APPLICATION CERTIFICATION
On Behalf of
Xiamen Innov Information Technology Co., LTD

READER
Model No.: IVF-RU01

FCC ID: 2ABREIVF-RU01

Prepared for	:	Xiamen Innov Information Technology Co., LTD
Address	:	Qiangye building 705 room, Xiangan District of Xiamen City, Fujian province, China
Prepared by	:	ACCURATE TECHNOLOGY CO. LTD
Address	:	F1, Bldg. A, Changyuan New Material Port, Keyuan Rd. Science & Industry Park, Nanshan, Shenzhen, Guangdong P.R. China Tel: (0755) 26503290 Fax: (0755) 26503396

Report Number	:	ATE20140010
Date of Test	:	Jan 03-17, 2014
Date of Report	:	Jan 20, 2014

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Description Page

Test Report Certification

Applicant	:	Xiamen Innov Information Technology Co., LTD
Manufacturer	:	Xiamen Innov Information Technology Co., LTD
EUT Description	:	READER

(A) MODEL NO.: IVF-RU01

(B) SERIAL NO.: N/A

(C) POWER SUPPLY: DC 3.7V or DC 5V

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.247
ANSI C63.4- 2009

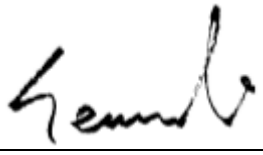
The device described above is tested by ACCURATE TECHNOLOGY CO. LTD to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C Section 15.247 limits. The measurement results are contained in this test report and ACCURATE TECHNOLOGY CO. LTD is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of ACCURATE TECHNOLOGY CO. LTD.

Date of Test : Dec 17-24, 2013

Prepared by : 

(Engineer)

Approved & Authorized Signer : 

(Manager)

1. GENERAL INFORMATION

1.1.Description of Device (EUT)

EUT	:	READER
Model Number	:	IVF-RU01
Frequency Band	:	902.75MHz-927.25MHz
Number of Channels	:	50
Modulation type	:	ASK
Antenna Gain	:	-2.0dBi
Antenna type	:	Integral Antenna
Power Supply	:	DC 3.7V(Battery)&DC 5V(USB)
Applicant	:	Xiamen Innov Information Technology Co., LTD
Address	:	Qiangye building 705 room, Xiangan District of Xiamen City, Fujian province, China
Manufacturer	:	Xiamen Innov Information Technology Co., LTD
Address	:	Qiangye building 705 room, Xiangan District of Xiamen City, Fujian province, China
Date of sample received	:	Jan 03, 2014
Date of Test	:	Jan 03-17, 2014

1.2.Description of Test Facility

EMC Lab	:	Accredited by TUV Rheinland Shenzhen Listed by FCC The Registration Number is 752051 Listed by Industry Canada The Registration Number is 5077A-2 Accredited by China National Accreditation Committee for Laboratories The Certificate Registration Number is L3193
Name of Firm	:	ACCURATE TECHNOLOGY CO. LTD
Site Location	:	F1, Bldg. A, Changyuan New Material Port, Keyuan Rd. Science & Industry Park, Nanshan, Shenzhen, Guangdong P.R. China

1.3.Measurement Uncertainty

Conducted Emission Expanded Uncertainty	=	2.23dB, k=2
Radiated emission expanded uncertainty (9kHz-30MHz)	=	3.08dB, k=2
Radiated emission expanded uncertainty (30MHz-1000MHz)	=	4.42dB, k=2
Radiated emission expanded uncertainty (Above 1GHz)	=	4.06dB, k=2

2. MEASURING DEVICE AND TEST EQUIPMENT

Table 1: List of Test and Measurement Equipment

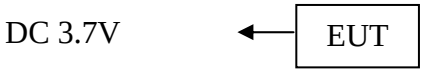
Kind of equipment	Manufacturer	Type	S/N	Calibrated dates	Calibrated until
EMI Test Receiver	Rohde&Schwarz	ESCS30	100307	Jan. 11, 2014	Jan. 10, 2015
EMI Test Receiver	Rohde&Schwarz	ESPI3	101526/003	Jan. 11, 2014	Jan. 10, 2015
Spectrum Analyzer	Agilent	E7405A	MY45115511	Jan. 11, 2014	Jan. 10, 2015
Pre-Amplifier	Rohde&Schwarz	CBLU1183540-01	3791	Jan. 11, 2014	Jan. 10, 2015
Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan. 15, 2014	Jan. 14, 2015
Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan. 15, 2014	Jan. 14, 2015
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Jan. 15, 2014	Jan. 14, 2015
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1067	Jan. 15, 2014	Jan. 14, 2015
LISN	Rohde&Schwarz	ESH3-Z5	100305	Jan. 11, 2014	Jan. 10, 2015
LISN	Schwarzbeck	NSLK8126	8126431	Jan. 11, 2014	Jan. 10, 2015

3. OPERATION OF EUT DURING TESTING

3.1.Operating Mode

The mode is used: Transmitting mode
Low Channel: 902.75MHz
Middle Channel: 915.25MHz
High Channel: 927.25MHz
Hopping

3.2.Configuration and peripherals



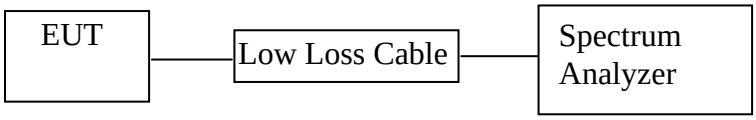
(EUT: READER)

4. TEST PROCEDURES AND RESULTS

FCC Rules	**Description of Test**	**Result**
Section 15.207	Conducted Emission Test	Compliant
Section 15.247(a)(1)(i)	20dB Bandwidth Test	Compliant
Section 15.247(a)(1)	Carrier Frequency Separation Test	Compliant
Section 15.247(b)(2)	Number Of Hopping Frequency Test	Compliant
Section 15.247(a)(1)(i)	Dwell Time Test	Compliant
Section 15.247(b)(2)	Maximum Peak Output Power Test	Compliant
Section 15.247(d) Section 15.209	Radiated Emission Test	Compliant
Section 15.247(d)	Band Edge Compliance Test	Compliant
Section 15.203	Antenna Requirement	Compliant

5. 20DB BANDWIDTH TEST

5.1.Block Diagram of Test Setup



(EUT: READER)

5.2.The Requirement For Section 15.247(a)(1)(i)

Section 15.247(a)(1)(i): For frequency hopping systems op-erating in the 902–928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period.

5.3.EUT Configuration on Measurement

The equipment are installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

5.4.Operating Condition of EUT

5.4.1.Setup the EUT and simulator as shown as Section 5.1.

5.4.2.Turn on the power of all equipment.

5.4.3.Let the EUT work in TX (Hopping off) modes measure it. The transmit frequency are 902.75-927.25MHz. We select 902.75MHz, 915.25MHz, and 927.25MHz TX frequency to transmit.

5.5. Test Procedure

5.5.1. The transmitter output was connected to the spectrum analyzer through a low loss cable.

5.5.2. Set RBW of spectrum analyzer to 30 kHz and VBW to 100 kHz.

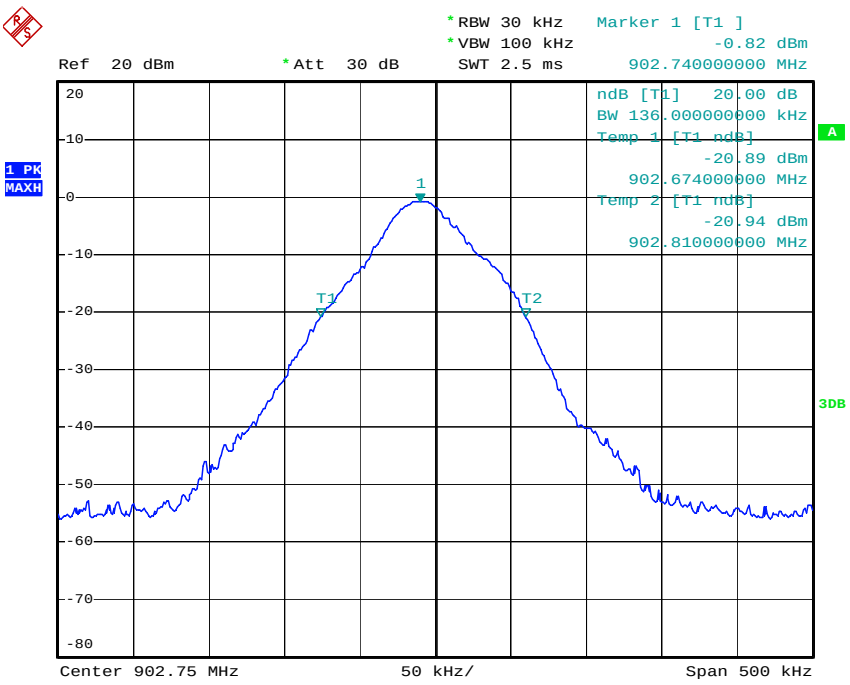
5.5.3. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

5.6. Test Result

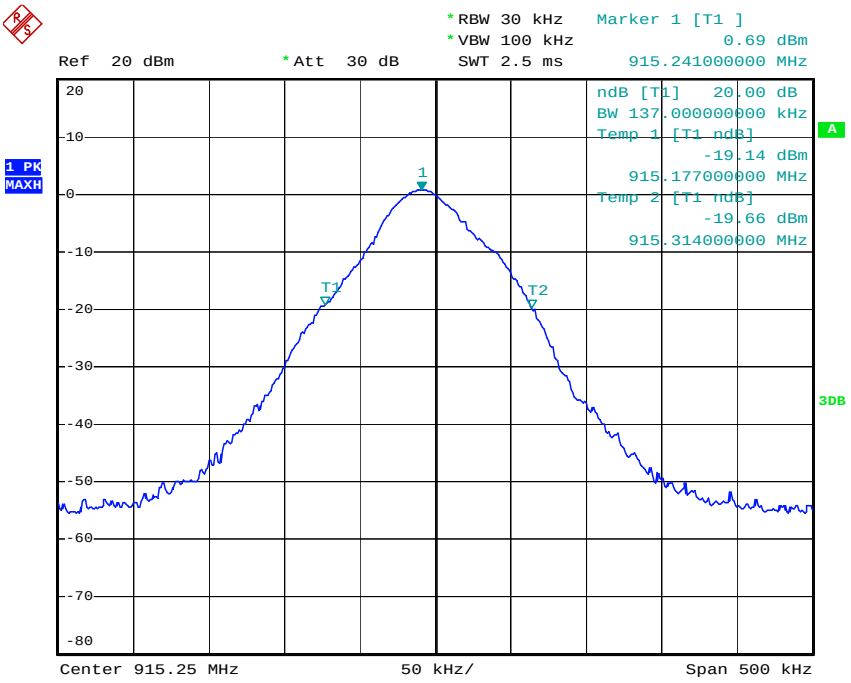
Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Limit (MHz)	Result
Low	902.75	0.136	0.250	Pass
Middle	915.25	0.137	0.250	Pass
High	927.25	0.138	0.250	Pass

The spectrum analyzer plots are attached as below.

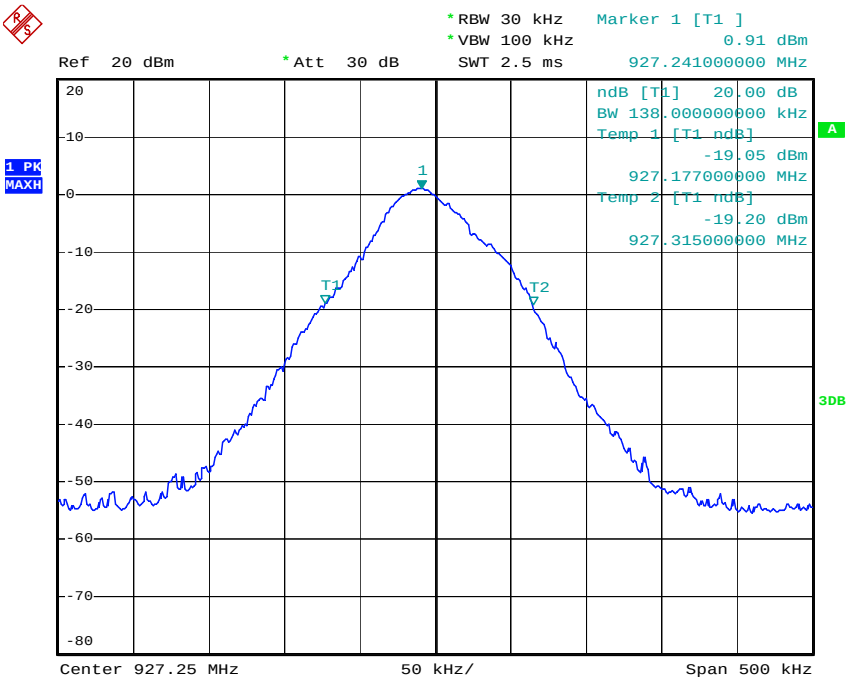
Low channel



Middle channel

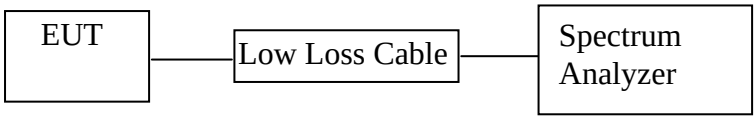


High channel



6. CARRIER FREQUENCY SEPARATION TEST

6.1.Block Diagram of Test Setup



(EUT: READER)

6.2.The Requirement For Section 15.247(a)(1)

Section 15.247(a)(1): 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. Alternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

6.3.EUT Configuration on Measurement

The equipment are installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

6.4.Operating Condition of EUT

6.4.1.Setup the EUT and simulator as shown as Section 6.1.

6.4.2.Turn on the power of all equipment.

6.4.3.Let the EUT work in TX (Hopping on) modes measure it. The transmit frequency are 902.75-927.25MHz. We select 902.75MHz, 915.25MHz, and 927.25MHz TX frequency to transmit.

6.5.Test Procedure

6.5.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.

6.5.2.Set RBW of spectrum analyzer to 30 kHz and VBW to 100 kHz. Adjust Span to 2 MHz.

6.5.3.Set the adjacent channel of the EUT maxhold another trace.

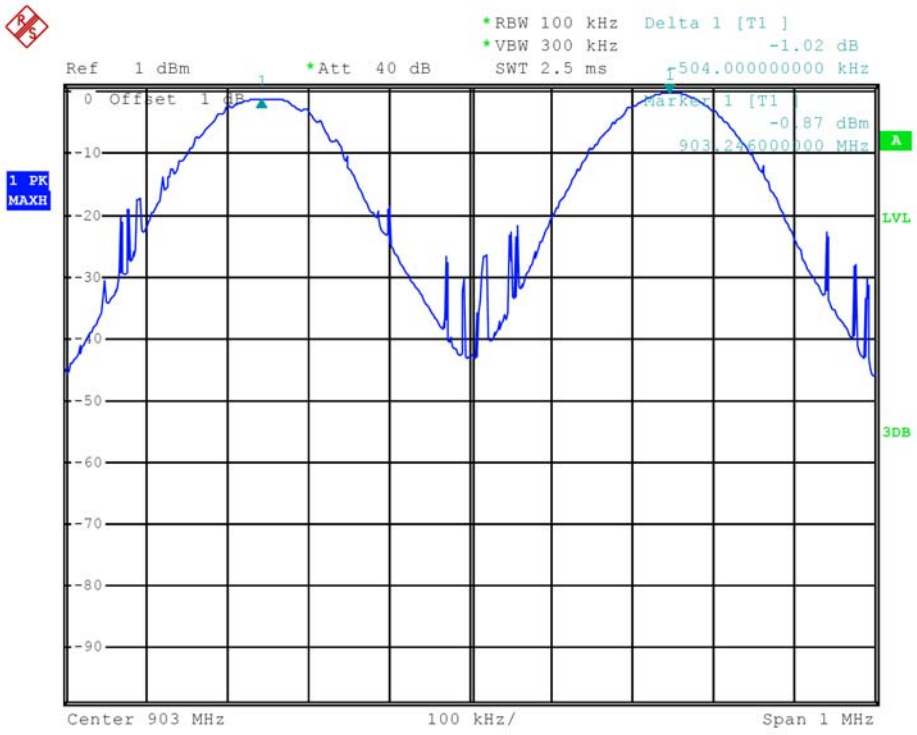
6.5.4.Measurement the channel separation

6.6.Test Result

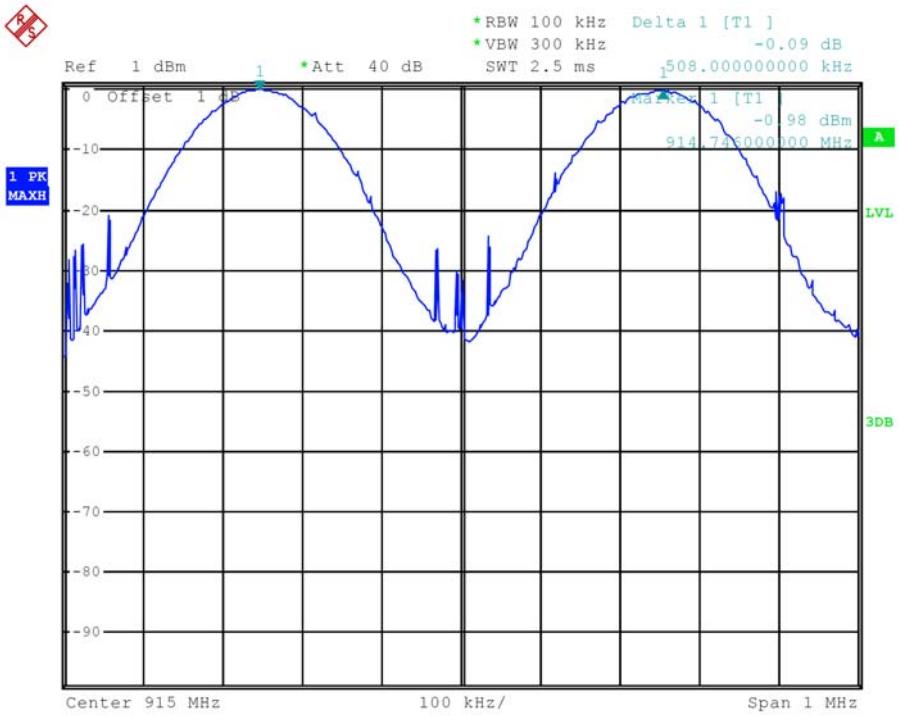
Channel	Frequency (MHz)	Channel Separation(MHz)	Limit (MHz)	Result
Low	902.75	0.504	25KHz or 20dB bandwidth	PASS
	903.25			
Middle	914.75	0.508	25KHz or 20dB bandwidth	PASS
	915.25			
High	927.25	0.508	25KHz or 20dB bandwidth	PASS
	926.75			

The spectrum analyzer plots are attached as below.

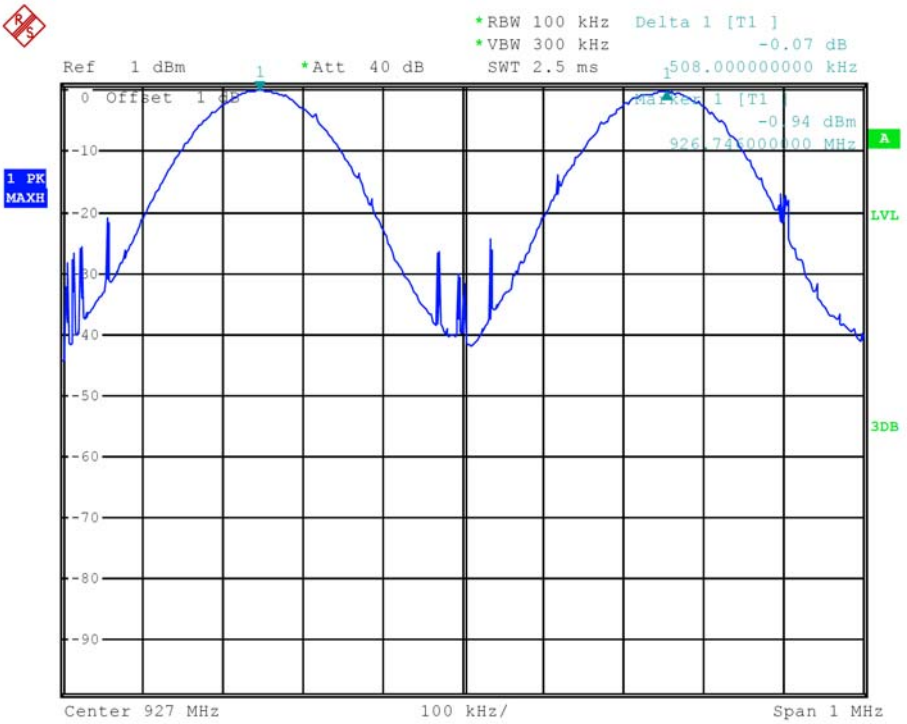
Low channel



Middle channel

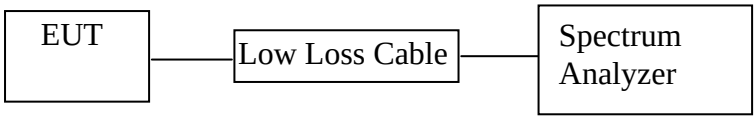


High channel



7. NUMBER OF HOPPING FREQUENCY TEST

7.1.Block Diagram of Test Setup



(EUT: READER)

7.2.The Requirement For Section 15.247(b)(2)

Section 15.247(b)(2): For frequency hopping systems operating in the 902–928 MHz band: 1 watt for systems employing at least 50 hopping channels

7.3.EUT Configuration on Measurement

The equipment are installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

7.4.Operating Condition of EUT

7.4.1.Setup the EUT and simulator as shown as Section 7.1.

7.4.2.Turn on the power of all equipment.

7.4.3.Let the EUT work in TX (Hopping on) modes measure it.

7.5.Test Procedure

7.5.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.

7.5.2.Set the spectrum analyzer as RBW=100 kHz, VBW=300 kHz.

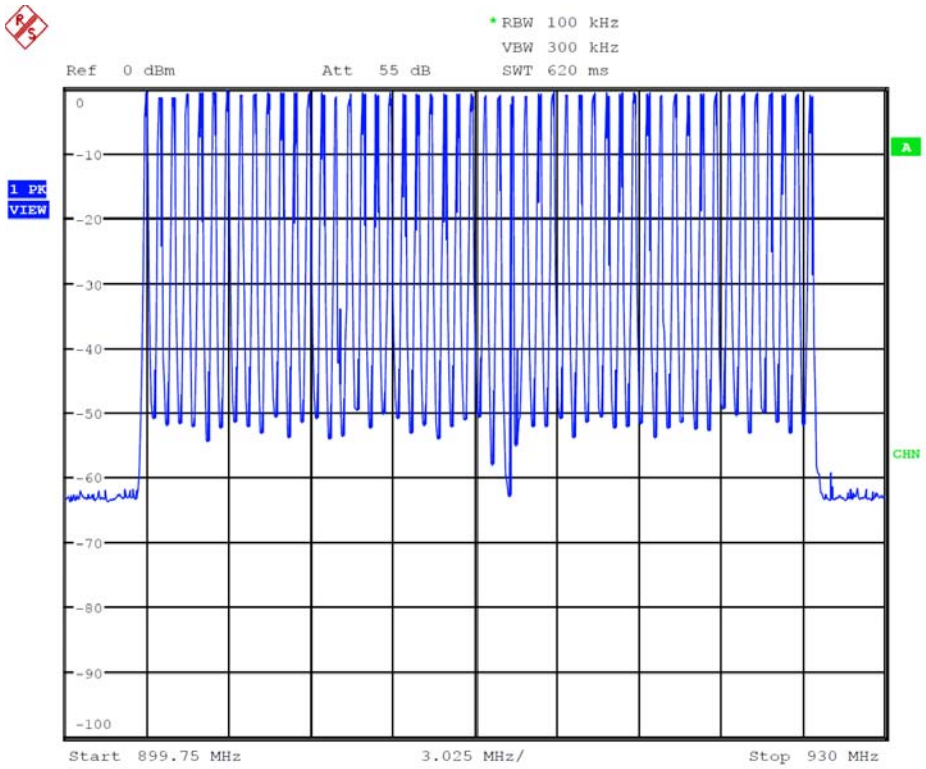
7.5.3.Max hold, view and count how many channel in the band.

7.6.Test Result

Total number of hopping channel	Measurement result(CH)	Limit(CH)
	50	⩾50

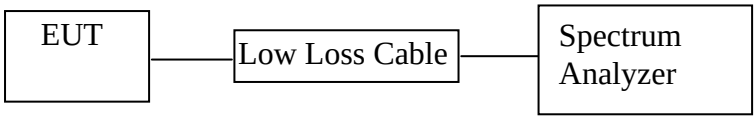
The spectrum analyzer plots are attached as below.

Number of hopping channels



8. DWELL TIME TEST

8.1.Block Diagram of Test Setup



(EUT: READER)

8.2.The Requirement For Section 15.247(a)(1)(i)

Section 15.247(a)(1)(i): For frequency hopping systems op-erating in the 902–928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period.

8.3.EUT Configuration on Measurement

The equipment are installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

8.4.Operating Condition of EUT

8.4.1.Setup the EUT and simulator as shown as Section 8.1.

8.4.2.Turn on the power of all equipment.

8.4.3.Let the EUT work in TX (Hopping on) modes measure it. The transmit frequency are 902.75-927.25MHz. We select 915.25MHz TX frequency to transmit.

8.5.Test Procedure

8.5.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.

8.5.2.Set center frequency of spectrum analyzer = operating frequency.

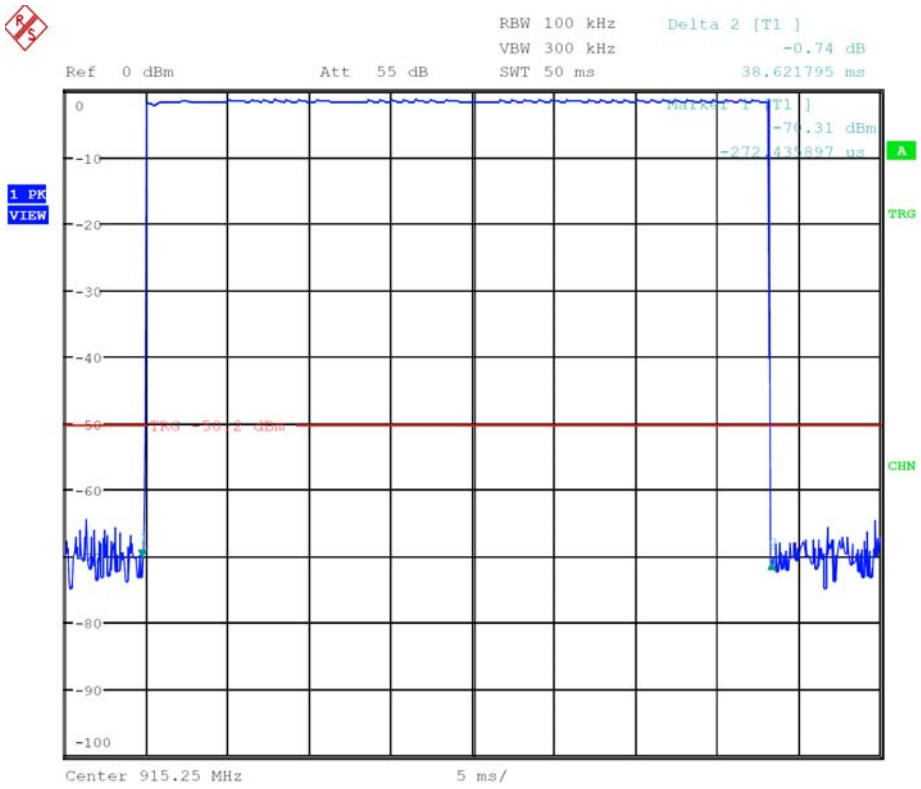
8.5.3.Set the spectrum analyzer as RBW=100kHz, VBW=300kHz, Span=0Hz, Get the pulse time.

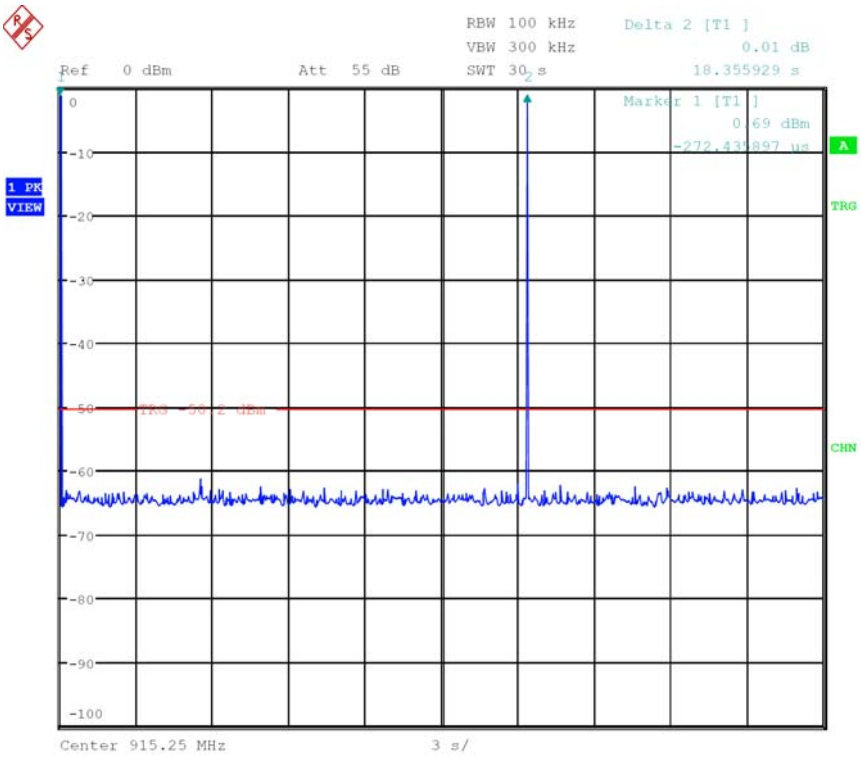
8.5.4.Repeat above procedures until all frequency measured were complete.

8.6.Test Result

Frequecny (MHz)	Pulse Time (ms)	Number of Channels in 20s	Dwell Time (ms)	Limit (ms)
915.25	38.62	2	77.24	400

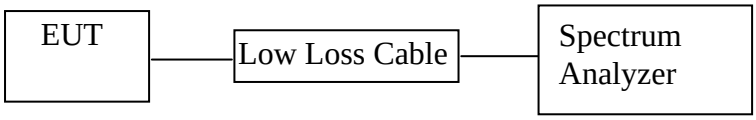
The spectrum analyzer plots are attached as below.




RBW 100 kHz
VBW 300 kHz
SWT 30 s
Delta 2 [T1]
0.01 dB
18.355929 s
Ref 0 dBm
Att 55 dB
Marker 1 [T1]
0.69 dBm
-272.439897 us
1 PK
VIEW
A
TRG
CHN
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
Center 915.25 MHz
3 s/

9. MAXIMUM PEAK OUTPUT POWER TEST

9.1.Block Diagram of Test Setup



(EUT: READER)

9.2.The Requirement For Section 15.247(b)(2)

Section 15.247(b)(2): For frequency hopping systems operating in the 902–928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hop-ping channels, but at least 25 hopping channels, as permitted under para-graph (a)(1)(i) of this section.

9.3.EUT Configuration on Measurement

The equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

9.4.Operating Condition of EUT

9.4.1.Setup the EUT and simulator as shown as Section 9.1.

9.4.2.Turn on the power of all equipment.

9.4.3.Let the EUT work in TX (Hopping off) modes measure it. The transmit frequency are 902.75-927.25MHz. We select 902.75MHz, 915.25MHz, and 927.25MHz TX frequency to transmit.

9.5.Test Procedure

9.5.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.

9.5.2.Set RBW of spectrum analyzer to 1MHz and VBW to 3MHz

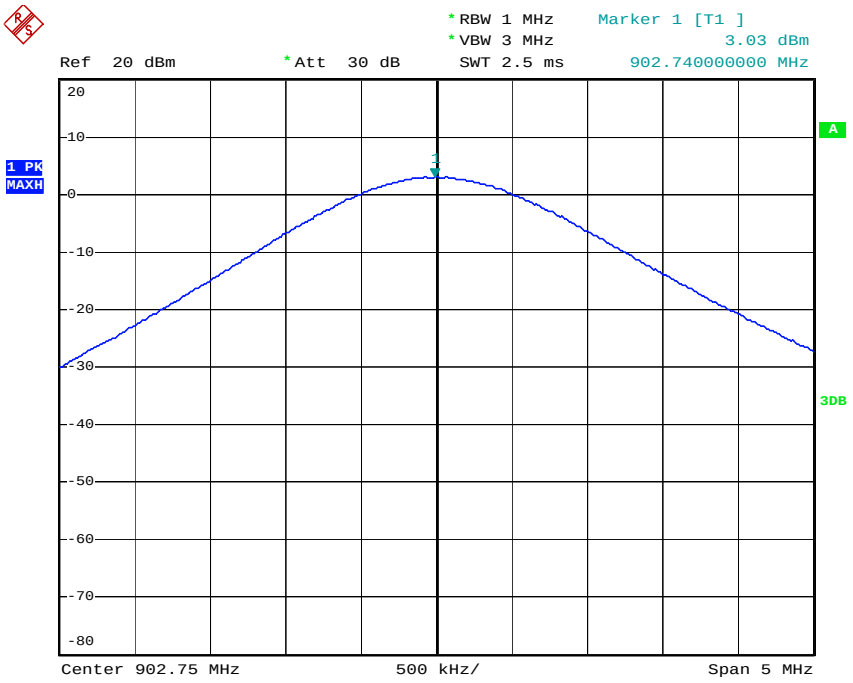
9.5.3.Measurement the maximum peak output power.

9.6.Test Result

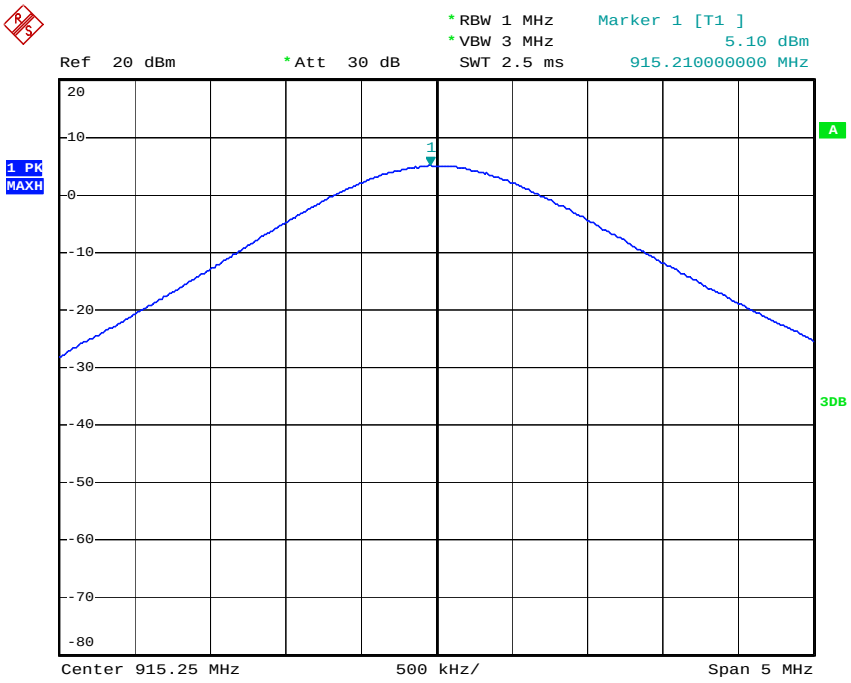
Channel	Frequency (MHz)	Peak Output Power (dBm/mW)	Limits (dBm/W)
Low	902.75	3.03/2.01	30/1.0
Middle	915.25	5.10/3.24	30/1.0
High	927.25	5.41/3.48	30/1.0

The spectrum analyzer plots are attached as below.

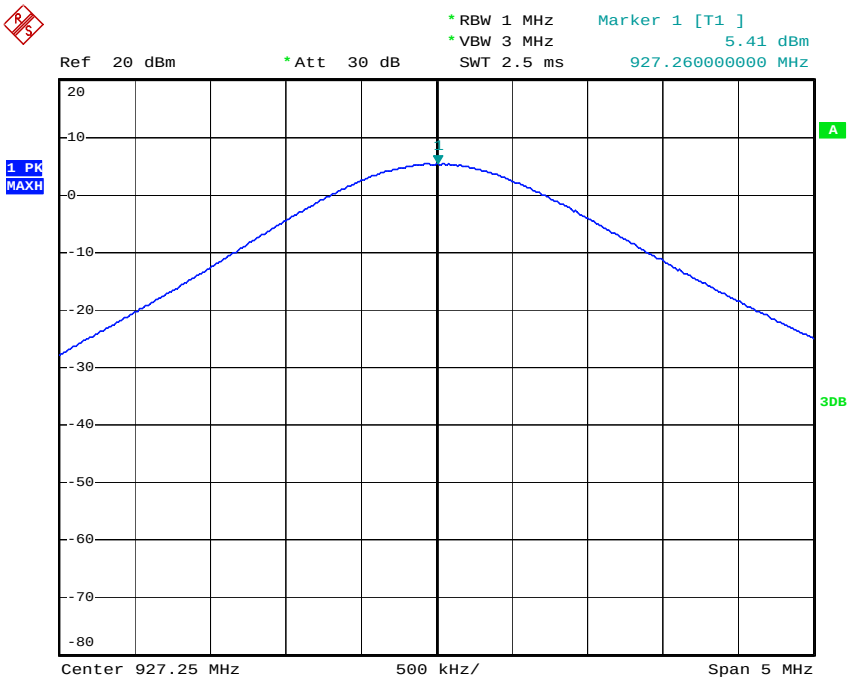
Low channel



Middle channel



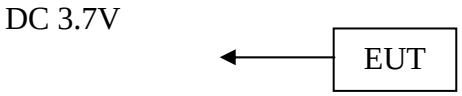
High channel



10.RADIATED EMISSION TEST

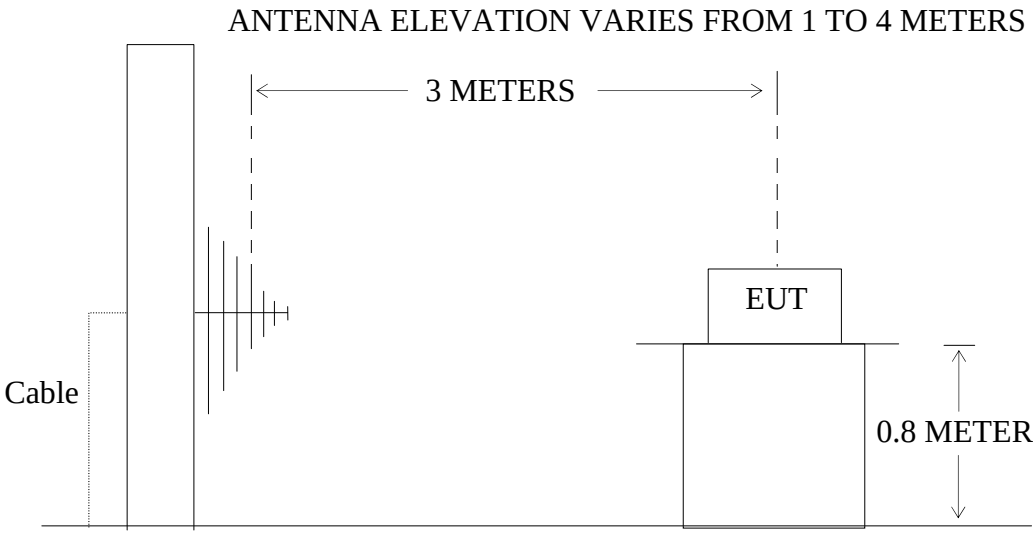
10.1.Block Diagram of Test Setup

10.1.1.Block diagram of connection between the EUT and simulators



(EUT: READER)

10.1.2.Anechoic Chamber Test Setup Diagram



(EUT: READER)

10.2.The Limit For Section 15.247(d)

Section 15.247(d): In any 100 kHz 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 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph 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 the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

10.3.Restricted bands of operation

10.3.1.FCC Part 15.205 Restricted bands of operation

(a) Except as shown in paragraph (d) of this section, Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
[1]0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	([2])
13.36-13.41			

[1]Until February 1, 1999, this restricted band shall be 0.490-0.510
[2]Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emission appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000MHz, Compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000MHz, compliance with the emission limits in Section15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

10.4.Configuration of EUT on Measurement

The equipment are installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

10.5.Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4- 2009 on radiated emission measurement.

The bandwidth of test receiver (R&S ESI26) is set at 120 KHz in 30-1000MHz. and set at 1MHz in above 1000MHz.

The frequency range from 30MHz to 25000MHz is checked.

The final measurement in band 9-90 kHz, 110-490 kHz and above 1000MHz is performed with Average detector. Except those frequency bands mention above, the final measurement for frequencies below 1000MHz is performed with Quasi Peak detector.

The field strength is calculated by adding the antenna factor, and cable loss, and subtracting the amplifier gain from the measured reading. The basic equation calculation is as follows:

Result = Reading + Corrected Factor

Where Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

10.6.The Field Strength of Radiation Emission Measurement Results

Note:

1. The fundamental radiated emissions were reduced by 2.4G Band Reject Filter in the attached plots.

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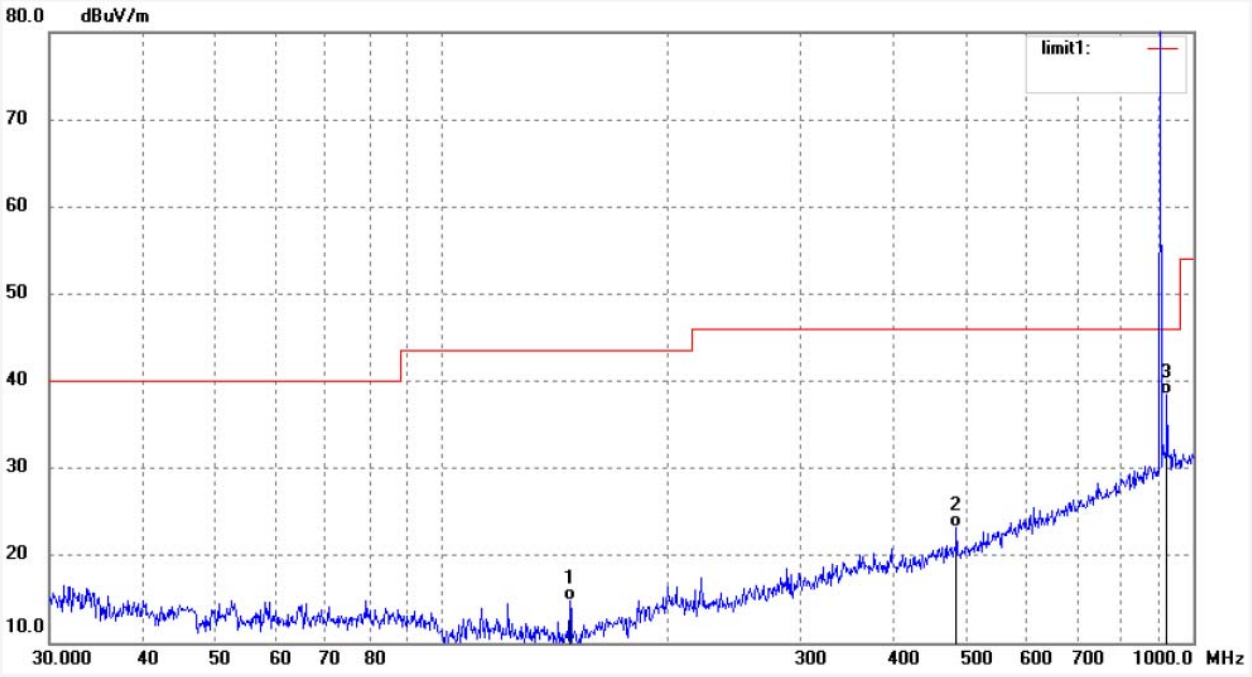
Job No.: RICKY #308	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: DC 3.7V
Test item: Radiation Test	Date: 14/01/13/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 10/59/08
EUT: READER	Engineer Signature: Ricky
Mode: 902.75	Distance: 3m
Model: IVF-RU01	
Manufacturer: Innov	

Note: Report No.:ATE20140010



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	147.9214	38.49	-23.76	14.73	43.50	-28.77	QP			
2	483.9094	37.32	-14.12	23.20	46.00	-22.80	QP			
3	922.5157	44.26	-5.77	38.49	46.00	-7.51	QP			

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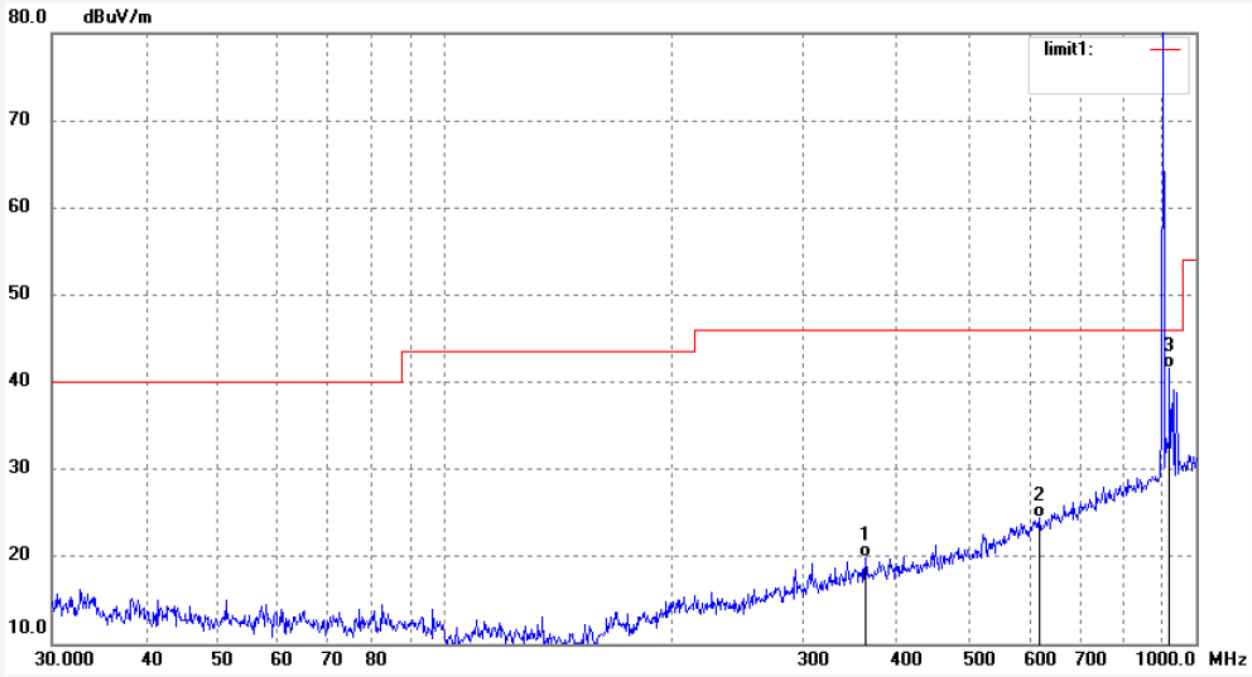
Job No.: RICKY #309	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: DC 3.7V
Test item: Radiation Test	Date: 14/01/13/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 11/01/20
EUT: READER	Engineer Signature: Ricky
Mode: 902.75	Distance: 3m
Model: IVF-RU01	
Manufacturer: Innov	

Note: Report No.:ATE20140010



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	362.9844	35.75	-15.89	19.86	46.00	-26.14	QP			
2	618.5369	35.63	-11.28	24.35	46.00	-21.65	QP			
3	922.5157	47.32	-5.77	41.55	46.00	-4.45	QP			

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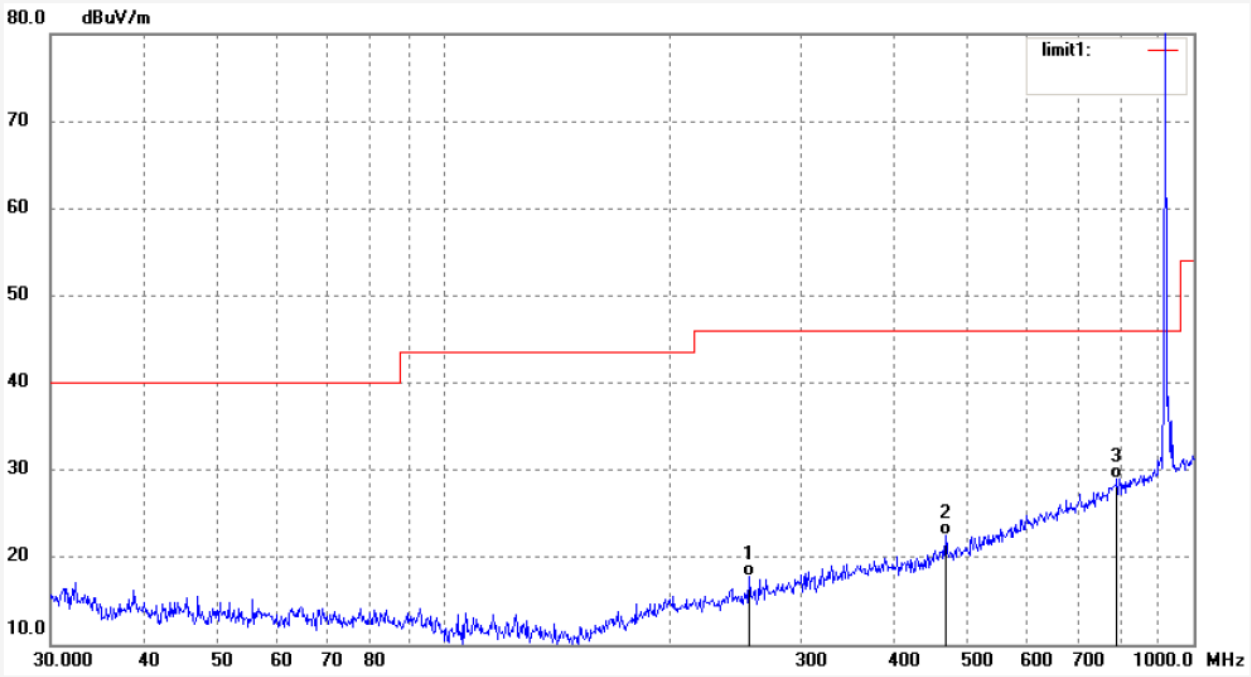
Job No.: RICKY #310	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: DC 3.7V
Test item: Radiation Test	Date: 14/01/13/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 11/06/23
EUT: READER	Engineer Signature: Ricky
Mode: 915.25	Distance: 3m
Model: IVF-RU01	
Manufacturer: Innov	

Note: Report No.:ATE20140010



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	255.6231	37.22	-19.41	17.81	46.00	-28.19	QP			
2	467.2349	36.87	-14.30	22.57	46.00	-23.43	QP			
3	790.6188	36.94	-7.92	29.02	46.00	-16.98	QP			

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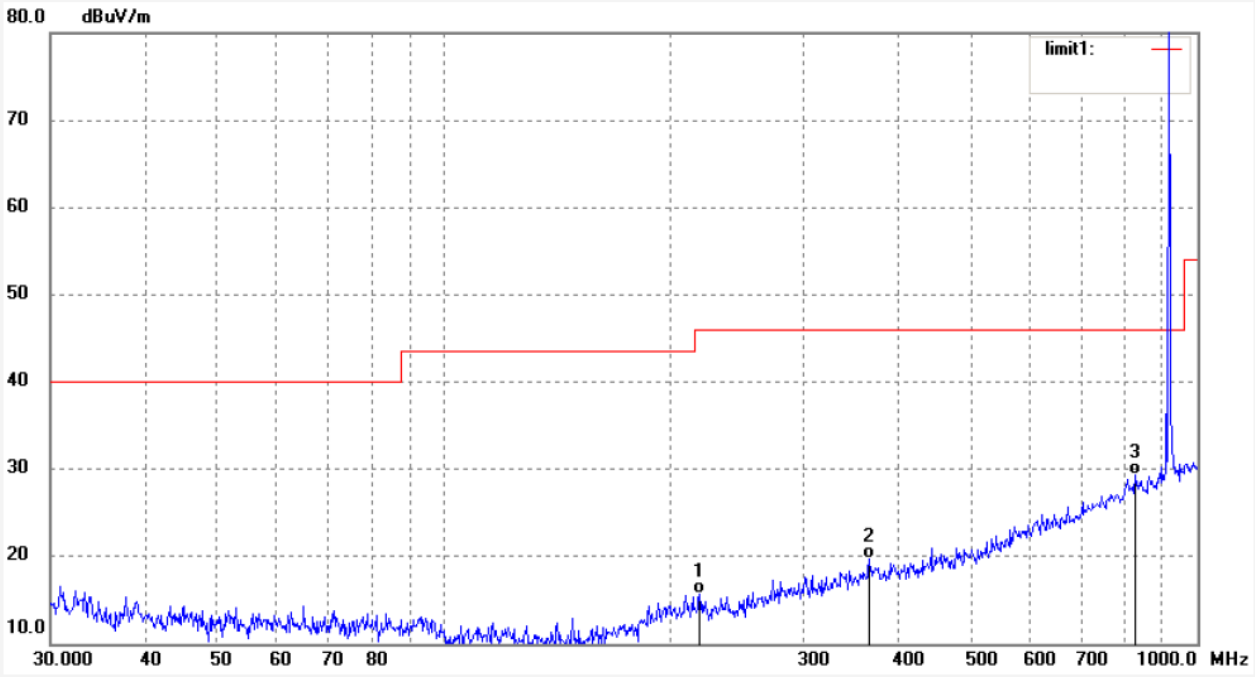
Job No.: RICKY #312	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: DC 3.7V
Test item: Radiation Test	Date: 14/01/13/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 11/09/16
EUT: READER	Engineer Signature: Ricky
Mode: 915.25	Distance: 3m
Model: IVF-RU01	
Manufacturer: Innov	

Note: Report No.:ATE20140010



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	218.3085	35.63	-19.95	15.68	46.00	-30.32	QP			
2	366.8231	35.64	-15.87	19.77	46.00	-26.23	QP			
3	827.4934	36.65	-7.32	29.33	46.00	-16.67	QP			

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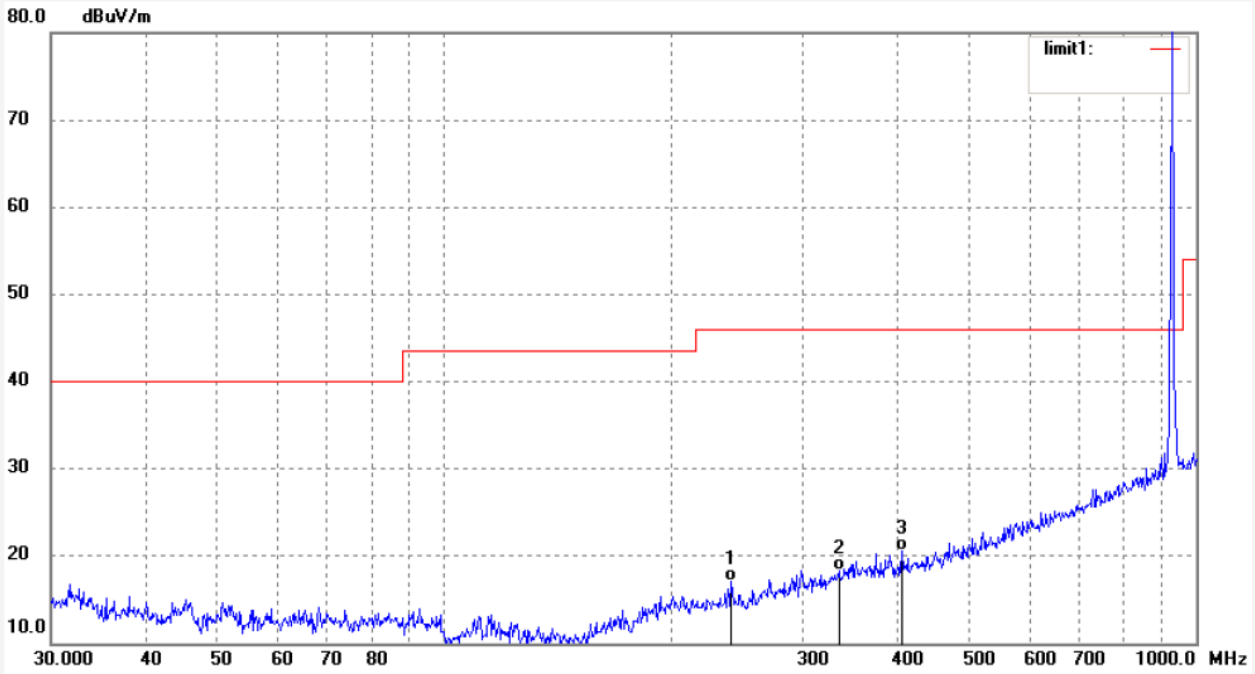
Job No.: RICKY #313
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: READER
Mode: 927.25
Model: IVF-RU01
Manufacturer: Innov

Polarization: Horizontal
Power Source: DC 3.7V
Date: 14/01/13/
Time: 11/12/00
Engineer Signature: Ricky
Distance: 3m

Note: Report No.:ATE20140010



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	240.8304	36.97	-19.80	17.17	46.00	-28.83	QP			
2	334.8589	35.05	-16.74	18.31	46.00	-27.69	QP			
3	406.0880	36.18	-15.54	20.64	46.00	-25.36	QP			

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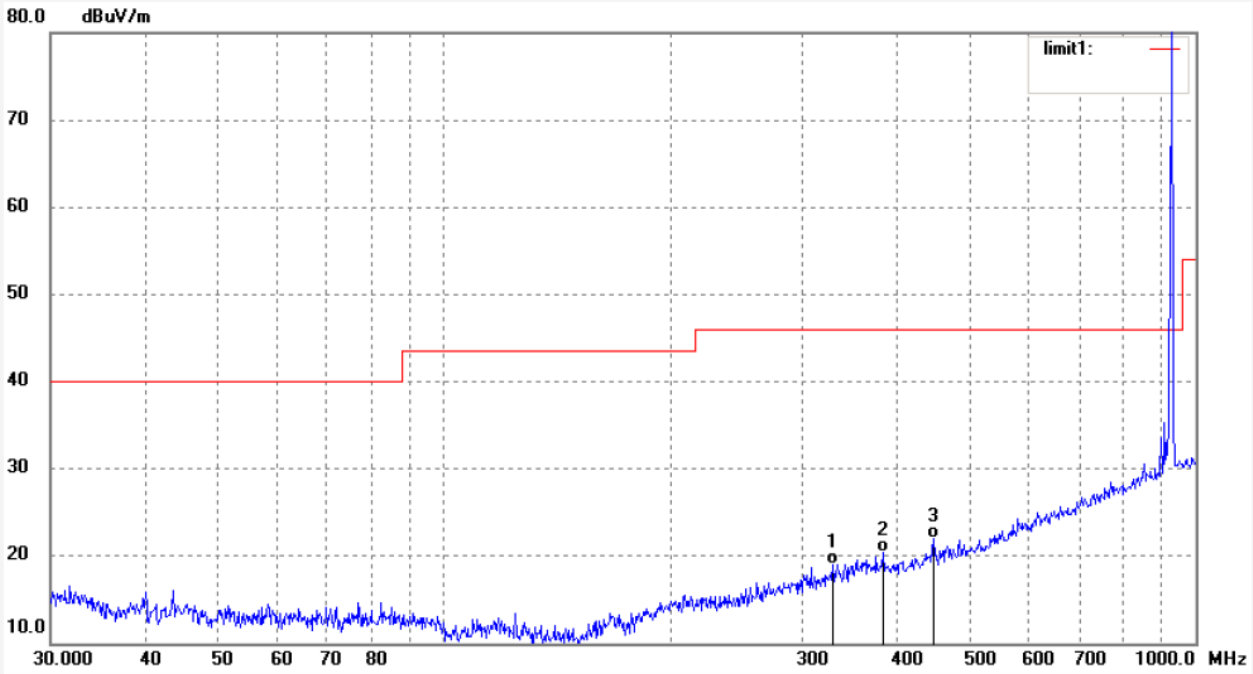
Job No.: RICKY #314
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: READER
Mode: 927.25
Model: IVF-RU01
Manufacturer: Innov

Polarization: Vertical
Power Source: DC 3.7V
Date: 14/01/13/
Time: 11/13/32
Engineer Signature: Ricky
Distance: 3m

Note: Report No.:ATE20140010



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	329.0390	36.12	-17.03	19.09	46.00	-26.91	QP			
2	383.9318	36.18	-15.76	20.42	46.00	-25.58	QP			
3	447.9822	36.77	-14.72	22.05	46.00	-23.95	QP			

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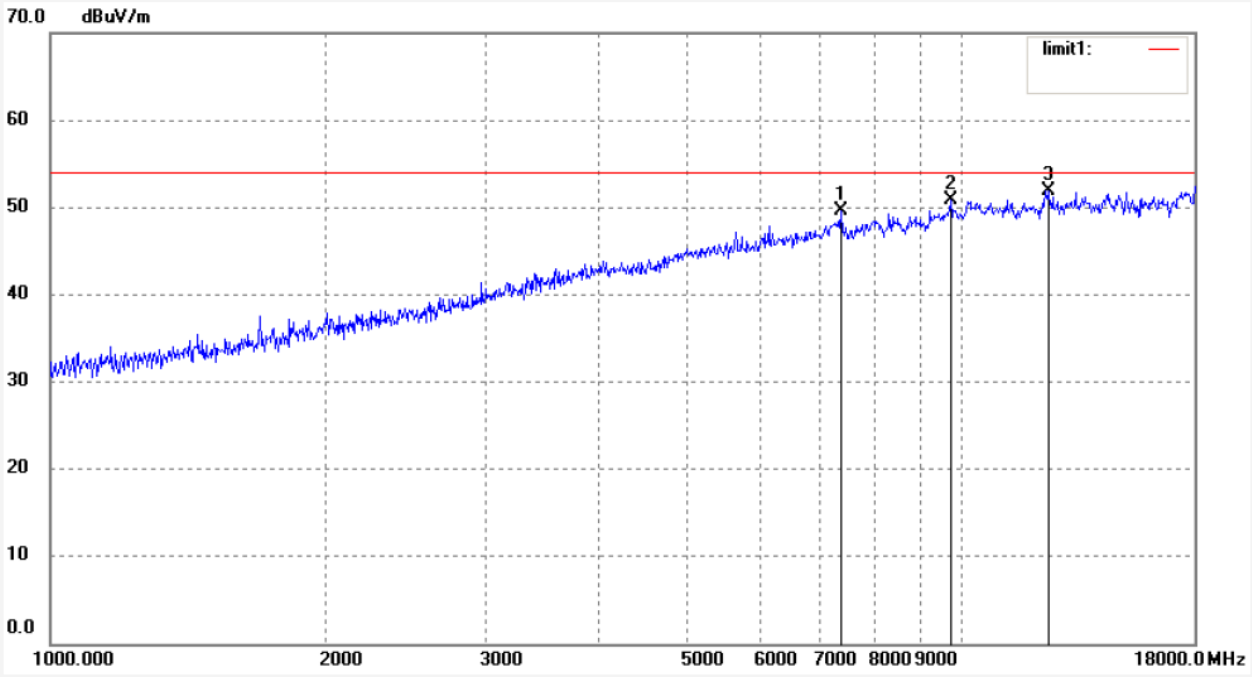
Job No.: RICKY #320	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: DC 3.7V
Test item: Radiation Test	Date: 14/01/13/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 11/24/16
EUT: READER	Engineer Signature: Ricky
Mode: 902.75	Distance: 3m
Model: IVF-RU01	
Manufacturer: Innov	

Note: Report No.:ATE20140010



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	7368.741	48.17	1.44	49.61	54.00	-4.39	peak			
2	9725.221	45.86	5.03	50.89	54.00	-3.11	peak			
3	12433.621	44.88	7.06	51.94	54.00	-2.06	peak			

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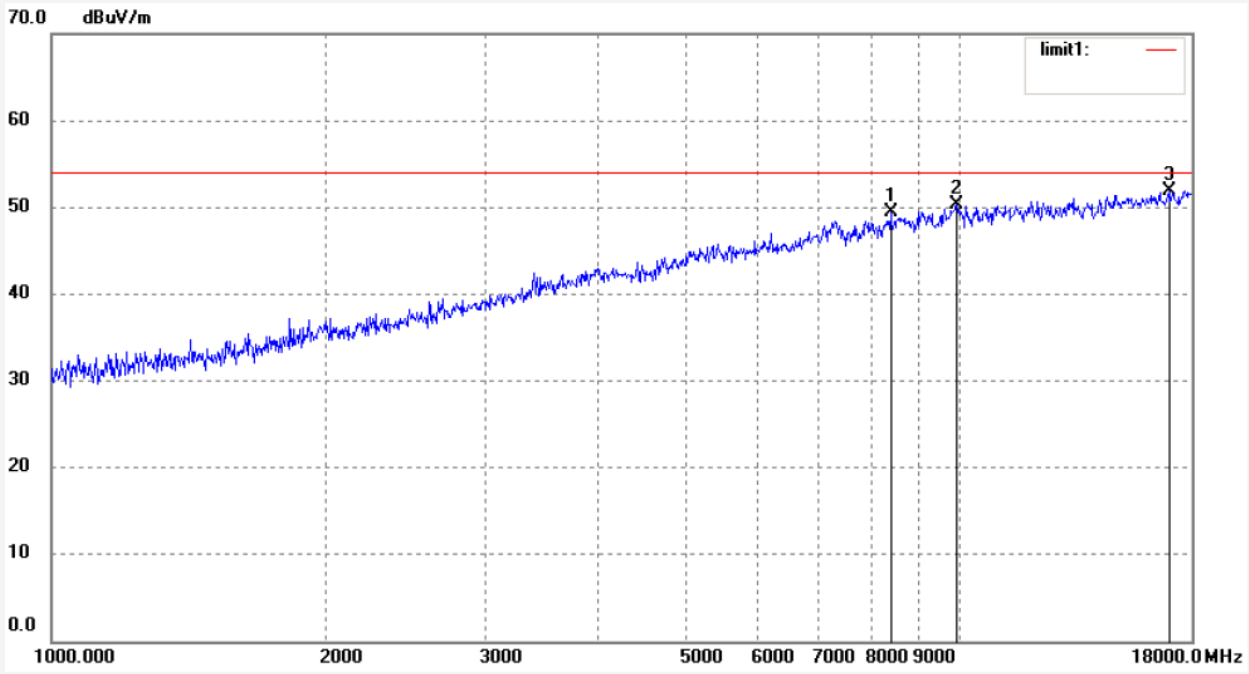
Job No.: RICKY #319
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: READER
Mode: 902.75
Model: IVF-RU01
Manufacturer: Innov

Polarization: Vertical
Power Source: DC 3.7V
Date: 14/01/13/
Time: 11/22/51
Engineer Signature: Ricky
Distance: 3m

Note: Report No.:ATE20140010



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	8392.292	46.61	2.81	49.42	54.00	-4.58	peak			
2	9923.991	44.99	5.24	50.23	54.00	-3.77	peak			
3	16988.970	38.17	13.77	51.94	54.00	-2.06	peak			

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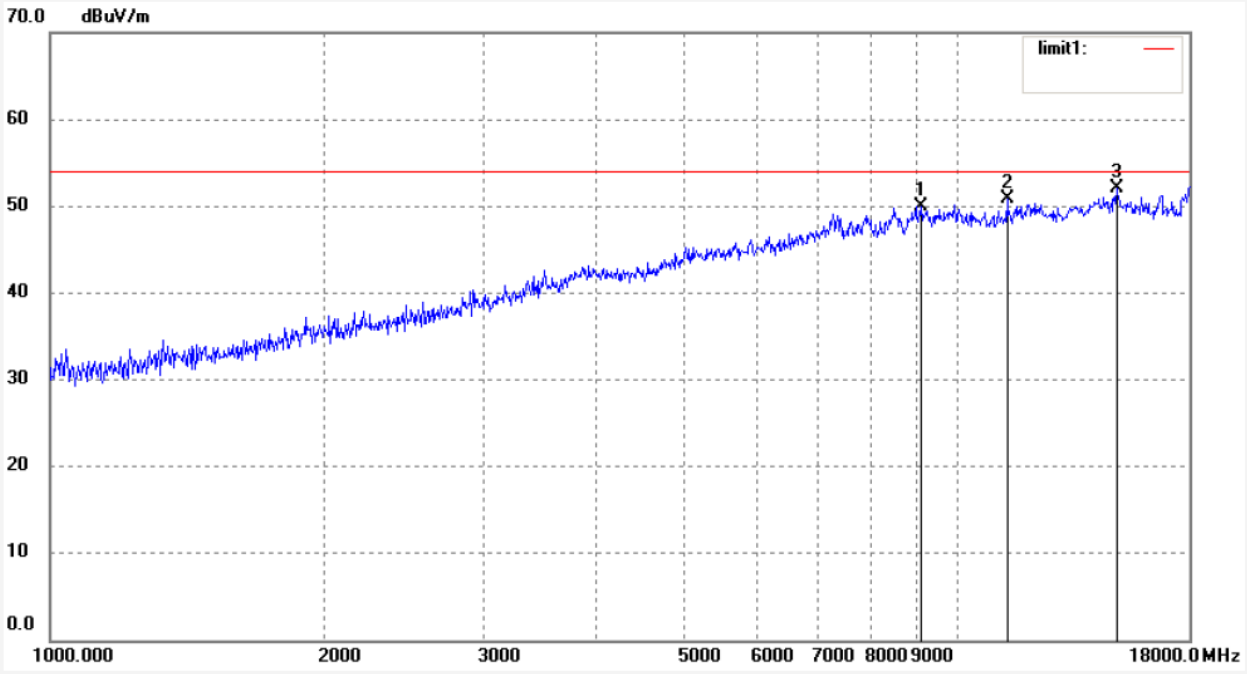
Job No.: RICKY #318	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: DC 3.7V
Test item: Radiation Test	Date: 14/01/13/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 11/21/52
EUT: READER	Engineer Signature: Ricky
Mode: 915.25	Distance: 3m
Model: IVF-RU01	
Manufacturer: Innov	

Note: Report No.:ATE20140010



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	9126.063	46.22	3.81	50.03	54.00	-3.97	peak			
2	11335.193	44.98	5.86	50.84	54.00	-3.16	peak			
3	14960.120	40.00	11.98	51.98	54.00	-2.02	peak			

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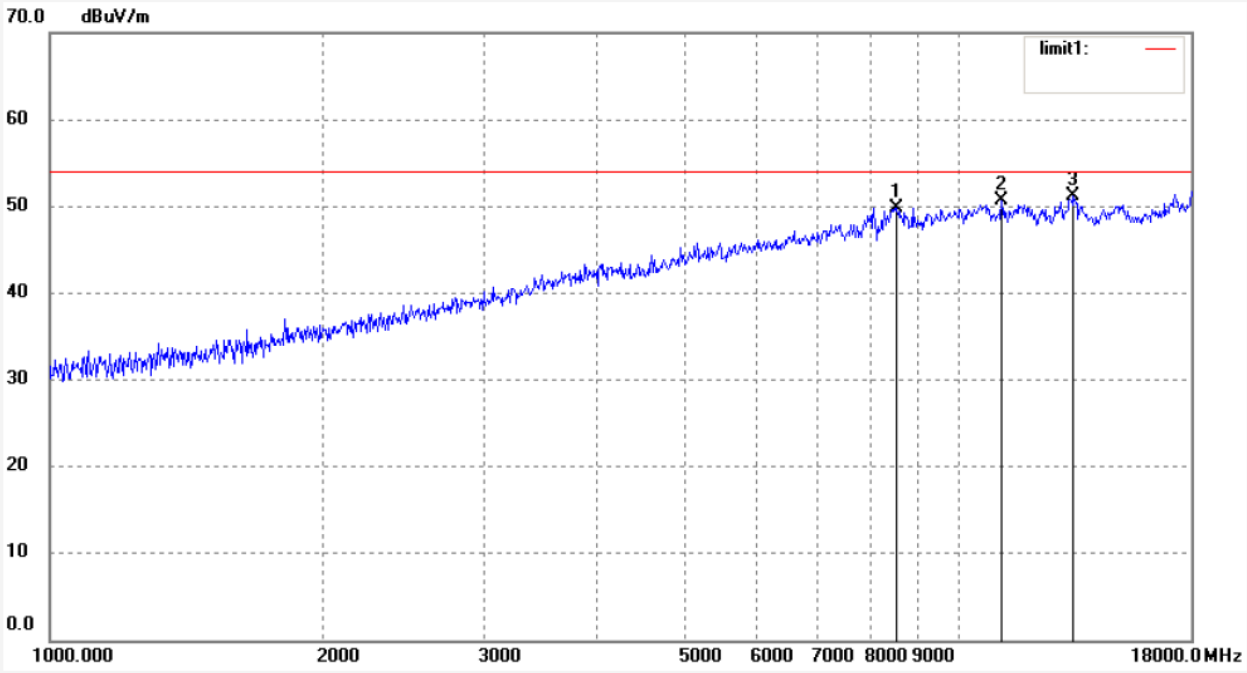
Job No.: RICKY #317	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: DC 3.7V
Test item: Radiation Test	Date: 14/01/13/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 11/20/50
EUT: READER	Engineer Signature: Ricky
Mode: 915.25	Distance: 3m
Model: IVF-RU01	
Manufacturer: Innov	

Note: Report No.:ATE20140010



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	8539.102	46.83	3.04	49.87	54.00	-4.13	peak			
2	11140.310	44.95	5.65	50.60	54.00	-3.40	peak			
3	13365.322	42.46	8.74	51.20	54.00	-2.80	peak			

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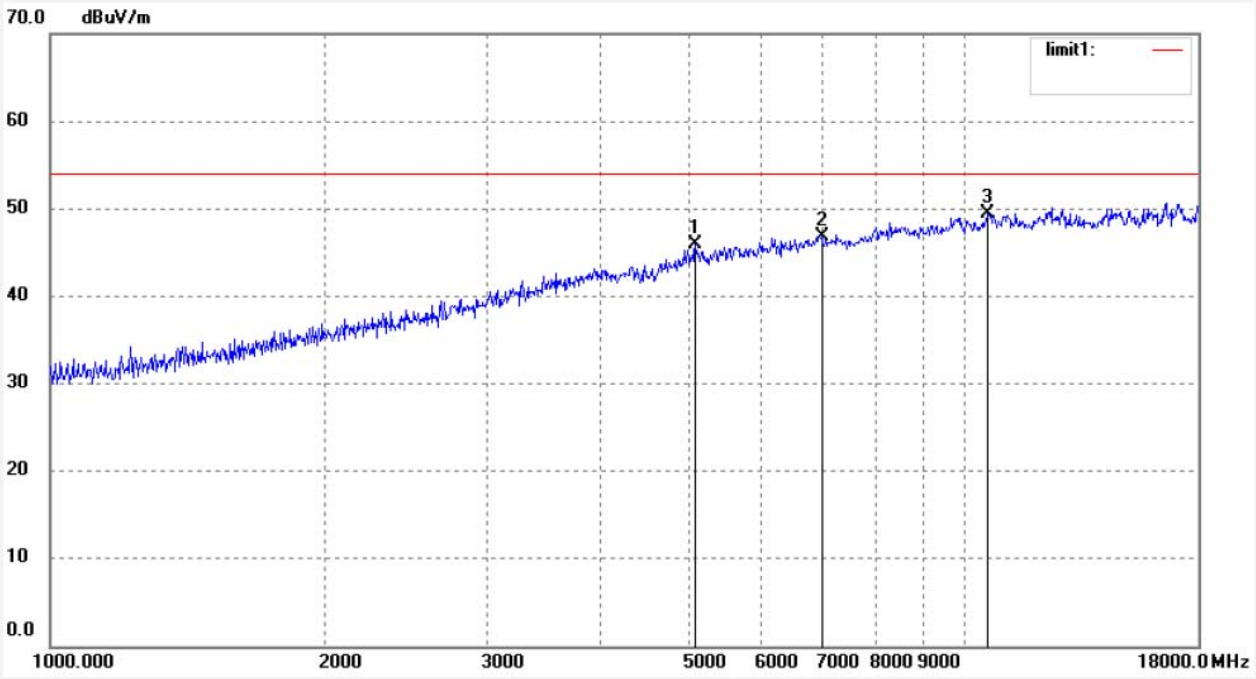
Job No.: RICKY #316
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: READER
Mode: 927.25
Model: IVF-RU01
Manufacturer: Innov

Polarization: Horizontal
Power Source: DC 3.7V
Date: 14/01/13/
Time: 11/19/09
Engineer Signature: Ricky
Distance: 3m

Note: Report No.:ATE20140010



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	5075.317	46.83	-0.93	45.90	54.00	-8.10	peak			
2	6974.983	45.73	1.07	46.80	54.00	-7.20	peak			
3	10606.147	44.20	5.26	49.46	54.00	-4.54	peak			

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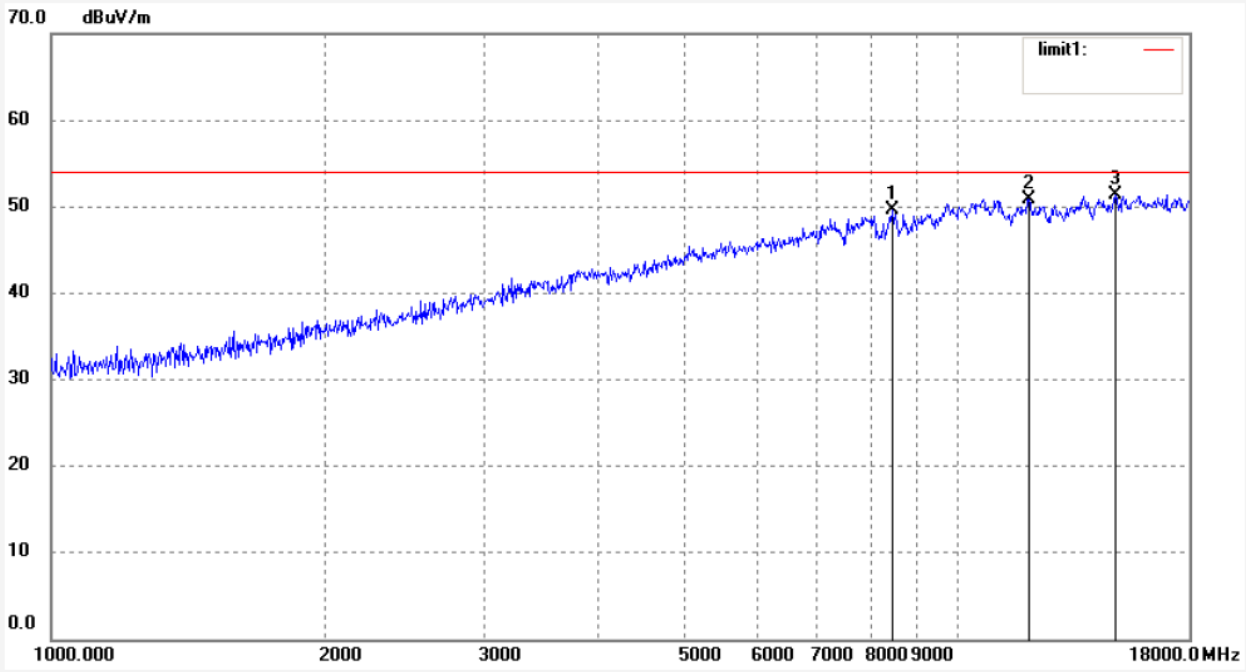
Job No.: RICKY #315
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: READER
Mode: 927.25
Model: IVF-RU01
Manufacturer: Innov

Polarization: Vertical
Power Source: DC 3.7V
Date: 14/01/13/
Time: 11/17/50
Engineer Signature: Ricky
Distance: 3m

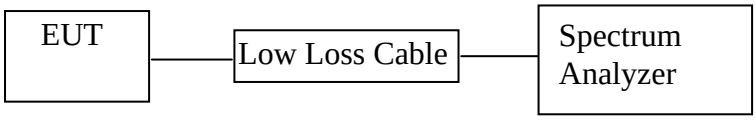
Note: Report No.:ATE20140010



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	8465.379	46.61	2.94	49.55	54.00	-4.45	peak			
2	11975.098	44.35	6.47	50.82	54.00	-3.18	peak			
3	14916.942	39.36	12.07	51.43	54.00	-2.57	peak			

11.BAND EDGE COMPLIANCE TEST

11.1.Block Diagram of Test Setup



(EUT: READER)

11.2.The Requirement For Section 15.247(d)

Section 15.247(d): In any 100 kHz 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 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph 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 the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

11.3.EUT Configuration on Measurement

The equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

11.4.Operating Condition of EUT

11.4.1.Setup the EUT and simulator as shown as Section 11.1.

11.4.2.Turn on the power of all equipment.

11.4.3.Let the EUT work in TX modes measure it. The transmit frequency are 902.75-927.25MHz. We select 902.75MHz, 927.25MHz TX frequency to transmit.

11.5.Test Procedure

11.5.1.The transmitter output was connected to the spectrum analyzer via a low loss cable.

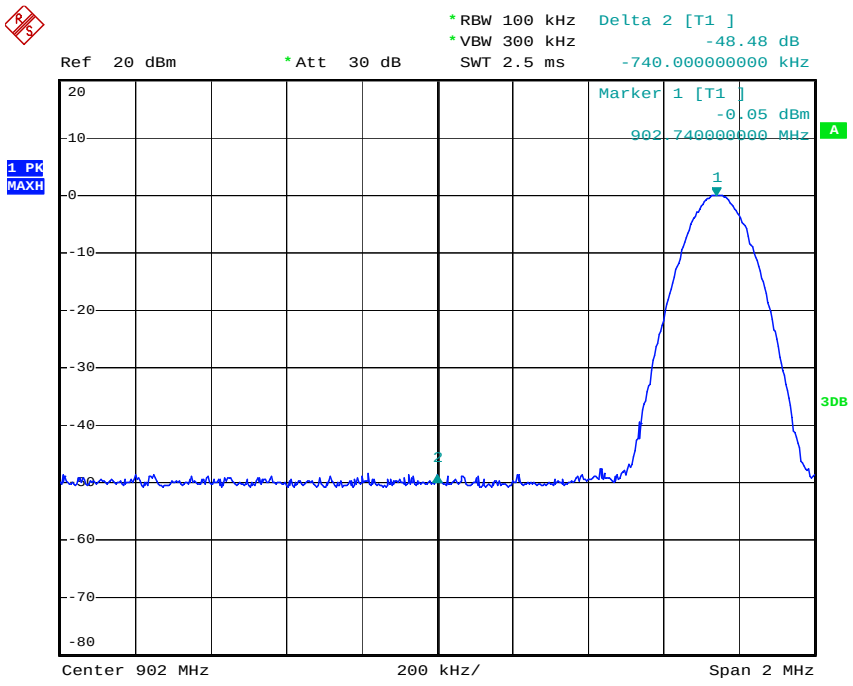
11.5.2.Set RBW of spectrum analyzer to 100 kHz and VBW to 300 kHz with convenient frequency span including 100 kHz bandwidth from band edge.

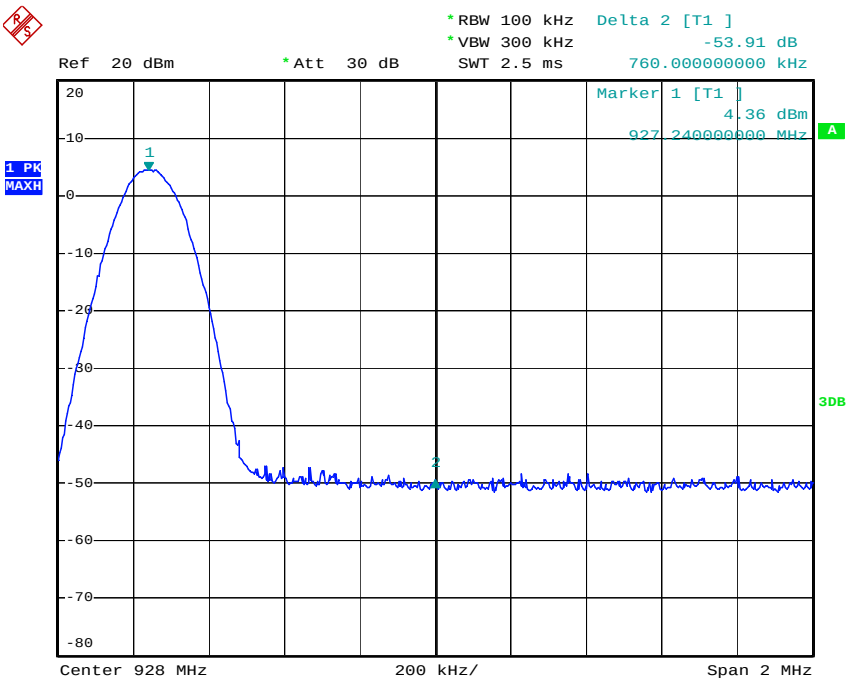
11.5.3.The band edges was measured and recorded.

11.6.Test Result

Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
902.75	48.48	> 20dBc
927.25	53.91	> 20dBc

The spectrum analyzer plots are attached as below.




RBW 100 kHz
VBW 300 kHz
SWT 2.5 ms
Delta 2 [T1]
-53.91 dB
760.000000000 kHz
Ref 20 dBm
Att 30 dB
Marker 1 [T1]
4.36 dBm
927.240000000 MHz
1 PK
MAXH
A
3DB
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 928 MHz
200 kHz/
Span 2 MHz

Radiated Band Edge Result

Note:

1. Emissions attenuated more than 20 dB below the permissible value are not reported.
2. The field strength is calculated by adding the antenna factor, high pass filter loss(if used) and cable loss, and subtracting the amplifier gain(if any)from the measured reading. The basic equation calculation is as follows:

   Result = Reading + Corrected Factor
3. Display the measurement of peak values.

Non-hopping

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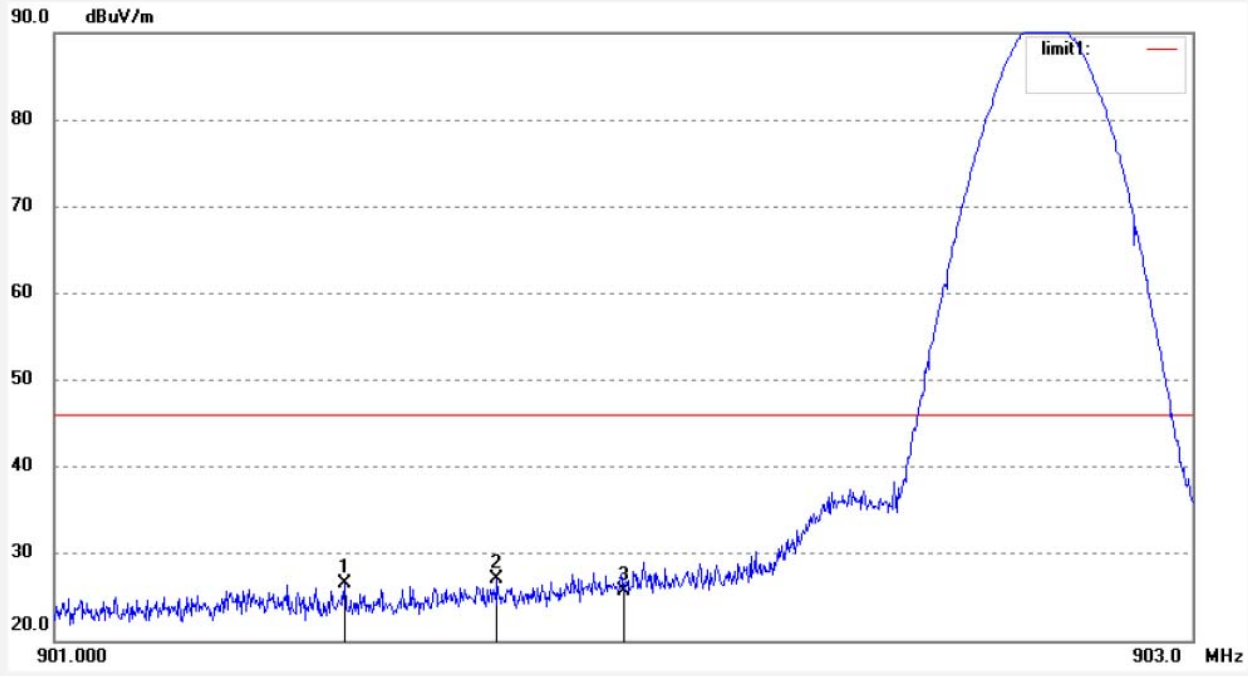
Job No.: RICKY #322	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: DC 3.7V
Test item: Radiation Test	Date: 14/01/13/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 13/46/40
EUT: READER	Engineer Signature: Ricky
Mode: 902.75	Distance: 3m
Model: IVF-RU01	
Manufacturer: Innov	

Note: Report No.:ATE20140010



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	901.5099	32.63	-6.08	26.55	46.00	-19.45	peak			
2	901.7780	33.11	-6.07	27.04	46.00	-18.96	peak			
3	902.0000	31.80	-6.07	25.73	46.00	-20.27	peak			

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Site: 1# Chamber
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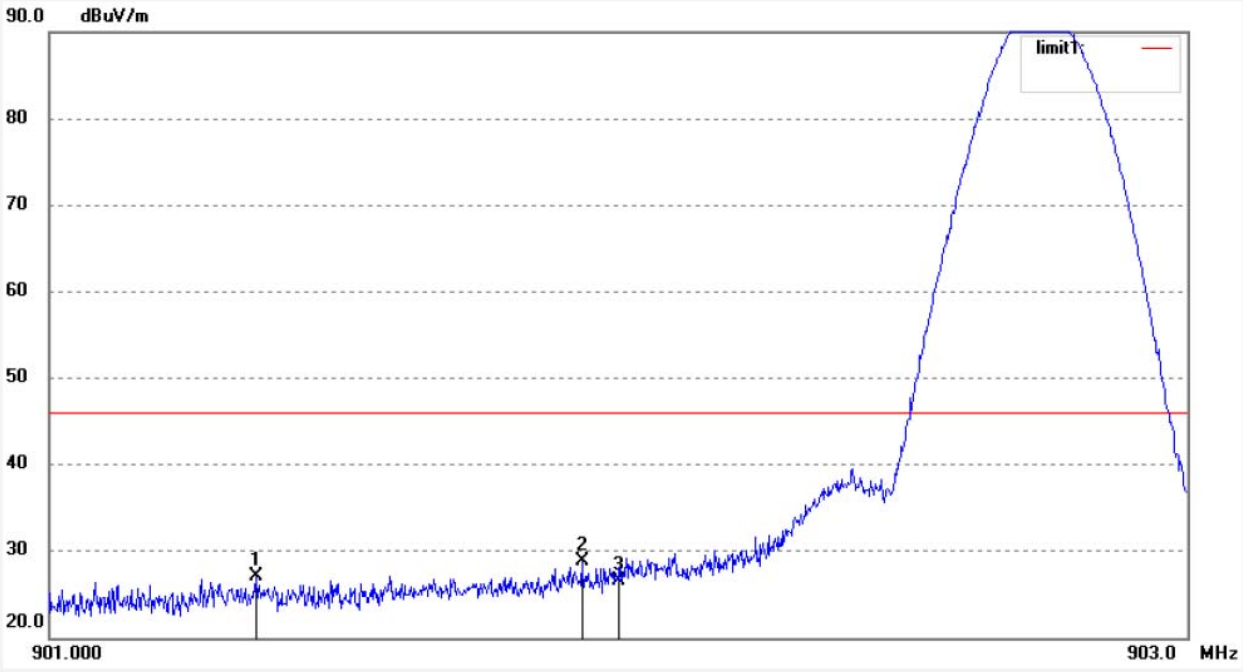
Fax:+86-0755-26503396

Job No.: RICKY #323
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: READER
Mode: 902.75
Model: IVF-RU01
Manufacturer: Innov

Polarization: Vertical
Power Source: DC 3.7V
Date: 14/01/13/
Time: 13/48/34
Engineer Signature: Ricky
Distance: 3m

Note: Report No.:ATE20140010



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	901.3640	33.14	-6.08	27.06	46.00	-18.94	peak			
2	901.9360	34.90	-6.07	28.83	46.00	-17.17	peak			
3	902.0000	32.58	-6.07	26.51	46.00	-19.49	peak			

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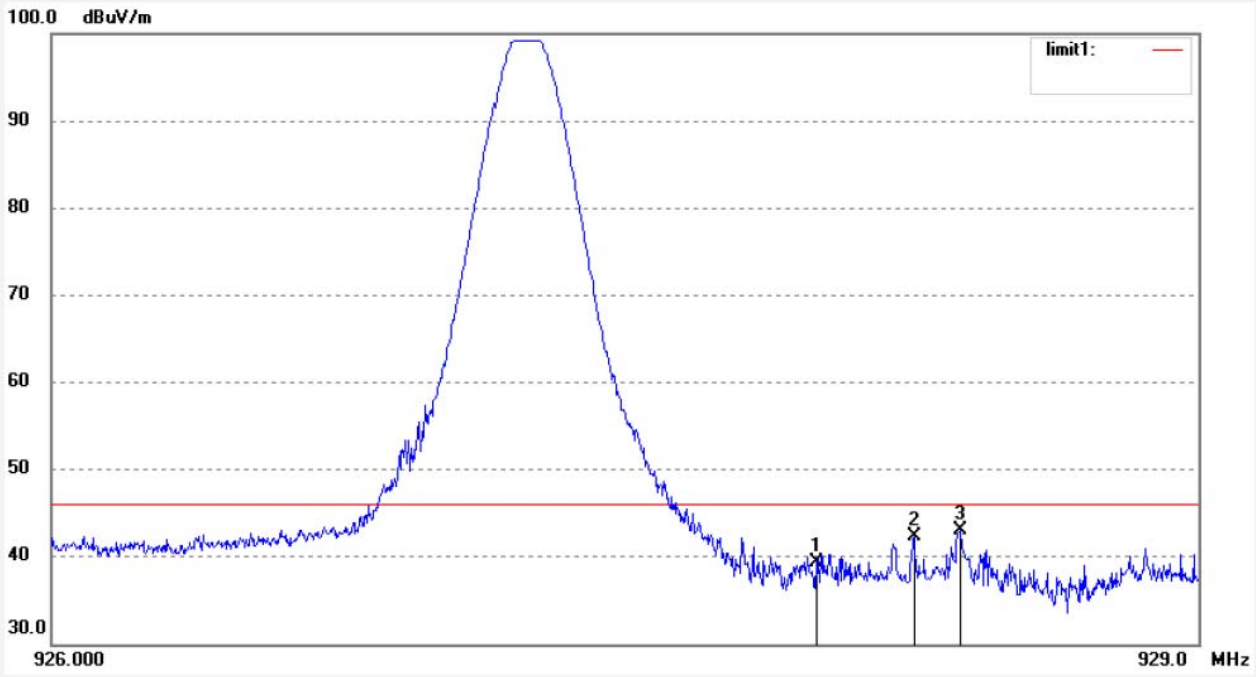
Fax:+86-0755-26503396

Job No.: RICKY #336
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: READER
Mode: 902.75
Model: IVF-RU01
Manufacturer: Innov

Polarization: Horizontal
Power Source: DC 3.7V
Date: 2014-1-14
Time: 10/50/34
Engineer Signature: Ricky
Distance: 3m

Note: Report No.:ATE20140010



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	928.0000	45.00	-5.71	39.29	46.00	-6.71	peak			
2	928.2558	48.11	-5.70	42.41	46.00	-3.59	peak			
3	928.3790	48.72	-5.70	43.02	46.00	-2.98	peak			

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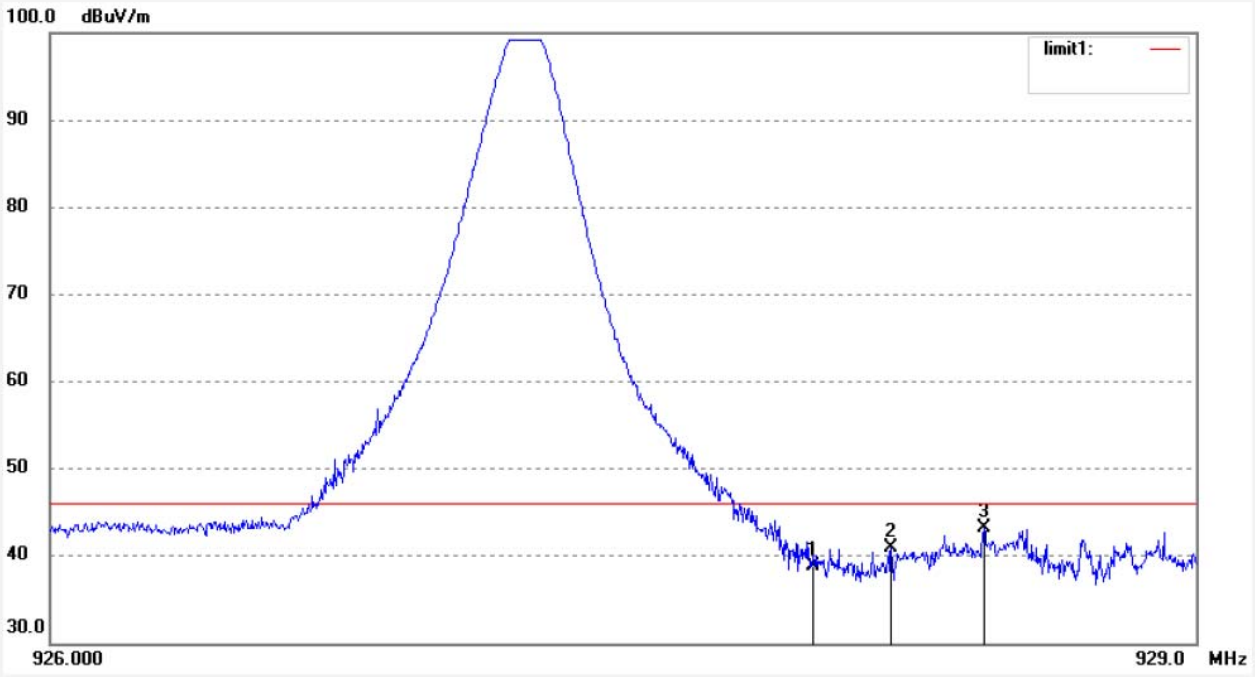
Fax:+86-0755-26503396

Job No.: RICKY #337
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: READER
Mode: 902.75
Model: IVF-RU01
Manufacturer: Innov

Polarization: Vertical
Power Source: DC 3.7V
Date: 2014-1-14
Time: 10/51/27
Engineer Signature: Ricky
Distance: 3m

Note: Report No.:ATE20140010



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	928.0000	44.61	-5.71	38.90	46.00	-7.10	peak			
2	928.2019	46.64	-5.70	40.94	46.00	-5.06	peak			
3	928.4450	48.90	-5.70	43.20	46.00	-2.80	peak			

Hopping

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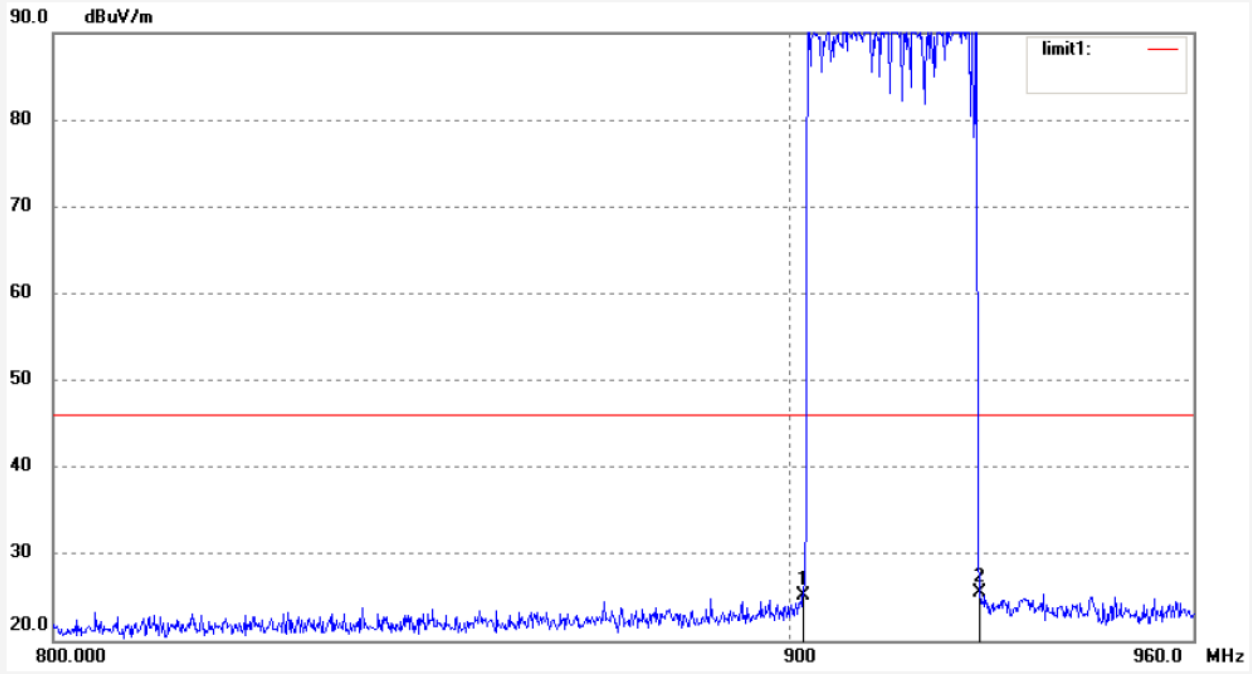
Fax:+86-0755-26503396

Job No.: RICKY #342	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: DC 3.7V
Test item: Radiation Test	Date: 14/01/16/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 8/41/08
EUT: READER	Engineer Signature: Ricky
Mode: hopping	Distance: 3m
Model: IVF-RU01	
Manufacturer: Innov	

Note: Report No.:ATE20140010



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	902.0000	31.25	-6.07	25.18	46.00	-20.82	peak			
2	928.0000	31.19	-5.71	25.48	46.00	-20.52	peak			

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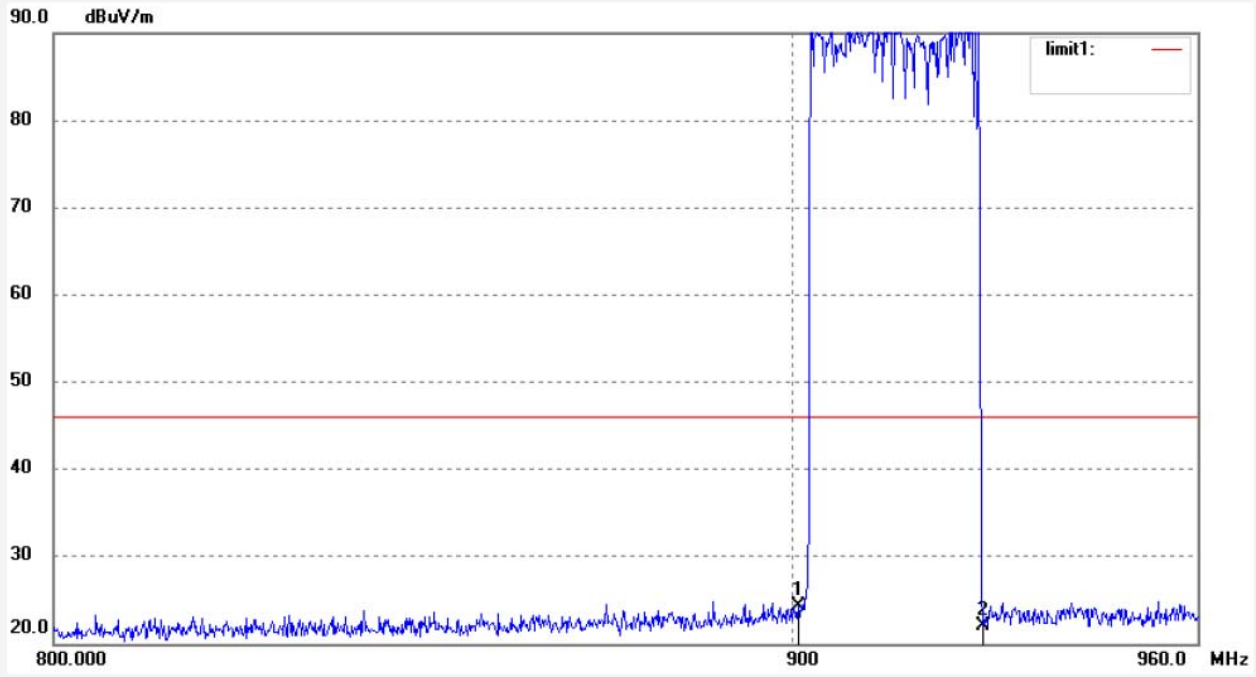
Fax:+86-0755-26503396

Job No.: RICKY #343
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: READER
Mode: hopping
Model: IVF-RU01
Manufacturer: Innov

Polarization: Horizontal
Power Source: DC 3.7V
Date: 14/01/16/
Time: 8/45/33
Engineer Signature: Ricky
Distance: 3m

Note: Report No.:ATE20140010



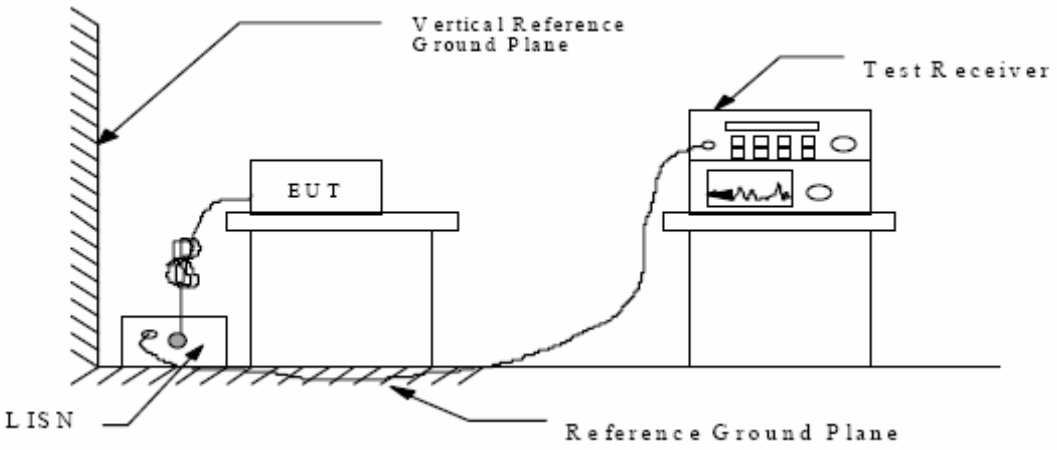
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	902.0000	30.30	-6.08	24.22	46.00	-21.78	peak			
2	928.0000	27.69	-5.71	21.98	46.00	-24.02	peak			

12. AC POWER LINE CONDUCTED EMISSION FOR FCC PART 15 SECTION 15.207(A)

12.1. Block Diagram of Test Setup

12.1.1. Block diagram of connection between the EUT and simulators

12.1.2. Shielding Room Test Setup Diagram



(EUT: READER)

12.2. The Emission Limit

12.2.1. Conducted Emission Measurement Limits According to Section 15.207(a)

Frequency (MHz)	Limit dB(μV)	
	Quasi-peak Level	Average Level
0.15 - 0.50	66.0 – 56.0 *	56.0 – 46.0 *
0.50 - 5.00	56.0	46.0
5.00 - 30.00	60.0	50.0

* Decreases with the logarithm of the frequency.

12.3.Configuration of EUT on Measurement

The equipment are installed on the Conducted Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

12.4.Operating Condition of EUT

12.4.1.Setup the EUT and simulator as shown as Section 11.1.

12.4.2.Turn on the power of all equipment.

12.4.3.Let the EUT work in TX (Operation) mode measure it.

12.5.Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC lines are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.4- 2009 on Conducted Emission Measurement.

The bandwidth of test receiver (R & S ESCS30) is set at 9 kHz.

The frequency range from 150 kHz to 30MHz is checked.

12.6.Power Line Conducted Emission Measurement Results

ACCURATE TECHNOLOGY CO.,LTD

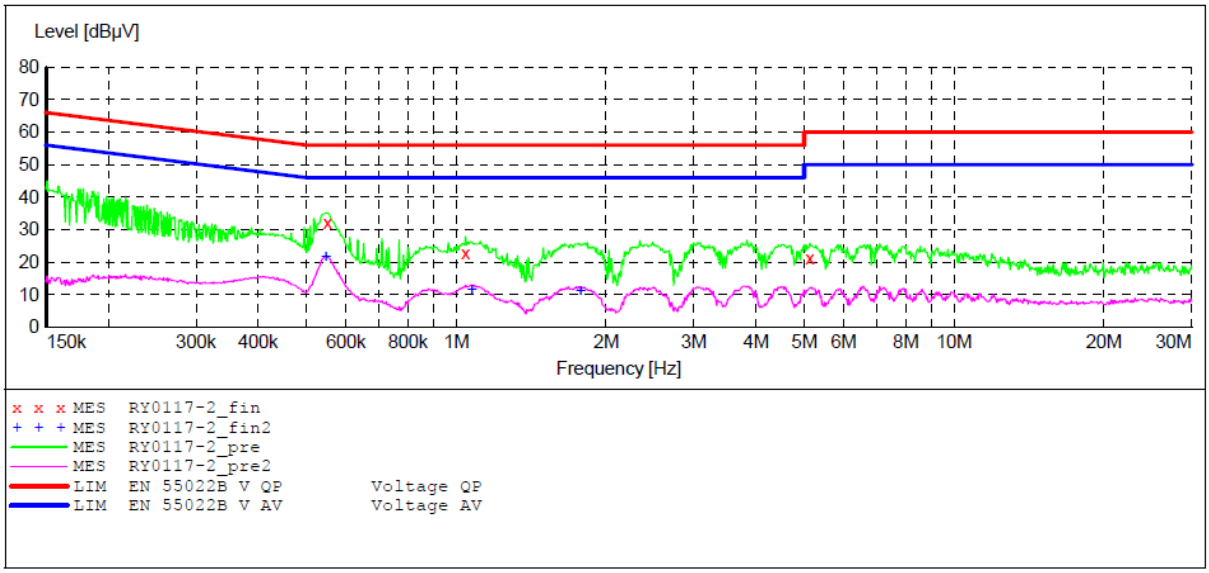
CONDUCTED EMISSION STANDARD EN 55022B

EUT: READER M/N:IVF-RU01
Manufacturer: Innov
Operating Condition: Op
Test Site: 1#Shielding Room
Operator: Ricky
Test Specification: L 120V/60Hz
Comment:
Report No.:ATE20140010

SCAN TABLE: "V 150K-30MHz fin"

Short Description: _SUB_STD_VTERM2 1.70

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	30.0 MHz	4.5 kHz	QuasiPeak Average	1.0 s	9 kHz	NSLK8126 2008



MEASUREMENT RESULT: "RY0117-2_fin"

1/17/2014 9:10AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.551165	32.00	10.7	56	24.0	QP	N	GND
1.043940	22.60	10.9	56	33.4	QP	N	GND
5.133660	21.10	11.2	60	38.9	QP	N	GND

MEASUREMENT RESULT: "RY0117-2_fin2"

1/17/2014 9:10AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.546782	21.40	10.7	46	24.6	AV	N	GND
1.073524	11.50	10.9	46	34.5	AV	N	GND
1.775250	10.90	11.0	46	35.1	AV	N	GND

ACCURATE TECHNOLOGY CO.,LTD

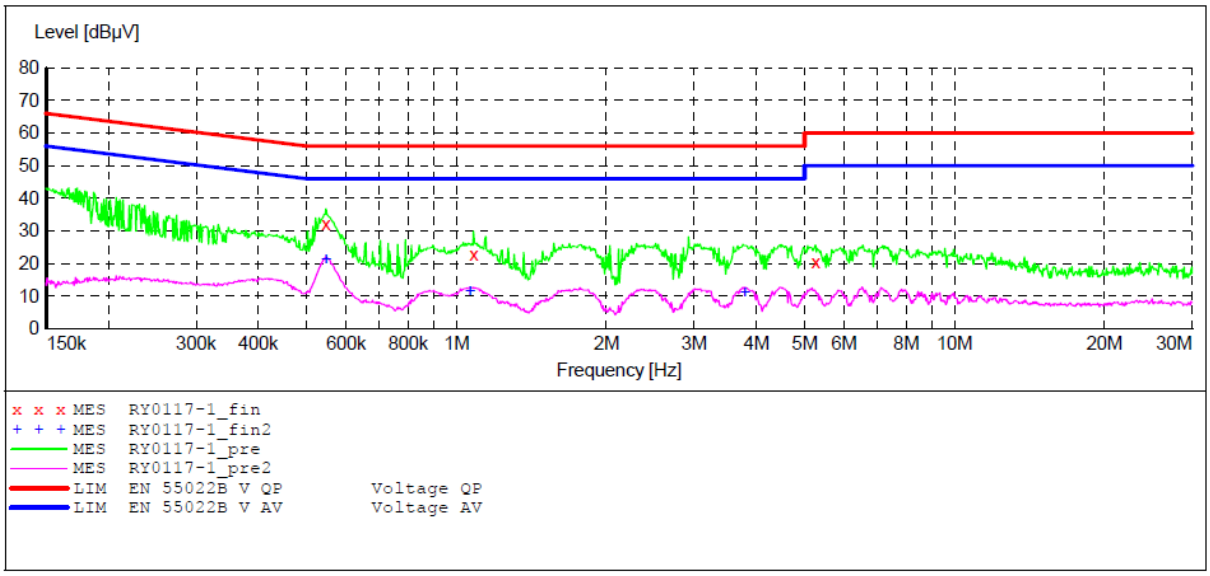
CONDUCTED EMISSION STANDARD EN 55022B

EUT: READER M/N:IVF-RU01
Manufacturer: Innov
Operating Condition: Op
Test Site: 1#Shielding Room
Operator: Ricky
Test Specification: N 120V/60Hz
Comment:
Report No.:ATE20140010

SCAN TABLE: "V 150K-30MHz fin"

Short Description: _SUB_STD_VTERM2 1.70

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	30.0 MHz	4.5 kHz	QuasiPeak Average	1.0 s	9 kHz	NSLK8126 2008



MEASUREMENT RESULT: "RY0117-1_fin"

1/17/2014 9:06AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.546782	32.20	10.7	56	23.8	QP	L1	GND
1.082129	22.60	10.9	56	33.4	QP	L1	GND
5.258106	20.40	11.2	60	39.6	QP	L1	GND

MEASUREMENT RESULT: "RY0117-1_fin2"

1/17/2014 9:06AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.546782	21.30	10.7	46	24.7	AV	L1	GND
1.064987	11.40	10.9	46	34.6	AV	L1	GND
3.790224	11.10	11.1	46	34.9	AV	L1	GND

13. ANTENNA REQUIREMENT

13.1. The Requirement

According to Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

13.2. Antenna Construction

The antenna is PCB Layout antenna, no consideration of replacement. Therefore, the equipment complies with the antenna requirement of Section 15.203.