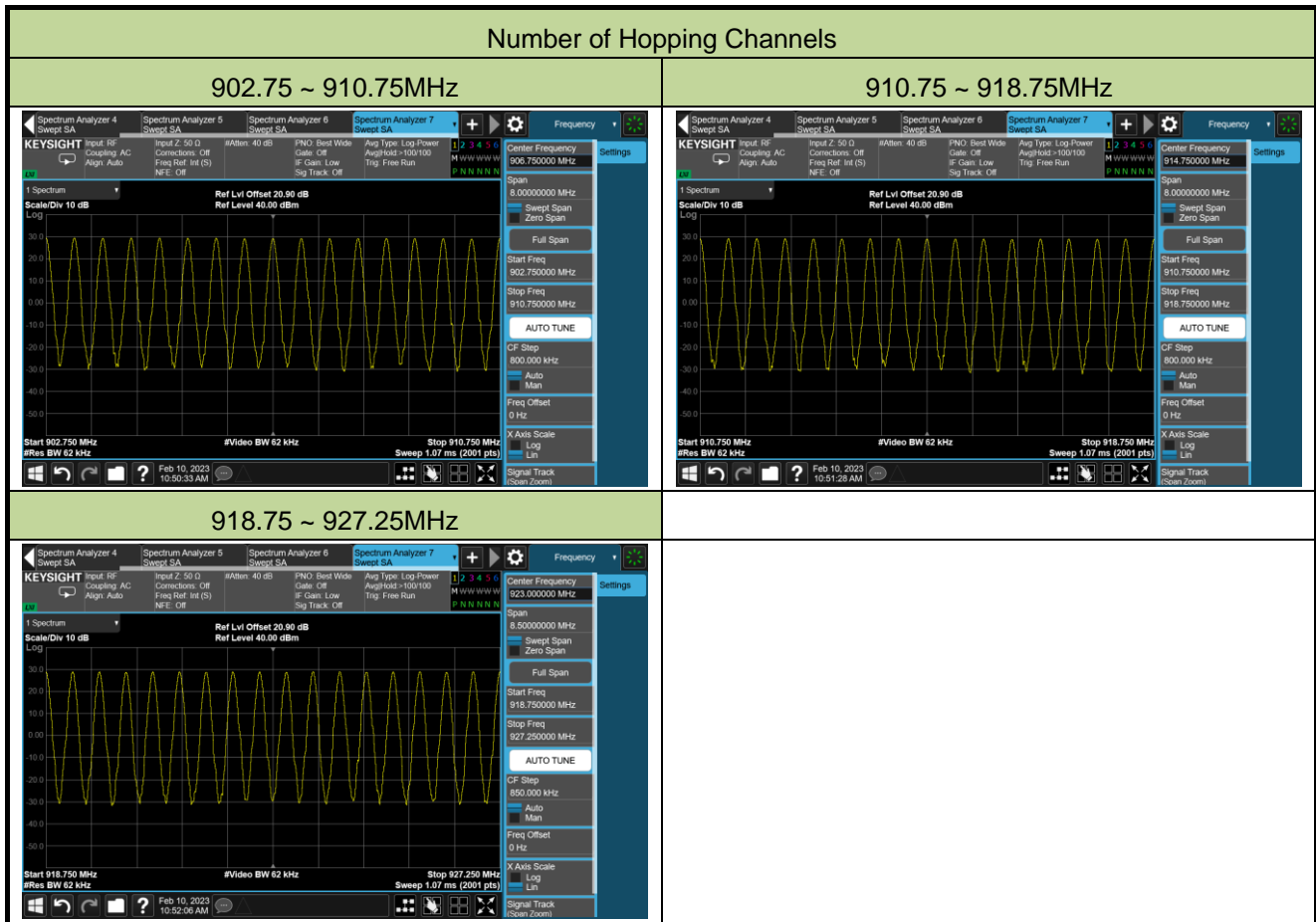
Note: The Limit is the value of the 20dB BW.



A.5 Number of Hopping Channels Test Result

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2023-02-10		

Channel Numbers	Frequency (MHz)	Limit (Hopping Channels)	Result
50	902.75 ~ 927.25	≥ 50	Pass

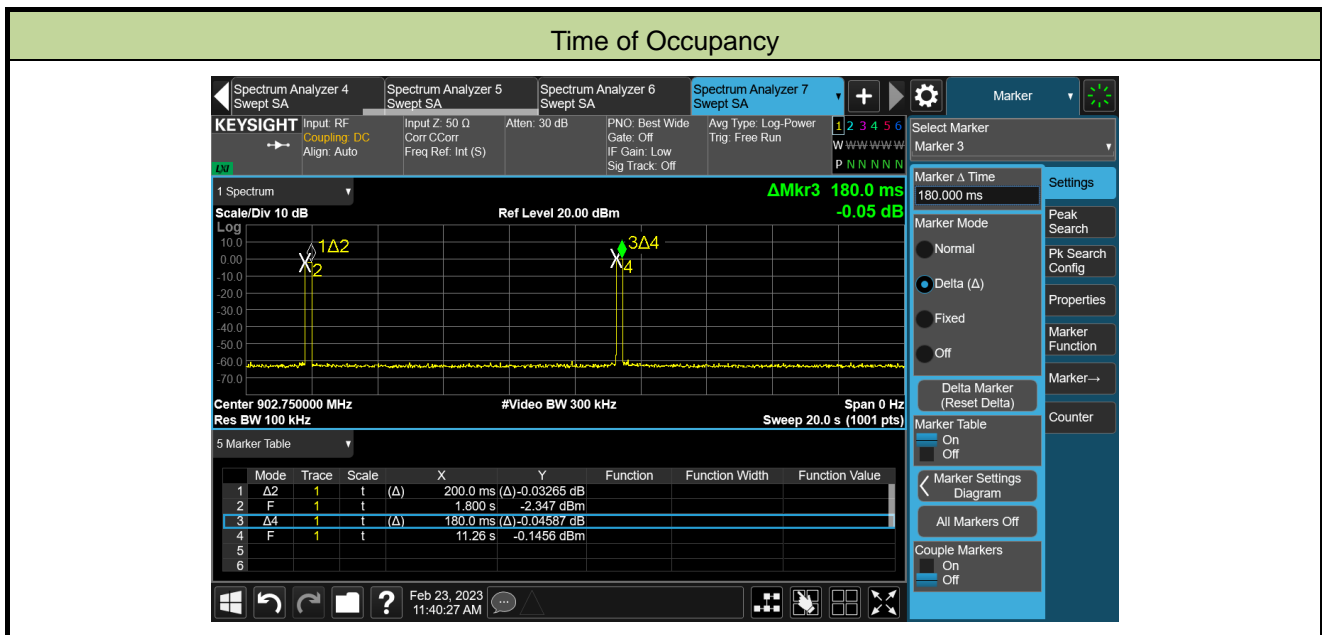


A.6 Time of Occupancy Test Result

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2023-02-23		

Channel No.	Frequency (MHz)	Observation Period (s)	Time of Occupancy (ms)	Limit (ms)	Result
00~49	902.75~927.25	20	380.0	≤ 400	Pass

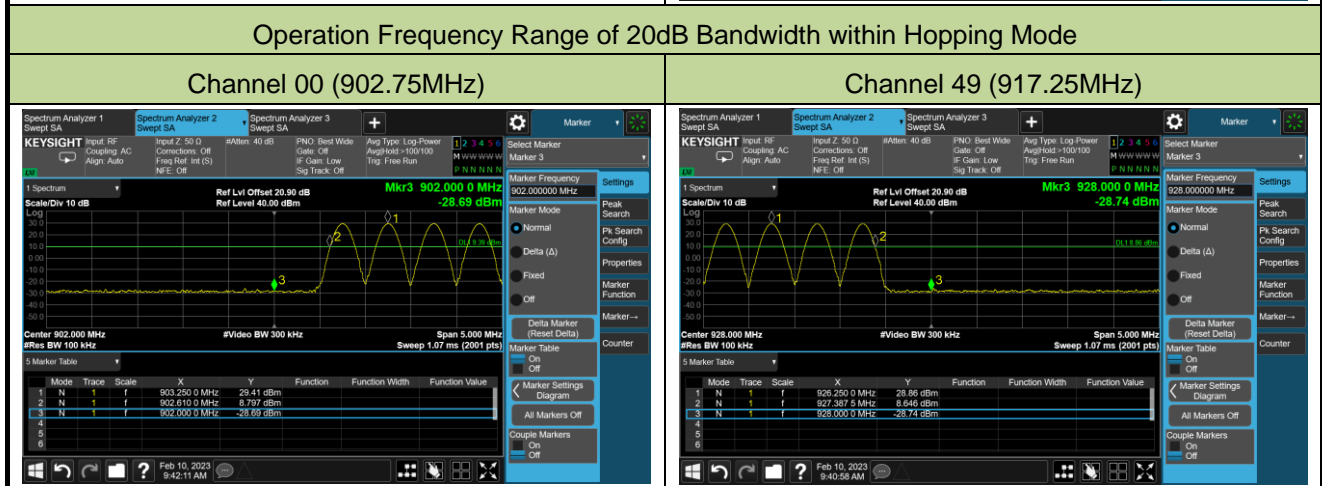
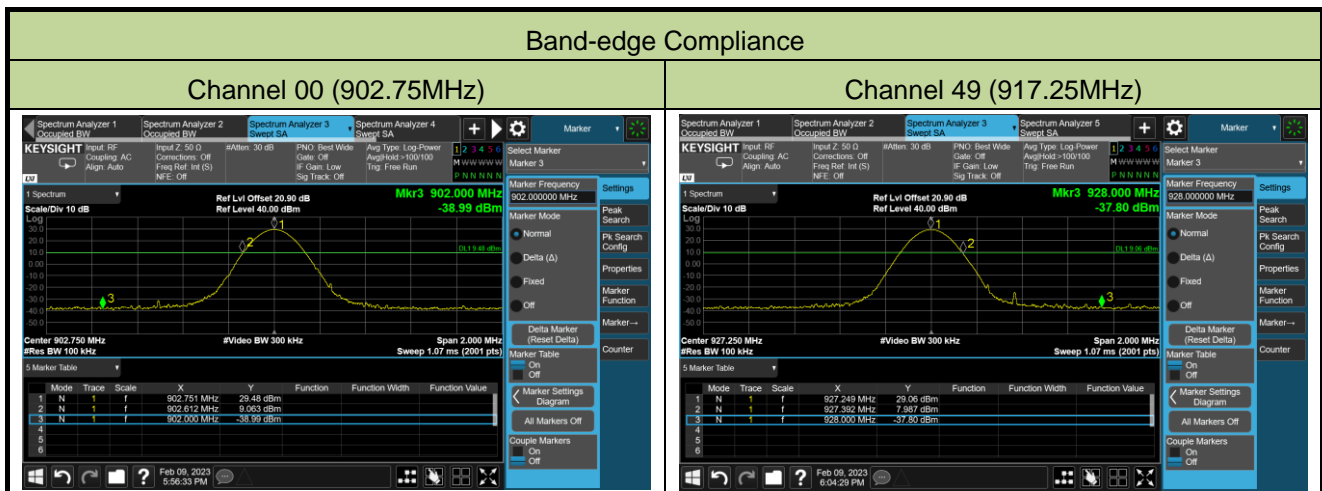
Note: 200 + 180 = 380.



A.7 Band-edge Compliance Test Result

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2023-02-09 ~ 2023-02-10		

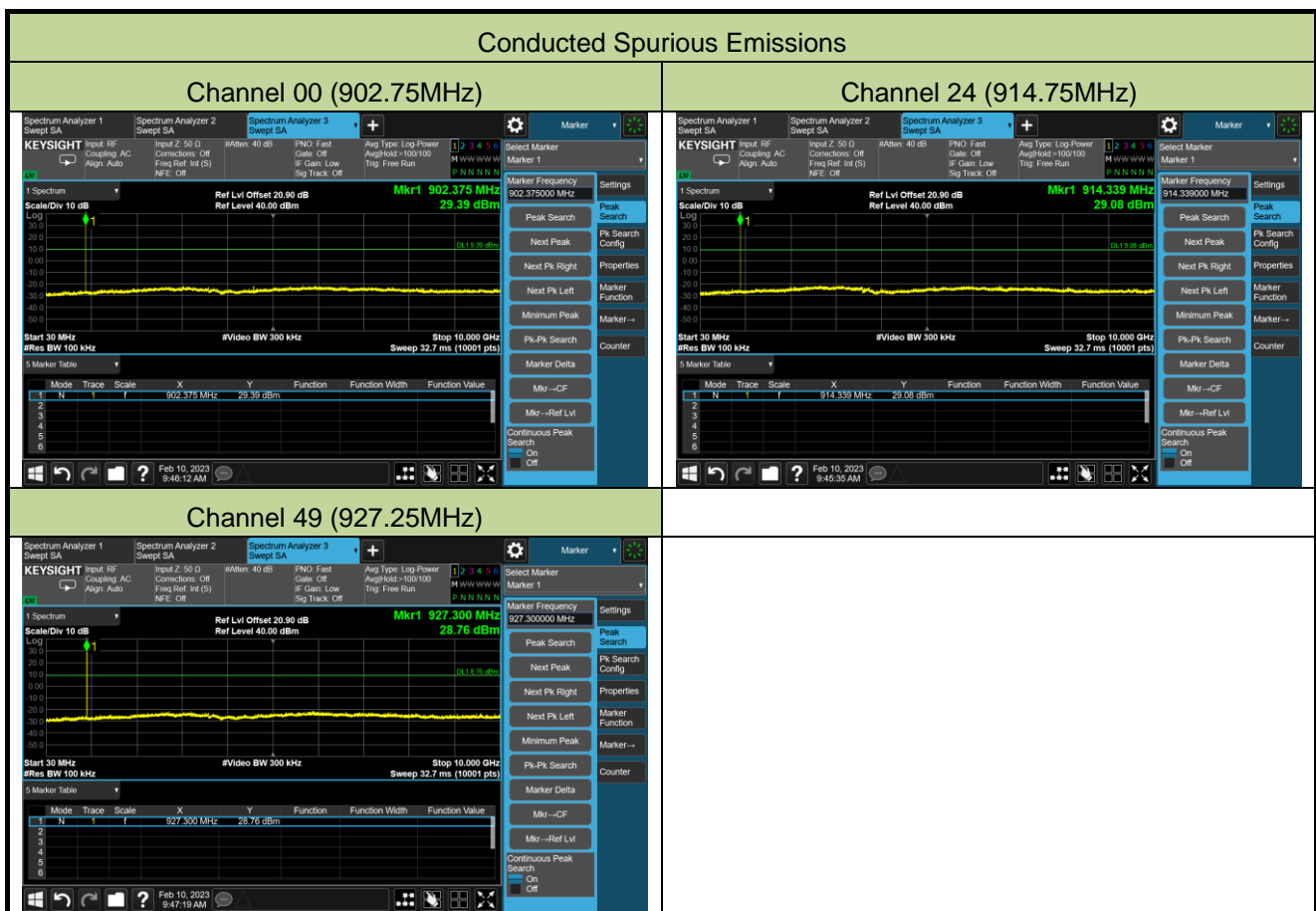
Channel No.	Frequency (MHz)	Limit	Result
00	902.75	20dBc fall within 902~928MHz	Pass
49	927.25	20dBc fall within 902~928MHz	Pass



A.8 Conducted Spurious Emissions Test Result

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2023-02-10		

Channel No.	Frequency (MHz)	Limit (MHz)	Result
00	902.75	20dBc	Pass
24	914.75	20dBc	Pass
49	927.25	20dBc	Pass



A.9 Radiated Spurious Emission Test Result

Test Site	WZ-AC2	Test Engineer	Dick Shen
Test Date	2023-02-08		
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-10GHz, there is not show in the report.		

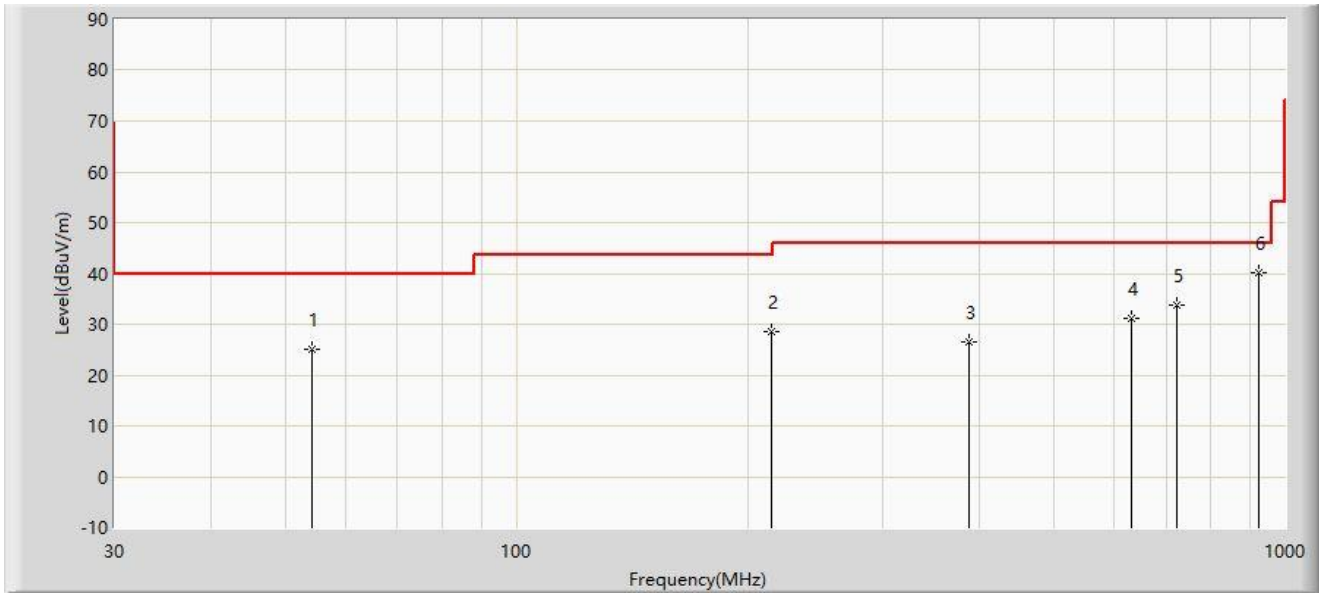
Test Channel	Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
00	3979.0	37.9	0.3	38.2	74.0	-35.8	Peak	Horizontal
	4960.0	39.7	3.5	43.2	74.0	-30.8	Peak	Horizontal
	9068.5	33.5	13.7	47.2	74.0	-26.8	Peak	Horizontal
	3718.0	38.9	-0.2	38.7	74.0	-35.3	Peak	Vertical
	7439.5	34.5	11.7	46.2	74.0	-27.8	Peak	Vertical
	9028.0	36.8	13.5	50.3	74.0	-23.7	Peak	Vertical
24	3889.0	38.3	0.3	38.6	74.0	-35.4	Peak	Horizontal
	7277.5	39.7	11.5	51.2	74.0	-22.8	Peak	Horizontal
	9145.0	33.6	14.1	47.7	74.0	-26.3	Peak	Horizontal
	3659.5	40.6	-0.3	40.3	74.0	-33.7	Peak	Vertical
	7439.5	41.2	11.7	52.9	74.0	-21.1	Peak	Vertical
	8150.5	34.6	12.1	46.7	74.0	-27.3	Peak	Vertical
49	3880.0	38.6	0.2	38.8	74.0	-35.2	Peak	Horizontal
	7439.5	34.1	11.7	45.8	74.0	-28.2	Peak	Horizontal
	9100.0	32.7	13.9	46.6	74.0	-27.4	Peak	Horizontal
	3709.0	40.5	-0.4	40.1	74.0	-33.9	Peak	Vertical
	4636.0	38.8	3.2	42.0	74.0	-32.0	Peak	Vertical
	8191.0	34.8	11.7	46.5	74.0	-27.5	Peak	Vertical

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)

Factor ((dB/m) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

The Result of Radiated Emission below 1GHz:

Site: WZ-AC2	Test Date: 2023-02-23
Limit: FCC_Part15.209_RSE(3m)	Engineer: Dick Shen
Probe: VULB9162_30-7000MHz	Polarity: Horizontal
EUT: Handheld UHF RFID Reader	Power: By Battery
Test Mode: Transmit at 902.75MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor	Type
1			54.250	25.016	4.690	-14.984	40.000	20.326	PK
2			214.300	28.573	10.405	-14.927	43.500	18.168	PK
3			388.415	26.500	3.543	-19.500	46.000	22.957	PK
4			629.945	31.071	3.840	-14.929	46.000	27.231	PK
5			722.580	33.642	4.944	-12.358	46.000	28.698	PK
6		*	924.340	40.168	9.096	-5.832	46.000	31.072	PK

Note 1: " * ", means this data is the worst emission level.

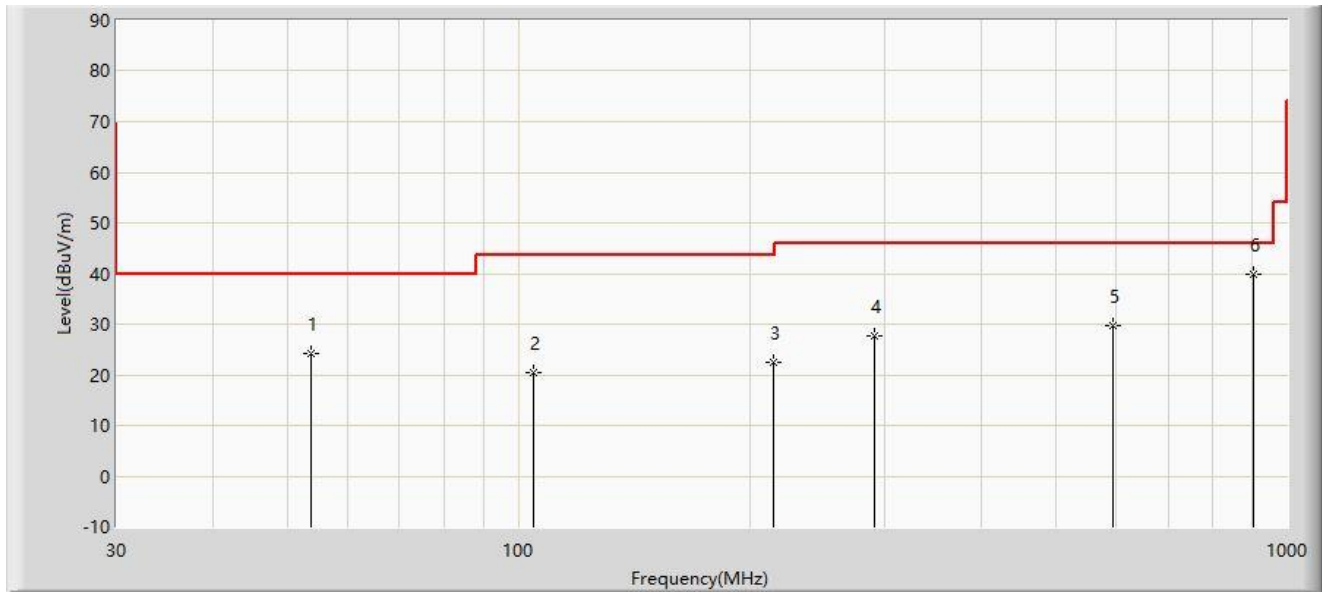
Note 2: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB/m).

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).

Note 4: Quasi-Peak measurement was not performed when peak measure level was lower than the quasi-peak limit.

Note 5: The amplitude of radiated emissions (frequency range from 9kHz to 30MHz) is that proximity to ambient noise, which also are attenuated more than 20 dB below the permissible value. Therefore, the data is not presented in the report.

Site: WZ-AC2	Test Date: 2023-02-23
Limit: FCC_Part15.209_RSE(3m)	Engineer: Dick Shen
Probe: VULB9162_30-7000MHz	Polarity: Vertical
EUT: Handheld UHF RFID Reader	Power: By Battery
Test Mode: Transmit at 902.75MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor	Type
1			53.765	24.159	3.800	-15.841	40.000	20.359	PK
2			104.690	20.320	1.757	-23.180	43.500	18.563	PK
3			214.785	22.467	4.278	-21.033	43.500	18.190	PK
4			290.445	27.641	6.879	-18.359	46.000	20.762	PK
5			593.085	29.640	2.704	-16.360	46.000	26.936	PK
6		*	902.515	39.842	8.623	-6.158	46.000	31.218	PK

Note 1: " * ", means this data is the worst emission level.

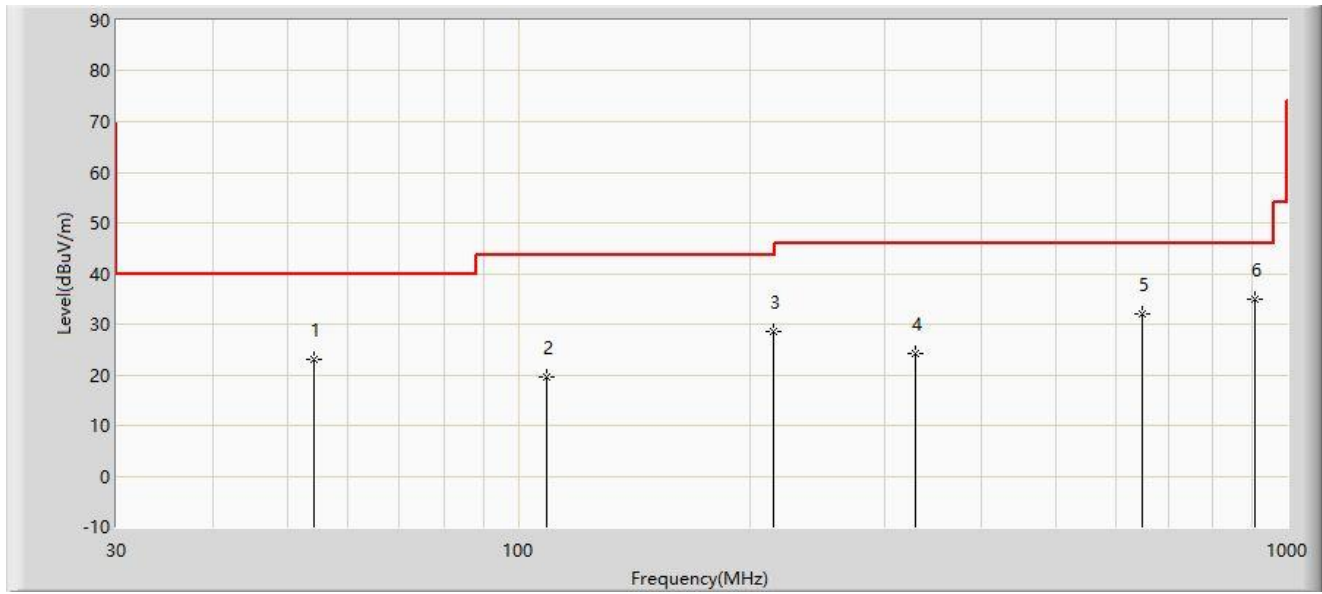
Note 2: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB/m).

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).

Note 4: Quasi-Peak measurement was not performed when peak measure level was lower than the quasi-peak limit.

Note 5: The amplitude of radiated emissions (frequency range from 9kHz to 30MHz) is that proximity to ambient noise, which also are attenuated more than 20 dB below the permissible value. Therefore, the data is not presented in the report.

Site: WZ-AC2	Test Date: 2023-02-23
Limit: FCC_Part15.209_RSE(3m)	Engineer: Dick Shen
Probe: VULB9162_30-7000MHz	Polarity: Horizontal
EUT: Handheld UHF RFID Reader	Power: By Battery
Test Mode: Transmit at 914.75MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor	Type
1			54.250	23.029	2.703	-16.971	40.000	20.326	PK
2			109.055	19.662	1.446	-23.838	43.500	18.216	PK
3			214.785	28.623	10.434	-14.877	43.500	18.190	PK
4			327.790	24.148	2.568	-21.852	46.000	21.580	PK
5			647.890	31.936	4.343	-14.064	46.000	27.593	PK
6		*	909.790	34.961	3.694	-11.039	46.000	31.267	PK

Note 1: " * ", means this data is the worst emission level.

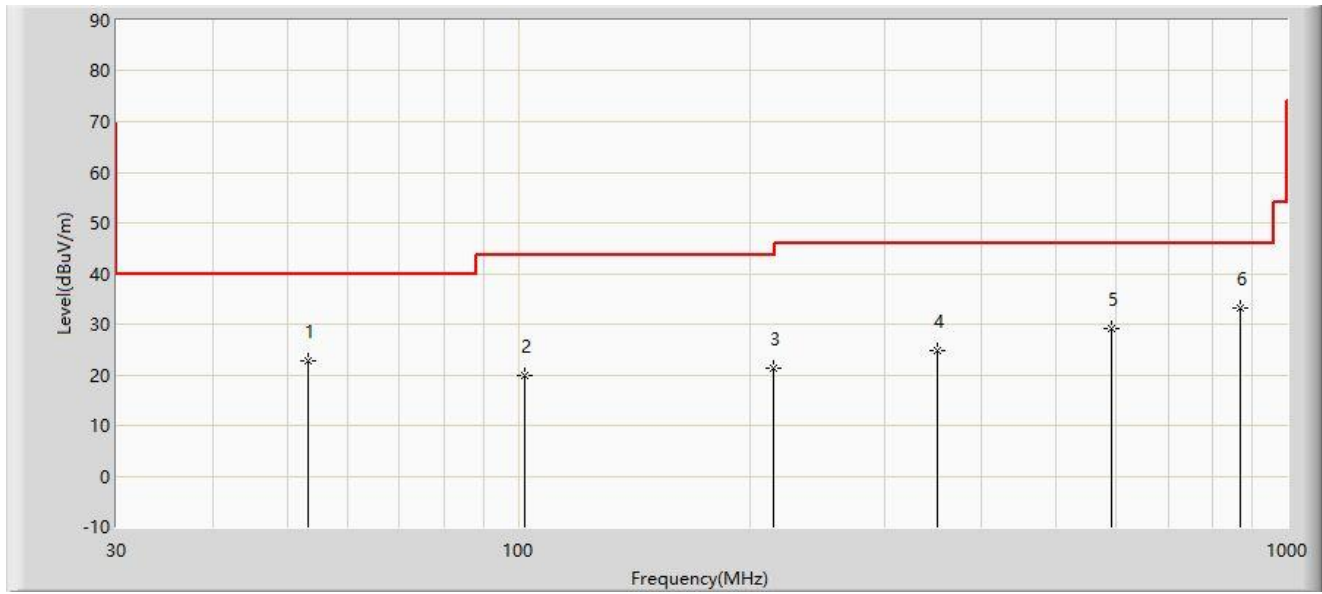
Note 2: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB/m).

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).

Note 4: Quasi-Peak measurement was not performed when peak measure level was lower than the quasi-peak limit.

Note 5: The amplitude of radiated emissions (frequency range from 9kHz to 30MHz) is that proximity to ambient noise, which also are attenuated more than 20 dB below the permissible value. Therefore, the data is not presented in the report.

Site: WZ-AC2	Test Date: 2023-02-23
Limit: FCC_Part15.209_RSE(3m)	Engineer: Dick Shen
Probe: VULB9162_30-7000MHz	Polarity: Vertical
EUT: Handheld UHF RFID Reader	Power: By Battery
Test Mode: Transmit at 914.75MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor	Type
1			53.280	22.807	2.416	-17.193	40.000	20.391	PK
2			101.780	19.969	1.383	-23.531	43.500	18.586	PK
3			214.300	21.362	3.194	-22.138	43.500	18.168	PK
4			350.585	24.705	1.984	-21.295	46.000	22.721	PK
5			591.145	29.028	2.083	-16.972	46.000	26.945	PK
6		*	869.535	33.262	2.486	-12.738	46.000	30.776	PK

Note 1: " * ", means this data is the worst emission level.

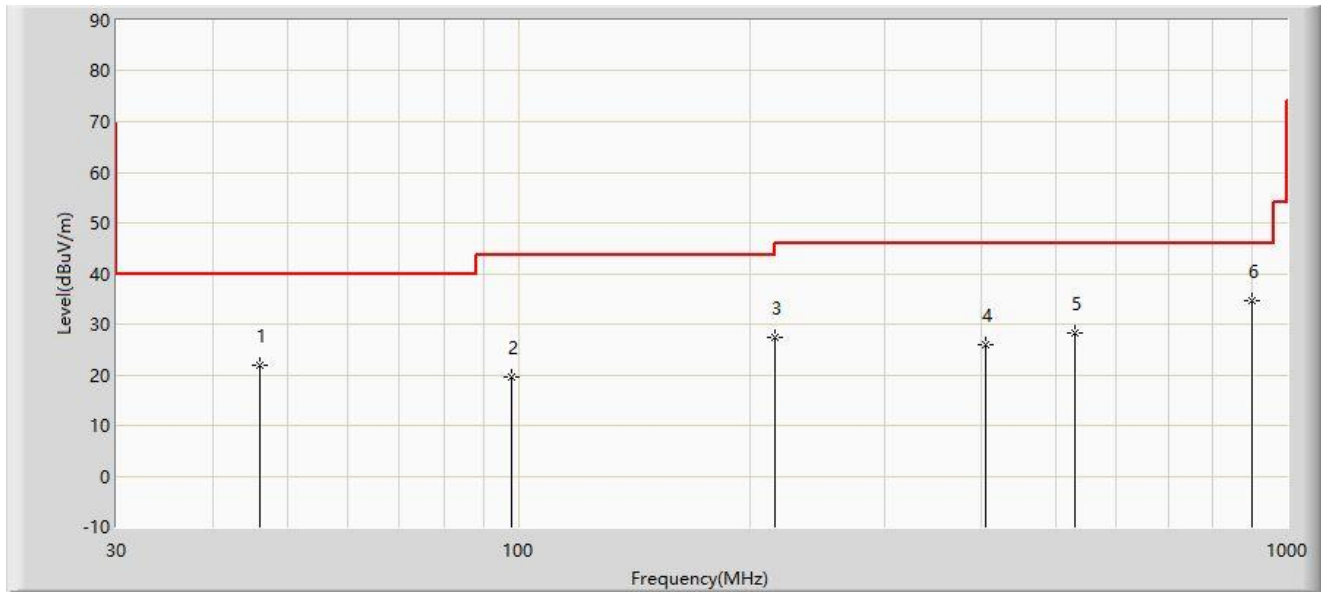
Note 2: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB/m).

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).

Note 4: Quasi-Peak measurement was not performed when peak measure level was lower than the quasi-peak limit.

Note 5: The amplitude of radiated emissions (frequency range from 9kHz to 30MHz) is that proximity to ambient noise, which also are attenuated more than 20 dB below the permissible value. Therefore, the data is not presented in the report.

Site: WZ-AC2	Test Date: 2023-02-23
Limit: FCC_Part15.209_RSE(3m)	Engineer: Dick Shen
Probe: VULB9162_30-7000MHz	Polarity: Horizontal
EUT: Handheld UHF RFID Reader	Power: By Battery
Test Mode: Transmit at 927.25MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor	Type
1			46.005	21.932	1.826	-18.068	40.000	20.106	PK
2			97.900	19.454	1.206	-24.046	43.500	18.248	PK
3			215.755	27.472	9.241	-16.028	43.500	18.231	PK
4			405.390	25.970	2.720	-20.030	46.000	23.250	PK
5			529.550	28.360	3.077	-17.640	46.000	25.283	PK
6		*	900.090	34.591	3.411	-11.409	46.000	31.180	PK

Note 1: " * ", means this data is the worst emission level.

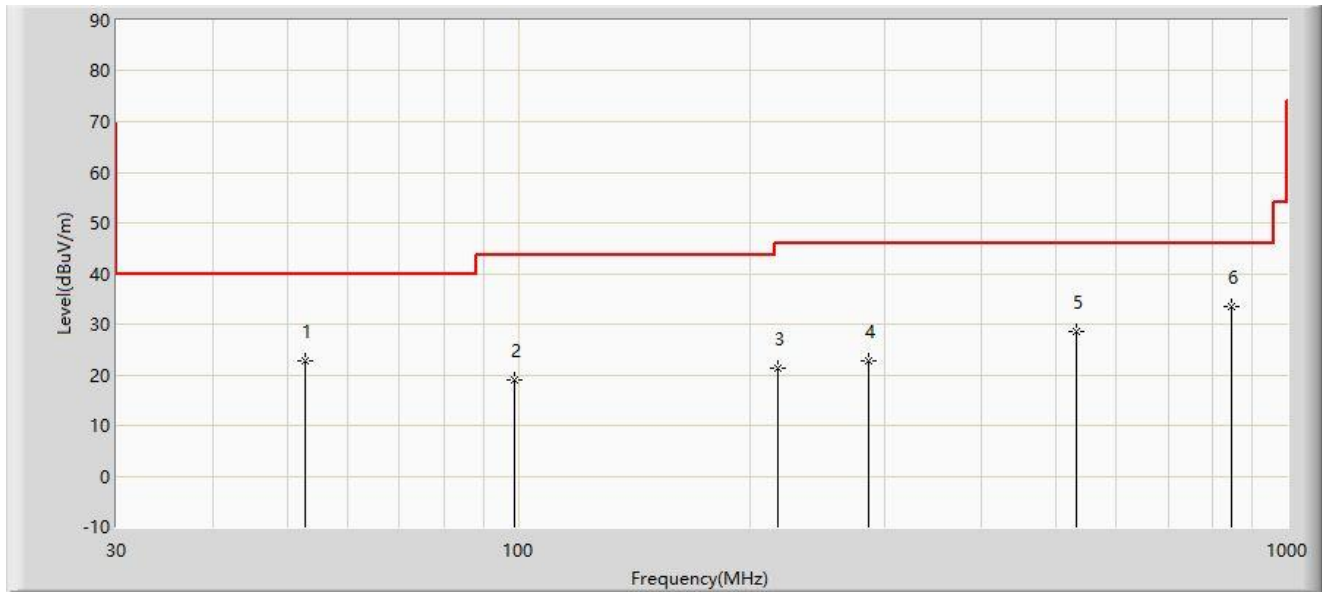
Note 2: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB/m).

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).

Note 4: Quasi-Peak measurement was not performed when peak measure level was lower than the quasi-peak limit.

Note 5: The amplitude of radiated emissions (frequency range from 9kHz to 30MHz) is that proximity to ambient noise, which also are attenuated more than 20 dB below the permissible value. Therefore, the data is not presented in the report.

Site: WZ-AC2	Test Date: 2023-02-23
Limit: FCC_Part15.209_RSE(3m)	Engineer: Dick Shen
Probe: VULB9162_30-7000MHz	Polarity: Vertical
EUT: Handheld UHF RFID Reader	Power: By Battery
Test Mode: Transmit at 927.25MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor	Type
1			52.795	22.812	2.407	-17.188	40.000	20.405	PK
2			98.870	18.913	0.521	-24.587	43.500	18.392	PK
3			217.210	21.386	3.093	-24.614	46.000	18.293	PK
4			285.595	22.726	2.068	-23.274	46.000	20.658	PK
5			531.490	28.443	3.098	-17.557	46.000	25.345	PK
6		*	845.285	33.490	3.104	-12.510	46.000	30.386	PK

Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB/m).

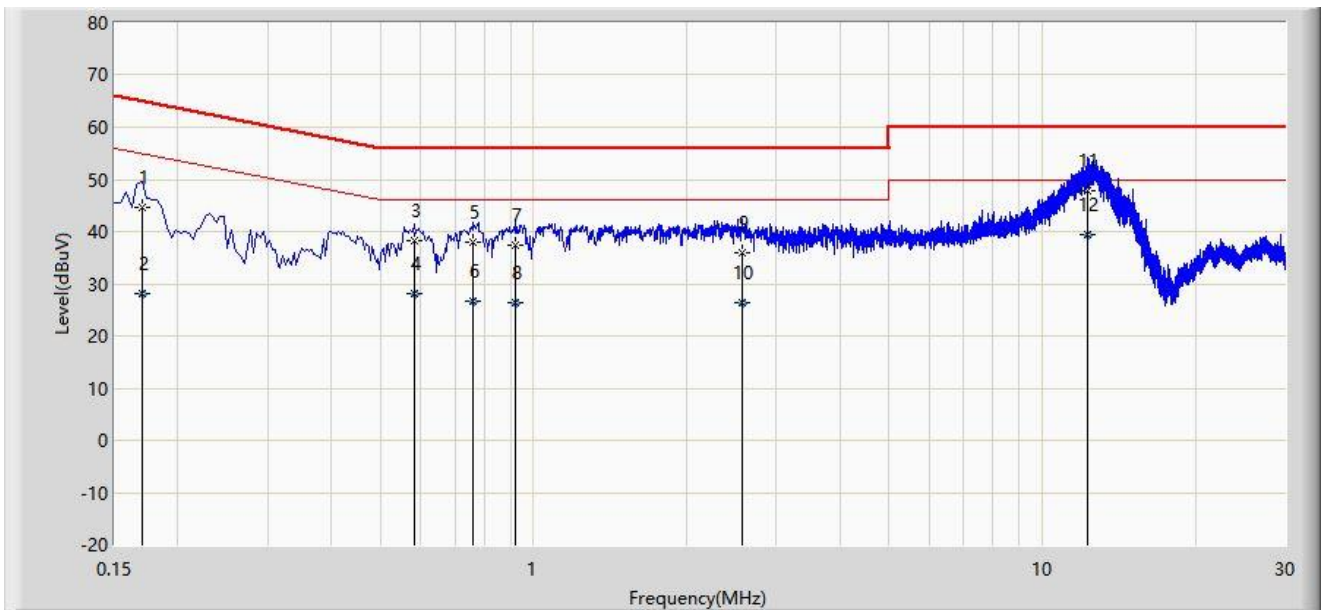
Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).

Note 4: Quasi-Peak measurement was not performed when peak measure level was lower than the quasi-peak limit.

Note 5: The amplitude of radiated emissions (frequency range from 9kHz to 30MHz) is that proximity to ambient noise, which also are attenuated more than 20 dB below the permissible value. Therefore, the data is not presented in the report.

A.10 AC Conducted Emissions Test Result

Site: WZ-SR2	Test Date: 2023-02-26
Limit: FCC_Part15.207_CE_AC Power	Engineer: Charles Zhang
Probe: ENV216_101683_Filter Off_C	Polarity: Line
EUT: Handheld UHF RFID Reader	Power: AC 120V/60Hz
Test Mode: Transmit at 902.75MHz	



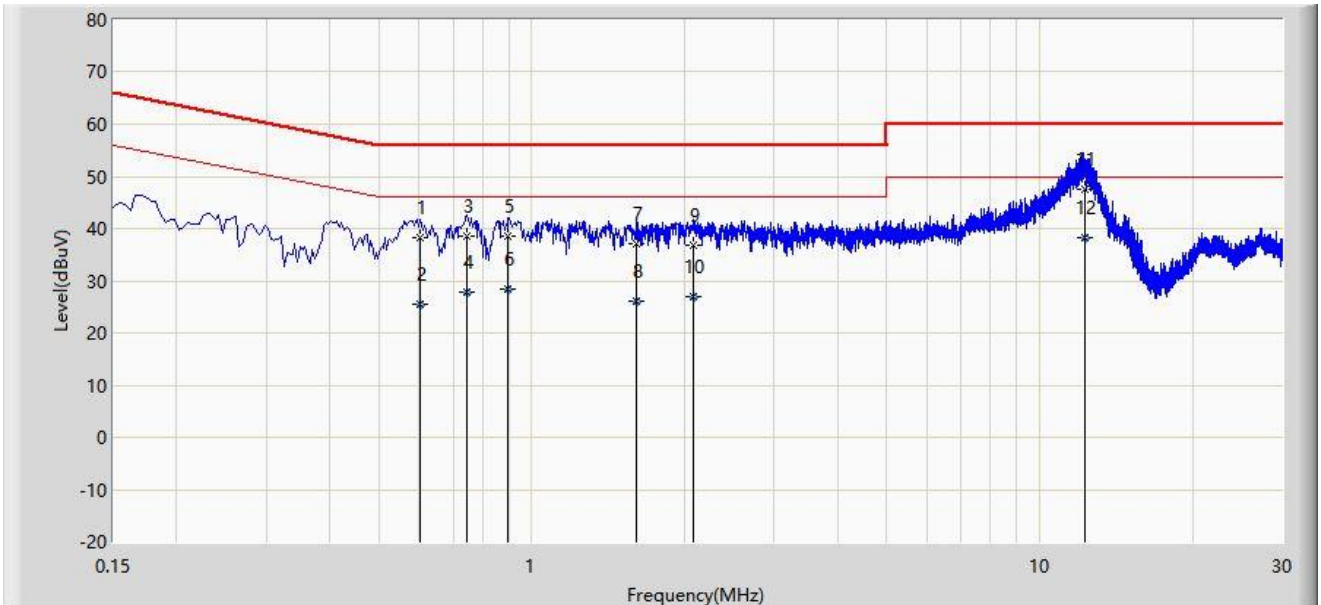
No	Mark	Frequency (MHz)	Measure Level (dBμV)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV)	Factor (dB)	Type
1		0.170	44.712	34.982	-20.249	64.960	9.730	QP
2		0.170	28.101	18.371	-26.860	54.960	9.730	AV
3		0.582	38.196	28.382	-17.804	56.000	9.814	QP
4		0.582	28.042	18.228	-17.958	46.000	9.814	AV
5		0.762	37.946	28.098	-18.054	56.000	9.848	QP
6		0.762	26.755	16.907	-19.245	46.000	9.848	AV
7		0.922	37.362	27.513	-18.638	56.000	9.850	QP
8		0.922	26.370	16.521	-19.630	46.000	9.850	AV
9		2.570	35.965	26.028	-20.035	56.000	9.937	QP
10		2.570	26.326	16.389	-19.674	46.000	9.937	AV
11		12.266	47.863	37.258	-12.137	60.000	10.605	QP
12	*	12.266	39.371	28.766	-10.629	50.000	10.605	AV

Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBμV) = Reading Level (dBμV) + Factor (dB).

Note 3: Factor (dB) = Cable Loss (dB) + LISN Factor (dB).

Site: WZ-SR2	Test Date: 2023-02-26
Limit: FCC_Part15.207_CE_AC Power	Engineer: Charles Zhang
Probe: ENV216_101683_Filter Off_C	Polarity: Neutral
EUT: Handheld UHF RFID Reader	Power: AC 120V/60Hz
Test Mode: Transmit at 902.75MHz	



No	Mark	Frequency (MHz)	Measure Level (dBμV)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV)	Factor (dB)	Type
1		0.602	38.225	28.387	-17.775	56.000	9.839	QP
2		0.602	25.638	15.800	-20.362	46.000	9.839	AV
3		0.746	38.648	28.803	-17.352	56.000	9.845	QP
4		0.746	27.831	17.986	-18.169	46.000	9.845	AV
5		0.898	38.616	28.781	-17.384	56.000	9.836	QP
6		0.898	28.332	18.496	-17.668	46.000	9.836	AV
7		1.606	37.036	27.187	-18.964	56.000	9.848	QP
8		1.606	26.192	16.344	-19.808	46.000	9.848	AV
9		2.074	36.840	26.966	-19.160	56.000	9.873	QP
10		2.074	26.908	17.034	-19.092	46.000	9.873	AV
11		12.275	47.557	36.931	-12.443	60.000	10.626	QP
12	*	12.275	38.239	27.613	-11.761	50.000	10.626	AV

Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBμV) = Reading Level (dBμV) + Factor (dB).

Note 3: Factor (dB) = Cable Loss (dB) + LISN Factor (dB).

Appendix B - Test Setup Photograph

Refer to "2212RSU051-UT" file.

Appendix C - EUT Photograph

Refer to “ 2212RSU051-UE” file.

The End