

TEST REPORT

CERTIFICATE OF CONFORMITY

Standard: 47 CFR FCC Part 15, Subpart C (Section 15.249)

Report No.: RFBCKS-WTW-P25020597-2

FCC ID: NKR-DLSAWI13WW

Product: WNC LPWA Module

Brand: WNC

Model No.: DLSA-WI13-WW

Received Date: 2025/2/21

Test Date: 2025/6/13 ~ 2025/6/19

Issued Date: 2025/7/22

Applicant: WNC Corporation

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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FCC Registration /
Designation Number: 788550 / TW0003

Approved by: Jeremy Lin, **Date:** 2025/7/22
Jeremy Lin / Project Engineer

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Prepared by : Gina Liu / Specialist



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Release Control Record

Issue No.	Description	Date Issued
RFBCKS-WTW-P25020597-2	Original release.	2025/7/22

1 Certificate

Product: WNC LPWA Module

Brand: WNC

Test Model: DLSA-WI13-WW

Sample Status: Engineering sample

Applicant: WNC Corporation

Test Date: 2025/6/13 ~ 2025/6/19

Standard: 47 CFR FCC Part 15, Subpart C (Section 15.249)

**Measurement
procedure:** ANSI C63.10-2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.249)			
Standard / Clause	Test Item	Result	Remark
15.207	AC Power Conducted Emissions	Pass	Minimum passing margin is -17.12 dB at 0.15687 MHz
15.209 / 15.249(a) / 15.249(d)	Radiated Emissions below 1 GHz	Pass	Minimum passing margin is -0.8 dB at 902.20 MHz
15.209 / 15.249(a) / 15.249(d) / 15.249(e)	Radiated Emissions above 1 GHz	Pass	Minimum passing margin is -24.2 dB at 2745.00 MHz and 2783.40 MHz
15.215 (c)	20 dB Bandwidth	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is SMA. (The device is professionally installed.)

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Specification	Expanded Uncertainty (k=2) (±)
20 dB Bandwidth	-	960 Hz
AC Power Conducted Emissions	9 kHz ~ 30 MHz	2.90 dB
Radiated Emissions below 1 GHz	9 kHz ~ 30 MHz	3.59 dB
	30 MHz ~ 1 GHz	3.60 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	2.29 dB
	18 GHz ~ 40 GHz	2.29 dB

The other instruments specified are routine verified to remain within the calibrated levels, no measurement uncertainty is required to be calculated.

2.2 Supplementary Information

There is not any deviation from the test standards for the test method, and no modifications required for compliance.

3 General Information

3.1 General Description

Product	WNC LPWA Module
Brand	WNC
Test Model	DLSA-WI13-WW
Status of EUT	Engineering sample
Power Supply Rating	3.8 Vdc
Modulation Type	ASK
Transfer Rate	100 kbps
Operating Frequency	902.2 ~ 927.8 MHz
Number of Channel	129
Field Strength Of Fundamental	93.2 dBuV/m (Quasi-Peak) at 3 meters

Note: The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 Antenna Description of EUT

1. The antenna information is listed as below.

Ant. No.	AntennaGain (dBi)	Frequency Range	Antenna Type	Connector Type
1	2.63	902 ~ 928 MHz	Dipole	RP-SMA

* Due to radiated measurements are made and the antenna gain is already accounted for this device, so provide an antenna datasheet and/or antenna measurement report is not required. The antenna dimensions and pictures (include antenna wire length if have) are stated in EUT photo exhibit.

3.3 Channel List

129 channels are provided to this EUT:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	902.2	33	908.8	66	915.4	99	922
1	902.4	34	909	67	915.6	100	922.2
2	902.6	35	909.2	68	915.8	101	922.4
3	902.8	36	909.4	69	916	102	922.6
4	903	37	909.6	70	916.2	103	922.8
5	903.2	38	909.8	71	916.4	104	923
6	903.4	39	910	72	916.6	105	923.2
7	903.6	40	910.2	73	916.8	106	923.4
8	903.8	41	910.4	74	917	107	923.6
9	904	42	910.6	75	917.2	108	923.8
10	904.2	43	910.8	76	917.4	109	924
11	904.4	44	911	77	917.6	110	924.2
12	904.6	45	911.2	78	917.8	111	924.4
13	904.8	46	911.4	79	918	112	924.6
14	905	47	911.6	80	918.2	113	924.8
15	905.2	48	911.8	81	918.4	114	925
16	905.4	49	912	82	918.6	115	925.2
17	905.6	50	912.2	83	918.8	116	925.4
18	905.8	51	912.4	84	919	117	925.6
19	906	52	912.6	85	919.2	118	925.8
20	906.2	53	912.8	86	919.4	119	926
21	906.4	54	913	87	919.6	120	926.2
22	906.6	55	913.2	88	919.8	121	926.4
23	906.8	56	913.4	89	920	122	926.6
24	907	57	913.6	90	920.2	123	926.8
25	907.2	58	913.8	91	920.4	124	927
26	907.4	59	914	92	920.6	125	927.2
27	907.6	60	914.2	93	920.8	126	927.4
28	907.8	61	914.4	94	921	127	927.6
29	908	62	914.6	95	921.2	128	927.8
30	908.2	63	914.8	96	921.4		
31	908.4	64	915	97	921.6		
32	908.6	65	915.2	98	921.8		

3.4 Test Mode Applicability and Tested Channel Detail

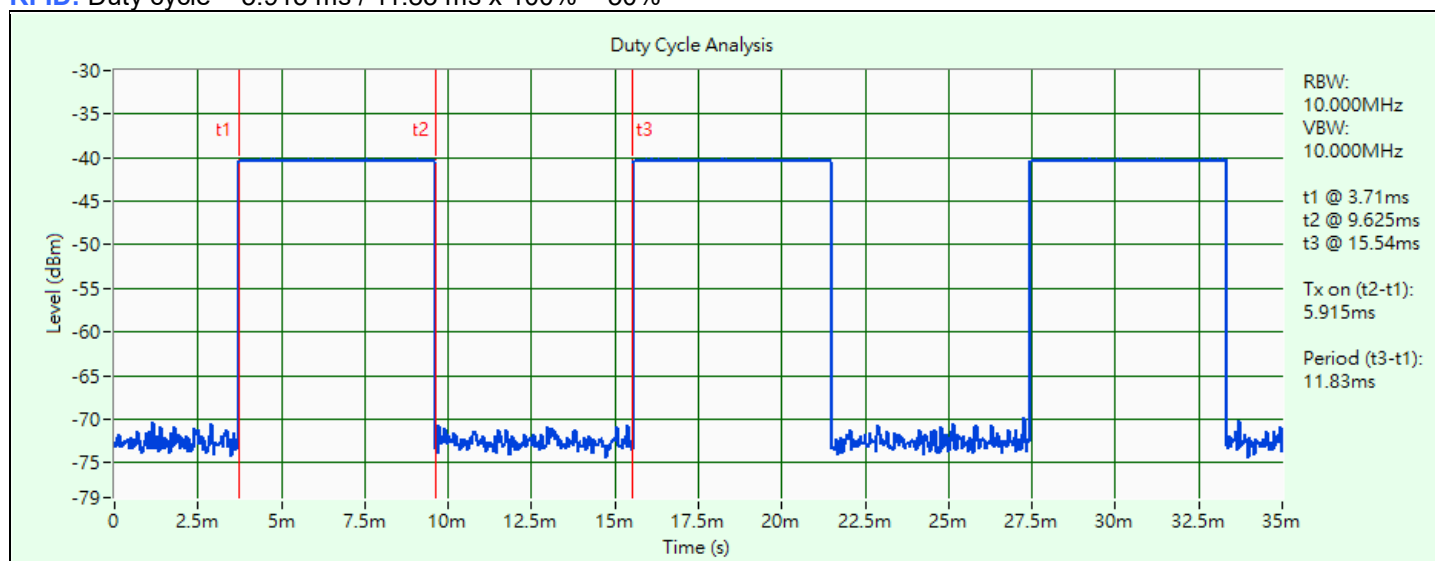
Pre-Scan:	1. EUT can be used in the following ways: X-axis/ Y-axis/ Z-axis. Pre-scan these ways and find the worst case as a representative test condition.
Worst Case:	X-axis/ Y-axis/ Z-axis Worst Condition: Z-axis (90 angle)

Following channel(s) was (were) selected for the final test as listed below:

Test Item	Channel	Operating Frequency	Modulation Type	Data Rate
AC Power Conducted Emissions	0	902.2 MHz	ASK	100
Radiated Emissions below 1 GHz	0	902.2 MHz	ASK	100
	64	915 MHz	ASK	100
	128	927.8 MHz	ASK	100
Radiated Emissions above 1 GHz	0	902.2 MHz	ASK	100
	64	915 MHz	ASK	100
	128	927.8 MHz	ASK	100
20 dB Bandwidth	0	902.2 MHz	ASK	100
	64	915 MHz	ASK	100
	128	927.8 MHz	ASK	100

3.5 Duty Cycle of Test Signal

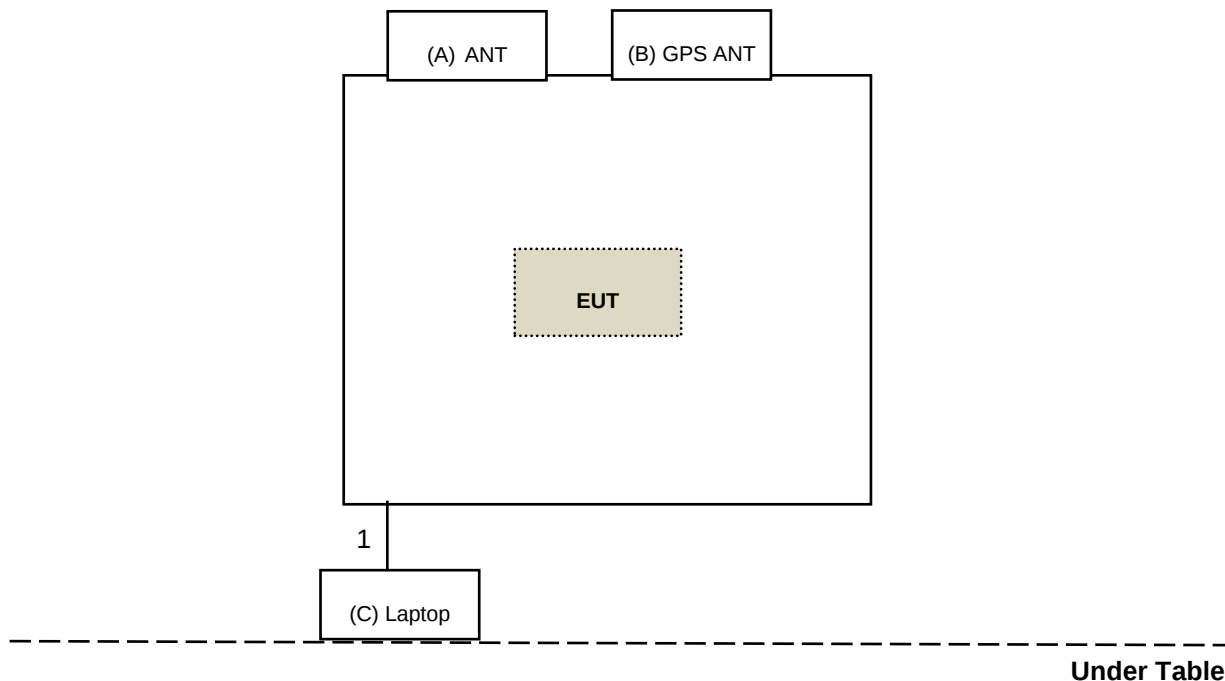
RFID: Duty cycle = 5.915 ms / 11.83 ms x 100% = 50%



3.6 Test Program Used and Operation Descriptions

Controlling software (Altair v5.1.1.0.19) has been activated to set the EUT under transmission condition continuously at specific channel frequency.

3.7 Connection Diagram of EUT and Peripheral Devices



3.8 Configuration of Peripheral Devices and Cable Connections

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A	ANT	Topward	N/A	725906	N/A	Supplied by applicant
B	GPS ANT	N/A	N/A	N/A	N/A	Supplied by applicant
C	Laptop	Acer	N16Q1	N/A	N/A	Supplied by applicant
D	Jig	N/A	N/A	N/A	N/A	Supplied by applicant

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	USB type C Cable	1	0.9	Yes	No	Supplied by applicant

4 Test Instruments

The calibration interval of the all test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.1 AC Power Conducted Emissions

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
50 ohm terminal resistance	E1-011280	05	2024/11/28	2025/11/27
	E1-011311	09	2024/11/28	2025/11/27
	E1-011279	04	2024/11/28	2025/11/27
DC-LISN Schwarzbeck	NNBM 8126G	8126G-069	2024/11/5	2025/11/4
EMI Test Receiver R&S	ESR3	102783	2024/12/17	2025/12/16
Fixed Attenuator STI	BNC5W10dB	PAD-COND2-01	2024/8/25	2025/8/24
LISN R&S	ESH2-Z5	100100	2025/3/5	2026/3/4
	ESH3-Z5	100312	2024/9/9	2025/9/8
RF Coaxial Cable Woken	5D-FB	Cable-cond2-01	2024/8/25	2025/8/24
Software BVADT	BVADT_Conf_ V7.4.1.0	N/A	N/A	N/A
V-LISN Schwarzbeck	NNBL 8226-2	8226-142	2024/8/28	2025/8/27

Notes:

1. The test was performed in HY - Conduction 2.
2. Tested Date: 2025/6/13

4.2 Radiated Emissions below 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower & Turn BV ADT	AT100	AT93021705	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
MXE EMI Receiver Agilent	N9038A	MY51210203	2024/8/27	2025/8/26
Signal & Spectrum Analyzer R&S	FSW43	101866	2025/3/25	2026/3/24
Preamplifier Agilent	Schwarzbeck	2944A10638	2025/4/27	2026/4/26
Bi_Log Antenna Schwarzbeck	VULB 9168	9168-160	2024/10/9	2025/10/8
Loop Antenna TESEQ	HLA 6121	45745	2024/8/21	2025/8/20
RF Coaxial Cable Woken	8D-FB	Cable-CH9-01	2025/4/27	2026/4/26

Notes:

1. The test was performed in HY - 966 chamber 4.
2. Tested Date: 2025/6/13~6/17

4.3 Radiated Emissions above 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Horn Antenna Schwarzbeckbb	BBHA 9120D	9120D-1169	2024/11/10	2025/11/9
Preamplifier Agilent	8449B	3008A02367	2025/1/5	2026/01/4
RF Coaxial Cable HUBER+SUHNER&EMCI	SUCOFLEX 104& EMC104-SM-SM8000	CABLE-CH9-02 (248780+171006)	2025/1/5	2026/01/4
RF Coaxial Cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-(250795/4)	2025/1/5	2026/1/4
Boresight antenna tower fixture BV	BAF-02	5	NA	NA
Preamplifier EMCI	EMC 184045	980116	2024/9/24	2025/9/23
Horn Antenna Schwarzbeck	BBHA 9170	9170-480	2024/11/10	2025/11/9
Horn Antenna Schwarzbeck	BBHA 9170	BBHA9170243	2024/11/10	2025/11/9
RF Coaxial Cable EMCI	EMC102-KM-KM-3000	150929	2024/7/6	2025/7/5
RF Coaxial Cable EMCI	EMC102-KM-KM-600	150928	2024/7/6	2025/7/5
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower &Turn BV ADT	AT100	AT93021705	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
MXE EMI Receiver Agilent	N9038A	MY51210203	2024/8/27	2025/8/26
Signal & Spectrum Analyzer R&S	FSW43	101866	2025/3/25	2026/3/24
Preamplifier Agilent	Schwarzbeck	2944A10638	2025/4/27	2026/4/26
Bi_Log Antenna Schwarzbeck	VULB 9168	9168-160	2024/10/9	2025/10/8
Loop Antenna TESEQ	HLA 6121	45745	2024/8/21	2025/8/20
RF Coaxial Cable Woken	8D-FB	Cable-CH9-01	2025/4/27	2026/4/26

Notes:

1. The test was performed in HY - 966 chamber 4.
2. Tested Date: 2025/6/13

4.4 20 dB Bandwidth

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
MXA Signal Analyzer Keysight	N9020B	MY60110462	2025/4/22	2026/4/21
Signal & Spectrum Analyzer R&S	FSW43	101582	2025/4/15	2026/4/14
Software BV	ADT_RF Test Software V7.6.5.4	N/A	N/A	N/A

Notes:

1. The test was performed in HY - Oven
2. Tested Date: 2025/6/19

5 Limits of Test Items

5.1 AC Power Conducted Emissions

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Notes:

1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

5.2 Radiated Emissions below 1 GHz

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following

Fundamental Frequency	Field Strength of Fundamental (millivolts/meter)	Field Strength of Harmonics (microvolts/meter)
902 ~ 928 MHz	50	500

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits as below table, whichever is the lesser attenuation

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table.

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
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

Notes:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).

5.3 Radiated Emissions above 1 GHz

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following

Fundamental Frequency	Field Strength of Fundamental (millivolts/meter)	Field Strength of Harmonics (microvolts/meter)
902 ~ 928 MHz	50	500

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits as below table, whichever is the lesser attenuation

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
Above 960	500	3

Notes:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

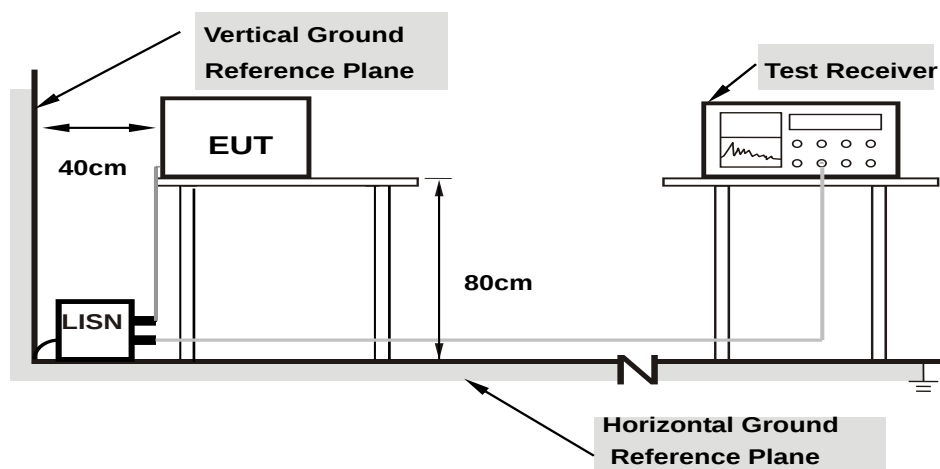
5.4 20 dB Bandwidth

The 20dB bandwidth shall be specified in operating frequency band.

6 Test Arrangements

6.1 AC Power Conducted Emissions

6.1.1 Test Setup



Note: 1. Support units were connected to second LISN.

For the actual test configuration, please refer to the attached file (Test Setup Photo).

6.1.2 Test Procedure

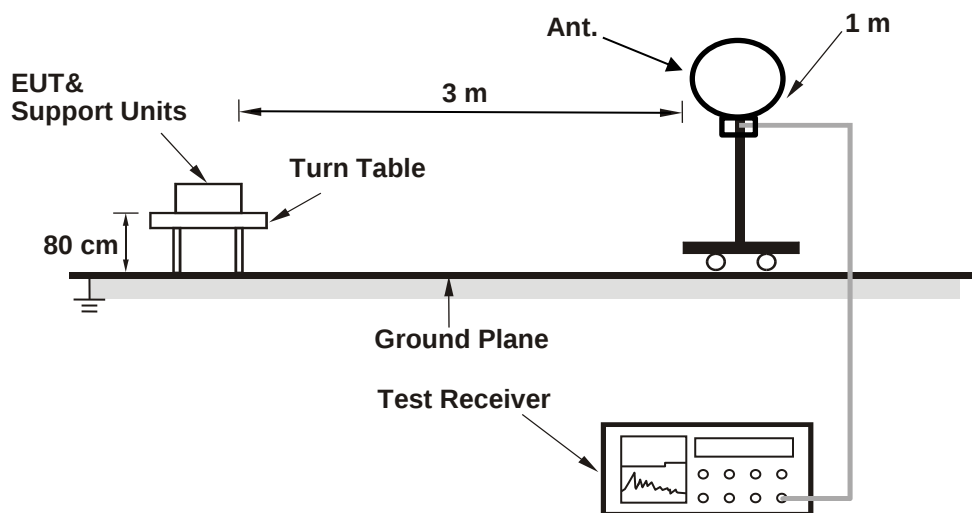
- The EUT was placed on a 0.8 meter to the top of table and placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50 uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit – 20 dB) was not recorded.

Note: The resolution bandwidth and video bandwidth of test receiver is 9 kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15 MHz-30 MHz.

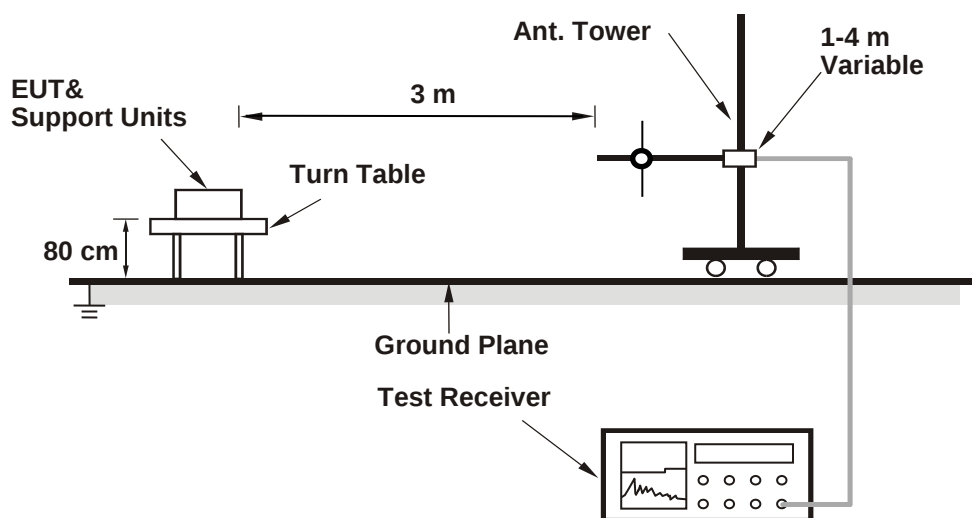
6.2 Radiated Emissions below 1 GHz

6.2.1 Test Setup

For Radiated emission below 30 MHz



For Radiated emission above 30 MHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

6.2.2 Test Procedure

For Radiated emission below 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode, except for the frequency band (9 kHz to 90 kHz and 110 kHz to 490 kHz) set to average detect function and peak detect function.

Notes:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 200 Hz at frequency below 150 kHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz or 10 kHz at frequency (150 kHz to 30 MHz).
3. All modes of operation were investigated and the worst-case emissions are reported.

For Radiated emission above 30 MHz

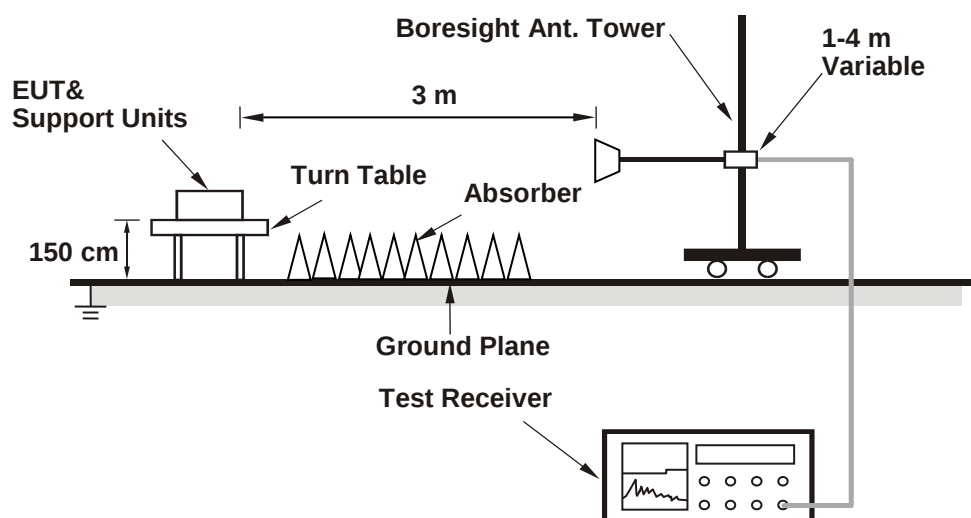
- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

Notes:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) at frequency below 1 GHz.
2. All modes of operation were investigated and the worst-case emissions are reported.

6.3 Radiated Emissions above 1 GHz

6.3.1 Test Setup



For the actual test configuration, please refer to the attached file (Test Setup Photo).

6.3.2 Test Procedure

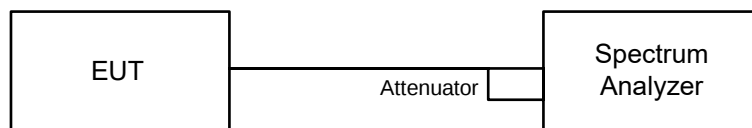
- The EUT was placed on the top of a rotating table 1.5 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Notes:

- The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) and Average detection (AV) at frequency above 1 GHz.
- For fundamental and harmonic signal measurement, the resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is $\geq 1/T$ (Duty cycle $< 98\%$) or 10 Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1 GHz.
- All modes of operation were investigated and the worst-case emissions are reported.

6.4 20 dB Bandwidth

6.4.1 Test Setup



6.4.2 Test Procedure

- Set resolution bandwidth (RBW) = 1% to 5% of the OBW.
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission.

7 Test Results of Test Item

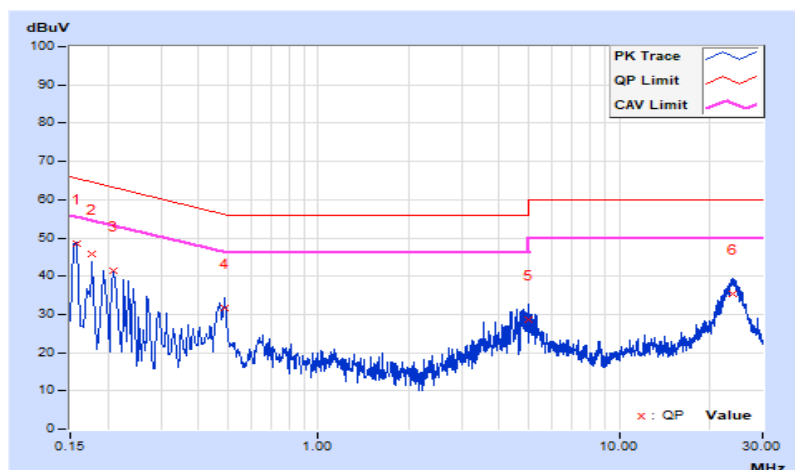
7.1 AC Power Conducted Emissions

RF Mode	RFID	Channel	CH 0 : 902.2 MHz
Frequency Range	150 kHz ~ 30 MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67 % RH
Tested By	Adair Peng		

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15687	10.25	38.26	20.55	48.51	30.80	65.63	55.63	-17.12	-24.83
2	0.17800	10.26	35.39	16.14	45.65	26.40	64.58	54.58	-18.93	-28.18
3	0.20960	10.27	31.13	12.18	41.40	22.45	63.22	53.22	-21.82	-30.77
4	0.49000	10.30	21.20	12.60	31.50	22.90	56.17	46.17	-24.67	-23.27
5	5.02600	10.42	18.34	5.07	28.76	15.49	60.00	50.00	-31.24	-34.51
6	23.88600	10.57	24.94	16.51	35.51	27.08	60.00	50.00	-24.49	-22.92

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

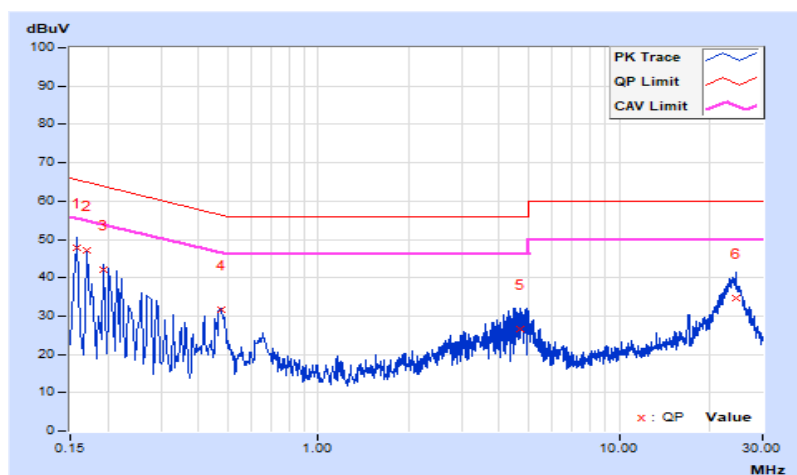


RF Mode	RFID	Channel	CH 0 : 902.2 MHz
Frequency Range	150 kHz ~ 30 MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67 % RH
Tested By	Adair Peng		

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15800	10.30	37.55	19.13	47.85	29.43	65.57	55.57	-17.72	-26.14
2	0.17000	10.30	36.67	17.05	46.97	27.35	64.96	54.96	-17.99	-27.61
3	0.19400	10.30	31.73	12.84	42.03	23.14	63.86	53.86	-21.83	-30.72
4	0.47400	10.32	21.32	10.24	31.64	20.56	56.44	46.44	-24.80	-25.88
5	4.66600	10.48	16.24	1.36	26.72	11.84	56.00	46.00	-29.28	-34.16
6	24.49800	10.78	24.05	16.72	34.83	27.50	60.00	50.00	-25.17	-22.50

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



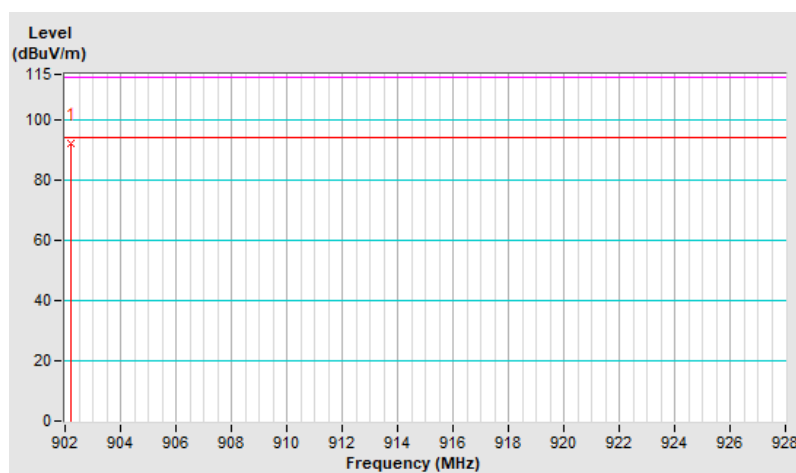
7.2 Radiated Emissions below 1 GHz

RF Mode	RFID	Channel	CH 0 : 902.20 MHz
Frequency Range	902MHz ~ 928MHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*902.20	92.2 QP	94.00	-1.8	1.62 H	276	59.6	32.6

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

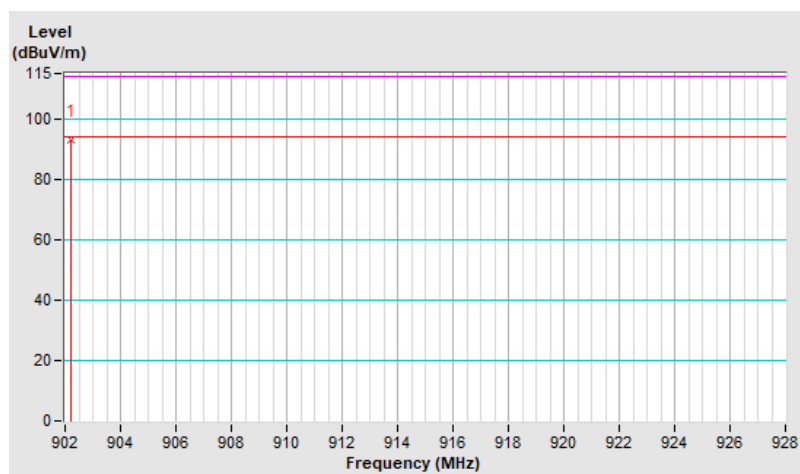


RF Mode	RFID	Channel	CH 0 : 902.20 MHz
Frequency Range	902MHz ~ 928MHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*902.20	93.2 QP	94.00	-0.8	1.00 V	289	60.6	32.6

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

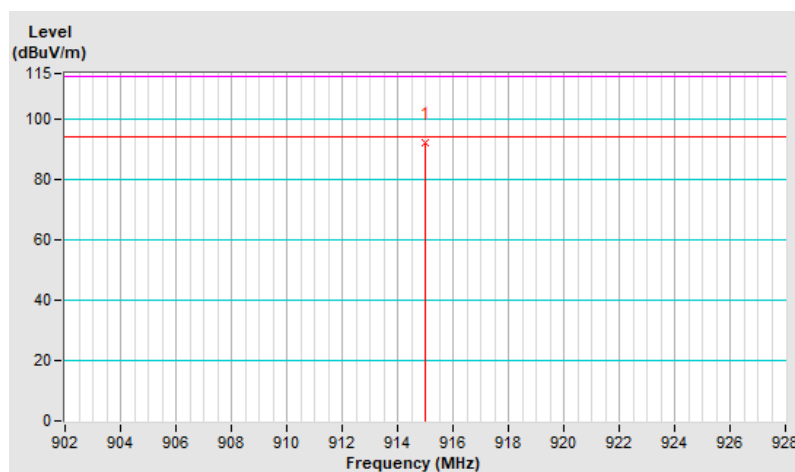


RF Mode	RFID	Channel	CH 64 : 915 MHz
Frequency Range	902MHz ~ 928MHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*915.00	92.2 QP	94.00	-1.8	1.60 H	280	59.3	32.9

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

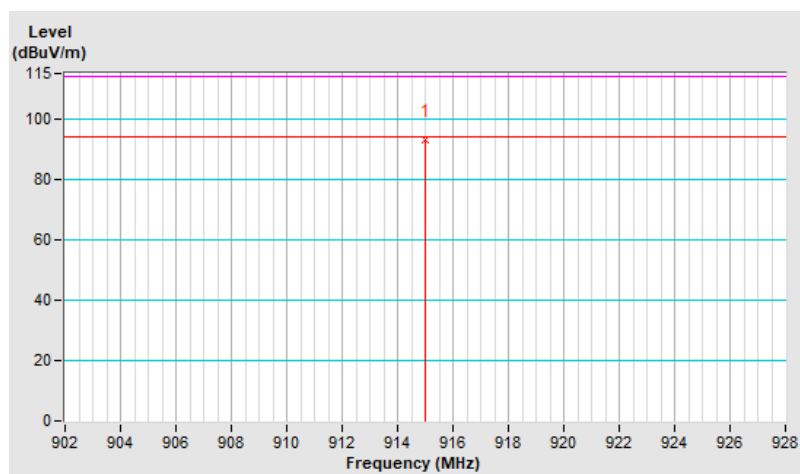


RF Mode	RFID	Channel	CH 64 : 915 MHz
Frequency Range	902MHz ~ 928MHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*915.00	93.1 QP	94.00	-0.9	1.00 V	273	60.2	32.9

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

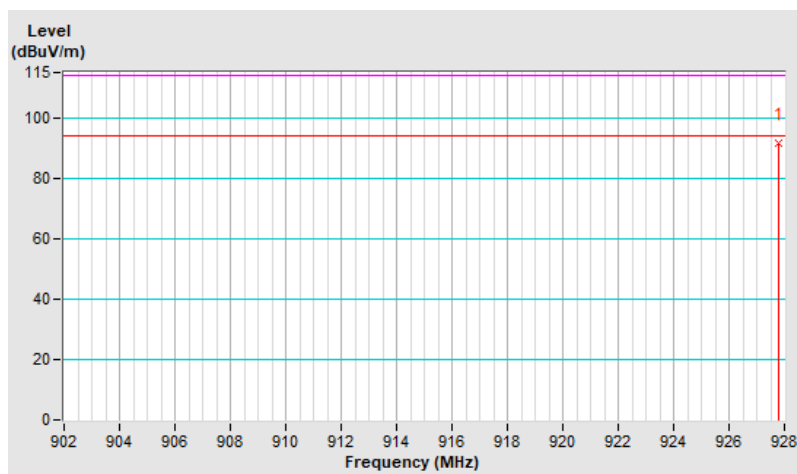


RF Mode	RFID	Channel	CH 128 : 927.8 MHz
Frequency Range	902MHz ~ 928MHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*927.80	91.4 QP	94.00	-2.6	1.59 H	275	58.5	32.9

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

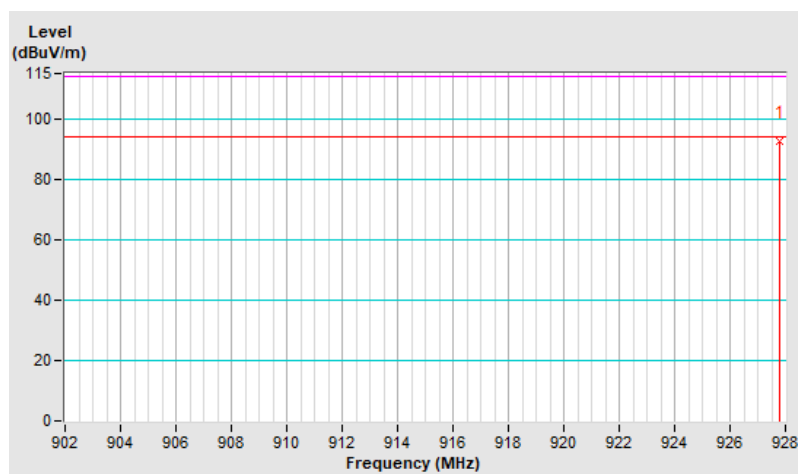


RF Mode	RFID	Channel	CH 128 : 927.8 MHz
Frequency Range	902MHz ~ 928MHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*927.80	92.6 QP	94.00	-1.4	1.00 V	292	59.7	32.9

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.



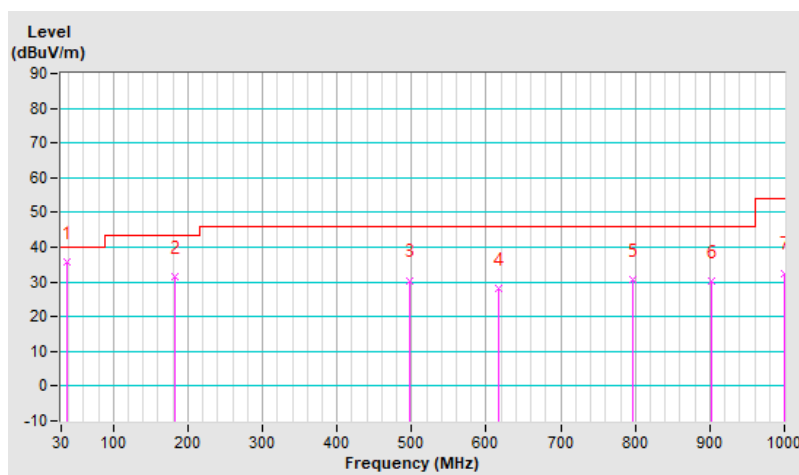
Below 1GHz worst-case data

RF Mode	RFID	Channel	CH 0 : 902.2 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120kHz, DET=Quasi-Peak
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67% RH
Tested By	Adair Peng		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	37.76	35.8 QP	40.0	-4.2	1.49 H	5	45.4	-9.6
2	183.26	31.4 QP	43.5	-12.1	1.00 H	85	41.4	-10.0
3	497.54	30.5 QP	46.0	-15.5	1.99 H	222	33.3	-2.8
4	615.88	28.3 QP	46.0	-17.7	1.49 H	18	28.5	-0.2
5	797.27	30.6 QP	46.0	-15.4	1.49 H	5	27.5	3.1
6	902.00	30.4 QP	46.0	-15.6	1.99 H	310	25.5	4.9
7	1000.00	32.6 QP	54.0	-21.4	1.49 H	49	26.6	6.0

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.
6. “ * “: Fundamental frequency.

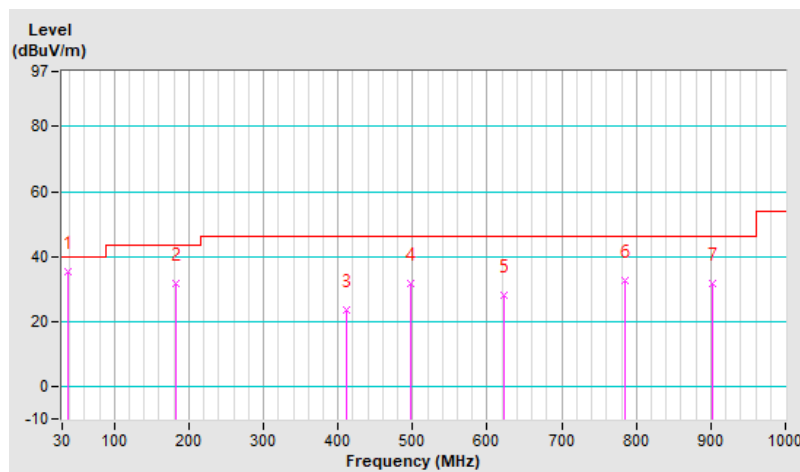


RF Mode	RFID	Channel	CH 0 : 902.2 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120kHz, DET=Quasi-Peak
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67% RH
Tested By	Adair Peng		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	38.73	35.2 QP	40.0	-4.8	1.99 V	6	44.9	-9.7
2	183.26	31.7 QP	43.5	-11.8	1.99 V	37	41.7	-10.0
3	412.18	23.5 QP	46.0	-22.5	1.49 V	13	27.9	-4.4
4	497.54	31.6 QP	46.0	-14.4	1.99 V	17	34.4	-2.8
5	622.67	28.2 QP	46.0	-17.8	1.00 V	124	28.3	-0.1
6	784.66	32.6 QP	46.0	-13.4	1.49 V	253	29.8	2.8
7	902.00	31.7 QP	46.0	-14.3	1.00 V	234	26.8	4.9

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.
6. “ * “: Fundamental frequency.

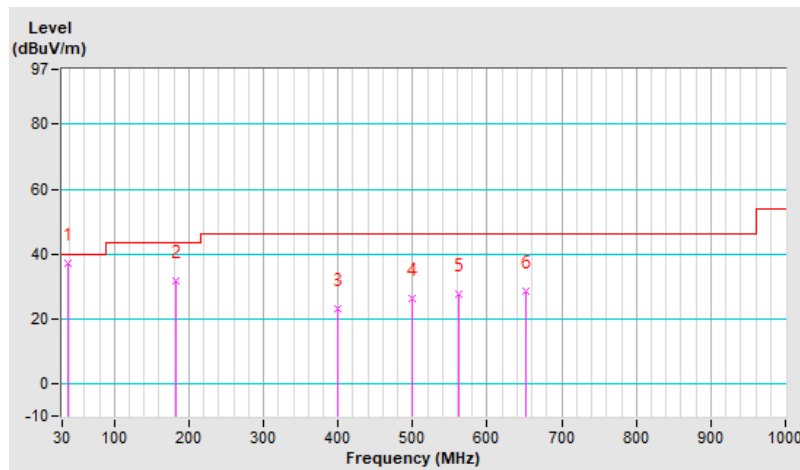


RF Mode	RFID	Channel	CH 64 : 915 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120kHz, DET=Quasi-Peak
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67% RH
Tested By	Adair Peng		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	37.76	37.3 QP	40.0	-2.7	1.50 H	19	46.9	-9.6
2	183.26	31.9 QP	43.5	-11.6	1.50 H	291	41.9	-10.0
3	399.57	23.3 QP	46.0	-22.7	1.00 H	0	27.9	-4.6
4	499.48	26.2 QP	46.0	-19.8	2.00 H	254	29.0	-2.8
5	562.53	27.6 QP	46.0	-18.4	1.00 H	133	29.3	-1.7
6	652.74	28.4 QP	46.0	-17.6	1.00 H	3	28.1	0.3

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.
6. “ * “: Fundamental frequency.

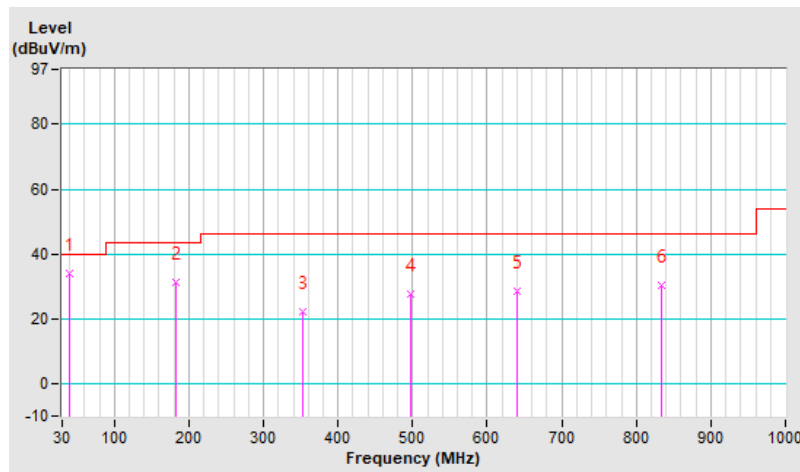


RF Mode	RFID	Channel	CH 64 : 915 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120kHz, DET=Quasi-Peak
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67% RH
Tested By	Adair Peng		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	39.70	34.1 QP	40.0	-5.9	2.00 V	78	43.6	-9.5
2	183.26	31.2 QP	43.5	-12.3	1.00 V	100	41.2	-10.0
3	352.04	22.1 QP	46.0	-23.9	1.50 V	188	27.6	-5.5
4	497.54	27.5 QP	46.0	-18.5	1.00 V	40	30.3	-2.8
5	641.10	28.6 QP	46.0	-17.4	2.00 V	123	28.4	0.2
6	834.13	30.5 QP	46.0	-15.5	1.00 V	212	26.9	3.6

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.
6. “ * “: Fundamental frequency.

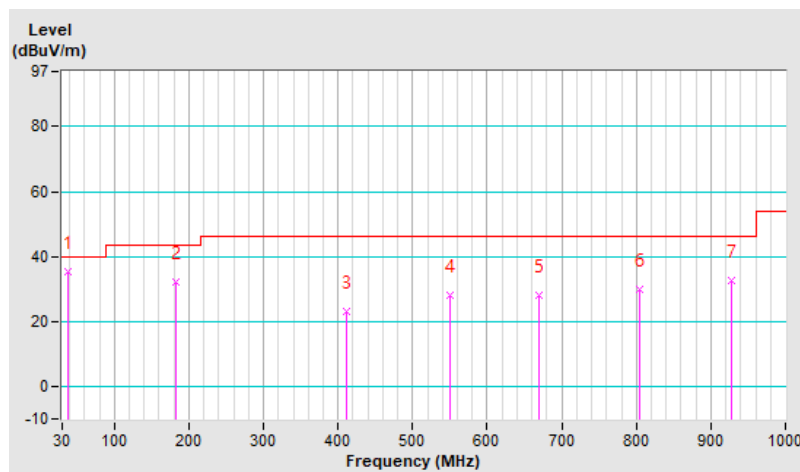


RF Mode	RFID	Channel	CH 128 : 927.8 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120kHz, DET=Quasi-Peak
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67% RH
Tested By	Adair Peng		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	37.76	35.2 QP	40.0	-4.8	1.00 H	288	44.8	-9.6
2	183.26	32.1 QP	43.5	-11.4	2.00 H	272	42.1	-10.0
3	412.18	23.2 QP	46.0	-22.8	1.00 H	330	27.6	-4.4
4	549.92	28.3 QP	46.0	-17.7	1.50 H	1	30.2	-1.9
5	669.23	28.2 QP	46.0	-17.8	2.00 H	235	27.8	0.4
6	804.06	29.9 QP	46.0	-16.1	1.00 H	179	26.8	3.1
7	928.00	32.6 QP	46.0	-13.4	1.00 H	211	27.5	5.1

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.
6. “ * “: Fundamental frequency.

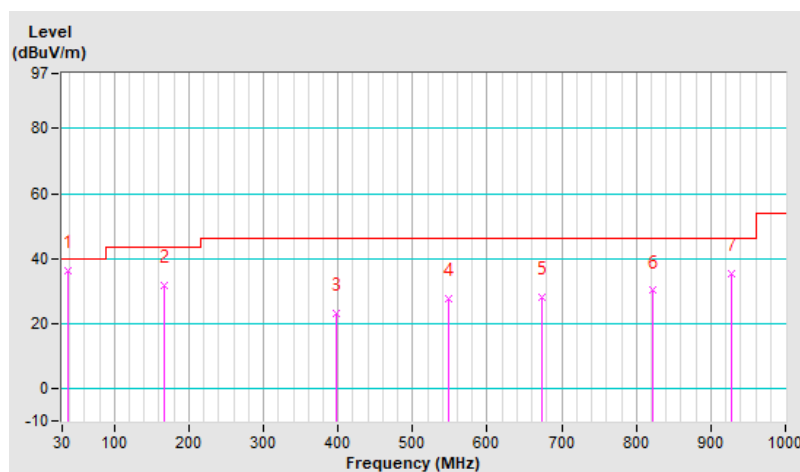


RF Mode	RFID	Channel	CH 128 : 927.8 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120kHz, DET=Quasi-Peak
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67% RH
Tested By	Adair Peng		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	37.76	36.1 QP	40.0	-3.9	1.00 V	317	45.7	-9.6
2	167.74	31.7 QP	43.5	-11.8	1.50 V	191	40.1	-8.4
3	398.60	23.0 QP	46.0	-23.0	1.00 V	7	27.6	-4.6
4	548.95	27.7 QP	46.0	-18.3	2.00 V	38	29.6	-1.9
5	673.11	28.2 QP	46.0	-17.8	2.00 V	357	27.7	0.5
6	821.52	30.1 QP	46.0	-15.9	1.00 V	178	26.7	3.4
7	928.00	35.4 QP	46.0	-10.6	1.50 V	288	30.3	5.1

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.
6. “ * “: Fundamental frequency.



7.3 Radiated Emissions above 1 GHz

RF Mode	RFID	Channel	CH 0 : 902.2 MHz
Frequency Range	1 GHz ~ 10 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=1 kHz, DET=RMS
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67% RH
Tested By	Adair Peng		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#1804.40	41.3 PK			1.93 H	252	45.4	-4.1
2	#1804.40	29.1 AV			1.93 H	252	33.2	-4.1
3	2706.60	42.1 PK	74.0	-31.9	2.58 H	177	43.1	-1.0
4	2706.60	29.2 AV	54.0	-24.8	2.58 H	177	30.2	-1.0
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#1804.40	41.5 PK			2.89 V	331	45.6	-4.1
2	#1804.40	29.4 AV			2.89 V	331	33.5	-4.1
3	2706.60	42.4 PK	74.0	-31.6	1.76 V	254	43.4	-1.0
4	2706.60	29.5 AV	54.0	-24.5	1.76 V	254	30.5	-1.0

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.

RF Mode	RFID	Channel	CH 64 : 915 MHz
Frequency Range	1 GHz ~ 10 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=1 kHz, DET=RMS
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67% RH
Tested By	Adair Peng		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#1830.00	41.5 PK			2.02 H	261	45.3	-3.8
2	#1830.00	29.2 AV			2.02 H	261	33.0	-3.8
3	2745.00	42.6 PK	74.0	-31.4	2.66 H	181	43.6	-1.0
4	2745.00	29.3 AV	54.0	-24.7	2.66 H	181	30.3	-1.0
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#1830.00	41.7 PK			3.05 V	321	45.5	-3.8
2	#1830.00	29.6 AV			3.05 V	321	33.4	-3.8
3	2745.00	42.9 PK	74.0	-31.1	1.82 V	267	43.9	-1.0
4	2745.00	29.8 AV	54.0	-24.2	1.82 V	267	30.8	-1.0

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.

RF Mode	RFID	Channel	CH 128 : 927.8 MHz
Frequency Range	1 GHz ~ 10 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=1 kHz, DET=RMS
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67% RH
Tested By	Adair Peng		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#1855.60	41.5 PK			1.95 H	246	45.1	-3.6
2	#1855.60	29.3 AV			1.95 H	246	32.9	-3.6
3	2783.40	42.5 PK	74.0	-31.5	2.67 H	171	43.3	-0.8
4	2783.40	29.4 AV	54.0	-24.6	2.67 H	171	30.2	-0.8
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#1855.60	41.9 PK			2.93 V	342	45.5	-3.6
2	#1855.60	29.7 AV			2.93 V	342	33.3	-3.6
3	2783.40	42.9 PK	74.0	-31.1	1.73 V	249	43.7	-0.8
4	2783.40	29.8 AV	54.0	-24.2	1.73 V	249	30.6	-0.8

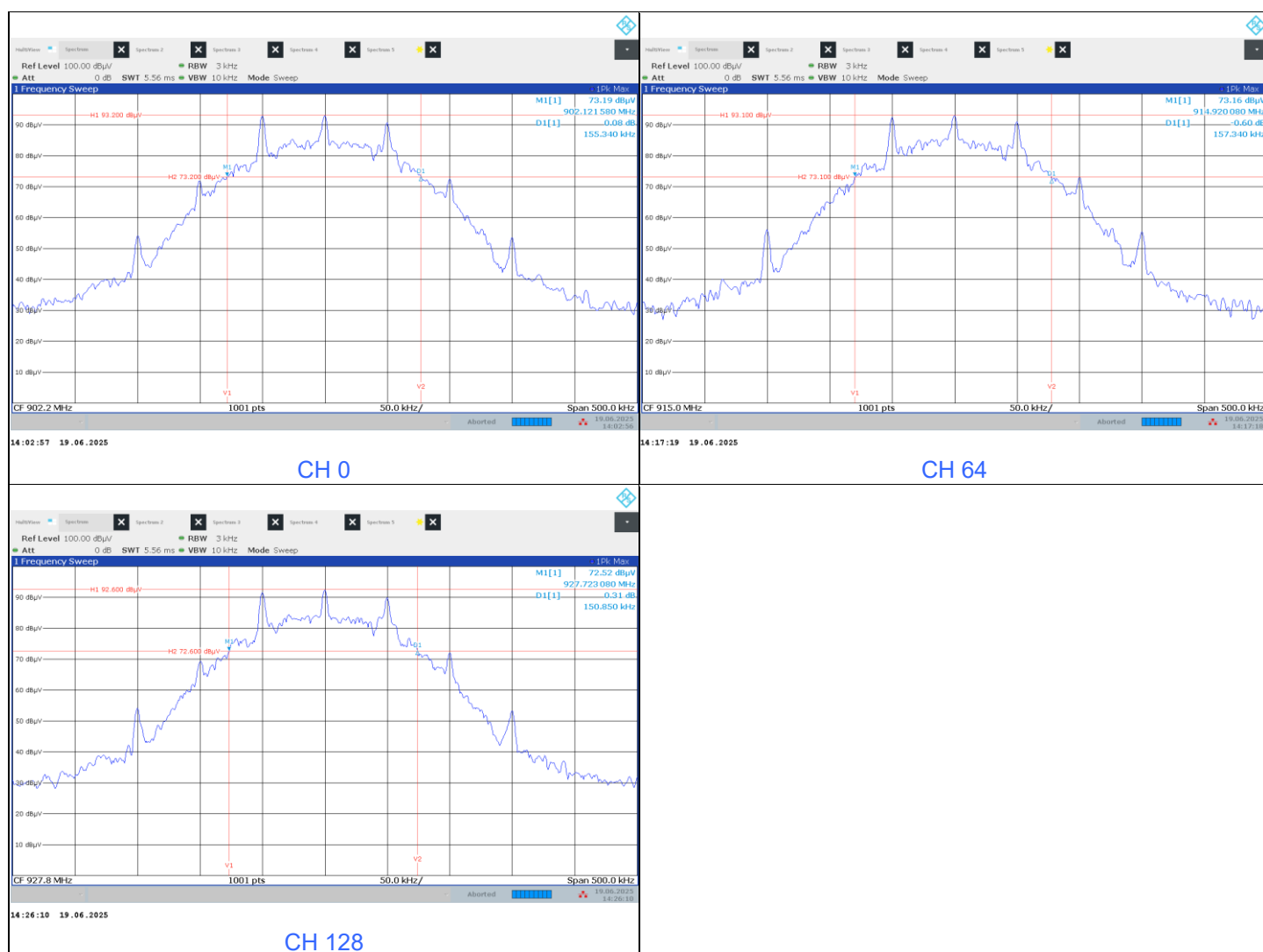
Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.

7.4 20 dB Bandwidth

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	25°C, 76% RH	Tested By:	Waydi Tuan
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Channel	Channel Frequency (MHz)	20 dB Bandwidth (kHz)
0	902.2	155.34
64	915	157.34
128	927.8	150.85



8 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo)

9 Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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The address and road map of all our labs can be found in our web site also.

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