

Project No: TM-2409000206P
Report No.: TMWK2409003200KR

FCC ID: 2AWUU60B04001
IC: 26271-60B04001

Page: 1 / 31
Rev.: 02

FCC 47 CFR PART 15 SUBPART C & INDUSTRY CANADA RSS-210

TEST REPORT

For

Mullion Video Intercom with Reader

Model No.: TD33-HW

Trade Name: Verkada

Issued to

FCC: Verkada Inc
405 E. 4th Ave. San Mateo California United States 94401
IC:Verkada, Inc.
405 E. 4th Ave. San Mateo CA 94401 United States Of America
(Excluding The States Of Alaska)

Issued by

Compliance Certification Services Inc.
Wugu Laboratory
No.11, Wugong 6th Rd., Wugu Dist.,
New Taipei City, Taiwan.
Issued Date: December 4, 2024

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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Project No: TM-2409000206P
Report No.: TMWK2409003200KR

Page: 2 / 31
Rev.: 02

Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	November 11, 2024	Initial Issue	ALL	Peggy Tsai
01	November 22, 2024	See the following Note Rev. (01)	P.16	Peggy Tsai
02	December 4, 2024	See the following Note Rev. (02)	P.5	Peggy Tsai

Note:

Rev. (01)

1. Add the unit (kHz) in section 7.1.

Rev. (02)

1. Modify antenna specification in section 2.

TABLE OF CONTENTS

1. TEST RESULT CERTIFICATION.....	4
2. EUT DESCRIPTION	5
3. TEST METHODOLOGY	6
3.1 EUT CONFIGURATION	6
3.2 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS.....	6
3.3 RSS GEN SECTION 8.10 RESTRICTED BANDS OF OPERATIONS	7
3.4 DESCRIPTION OF TEST MODES	8
4. TEST SUMMARY.....	9
5. INSTRUMENT CALIBRATION.....	10
5.1 MEASURING INSTRUMENT CALIBRATION	10
5.2 MEASUREMENT EQUIPMENT USED	10
5.3 MEASUREMENT UNCERTAINTY	12
5.4 FACILITIES AND TEST LOCATION	12
6. SETUP OF EQUIPMENT UNDER TEST	13
6.1 SUPPORT EQUIPMENT	13
6.2 SETUP CONFIGURATION OF EUT	14
6.3 TEST PROGRAM.....	14
7. FCC PART 15.209 REQUIREMENTS & RSS-210 REQUIREMENTS.....	15
7.1 OCCUPIED BANDWIDTH(99%) AND 20 DB BANDWIDTH.....	15
7.2 FUNDAMENTAL AND RADIATED EMISSIONS	17
7.3 AC POWERLINE CONDUCTED EMISSIONS	27
APPENDIX A PHOTOGRAPHS OF TEST SETUP	A-1



Project No: TM-2409000206P
Report No.: TMWK2409003200KR

Page: 4 / 31
Rev.: 02

1. TEST RESULT CERTIFICATION

Applicant: FCC: Verkada Inc
405 E. 4th Ave. San Mateo California United States 94401
IC: Verkada, Inc.
405 E. 4th Ave. San Mateo CA 94401 United States Of America
(Excluding The States Of Alaska)

Manufacturer: CHICONY ELECTRONICS (THAILAND) CO., LTD
82 MOO 4 T. THAKHAM A. BANGPAKONG,
CHACHOENGSAO, THAILAND 24130

Equipment Under Test: Mullion Video Intercom with Reader

Trade Name: Verkada

Model No.: TD33-HW

Date of Test: September 23 ~ October 4, 2024

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR Part 15 209 & RSS-210 Issue 11 and RSS-GEN Issue 5	Compliance
Statements of Conformity	
Determination of compliance is based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.	

We hereby certify that:

All test results conform to above mentioned standards.

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10: 2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part15.203, Part15.207, Part15.209. Part15.215.

The test results of this report relate only to the tested sample identified in this report.

Approved by:

Dally Hong
Sr. Engineer

2. EUT DESCRIPTION

Product	Mullion Video Intercom with Reader
Trade	Verkada
Model No.	TD33-HW
Model Discrepancy	N/A
Received Date	September 12, 2024
Power Supply	Power from Poe Adapter. ZYSXEL / PoE12-60W I/P: 100-240VAC, 2.0A, 50-60Hz O/P: 56.0VDC, 1.161A, 65.1W
Frequency Range	125kHz
Modulation Technique	ASK
Number of Channels	1 Channel
Antenna Specification	Type: Loop Antenna SPEED / F-0W-51-6006-006-00
PMN	TD33-HW Mullion Video Intercom Reader
EUT Serial #	YDAK-KEDE-TYDL
HW Version	60-B04001-A
FW Version	5.1.4

Remark:

1. For more details, refer to the User's manual of the EUT.
2. Disclaimer: Antenna information is provided by the applicant, test results of this report are applicable to the sample EUT received.
3. The manufacturer stated that the PoE adapter will provide corresponding current according to the product.

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10: 2013 and FCC CFR 47 Part 15.203, 15.207, 15.209, 15.215.

The tests documented in this report were performed in accordance with IC RSS-210, IC RSS-Gen, and ANSI C63.10: 2013

3.1 EUT CONFIGURATION

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

3.2 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

- (a) Except as shown in other rules, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	(²)
13.36 - 13.41	322 - 335.4		

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

² Above 38.6

- (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 in 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.

3.3 RSS GEN SECTION 8.10 RESTRICTED BANDS OF OPERATIONS

Restricted frequency bands, identified in table 7, are designated primarily for safety-of-life services (distress calling and certain aeronautical activities), certain satellite downlinks, radio astronomy and some government uses. Except where otherwise indicated, the following conditions related to the restricted frequency bands apply:

- (a) The transmit frequency, including fundamental components of modulation, of licence-exempt radio apparatus shall not fall within the restricted frequency bands listed in table 7 except for apparatus compliant with RSS-287, Emergency Position Indicating Radio Beacons (EPIRB), Emergency Locator Transmitters (ELT), Personal Locator Beacons (PLB), and Maritime Survivor Locator Devices (MSLD).
- (b) Unwanted emissions that fall into restricted frequency bands listed in table 7 shall comply with the limits specified in table 5 and table 6.
- (c) Unwanted emissions that do not fall within the restricted frequency bands listed in table 7 shall comply either with the limits specified in the applicable RSS or with those specified in table 5 and table 6.

Table 7 – Restricted frequency bands ^{Note 1}			
MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	608 - 614	9.0 - 9.2
0.495 - 0.505	16.69475 - 16.69525	960 - 1427	9.3 - 9.5
2.1735 - 2.1905	16.80425 - 16.80475	1435 - 1626.5	10.6 - 12.7
3.020 - 3.026	25.5 - 25.67	1645.5 - 1646.5	13.25 - 13.4
4.125 - 4.128	37.5 - 38.25	1660 - 1710	14.47 - 14.5
4.17725 - 4.17775	73 - 74.6	1718.8 - 1722.2	15.35 - 16.2
4.20725 - 4.20775	74.8 - 75.2	2200 - 2300	17.7 - 21.4
5.677 - 5.683	108 - 138	2310 - 2390	22.01 - 23.12
6.215 - 6.218	149.9 - 150.05	2483.5 - 2500	23.6 - 24.0
6.26775 - 6.26825	156.52475 -	2655 - 2900	31.2 - 31.8
6.31175 - 6.31225	156.52525	3260 - 3267	36.43 - 36.5
8.291 - 8.294	156.7 - 156.9	3332 - 3339	Above 38.6
8.362 - 8.366	162.0125 - 167.17	3345.8 - 3358	
8.37625 - 8.38675	167.72 - 173.2	3500 - 4400	
8.41425 - 8.41475	240 - 285	4500 - 5150	
12.29 - 12.293	322 - 335.4	5350 - 5460	
12.51975 - 12.52025	399.9 - 410	7250 - 7750	
12.57675 - 12.57725		8025 - 8500	
13.36 - 13.41			

Note 1: Certain frequency bands listed in table 7 and in bands above 38.6 GHz are designated for licence-exempt applications. These frequency bands and the requirements that apply to related devices are set out in the 200 and 300 series of RSSs.

3.4 DESCRIPTION OF TEST MODES

The EUT had been tested under engineering test mode condition and the EUT staying in continuous transmitting mode.

3.4.1 The worst mode of measurement

AC Power Line Conduction Emission	
Test Condition	AC Power line conduction emission for line and neutral
Power supply Mode	Mode 1: EUT Power by POE Adapter
Worst Mode	☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4

Radiated Emission Measurement Below 1G	
Test Condition	Radiated Emission Below 1G
Power supply Mode	Mode 1: EUT power by PoE Adapter
Worst Mode	☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4

Remark:

1. The worst mode was record in this test report.
2. AC power line conducted emission were performed the EUT transmit at the highest output power channel as worse case.
3. EUT pre-scanned in three axis ,X,Y, Z and two polarity, for radiated measurement. The worst case(Z-Plane) were recorded in this report

4. TEST SUMMARY

FCC Standard Sec.	IC Standard Sec.	Chapter	Test Item	Result
15.203	RSS-GEN Sec. 6.8	2	Antenna Requirement	Pass
15.215	RSS-GEN Sec 6.7	7.1	Occupied Bandwidth (99%) and 20dB Bandwidth	Pass
15.209 15.205	Sec 8.3, RSS-GEN Sec 8.9 / 8.10	7.2	Radiated Emissions	Pass
15.207	RSS-GEN Sec. 8.8	7.3	AC Power-line Conducted Emission	Pass

5. INSTRUMENT CALIBRATION

5.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

5.2 MEASUREMENT EQUIPMENT USED

Equipment Used for Emissions Measurement

Conducted FCC/IC/NCC					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Loop Probe	LANGER EMV-TECHNIK	RF-R 50-1	02-2644	2024-01-02	2025-01-01
EXA Signal Analyzer	Keysight	N9010B	MY55460167	2024-01-03	2025-01-02
DC Block	Marvelous Microwave Inc	MVE6411	MVE-001	2024-08-08	2025-08-07
Software	N/A				

966A_Radiated Below 30MHz					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Signal Analyzer	KEYSIGHT	N9010A	MY52220817	2024-03-15	2025-03-14
Active Loop Antenna	SCHWARZBECK	FMZB 1513-60	1513-60-028	2023-12-13	2024-12-12
Thermo-Hygro Meter	WISEWIND	1206	D07	2023-12-07	2024-12-06
Bi-Log Antenna	Sunol Sciences	JB3	A030105	2024-07-12	2025-07-11
Preamplifier	EMEC	EM330	060609	2024-02-21	2025-02-20
Cable	Huber+Suhner	104PEA	20995+21000+182330	2024-02-21	2025-02-20
Turn Table	CCS	CC-T-1F	N/A	N.C.R	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R	N.C.R
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R	N.C.R
Software	e3 V9-210616c				

Remark:

1. Each piece of equipment is scheduled for calibration once a year.
2. N.C.R. = No Calibration Request.



Project No: TM-2409000206P
Report No.: TMWK2409003200KR

Page: 11 / 31
Rev.: 02

AC Mains Conduction					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EMI Test Receiver	R&S	ESCI	100064	2024-06-14	2025-06-13
LISN	TESEQ	LN2-16N	22012	2024-02-29	2025-02-27
Cable	Woken	SFL402	185A	2024-07-08	2025-07-07
Software	e3 V6-110812				

Remark:

1. Each piece of equipment is scheduled for calibration once a year.
2. N.C.R. = No Calibration Request.

5.3 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
AC Powerline Conducted Emission	± 2.21 dB
Channel Bandwidth	± 2.79 dB
Radiated Emission_9kHz-30MHz	± 3.492 dB
Radiated Emission_30MHz-200MHz	± 3.683 dB
Radiated Emission_200MHz-1GHz	± 3.966 dB

Remark: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

5.4 FACILITIES AND TEST LOCATION

All measurement facilities used to collect the measurement data are located at No.11, Wugong 6th Rd., Wugu Dist., New Taipei City, Taiwan.

CAB identifier: TW1309

Test site	Test Engineer	Remark
AC Conduction Room	Ben Yang	-
Radiation	Ray Li 、 Tony Chao	-
RF Conducted	Jerry Chang	-

Remark: The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC public Access Link (PAL) database, FCC Registration No. :444940, the FCC Designation No.:TW1309

6. SETUP OF EQUIPMENT UNDER TEST

6.1 SUPPORT EQUIPMENT

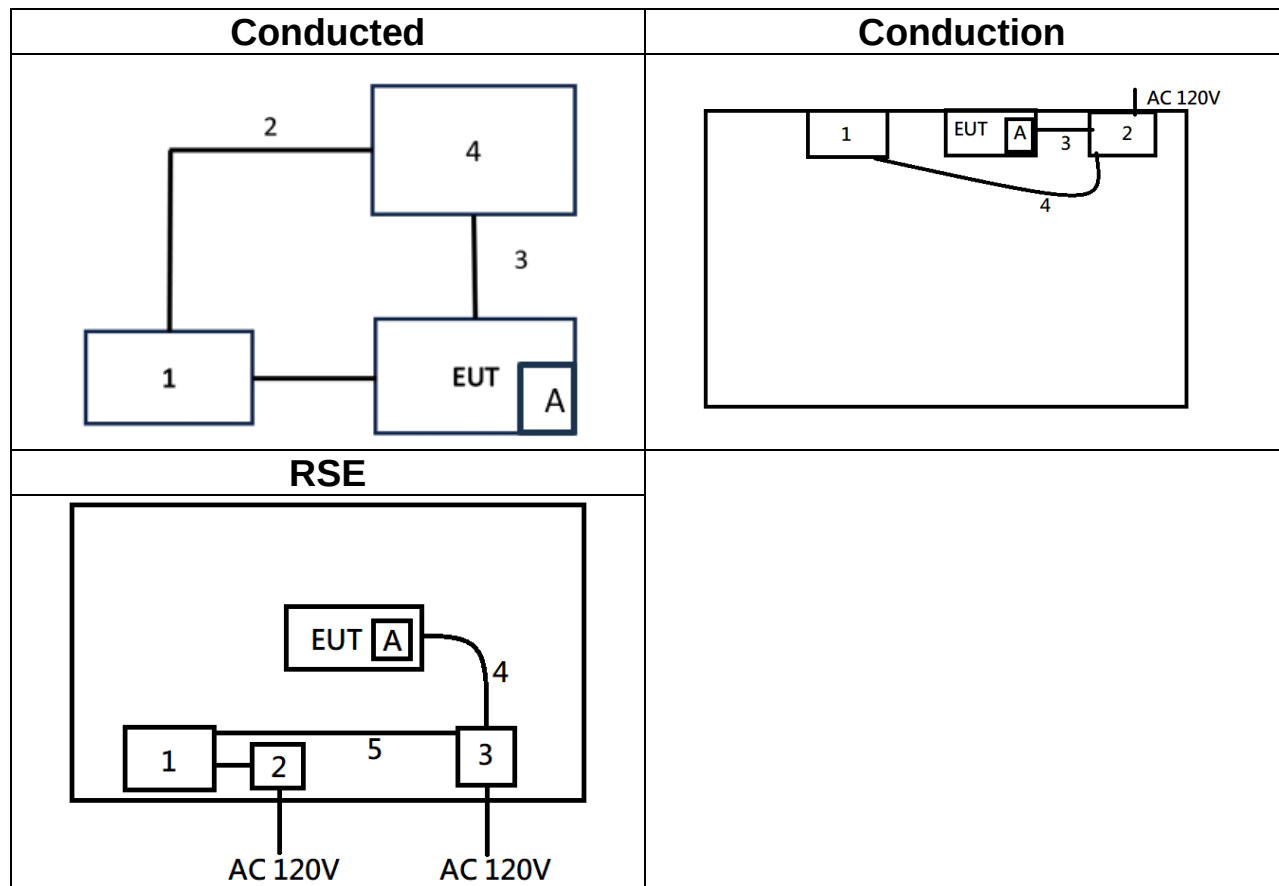
EUT Accessories Equipment						
No.	Equipment	Brand	Model	Series No.	FCC ID	IC
	N/A					

Support Equipment (Conducted)					
No.	Equipment	Brand	Model	Series No.	FCC ID
1	NB(B)	Lenovo	X260	N/A	N/A
2	Lan Cable	RASTO REC4	R-PCC004	N/A	N/A
3	Lan Cable	RASTO REC4	R-PCC004	S212L41486914	N/A
4	POE Adapter	ZYXEL	PoE12-60W	N/A	N/A
A	Card	N/A	N/A	N/A	N/A

Support Equipment (RSE)					
No.	Equipment	Brand	Model	Series No.	FCC ID
1	NB(D)	Lenovo	ThinkPad X260	N/A	N/A
2	Adapter	Lenovo	ADLX45DLC3A	N/A	N/A
3	PoE Injector	ZYXEL	PoE12-60W	S212L41486914	N/A
4	Ethernet Cable	N/A	N/A	N/A	N/A
5	Ethernet Cable	N/A	N/A	N/A	N/A
A	Card	N/A	N/A	N/A	N/A

Support Equipment (Conduction)					
No.	Equipment	Brand	Model	Series No.	FCC ID
1	NB(D)	Lenovo	ThinkPad X260	N/A	N/A
2	PoE Injector	ZYXEL	PoE12-60W	S212L41486914	N/A
3	Ethernet Cable	RASTO REC4	R-PCC004	N/A	N/A
4	Ethernet Cable	RASTO REC4	R-PCC004	N/A	N/A
A	Card	N/A	N/A	N/A	N/A

6.2 SETUP CONFIGURATION OF EUT



6.3 TEST PROGRAM

This EUT uses "Tera term v4.73" software and setup command to set the frequency, modulation, and power to allow the sample to continuously transmit.

7. FCC PART 15.209 REQUIREMENTS & RSS-210 REQUIREMENTS

7.1 OCCUPIED BANDWIDTH(99%) AND 20 DB BANDWIDTH

TEST CONFIGURATION

Refer to section 6.2.

TEST PROCEDURE

According to FCC Part 15.215 (c) ,Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

For ISSED, RSS-GEN, 6.7 Occupied bandwidth (or 99% emission bandwidth) and x dB bandwidth

The occupied bandwidth or the “99% emission bandwidth” is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.

In some cases, the “x dB bandwidth” is required, which is defined as the frequency range between two points, one at the lowest frequency below and one at the highest frequency above the carrier frequency, at which the maximum power level of the transmitted emission is attenuated x dB below the maximum in-band power level of the modulated signal, where the two points are on the outskirts of the in-band emission.

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW & VBW (RBW) shall be in the range of 1% to 5% of the actual occupied / x dB bandwidth (VBW) shall not be smaller than three times the RBW value.
4. Record the max. reading.

TEST RESULTS

Compliance

Project No: TM-2409000206P
Report No.: TMWK2409003200KR

Page: 16 / 31
Rev.: 02

TEST DATA

Temperature: 20.9°C

Test Date: September 23, 2024

Humidity: 55% RH

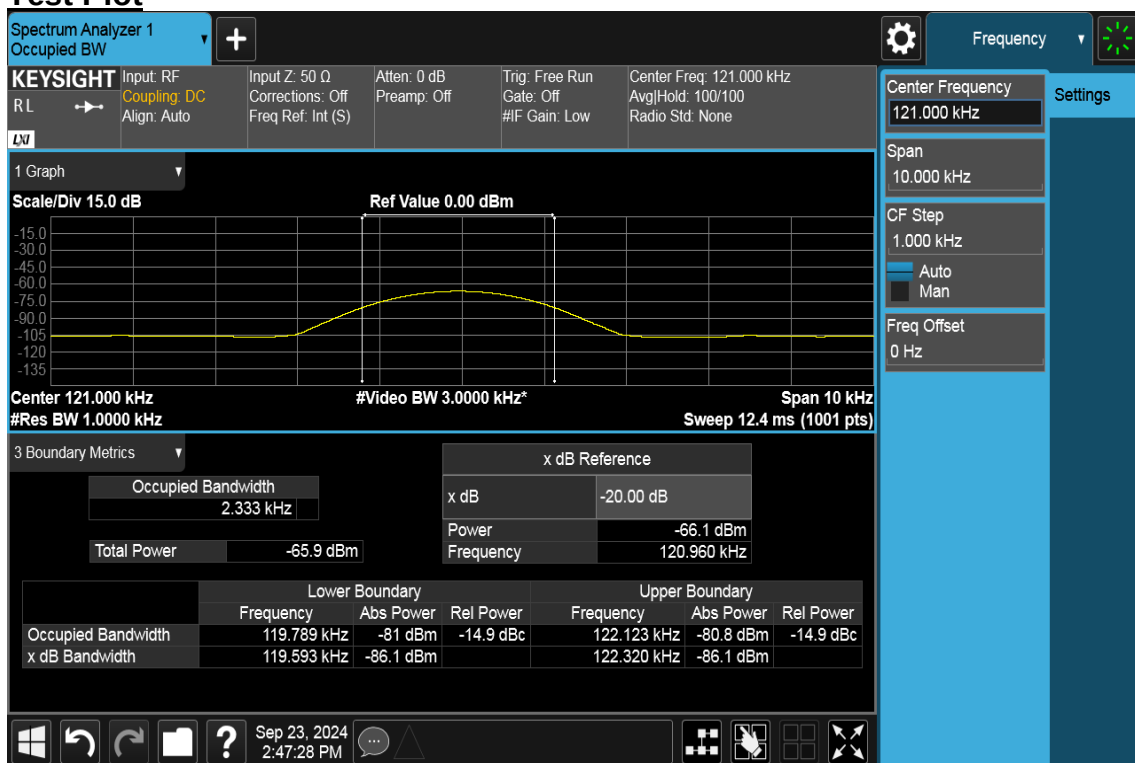
Tested by: Jerry Chang

Occupied Channel Bandwidth Result						
Modulation Mode	Frequency (F _C) (kHz)	99% Bandwidth (kHz)	F _{SL} (kHz)	F _L BW (kHz)	F _H at 20dB BW (kHz)	F _{SH} at 20dB BW (kHz)
Full charging loading	120.960	2.333	119.789	122.123	119.593	122.320
Result		Complied				

Note

Because the measured signal adjusting the RBW per C63.10 would not be practical since measured bandwidth will always follow the RBW and the result will be approximately twice ~ three the RBW.

Test Plot



7.2 FUNDAMENTAL AND RADIATED EMISSIONS

LIMIT

According to FCC PART 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:

Frequency (MHz)	Field Strength ($\mu\text{V/m}$ at meter)	Measurement Distance (meter)
0.009 – 0.490	2400 / F (kHz)	300
0.490 – 1.705	24000 / F (kHz)	30
1.705 – 30.0	30	30
30 - 88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

** Except as provided in paragraph (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 or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

Above 30MHz

Frequency (MHz)	Field Strength		Measurement Distance (meter)
	($\mu\text{V/m}$)	(dB $\mu\text{V/m}$)	
30-88	100	40.0	3
88-216	150	43.5	3
216-960	200	46.0	3
Above 960	500	54.0	3

According to RSS-210, Section 7.3 and RSS-GEN Sec. 8.9 §B.6 Transmitters whose wanted and unwanted emissions fall within the general field strength limits specified in RSS-Gen may operate licence-exempt in any of the frequency bands, other than the restricted frequency bands listed in RSS-Gen and the TV bands 54-72 MHz, 76-88 MHz, 174-216 MHz and 470-602 MHz, and shall be certified under RSS-210. Under no circumstances shall the level of any unwanted emissions exceed the level of the fundamental emissions.

Below 30 MHz

Frequency	Magnetic field strength (H-Field) ($\mu\text{A/m}$)	Measurement Distance (metres)
9-490 kHz ^{Note 1}	6.37/F (F in kHz)	300
490-1,705 kHz	63.7/F (F in kHz)	30
1.705-30 MHz	0.08	30

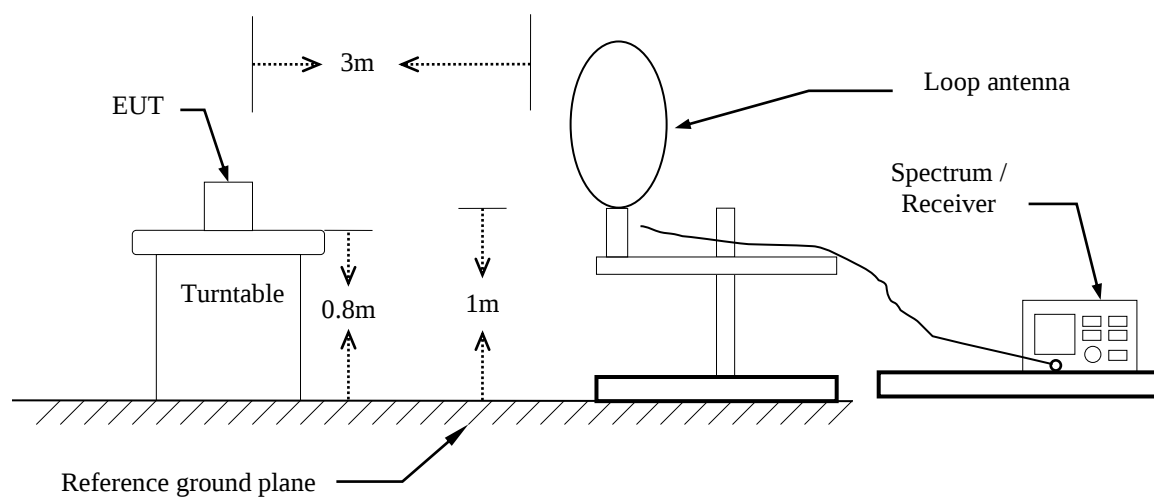
Note 1: The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector.

Above 30 MHz

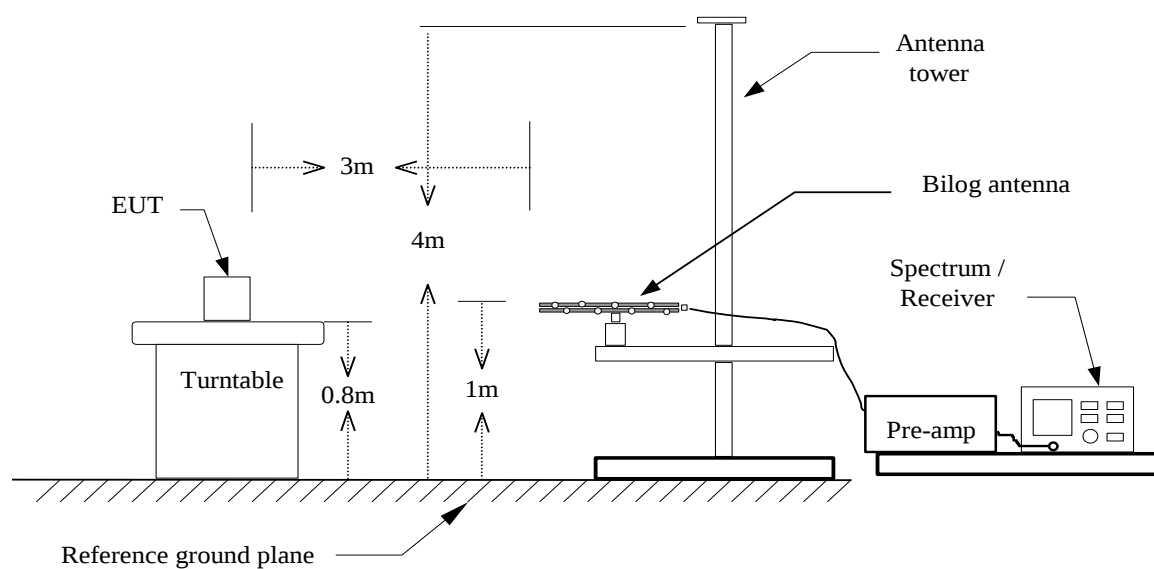
Frequency	Field strength ($\mu\text{V/m}$ at 3 m)
30-88	100
88-216	150
216-960	200
Above 960	500

Test Configuration

9kHz ~ 30MHz



30MHz ~ 1GHz



TEST PROCEDURE

For 9kHz ~ 30MHz

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, The lower edge of the loop shall be 1 m above the ground then to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. Set the spectrum analyzer in the following setting as:
9KHz-490KHz : RBW=200Hz / VBW=1kHz / Sweep=AUTO
490KHz-30MHz : RBW=10kHz / VBW=30kHz / Sweep=AUTO
6. Repeat above procedures until the measurements for all frequencies are complete.

For 30MHz ~ 1GHz

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:
RBW=100kHz / VBW=300kHz / Sweep=AUTO
7. Repeat above procedures until the measurements for all frequencies are complete.

Remark :

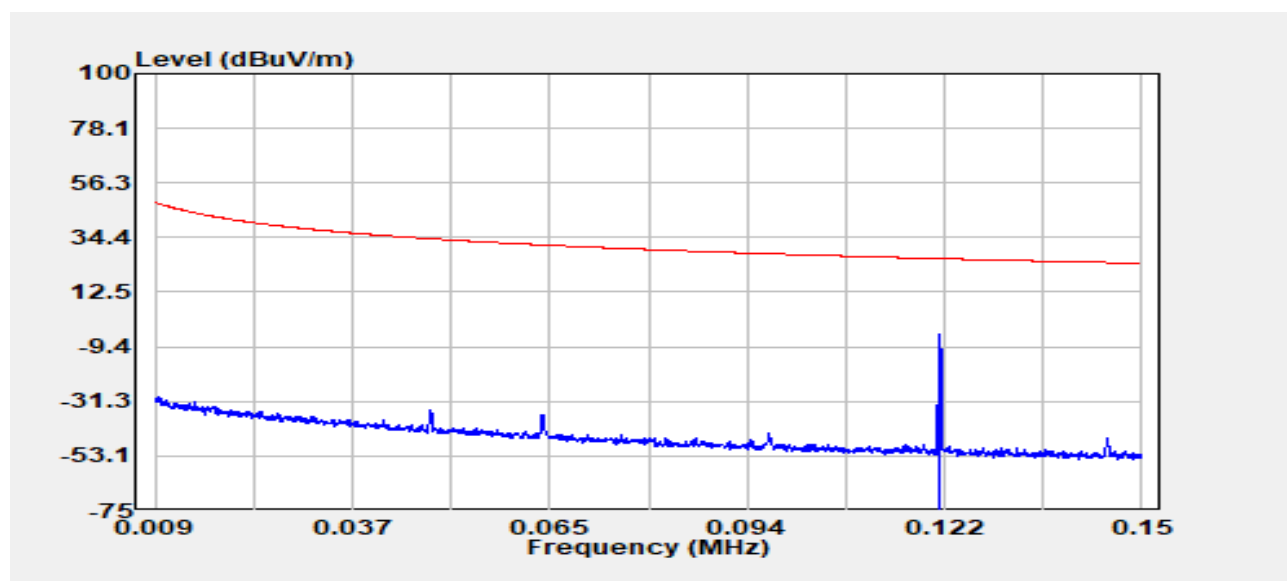
Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open area test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.

Project No: TM-2409000206P
Report No.: TMWK2409003200KR

Page: 21 / 31
Rev.: 02

Fundamental Strength

Project No	:TM-2409000206P	Test Date	:2024-09-27
Operation Band	:RFID	Temp./Humi.	:24.6/57
Frequency	:125 kHz	Antenna Pol.	:Horizontal
Operation Mode	:Main	Engineer	:Ray Li
EUT Pol	:H	Test Chamber	: 966A
Setting	:default		



Freq. MHz	Detector Mode	Spectrum Read Level @3m dBμV	Factor @3m dB	Actual FS @3m dBUV/m	Factor @30m&300m dB	Actual FS @300m dBUV/m	Limit dBUV/m	Margin dB
0.125	Peak	56.97	18.89	75.86	-80.00	-4.14	25.94	-30.08

Remark:

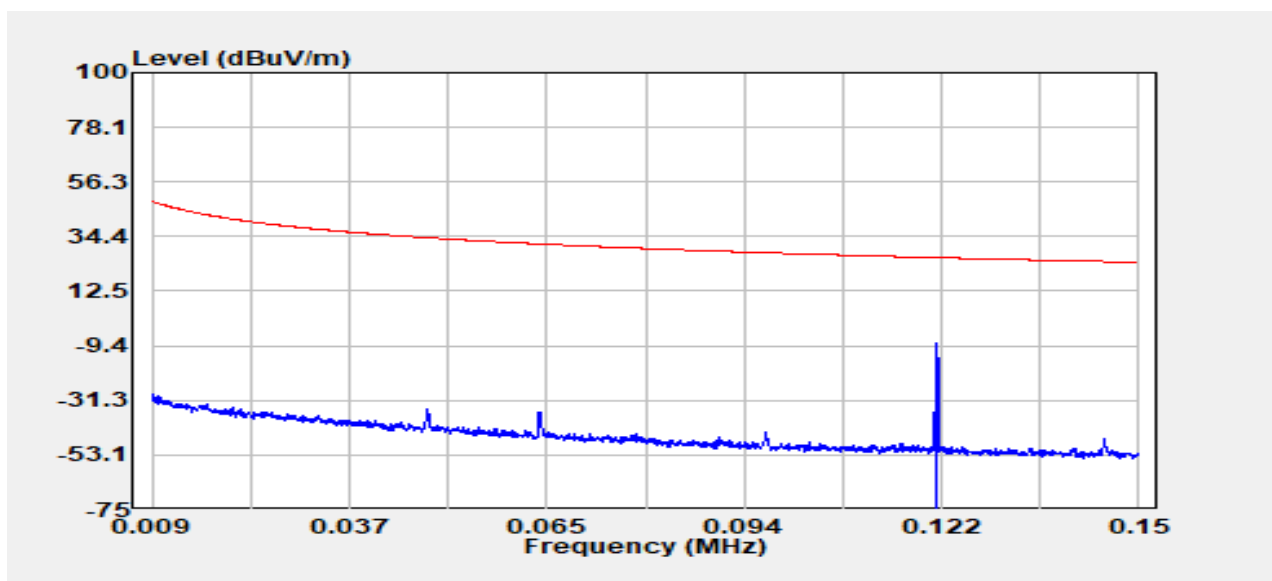
1. Radiated emissions measured were made with an instrument using peak/quasi-peak/average detector mode.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Margin (dB) = Result (dBUV/m) – Limit (dBUV/m).
4. Result=Read level+Factor@3m-Distance factor
5. Distance factor=40log(30m/3m)
6. Factor=antenna factor+cable loss

Project No: TM-2409000206P
Report No.: TMWK2409003200KR

Page: 22 / 31
Rev.: 02

Project No :TM-2409000206P
Operation Band :RFID
Frequency :125 kHz
Operation Mode :Main
EUT Pol :H
Setting :default

Test Date :2024-09-27
Temp./Humi. :24.6/57
Antenna Pol. :Vertical
Engineer :Ray Li
Test Chamber : 966A



Freq.	Detector Mode	Spectrum Read Level @3m	Factor @3m	Actual FS @3m	Factor @30m&300m	Actual FS @300m	Limit	Margin
MHz	PK/QP/AV	dBμV	dB	dBμV/m	dB	dBμV/m	dBμV/m	dB
0.125	Peak	52.99	18.89	71.87	-80.00	-8.13	25.94	-34.06

Remark:

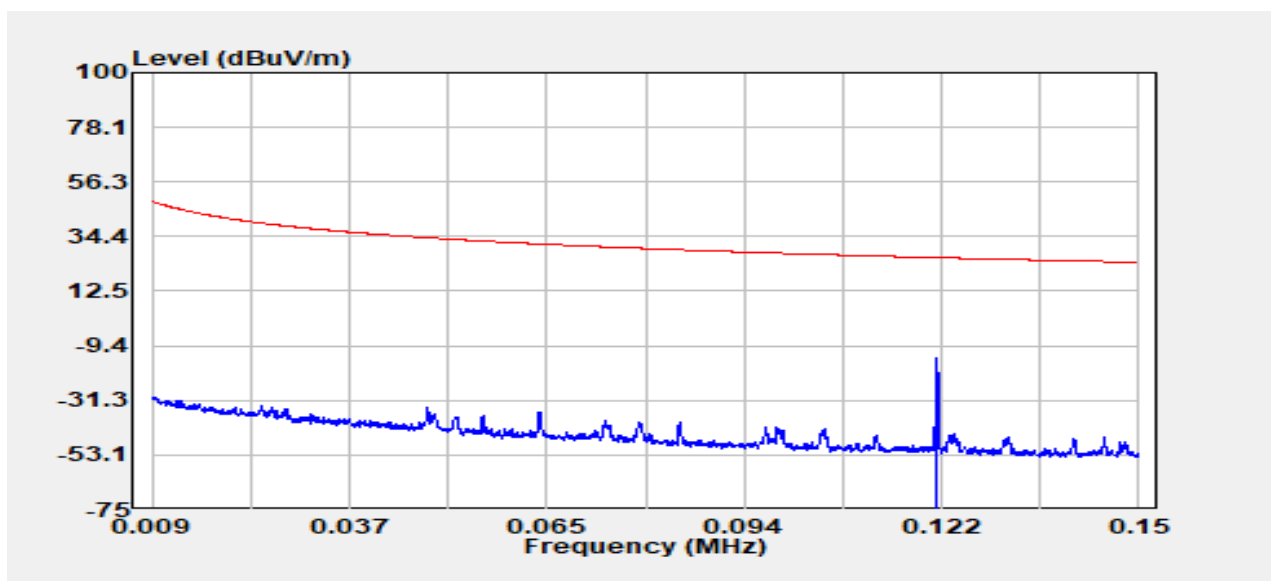
1. Radiated emissions measured were made with an instrument using peak/quasi-peak/average detector mode.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Margin (dB) = Result (dBUV/m) – Limit (dBUV/m).
4. Result=Read level+Factor@3m-Distance factor
5. Distance factor=40log(30m/3m)
6. Factor=antenna factor+cable loss

Project No: TM-2409000206P
Report No.: TMWK2409003200KR

Page: 23 / 31
Rev.: 02

Project No :TM-2409000206P
Operation Band :RFID
Frequency :125 kHz
Operation Mode :Main
EUT Pol :H
Setting :default

Test Date :2024-09-27
Temp./Humi. :24.6/57
Antenna Pol. :Ground
Engineer :Ray Li
Test Chamber : 966A



Freq.	Detector Mode	Spectrum Read Level @3m	Factor @3m	Actual FS @3m	Factor @30m&300m	Actual FS @300m	Limit	Margin
MHz	PK/QP/AV	dBμV	dB	dBμV/m	dB	dBμV/m	dBμV/m	dB
0.125	Peak	46.94	18.89	65.82	-80.00	-14.18	25.94	-40.11

Remark:

1. Radiated emissions measured were made with an instrument using peak/quasi-peak/average detector mode.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Margin (dB) = Result (dBuV/m) – Limit (dBuV/m).
4. Result=Read level+Factor@3m-Distance factor
5. Distance factor=40log(30m/3m)
6. Factor=antenna factor+cable loss

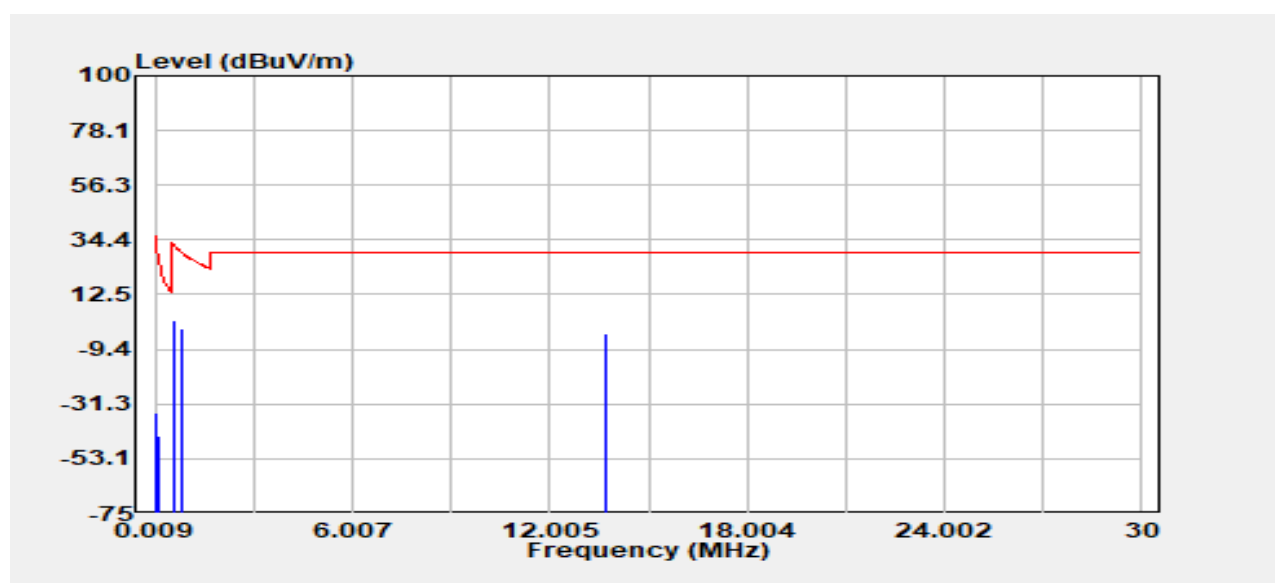
Project No: TM-2409000206P
Report No.: TMWK2409003200KR

Page: 24 / 31
Rev.: 02

9kHz ~ 30MHz

Project No :TM-2409000206P
Operation Band :RFID
Frequency :125 kHz
Operation Mode :TX
EUT Pol :H
Setting :default

Test Date :2024-09-27
Temp./Humi. :24.6/57
Antenna Pol. :Horizontal
Engineer :Ray Li
Test Chamber : 966A



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level @3m dBμV	Factor @3m dB	Actual FS @3m dBμV/m	Factor @30m&300m dB	Actual FS @30m&300m dBμV/m	Limit dBμV/m	Margin dB
0.05	Peak	25.31	20.02	45.33	-80.00	-34.67	33.91	-68.58
0.06	Peak	23.92	19.67	43.58	-80.00	-36.42	31.43	-67.85
0.10	Peak	17.32	18.89	36.21	-80.00	-43.79	27.90	-71.69
0.61	Peak	23.09	19.44	42.54	-40.00	2.54	31.90	-29.37
0.85	Peak	19.38	19.49	38.87	-40.00	-1.13	29.03	-30.16
13.73	Peak	15.16	22.02	37.18	-40.00	-2.82	29.54	-32.36

Remark:

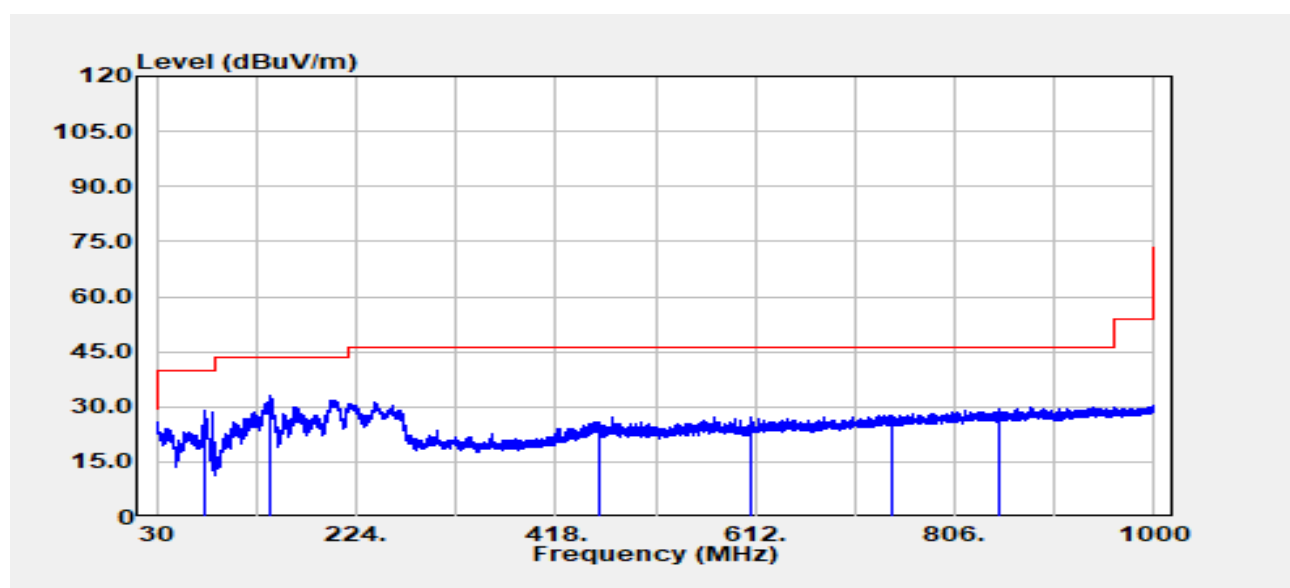
- 9kHz to 490kHz Limit(@3m) = 2400(F/kHz)
490kHz to 1.705MHz Limit (@3m) = 2400(F/kHz)
1.705MHz to 30MHz Limit (@3m) = 29.54
- Distance factor=40log(300m/3m)@9-490kHz ; 40log(30m/3m)@490kHz-30MHz
- Result=Read level+Factor@3m-Distance factor

Project No: TM-2409000206P
Report No.: TMWK2409003200KR

Page: 25 / 31
Rev.: 02

30MHz ~ 1GHz

Project No	:TM-2409000206P	Test Date	:2024-09-27
Operation Band	:RFID	Temp./Humi.	:24.6/57
Frequency	:125 kHz	Antenna Pol.	:VERTICAL
Operation Mode	:TX	Engineer	:Tony Chao
EUT Pol	:H	Test Chamber	: 966A
Setting	:default		



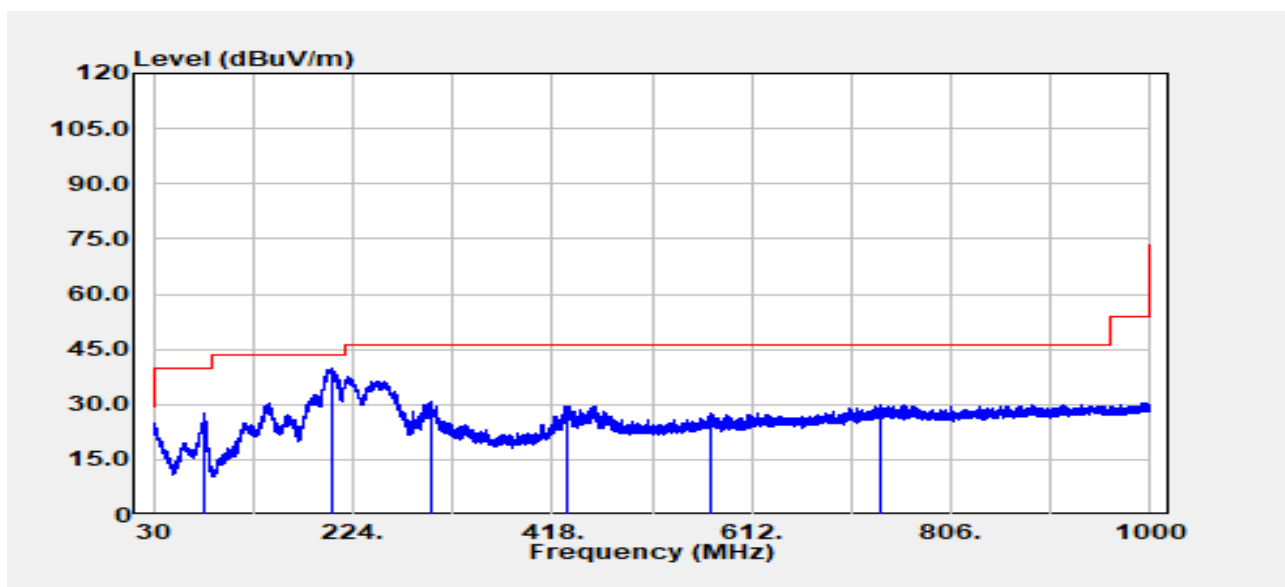
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dBμV	Factor dB	Actual FS dBμV/m	Limit dBμV/m	Margin dB
76.20	Peak	44.77	-15.81	28.96	40.00	-11.04
140.70	Peak	43.81	-10.66	33.14	43.50	-10.36
459.71	Peak	31.20	-5.20	26.00	46.00	-20.00
608.85	Peak	30.22	-2.86	27.35	46.00	-18.65
744.28	Peak	28.18	-0.40	27.78	46.00	-18.22
848.44	Peak	28.56	0.98	29.54	46.00	-16.46

Project No: TM-2409000206P
Report No.: TMWK2409003200KR

Page: 26 / 31
Rev.: 02

Project No :TM-2409000206P
Operation Band :RFID
Frequency :125 kHz
Operation Mode :TX
EUT Pol :H
Setting :default

Test Date :2024-09-27
Temp./Humi. :24.6/57
Antenna Pol. :HORIZONTAL
Engineer :Tony Chao
Test Chamber : 966A



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dBuV	Factor dB	Actual FS dBuV/m	Limit dBuV/m	Margin dB
79.23	Peak	43.59	-16.08	27.51	40.00	-12.49
204.24	Peak	51.74	-12.10	39.63	43.50	-3.87
299.18	Peak	40.00	-9.36	30.64	46.00	-15.36
432.19	Peak	35.48	-5.82	29.65	46.00	-16.35
571.26	Peak	30.67	-3.18	27.50	46.00	-18.50
738.10	Peak	30.42	-0.53	29.89	46.00	-16.11

7.3 AC POWERLINE CONDUCTED EMISSIONS

LIMIT

According to §15.207(a) and RSS-Gen §8.8 for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

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

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

Test method Refer as ANSI 63.10:2013 clause 6.2,

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete

TEST RESULTS

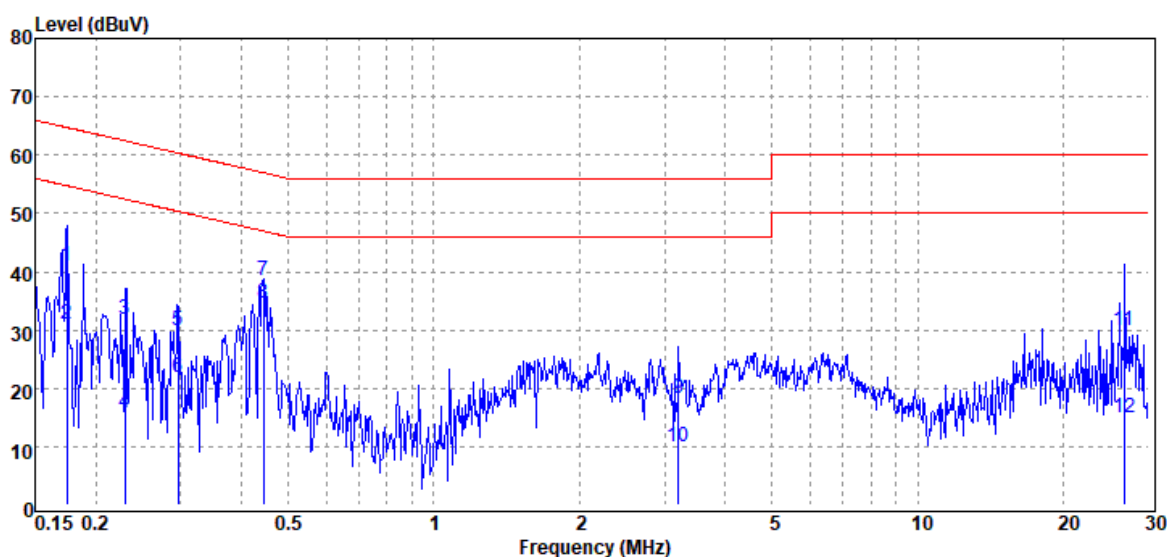
The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked and Average measurement records.

Project No: TM-2409000206P
Report No.: TMWK2409003200KR

Page: 28 / 31
Rev.: 02

Project No : TM-2409000206P
Operation Mode : RFID
Test Chamber : Conduction
Probe : LINE
Note :

Test Date : 2024-10-04
Temp./Humi. : 23.4°C / 54%
Engineer : Ben Yang
Test Voltage : AC 120V/60Hz



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dBμV	Factor dB	Actual FS dBμV	Limit dBμV	Margin dB
0.174	QP	40.77	0.25	41.02	64.75	-23.73
0.174	Average	30.82	0.25	31.07	54.75	-23.68
0.230	QP	31.38	0.39	31.77	62.44	-30.67
0.230	Average	15.49	0.39	15.88	52.44	-36.56
0.296	QP	29.57	0.38	29.95	60.35	-30.40
0.296	Average	21.48	0.38	21.86	50.35	-28.49
0.446	QP	37.97	0.38	38.35	56.96	-18.61
0.446	Average	34.27	0.38	34.65	46.96	-12.31
3.198	QP	18.11	0.22	18.33	56.00	-37.67
3.198	Average	9.86	0.22	10.08	46.00	-35.92
26.708	QP	29.44	0.58	30.02	60.00	-29.98
26.708	Average	14.37	0.58	14.95	50.00	-35.05

Note: 1. Actual FS= Spectrum Read Level + Factor

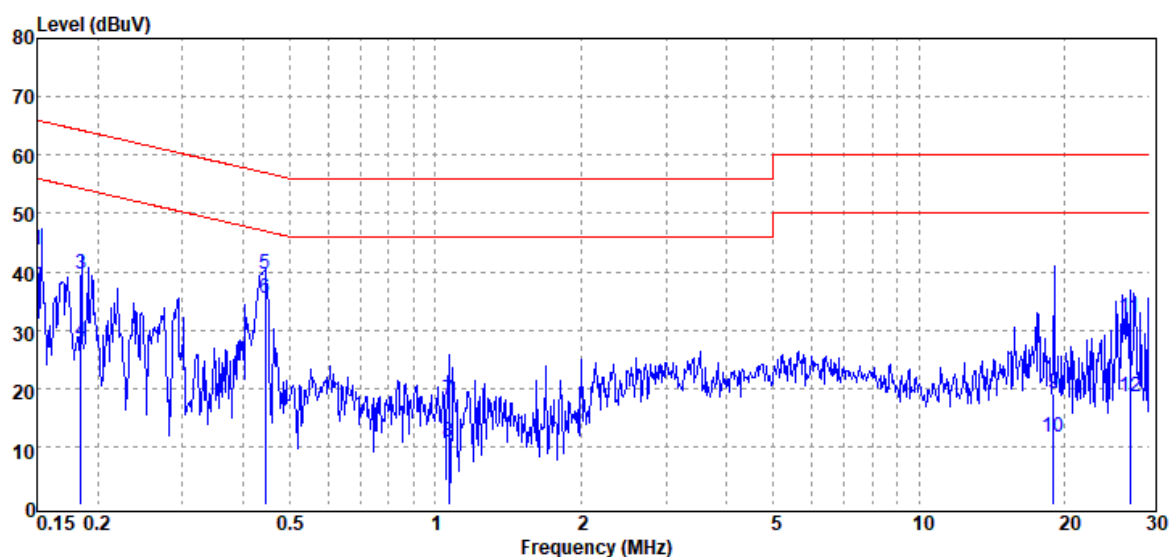
Note: 2. Margin= Actual FS - Limit

Project No: TM-2409000206P
Report No.: TMWK2409003200KR

Page: 29 / 31
Rev.: 02

Project No : TM-2409000206P
Operation Mode : RFID
Test Chamber : Conduction
Probe : NEUTRAL
Note :

Test Date : 2024-10-04
Temp./Humi. : 23.4°C / 54%
Engineer : Ben Yang
Test Voltage : AC 120V/60Hz



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dBμV	Factor dB	Actual FS dBμV	Limit dBμV	Margin dB
0.150	QP	43.69	0.10	43.79	65.97	-22.18
0.150	Average	37.38	0.10	37.48	55.97	-18.49
0.185	QP	39.22	0.29	39.51	64.28	-24.77
0.185	Average	27.67	0.29	27.96	54.28	-26.32
0.444	QP	39.34	0.35	39.69	56.99	-17.30
0.444	Average	35.21	0.35	35.56	46.99	-11.43
1.065	QP	17.74	0.13	17.87	56.00	-38.13
1.065	Average	10.71	0.13	10.84	46.00	-35.16
18.992	QP	18.74	0.44	19.18	60.00	-40.82
18.992	Average	11.23	0.44	11.67	50.00	-38.33
27.303	QP	31.52	0.53	32.05	60.00	-27.95
27.303	Average	18.08	0.53	18.61	50.00	-31.39

Note: 1. Actual FS= Spectrum Read Level + Factor

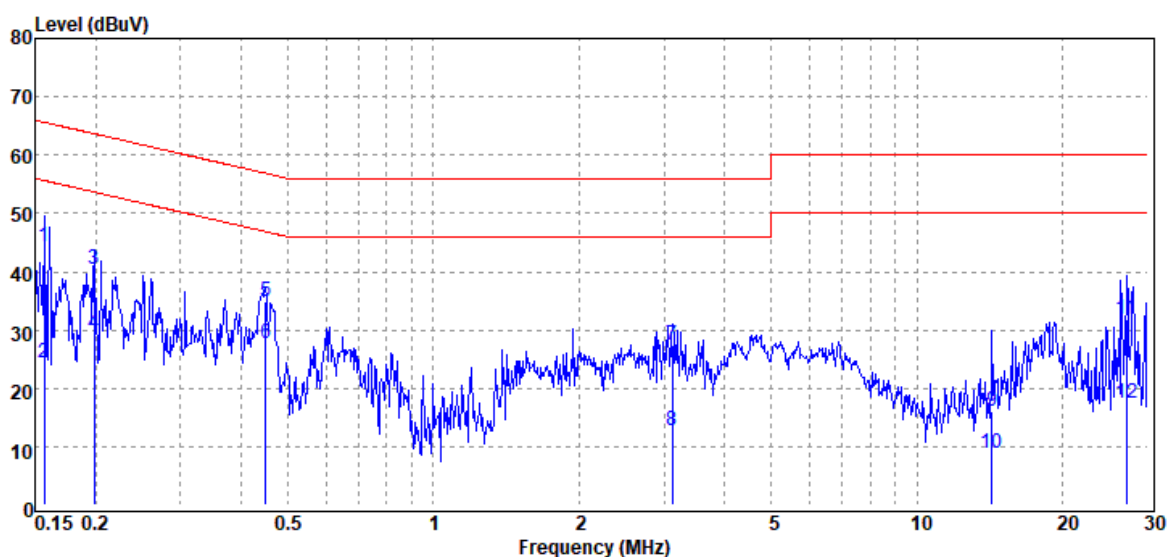
Note: 2. Margin= Actual FS - Limit

Project No: TM-2409000206P
Report No.: TMWK2409003200KR

Page: 30 / 31
Rev.: 02

Project No : TM-2409000206P
Operation Mode : RFID
Test Chamber : Conduction
Probe : LINE
Note :

Test Date : 2024-10-04
Temp./Humi. : 23.4°C / 54%
Engineer : Ben Yang
Test Voltage : AC 230V/60Hz



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dBμV	Factor dB	Actual FS dBμV	Limit dBμV	Margin dB
0.157	QP	44.02	0.16	44.18	65.63	-21.45
0.157	Average	24.27	0.16	24.43	55.63	-31.20
0.199	QP	40.15	0.38	40.53	63.67	-23.14
0.199	Average	29.10	0.38	29.48	53.67	-24.19
0.449	QP	34.42	0.38	34.80	56.89	-22.09
0.449	Average	27.42	0.38	27.80	46.89	-19.09
3.116	QP	27.27	0.22	27.49	56.00	-28.51
3.116	Average	12.53	0.22	12.75	46.00	-33.25
14.262	QP	15.55	0.42	15.97	60.00	-44.03
14.262	Average	8.34	0.42	8.76	50.00	-41.24
27.105	QP	31.32	0.58	31.90	60.00	-28.10
27.105	Average	16.83	0.58	17.41	50.00	-32.59

Note: 1. Actual FS= Spectrum Read Level + Factor

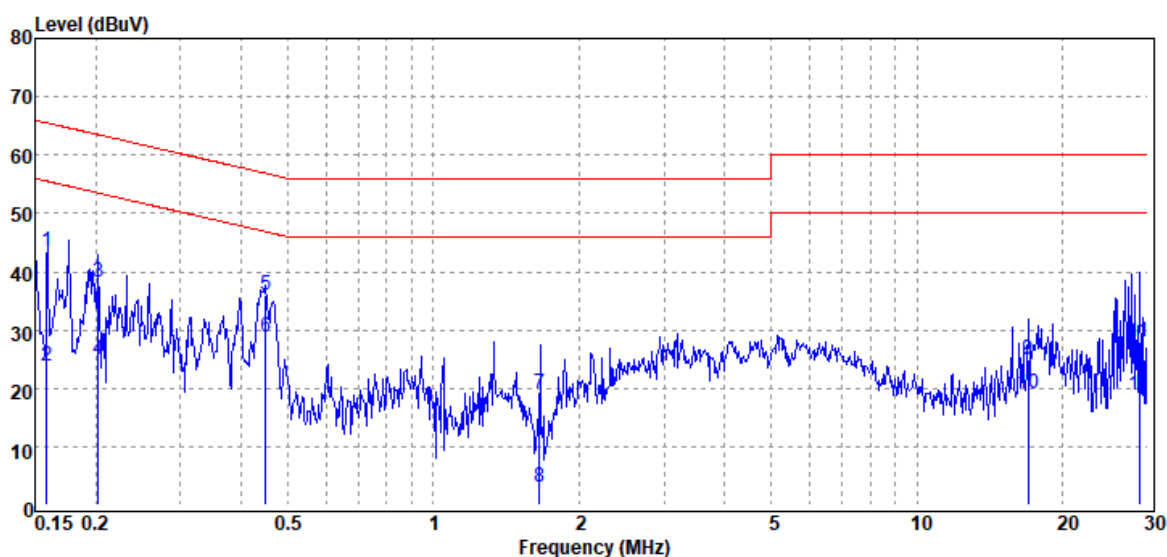
Note: 2. Margin= Actual FS - Limit

Project No: TM-2409000206P
Report No.: TMWK2409003200KR

Page: 31 / 31
Rev.: 02

Project No : TM-2409000206P
Operation Mode : RFID
Test Chamber : Conduction
Probe : NEUTRAL
Note :

Test Date : 2024-10-04
Temp./Humi. : 23.4°C / 54%
Engineer : Ben Yang
Test Voltage : AC 230V/60Hz



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dBμV	Factor dB	Actual FS dBμV	Limit dBμV	Margin dB
0.158	QP	43.42	0.16	43.58	65.55	-21.97
0.158	Average	23.74	0.16	23.90	55.55	-31.65
0.202	QP	37.84	0.36	38.20	63.51	-25.31
0.202	Average	24.69	0.36	25.05	53.51	-28.46
0.449	QP	35.61	0.35	35.96	56.89	-20.93
0.449	Average	28.40	0.35	28.75	46.89	-18.14
1.657	QP	18.96	0.15	19.11	56.00	-36.89
1.657	Average	2.91	0.15	3.06	46.00	-42.94
16.979	QP	24.52	0.42	24.94	60.00	-35.06
16.979	Average	18.77	0.42	19.19	50.00	-30.81
28.787	QP	27.53	0.54	28.07	60.00	-31.93
28.787	Average	18.34	0.54	18.88	50.00	-31.12

Note: 1. Actual FS= Spectrum Read Level + Factor

Note: 2. Margin= Actual FS - Limit

- End of Test Report -