

RF MEASUREMENT REPORT

FCC ID: XMR202211KG100S
Applicant: Quectel Wireless Solutions Co., Ltd
Product: Wireless Module for Amazon Sidewalk (900MHz & Bluetooth)
Model No.: KG100S
Brand Name: Quectel
FCC Classification: Digital Transmission System (DTS)
FCC Rule Part(s): Part 15 Subpart C (Section 15.247)
Result: Complies
Received Date: 2022-11-18
Test Date: 2023-02-02 ~ 2023-02-15

Reviewed By:

Sunny Sun

Approved By:

Robin Wu



The test results relate only to the samples tested.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10-2013. Test results reported herein relate only to the item(s) tested.

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	2023-03-25	Valid

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1.4. Product Information

Product Name	Wireless Module for Amazon Sidewalk (900MHz & Bluetooth)
Model No.	KG100S
Serial No.	D1N22JJ0E000231 (KG100SABMD) P1N22LA23000016 (KG100SAAMD)
Bluetooth Specification	BT 5.1 (LE only)
LoRa Specification	902 ~ 928 MHz
Working Voltage	3.0 ~ 3.6 V, nominal 3.3 V
Note: <ol style="list-style-type: none">1. The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.2. The model differences of serial numbers are different for the duplexer, this report assessed two serial numbers.	

1.5. Radio Specification under Test

Frequency Range	902 ~ 928MHz
Channel Number	31
Type of modulation	CCS
Antenna Type	Dipole
Antenna Gain	2.50 dBi

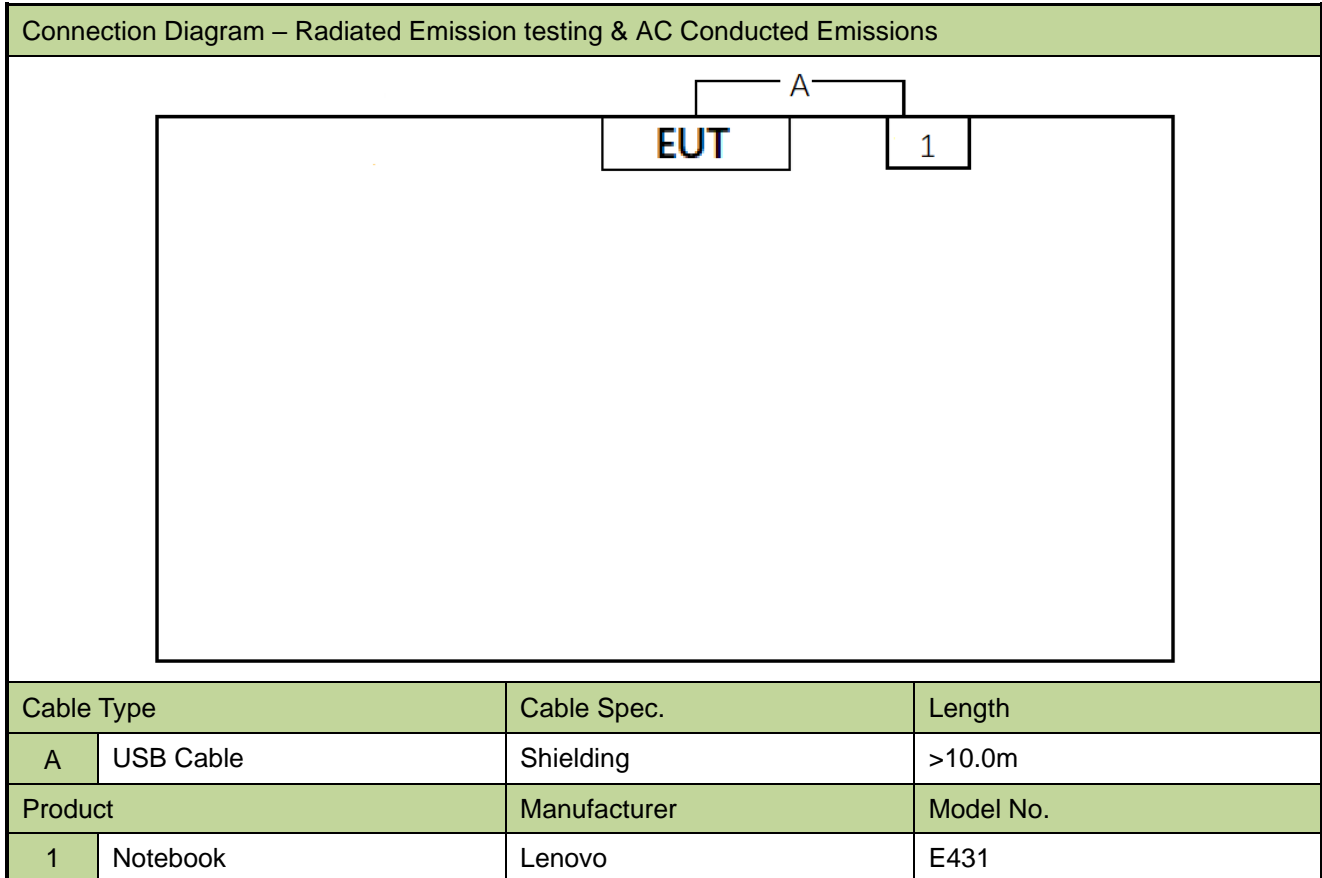
1.6. Working Frequencies

Channel	Frequency	Channel	Frequency	Channel	Frequency
01	902.5 MHz	02	903.3 MHz	03	904.1 MHz
04	904.9 MHz	05	905.7 MHz	06	906.5 MHz
07	907.3 MHz	08	908.1 MHz	09	908.9 MHz
10	909.7 MHz	11	910.5 MHz	12	911.3 MHz
13	912.1 MHz	14	912.9 MHz	15	913.7 MHz
16	914.5 MHz	17	915.3 MHz	18	916.1 MHz
19	916.9 MHz	20	917.7 MHz	21	918.5 MHz
22	919.3 MHz	23	920.1 MHz	24	920.9 MHz
25	921.7 MHz	26	922.5 MHz	27	923.3 MHz
28	924.1 MHz	29	924.9 MHz	30	925.7 MHz
31	926.5 MHz	--	--	--	--

2. Test Configuration

2.1. Test System Connection Diagram

The device was tested per the guidance ANSI C63.10: 2013 was used to reference the appropriate EUT setup for radiated emissions testing and AC line conducted testing.



2.2. Test Software

The test utility software used during testing was “QCOM”, and the version was 1.6.

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 Requirements

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.”

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
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2023-12-28	WZ-AC1
Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06023	1 year	2023-08-22	WZ-AC1
Preamplifier	Agilent	83017A	MRTSUE06076	1 year	2023-05-08	WZ-AC1
TRILOG Antenna	Schwarzbeck	VULB 9168	MRTSUE06172	1 year	2023-06-21	WZ-AC1
Anechoic Chamber	TDK	WZ-AC1	MRTSUE06212	1 year	2023-04-21	WZ-AC1
Thermohygrometer	testo	608-H1	MRTSUE06403	1 year	2023-06-06	WZ-AC1
Signal Analyzer	Keysight	N9010B	MRTSUE06607	1 year	2023-12-28	WZ-AC1
Thermohygrometer	testo	608-H1	MRTSUE11039	1 year	2023-11-01	WZ-AC1
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2023-09-29	WZ-AC1
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	2.03C	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% ($U=2Uc(y)$): 1.50dB
Power Spectrum Density
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)(2)	6dB Bandwidth	Conducted	Pass
15.247(b)(3)	Output Power		Pass
15.247(e)	Power Spectral Density		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:

1. 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.
2. 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. 6dB Bandwidth Measurement

6.2.1. Test Limit

The minimum 6dB bandwidth shall be at least 500 kHz.

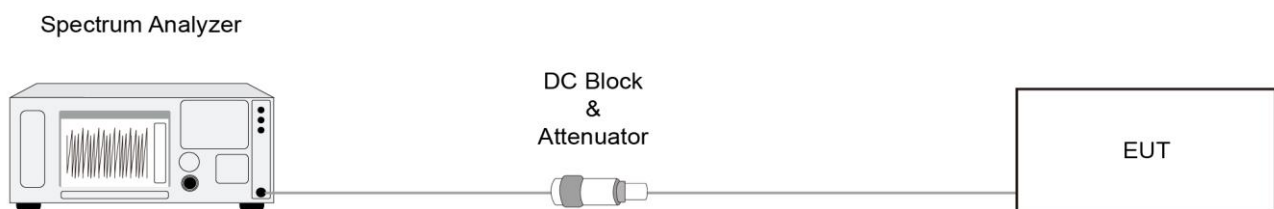
6.2.2. Test Procedure

ANSI C63.10 - 2013 - Section 11.8

6.2.3. Test Setting

1. The Spectrum's automatic bandwidth measurement capability was used to perform the 6dB bandwidth measurement. The "X" dB bandwidth parameter was set to $X = 6$. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. Set RBW = 100 kHz
3. VBW $\geq 3 \times$ RBW
4. Detector = Peak
5. Trace mode = Max hold
6. Sweep = Auto couple
7. Allow the trace to stabilize

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

The maximum output power shall be less 1 Watt (30dBm).

The conducted output power limit specified in paragraph FCC Part 15.247(b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. 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 FCC Part 15.247(b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

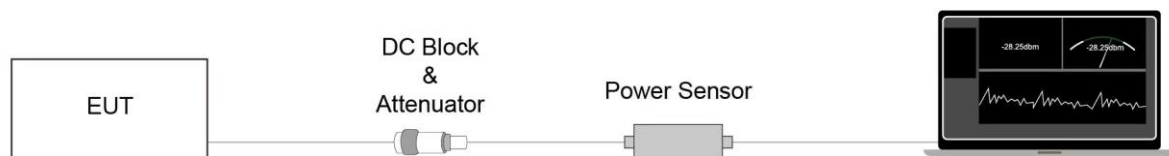
6.3.2. Test Procedure

ANSI C63.10 - 2013 - Section 11.9.2.3.2

6.3.3. Test Setting

Average power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter.

6.3.4. Test Setup



6.3.5. Test Result

Refer to Appendix A.3.

6.4. Power Spectral Density Measurement

6.4.1. Test Limit

The maximum permissible power spectral density is 8dBm in any 3 kHz band.

The same method of determining the conducted output power shall be used to determine the power spectral density.

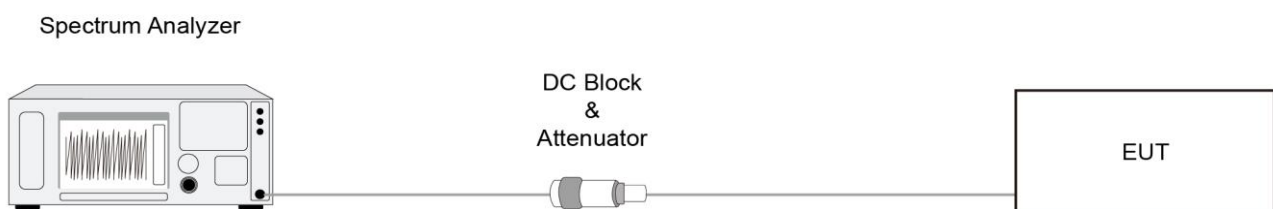
6.4.2. Test Procedure

ANSI C63.10 - 2013 - Section 11.10.5

6.4.3. Test Setting

1. Measure the duty cycle (x) of the transmitter output signal.
2. Set instrument center frequency to DTS channel center frequency.
3. Set span to at least 1.5 times the OBW.
4. RBW = 3 kHz.
5. VBW = 10 kHz.
6. Detector = RMS.
7. Ensure that the number of measurement points in the sweep $\geq 2 \times \text{span}/\text{RBW}$.
8. Sweep time = auto couple.
9. Don't use sweep triggering. Allow sweep to "free run".
10. Employ trace averaging (RMS) mode over a minimum of 100 traces.
11. Use the peak marker function to determine the maximum amplitude level.
12. Add $10 \log (1/x)$, where x is the duty cycle measured in step (a), to the measured PSD to compute the average PSD during the actual transmission time. If measured value exceeds requirement specified by regulatory agency, then reduce RBW (but no less than 3 kHz) and repeat (note that this may require zooming in on the emission of interest and reducing the span to meet the minimum measurement point requirement as the RBW is reduced).

6.4.4. Test Setup



6.4.5. Test Result

Refer to Appendix A.4.

6.5. Conducted Band Edge and Out-of-Band Emissions Measurement

6.5.1. Test Limit

The limit for out-of-band spurious emissions at the band edge is 30dB below the fundamental emission level, as determined from the in-band power measurement of the DTS channel performed in a 100 kHz bandwidth per the PSD procedure.

6.5.2. Test Procedure

ANSI C63.10-2013 - Section 11.11

6.5.3. Test Setting

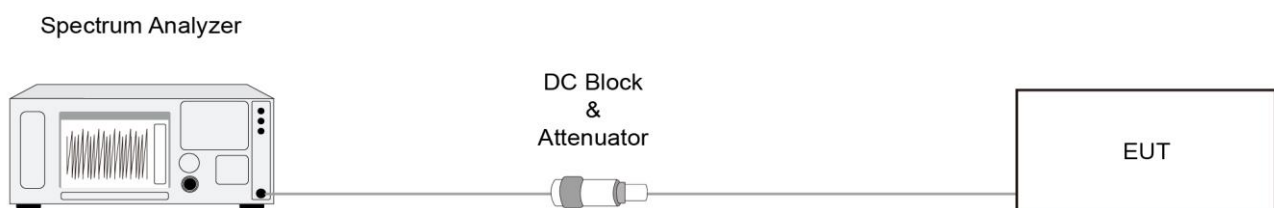
Reference level measurement

1. Set instrument center frequency to DTS channel center frequency
2. Set the span to ≥ 1.5 times the DTS bandwidth
3. Set the RBW = 100 kHz
4. Set the VBW $\geq 3 \times$ RBW
5. Detector = peak
6. Sweep time = auto couple
7. Trace mode = max hold
8. Allow trace to fully stabilize

Emission level measurement

1. Set the center frequency and span to encompass frequency range to be measured
2. RBW = 100kHz
3. VBW = 300kHz
4. Detector = Peak
5. Trace mode = max hold
6. Sweep time = auto couple
7. The trace was allowed to stabilize

6.5.4. Test Setup



6.5.5. Test Result

Refer to Appendix A.5.

6.6. Radiated Spurious Emission Measurement

6.6.1. 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

6.6.2. Test Procedure

ANSI C63.10 - 2013 - Section 11.11 & 11.12

ANSI C63.10 - 2013 - Section 6.3 (General Requirements)

ANSI C63.10 - 2013 - Section 6.4 (Standard test method below 30MHz)

ANSI C63.10 - 2013 - Section 6.5 (Standard test method above 30MHz to 1GHz)

ANSI C63.10 - 2013 - Section 6.6 (Standard test method above 1GHz)

6.6.3. 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
> 1000MHz	1MHz

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

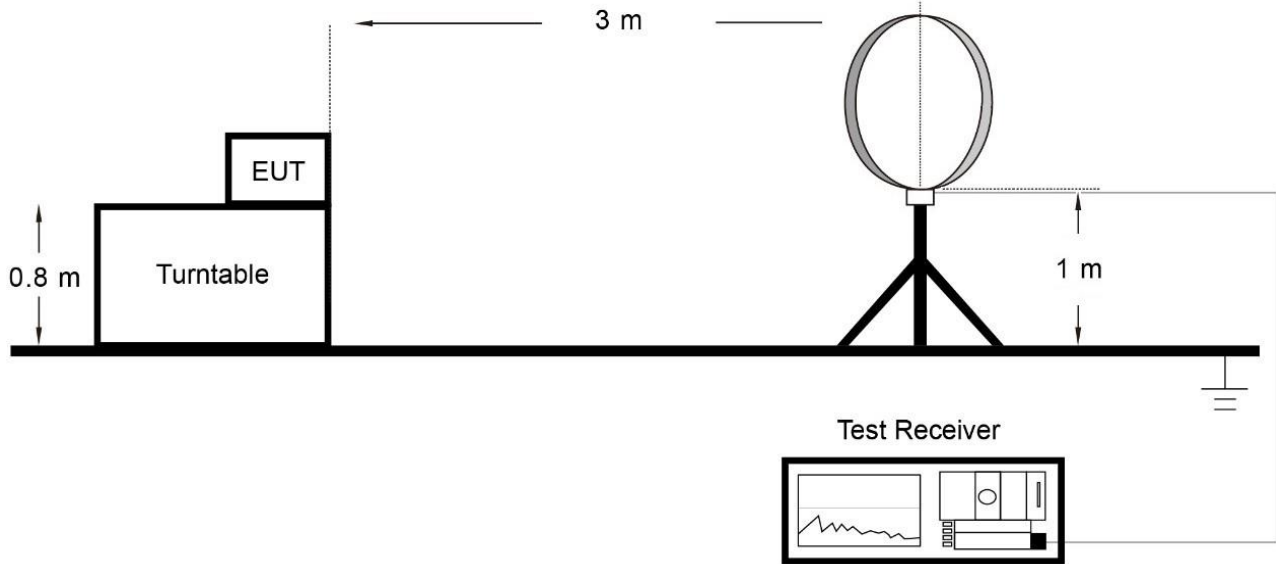
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

Average Measurements above 1GHz (Method VB)

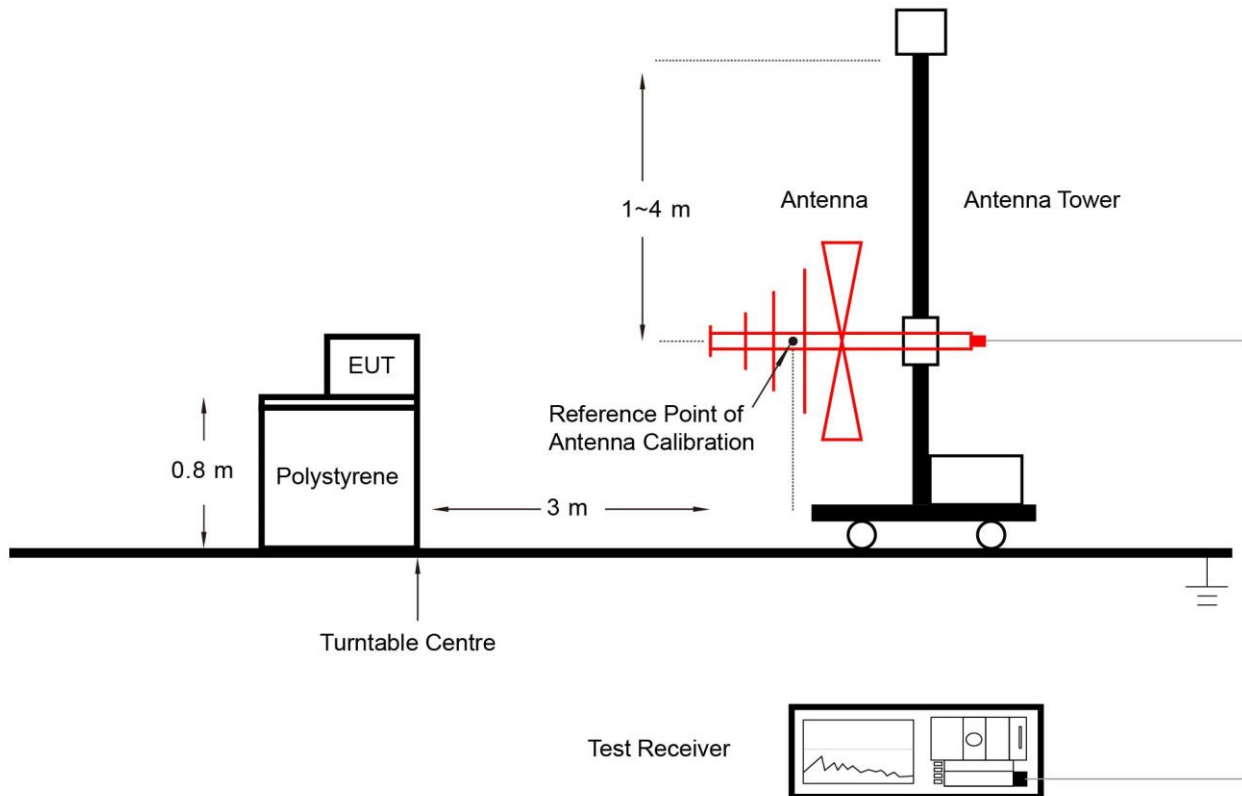
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW; If the EUT is configured to transmit with duty cycle $\geq 98\%$, set VBW = 10 Hz.
If the EUT duty cycle is $< 98\%$, set VBW $\geq 1/T$. T is the minimum transmission duration.
4.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

6.6.4. Test Setup

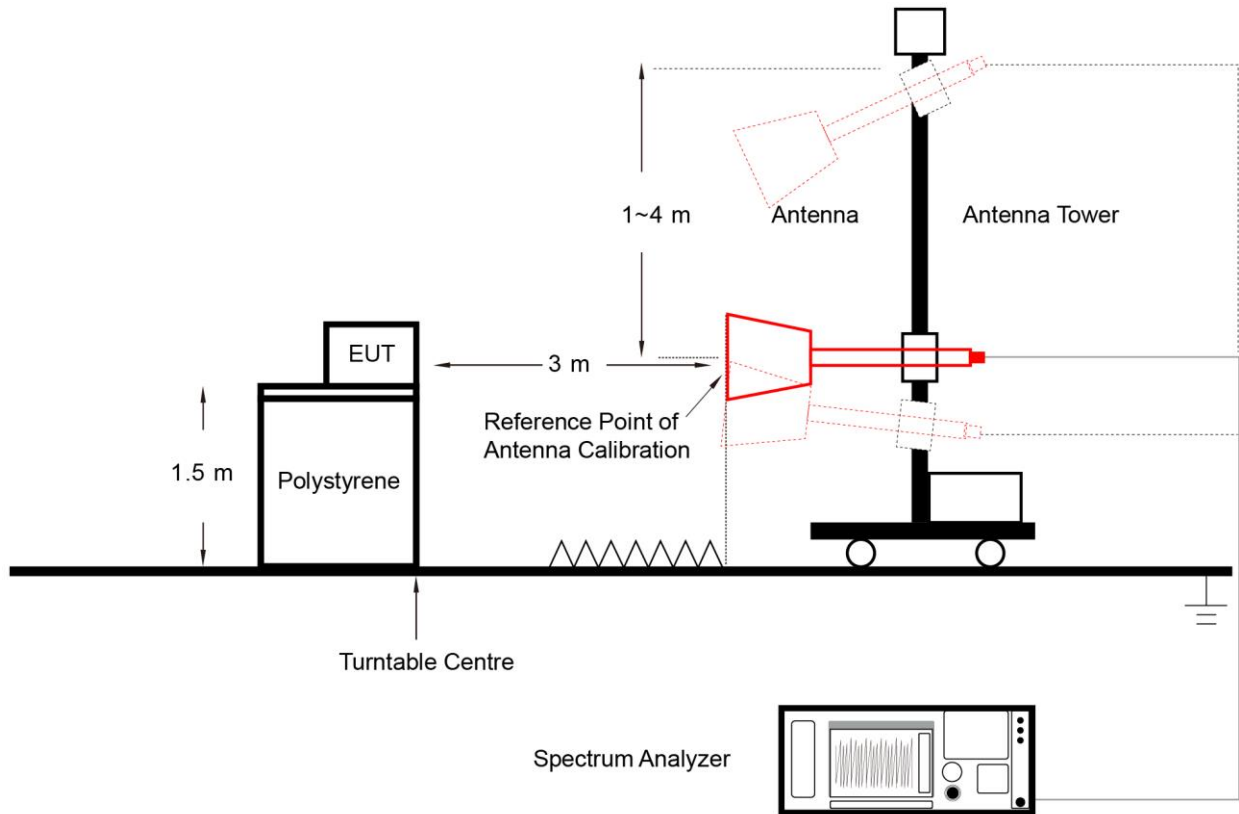
Below 30MHz Test Setup:



Below 1GHz Test Setup:



Above 1GHz Test Setup:



6.6.5. Test Result

Refer to Appendix A.6.

6.7. AC Conducted Emissions Measurement

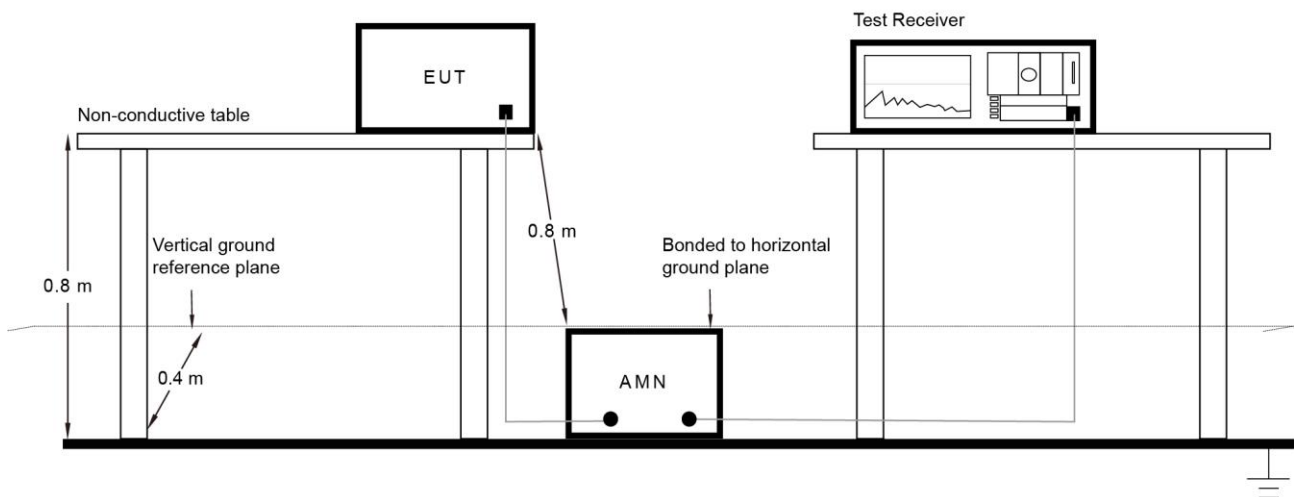
6.7.1. Test Limit

FCC Part 15 Subpart C Paragraph 15.207 Limits		
Frequency (MHz)	QP (dBuV)	AV (dBuV)
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.

6.7.2. Test Setup



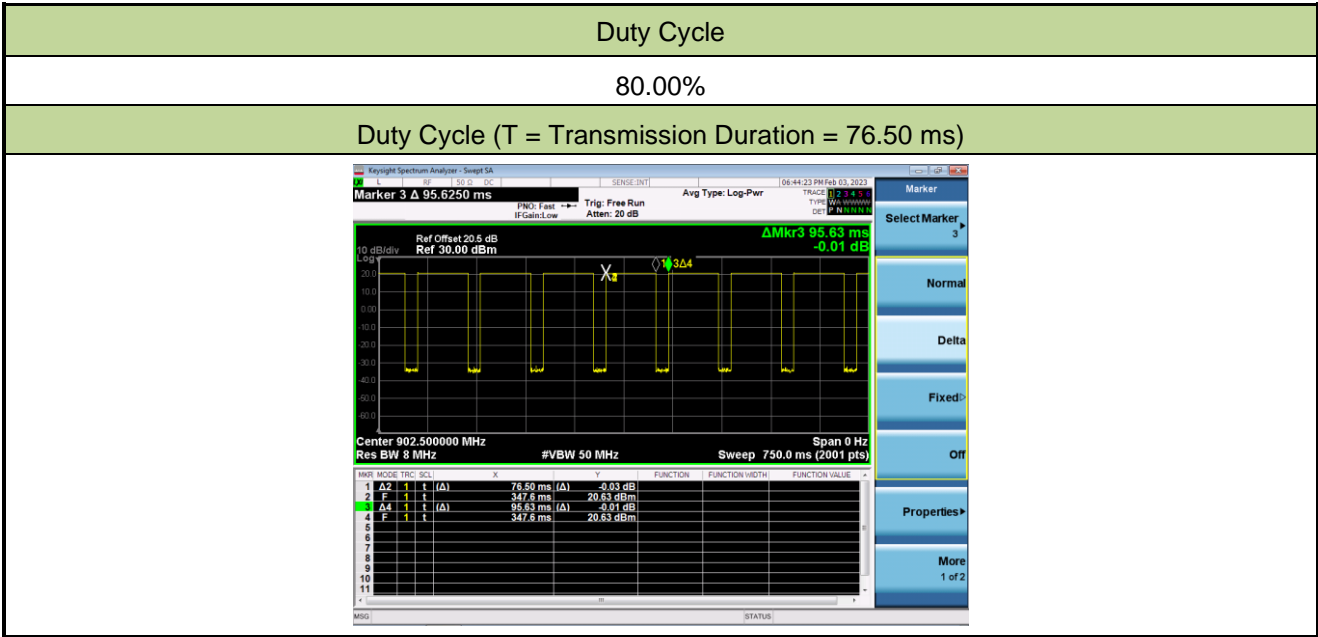
6.7.3. Test Result

Refer to Appendix A.7.

Appendix A - Test Result

A.1 Duty Cycle Test Result

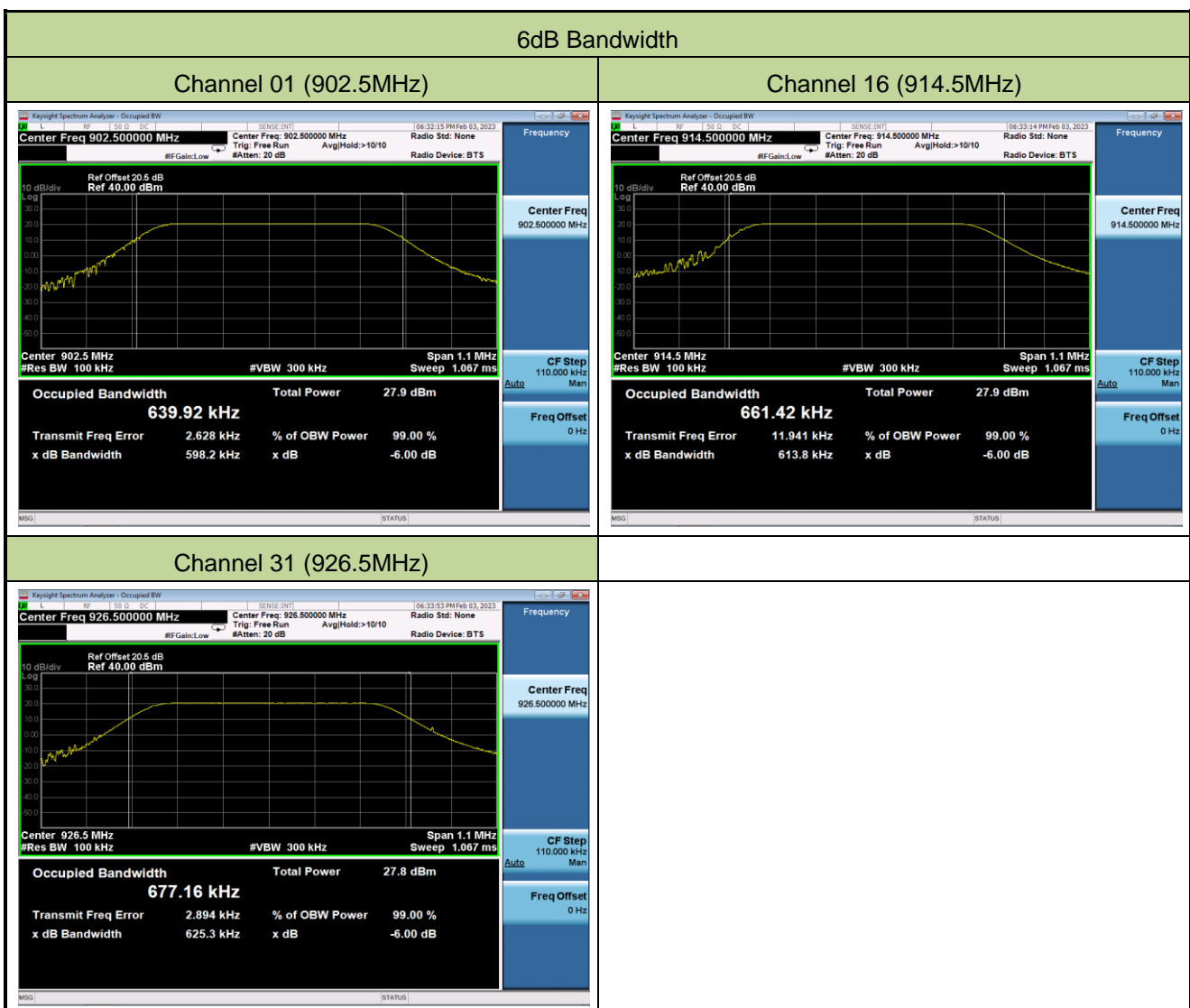
Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2023-02-03		



A.2 6dB Bandwidth Test Result

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2023-02-03		

Channel No.	Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)
00	902.5	598.2	≥ 500
16	914.5	613.8	≥ 500
31	926.5	625.3	≥ 500



A.3 Output Power Test Result

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2023-02-03	Duplexer Type No.	KG100SABMD

Channel No.	Frequency (MHz)	Average Power (dBm)	Limit (dBm)	Result
00	902.5	20.72	≤ 30.00	Pass
16	914.5	20.75	≤ 30.00	Pass
31	926.5	20.71	≤ 30.00	Pass

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2023-02-03	Duplexer Type No.	KG100SAAMD

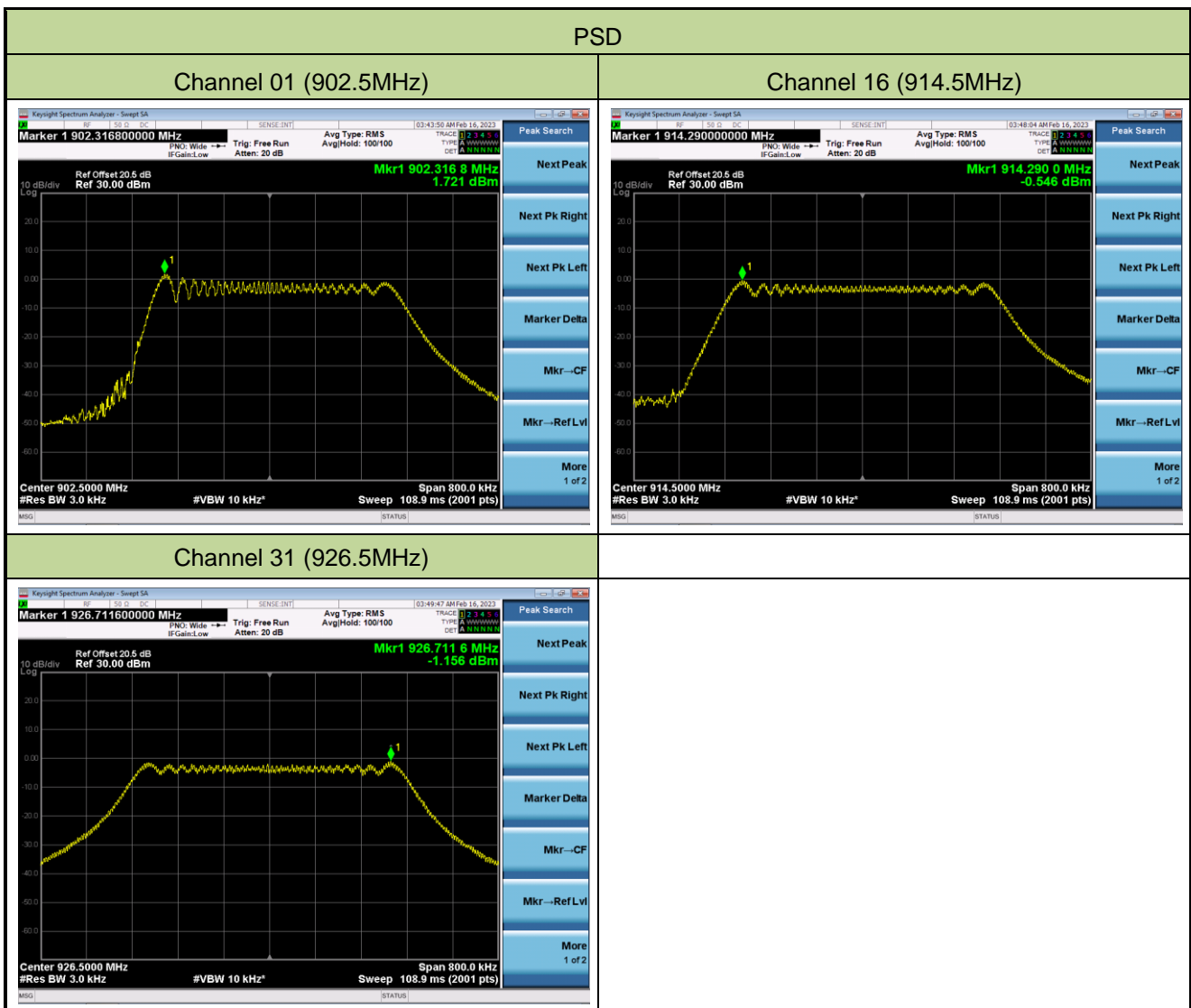
Channel No.	Frequency (MHz)	Average Power (dBm)	Limit (dBm)	Result
00	902.5	21.07	≤ 30.00	Pass
16	914.5	21.14	≤ 30.00	Pass
31	926.5	20.99	≤ 30.00	Pass

A.4 Power Spectral Density Test Result

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2023-02-15	Duplexer Type No.	KG100SAAMD

Channel No.	Frequency (MHz)	AVPSD (dBm / 3kHz)	Duty Cycle (%)	Total PSD (dBm / 3kHz)	Limit (dBm / 3kHz)	Result
00	902.5	1.721	80.00	2.69	≤ 8.00	Pass
16	914.5	-0.546	80.00	0.42	≤ 8.00	Pass
31	926.5	-1.156	80.00	-0.19	≤ 8.00	Pass

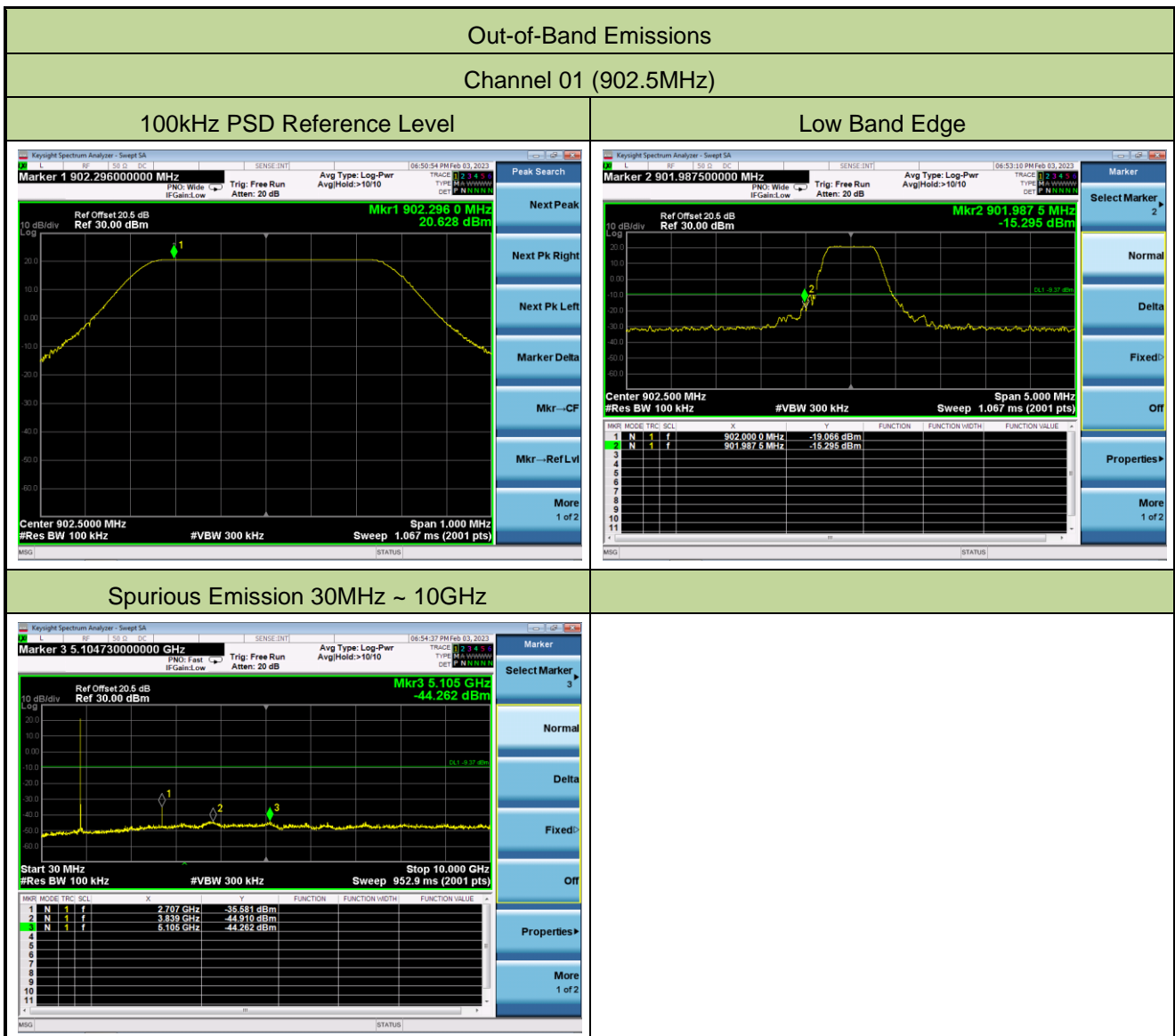
Note: Total PSD (dBm / 3kHz) = AVPSD (dBm / 3kHz) + 10*log (1/Duty cycle).



A.5 Conducted Band Edge and Out-of-Band Emissions Test Result

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2023-02-03	Duplexer Type No.	KG100SAAMD

Channel No.	Frequency (MHz)	Limit (dBc)	Result
00	902.5	30	Pass
16	914.5	30	Pass
31	926.5	30	Pass





A.6 Radiated Spurious Emission Test Result
KG100SABMD:

Test Site	WZ-AC1	Test Engineer	Charles Zhang
Test Date	2023-02-10		
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.		

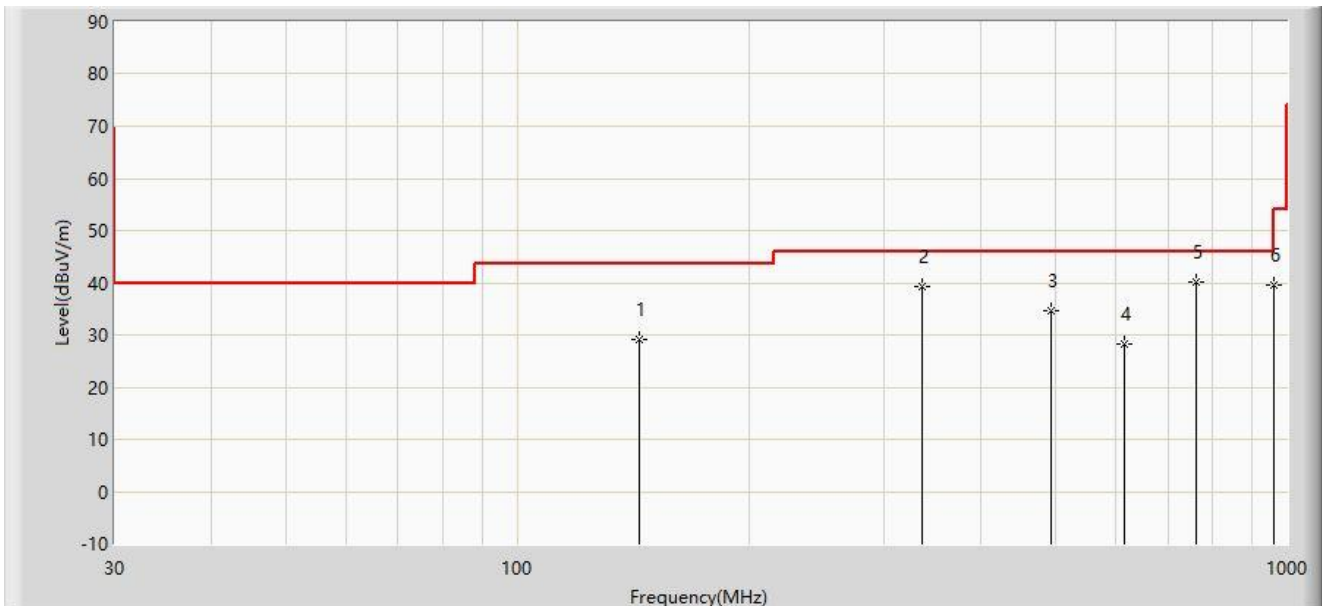
Test Channel	Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
00	1076.5	53.1	-7.4	45.7	74.0	-28.3	Peak	Horizontal
	2705.5	56.9	-2.7	54.2	74.0	-19.8	Peak	Horizontal
	2705.5	53.4	-2.7	50.7	54.0	-3.3	Average	Horizontal
	9028.0	39.4	10.4	49.8	74.0	-24.2	Peak	Horizontal
	1162.0	46.3	-7.1	39.2	74.0	-34.8	Peak	Vertical
	2710.0	47.0	-2.7	44.3	74.0	-29.7	Peak	Vertical
	9023.5	38.3	10.4	48.7	74.0	-25.3	Peak	Vertical
16	1189.0	52.7	-6.8	45.9	74.0	-28.1	Peak	Horizontal
	2741.5	53.1	-2.5	50.6	74.0	-23.4	Peak	Horizontal
	9307.0	36.2	11.8	48.0	74.0	-26.0	Peak	Horizontal
	2741.5	46.1	-2.5	43.6	74.0	-30.4	Peak	Vertical
	4573.0	38.7	2.0	40.7	74.0	-33.3	Peak	Vertical
	7354.0	37.0	8.1	45.1	74.0	-28.9	Peak	Vertical
31	1049.5	53.2	-7.5	45.7	74.0	-28.3	Peak	Horizontal
	2777.5	49.9	-2.4	47.5	74.0	-26.5	Peak	Horizontal
	9338.5	36.5	11.8	48.3	74.0	-25.7	Peak	Horizontal
	2782.0	43.8	-2.4	41.4	74.0	-32.6	Peak	Vertical
	4631.5	37.8	2.4	40.2	74.0	-33.8	Peak	Vertical
	7669.0	37.8	7.8	45.6	74.0	-28.4	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-AC1	Test Date: 2023-02-02
Limit: FCC_Part15.209_RSE(3m)	Engineer: Bob Zhang
Probe: VULB 9168_25-2000MHz	Polarity: Horizontal
EUT: Wireless Module for Amazon Sidewalk (900MHz & Bluetooth)	Power: By PC
Test Mode: Transmit at 902.5MHz	



No	Mark	Frequency (MHz)	Measure Level (dB μ V/m)	Reading Level (dB μ V)	Margin (dB)	Limit (dB μ V/m)	Factor (dB/m)	Type
1		143.975	29.092	11.377	-14.408	43.500	17.715	PK
2		335.065	39.177	19.700	-6.823	46.000	19.477	PK
3		494.630	34.584	11.557	-11.416	46.000	23.027	PK
4		614.000	28.274	2.542	-17.726	46.000	25.732	PK
5	*	760.410	40.049	11.810	-5.951	46.000	28.239	PK
6		960.000	39.486	9.707	-6.514	46.000	29.779	PK

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

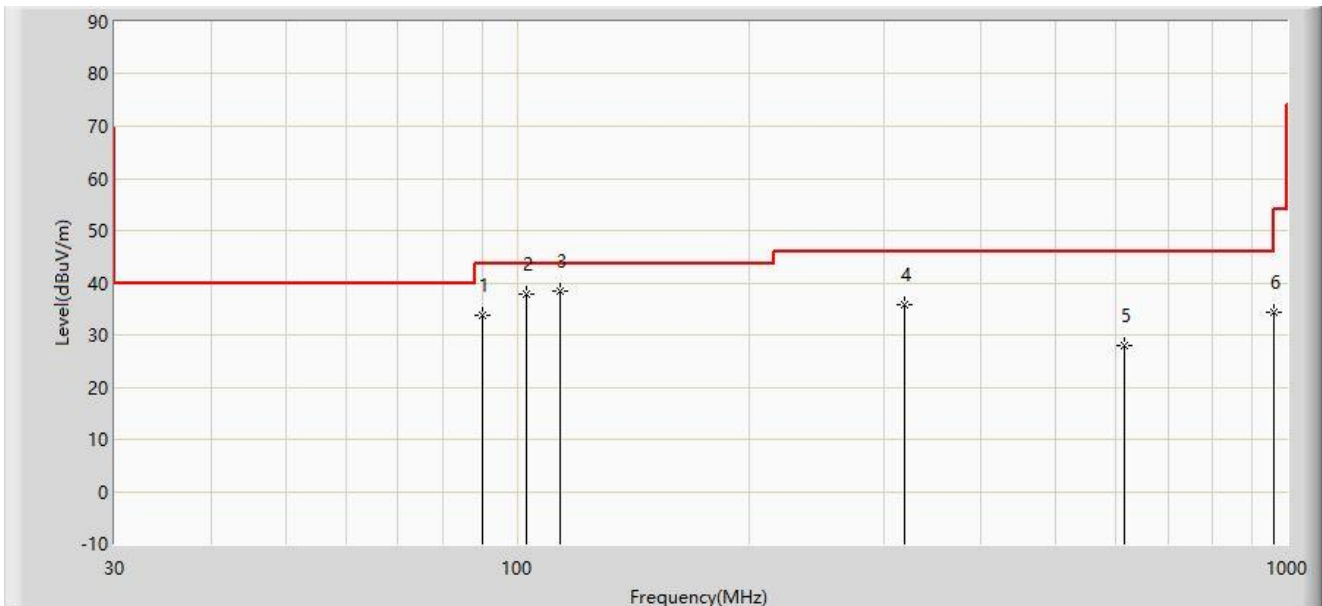
Note 2: Measure Level (dB μ V/m) = Reading Level (dB μ V) + Factor (dB/m).

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-AC1	Test Date: 2023-02-02
Limit: FCC_Part15.209_RSE(3m)	Engineer: Bob Zhang
Probe: VULB 9168_25-2000MHz	Polarity: Vertical
EUT: Wireless Module for Amazon Sidewalk (900MHz & Bluetooth)	Power: By PC
Test Mode: Transmit at 902.5MHz	



No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		90.140	33.716	21.423	-9.784	43.500	12.293	PK
2		102.750	37.815	24.161	-5.685	43.500	13.654	PK
3	*	113.905	38.392	23.274	-5.108	43.500	15.118	PK
4		319.060	35.716	16.659	-10.284	46.000	19.057	PK
5		614.000	27.846	2.114	-18.154	46.000	25.732	PK
6		960.000	34.308	4.529	-11.692	46.000	29.779	PK

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

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + 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.

KG100SAAMD:

Test Site	WZ-AC1	Test Engineer	Charles Zhang
Test Date	2023-02-10		
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.		

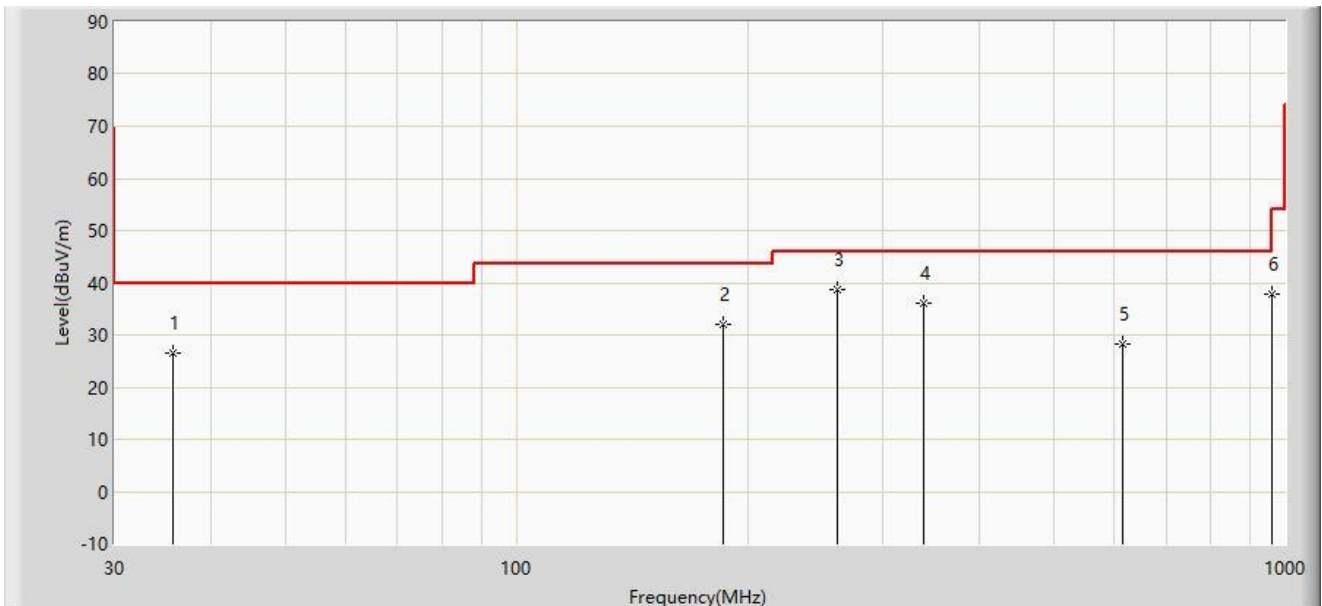
Test Channel	Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
00	1184.5	54.4	-6.8	47.6	74.0	-26.4	Peak	Horizontal
	2705.5	51.1	-2.7	48.4	74.0	-25.6	Peak	Horizontal
	9023.5	39.4	10.4	49.8	74.0	-24.2	Peak	Horizontal
	2705.5	44.7	-2.7	42.0	74.0	-32.0	Peak	Vertical
	3700.0	40.1	-0.2	39.9	74.0	-34.1	Peak	Vertical
	9023.5	38.3	10.4	48.7	74.0	-25.3	Peak	Vertical
16	1045.0	56.3	-7.5	48.8	74.0	-25.2	Peak	Horizontal
	2746.0	46.1	-2.5	43.6	74.0	-30.4	Peak	Horizontal
	7439.5	37.4	8.2	45.6	74.0	-28.4	Peak	Horizontal
	1049.5	46.7	-7.5	39.2	74.0	-34.8	Peak	Vertical
	3970.0	38.5	0.5	39.0	74.0	-35.0	Peak	Vertical
	7466.5	37.3	8.2	45.5	74.0	-28.5	Peak	Vertical
31	1049.5	55.1	-7.5	47.6	74.0	-26.4	Peak	Horizontal
	2777.5	43.7	-2.4	41.3	74.0	-32.7	Peak	Horizontal
	7651.0	38.0	7.9	45.9	74.0	-28.1	Peak	Horizontal
	1148.5	45.9	-7.2	38.7	74.0	-35.3	Peak	Vertical
	3848.5	38.7	0.2	38.9	74.0	-35.1	Peak	Vertical
	7480.0	36.8	8.3	45.1	74.0	-28.9	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-AC1	Test Date: 2023-02-02
Limit: FCC_Part15.209_RSE(3m)	Engineer: Bob Zhang
Probe: VULB 9168_25-2000MHz	Polarity: Horizontal
EUT: Wireless Module for Amazon Sidewalk (900MHz & Bluetooth)	Power: By PC
Test Mode: Transmit at 902.5MHz	



No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		35.820	26.463	8.663	-13.537	40.000	17.800	PK
2		186.170	32.035	16.192	-11.465	43.500	15.843	PK
3	*	261.830	38.785	21.794	-7.215	46.000	16.991	PK
4		337.975	35.968	16.460	-10.032	46.000	19.508	PK
5		614.000	28.151	2.419	-17.849	46.000	25.732	PK
6		960.000	37.946	8.167	-8.054	46.000	29.779	PK

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

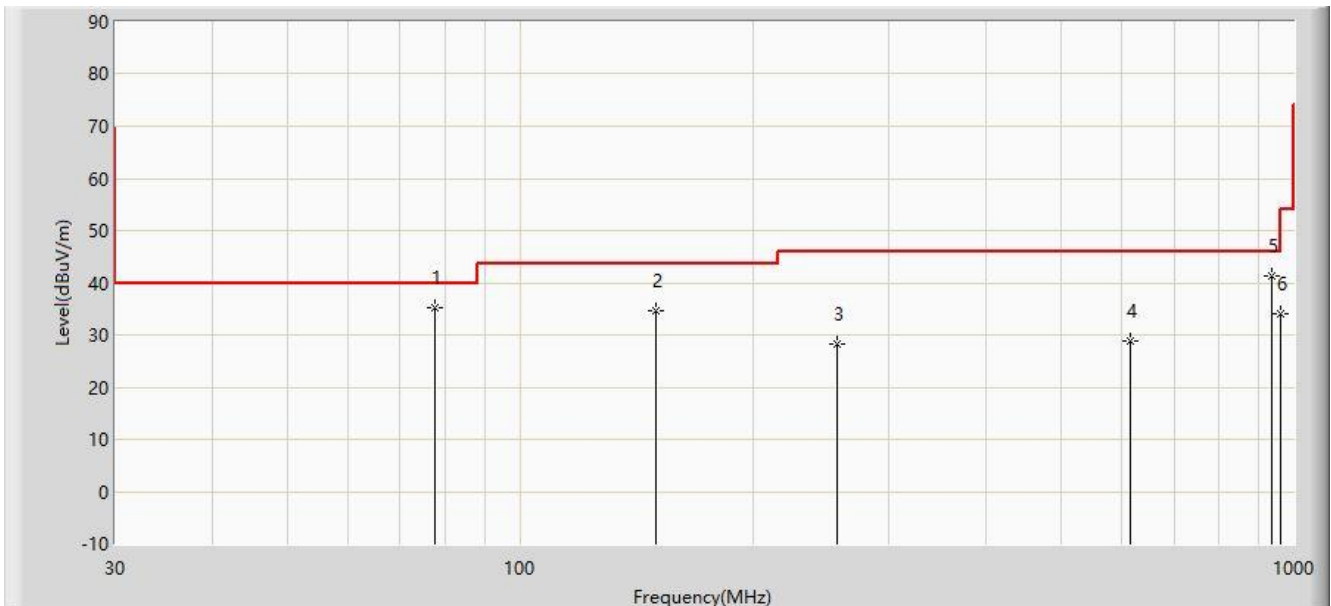
Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m).

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-AC1	Test Date: 2023-02-02
Limit: FCC_Part15.209_RSE(3m)	Engineer: Bob Zhang
Probe: VULB 9168_25-2000MHz	Polarity: Vertical
EUT: Wireless Module for Amazon Sidewalk (900MHz & Bluetooth)	Power: By PC
Test Mode: Transmit at 902.5MHz	



No	Mark	Frequency (MHz)	Measure Level (dB μ V/m)	Reading Level (dB μ V)	Margin (dB)	Limit (dB μ V/m)	Factor (dB/m)	Type
1		77.530	35.152	20.472	-4.848	40.000	14.680	PK
2		149.795	34.606	16.616	-8.894	43.500	17.990	PK
3		257.465	28.340	11.519	-17.660	46.000	16.821	PK
4		614.000	28.920	3.188	-17.080	46.000	25.732	PK
5	*	934.525	41.322	11.563	-4.678	46.000	29.759	PK
6		960.000	34.011	4.232	-11.989	46.000	29.779	PK

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

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

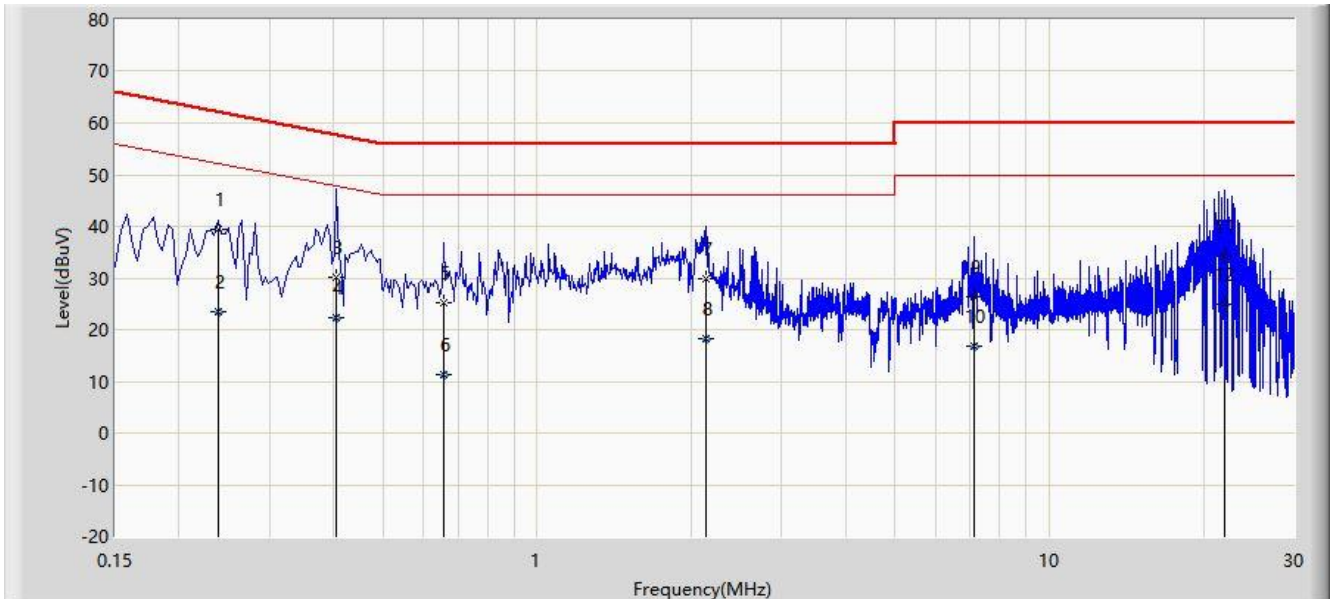
Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).

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.7 AC Conducted Emissions Test Result

Site: WZ-SR2	Test Date: 2023-02-14
Limit: FCC_Part15.207_CE_AC Power	Engineer: Helen Han
Probe: ENV216_101683_Filter Off_C	Polarity: Line
EUT: Wireless Module for Amazon Sidewalk (900MHz & Bluetooth)	Power by PC
Test Mode: Transmit at 914.5MHz	



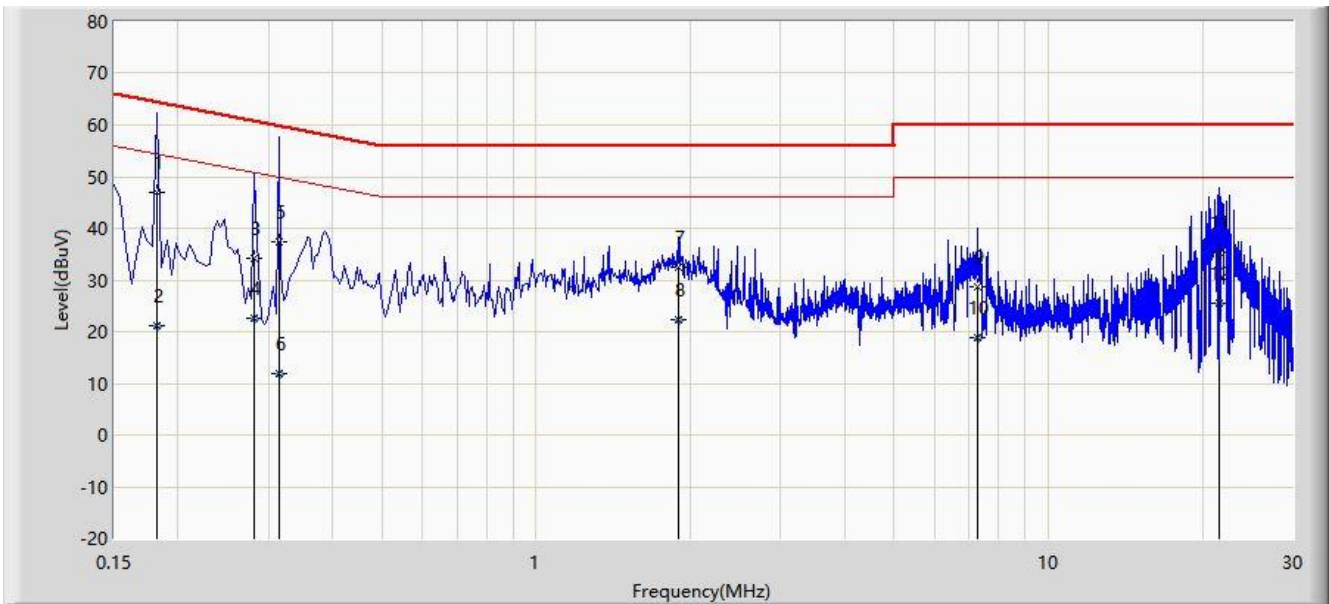
No	Mark	Frequency (MHz)	Measure Level (dBμV)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV)	Factor (dB)	Type
1	*	0.238	39.510	29.772	-22.656	62.166	9.738	QP
2		0.238	23.451	13.713	-28.715	52.166	9.738	AV
3		0.406	30.049	20.277	-27.681	57.730	9.771	QP
4		0.406	22.245	12.474	-25.485	47.730	9.771	AV
5		0.658	25.107	15.271	-30.893	56.000	9.836	QP
6		0.658	11.267	1.431	-34.733	46.000	9.836	AV
7		2.138	29.968	20.104	-26.032	56.000	9.864	QP
8		2.138	18.315	8.451	-27.685	46.000	9.864	AV
9		7.130	26.327	15.878	-33.673	60.000	10.448	QP
10		7.130	16.699	6.251	-33.301	50.000	10.448	AV
11		22.018	34.330	23.440	-25.670	60.000	10.890	QP
12		22.018	24.858	13.968	-25.142	50.000	10.890	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: 2023-02-14
Limit: FCC_Part15.207_CE_AC Power	Engineer: Helen Han
Probe: ENV216_101683_Filter Off_C	Polarity: Neutral
EUT: Wireless Module for Amazon Sidewalk (900MHz & Bluetooth)	Power by PC
Test Mode: Transmit at 914.5MHz	



No	Mark	Frequency (MHz)	Measure Level (dBµV)	Reading Level (dBµV)	Margin (dB)	Limit (dBµV)	Factor (dB)	Type
1	*	0.182	46.977	37.210	-17.417	64.394	9.767	QP
2		0.182	21.175	11.409	-33.218	54.394	9.767	AV
3		0.282	34.205	24.418	-26.552	60.757	9.786	QP
4		0.282	22.549	12.762	-28.208	50.757	9.786	AV
5		0.314	37.519	27.726	-22.345	59.864	9.793	QP
6		0.314	11.810	2.017	-38.054	49.864	9.793	AV
7		1.894	32.457	22.600	-23.543	56.000	9.857	QP
8		1.894	22.308	12.451	-23.692	46.000	9.857	AV
9		7.266	28.627	18.150	-31.373	60.000	10.477	QP
10		7.266	18.859	8.382	-31.141	50.000	10.477	AV
11		21.530	35.483	24.604	-24.517	60.000	10.880	QP
12		21.530	25.425	14.546	-24.575	50.000	10.880	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 "2211RSU051-UT" file.

Appendix C - EUT Photograph

Refer to "2211RSU051-UE" file.

_____ The End _____