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RADIO TEST REPORT

Report No: STS1703004F01

Issued for

GTSYS LIMITED

R07 Unit E, 9/F Kwai Shing Industrial Building Phase2, Kwai
Chung, Hong Kong

Product Name:	GTSYS - RFID UHF Integrated Reader Radio Frequency Identification Reader / Interrogator
Brand Name:	GTSYS R.I.A.
Model No.:	IR-U-POEv3/12
Series Model:	N/A
FCC ID:	A2BIRUPOE-12-V3
Test Standard:	FCC Part 15.247

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**TEST RESULT CERTIFICATION**

Applicant's name..... GTSYS LIMITED
Address R07 Unit E, 9/F Kwai Shing Industrial Building Phase2, Kwai Chung, Hong Kong
Manufacture's Name..... CWLINUX LIMITED
Address Unit 138, 13/F Weswick Commercial Bld. 147-151 Queen's Road East, Wan Chai, Hong Kong

Product description

Product name GTSYS - RFID UHF Integrated Reader Radio Frequency Identification
Brand name GTSYS R.I.A.
Model and/or type reference IR-U-POEv3/12

Standards FCC Part 15.247

Test procedure ANSI C63.10-2013

This device described above has been tested by STS, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test

Date (s) of performance of tests .. 01 Mar. 2017 ~08 Mar. 2017

Date of Issue..... 09 Mar. 2017

Test Result..... Pass

Testing Engineer :

(Leo li)

Technical Manager :

(Tony liu)

Authorized Signatory :

(Vita Li)





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**Revision History**

Rev.	Issue Date	Report NO.	Effect Page	Contents
00	08 Mar. 2017	STS1703004F01	ALL	Initial Issue





1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.247) , Subpart C			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	PASS	--
15.247(a)(i)	Hopping Channel Separation	PASS	--
15.247(b)(2)	Peak Output Power	PASS	--
15.247(c)	Radiated Spurious Emission	PASS	--
15.247(d)	Conducted Spurious Emission	PASS	--
15.247(a)(i)	Number of Hopping Frequency	PASS	--
15.247(a)(i)	Dwell Time	PASS	--
15.247(a)(1)	Bandwidth	PASS	--
15.205	Band Edge Emission	PASS	--
15.203	Antenna Requirement	PASS	--

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report



1.1 TEST FACTORY

Shenzhen STS Test Services Co., Ltd.

Add. : 1/F., Building B, Zhuoke Science Park, No.190,Chongqing Road,
Fuyong Street, Bao'an District, Shenzhen, Guangdong,China

CNAS Registration No.: L7649;

FCC Registration No.: 842334; IC Registration No.: 12108A-1

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	Conducted Emission (9KHz-150KHz)	$\pm 2.88\text{dB}$
2	Conducted Emission (150KHz-30MHz)	$\pm 2.67\text{dB}$
3	RF power,conducted	$\pm 0.70\text{dB}$
4	Spurious emissions,conducted	$\pm 1.19\text{dB}$
5	All emissions,radiated(<1G) 30MHz-200MHz	$\pm 2.83\text{dB}$
6	All emissions,radiated(<1G) 200MHz-1000MHz	$\pm 2.94\text{dB}$
7	All emissions,radiated(>1G)	$\pm 3.03\text{dB}$
8	Temperature	$\pm 0.5^{\circ}\text{C}$
9	Humidity	$\pm 2\%$



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	GTSYS-RFID UHF Integrated Reader Radio Frequency Identification Reader / Interrogator
Trade Name	GTSYS R.I.A.
Model Name	IR-U-POEv3/12
Serial Model	N/A
Model Difference	N/A
Channel List	Please refer to the Note 2.
RFID	Frequency: 902.75 – 927.75 MHz Modulation: GFSK
Antenna gain	12dBi
Hardware version number	--
Software versioning number	--
Connecting I/O Port(s)	Please refer to the User's Manual

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.



2.

Channel List			
Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	902.75	27	916.25
01	903.25	28	916.75
02	903.75	29	917.25
03	904.25	30	917.75
04	904.75	31	918.25
05	905.25	32	918.75
06	905.75	33	919.25
07	906.25	34	919.75
08	906.75	35	920.25
09	907.25	36	920.75
10	907.75	37	921.25
11	908.25	38	921.75
12	908.75	39	922.25
13	909.25	40	922.75
14	909.75	41	923.25
15	910.25	42	923.75
16	910.75	43	924.25
17	911.25	44	924.75
18	911.75	45	925.25
19	912.25	46	925.75
20	912.75	47	926.25
21	913.25	48	926.75
22	913.75	49	927.25
23	914.25	50	927.75
24	914.75		
25	915.25		
26	915.75		

3. Table for Filed Antenna

Ant	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	GTSYS-RFID UHF Integrated Reader Radio Frequency Identification Reader/Interrogator	IR-U-PO Ev3/12	flat panel Antenna	N/A	12	Antenna

The EUT antenna is flat panel Antenna. no antenna other than that furnished by the responsible party shall be used with the device.



2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possibly have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	CH00
Mode 2	CH24
Mode 3	CH50
Mode 4	Charging + Keeping TX mode

For Conducted Emission	
Final Test Mode	Description
Mode 4	Charging + Keeping TX mode

For Radiated Emission	
Final Test Mode	Description
Mode 1	CH00
Mode 2	CH24
Mode 3	CH50
Mode 4	Charging + Keeping TX mode

Note:

- (1) The measurements are performed at the highest, middle, lowest available channels.
- (2) We have been tested for all available U.S. voltage and frequencies (For 120V, 60Hz) for which the device is capable of operation.

2.3 TABLE OF PARAMETERS OF TEST SOFTWARE SETTING

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of FHSS

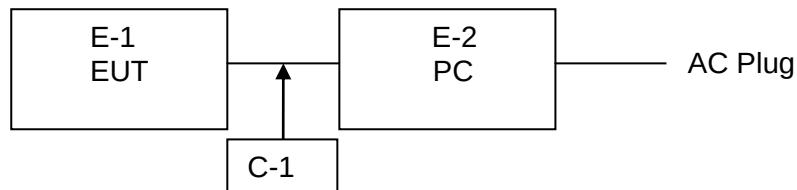
Test software Version	Test program: N/A		
Frequency	902.75 MHz	914.75 MHz	927.75 MHz
Parameters	DEF	DEF	DEF



2.4 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of FHSS

Radiated Spurious Emission Test





2.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	GTSYS - RFID UHF Integrated Reader Radio Frequency Identification Reader/Interrogator	GTSYS R.I.A.	IR-U-POEv3/12	N/A	EUT
E-2	PC	4CV428DQXR	500-320cx	4CV428DQYN	N/A

Item	Shielded Type	Ferrite Core	Length	Note
C-1	unshielded	NO	101cm	N/A

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (3) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.



2.6 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Spectrum Analyzer	Agilent	E4407B	MY50140340	2016.10.23	2017.10.22
Test Receiver	R&S	ESCI	101427	2016.10.23	2017.10.22
Bilog Antenna	TESEQ	CBL6111D	34678	2014.11.24	2017.11.23
Horn Antenna	Schwarzbeck	BBHA 9120D(1201)	9120D-1343	2015.03.05	2018.03.04
50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2016.06.06	2017.06.05
PreAmplifier	Agilent	8449B	60538	2016.10.23	2017.10.22
Loop Antenna	ARA	PLA-1030/B	1029	2016.03.06	2019.03.05
USB RF power sensor	DARE	RPR3006W	15I00041SNO03	2016.10.23	2017.10.22

Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESPI	102086	2016.10.23	2017.10.22
LISN	R&S	ENV216	101242	2016.10.23	2017.10.22
LISN	EMCO	3810/2NM	000-23625	2016.10.23	2017.10.22



3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION LIMITS

Operating frequency band. In case the emission fall within the restricted band specified on Part 15.247&207(a) limit in the table below has to be followed.

FREQUENCY (MHz)	Class B (dBuV)	
	Quasi-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

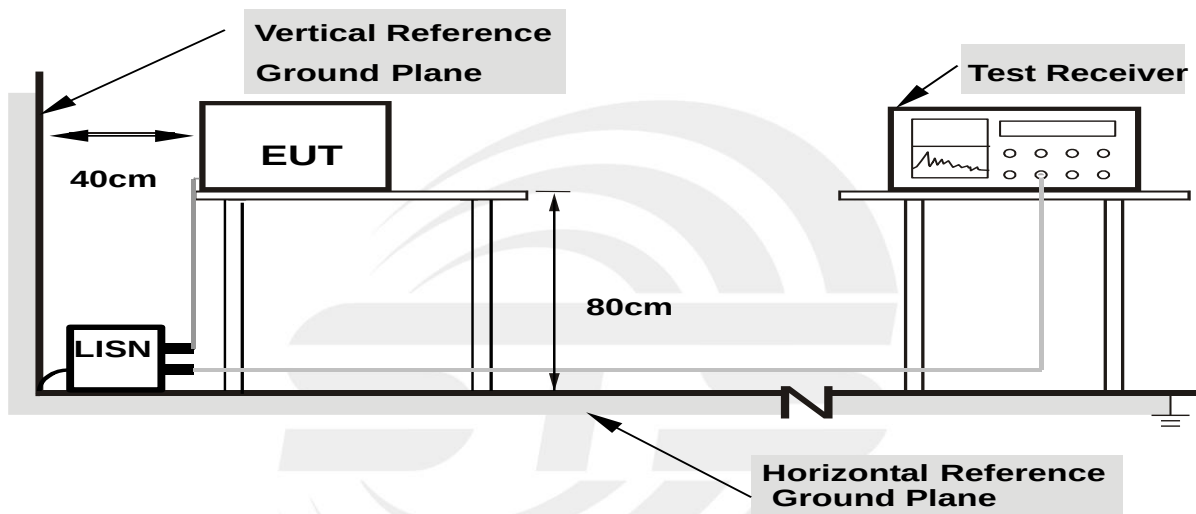
The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

3.1.2 TEST PROCEDURE

- The EUT was 0.8 meters from the horizontal ground plane and 0.4 meters from the vertical ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 TEST SETUP



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

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.1.4 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.



3.1.5 TEST RESULTS

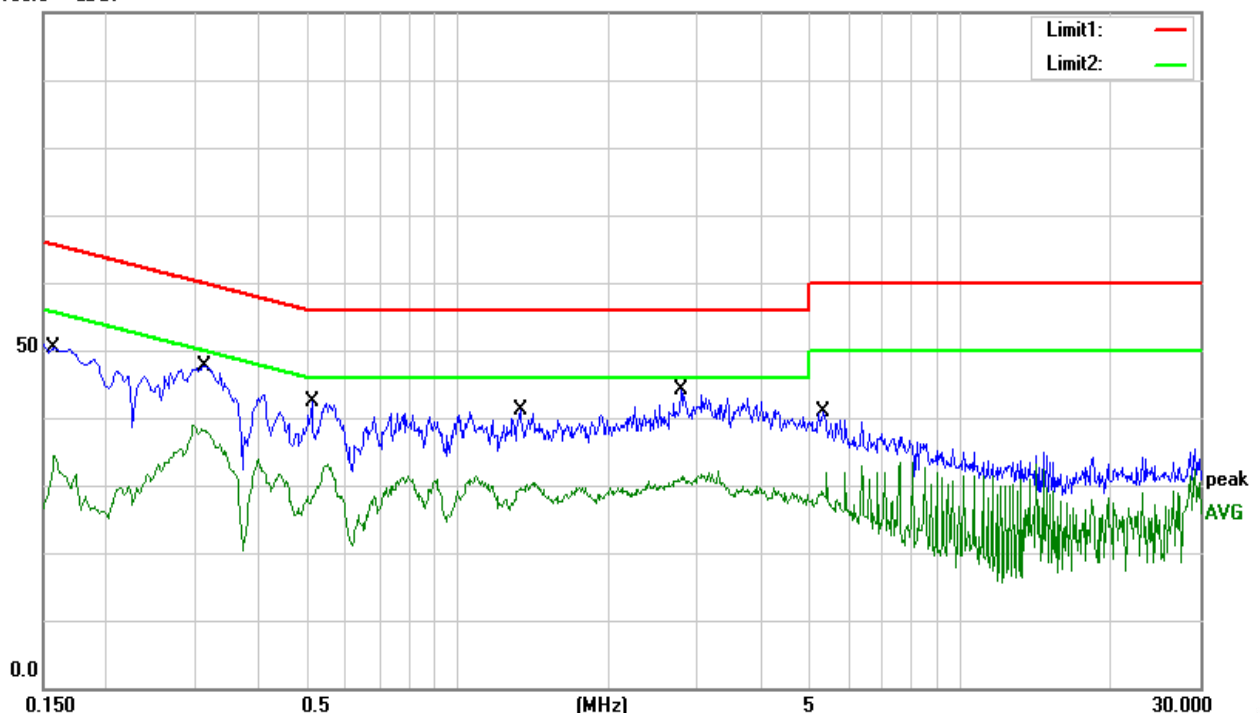
EUT:	GTSYS - RFID UHF Integrated Reader Radio Frequency Identification Reader / Interrogator	Model Name.:	IR-U-POEv3/12
Temperature:	26 °C	Relative Humidity:	54%
Pressure:	1010hPa	Phase:	L
Test Voltage:	AC120V/60Hz	Test Mode:	Mode 4

Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
0.1582	41.04	9.23	50.27	65.56	-15.29	QP
0.1582	25.04	9.23	34.27	55.56	-21.29	AVG
0.3140	38.46	9.17	47.63	59.86	-12.23	QP
0.3140	28.89	9.17	38.06	49.86	-11.80	AVG
0.5140	33.14	9.15	42.29	56.00	-13.71	QP
0.5140	19.09	9.15	28.24	46.00	-17.76	AVG
1.3340	31.99	9.18	41.17	56.00	-14.83	QP
1.3420	20.17	9.18	29.35	46.00	-16.65	AVG
2.7820	34.92	9.26	44.18	56.00	-11.82	QP
2.7820	21.60	9.26	30.86	46.00	-15.14	AVG
5.3580	31.58	9.27	40.85	60.00	-19.15	QP
5.3580	19.66	9.27	28.93	50.00	-21.07	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Margin = Result (Result = Reading + Factor) - Limit

100.0 dBuV





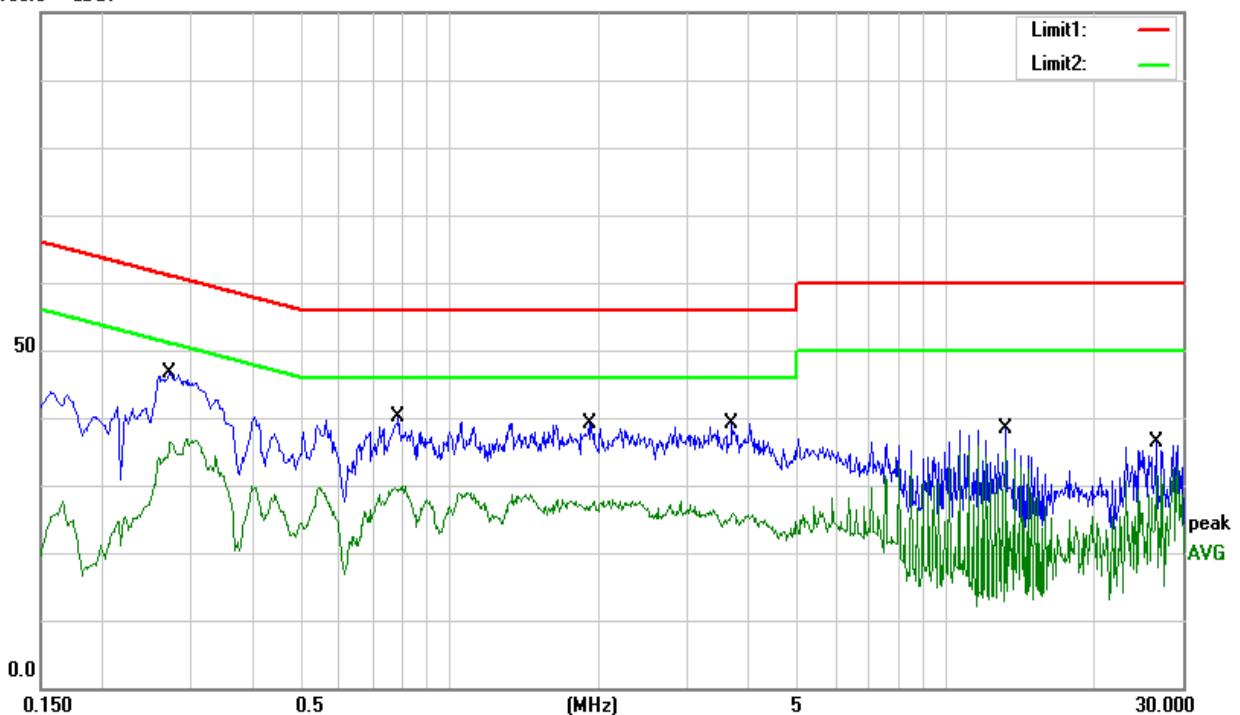
EUT:	GTSYS - RFID UHF Integrated Reader Radio Frequency Identification Reader / Interrogator	Model Name.:	IR-U-POEv3/12
Temperature:	26 °C	Relative Humidity:	54%
Pressure:	1010hPa	Phase:	N
Test Voltage:	AC120V/60Hz	Test Mode:	Mode 4

Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
0.2740	37.56	9.16	46.72	61.00	-14.28	QP
0.2740	27.33	9.16	36.49	51.00	-14.51	AVG
0.7900	30.81	9.22	40.03	56.00	-15.97	QP
0.7900	20.03	9.22	29.25	46.00	-16.75	AVG
1.9180	29.83	9.24	39.07	56.00	-16.93	QP
1.9180	17.25	9.24	26.49	46.00	-19.51	AVG
3.7020	29.95	9.26	39.21	56.00	-16.79	QP
3.7020	16.11	9.26	25.37	46.00	-20.63	AVG
13.2380	28.84	9.46	38.30	60.00	-21.70	QP
13.2380	25.81	9.46	35.27	50.00	-14.73	AVG
26.6100	26.48	9.80	36.28	60.00	-23.72	QP
26.6100	21.94	9.80	31.74	50.00	-18.26	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Margin = Result (Result =Reading + Factor)-Limit

100.0 dBuV





3.2 RADIATED EMISSION MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS

in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the Restricted band specified on Part15.205(a)&209(a) limit in the table and according to ANSI C63.10-2013 below has to be followed

LIMITS OF RADIATED EMISSION MEASUREMENT (30MHz - 1000MHz)

Frequencies (MHz)	Field Strength (microvolt/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

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Class B (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

For Radiated Emission

Spectrum Parameter	Setting
Attenuation	Auto
Detector	Peak
Start Frequency	1000 MHz(Peak/AV)
Stop Frequency	10th carrier harmonic(Peak/AV)
RB / VB (emission in restricted band)	PK=1MHz / 1MHz, AV=1 MHz / 10 Hz

For Band edge

Spectrum Parameter	Setting
Detector	Peak
Start/Stop Frequency	Lower Band Edge: 890 to 903 MHz Upper Band Edge: 926.5 to 940 MHz
RB / VB (emission in restricted band)	PK=1MHz / 1MHz, AV=1 MHz / 10 Hz



Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~90kHz / RB 200Hz for PK & AV
Start ~ Stop Frequency	90kHz~110kHz / RB 200Hz for QP
Start ~ Stop Frequency	110kHz~490kHz / RB 200Hz for PK & AV
Start ~ Stop Frequency	490kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.2.2 TEST PROCEDURE

- The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- The EUT was placed on the top of a rotating table 0.8 meters(above 1GHz is 1.5 m) above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- The height of the equipment or of the substitution antenna shall be 0.8 m(above 1GHz is 1.5 m); the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

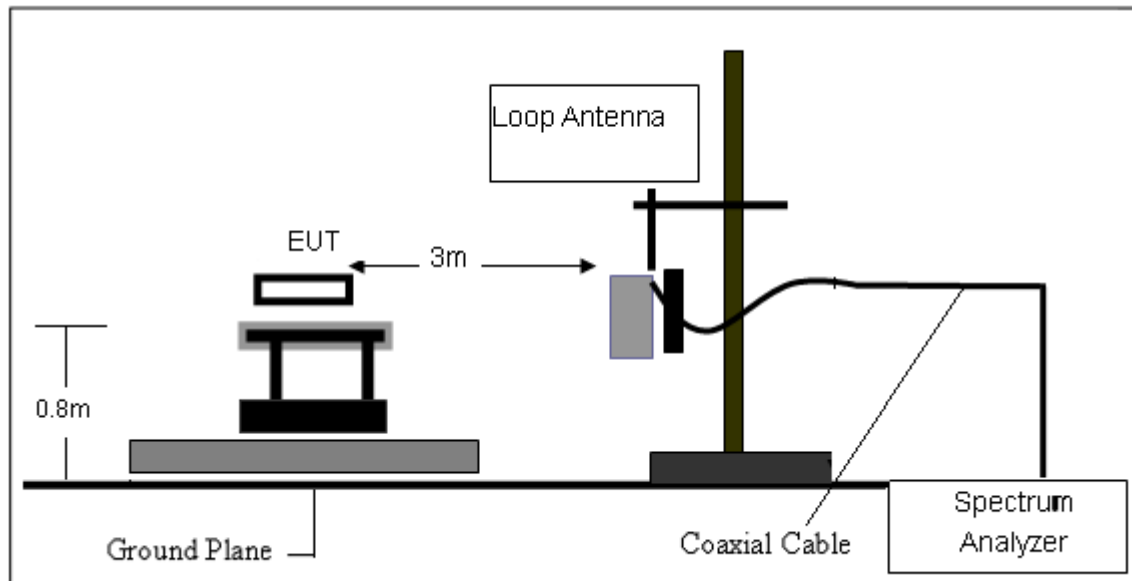
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

3.2.3 DEVIATION FROM TEST STANDARD

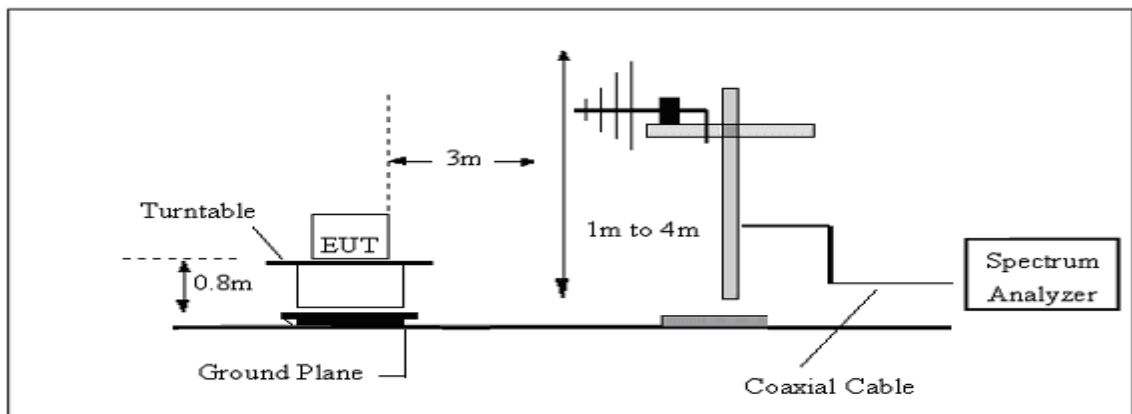
No deviation

3.2.4 TEST SETUP

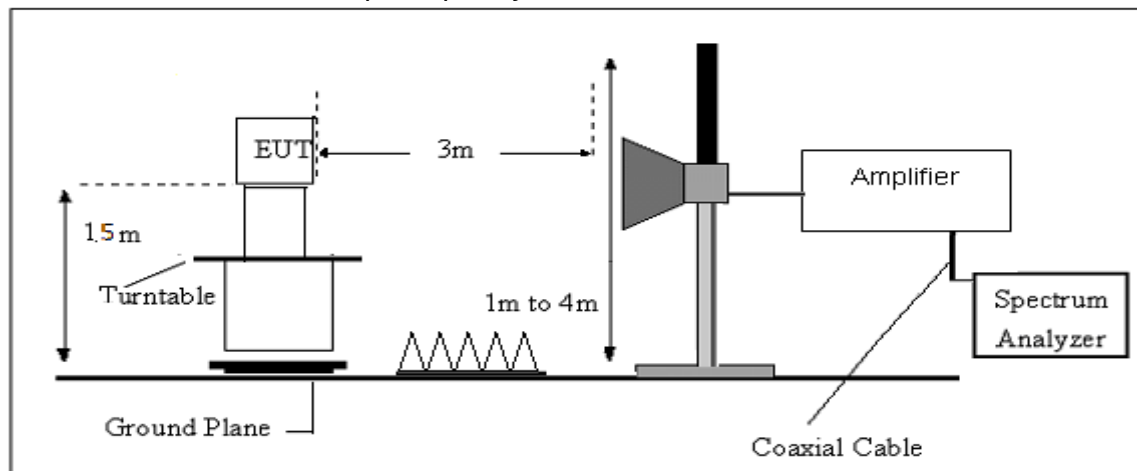
(A) Radiated Emission Test-Up Frequency Below 30MHz



(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



(C) Radiated Emission Test-Up Frequency Above 1GHz



3.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



3.2.6 TEST RESULTS

Below 30MHz

EUT:	GTSYS - RFID UHF Integrated Reader Radio Frequency Identification Reader / Interrogator	Model Name.:	IR-U-POEv3/12
Temperature:	26 °C	Relative Humidity:	54%
Pressure:	1010hPa	Test Mode:	Mode 4
Test Voltage:	AC120V/60Hz		

Freq.	Reading	Limit	Margin	State	Test Result
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F	
--	--	--	--	--	PASS
--	--	--	--	--	PASS

NOTE:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log (\text{specific distance/test distance})$ (dB);

Limit line = specific limits(dBuV) + distance extrapolation factor.



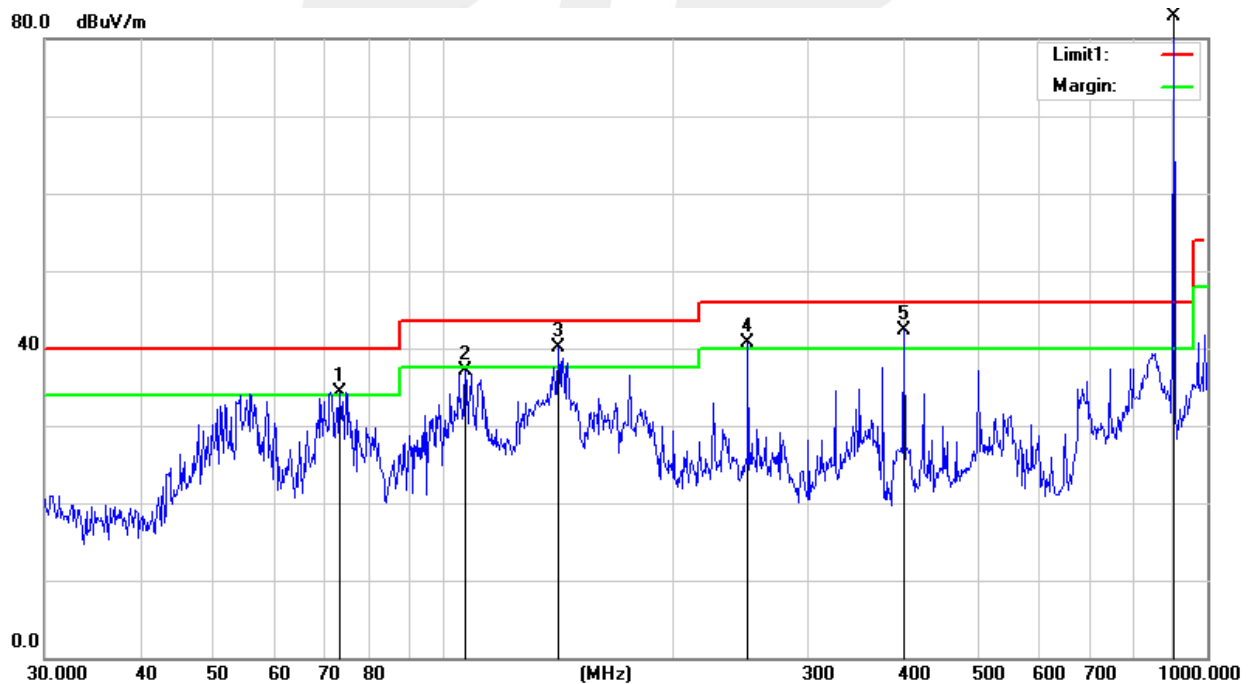
Between 30-1000MHz

EUT:	GTSYS - RFID UHF Integrated Reader Radio Frequency Identification Reader / Interrogator	Model Name.:	IR-U-POEv3/12
Temperature:	26 °C	Relative Humidity:	54%
Pressure:	1010hPa	Phase:	Horizontal
Test Voltage:	AC120V/60Hz	Test Mode:	Mode 4

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	73.1025	58.04	-23.66	34.38	40.00	-5.62	QP
2	106.7587	55.65	-18.61	37.04	43.50	-6.46	QP
3	141.3298	57.60	-17.58	40.02	43.50	-3.48	QP
4	250.3010	56.90	-16.29	40.61	46.00	-5.39	QP
5	400.4318	53.58	-11.22	42.36	46.00	-3.64	QP

Remark:

1. Margin = Result (Result = Reading + Factor)-Limit.



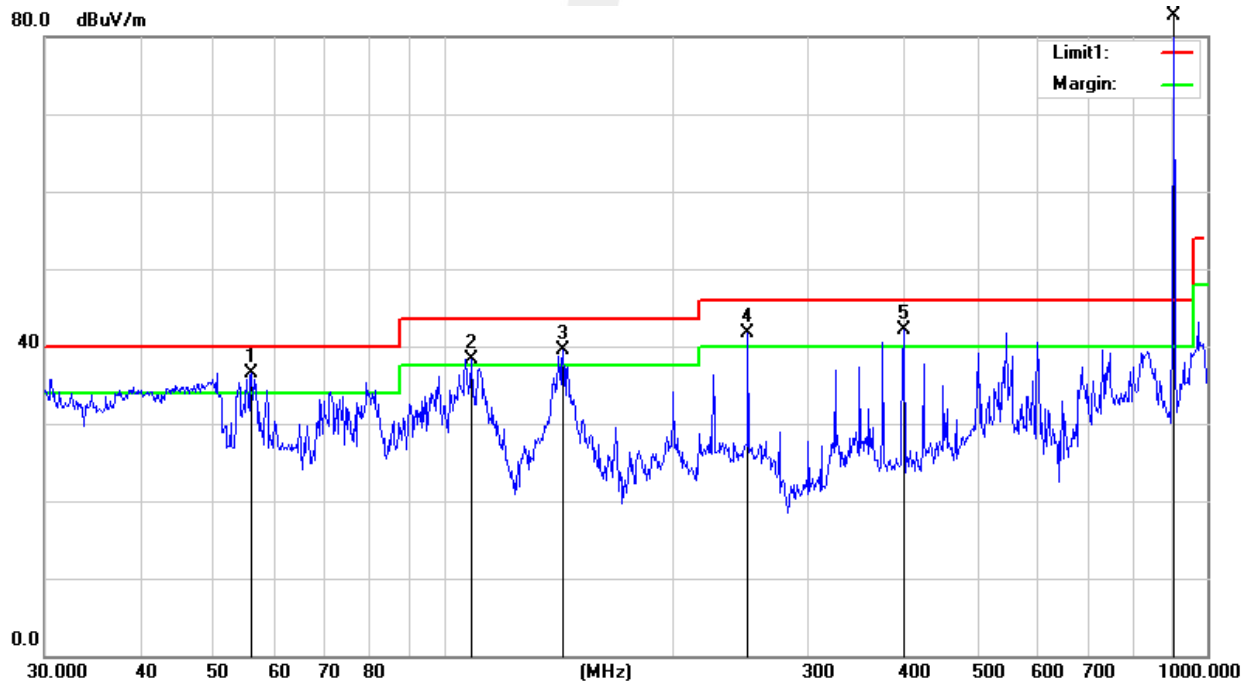


EUT:	GTSYS - RFID UHF Integrated Reader Radio Frequency Identification Reader / Interrogator	Model Name.:	IR-U-POEv3/12
Temperature:	26 °C	Relative Humidity:	54%
Pressure:	1010hPa	Phase:	Vertical
Test Voltage:	AC120V/60Hz	Test Mode:	Mode 4

No.	Frequency (MHz)	Reading (dBUV)	Factor (dB)	Results (dBUV/m)	Limit (dBUV/m)	Margin (dB)	Detector
1	56.0007	59.77	-23.19	36.58	40.00	-3.42	QP
2	108.6470	56.68	-18.46	38.22	43.50	-5.28	QP
3	143.3260	57.23	-17.67	39.56	43.50	-3.94	QP
4	250.3010	57.90	-16.29	41.61	46.00	-4.39	QP
5	400.4318	53.28	-11.22	42.06	46.00	-3.94	QP

Remark:

1. Margin = Result (Result = Reading + Factor)-Limit





(1GHz~10GHz) Restricted band and Spurious emission Requirements

Low Channel

Meter		Antenna		Orrected	Emission					
Frequency	Reading	Amplifier	Loss	Factor	Factor	Level	Limits	Margin	Detector	
(MHz)	(dBμV)	(dB)	(dB)	(dB/m)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	Type	Comment
Low Channel (902.75 MHz)										
1805.17	65.01	44.10	5.30	25.00	-13.80	51.21	74	-22.79	Pk	Vertical
1805.17	54.63	44.10	5.30	25.00	-13.80	40.83	54	-13.17	AV	Vertical
1804.91	64.29	44.10	5.30	25.00	-13.80	50.49	74	-23.51	Pk	Horizontal
1804.91	54.23	44.10	5.30	25.00	-13.80	40.43	54	-13.57	AV	Horizontal
2144.94	62.74	43.80	5.40	25.90	-12.50	50.24	74	-23.76	Pk	Vertical
2144.94	53.35	43.80	5.40	25.90	-12.50	40.85	54	-13.15	AV	Vertical
2144.92	62.36	43.80	5.40	25.90	-12.50	49.86	74	-24.14	Pk	Horizontal
2144.92	49.74	43.80	5.40	25.90	-12.50	37.24	54	-16.76	AV	Horizontal
2707.94	66.59	44.40	6.20	27.60	-10.60	55.99	74	-18.01	Pk	Vertical
2707.94	50.90	44.40	6.20	27.60	-10.60	40.30	54	-13.70	AV	Vertical
2707.87	65.24	44.40	6.20	27.60	-10.60	54.64	74	-19.36	Pk	Horizontal
2707.87	51.19	44.40	6.20	27.60	-10.60	40.59	54	-13.41	AV	Horizontal
3264.84	62.97	44.70	6.70	28.20	-9.80	53.17	74	-20.83	Pk	Vertical
3264.84	51.24	44.70	6.70	28.20	-9.80	41.44	54	-12.56	AV	Vertical
3264.90	63.64	44.70	6.70	28.20	-9.80	53.84	74	-20.16	Pk	Horizontal
3264.90	51.12	44.70	6.70	28.20	-9.80	41.32	54	-12.68	AV	Horizontal
7222.10	55.35	43.50	11.40	35.50	3.40	58.75	74	-15.25	Pk	Vertical
7222.10	38.58	43.50	11.40	35.50	3.40	41.98	54	-12.02	AV	Vertical
7222.04	56.19	43.50	11.40	35.50	3.40	59.59	74	-14.41	Pk	Horizontal
7222.04	38.06	43.50	11.40	35.50	3.40	41.46	54	-12.54	AV	Horizontal
8124.21	54.61	44.20	12.00	37.00	4.80	59.41	74	-14.59	Pk	Vertical
8124.21	37.89	44.20	12.00	37.00	4.80	42.69	54	-11.31	AV	Vertical
8123.99	53.86	44.20	12.00	37.00	4.80	58.66	74	-15.34	Pk	Horizontal
8123.99	38.15	44.20	12.00	37.00	4.80	42.95	54	-11.05	AV	Horizontal
9929.95	48.72	43.60	14.33	39.50	10.20	58.92	74	-15.08	Pk	Vertical
9929.95	33.99	43.60	14.33	39.50	10.20	44.19	54	-9.81	AV	Vertical
9929.95	51.64	43.60	14.33	39.50	10.20	61.84	74	-12.16	Pk	Horizontal
9929.95	36.11	43.60	14.33	39.50	10.20	46.31	54	-7.69	AV	Horizontal



Mid Channel

Meter		Antenna		Orrected	Emission					
Frequency	Reading	Amplifier	Loss	Factor	Factor	Level	Limits	Margin	Detector	
(MHz)	(dBμV)	(dB)	(dB)	(dB/m)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	Type	Comment
Mid Channel (914.75 MHz)										
1829.05	65.77	44.10	5.30	25.00	-13.80	51.97	74	-22.03	Pk	Vertical
1829.05	54.50	44.10	5.30	25.00	-13.80	40.70	54	-13.30	AV	Vertical
1828.95	65.57	44.10	5.30	25.00	-13.80	51.77	74	-22.23	Pk	Horizontal
1828.95	54.12	44.10	5.30	25.00	-13.80	40.32	54	-13.68	AV	Horizontal
2144.92	63.06	43.80	5.40	25.90	-12.50	50.56	74	-23.44	Pk	Vertical
2144.92	53.45	43.80	5.40	25.90	-12.50	40.95	54	-13.05	AV	Vertical
2145.06	62.60	43.80	5.40	25.90	-12.50	50.10	74	-23.90	Pk	Horizontal
2145.06	49.60	43.80	5.40	25.90	-12.50	37.10	54	-16.90	AV	Horizontal
2743.77	66.69	44.40	6.20	27.60	-10.60	56.09	74	-17.91	Pk	Vertical
2743.77	50.36	44.40	6.20	27.60	-10.60	39.76	54	-14.24	AV	Vertical
2744.06	65.45	44.40	6.20	27.60	-10.60	54.85	74	-19.15	Pk	Horizontal
2744.06	51.28	44.40	6.20	27.60	-10.60	40.68	54	-13.32	AV	Horizontal
3264.99	62.65	44.70	6.70	28.20	-9.80	52.85	74	-21.15	Pk	Vertical
3264.99	51.45	44.70	6.70	28.20	-9.80	41.65	54	-12.35	AV	Vertical
3265.08	62.72	44.70	6.70	28.20	-9.80	52.92	74	-21.08	Pk	Horizontal
3265.08	51.59	44.70	6.70	28.20	-9.80	41.79	54	-12.21	AV	Horizontal
7318.10	56.32	43.50	11.40	35.50	3.40	59.72	74	-14.28	Pk	Vertical
7318.10	37.90	43.50	11.40	35.50	3.40	41.30	54	-12.70	AV	Vertical
7318.18	55.40	43.50	11.40	35.50	3.40	58.80	74	-15.20	Pk	Horizontal
7318.18	38.90	43.50	11.40	35.50	3.40	42.30	54	-11.70	AV	Horizontal
8124.10	53.98	44.20	12.00	37.00	4.80	58.78	74	-15.22	Pk	Vertical
8124.10	37.85	44.20	12.00	37.00	4.80	42.65	54	-11.35	AV	Vertical
8124.26	53.39	44.20	12.00	37.00	4.80	58.19	74	-15.81	Pk	Horizontal
8124.26	37.41	44.20	12.00	37.00	4.80	42.21	54	-11.79	AV	Horizontal
9930.16	48.79	43.60	14.33	39.50	10.20	58.99	74	-15.01	Pk	Vertical
9930.16	33.74	43.60	14.33	39.50	10.20	43.94	54	-10.06	AV	Vertical
9930.15	51.11	43.60	14.33	39.50	10.20	61.31	74	-12.69	Pk	Horizontal
9930.15	35.42	43.60	14.33	39.50	10.20	45.62	54	-8.38	AV	Horizontal



High Channel

Meter		Antenna		Orrected	Emission					
Frequency	Reading	Amplifier	Loss	Factor	Factor	Level	Limits	Margin	Detector	
(MHz)	(dBμV)	(dB)	(dB)	(dB/m)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	Type	Comment
High Channel (927.75 MHz)										
1855.16	64.91	44.10	5.30	25.00	-13.80	51.11	74	-22.89	Pk	Vertical
1855.16	55.25	44.10	5.30	25.00	-13.80	41.45	54	-12.55	AV	Vertical
1854.92	65.27	44.10	5.30	25.00	-13.80	51.47	74	-22.53	Pk	Horizontal
1854.92	53.34	44.10	5.30	25.00	-13.80	39.54	54	-14.46	AV	Horizontal
2144.99	62.61	43.80	5.40	25.90	-12.50	50.11	74	-23.89	Pk	Vertical
2144.99	52.43	43.80	5.40	25.90	-12.50	39.93	54	-14.07	AV	Vertical
2144.97	62.55	43.80	5.40	25.90	-12.50	50.05	74	-23.95	Pk	Horizontal
2144.97	49.89	43.80	5.40	25.90	-12.50	37.39	54	-16.61	AV	Horizontal
2782.96	67.04	44.40	6.20	27.60	-10.60	56.44	74	-17.56	Pk	Vertical
2782.96	50.49	44.40	6.20	27.60	-10.60	39.89	54	-14.11	AV	Vertical
2782.81	64.92	44.40	6.20	27.60	-10.60	54.32	74	-19.68	Pk	Horizontal
2782.81	51.34	44.40	6.20	27.60	-10.60	40.74	54	-13.26	AV	Horizontal
3265.06	62.98	44.70	6.70	28.20	-9.80	53.18	74	-20.82	Pk	Vertical
3265.06	51.50	44.70	6.70	28.20	-9.80	41.70	54	-12.30	AV	Vertical
3264.84	63.46	44.70	6.70	28.20	-9.80	53.66	74	-20.34	Pk	Horizontal
3264.84	51.47	44.70	6.70	28.20	-9.80	41.67	54	-12.33	AV	Horizontal
7421.93	55.91	43.50	11.40	35.50	3.40	59.31	74	-14.69	Pk	Vertical
7421.93	39.26	43.50	11.40	35.50	3.40	42.66	54	-11.34	AV	Vertical
7422.06	55.28	43.50	11.40	35.50	3.40	58.68	74	-15.32	Pk	Horizontal
7422.06	39.00	43.50	11.40	35.50	3.40	42.40	54	-11.60	AV	Horizontal
8124.14	53.82	44.20	12.00	37.00	4.80	58.62	74	-15.38	Pk	Vertical
8124.14	38.56	44.20	12.00	37.00	4.80	43.36	54	-10.64	AV	Vertical
8124.02	54.77	44.20	12.00	37.00	4.80	59.57	74	-14.43	Pk	Horizontal
8124.02	37.61	44.20	12.00	37.00	4.80	42.41	54	-11.59	AV	Horizontal
9930.13	48.95	43.60	14.33	39.50	10.20	59.15	74	-14.85	Pk	Vertical
9930.13	33.63	43.60	14.33	39.50	10.20	43.83	54	-10.17	AV	Vertical
9930.15	51.82	43.60	14.33	39.50	10.20	62.02	74	-11.98	Pk	Horizontal
9930.15	36.35	43.60	14.33	39.50	10.20	46.55	54	-7.45	AV	Horizontal

Note:

1) Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Emission Level = Meter Reading + Factor



Band edge Requirements

Meter		Antenna		Orrected	Emission					
Frequency	Reading	Amplifier	Loss	Factor	Factor	Level	Limits	Margin	Detector	
(MHz)	(dBμV)	(dB)	(dB)	(dB/m)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	Type	Comment
902.75MHz										
902.00	49.25	43.8	2.91	25.9	-12.99	36.26	46	-9.74	QP	Vertical
902.00	34.15	43.8	2.91	25.9	-12.99	21.16	46	-24.84	QP	Horizontal
901.90	51.06	43.8	2.12	25.9	-12.78	38.28	46	-7.72	QP	Vertical
901.90	34.06	43.8	2.12	25.9	-12.78	21.28	46	-24.72	QP	Horizontal
927.75MHz										
928.00	47.25	43.8	3.11	25.9	-12.99	34.26	46	-11.74	QP	Vertical
928.00	26.15	43.8	3.11	25.9	-12.99	13.16	46	-32.84	QP	Horizontal
928.10	48.06	43.8	3.11	25.9	-12.78	35.28	46	-10.72	QP	Vertical
928.10	23.06	43.8	3.11	25.9	-12.78	10.28	46	-35.72	QP	Horizontal
Low measurement frequencies is range from 890 to 903 MHz, high measurement frequencies is range from 926.5 to 940 MHz. Only showthe worst point data of the emissions in the frequency 890 to 903 MHz and 926.5 to 940 MHz..										

Band Hopping edge Requirements

Meter		Antenna		Orrected	Emission					
Frequency	Reading	Amplifier	Loss	Factor	Factor	Level	Limits	Margin	Detector	
(MHz)	(dBμV)	(dB)	(dB)	(dB/m)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	Type	Comment
902.75MHz										
902.00	49.18	43.8	2.91	25.9	-12.99	36.19	46	-9.81	QP	Vertical
902.00	34.19	43.8	2.91	25.9	-12.99	21.2	46	-24.8	QP	Horizontal
901.90	35.14	43.8	2.12	25.9	-12.78	22.36	46	-23.64	QP	Vertical
901.90	34.03	43.8	2.12	25.9	-12.78	21.25	46	-24.75	QP	Horizontal
927.75MHz										
928.00	49.12	43.8	3.91	25.9	-12.99	36.13	46	-9.87	QP	Vertical
928.00	34.22	43.8	3.91	25.9	-12.99	21.23	46	-24.77	QP	Horizontal
928.10	35.12	43.8	3.12	25.9	-12.78	22.34	46	-23.66	QP	Vertical
928.10	34.07	43.8	3.12	25.9	-12.78	21.29	46	-24.71	QP	Horizontal
Low measurement frequencies is range from 890 to 903 MHz, high measurement frequencies is range from 926.5 to 940 MHz. Only showthe worst point data of the emissions in the frequency 890 to 903 MHz and 926.5 to 940 MHz..										

4. CONDUCTED SPURIOUS EMISSIONS

4.1 REQUIREMENT

According to FCC section 15.247(d), 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.

4.2 TEST PROCEDURE

According to FCC section 15.247(d), 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.

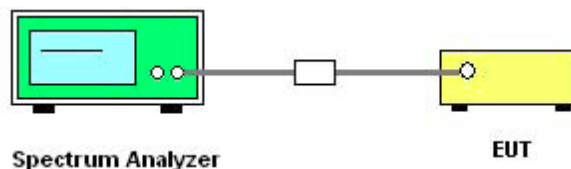
Spectrum Parameter	Setting
Detector	Peak
Start/Stop Frequency	30 MHz to 10th carrier harmonic
RB / VB (emission in restricted band)	100 KHz/300 KHz
Trace-Mode:	Max hold

For Band edge

Spectrum Parameter	Setting
Detector	Peak
Start/Stop Frequency	Lower Band Edge: 901.9 – 902 MHz Upper Band Edge: 928 – 928.1 MHz
RB / VB (emission in restricted band)	100 KHz/300 KHz
Trace-Mode:	Max hold

Remark : Hopping on and Hopping off mode all have been tested, only worst case hopping off is reported.

4.3 TEST SETUP



The EUT is coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. Make the measurement with the spectrum analyzer's resolution bandwidth(RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW.

4.4 EUT OPERATION CONDITIONS

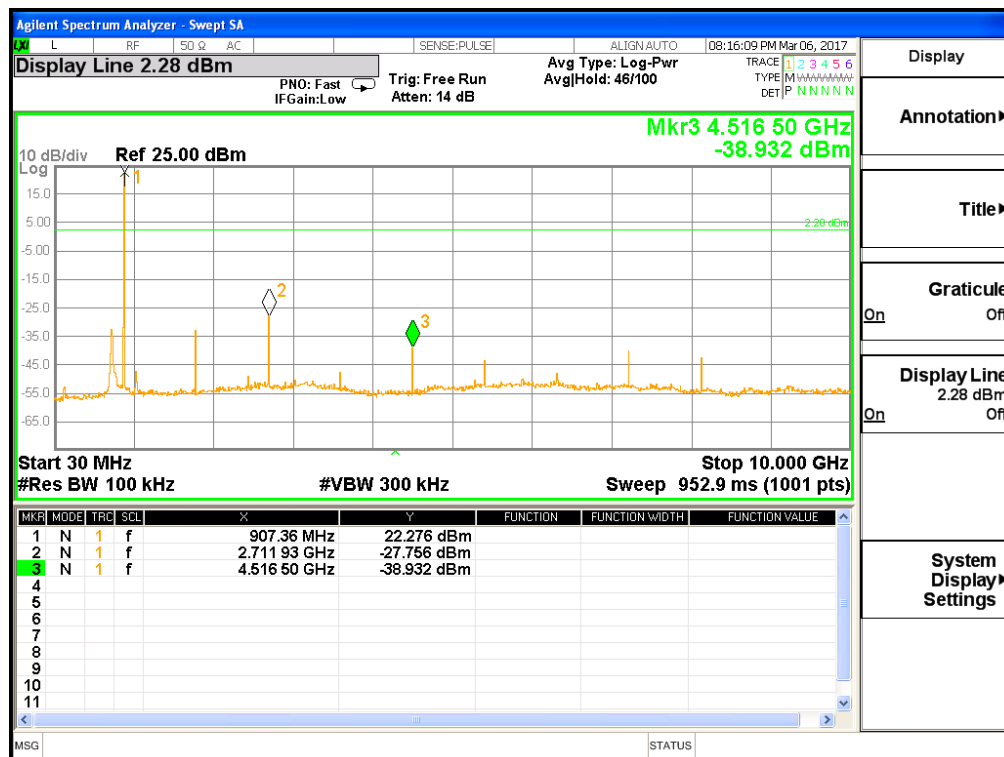
The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.



4.5 TEST RESULTS

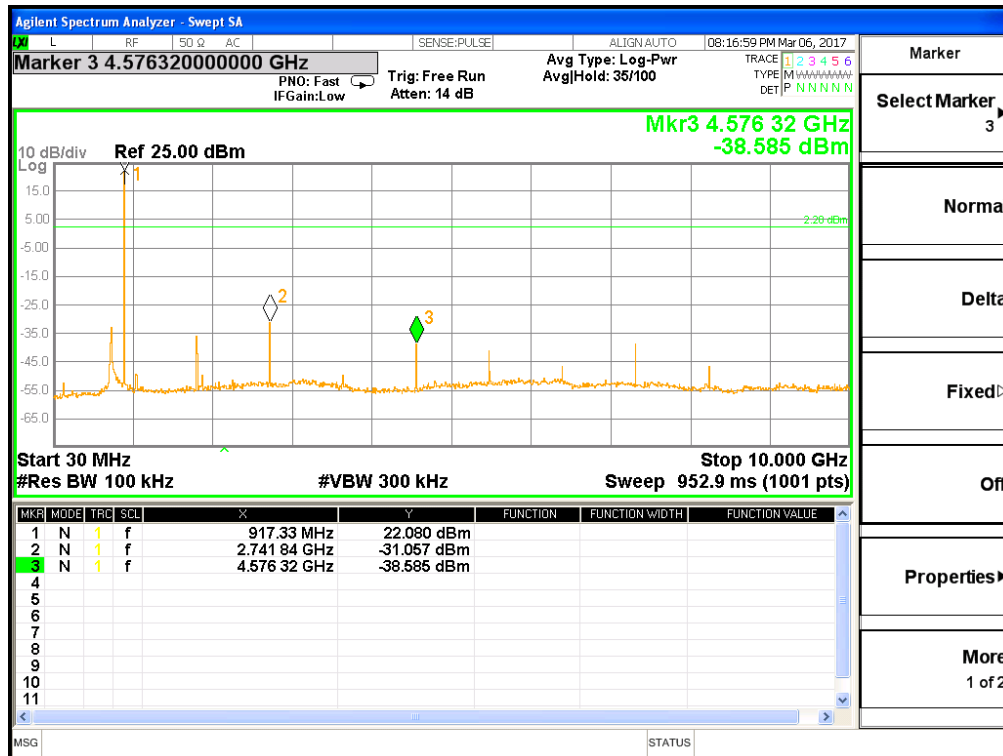
EUT :	GTSYS-RFID UHF Integrated Reader Radio Frequency Identification Reader/Interrogator	Model Name :	IR-U-POEv3/12
Temperature :	25 °C	Relative Humidity :	50%
Pressure :	1012 hPa	Test Voltage :	AC120V60Hz

00 CH

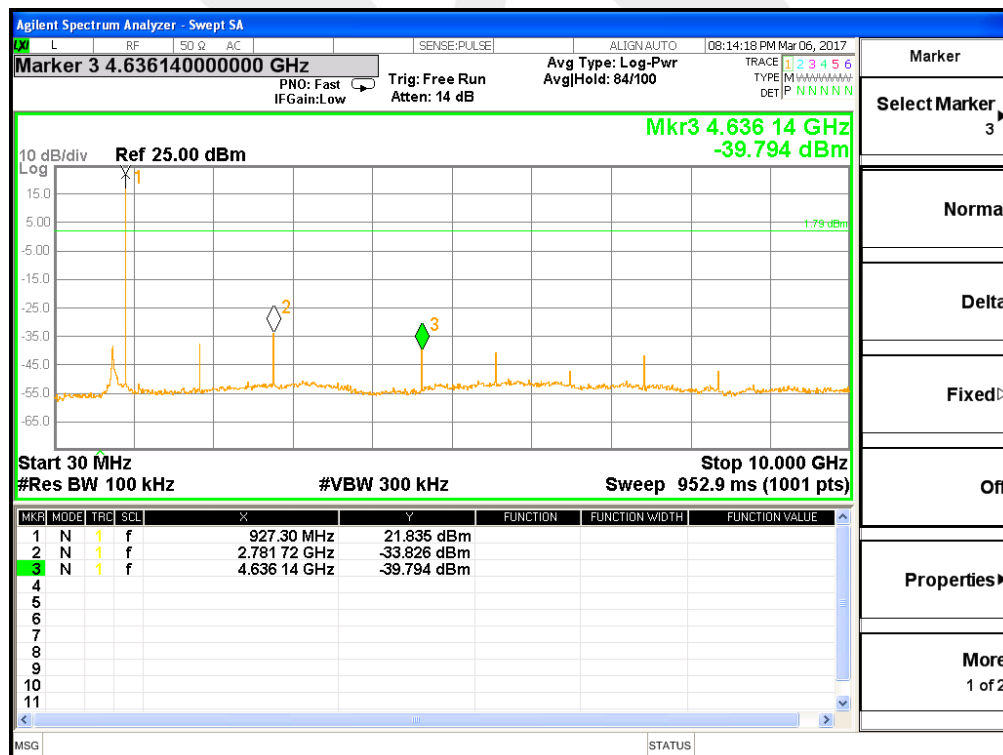




24 CH



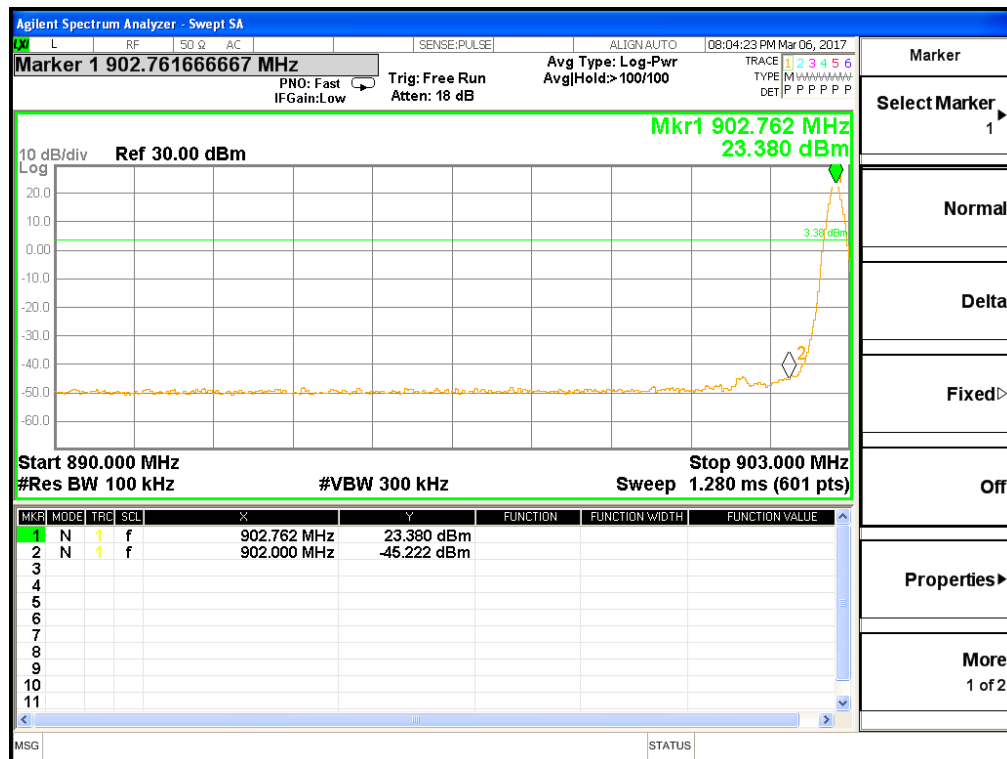
50 CH



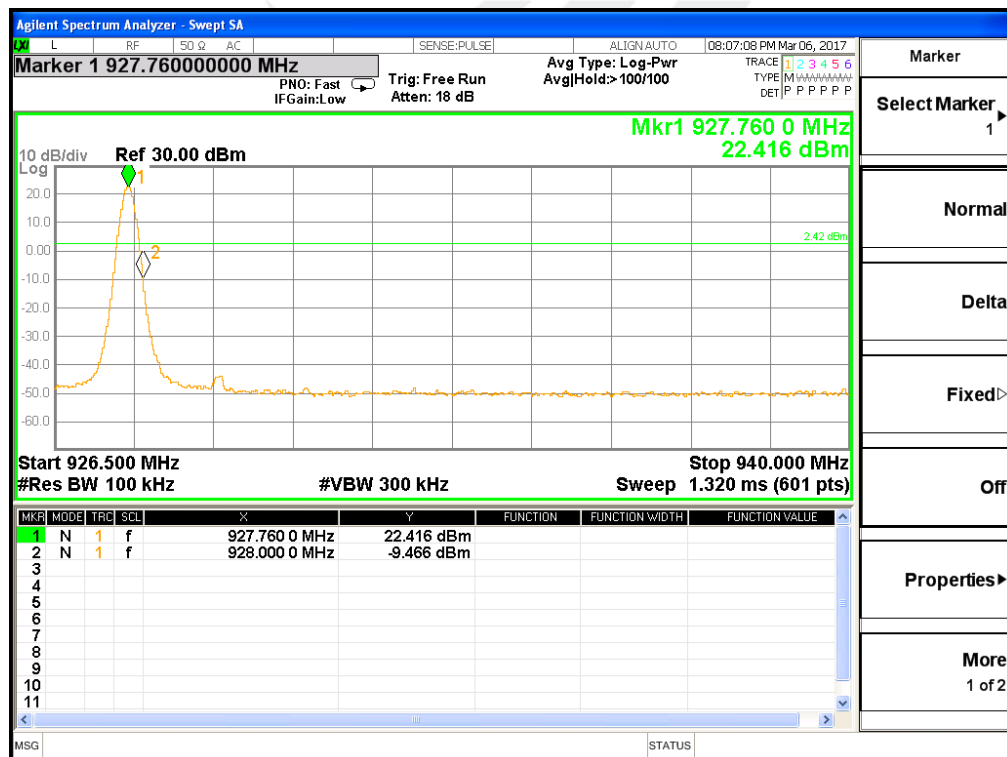


For Band edge

00 CH



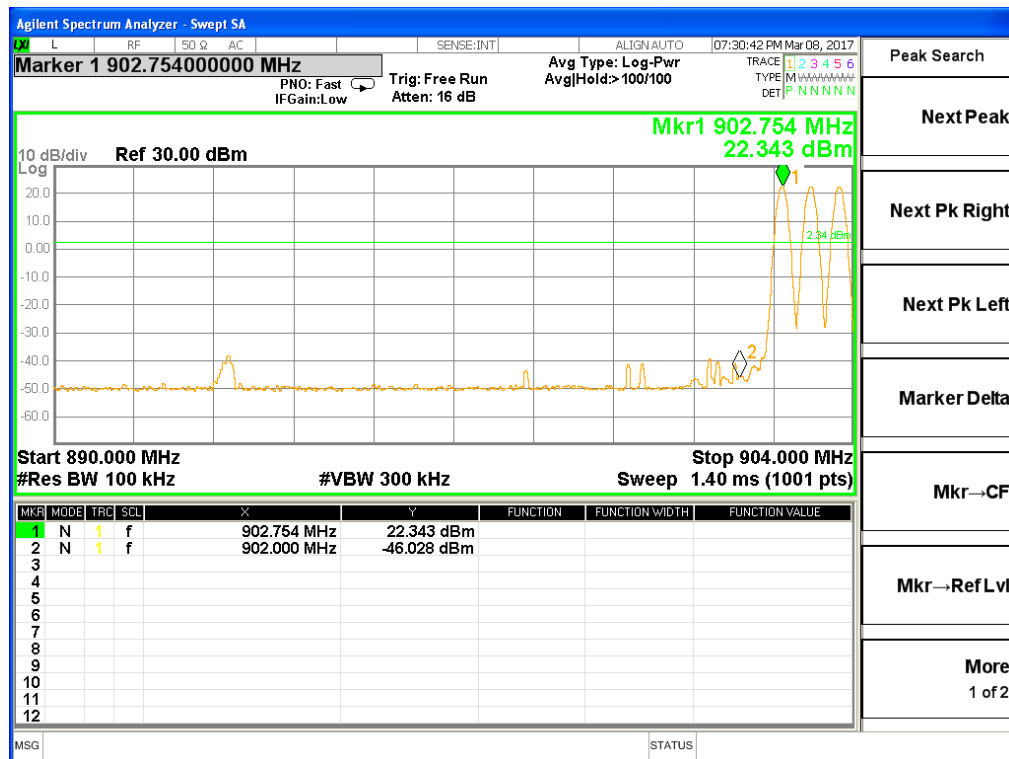
50CH



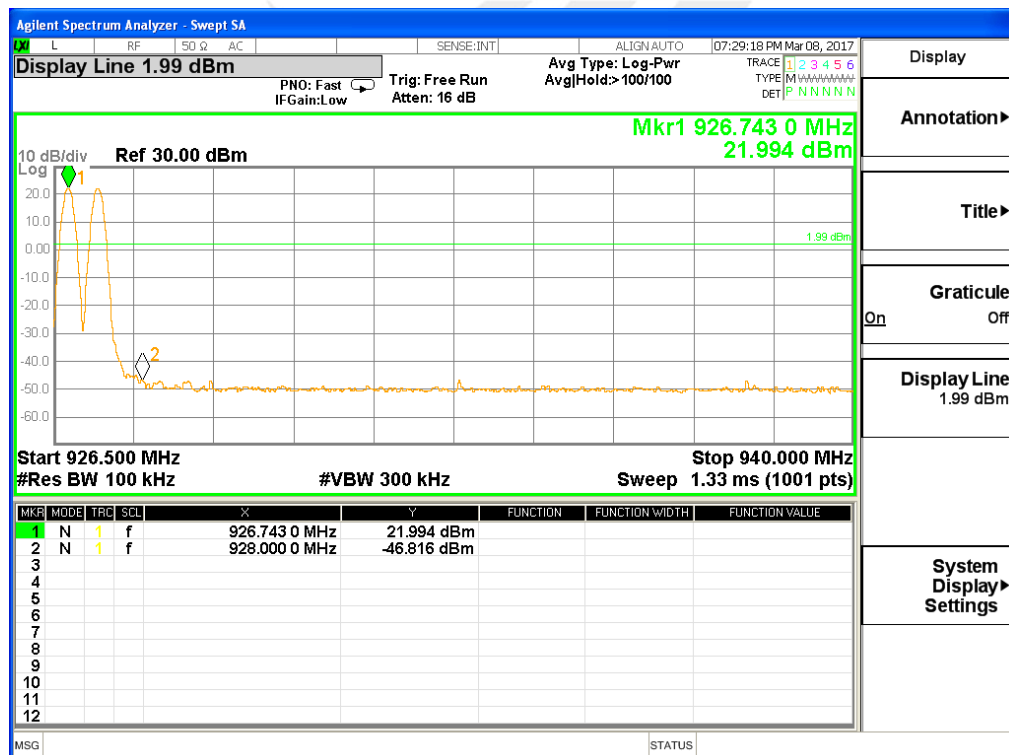


For Hopping Band edge

00 CH



50CH





5. NUMBER OF HOPPING CHANNEL

5.1 APPLIED PROCEDURES / LIMIT

FCC Part15.247 , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (a)(i)	Number of Hopping Channel	≥50	902-928	PASS

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> Operating Frequency Range
RB	100 KHz
VB	100 KHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

5.2 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting : RBW= 100KHz, VBW=100KHz, Sweep time = Auto.

5.3 TEST SETUP



5.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



5.5 TEST RESULTS

EUT :	GTSYS-RFID UHF Integrated Reader Radio Frequency Identification Reader / Interrogator	Model Name :	IR-U-POEv3/12
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1015 hPa	Test Voltage :	AC120V60Hz
Test Mode :	Hopping Mode		

Number of Hopping Channel : 51

Hopping channel





6. AVERAGE TIME OF OCCUPANCY

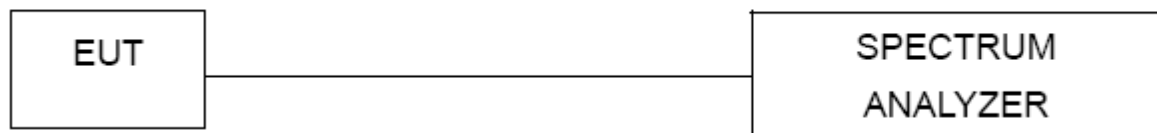
6.1 APPLIED PROCEDURES / LIMIT

FCC Part15.247 , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (a)(i)	Average Time of Occupancy	0.4sec	902-928	PASS

6.2 TEST PROCEDURE

- The transmitter output (antenna port) was connected to the spectrum analyzer
- Set RBW of spectrum analyzer to 1MHz and VBW to 3MHz.
- Use a video trigger with the trigger level set to enable triggering only on full pulses.
- Sweep Time is more than once pulse time.
Set the center frequency on any frequency would be measure and set the frequency span to
- zero span.
- Measure the maximum time duration of one single pulse.
- and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period.

6.3 TEST SETUP



6.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



6.5 TEST RESULTS

EUT :	GTSYS-RFID UHF Integrated Reader Radio Frequency Identification Reader / Interrogator	Model Name :	IR-U-POEv3/12
Temperature :	25 °C	Relative Humidity :	50%
Pressure :	1012 hPa	Test Voltage :	AC120V60Hz

Center Channel (MHz)	within 20 (s)period	Pulse Duration (ms)	Dwell Time (s)	Limits(s)
914.75MHz	41	3.8	0.156	0.4

CH24

