Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

FCC 15.247
RFID Report

for

Elitegroup Computer Systems Co., Ltd.

No. 239, Sec. 2, Ti Ding Blvd,
Taipei, Taiwan 11493

Product Name	**:**	**RFID Reader**
Model Name	**:**	**GWS-RFID**
Brand	**:**	**ECS**
FCC ID	**:**	**WL6-GWS-RFID**

Prepared by: **:** **AUDIX Technology Corporation,**
EMC Department

Testing Laboratory
1724

Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

TABLE OF CONTENTS

Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

TEST REPORT CERTIFICATION

Applicant	:	Elitegroup Computer Systems Co., Ltd.
Manufacture	:	Golden Elite Technology (SHENZHEN) CO., LTD.
EUT Description		
(1) Product	:	RFID Reader
(2) Model	:	GWS-RFID
(3) Brand	:	ECS

Applicable Standards:

47 CFR FCC Part 15 Subpart C
ANSI C63.10:2013

Audix Technology Corp. tested the equipment mentioned in accordance with the requirements set forth in the above standards. Test results indicate that the equipment tested is capable of demonstrating compliance with the requirements as documented within this report.
Audix Technology Corp. does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens and samples.

Date of Report: 2017. 06. 09

Reviewed by: (Tina Huang/Administrator)

Approved by: (Ben Cheng/Manager)

Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

1. REVISION RECORD OF TEST REPORT

Edition No	Issued Data	Revision Summary	Report Number
0	2017. 06. 09	Original Report	EM-F170345

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New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

2. SUMMARY OF TEST RESULTS

Rule	Description	Results
15.207	Conducted Emission	**PASS**
15.247(d)/15.205	Radiated Spurious Emission	**PASS**
15.247(a)(1)	20dB Bandwidth	**PASS**
15.247(a)(1)	Carrier Frequency Separation	**PASS**
15.247(a)(1)(i)	Time of Occupancy	**PASS**
15.247(b)(2)	Number of Hopping Channels	**PASS**
15.247(b)(2)	Maximum Peak Output Power	**PASS**
15.247(d)	Conducted Band Edges and Conducted Spurious Emission	**PASS**
15.203	Antenna Requirement	**PASS**

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New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

3. GENERAL INFORMATION

3.1. Description of Application

Applicant	Elitegroup Computer Systems Co., Ltd. No. 239, Sec. 2., TiDing Blvd., Taipei, Taiwan 11493
Manufacturer	Golden Elite Technology (SHENZHEN) CO., LTD. No.1, Nan-Huan Rd., ShaJing, BaoAn, Shenzhen, China
Product	RFID Reader
Model	GWS-RFID
Brand	ECS

3.2. Description of EUT

Test Model	GWS-RFID
Serial Number	N/A
Power Rating	DC 48V, 600mA
RF Features	RFID
Transmit Type	1T1R
Accessories	Panel Antenna Cable: Shielded, Detachable, 1.0m
I/O Ports	LAN Port x1 USB Port x1 D1, DO, RS232 Port x1 Antenna Ports (TNC-reverse Type) x4
Date of Receipt	2017. 03. 28
Date of Test	2017. 04. 20 ~ 06. 09

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No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

3.3. EUT Specifications Assessed in Current Report

Mode	Fundamental Range (MHz)	Channel Number	Modulation	Data Rate
RFID	902.75-927.25	50	FHSS (ASK)	115.2k, 230.4k, 460.8k, 921.6 k

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

3.4. Antenna Information

No.	Model No.	Manufacture	Antenna Type	Frequency (MHz)	Max Gain (dBi)
1	PAA-001	PRO-CELL Co., Ltd.	PANEL Antenna (TNC-reverse Type)	860 to 930	**8**

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New Taipei City244, Taiwan
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Fax: +886 2 26099303

3.5. Description of Key Components

Item	Supplier	Model / Type	Character
Mother Board	ECS	GBW-RFID	---
CPU (FCBGA393)	Intel	Intel® Quark SoC X1021	400MHz
Memory	MICRON	MT41K256M8DA-125IT:K	DDR3L SDRAM 512M
eMMC	MICRON	MTFC4GLDEA-0M WT	4GB
Battery	JTR	CR2032	DC 3V
RFID HP-SIP Module	MTI	RU00-M03	FCC ID: MAD-RU00-M03
Panel Antenna	PRO-CELL	PAA-001	860 to 930MHz, 8dBi

3.6. Test Configuration

Mode	Duty Cycle (x)	T (ms)	Duty Cycle Factor (dB)
RFID	N/A	399	N/A

AC Conduction	
Test Case	Normal operation

Item		Mode	Test Channel
Radiated Test Case	Radiated Spurious Emission Note1	RFID	00/24/49
Conducted Test Case[2]	20dB Bandwidth	RFID	00/24/49
	Carrier Frequency Separation	RFID	00/24/49
	Time of Occupancy	RFID	00/24/49
	Number of Hopping Channels	RFID	24
	Maximum Peak Output Power	RFID	00/24/49
	Band Edges	RFID	00/49
	Spurious Emission	RFID	00/24/49

Note 1:
■Mobile Device: Device.
□Portable Device, and 3 axis were assessed.
- □ Lie
- □ Side
- □ Stand

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3.7. Tested Supporting System List

3.7.1. Support Peripheral Unit

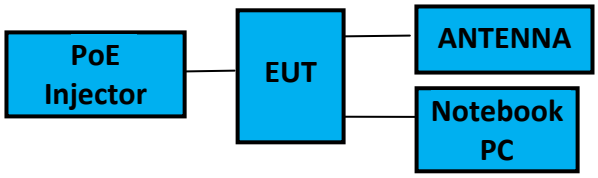
No.	Product	Brand	Model No.	Serial No.	Approval
1.	Notebook PC	ASUS	X5502E	N/A	Contains FCC ID PPD-AAR5B225
2.	PoE Injector	Qno	QPE1011G-30W	N/A	N/A

3.7.2. Cable Lists

No.	Cable Description Of The Above Support Units
1.	USB to RS232 Cable: Unshielded, Detachable, 1.0m BNC Cable: Unshielded, Detachable, 1.0m AC Adapter: Enerironix, M/N EXA1208UH, AC Power Cord: Shielded, Detachable, 1.8m DC Power Cord: Shielded, Undetachable, 1.8m, Bonded a ferrite core
4.	BNC Cable: Shielded, Detachable, 1.0m AC Power Cord: Unshielded, Detachable, 1.0m

3.8. Setup Configuration

3.8.1. EUT Configuration for Power Line & Radiated Emission



3.8.2. EUT Configuration for RF Conducted Test Items

3.9. Operating Condition of EUT

Test program “Tera Term” is used for enabling RFID function under continues transmitting and choosing data rate/ channel.

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No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

3.10.Description of Test Facility

Name of Test Firm	Audix Technology Corporation / EMC Department No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan Tel: +886-2-26092133 Fax: +886-2-26099303 Website : www.audixtech.com Contact e-mail: sales@audixtech.com
Accreditations	The laboratory is accredited by following organizations under ISO/IEC 17025:2005 (1) NVLAP(USA) NVLAP Lab Code 200077-0 (2) TAF(Taiwan) No. 1724 (3) FCC OET Designation No. TW1004 & TW1090
Test Facilities	(1) No. 8 Shielding Room (2) Semi-Anechoic Chamber (IC Test Site Registration No.: 5183B-1) (3) Fully Anechoic Chamber (IC Test Site Registration No.: 5183B-4)

3.11.Measurement Uncertainty

Test Item	Frequency Range	Uncertainty
Conduction Test	150kHz~30MHz	±3.50dB
Radiation Test (Distance: 3m)	9kHz~30MHz	± 0.5dB
	30MHz~1000MHz	± 3.68dB
	Above 1GHz	± 5.82dB

Remark：Uncertainty = $ku_c(y)$

Test Item	Uncertainty
20dB Bandwidth	±0.2kHz
Carrier Frequency Separation	±0.2kHz
Time of Occupancy	±0.03sec
Maximum peak Output power	± 0.52dB
Conducted Emission Limitations	± 0.13dB

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New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

4. MEASUREMENT EQUIPMENT LIST

4.1. Conducted Emission Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
1.	Test Receiver	R&S	ESCI	101276	2017. 03. 23	1 Year
2.	A.M.N.	R&S	ESH2-Z5	100366	2016. 07. 27	1 Year
3.	L.I.S.N.	Kyoritsu	KNW-407	8-1539-3	2017. 01. 13	1 Year
4.	Pulse Limiter	R&S	ESH3-Z2	101495	2017. 01. 16	1 Year
5.	Test Software	Audix	e3	V.6.120424	N.C.R.	N.C.R.

4.2. Radiated Emission Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
1.	Spectrum Analyzer	Agilent	N9010A-526	MY53400071	2016. 09. 19	1 Year
2.	Spectrum Analyzer	Agilent	N9010A-526	MY52220368	2016. 12. 01	1 Year
3.	Test Receiver	R & S	ESCS30	100338	2016. 06. 22	1 Year
4.	Amplifier	HP	8447D	2944A06305	2017. 02. 16	1 Year
5.	Amplifier	Sonoma	310N	187161	2016. 06. 14	1 Year
6.	Loop Antenna	R & S	HFH2-Z2	891847/27	2016. 12. 23	1 Year
7.	Bilog Antenna	CHASE	CBL6112D	33821	2017. 01. 21	1 Year
8.	Double-Ridged Waveguide Horn	ETS-Lindgren	3117	00135902	2017. 03. 08	1 Year
9.	Tunable Notch Filter	K&L	3TNF-800/1000-0.2-N/N	498	2017. 01. 27	1 Year
10.	Test Software	Audix	e3	V.6.110601	N.C.R.	N.C.R.

4.3. RF Conducted Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
1.	Spectrum Analyzer	Agilent	N9010A-507	MY52220264	2016. 08. 09	1 Year

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No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

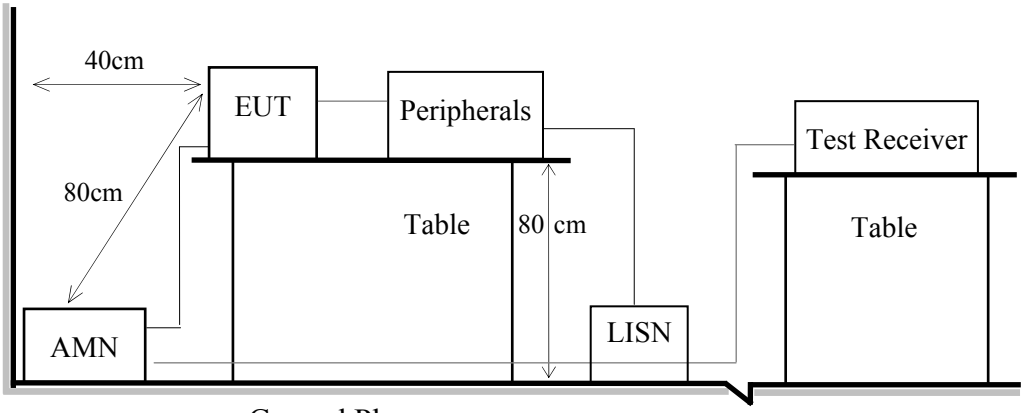
5. CONDUCTED EMISSION

5.1. Block Diagram of Test Setup

5.1.1. Block Diagram of EUT

Indicated as section 3.8

5.1.2. Shielded Room Setup Diagram



5.2. Conducted Emission Limit

Frequency	Conducted Limit	
	Quasi-Peak Level	Average Level
150kHz ~ 500kHz	66 ~ 56 dBμV	56 ~ 46 dBμV
500kHz ~ 5MHz	56 dBμV	46 dBμV
5MHz ~ 30MHz	60 dBμV	50 dBμV

Remark 1.: If the average limit is met when using a Quasi-Peak detector, the measurement using the average detector is not required.
2.: The lower limit applies to the band edges.

5.3. Test Procedure

5.3.1. To set up the EUT as indicated in ANSI C 63.10. The EUT was placed on the table which has 80 cm height to the ground and 40 cm distance to the conducting wall.

5.3.2. Power supplier of the EUT was connected to the AC mains through an Artificial Mains Network (A.M.N.).

5.3.3. The AC power supplies to all peripheral devices must be provided through line impedance stabilization network (L.I.S.N.)

5.3.4. Checking frequency range from 150 kHz to 30 MHz and record the emission which does not have 20 dB below limit.

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No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

5.4. Test Results

Please refer to Appendix A.

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No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

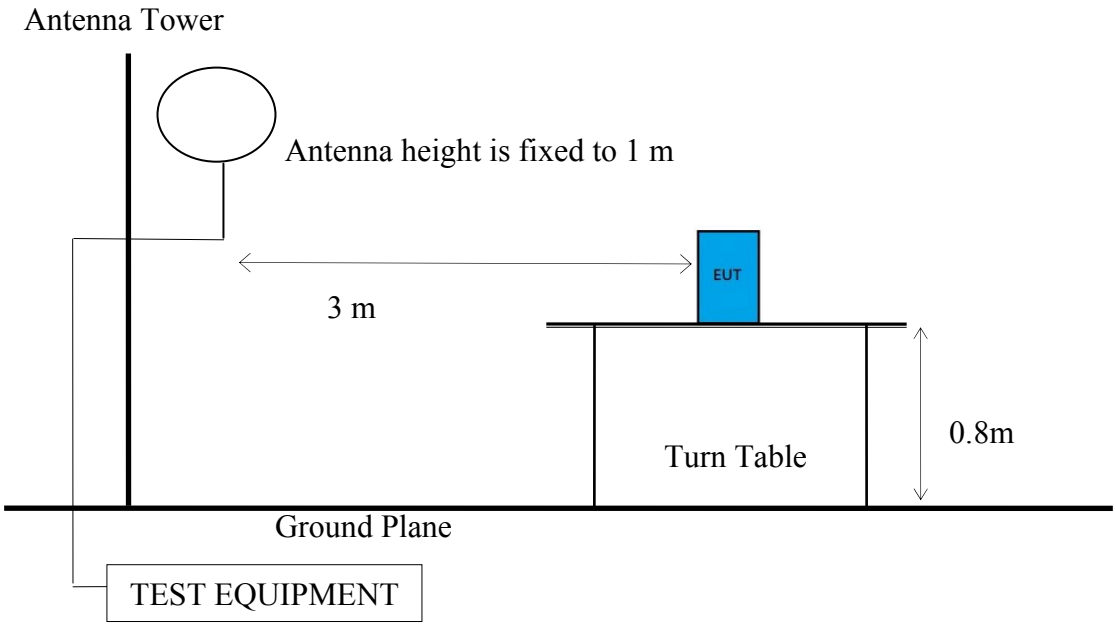
6. RADIATED EMISSION

6.1. Block Diagram of Test Setup

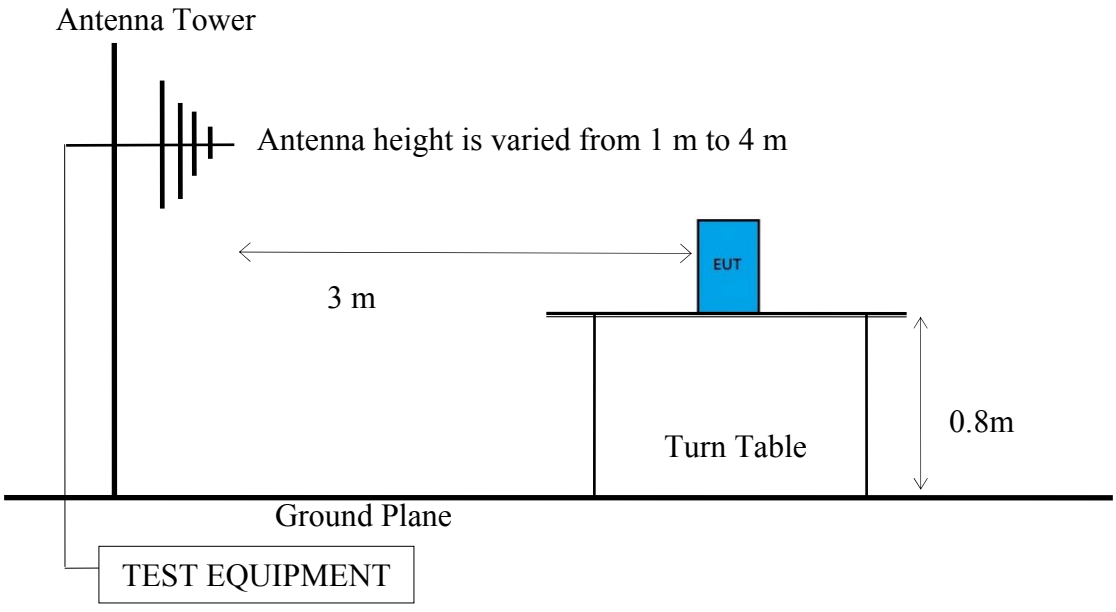
6.1.1. Block Diagram of EUT

Indicated as section 3.8

6.1.2. Setup Diagram for 9kHz-30MHz



6.1.3. Setup Diagram for 30-1000 MHz



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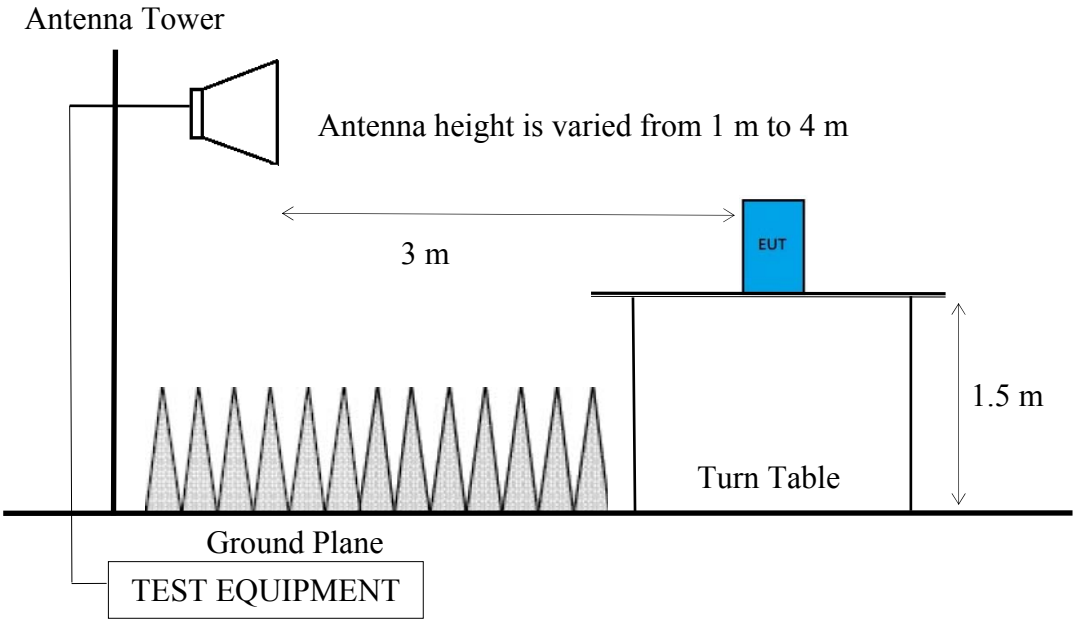
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

6.1.4. Setup Diagram for above 1GHz



6.2. Radiated Emission Limits

In any 100kHz bandwidth outside the frequency band, the radio frequency power produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level. In addition, radiated emissions which fall in restricted bands, as defined in Section 15.205 must also comply with the radiated emission limits specified as below.

Frequency (MHz)	Distance (m)	Limits	
		dBμV/m	μV/m
0.009 - 0.490	300	67.6	2400/kHz
0.490 - 1.705	30	87.6	24000/kHz
1.705 - 30	30	29.5	30
30 - 88	3	40.0	100
88- 216	3	43.5	150
216- 960	3	46.0	200
Above 960	3	54.0	500
Above 1000	3	74.0 dBμV/m (Peak) 54.0 dBμV/m (Average)	

Remark：(1) dBμV/m = 20 log (μV/m)
(2) The tighter limit applies to the edge between two frequency bands.
(3) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
(4) Fundamental and emission fall within operation band are exempted from this section.
(5) Pursuant to ANSI C63.10: 6.6.4.3, if the maximized peak measured value complies with the average limit, then it is unnecessary to perform an average measurement.

Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

6.3. Test Procedure

Frequency Range 9kHz~30MHz:
The EUT setup on the turn table which has 0.8 m height to the ground. The turn table rotated 360 degrees and antenna fixed to 1 m to find the maximum emission level.
In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10-2013 regulation.

(1) RBW = 9kHz with peak and average detector.
(2) Detector: average and peak (9kHz-490kHz)
Q.P. (490kHz-30MHz)

Frequency Range Above 1GHz:
The EUT setup on the turn find table which has 80 cm (for 30-1000 MHz) and 1.5m (for above 1GHz) height to the ground. The turn table rotated 360 degrees and antenna varied from 1 m to 4 m to find the maximum emission level. Both horizontal and vertical polarization are required. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10-2013 regulation.

Frequency below 1 GHz:
Spectrum Analyzer is used for pre-testing with following setting:
(1)RBW = 120KHz
(2)VBW ≥ 3 x RBW.
(3)Detector = Peak.
(4)Sweep time = auto.
(5)Trace mode = max hold.
(6)Allow sweeps to continue until the trace stabilizes.
(7)When peak-detected value is lower than limit that the measurement using the Q.P. detector is not required. Otherwise using Q.P. for finally measurement.

Frequency above 1GHz to 10th harmonic (up to 10 GHz):
Peak Detector:
(1)RBW = 1MHz
(2)VBW ≥ 3 x RBW.
(3)Detector = Peak.
(4)Sweep time = auto.
(5)Trace mode = max hold.
(6)Allow sweeps to continue until the trace stabilizes.
(7)When peak-detected value is lower than limit that the measurement using the average detector is not required. Otherwise using average detector for finally measurement.

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No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

Average Detector:

■**Option 1:**

(1)RBW = 1MHz
(2)VBW ≥ 1/ T.
(3)Detector = Peak.
(4)Sweep time = auto.
(5)Trace mode = max hold.
(6)Allow sweeps to continue until the trace stabilizes.

□**Option 2:**

Average Emission Level= Peak Emission Level+ D.C.C.F.

6.4. Measurement Result Explanation

■Peak Emission Level=Antenna Factor + Cable Loss + Meter Reading
■Average Emission Level l=Antenna Factor + Cable Loss + Meter Reading
□Average Emission Level= Peak Emission Level+ DCCF
Duty Cycle Correction Factor (DCCF)= 20log (TX_{on}/TX_{on+off}) presented in section 3.6
□ERP= Peak Emission Level-95.2dB-2.14dB

6.5. Test Results

Please refer to Appendix A.

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No. 53-11, Dingfu, Linkou, Dist.,
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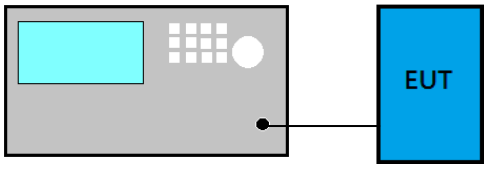
Tel: +886 2 26099301
Fax: +886 2 26099303

7. 20dB BANDWIDTH

7.1. Block Diagram of Test Setup



7.2. Specification Limits

For frequency hopping systems operating in the 902-928MHz band:

If the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies.

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

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

7.3. Test Procedure

Following measurement procedure is reference to ANSI C63.10:2013:

(1) Set RBW close to1% of OBW.
(2) Set VBW≥RBW.
(3) Detector = Peak.
(4) Trace mode = max hold.
(5) Sweep = auto couple.
(6) Allow the trace to stabilize.
(7) Setting channel bandwidth function x dB to -20 dB to record the final bandwidth.

7.4. Test Results

Please refer to Appendix A

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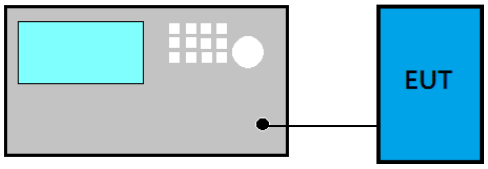
8. CARRIER FREQUENCY SEPARATION

8.1. Block Diagram of Test Setup



8.2. Specification Limits

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.

8.3. Test Procedure

Following measurement procedure is reference to DA00-705:

(1) Span = wide enough to capture the peaks of two adjacent channels
(2) RBW ≥ 1% of the span
(3) VBW≥ RBW
(4) Sweep = auto
(5) Detector function = peak
(6) Trace = max hold

8.4. Test Results

Please refer to Appendix A

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No. 53-11, Dingfu, Linkou, Dist.,
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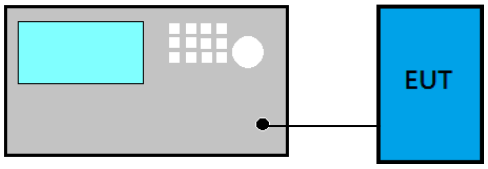
Tel: +886 2 26099301
Fax: +886 2 26099303

9. TIME OF OCCUPANCY

9.1. Block Diagram of Test Setup



9.2. Specification Limits

For frequency hopping systems operating in the 902-928MHz band:

If the 20dB bandwidth of the hopping channel is less than 250kHz, 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;

If the 20dB bandwidth of the hopping channel is 250kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period.

9.3. Test Procedure

Following measurement procedure is reference to ANSI C63.10:2013

(1) Span = zero span, centered on a hopping channel
(2) RBW = 1 MHz
(3) VBW ≥ RBW
(4) Sweep = as necessary to capture the entire dwell time per hopping channel
(5) Detector function = peak
(6) Trace = max hold

9.4. Test Results

Please refer to Appendix A

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No. 53-11, Dingfu, Linkou, Dist.,
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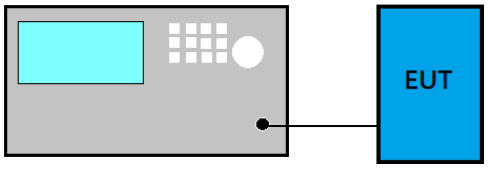
10. NUMBER OF HOPPING CHANNELS

10.1. Block Diagram of Test Setup



10.2. Specification Limits

For frequency hopping systems operating in the 902-928MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph FCC 15.247 (a)(1)(i) of this section

10.3. Test Procedure

Following measurement procedure is reference to ANSI C63.10:2013:

(1) Span = the frequency band of operation
(2) RBW ≥ 1% of the span
(3) VBW ≥ RBW
(4) Sweep = auto
(5) Detector function = peak
(6) Trace = max hold

10.4. Test Results

Please refer to Appendix A

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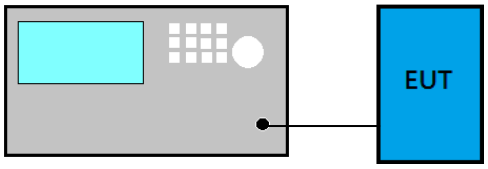
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

11. MAXIMUM PEAK OUTPUT POWER

11.1. Block Diagram of Test Setup



11.2. Specification Limits

For frequency hopping systems operating in the 902-928MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph FCC 15.247 (a)(1)(i) of this section.

11.3. Test Procedure

Following measurement procedure is reference to ANSI C63.10:2013:

(1) Span = Set the center frequency and span to encompass frequency range to be measured.
(2) RBW ≥ OBW
(3) VBW ≥ RBW
(4) Sweep = auto
(5) Detector function = peak
(6) Trace = max hold

11.4. Test Results

Please refer to Appendix A

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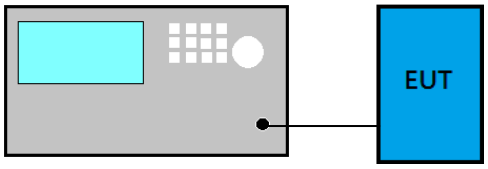
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

12. EMISSION LIMITATIONS

12.1. Block Diagram of Test Setup



12.2. Specification Limits

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

Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (See Section 15.205(c)).

12.3. Test Procedure

Following measurement procedure is reference to ANSI C63.10:2013:

(1) Set span wide enough to capture the peak level of the in-band emission and all spurious emissions; up to 10^{th} harmonic.
(2) RBW = 100 kHz
(3) VBW ≥ RBW
(4) Sweep = auto
(5) Detector function = peak
(6) Trace = max hold

12.4. Test Results

Please refer to Appendix A

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No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

13. DEVIATION TO TEST SPECIFICATIONS

【NONE】

Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

APPDNDIX A

TEST DATA AND PLOTS

(Model: GWS-RFID)

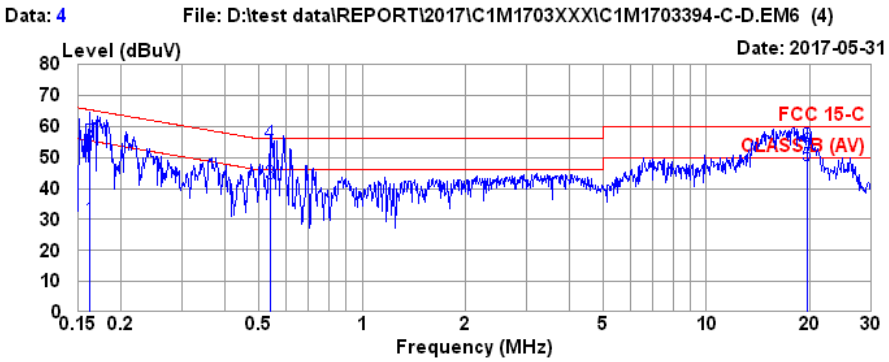
AUDIX Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

TABLE OF CONTENTS

AUDIX Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

A.1 CONDUCTED EMISSION

Test Date	2017/05/31	Temp./Hum.	26℃/56%
Test Voltage	AC 120V, 60Hz (via PoE Injector)		



Site no. : No.7 Shielded Room
Data no. : 4
Condition : ESH2-Z5 366(ADAPTER)
Phase : NEUTRAL
Limit : FCC 15-C
Env. / Ins. : 26*C / 56% ESCI (1276)
Engineer : Nick Du
EUT : GWS-RFID
Power Rating : 120Vac/60Hz
Test Mode : Operating

	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Pulse Att. (dB)	Reading (dBµV)	Emission Level (dBµV)	Limits (dBµV)	Margin (dB)	Remark
1	0.162	0.18	0.03	9.86	19.67	29.74	55.38	25.64	Average
2	0.162	0.18	0.03	9.86	44.85	54.92	65.38	10.46	QP
3	0.541	0.20	0.05	9.86	31.53	41.64	46.00	4.36	Average
4	0.541	0.20	0.05	9.86	44.48	54.59	56.00	1.41	QP
5	19.635	0.98	0.25	9.94	36.38	47.55	50.00	2.45	Average
6	19.635	0.98	0.25	9.94	42.54	53.71	60.00	6.29	QP

Remarks: 1. Emission Level= AMN Factor + Cable Loss + Pulse Att. + Reading.
2. If the average limit is met when useing a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

3. The emissions higher than limit were confirmed not emitted from RF transmitter are subject to FCC 15.107 and presented at report number: EM-F170243.

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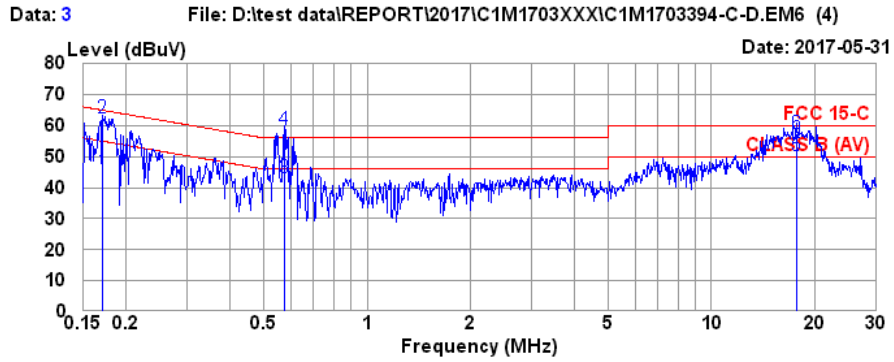
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

Test Date	2017/05/31	Temp./Hum.	26℃/56%
Test Voltage	AC 120V, 60Hz (via PoE Injector)		



Site no. : No.7 Shielded Room Data no. : 3
Condition : ESH2-Z5 366(ADAPTER) Phase : LINE
Limit : FCC 15-C
Env. / Ins. : 26*C / 56% ESCI (1276) Engineer : Nick Du
EUT : GWS-RFID
Power Rating : 120Vac/60Hz
Test Mode : Operating

	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Pulse Att. (dB)	Reading (dBµV)	Emission Level (dBµV)	Limits (dBµV)	Margin (dB)	Remark
1	0.171	0.17	0.03	9.86	35.01	45.07	54.90	9.83	Average
2	0.171	0.17	0.03	9.86	52.16	62.22	64.90	2.68	QP
3	0.576	0.19	0.05	9.86	33.24	43.34	46.00	2.66	Average
4	0.576	0.19	0.05	9.86	48.61	58.71	56.00	-2.71	QP
* 5	17.661	1.02	0.23	9.93	38.97	50.15	50.00	-0.15	Average
* 6	17.661	1.02	0.23	9.93	46.25	57.43	60.00	2.57	QP

Remarks: 1. Emission Level= AMN Factor + Cable Loss + Pulse Att. + Reading.
2. If the average limit is met when useing a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

3. The emissions higher than limit were confirmed not emitted from RF transmitter are subject to FCC 15.107 and presented at report number: EM-F170243.

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No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

A.2 RADIATED EMISSION

Test Date	2017/04/24	Temp./Hum.	23℃/53%
Test Voltage	AC 120V, 60Hz (via PoE Injector)		

A.2.1 Emissions within Restricted Frequency Bands

A.2.1.1 Frequency 9kHz~30MHz

The emissions (9kHz~30MHz) not reported for there is no emission be found.

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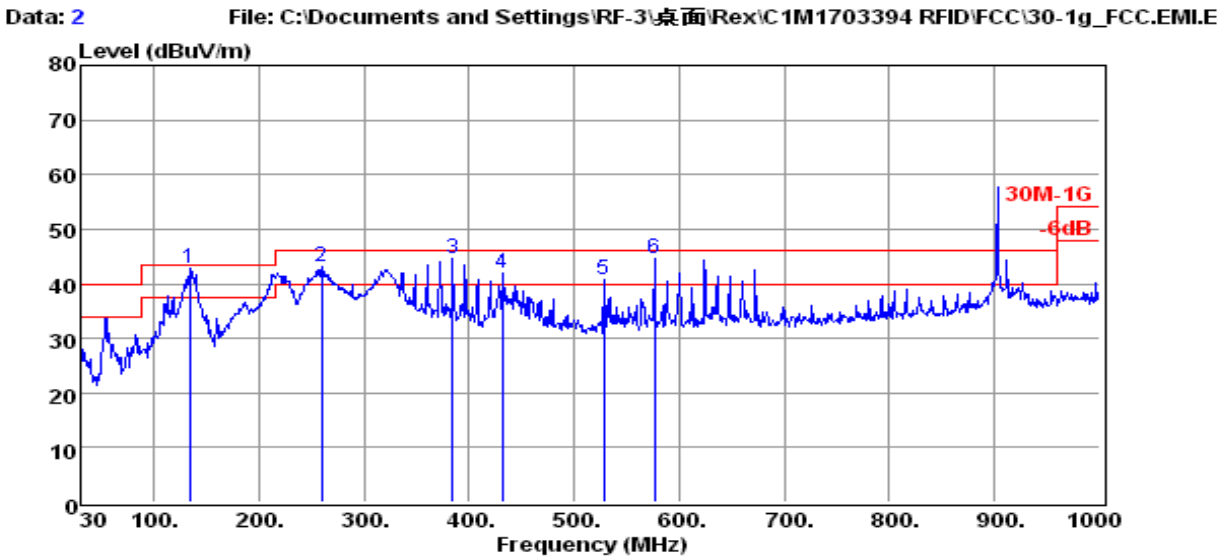
A.2.1.2 Frequency Below 1 GHz

Mode	RFID	Frequency	TX 902.75MHz




```
Site no.      : AUDIX No.1 3m Chamber                Data no.   : 2
Dis. / Ant.   : 3m    CBL6112D 33821(PAD)     Ant. pol. : HORIZONTAL
Limit         : 30M-1G
Env. / Ins.   : 23*C / 53% N9010A              Engineer   : Rex
EUT           : GWS-RFID
Power Rating  : 120Vac/60Hz
Test Mode     : Tx 902.75MHz(RFID)
```

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
133.79	18.05	2.65	22.10	42.80	43.50	0.70	Peak
259.89	19.10	3.92	19.97	42.99	46.00	3.01	Peak
384.05	22.32	5.38	16.81	44.51	46.00	1.49	Peak
431.58	23.08	5.85	12.92	41.85	46.00	4.15	Peak
527.61	24.05	6.52	10.16	40.73	46.00	5.27	Peak
576.11	24.52	6.68	13.52	44.72	46.00	1.28	Peak

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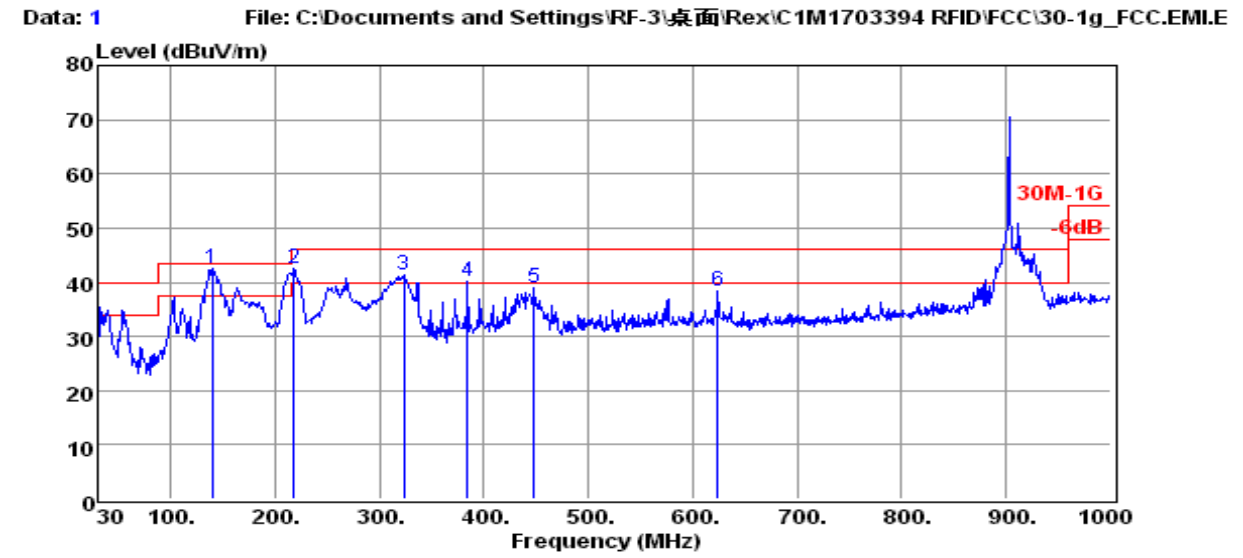
Fax: +886 2 26099303




```
ite no.      : AUDIX No.1 3m Chamber                    Data no.  : 1
is. / Ant.   : 3m   CBL6112D 33821(PAD)      Ant. pol. : VERTICAL
imit         : 30M-1G
nv. / Ins.   : 23*C / 53% N9010A              Engineer  : Rex
UT           : GWS-RFID
ower Rating  : 120Vac/60Hz
est Mode     : Tx 902.75MHz(RFID)
```

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
139.61	17.76	2.72	22.12	42.60	43.50	0.90	Peak
218.18	17.00	3.52	22.09	42.61	46.00	3.39	Peak
322.94	20.55	4.63	16.22	41.40	46.00	4.60	Peak
384.05	22.32	5.38	12.45	40.15	46.00	5.85	Peak
448.07	23.26	6.00	9.63	38.89	46.00	7.11	Peak
623.64	24.97	6.83	6.65	38.45	46.00	7.55	Peak

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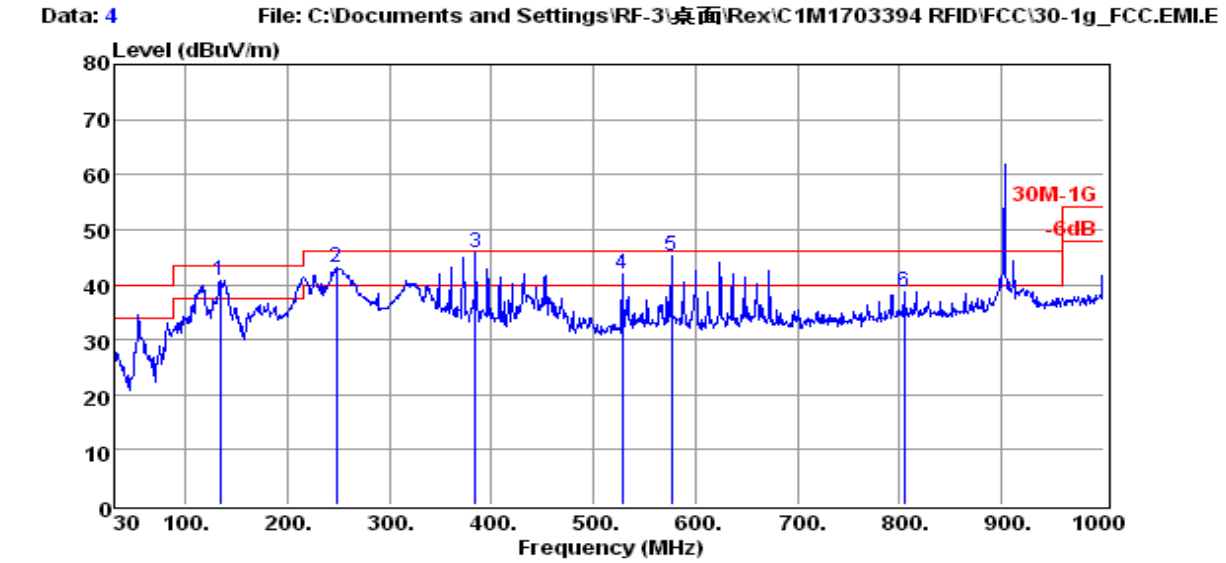
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

Mode	RFID	Frequency	TX 914.75MHz




```
Site no.      : AUDIX No.1 3m Chamber                Data no.   : 4
Dis. / Ant.   : 3m   CBL6112D 33821(PAD)      Ant. pol. : HORIZONTAL
Limit         : 30M-1G
Env. / Ins.   : 23*C / 53% N9010A              Engineer   : Rex
EUT           : GWS-RFID
Power Rating  : 120Vac/60Hz
Test Mode     : Tx 914.75MHz(RFID)
```

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
133.79	18.05	2.65	20.13	40.83	43.50	2.67	Peak
248.25	18.81	3.80	20.48	43.09	46.00	2.91	Peak
384.05	22.32	5.38	18.01	45.71	46.00	0.29	Peak
527.61	24.05	6.52	11.23	41.80	46.00	4.20	Peak
576.11	24.52	6.68	13.90	45.10	46.00	0.90	Peak
804.06	26.57	7.63	4.59	38.79	46.00	7.21	Peak

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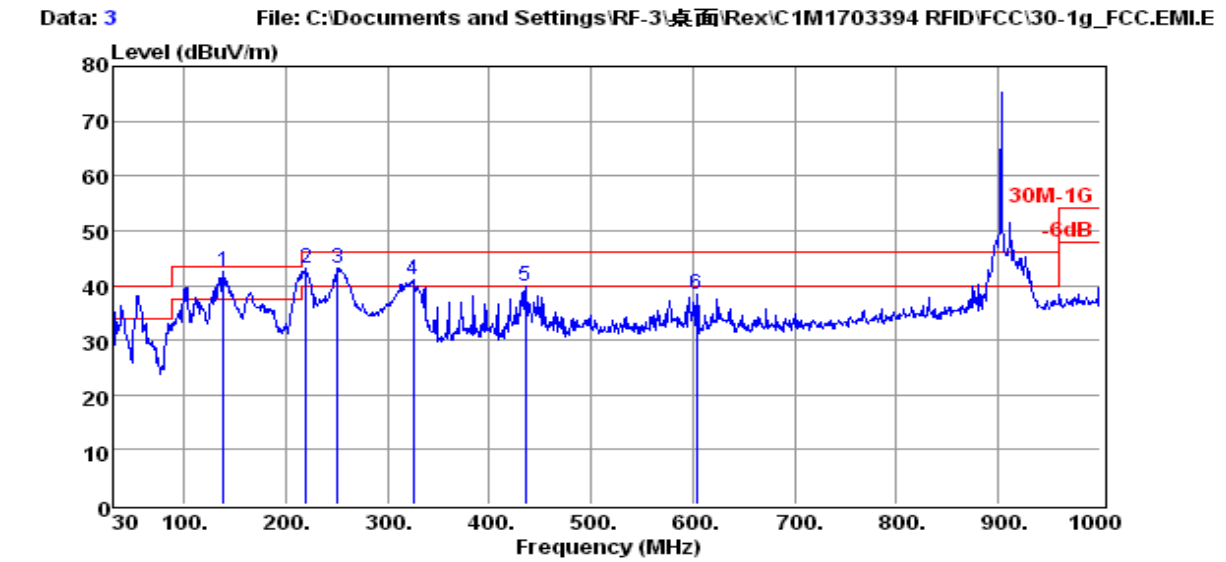
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303



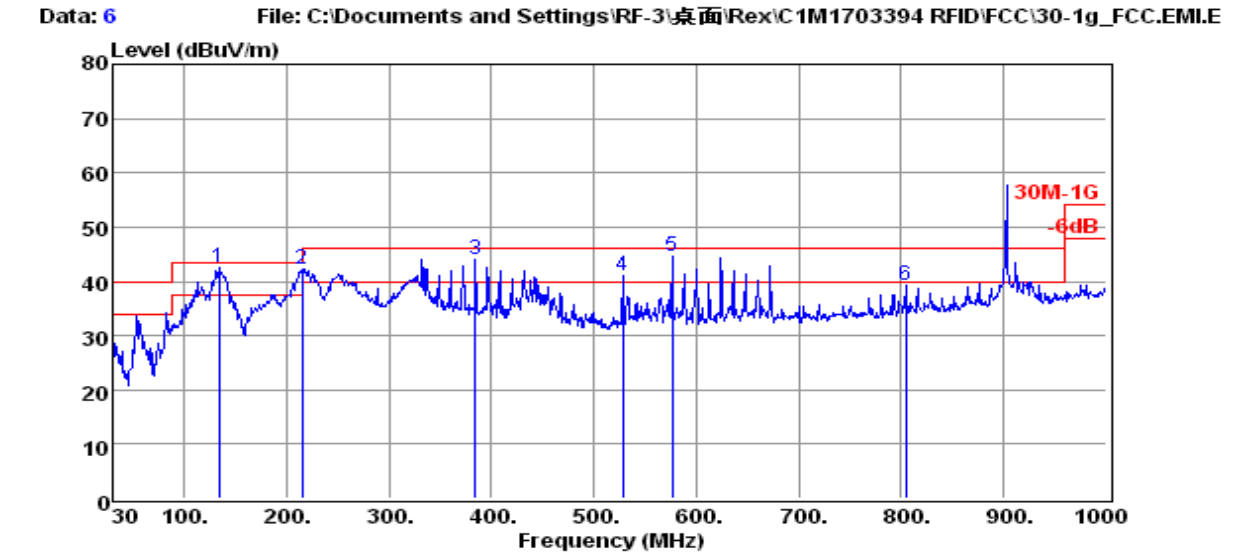

```
Site no.      : AUDIX No.1 3m Chamber                Data no.  : 3
Dis. / Ant.   : 3m   CBL6112D 33821(PAD)      Ant. pol. : VERTICAL
Limit         : 30M-1G
Env. / Ins.   : 23*C / 53% N9010A              Engineer  : Rex
EUT           : GWS-RFID
Power Rating  : 120Vac/60Hz
Test Mode     : Tx 914.75MHz(RFID)
```

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
138.64	17.80	2.71	22.07	42.58	43.50	0.92	Peak
220.12	17.09	3.54	22.43	43.06	46.00	2.94	Peak
251.16	18.93	3.82	20.31	43.06	46.00	2.94	Peak
324.88	20.58	4.65	15.87	41.10	46.00	4.90	Peak
435.46	23.13	5.89	10.82	39.84	46.00	6.16	Peak
603.27	24.77	6.76	6.79	38.32	46.00	7.68	Peak

AUDIX Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

Mode	RFID	Frequency	TX 927.25MHz




```
Site no.      : AUDIX No.1 3m Chamber                Data no.   : 6
Dis. / Ant.   : 3m    CBL6112D 33821(PAD)    Ant. pol. : HORIZONTAL
Limit         : 30M-1G
Env. / Ins.   : 23*C / 53% N9010A             Engineer  : Rex
EUT           : GWS-RFID
Power Rating  : 120Vac/60Hz
Test Mode     : Tx 927.25MHz(RFID)
```

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
133.79	18.05	2.65	21.73	42.43	43.50	1.07	Peak
215.27	16.80	3.49	21.92	42.21	43.50	1.29	Peak
384.05	22.32	5.38	16.38	44.08	46.00	1.92	Peak
527.61	24.05	6.52	10.50	41.07	46.00	4.93	Peak
576.11	24.52	6.68	13.53	44.73	46.00	1.27	Peak
804.06	26.57	7.63	5.17	39.37	46.00	6.63	Peak

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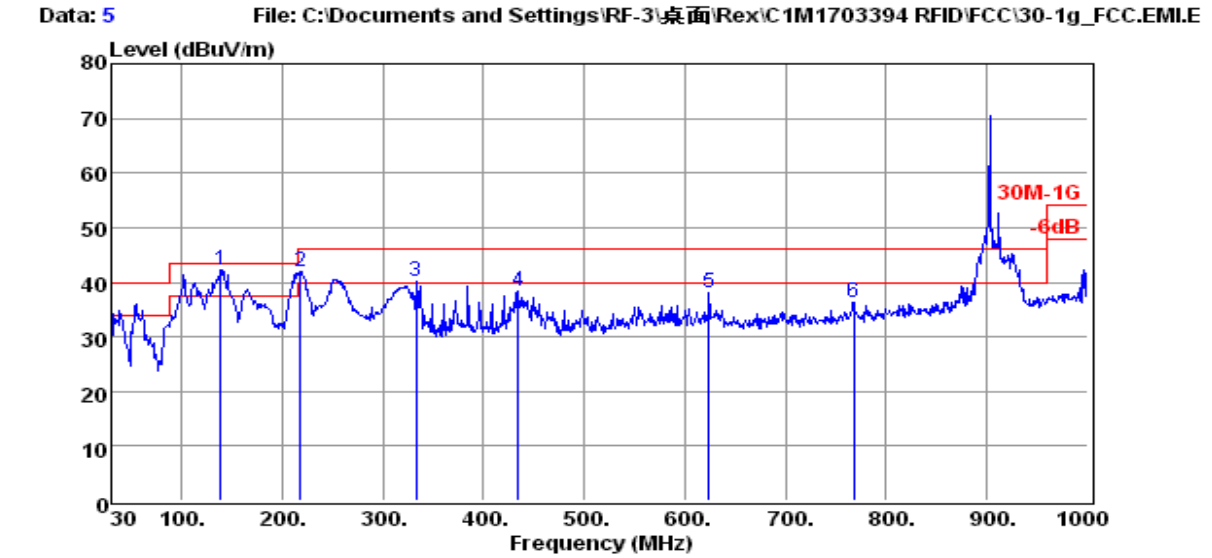
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303




```
Site no.      : AUDIX No.1 3m Chamber                Data no.   : 5
Dis. / Ant.   : 3m    CBL6112D 33821(PAD)    Ant. pol. : VERTICAL
Limit         : 30M-1G
Env. / Ins.   : 23*C / 53% N9010A             Engineer   : Rex
EUT           : GWS-RFID
Power Rating  : 120Vac/60Hz
Test Mode     : Tx 927.25MHz(RFID)
```

Antenna at Vertical Polarization

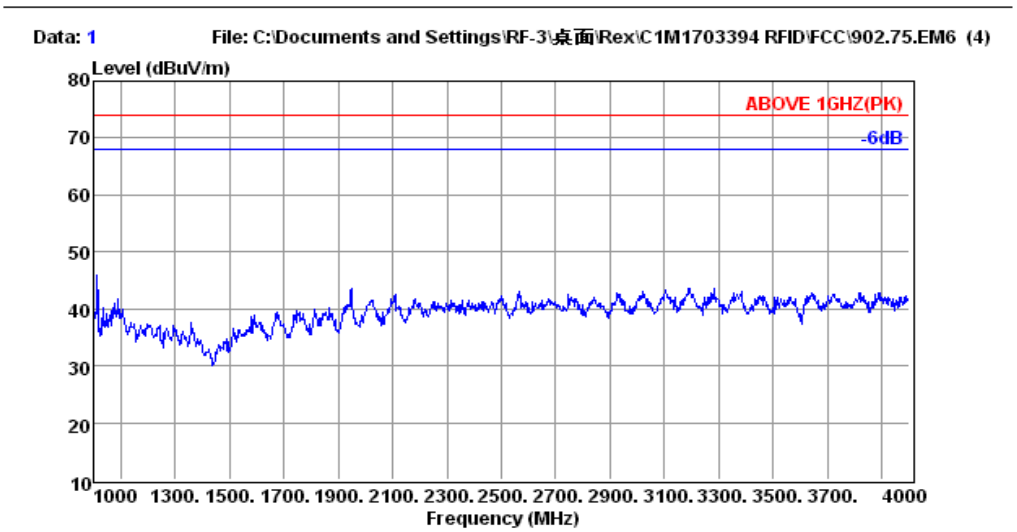
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
138.64	17.80	2.71	21.81	42.32	43.50	1.18	Peak
218.18	17.00	3.52	21.51	42.03	46.00	3.97	Peak
332.64	20.84	4.75	14.69	40.28	46.00	5.72	Peak
434.49	23.12	5.87	9.42	38.41	46.00	7.59	Peak
623.64	24.97	6.83	6.13	37.93	46.00	8.07	Peak
767.20	26.26	7.44	2.67	36.37	46.00	9.63	Peak

AUDIX Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

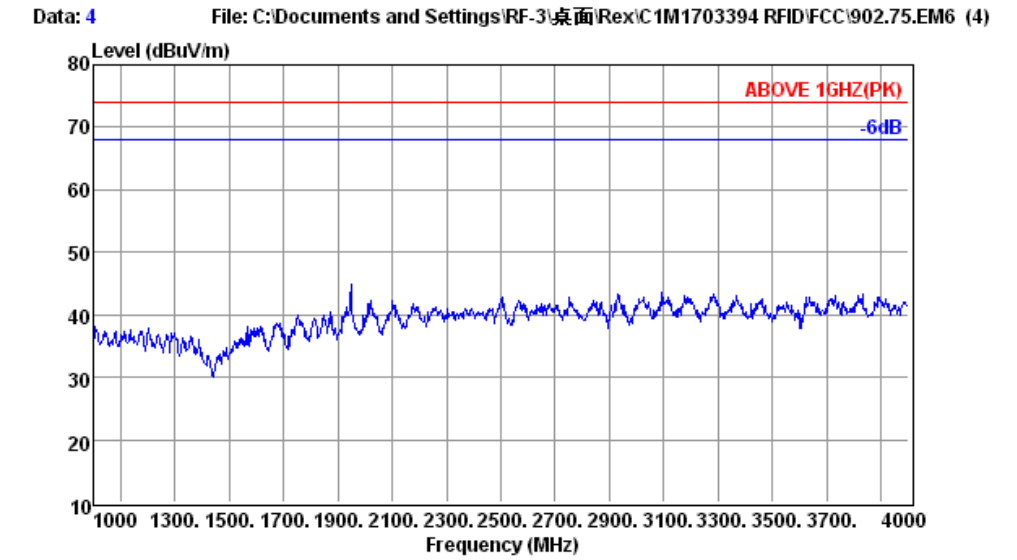
A.2.2 Emissions outside the frequency band:

The emissions (up to 10GHz) not reported for there is no emission be found.

Mode	RFID	Frequency	TX 902.75MHz



Site no. : Fully Chamber Site Data no. : 1
Dis. / Ant. : 3m 3117(00135902) Ant. pol. : HORIZONTAL
Limit : ABOVE 1GHZ(PK)
Env. / Ins. : 23*C / 53% N9010B Engineer : Rex
EUT : GWS-RFID
Power Rating : 120Vac/60Hz
Test Mode : Tx 902.75MHz(RFID)



Site no. : Fully Chamber Site Data no. : 4
Dis. / Ant. : 3m 3117(00135902) Ant. pol. : VERTICAL
Limit : ABOVE 1GHZ(PK)
Env. / Ins. : 23*C / 53% N9010B Engineer : Rex
EUT : GWS-RFID
Power Rating : 120Vac/60Hz
Test Mode : Tx 902.75MHz(RFID)

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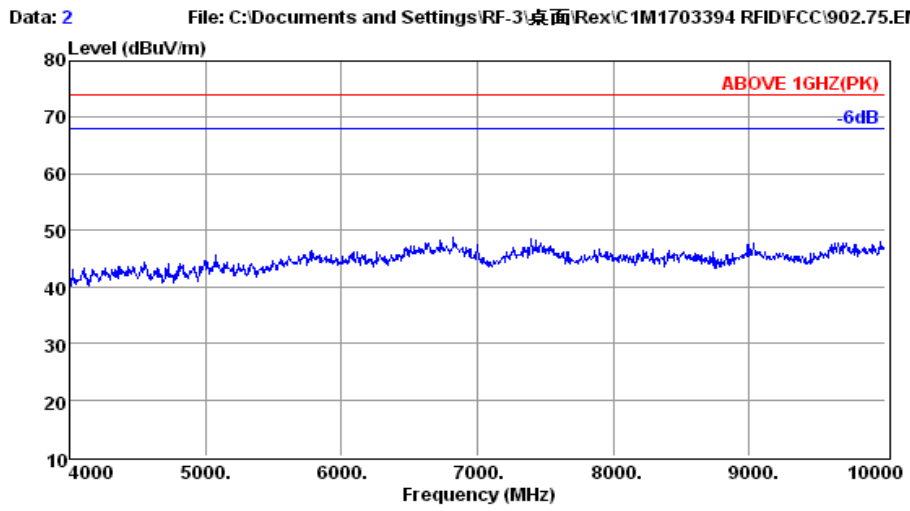
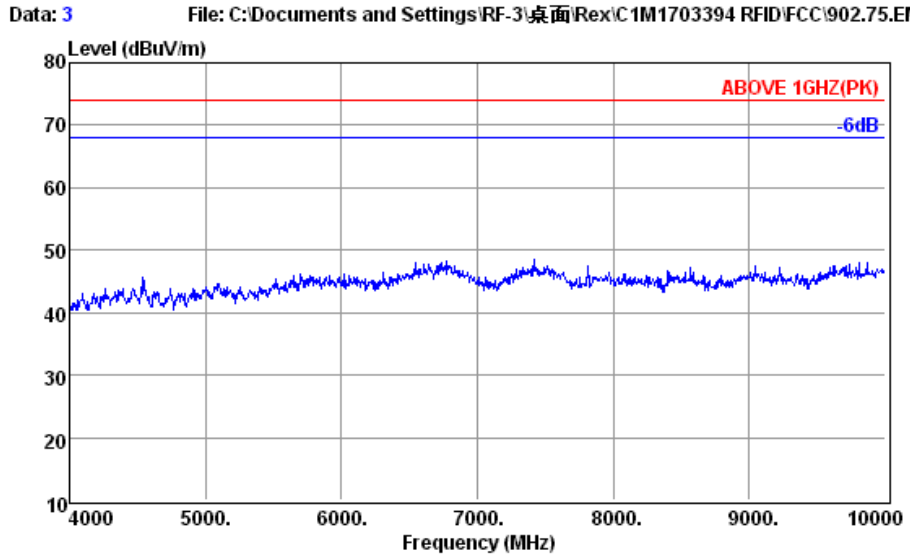
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303



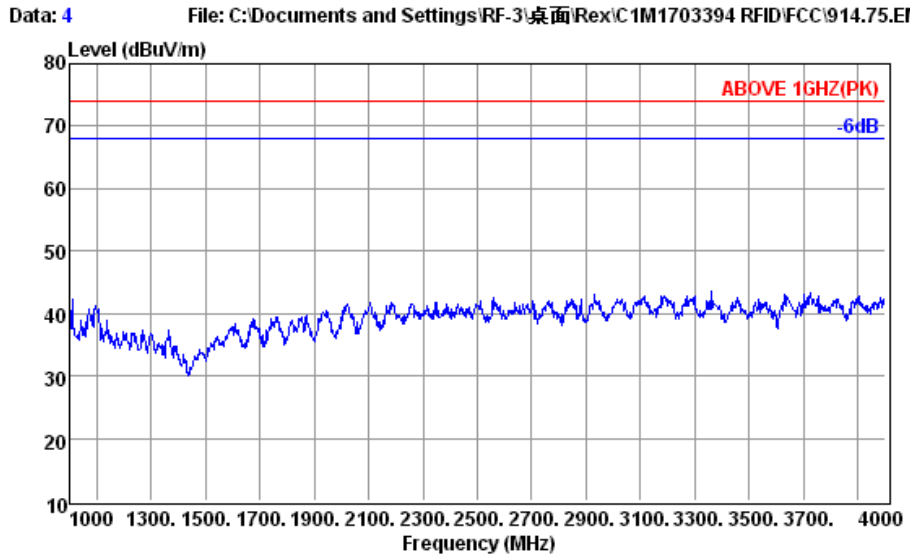
Site no. : Fully Chamber Site Data no. : 2
Dis. / Ant. : 3m 3117(00135902) Ant. pol. : HORIZONTAL
Limit : ABOVE 1GHZ(PK)
Env. / Ins. : 23*C / 53% N9010B Engineer : Rex
EUT : GWS-RFID
Power Rating : 120Vac/60Hz
Test Mode : Tx 902.75MHz(RFID)



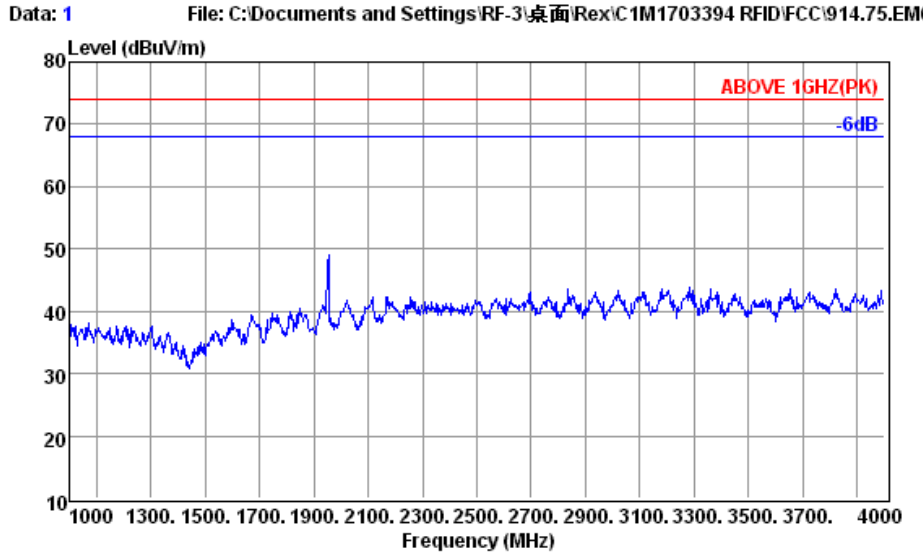
Site no. : Fully Chamber Site Data no. : 3
Dis. / Ant. : 3m 3117(00135902) Ant. pol. : VERTICAL
Limit : ABOVE 1GHZ(PK)
Env. / Ins. : 23*C / 53% N9010B Engineer : Rex
EUT : GWS-RFID
Power Rating : 120Vac/60Hz
Test Mode : Tx 902.75MHz(RFID)

AUDIX Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

Mode	RFID	Frequency	TX 914.75MHz



Site no. : Fully Chamber Site Data no. : 4
Dis. / Ant. : 3m 3117(00135902) Ant. pol. : HORIZONTAL
Limit : ABOVE 1GHZ(PK)
Env. / Ins. : 23*C / 53% N9010B Engineer : Rex
EUT : GWS-RFID
Power Rating : 120Vac/60Hz
Test Mode : Tx 914.75MHz(RFID)



Site no. : Fully Chamber Site Data no. : 1
Dis. / Ant. : 3m 3117(00135902) Ant. pol. : VERTICAL
Limit : ABOVE 1GHZ(PK)
Env. / Ins. : 23*C / 53% N9010B Engineer : Rex
EUT : GWS-RFID
Power Rating : 120Vac/60Hz
Test Mode : Tx 914.75MHz(RFID)

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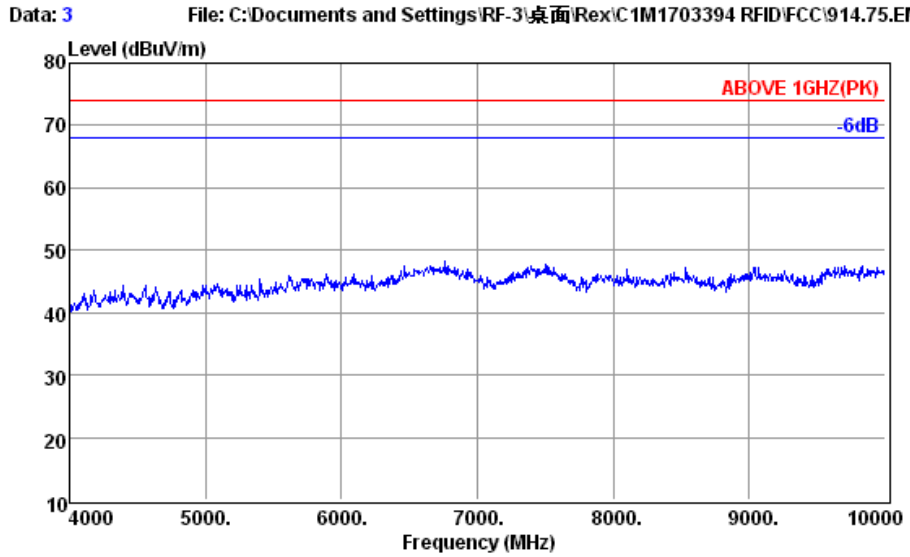
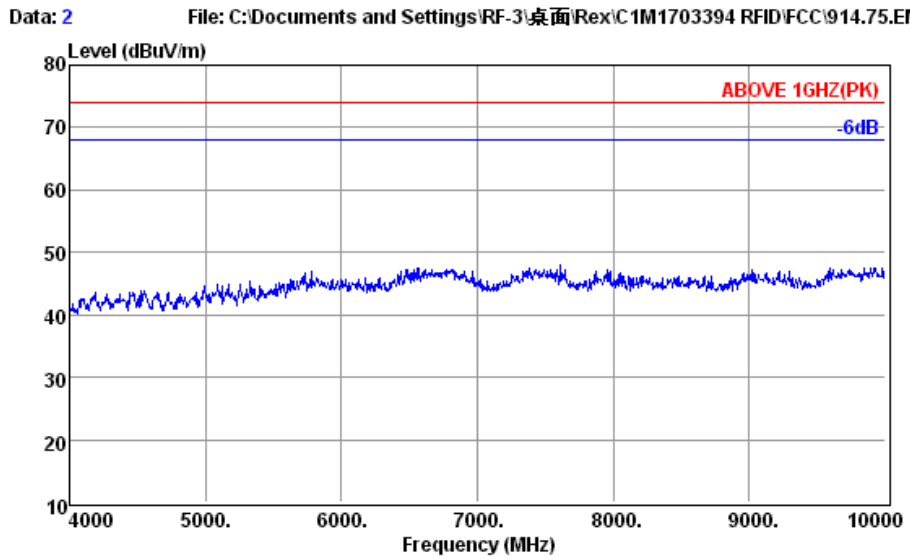
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303



Site no. : Fully Chamber Site Data no. : 3
Dis. / Ant. : 3m 3117(00135902) Ant. pol. : HORIZONTAL
Limit : ABOVE 1GHZ(PK)
Env. / Ins. : 23*C / 53% N9010B Engineer : Rex
EUT : GWS-RFID
Power Rating : 120Vac/60Hz
Test Mode : Tx 914.75MHz(RFID)



Site no. : Fully Chamber Site Data no. : 2
Dis. / Ant. : 3m 3117(00135902) Ant. pol. : VERTICAL
Limit : ABOVE 1GHZ(PK)
Env. / Ins. : 23*C / 53% N9010B Engineer : Rex
EUT : GWS-RFID
Power Rating : 120Vac/60Hz
Test Mode : Tx 914.75MHz(RFID)

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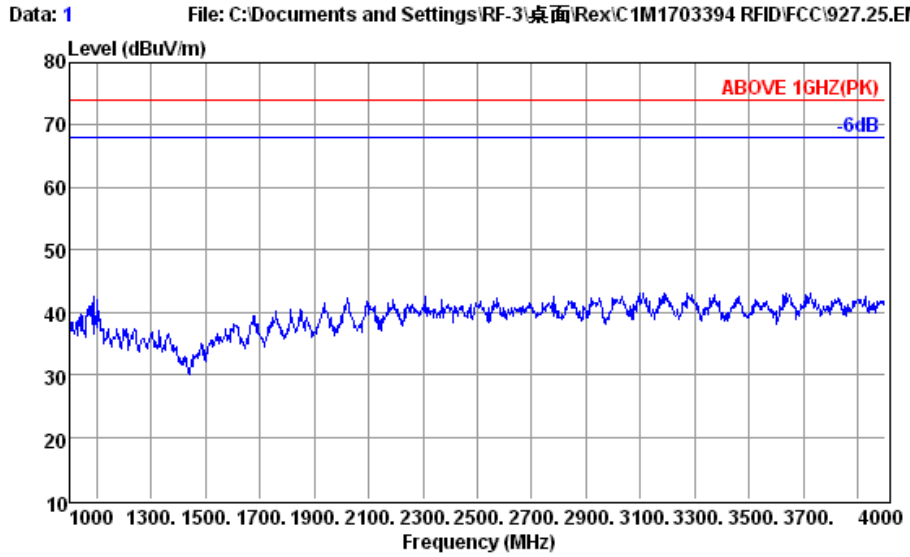
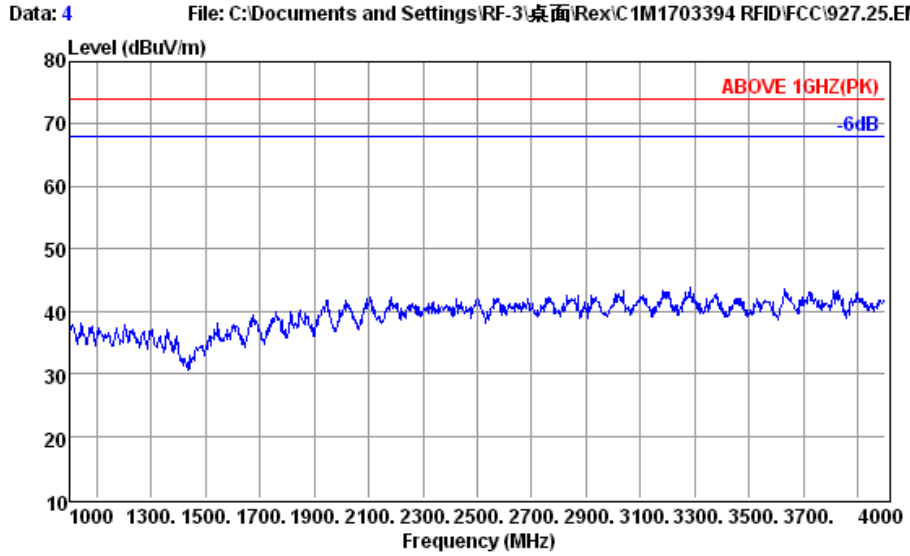
Mode	RFID	Frequency	TX 927.75MHz



Site no. : Fully Chamber Site Data no. : 1
Dis. / Ant. : 3m 3117(00135902) Ant. pol. : HORIZONTAL
Limit : ABOVE 1GHZ(PK)
Env. / Ins. : 23*C / 53% N9010B Engineer : Rex
EUT : GWS-RFID
Power Rating : 120Vac/60Hz
Test Mode : Tx 927.25MHz(RFID)



Site no. : Fully Chamber Site Data no. : 4
Dis. / Ant. : 3m 3117(00135902) Ant. pol. : VERTICAL
Limit : ABOVE 1GHZ(PK)
Env. / Ins. : 23*C / 53% N9010B Engineer : Rex
EUT : GWS-RFID
Power Rating : 120Vac/60Hz
Test Mode : Tx 927.25MHz(RFID)

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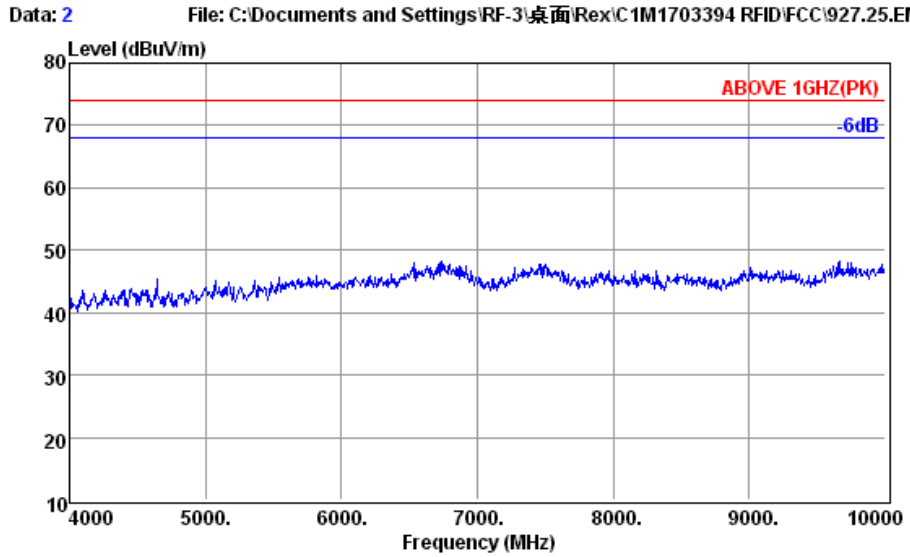
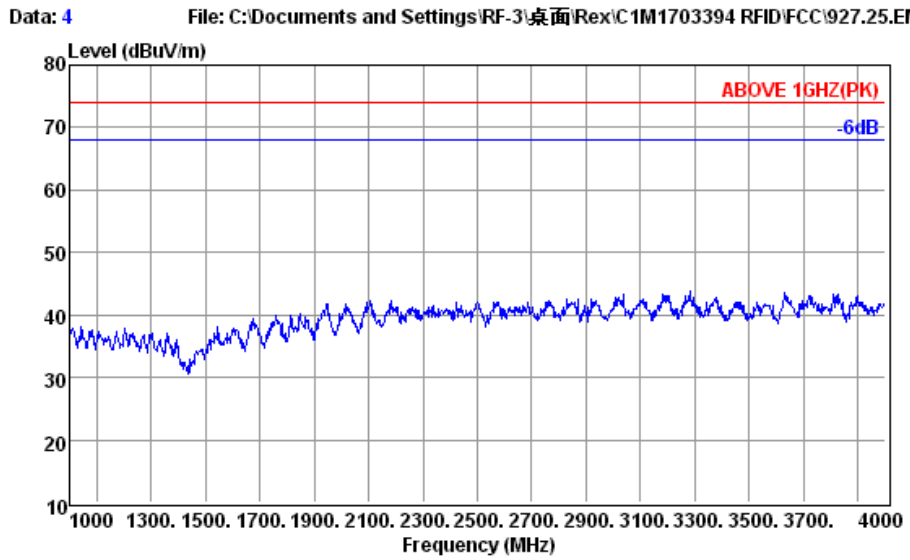


Site no. : Fully Chamber Site Data no. : 2
Dis. / Ant. : 3m 3117(00135902) Ant. pol. : HORIZONTAL
Limit : ABOVE 1GHZ(PK)
Env. / Ins. : 23*C / 53% N9010B Engineer : Rex
EUT : GWS-RFID
Power Rating : 120Vac/60Hz
Test Mode : Tx 927.25MHz(RFID)



Site no. : Fully Chamber Site Data no. : 4
Dis. / Ant. : 3m 3117(00135902) Ant. pol. : VERTICAL
Limit : ABOVE 1GHZ(PK)
Env. / Ins. : 23*C / 53% N9010B Engineer : Rex
EUT : GWS-RFID
Power Rating : 120Vac/60Hz
Test Mode : Tx 927.25MHz(RFID)

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A.2.3 Emissions in Non-restricted Frequency Bands:

All emission levels below the 15.209 general radiated emissions limits is not required.

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Fax: +886 2 26099303

A.3 20dB BANDWIDTH

Test Date	2017/04/20	Temp./Hum.	26℃/52%
Cable Loss	0.36dB	Test Voltage	AC 120V, 60Hz (with PoE Injector)

A.3.1 6dB Bandwidth Result

Mode	Centre Frequency (MHz)	20dB Bandwidth (kHz)
RFID	902.75	36.13
	914.75	36.31
	927.25	36.08

Note: All results have been tested with worst antenna port 1.

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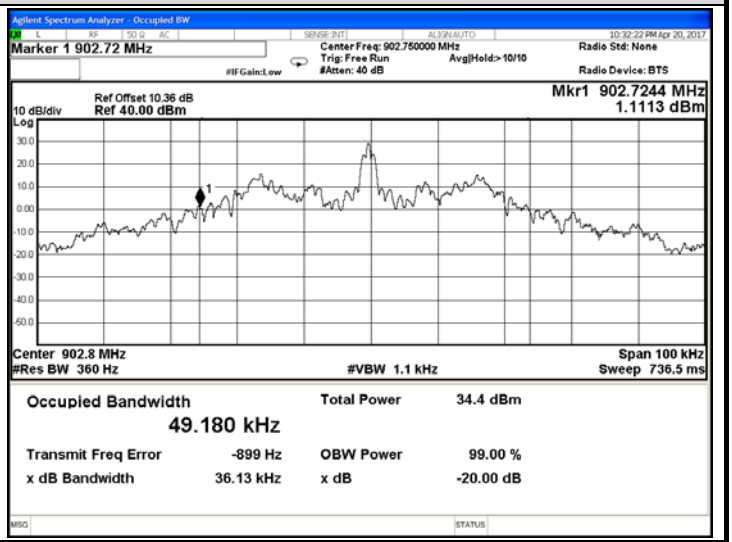
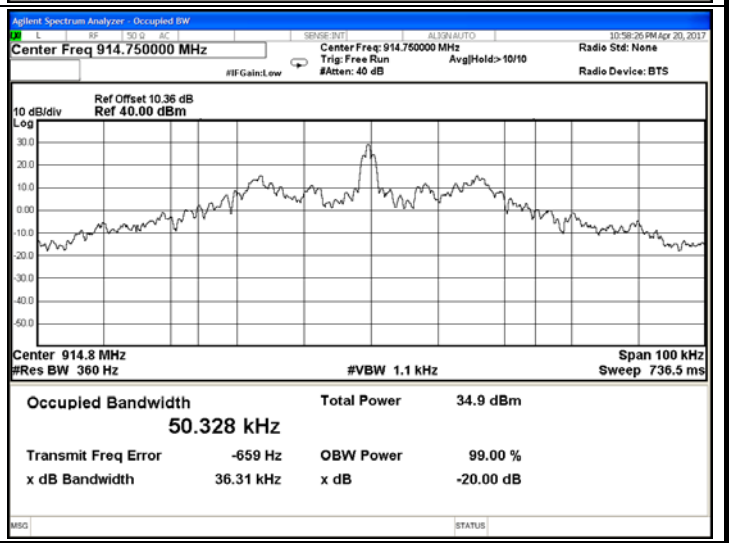
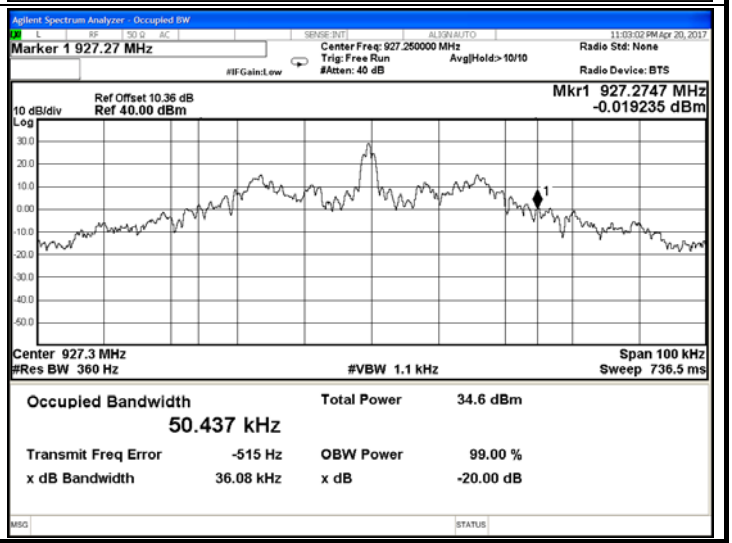
A.3.2 Measurement Plots

Mode: RFID







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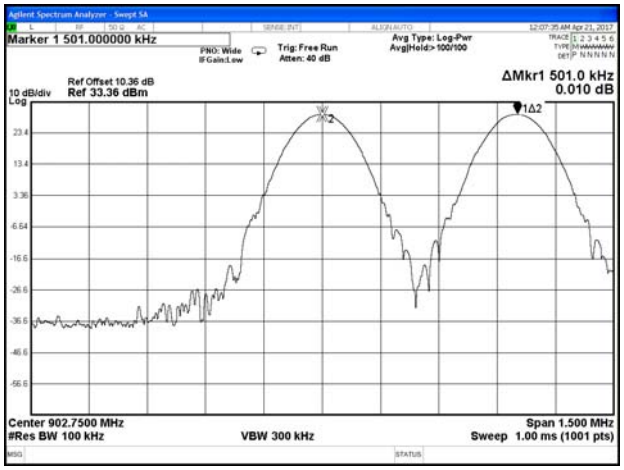
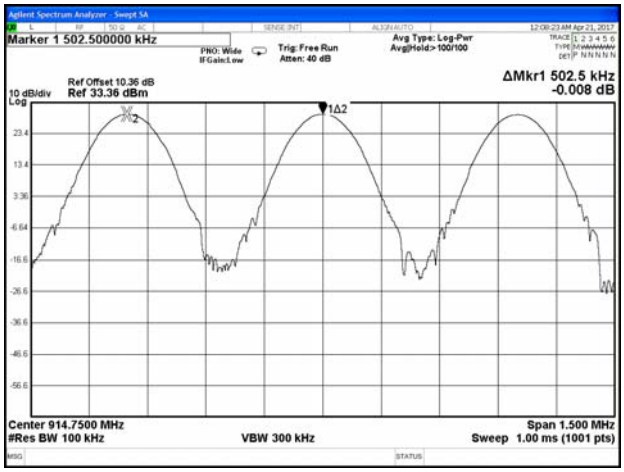
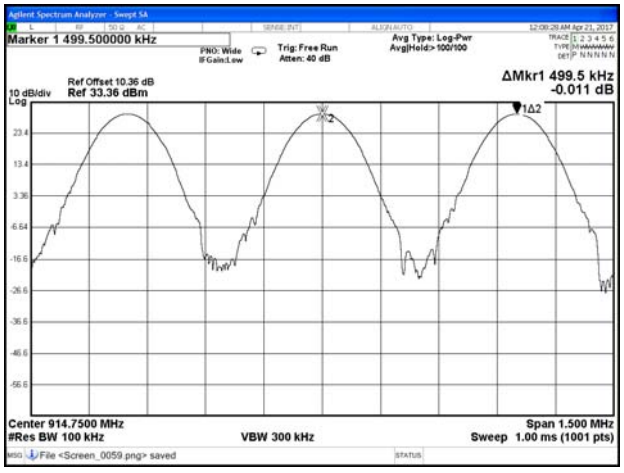
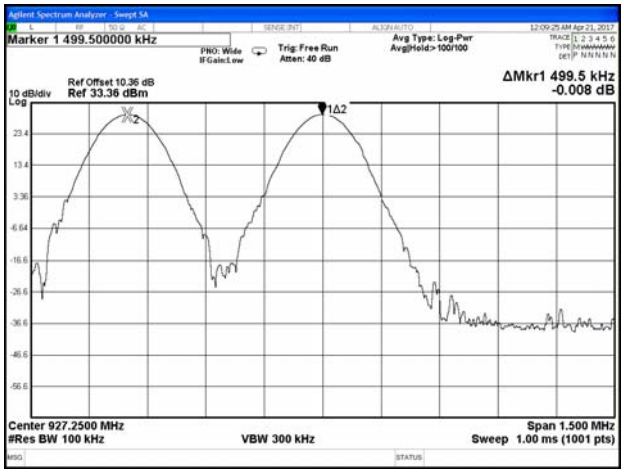
A.4 CARRIER FREQUENCY SEPARATION

Test Date	2017/04/21	Temp./Hum.	26℃/52%
Cable Loss	0.36dB	Test Voltage	AC 120V, 60Hz (with PoE Injector)

Mode: RFID	
902.75MHz	914.75MHz adjacent channel of left carrier frequency
	
914.75MHz adjacent channel of right carrier frequency	927.75MHz
	

Note: All results have been tested with worst antenna port 1.

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A.5 TIME OF OCCUPANCY

Test Date	2017/05/09	Temp./Hum.	25℃/50%
Cable Loss	0.26dB	Test Voltage	AC 120V, 60Hz (with Docking via AC Adapter)

A.5.1 Time of Occupancy

Mode	Centre Frequency (MHz)	Time of Occupancy (ms)	Maximum accumulated Time of Occupancy (ms)	Limit (ms)
RFID	902.75	396	396	<400
	914.75	399	399	<400
	927.25	399	399	<400

Observation Period: 50 channels*0.4 seconds = 20 seconds

Centre Frequency: 902.75MHz

For each second of 1 channel appearance, the longest time of occupancy for each of 20 seconds is:

1 channel* **396** ms= **396.000** ms

Centre Frequency: 914.75MHz

For each second of 1 channel appearance, the longest time of occupancy for each of 20 seconds is:

1 channel* **399** ms= **399.000** ms

Centre Frequency: 927.25MHz

For each second of 1 channel appearance, the longest time of occupancy for each of 20 seconds is:

1 channel* **399** ms= **399.000** ms

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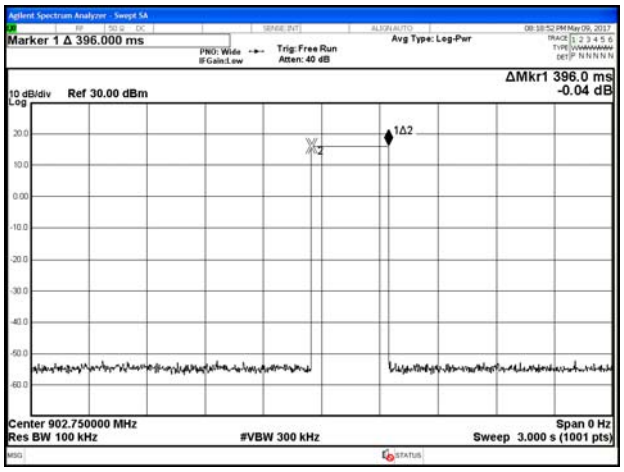
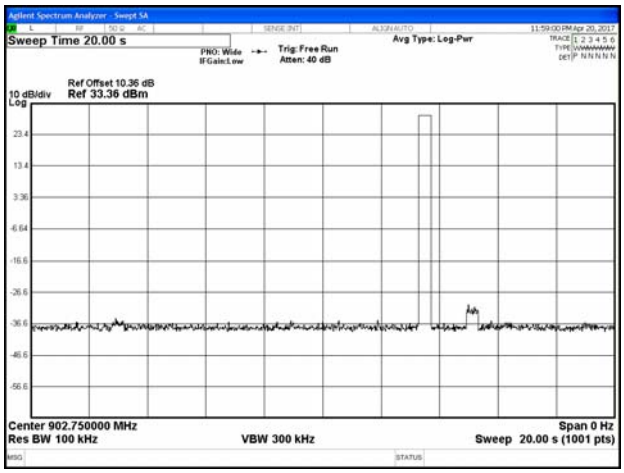
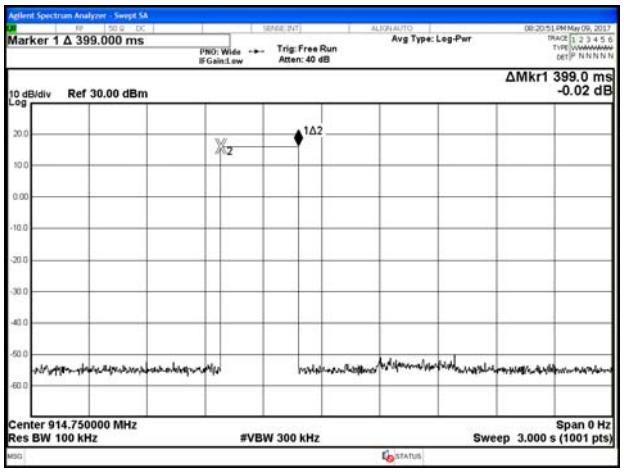
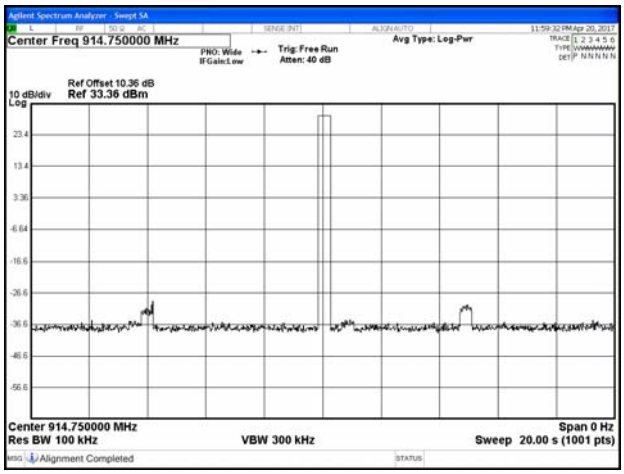
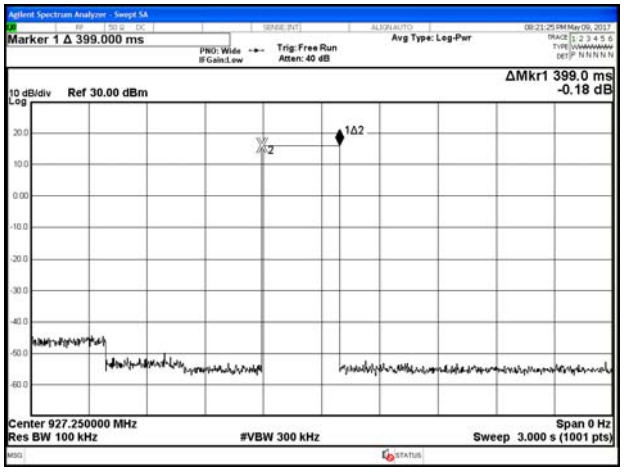
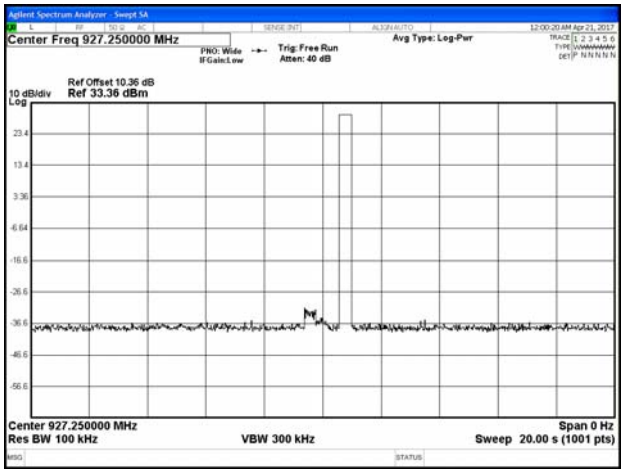
- Measurement Plots

Mode: RFID	
Centre Frequency: 902.75MHz	
	
Centre Frequency: 914.75MHz	
	
Centre Frequency: 927.25MHz	
	

Note: All results have been tested with worst antenna port 1.

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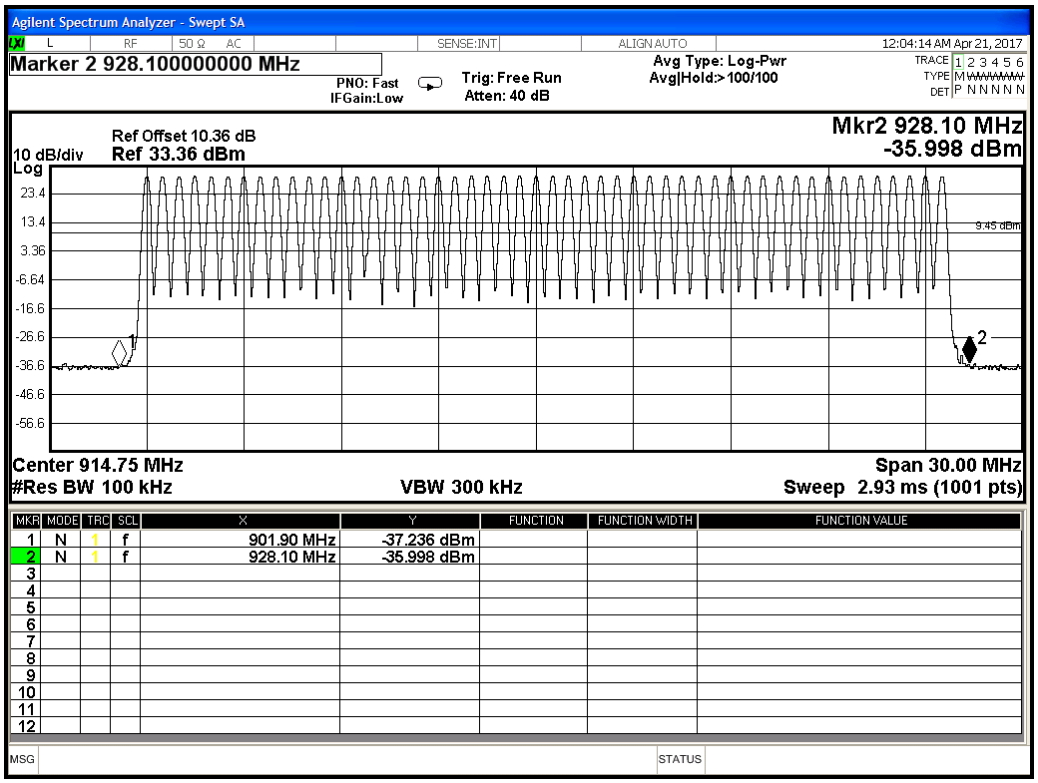
A.6 NUMBER OF HOPPING CHANNELS

Test Date	2017/04/21	Temp./Hum.	26℃/52%
Cable Loss	0.36dB	Test Voltage	AC 120V, 60Hz (with PoE Injector)

Mode: GFSK



The number hopping channel is 50

Note: All results have been tested with worst antenna port 1.

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A.7 MAXIMUM PEAK OUTPUT POWER

Test Date	2017/04/20, 06/09	Temp./Hum.	26℃/52% , 25℃/50%
Cable Loss	0.36dB	Test Voltage	AC 120V, 60Hz (with PoE Injector)

A.7.1 Maximum Peak Output Power

Mode	ANT Port	Centre Frequency (MHz)	Maximum Peak Output Power		Limit
			dBm	W	
RFID	1	902.75	27.617	0.577697	28dBm (0.63W)Note2
		914.75	27.752	0.595937	
		927.25	27.717	0.591153	
	2	902.75	27.460	0.557186	
		914.75	27.420	0.552077	
		927.25	27.541	0.567675	
	3	902.75	27.019	0.503385	
		914.75	27.197	0.524445	
		927.25	27.098	0.512625	
	4	902.75	26.951	0.495564	
		914.75	26.976	0.498425	
		927.25	27.097	0.512507	

Note: 1. The Antenna port 1 is a worst.

2. The antenna gain is 8dBi, so limit is 30dBm-(8dBi-6dBi)=28dBm

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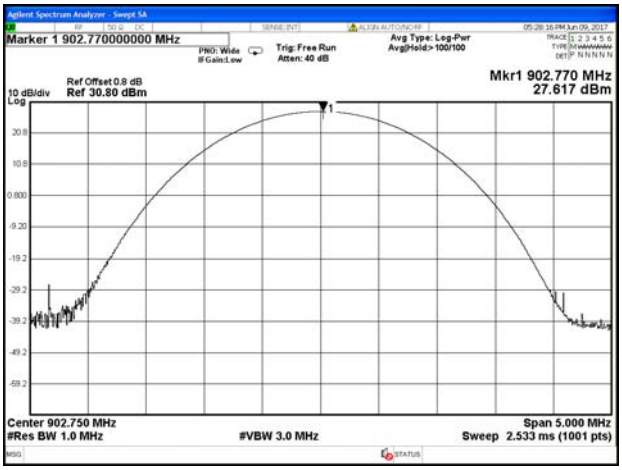
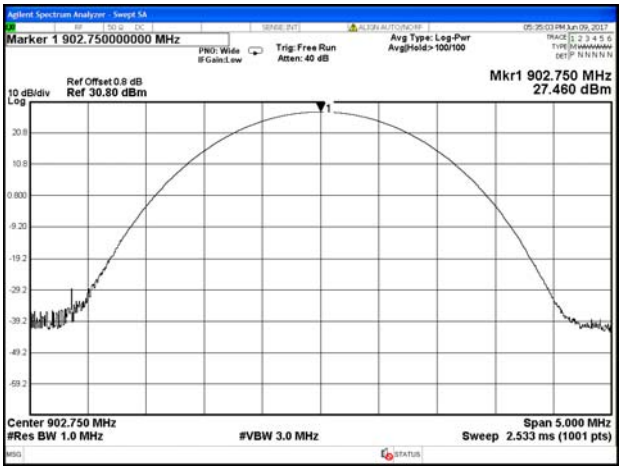
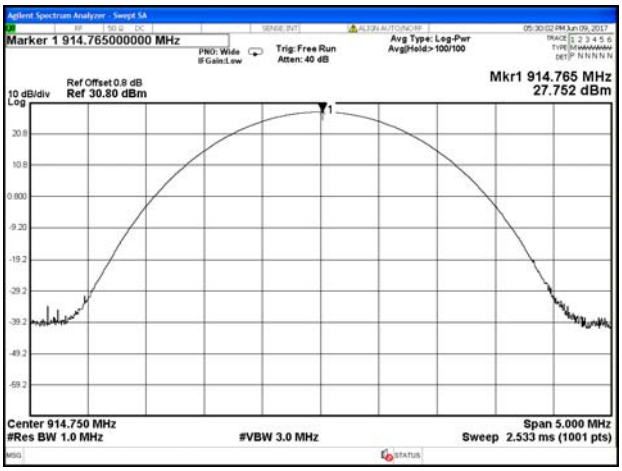
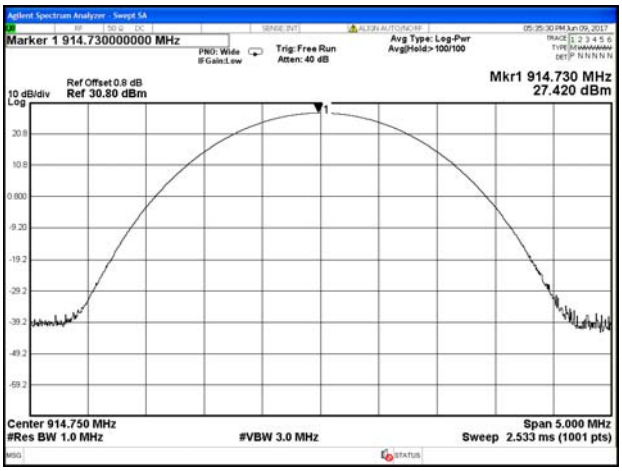
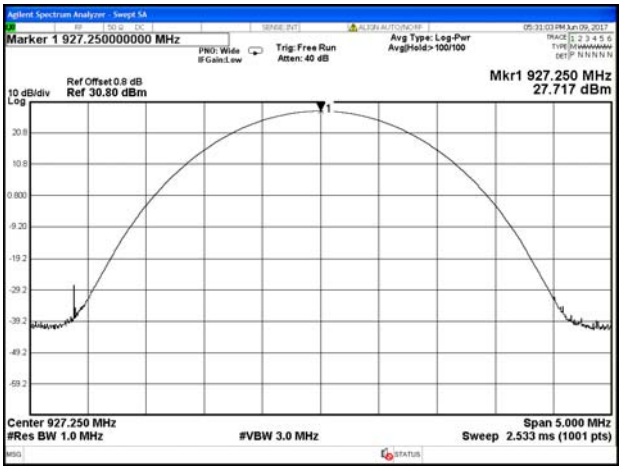
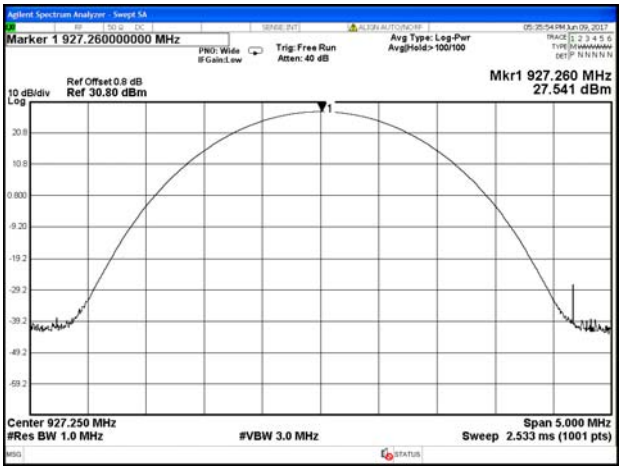
A.7.2 Measurement Plots

Mode: RFID	
ANT Port 1	ANT Port 2
	
	
	

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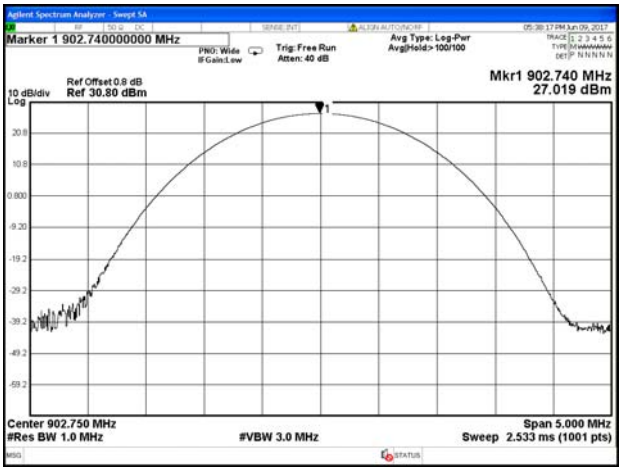
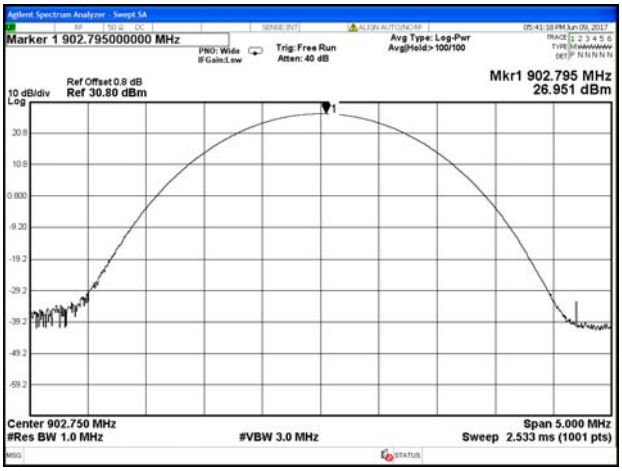
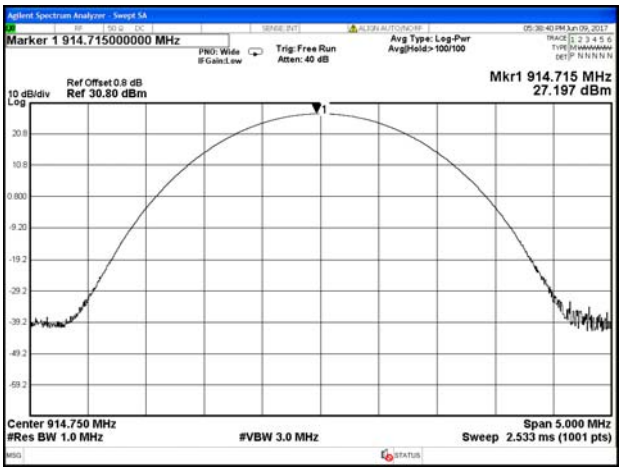
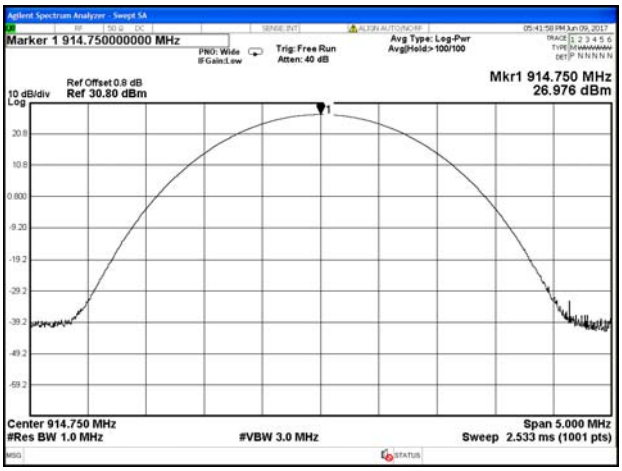
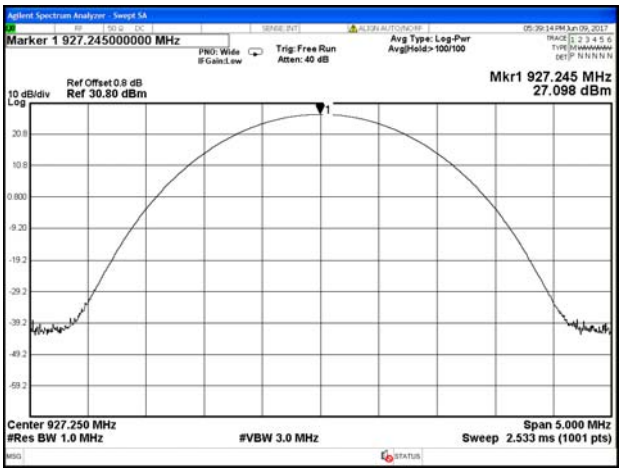
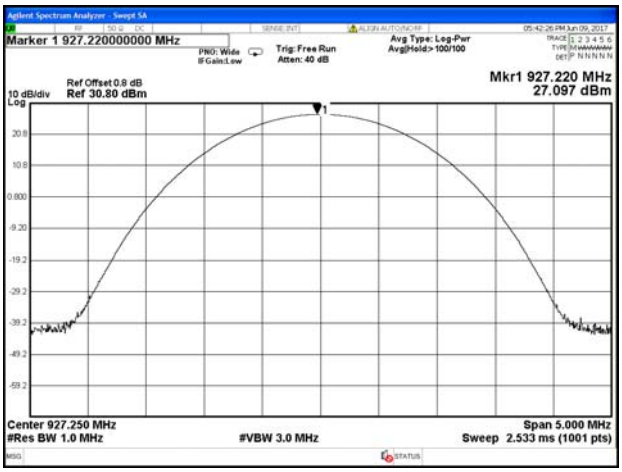
Mode: RFID	
ANT Port 3	ANT Port 4
	
	
	

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A.8 EMISSION LIMITATIONS MEASUREMENT

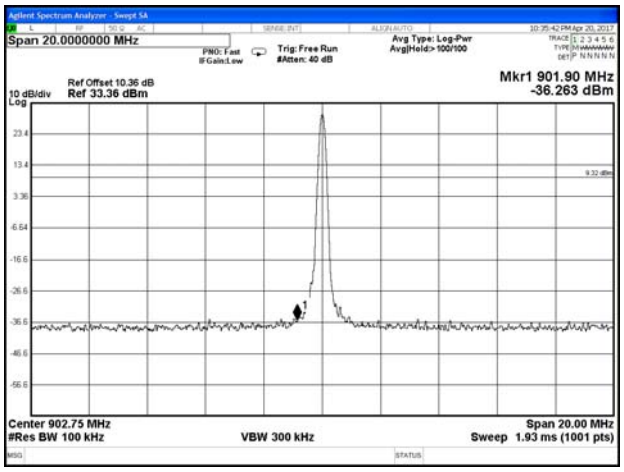
Test Date	2017/04/20~21	Temp./Hum.	26℃/52%
Cable Loss	0.36dB	Test Voltage	AC 120V, 60Hz (with PoE Injector)

A.8.1 Band Edge

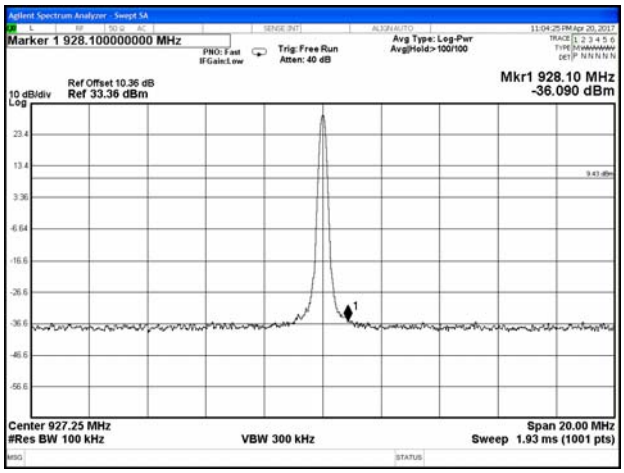
Mode: RFID

Single Channel

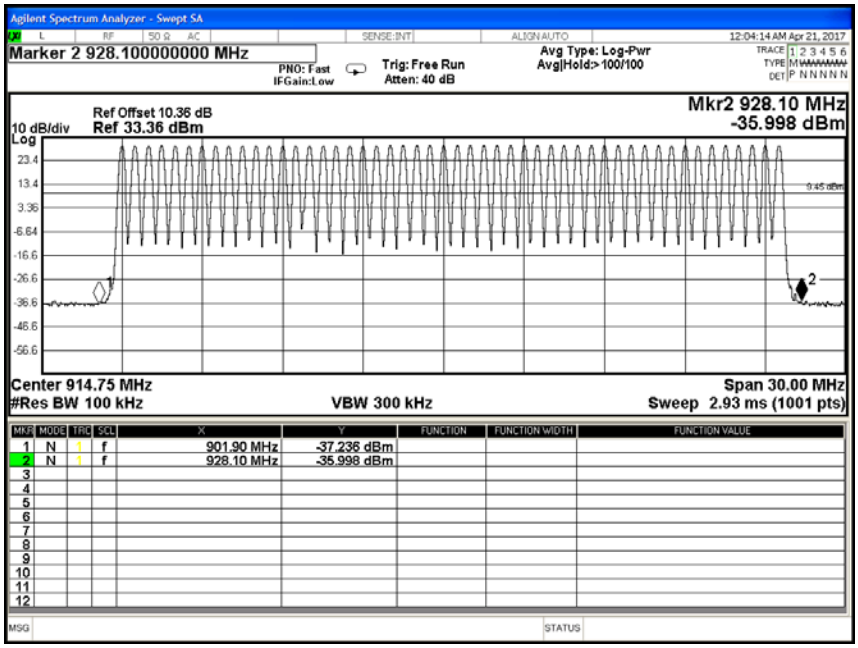
Low channel



High channel



Hopping Mode



Note: All results have been tested with worst antenna port 1.

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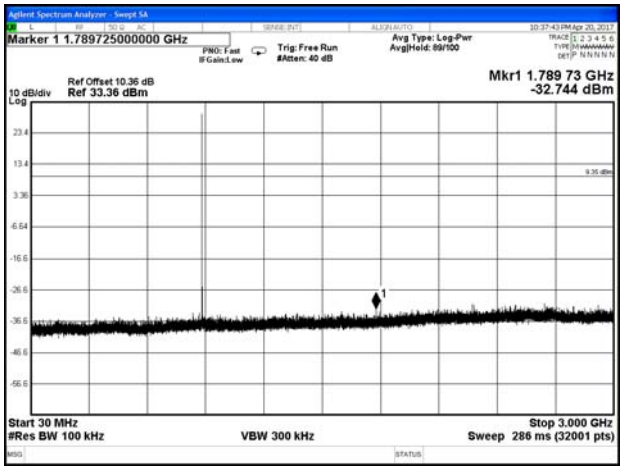
Tel: +886 2 26099301
Fax: +886 2 26099303

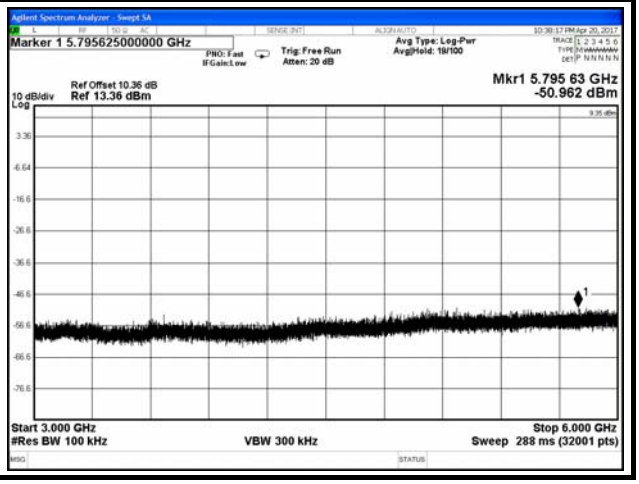
A.8.2 Spurious Emission

Test Date	2017/04/20	Temp./Hum.	26℃/52%
Mode	RFID	Frequency	902.75MHz
Cable Loss	0.36dB	Test Voltage	AC 120V, 60Hz (with PoE Injector)

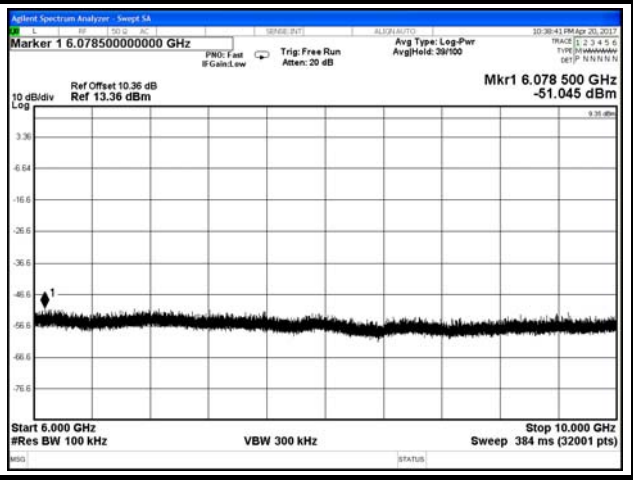
30MHz – 3GHz



3GHz – 6GHz



6GHz – 10GHz



Note: All results have been included cable loss and with worst antenna port 1.

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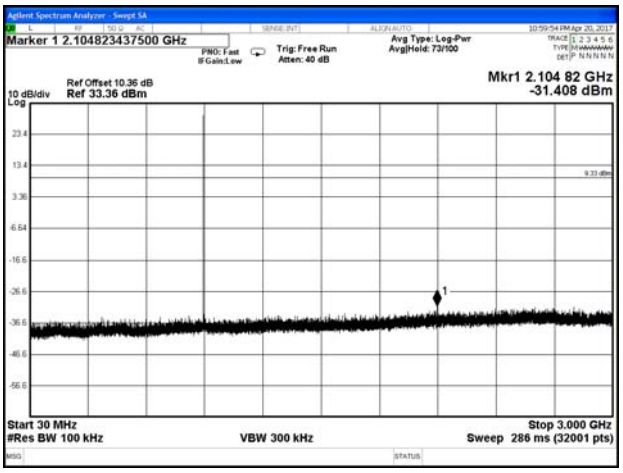
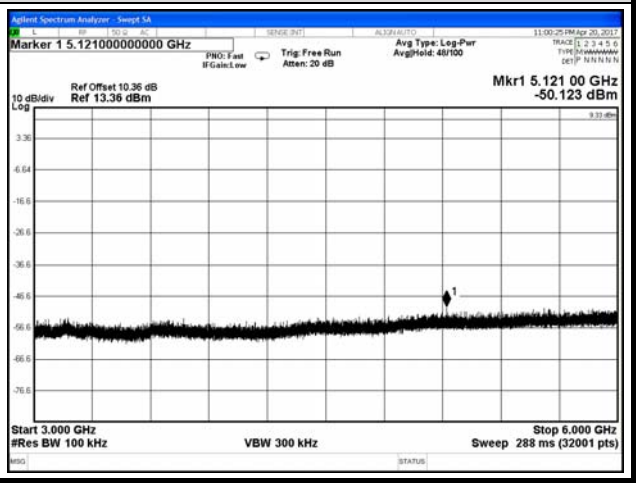
Test Date	2017/04/20	Temp./Hum.	26℃/52%
Mode	RFID	Frequency	914.75MHz
Cable Loss	0.36dB	Test Voltage	AC 120V, 60Hz (with PoE Injector)

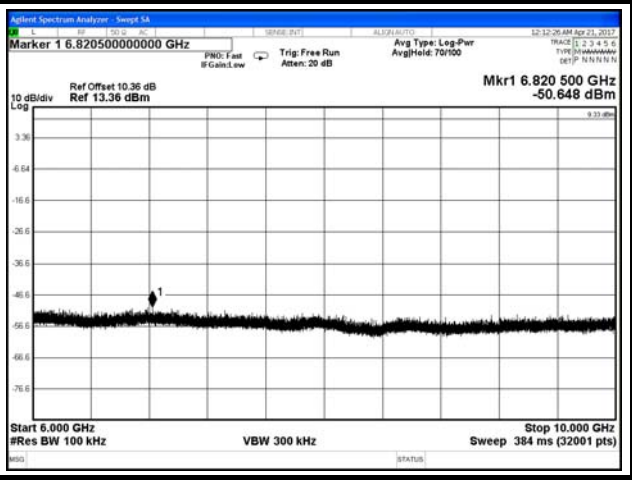
30MHz – 3GHz



3GHz – 6GHz



6GHz – 10GHz



Note: All results have been included cable loss and with worst antenna port 1.

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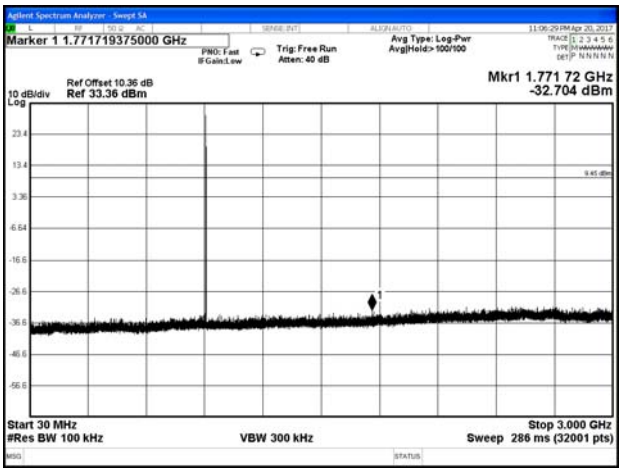
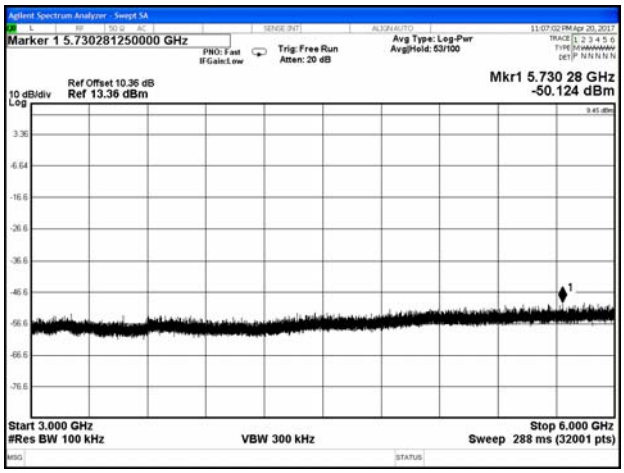
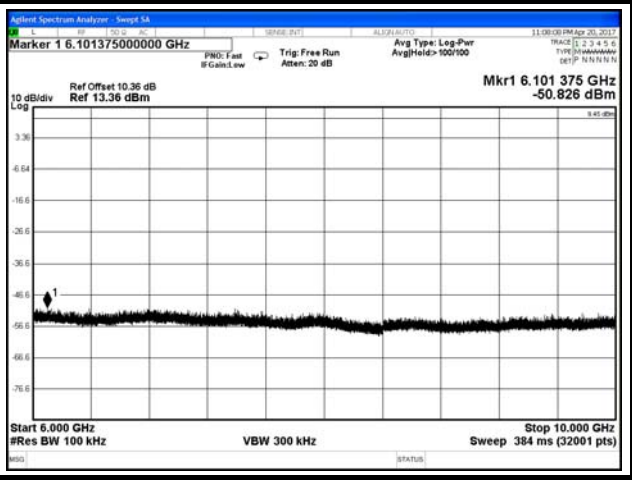
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

Test Date	2017/04/20	Temp./Hum.	26℃/52%
Mode	RFID	Frequency	927.25MHz
Cable Loss	0.36dB	Test Voltage	AC 120V, 60Hz (with PoE Injector)

30MHz – 3GHz	3GHz – 6GHz
	

6GHz – 10GHz


Note: All results have been included cable loss and with worst antenna port 1.

Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

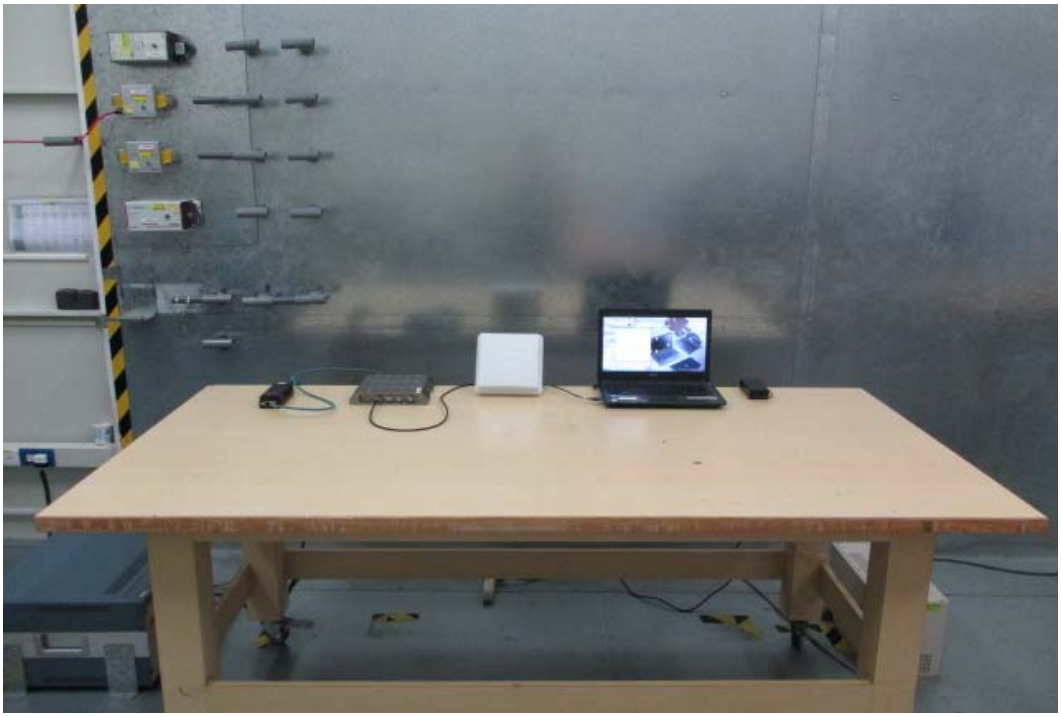
APPDNDIX B

TEST PHOTOGRAPHS

(Model: GWS-RFID)

AUDIX Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

B.1 Conducted Emission Measurement



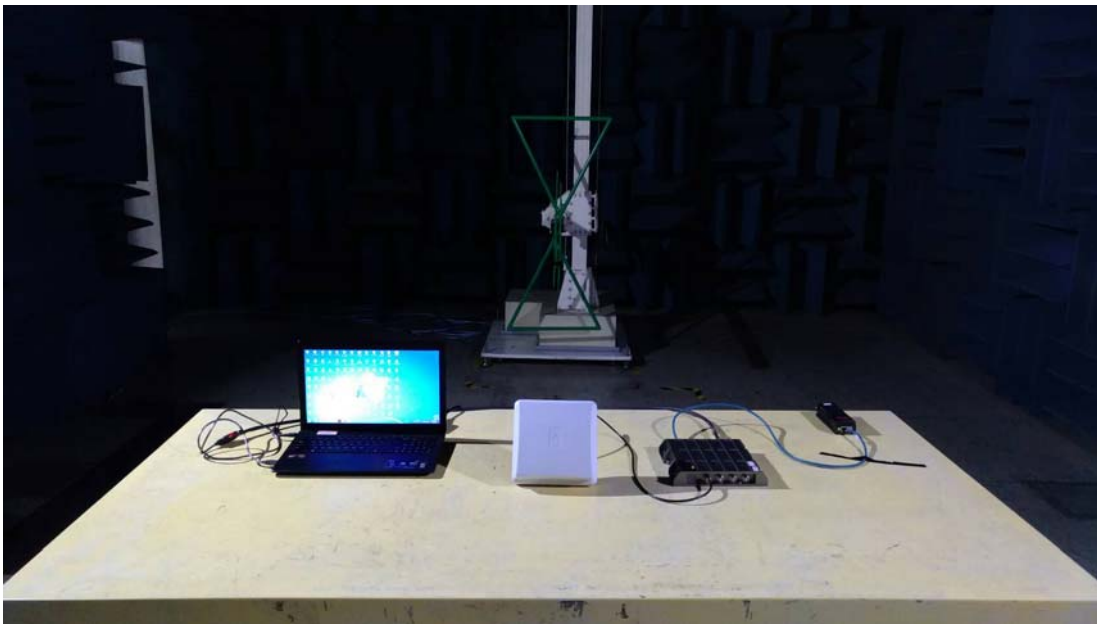
FRONT VIEW

BACK VIEW

AUDIX Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

B.2 Radiated Measurement at Chamber

Frequency Below to 1GHz



Frequency Above to 1GHz

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No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

B.3 RF Conducted Measurement