TEST REPORT

CTK Co., Ltd.
(Ho-dong), 113, Yejik-ro, Cheoin-gu,
Yongin-si, Gyeonggi-do, Korea
Tel: +82-31-339-9970
Fax: +82-31-624-9501

Report No.:
CTK-2024-02571

1. Applicant

◦ Name : EVERINT Co., Ltd.

◦ Address : 129, Chungjusandan1-ro, Chungju-si, Chungcheongbuk-do, South Korea

◦ Date of Receipt : 2024-07-24

2. Manufacturer

◦ Name : IDRO Co., Ltd.

◦ Address : 11, Jiphyeondong-ro, Sejong-si, Republic of Korea

3. Use of Report : For FCC Certification

4. Test Sample / Model: UHF RFID Reader Module / IDRO900ME-L3

5. Date of Test : 2024-08-27 to 2024-09-02

6. Test Standard(method) used : FCC 47 CFR part 15 subpart C 15.247

7. Testing Environment: refer to 6 page

8. Test Results : Compliance

9. Location of Test : ☒ Permanent Testing Lab ☐ On Site Testing

(Address : 5, Dongbu-ro 221beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Republic of Korea)

Approval	Tested by Bong-seok Kim: (Signature)	Technical Manager Young-taek Lee: (Signature)

Remark. This report is not related to KOLAS accreditation and relevant regulation.

2024-09-12

CTK Co., Ltd.

REPORT REVISION HISTORY

Date	Revision	Page No
2024-09-12	Issued (CTK-2024-02571)	All

CONTENTS

1. General Product Description

1.1 Applicant Information

Company	EVERINT Co., Ltd.
Contact Point	129, Chungjusandan1-ro, Chungju-si, Chungcheongbuk-do, South Korea
Contact Person	Name : Ji-Sung Shin E-mail : jsshin@bixolon.kr Tel : +81-31-218-5959 Fax : +81-31-218-5589

1.2 Product Information

FCC ID	2AKMF-IDRO900ME-L3
IC	22266-IDRO900MEL3
Product Description	UHF RFID Reader Module
Basic model (HVIN)	IDRO900ME-L3
Variant Model name	-
Operating Frequency	902.75 MHz – 927.25 MHz
RF Output Power	29.62 dBm (916.22 mW)
Antenna type 1	PCB Antenna
	Antenna gain : -10.29 dBi
Antenna type 2	PCB Antenna
	Antenna gain : -37.36 dBi
Number of channels	50
Channel Spacing	500 kHz
Type of Modulation	ASK
Power Source	DC 4 V
Test Software	E710Tester_2023_03_31_normal
RF Power setting in Test SW	Power Setting “300”

1.3 Peripheral Devices

Device	Manufacturer	Model No.	Serial No.
Notebook	HP Inc.	HP Probook 455 G7	5CD0234DWM
AC Adapter	HP Inc.	PPP012D-S	677777-003

2. Accreditations

2.1 Laboratory Accreditations and Listings

ssss	Agency	Registration Number
USA	FCC	805871
CANADA	ISED	CN : 8737A CAB ID : KR0025
KOREA	NRRA	KR0025

2.2 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less. All test equipment calibrations are traceable to the Korea Research Institute of Standards and Science (KRISS), therefore, all test data recorded in this report is traceable to KRISS.

3. Test Specifications

3.1 Standards

Section in FCC	Requirement(s)	Status (Note 1)	Test Condition
15.247(a)(1)	Carrier Frequency Separation	C	Conducted
15.247(a)(1)(i)	Number of Hopping Frequencies	C	
15.247(a)	20 dB Bandwidth	C	
15.247(a)(1)(i)	Time of occupancy (Dwell Time)	C	
15.247(b)(2)	Maximum peak conducted output power	C	
15.247(d)	Unwanted emission	C	
15.209	Transmitter emission	C	Radiated
15.207(a)	AC Conducted Emission	C	Line Conducted
Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable			
Note 2: The data in this test report are traceable to the national or international standards.			
Note 3: The sample was tested according to the following specification: FCC Part 15.247, ANSI C63.10-2013			

3.2 Testing Environment

Test Item		Test Date	Temperature (℃)	Relative Humidity (%)
Carrier Frequency Separation		2024-08-27	22	51
Number of Hopping Frequencies				
20 dB Bandwidth				
Time of occupancy (Dwell Time)		2023-08-28	23	66
Maximum peak conducted output power		2024-08-27	22	51
Unwanted emission (Conducted)				
Transmitter emission (Radiated)	1) 9 kHz to 30 MHz	2023-08-28	21	58
	2) 30 MHz to 1 GHz			
	3) 1 GHz to 10 GHz	2023-08-28	21	50
AC Conducted Emission		2023-08-30	22	54

3.3 Mode of operation during the test

The EUT is operated in a manner representative of the typical of the equipments.
During at testing, system components were manipulated within the confines of typical usage to maximize each emission. All modulation modes were tests.
The results are only attached worst cases.

Test Frequency

Lowest frequency	Middle frequency	Highest frequency
902.75 MHz	914.75 MHz	927.25 MHz

3.4 Maximum Measurement Uncertainty

The value of the measurement uncertainty for the measurement of each parameter.
Coverage factor k = 2, Confidence levels of 95 %

Description	Uncertainty
Conducted RF Output Power	1.5 dB (C.L. : Approx. 95%, k = 2)
20 dB Bandwidth	0.01 MHz (C.L. : Approx. 95%, k = 2)
Unwanted Emission(conducted)	3.0 dB (C.L. : Approx. 95%, k = 2)
Radiated Emissions (f ≤ 30 MHz)	1.5 dB (C.L. : Approx. 95%, k = 2)
Radiated Emissions (f ≤ 1 GHz)	3.88 dB (C.L. : Approx. 95%, k = 2)
Radiated Emissions (f > 1 GHz)	4.50 dB (C.L. : Approx. 95%, k = 2)
AC Conducted Emission	1.94 dB (C.L. : Approx. 95%, k = 2)

3.5 Test Software

Conducted Test	Ics Pro Ver. 6.0.3
Radiated Test	EP5RE Ver. 6.0.1.0, ES10 Ver. 10.001
Line Conducted Test	EMC32 Ver. 8.50.0

4. Technical Characteristic Test

4.1 Carrier Frequency Separation

Test Procedures

ANSI C63.10-2013 - Section 7.8.2

The carrier frequency separation was measured with a spectrum analyzer connected to the antenna terminal, while EUT has its hopping function enabled.
After the trace being stable, the reading value between the peaks of the adjacent channels using the marker-delta function was recorded as the measurement results.

The spectrum analyzer is set to:

a) Span = 2 MHz (wide enough to capture the peaks of two adjacent channels)
b) RBW = 100 kHz (Start with the RBW set to approximately 30% of the channel spacing; adjust as necessary to best identify the center of each individual channel)
c) VBW = 100 kHz (≥ RBW)
d) Sweep = auto
e) Detector function = peak
f) Trace = max hold

Figure 1 : Measurement setup for the carrier frequency separation

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.

Test Results

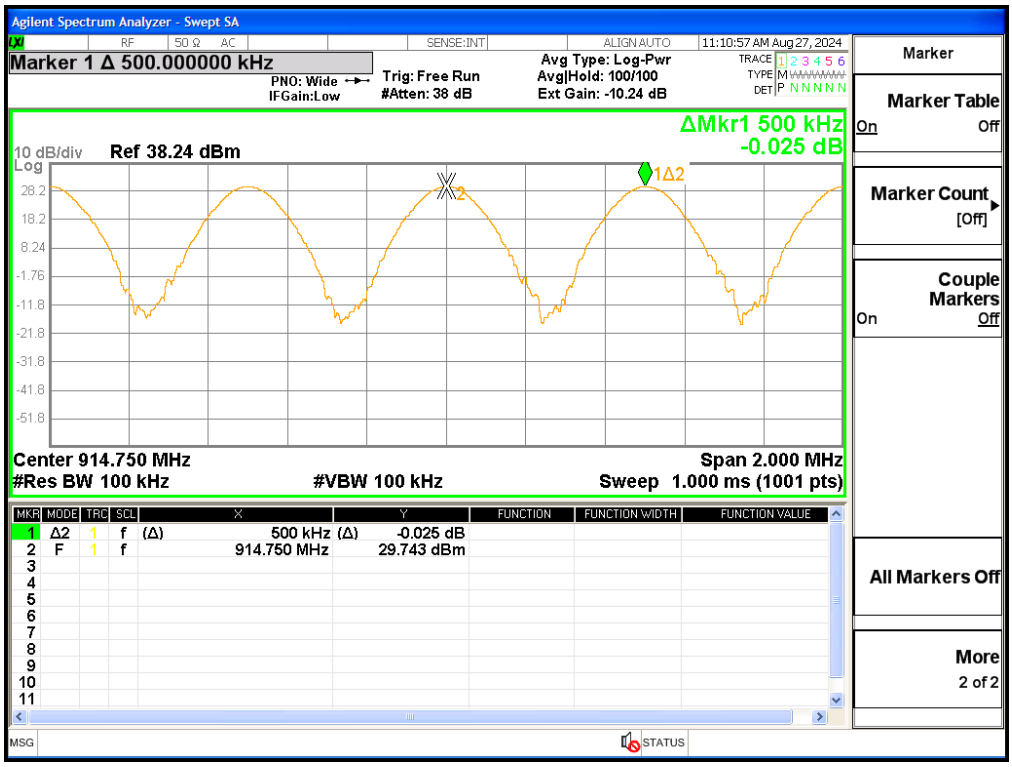
Test mode : Hopping mode

Channel	Adjacent Hopping Channel Separation [kHz]	20dB bandwidth [kHz]	Minimum Bandwidth [kHz]	Result
Middle	500	94.62	25	Complies

See follow for actual measured spectrum plots.

Test Data

Test mode : Hopping Mode



4.2 Number of Hopping Frequencies

Test Procedures

ANSI C63.10-2013 - Section 7.8.3

The number of hopping frequencies was measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function enabled.

The spectrum analyzer is set to:

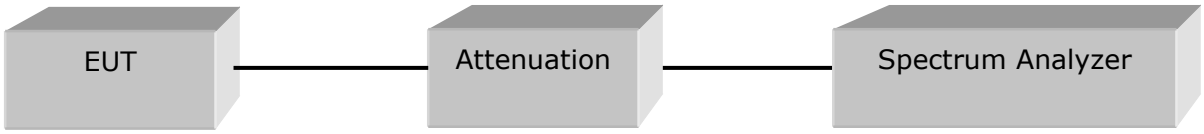
a) RBW = 100 kHz (To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller)

b) VBW = 100 kHz (≥ RBW)

c) Sweep = auto

d) Detector function = peak

e) Trace = max hold



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.

Test Results

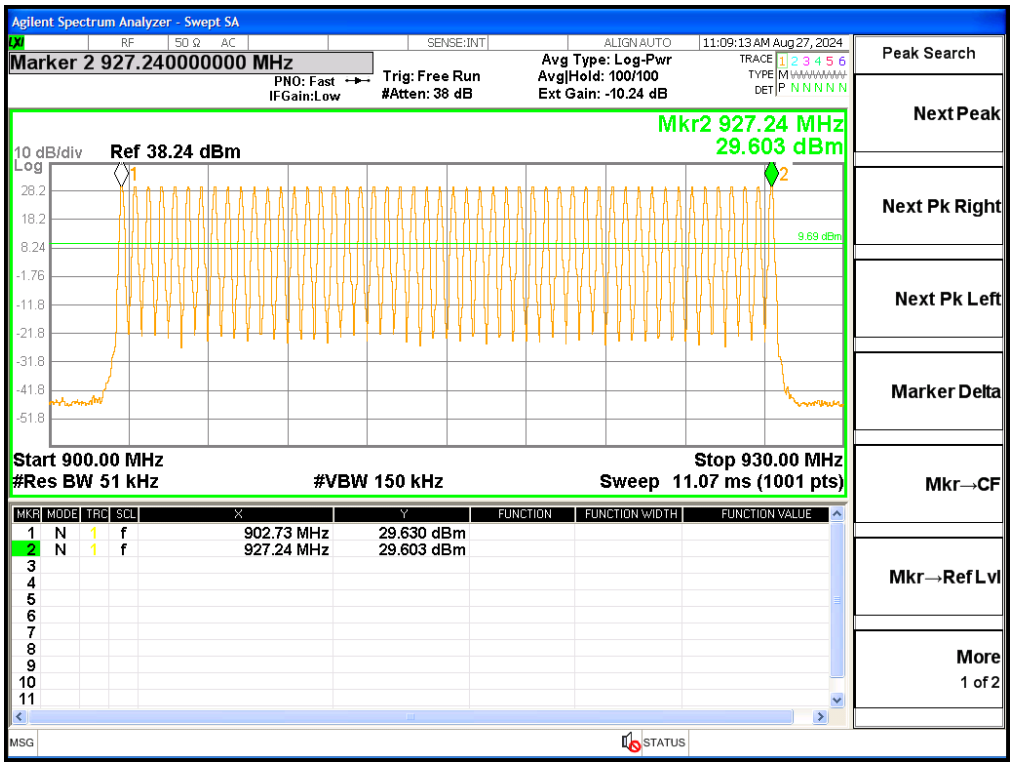
Test mode : Hopping Mode

Total number of Hopping Channels	Result
50	Complies

See follow for actual measured spectrum plots.

Test Data

Test Mode : Hopping Mode



4.3 20 dB bandwidth & 99% Bandwidth

Test Procedures

ANSI C63.10-2013 - Section 6.9.2
RSS-GEN Issue 5 - Section 6.7

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.

Test Procedures

ANSI C63.10-2013 - Section 6.9.3
RSS-GEN Issue 5 - Section 6.7

The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission.
Use the 99% power bandwidth function of the instrument and report the measured bandwidth.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

a) Span = 200 kHz (between 2 times and 5 times the OBW)

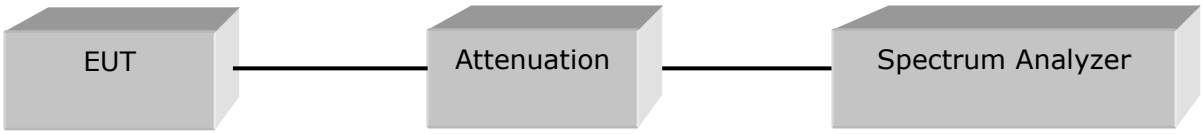
b) RBW = 3 kHz (1% to 5% of the OBW)

c) VBW = 9 kHz (approximately 3 times RBW)

d) Sweep = auto

e) Detector function = peak

f) Trace = max hold



Limit

Limit : N/A

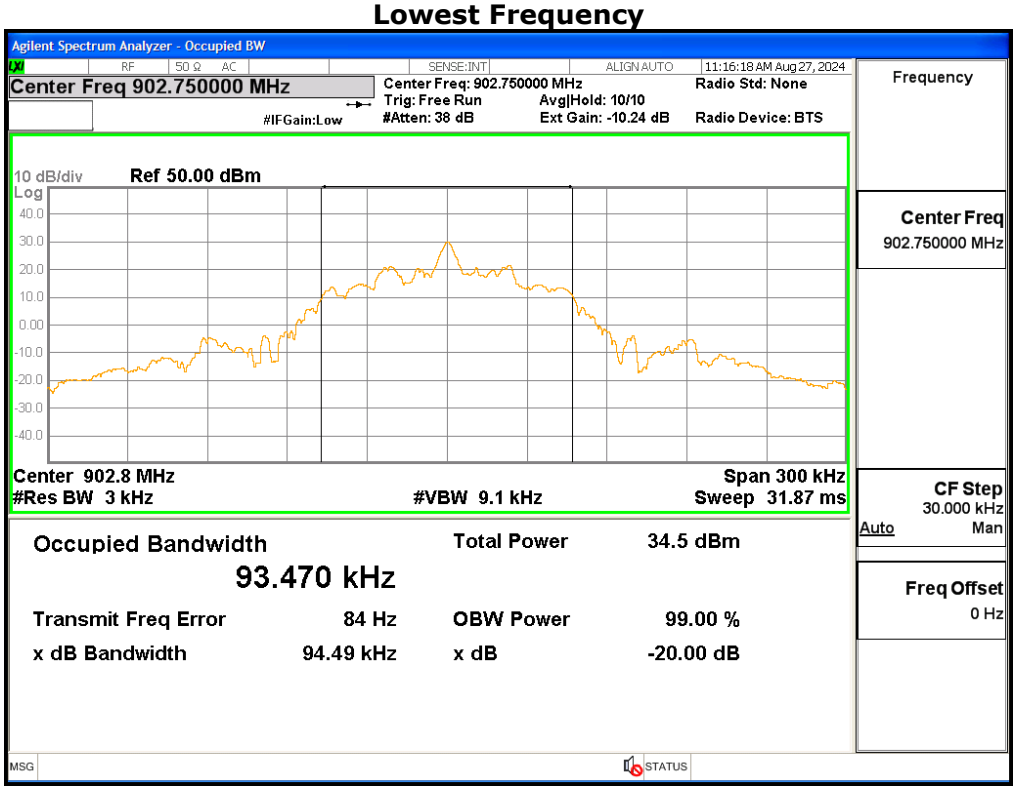
Test Results

Channel	Frequency [MHz]	20 dB Bandwidth [kHz]	99 % Bandwidth [kHz]	Result
Lowest	902.75	94.49	93.47	Complies
Middle	914.75	94.62	92.78	Complies
Highest	927.25	94.41	93.97	Complies

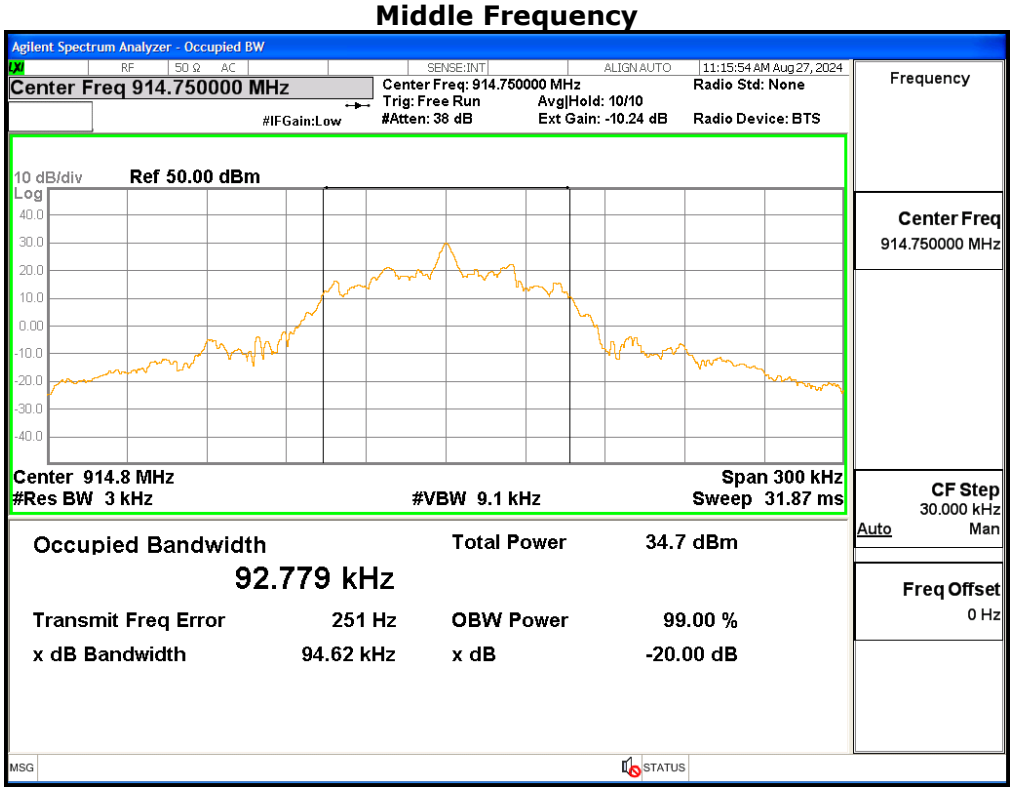
See follow for actual measured spectrum plots.

Test Data

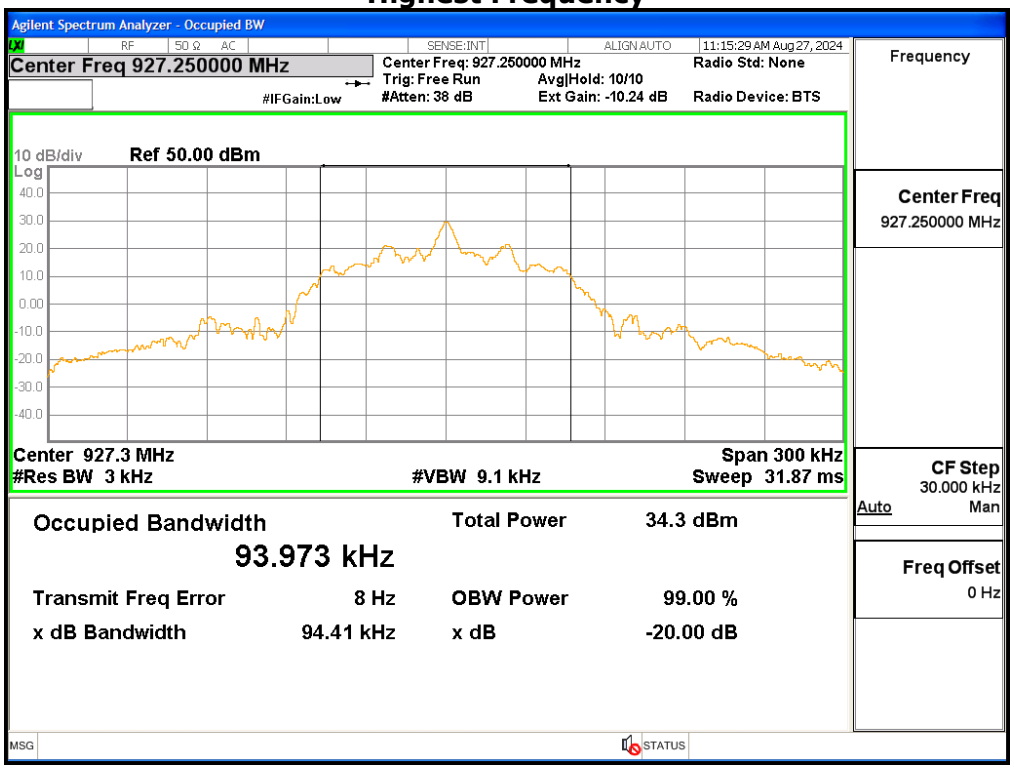
Lowest Frequency



Middle Frequency



Highest Frequency



4.4 Time of Occupancy

Test Procedures

ANSI C63.10-2013 - Section 7.8.4

The dwell time was measured with the connected to the antenna and EUT hopping function enabled.

a) Span: Zero span, centered on a hopping channel.
b) RBW shall be ≤ channel spacing and where possible RBW should be set >> 1 / T, where T is the expected dwell time per channel.
c) Sweep: As necessary to capture the entire dwell time per hopping channel; where possible use a video trigger and trigger delay so that the transmitted signal starts a little to the right of the start of the plot. The trigger level might need slight adjustment to prevent triggering when the system hops on an adjacent channel; a second plot might be needed with a longer sweep time to show two successive hops on a channel.
d) Detector function: Peak.
e) Trace: Max hold.

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.

Repeat the measurement using a longer sweep time to determine the number of hops over the period specified in the requirements. The sweep time shall be equal to, or less than, the period specified in the requirements. Determine the number of hops over the sweep time and calculate the total number of hops in the period specified in the requirements, using the following equation:

Number of hops in the period specified in the requirements =
(number of hops on spectrum analyzer) × (period specified in the requirements / analyzer sweep time)

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 and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period. The average time of occupancy is calculated from the transmit time per hop multiplied by the number of hops in the period specified in the requirements.

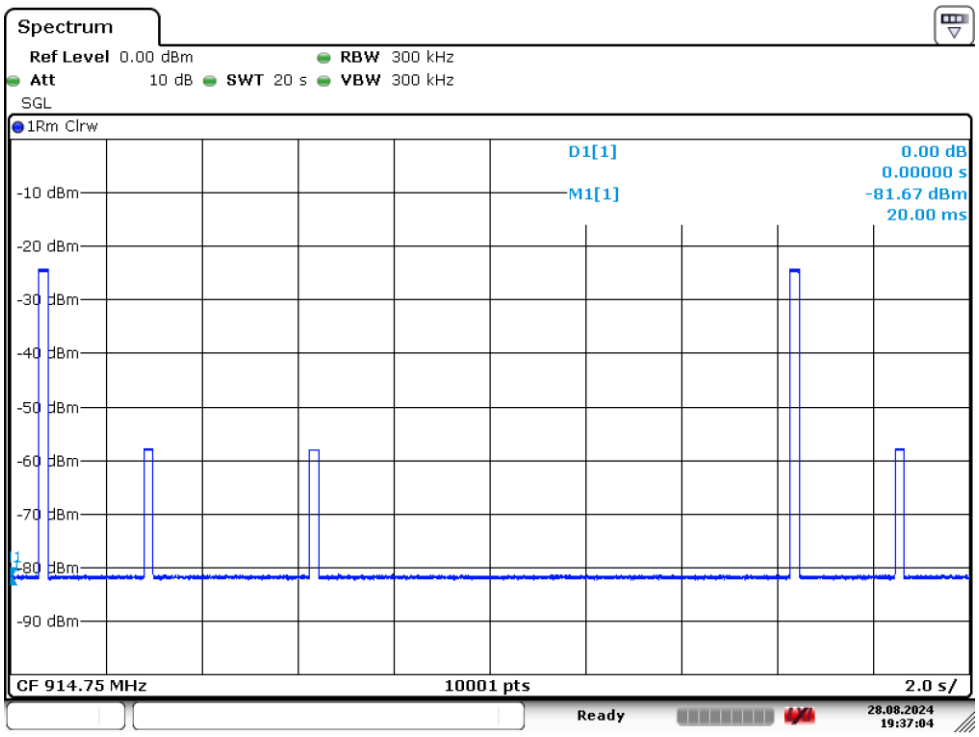
Test Results

Number of hops channels within a 20 second period	Transmit time per hop(msec)	Result (msec)	Limit (msec)
2	196	392	400

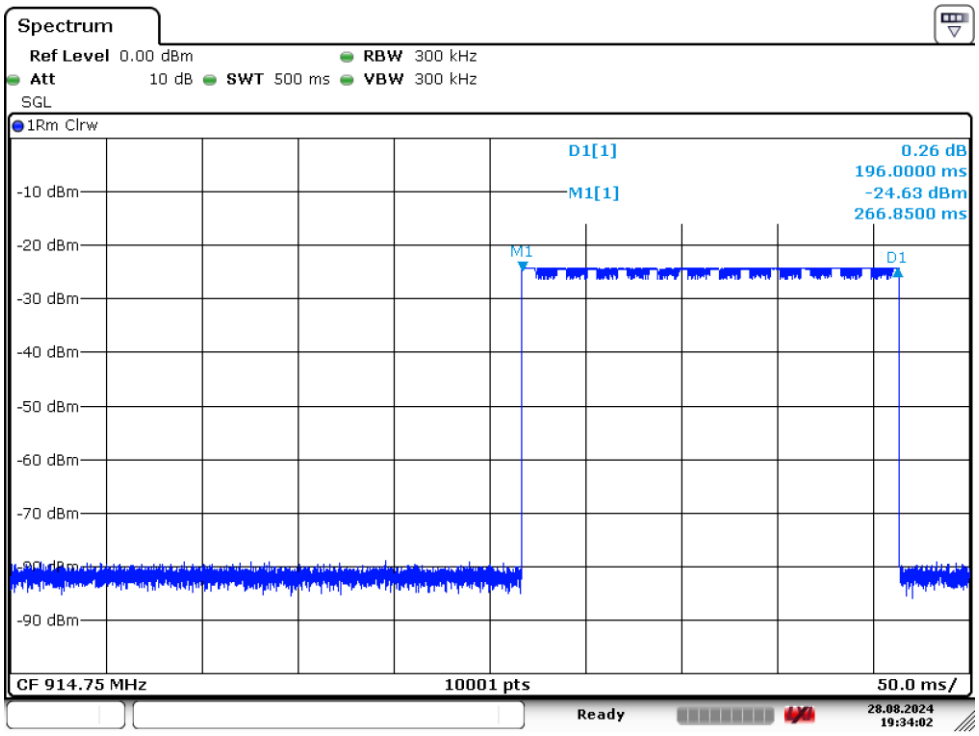
See follow for actual measured spectrum plots.

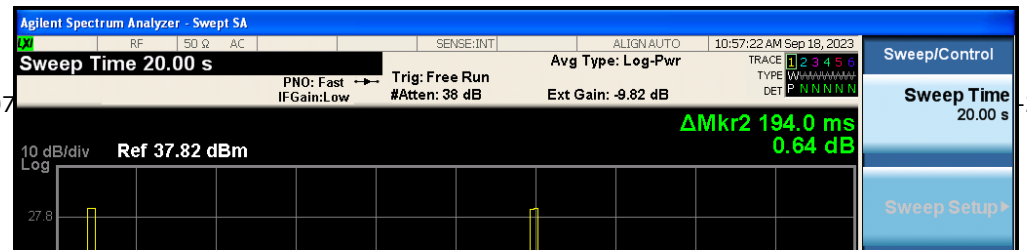
Test Data

Number of hops channels within a 20 second period



Transmit time per hop





4.5 Maximum peak Conducted Output Power

Test Procedures

ANSI C63.10-2013 - Section 7.8.5

This is an RF-conducted test to evaluate maximum peak output power. Use a direct connection between the antenna port of the unlicensed wireless device and the spectrum analyzer, through suitable attenuation. The hopping shall be disabled for this test.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

a) Span = 400 kHz (approximately 5 times of the 20 dB bandwidth)

b) RBW = 1 MHz (greater than the 20 dB bandwidth of the emission being measured)

c) VBW = 1 MHz (≥ RBW)

d) Detector = peak

e) Trace = max hold

f) Sweep = auto

Limit

For frequency hopping systems operating in the 902-928 MHz band: 1 watt(30 dBm) for systems employing at least 50 hopping channels.
The limit reduced by the antenna gain exceeding 6dB from the original limit is 29.88 dBm.

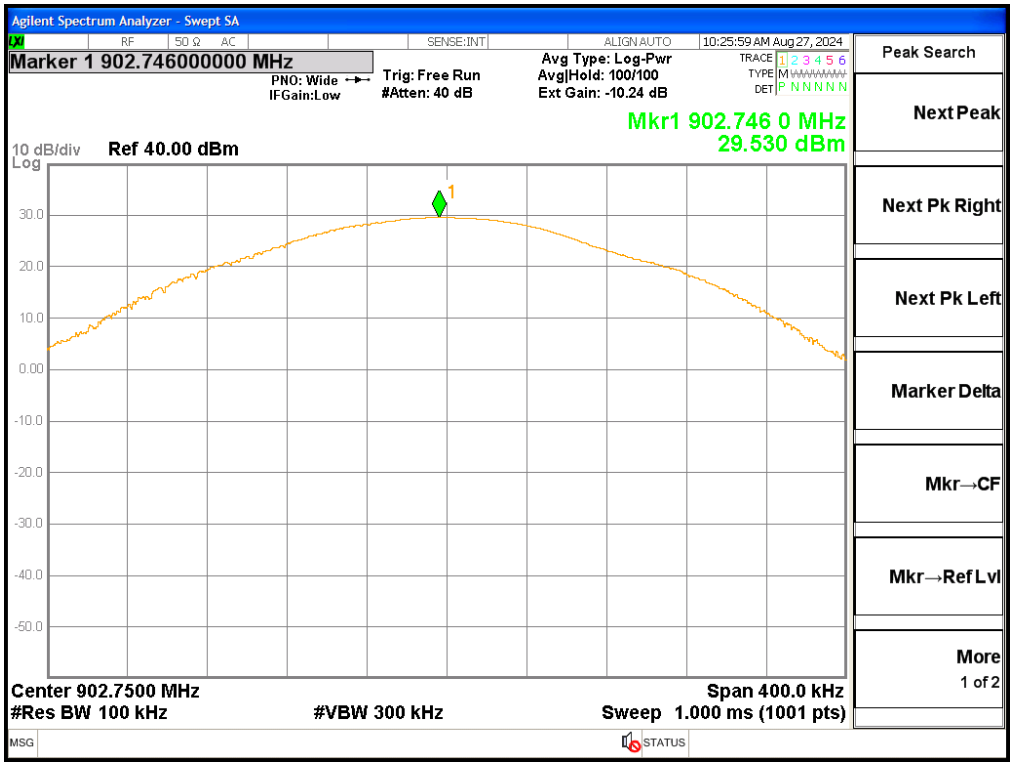
Test Results

Channel	Frequency [MHz]	Output Power [dBm]	Output power [mW]	Result
Lowest	902.75	29.53	897.43	Complies
Middle	914.75	29.59	909.91	Complies
Highest	927.25	29.62	916.22	Complies

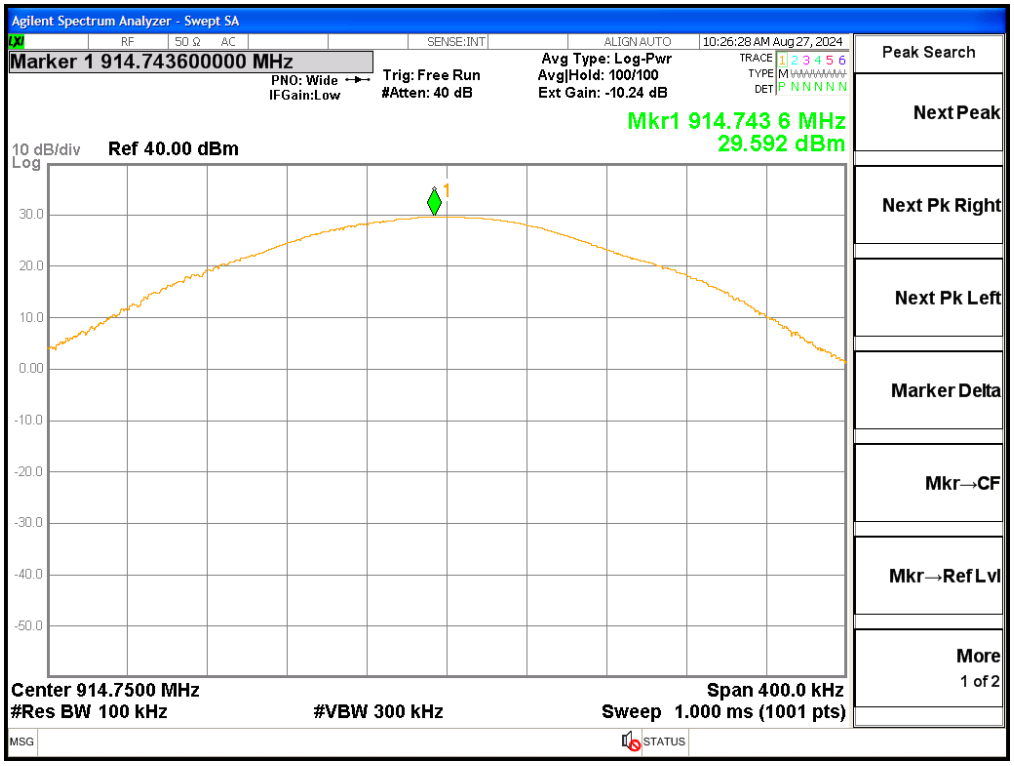
See follow for actual measured spectrum plots.

Test Data

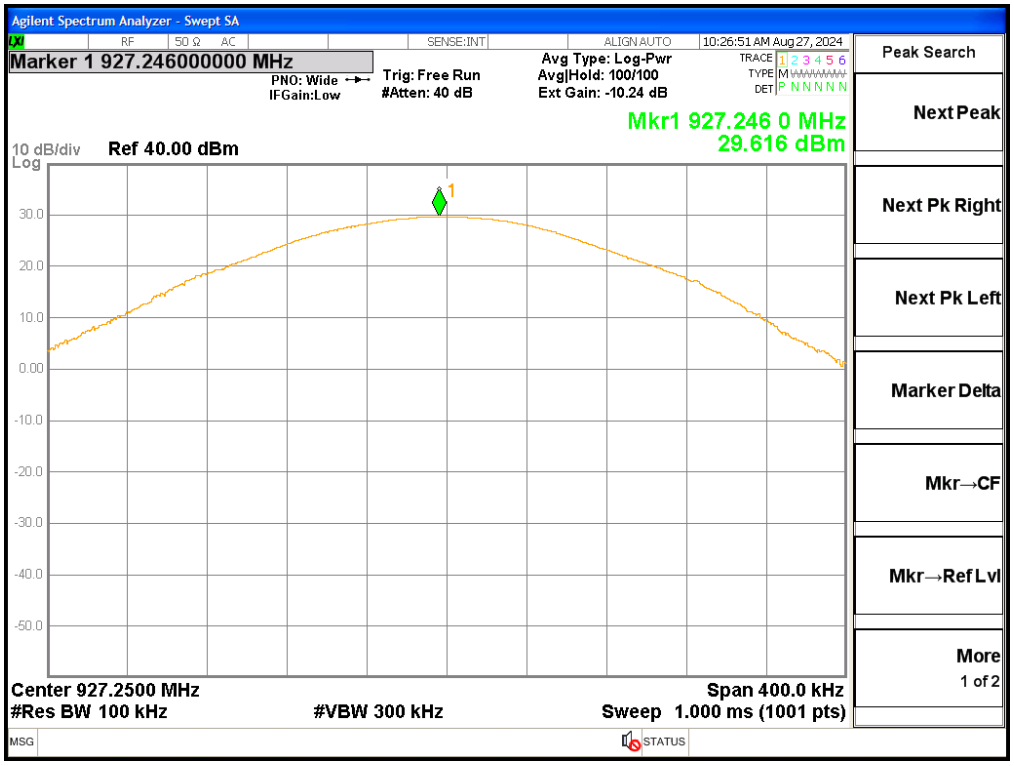
Output Power - Lowest Frequency



Output Power - Middle frequency



Output Power - Highest frequency



4.6 Unwanted Emissions (Conducted)

Test Procedures

ANSI C63.10-2013 - Section 7.8.6, 7.8.8

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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 that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section 5.4(4), the attenuation required shall be 30 dB instead of 20 dB.

The bandwidth at 20 dB down from the highest inband spectral density was measured with a spectrum analyzer connected to the antenna terminal, while EUT has its hopping function disabled at the highest, middle and the lowest available channels.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

a) RBW = 100 kHz

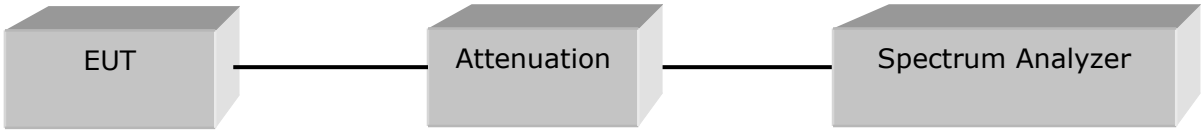
b) VBW = 300 kHz (≥ RBW)

c) Span = 10 MHz

d) Detector = peak

e) Trace = max hold

f) Sweep = auto



Limit

> 20 dBc

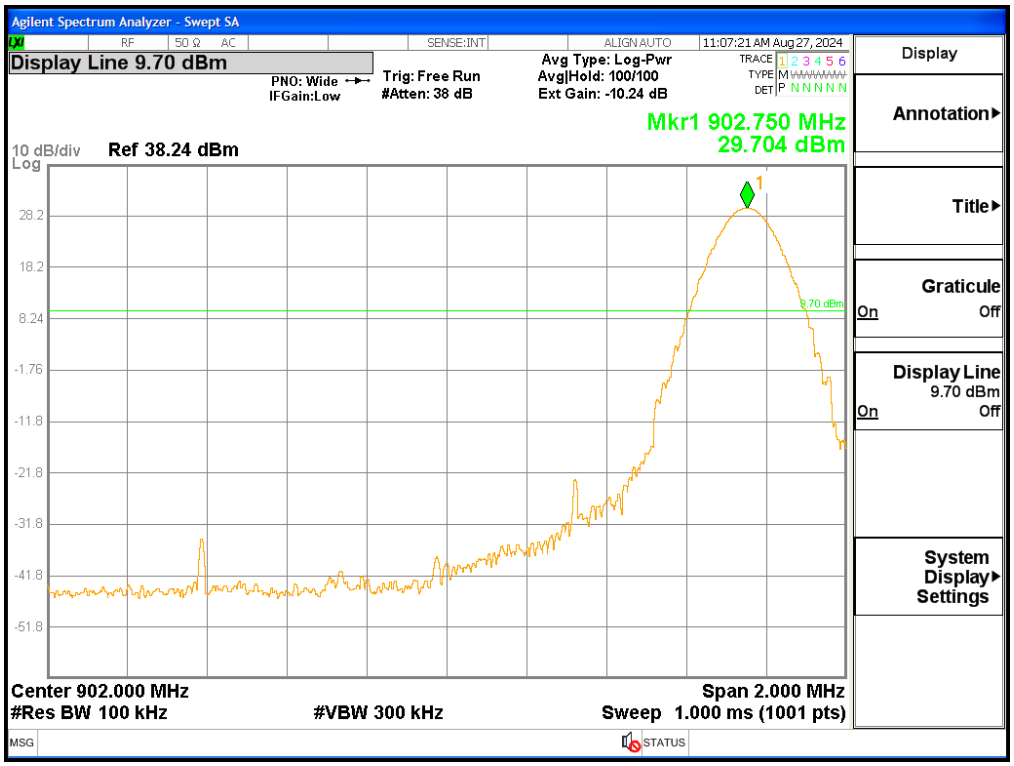
Test Results

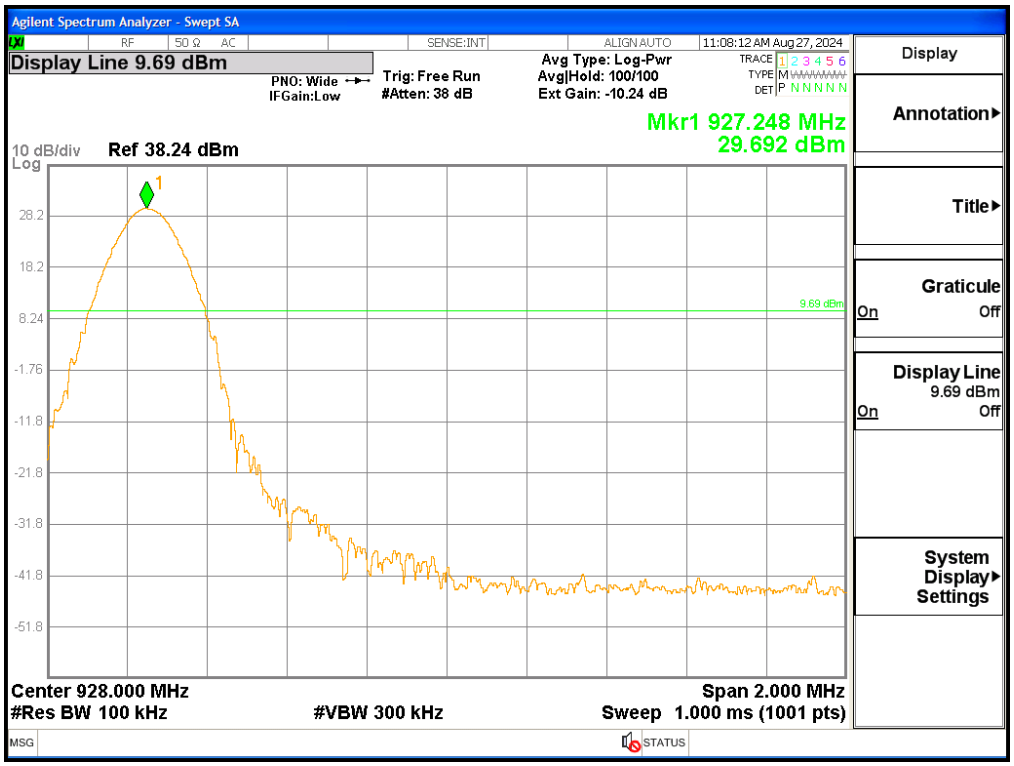
All conducted emission in any 100 kHz bandwidth outside of the spectrum band was at least 20 dB lower than the highest level of the in-band spectral density.
Therefore the applying equipment meets the requirement.

See follow for actual measured spectrum plots.

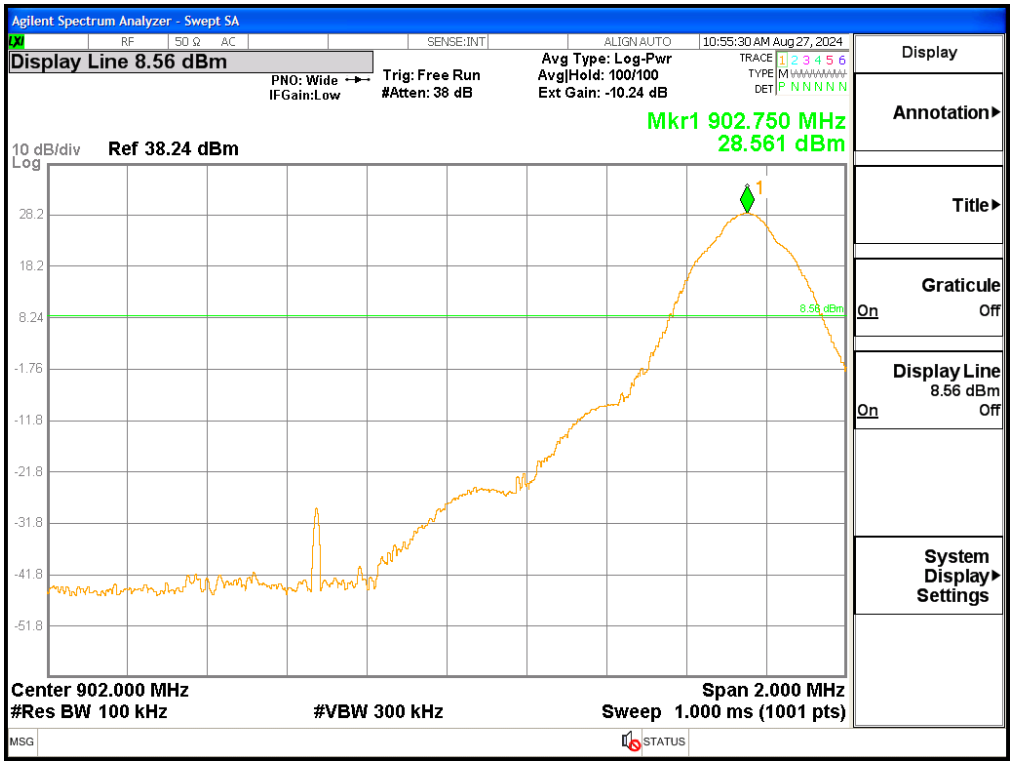
Test Data

Band Edge - Hopping mode

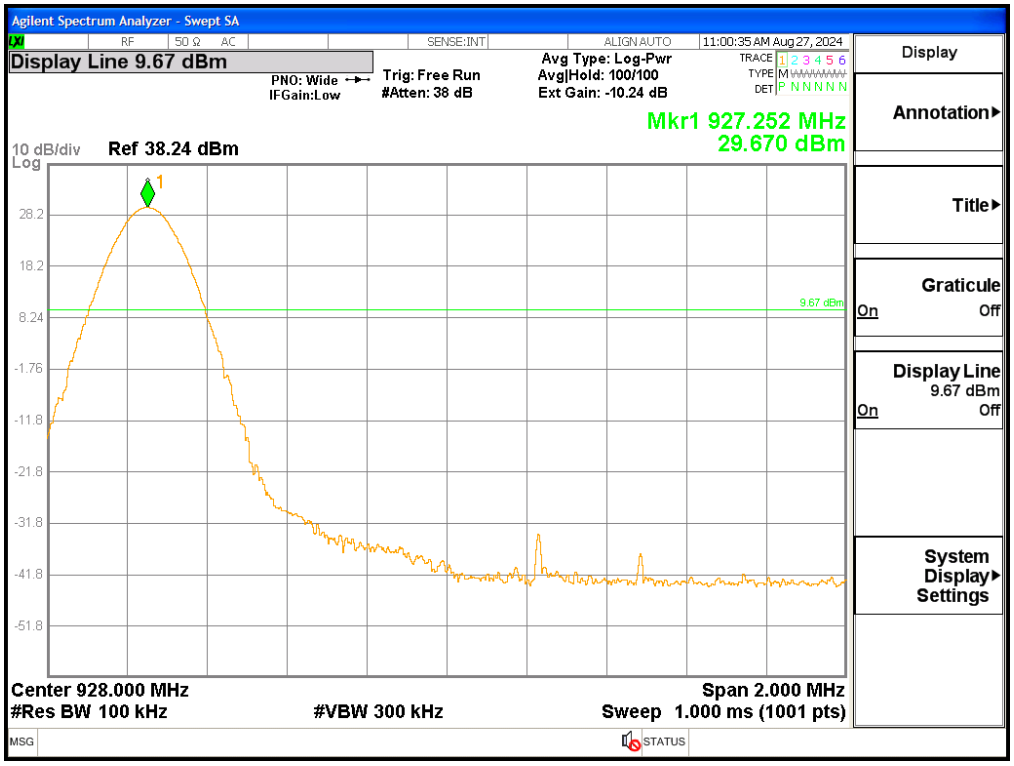




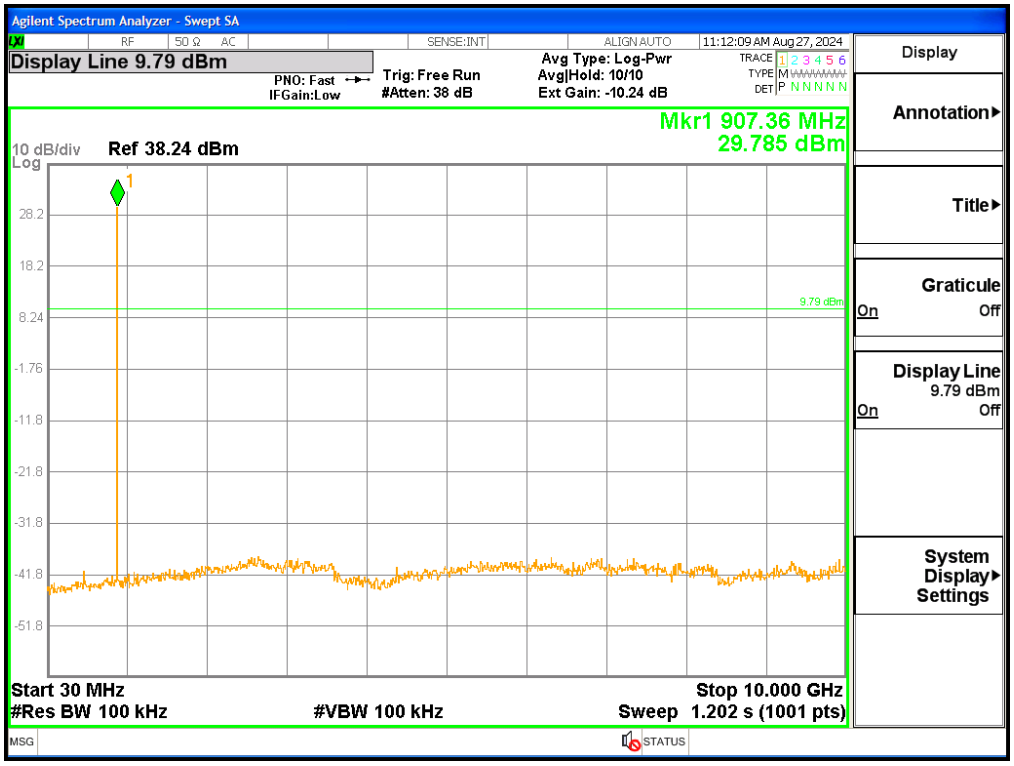
Band Edge - Lowest frequency



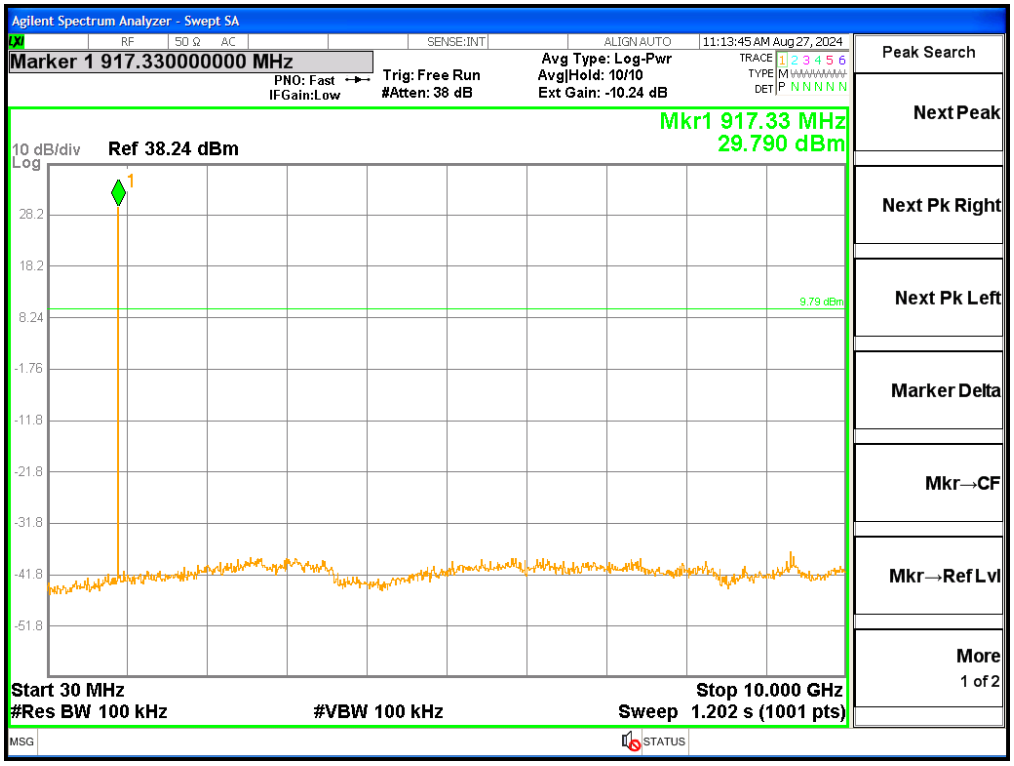
Band Edge - Highest frequency



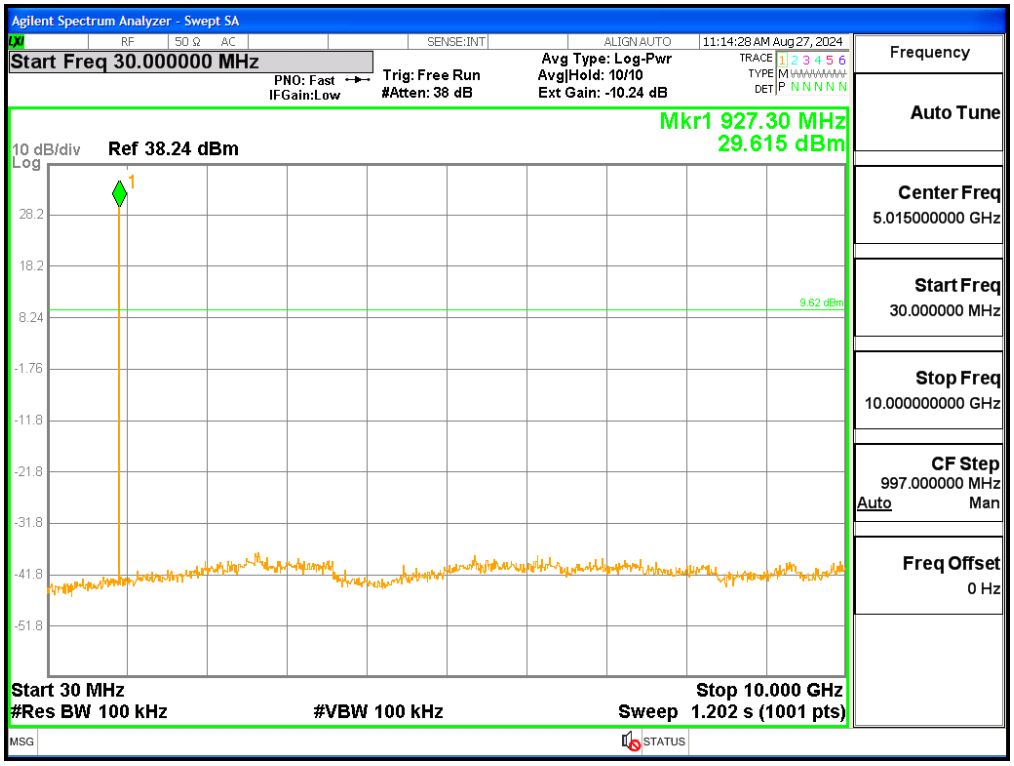
Spurious Emission - Lowest frequency



Spurious Emission - Middle frequency



Spurious Emission - Highest frequency



4.7 Radiated Emission

Test Location

☒ 10 m SAC (test distance : ☐ 10 m, ☒ 3 m)
☒ 3 m SAC (test distance : 3 m)

Test Procedures

ANSI C63.10–2013 – Section 6.5, 6.6

1) In the frequency range of 9 kHz to 30 MHz, magnetic field is measured with Loop Antenna. The center of the Loop Test Antenna is 1m above the ground. During the measurement the Loop Test Antenna rotates about its vertical axis for maximum response at each azimuth about the EUT.
2) In the frequency rage above 30 MHz, Bi-Log Test Antenna(30 MHz to 1 GHz) and Horn Test Antenna(above 1 GHz) are used. Test Antenna is 3 m away from the EUT. Test Antenna height is carried from 1 m to 4 m above the ground to determine the maximum value of the field strength. The emissions levels at both horizontal and vertical polarizations should be tested.

Test Settings :

Frequency Range = 9 kHz ~ 10 GHz (900 MHz 10^{th} harmonic)

a) RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f < 1 GHz, 9 kHz for f < 30 MHz,
200 Hz for f < 150 kHz

b) VBW ≥ RBW

c) Sweep time = auto couple

Limit :

Unwanted emissions that do not fall within the restricted frequency bands of Table 1 shall comply either with the limits specified in the applicable RSS or with those specified in this RSS-Gen.

FCC Part 15 § 15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

Table 1. Restricted Frequency Bands

MHz	MHz	MHz	MHz	MHz	GHz
0.09-0.11	8.37626-8.38675	73-74.6	399.9-410	2690-2900	10.6-12.7
[1]0.495-0.505	8.41425-8.41475	74.8-75.2	608-614	3260-3267	13.25-13.4
2.1735-2.1905	12.29-12.293	108-121.94	960-1240	3332-3339	14.47-14.5
4.125-4.128	12.51975-12.52025	123-138	1300-1427	3345.8-3358	15.35-16.2
4.17725-4.17775	12.57675-12.57725	149.9-150.05	1435-1626.5	3600-4400	17.7-21.4
4.20725-4.20775	13.36-13.41	156.52475-156.52525	1645.5-1646.5	4500-5150	22.01-23.12
6.215-6.218	16.42-16.423	156.7-156.9	1660-1710	5350-5460	23.6-24
6.26775-6.26825	16.69475-16.69525	162.0125-167.17	1718.8-1722.2	7250-7750	31.2-31.8
6.31175-6.31225	16.80425-16.80475	167.72-173.2	2200-2300	8025-8500	36.43-36.5
8.291-8.294	25.5-25.67	240-285	2310-2390	9000-9200	[2]Above 38.6
8.362-8.366	37.5-38.25	322-335.4	2483.5-2500	9300-9500	

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

[2] Above 38.6

§ 15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown is Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

FCC Part 15 § 15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table 2 :

Except when the requirements applicable to a given device state otherwise, emissions from licence-exempt transmitters shall comply with the field strength limits shown in table 2 Additionally, the level of any transmitter emission shall not exceed the level of the transmitter's fundamental emission.

Table 2. General Field Strength Limits for Licence-Exempt Transmitters (FCC)

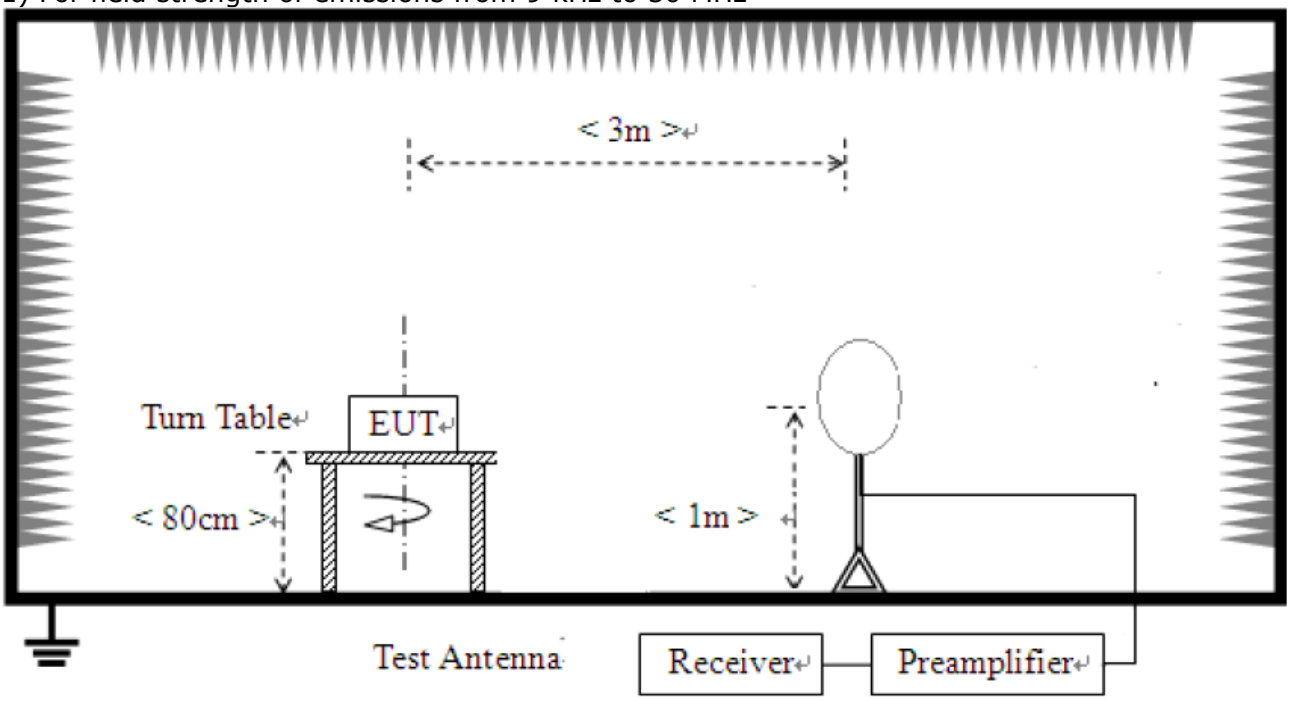
Frequency(MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Deasurement Distance (meters)
0.009-0.490	2400/F(kHz)	48.5 – 13.8	300
0.490-1.705	24000/F(kHz)	33.8 – 23	30
1.705-30	30	29.5	30
30-88	100**	40	3
88-216	150**	43.5	3
216-960	200**	46	3
Above 960	500	54	3

** Except as provided in 15.209(g).fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz, 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g.15.231 and 15.241.

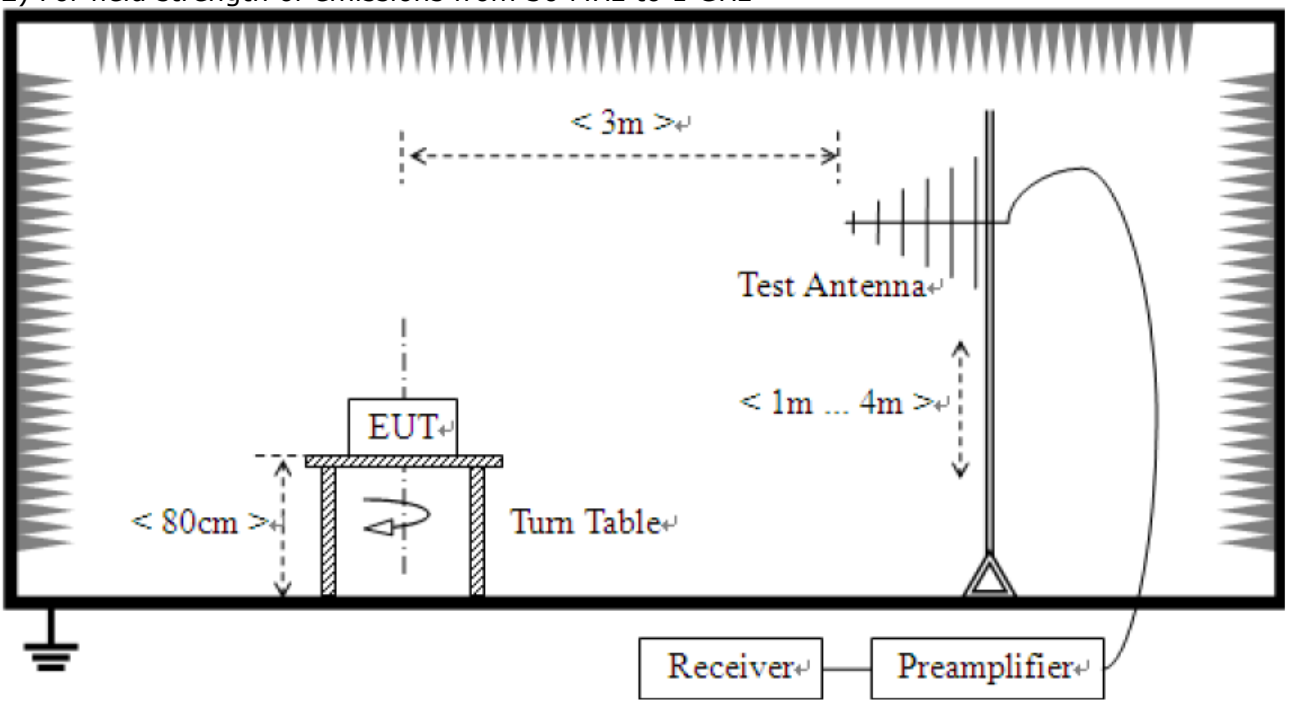
Note :
1) For above 1 GHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.
2) For above 1 GHz, limit field strength of harmonics : 54 dBuV/m@3 m (AV) and 74 dBuV/m@3 m (PK)
3) For measurement above 1 GHz, the resolution bandwidth is set to 1 MHz and video bandwidth is set to 3 MHz for peak measurement.

Test Setup:

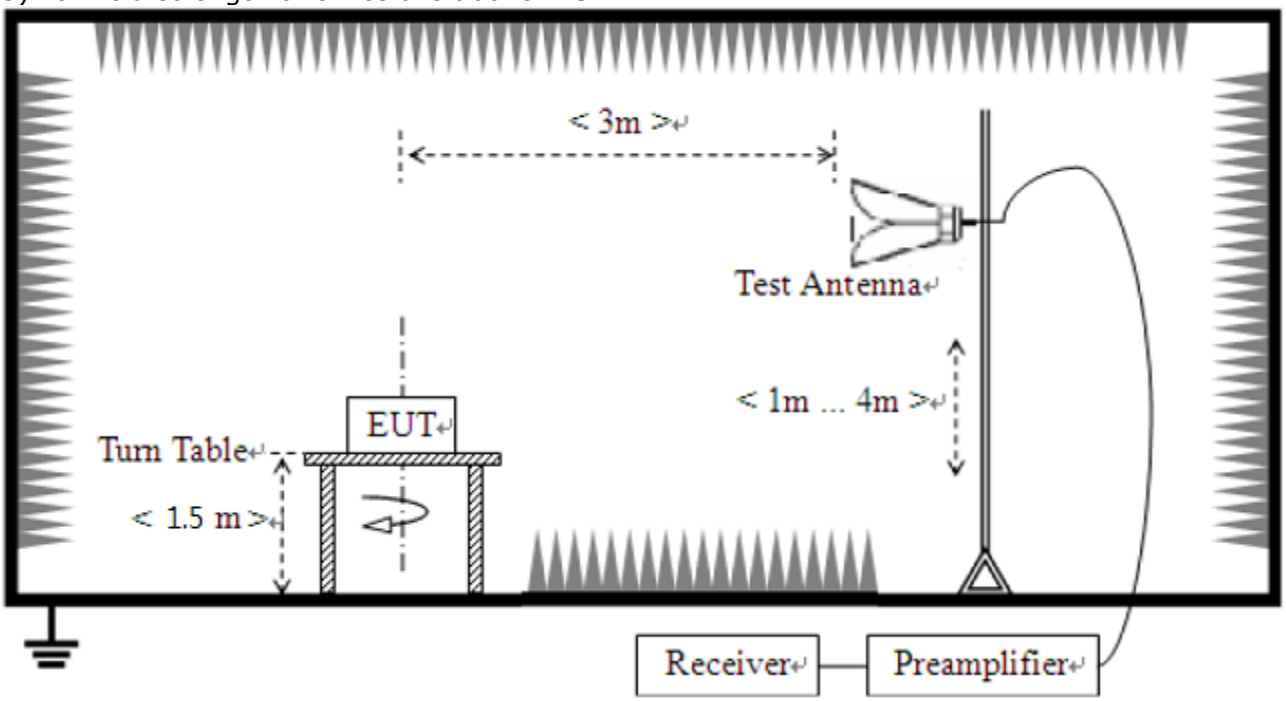
1) For field strength of emissions from 9 kHz to 30 MHz



2) For field strength of emissions from 30 MHz to 1 GHz



3) For field strength of emissions above 1 GHz



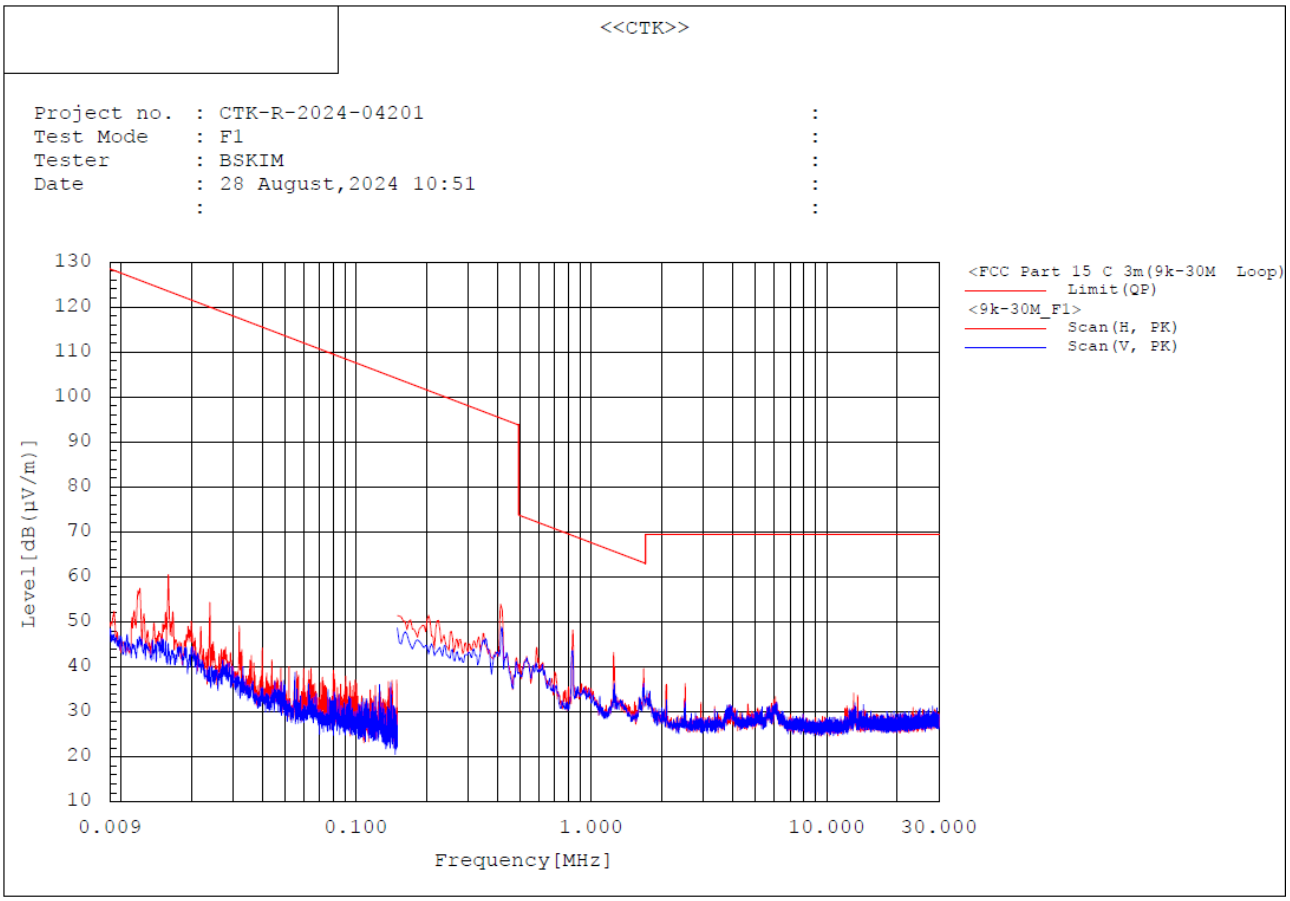
Test results

1) 9 kHz to 30 MHz

Test mode : Antenna type 1_Highest (Worst case)

The requirements are:
☒ Complies

Test Data



Result : There are more than 20 dB of margin compared to the reference value.

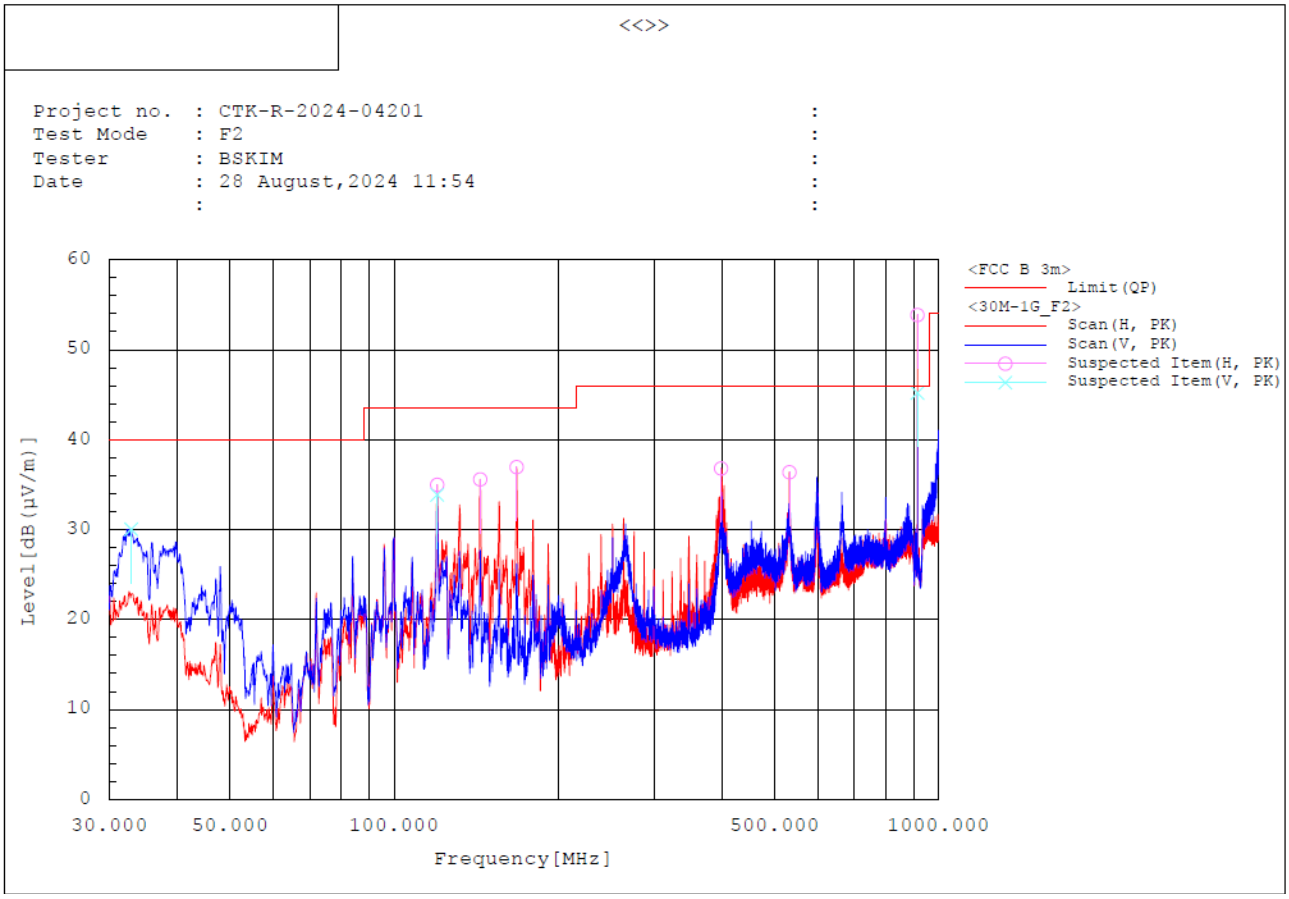
Remark :
1. Measuring position : The Unwanted emission was measured in the following position: EUT stand-up position(Z axis), lie-down position(X,Y axis). The worst emission was found in lie-down position(Y axis) and the worst case was recorded.
2. Result = Reading + c.f(correction factor)
3. Correction factor = Antenna factor + Cable loss + 6 dB attenuator
4. This data is the Peak(PK) value.

2) 30 MHz to 1 GHz

Test mode : Antenna type 1 Middle (Worst case)

The requirements are:
☒ Complies

Test Data



No.	Frequency [MHz]	Pol	Reading PK [dB(μV)]	c.f [dB(1/m)]	Result PK [dB(μV/m)]	Limit QP [dB(μV/m)]	Margin QP-PK [dB]	Height [cm]	Angle [deg]	Remark
1	32.910	V	38.1	-8.1	30.0	40.0	10.0	100.0	356.8	
2	120.016	H	48.0	-13.0	35.0	43.5	8.5	200.1	191.6	
3	120.016	V	46.9	-13.0	33.9	43.5	9.6	100.0	299.2	
4	143.975	H	48.4	-12.8	35.6	43.5	7.9	200.1	164.3	
5	167.934	H	51.5	-14.6	36.9	43.5	6.6	200.1	167.2	
6	398.600	H	44.0	-7.2	36.8	46.0	9.2	200.1	282.9	
7	532.460	H	40.9	-4.5	36.4	46.0	9.6	200.1	355.6	
8	914.834	H	50.3	3.6	53.9	46.0	-7.9	100.0	47.4	
9	914.834	V	41.6	3.6	45.2	46.0	0.8	200.1	78.5	

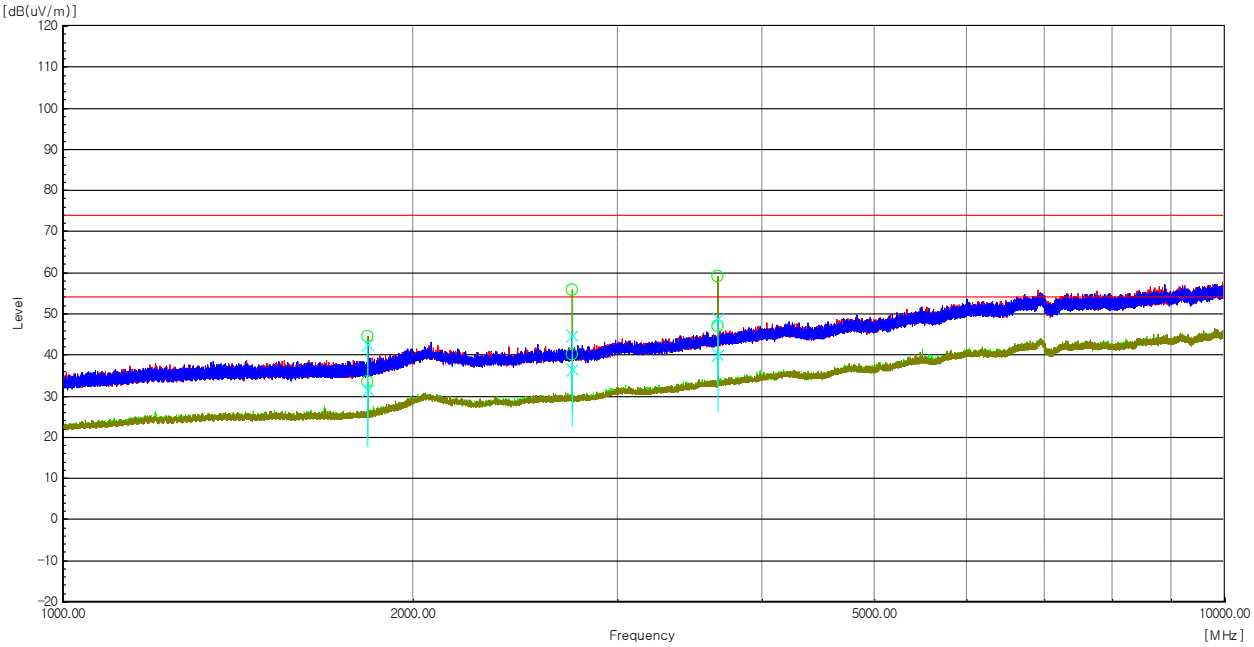
Remark :
1. Measuring position : The Unwanted emission was measured in the following position: EUT stand-up position(Z axis), lie-down position(X,Y axis). The worst emission was found in lie-down position(Y axis) and the worst case was recorded.
2. Result = Reading + c.f(Correction factor)
3. Correction factor = Antenna factor + Cable loss + 6 dB attenuator - Amp Gain
4. This data is the Peak(PK) value.
5. Band reject filter was used.
6. No.3 to No.4 are the fundamental frequencies of the product.

3) 1 GHz to 10 GHz

Test mode : Antenna type 2_Middle (Worst case)

The requirements are:
☒ Complies

Test Data



Frequency [MHz]	(P)	Reading PK [dBuV]	Reading AV [dBuV]	c.f [dB(1/m)]	Level PK [dB(uV/m)]	Level AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin AV [dB]
2 744.35	H	59.8	-----	-4.0	55.8	-----	74.0	-----	18.2	-----
2 744.35	H	-----	44.0	-4.0	-----	40.0	-----	54.0	-----	14.0
2 744.35	V	-----	40.6	-4.0	-----	36.6	-----	54.0	-----	17.4
3 658.95	H	60.2	-----	-1.2	59.0	-----	74.0	-----	15.0	-----
3 658.95	H	-----	48.1	-1.2	-----	46.9	-----	54.0	-----	7.1
3 658.95	V	-----	41.2	-1.2	-----	40.0	-----	54.0	-----	14.0

Remarks
1. Measuring position : The Unwanted emission was measured in the following position: EUT stand-up position(Z axis), lie-down position(X,Y axis). The worst emission was found in lie-down position(Y axis) and the worst case was recorded.
2. Result = Reading + c.f(correction factor)
3. Correction factor = Antenna factor + Cable loss - Amp Gain
4. Band reject filter & high pass filter was used.

4.8 AC Conducted Emissions

A radio apparatus that is designed to be connected to the public utility (AC) power line shall ensure that the radio frequency voltage, which is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz-30 MHz, shall not exceed the limits.

Frequency Range of Measurement
150 kHz to 30 MHz

Instrument Settings
IF Band Width: 9 kHz

Test Procedures

ANSI C63.10-2013 - Section 6.2.2

The EUT was placed on a non-metallic table 0.8m above the metallic, grounded floor and 0.4m from the reference ground plane wall. The distance to other metallic surfaces was at least 0.8m.
Amplitude measurements were performed with a quasi-peak detector and an average detector.

Limit
- 15.207(a)

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

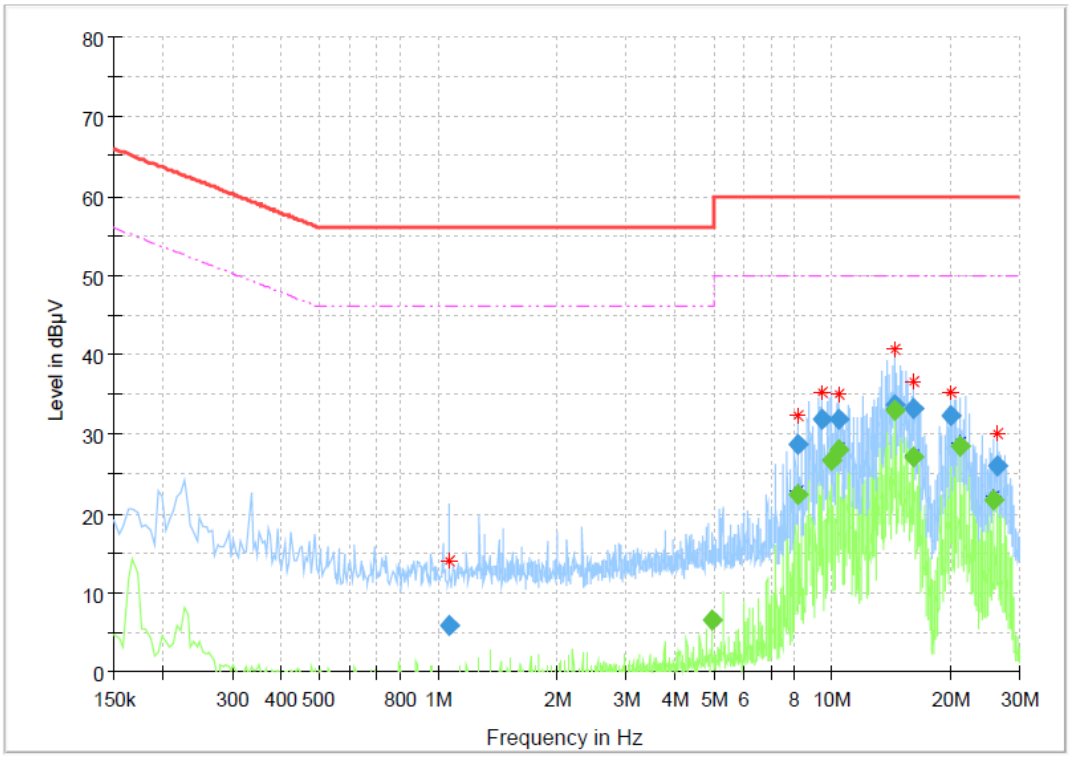
* The level decreases linearly with the logarithm of the frequency.
** A linear average detector is required.

Test Results

The requirements are:
☒ Complies

Test Data

[LINE, NEUTRAL]



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
1.068000	5.94	---	56.00	50.06	15000.0	9.000	L1	ON	9.7
4.965000	---	6.58	46.00	39.42	15000.0	9.000	N	ON	9.8
8.227500	28.74	---	60.00	31.26	15000.0	9.000	N	ON	9.9
8.232000	---	22.42	50.00	27.58	15000.0	9.000	N	ON	9.9
9.429000	31.76	---	60.00	28.24	15000.0	9.000	L1	ON	9.8
9.946500	---	26.66	50.00	23.34	15000.0	9.000	N	ON	9.9
10.455000	31.87	---	60.00	28.13	15000.0	9.000	N	ON	9.9
10.459500	---	28.09	50.00	21.91	15000.0	9.000	N	ON	9.9
14.397000	33.64	---	60.00	26.36	15000.0	9.000	N	ON	9.9
14.397000	---	32.98	50.00	17.02	15000.0	9.000	N	ON	9.9
16.111500	---	27.09	50.00	22.91	15000.0	9.000	N	ON	10.0
16.125000	33.32	---	60.00	26.68	15000.0	9.000	N	ON	10.0
20.062500	32.22	---	60.00	27.78	15000.0	9.000	N	ON	10.0
21.259500	---	28.58	50.00	21.42	15000.0	9.000	N	ON	10.0
25.710000	---	21.71	50.00	28.29	15000.0	9.000	N	ON	10.0
26.223000	26.01	---	60.00	33.99	15000.0	9.000	N	ON	10.0

4.9 Frequency Hopping System Requirements

Requirements

According to FCC Part 15.247(a)(1), The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

(g) Frequency hopping spread spectrum systems are not required to employ all available hopping channels during each transmission. However, the system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this section should the transmitter be presented with a continuous data (or information) stream. In addition, a system employing short transmission bursts must comply with the definition of a frequency hopping system and must distribute its transmissions over the minimum number of hopping channels specified in this section.

(h) The incorporation of intelligence within a frequency hopping spread spectrum system that permits the system to recognize other users within the spectrum band so that it individually and independently chooses and adapts its hopsets to avoid hopping on occupied channels is permitted. The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

Frequency Hopping System

This transmitter device is frequency hopping device, and complies with FCC part 15.247 rule.

This device uses RFID radio which operates in 902-928 MHz band. It uses a radio technology called frequency-hopping spread spectrum, which chops up the data being sent and transmits chunks of it on up to 50 bands (0.5 MHz each; centered from 902.75 to 927.25 MHz) in the range 902-928 MHz.

EUT Pseudo random Frequency Hopping Sequence

Pseudo random Frequency Hopping Sequence Table as below:
Channel:
27,26,2,49,48,4,50,36,34,14,33,31,6,5,46,39,25,9,23,40,18,19,3,13,7,20,8,30,24,10,32,28,16,17,11,45,15,35,29,22,43,12,47,21,44,38,37,41,1,42

The system receiver has input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shift frequencies in synchronization with the transmitted signals

5. APPENDIX A – Test Equipment Used For Tests

	Name of Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	Signal Analyzer	Agilent	N9020A	MY50510324	2023-12-05	2024-12-05
2	Signal Generator	Rohde & Schwarz	SMB100A	175528	2024-03-21	2025-03-21
3	EMI TEST RECEIVER	Rohde & Schwarz	ESW44	102039	2024-04-29	2025-04-29
4	Bilog Antenna	TESEQ	CBL6111D	60654	2023-08-21	2025-08-21
5	Active Loop Antenna	SCHWARZBECK	FMZB 1513	1513-125	2024-04-15	2026-04-15
6	Attenuator	PASTERNACK	PE7AP006-06	L20210504000 023	2024-07-31	2025-07-31
7	ATTENUATOR	NONE	6dB	190557	2023-09-25	2024-09-25
8	AMPLIFIER	SONOMA	310N	411011	2024-07-31	2025-07-31
9	Spectrum Analyzer	Rohde & Schwarz	FSV40	101574	2024-01-15	2025-01-15
10	Preamplifier	Agilent	8449B	3008A00620	2024-04-11	2025-04-11
11	Double Ridged Guide Antenna	ETS-Lindgren	3115	00078895	2024-04-16	2025-04-16
12	Band Reject Filter	Wainwright Instruments GmbH	WRCG902/930 -894/938- 50/12SS	SN1	2024-03-21	2025-03-21
13	High Pass Filter	FILTRON	H16029FL	1606001S-1	2024-03-20	2025-03-20
14	Dual-Tracking DC Power Supply	Topward Electric Instruments Co.,Ltd.	6303D	711196	2024-03-20	2025-03-20
15	DC POWER SUPPLY	HP	E3632A	MY40009327	2024-03-20	2025-03-20
16	EMI Test Receiver	R&S	ESR3	102826	2024-04-29	2025-04-29
17	LISN	R&S	ENV216	101236	2023-10-31	2024-10-31
18	COAXIAL STEP ATTENUATOR	HP	8494B	3308A31418	2024-03-21	2025-03-21
19	COAXIAL STEP ATTENUATOR	HP	8496B	3308A70904	2024-03-21	2025-03-21

No.	Cable	Manufacturer	Model No.	Serial No.	Check Date
1	RF Cable(conducted)	Junkosha Inc.	MWX221	2008S240	2024-08-27
2	RF Cable (Line Conducted)	Canare Corporation	L-5D2W	N/A	2024-03-05
3	RF Cable (9kHz-1GHz Radiated)	Canare Corporation	L-5D2W	N/A	2024-03-05
4	RF Cable (9kHz-1GHz Radiated)	HUBER+SUHNER	SUCOFLEX 104	MY27558/4	2024-03-05
5	RF Cable (1GHz-18GHz Radiated)	Junkosha Inc.	MWX221	2008S246	2023-06-28
6	RF Cable (1GHz-18GHz Radiated)	Rosenberger	NONE	1520.9927.00	2023-06-28
7	RF Cable (1GHz-18GHz Radiated)	Sensorview Co., LTD	9S18	TPC2204060007	2023-06-28
8	RF Cable (18GHz-26.5GHz Radiated)	HUBER+SUHNER	SUCOFLEX 102	MY2372/2	2023-06-28
9	RF Cable (18GHz-26.5GHz Radiated)	HUBER+SUHNER	SUCOFLEX 102	MY073/2	2023-06-28
10	RF Cable (18GHz-26.5GHz Radiated)	Sensorview Co., LTD	9S40	TP210713-001	2023-06-28

-END-