FCC RADIO TEST REPORT

According to

FCC Part 15 Subpart C § 15.247

Equipment	:	**UHF RFID READER**
Model No	:	**SST-US-URFR01A**
Applicant	:	**Straffic Co., Ltd.** 8F, Mtek IT tower, 344, Pangyo-ro, Bundang-gu, Seungnam-si, Gyeonggi-do, 13493, Republic of Korea
Date of reception	:	**January 03, 2017**
Date of test	:	**January 03, 2017 to January 13, 2017**
Report Number	:	**BWS-17-RF-0001**
Report Type	:	**Original Report**
Date of issue	:	**January 13, 2017**
FCC Rule Part(s)	:	**FCC Part 15 Subpart C §15.247**

The product was received on January 03, 2017 and testing was completed on January 13, 2017. We, BWS TECH Inc. would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of BWS TECH Inc. the test report shall not be reproduced except in full.

(Date) 01/13/2017
Tested by **Hyun-Yong, Seol**

(Date)01/13/2017
Reviewed by **Bang-Hyun, Nam**

BWS TECH INC.

#23, Gokhyeon-ro 480 Beon-gil, Mohyeon-myeon, Cheoin-gu, Yongin-si, Gyeonggi-do, 17031, Republic of Korea
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http://www.bws.co.kr

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FCC TEST REPORT

Scope – *Measurement and determination of electromagnetic emission(EME) of radio frequency devices including intentional radiators and/or unintentional radiators for compliance with the technical rules and regulations of the U.S Federal Communications Commission(FCC)*

1. General Information

1.1 Applicant

● **Company Name**	: Straffic Co., Ltd.
● **Company Address**	: 8F, Mtek IT tower, 344, Pangyo-ro, Bundang-gu, Seungnam-si, Gyeonggi-do, 13493, Republic of Korea
● **Phone/Fax**	: Tel No. : +82-31-610-3500 Fax No. : +82-31-610-3515

1.2 Manufacturer

● **Company Name**	: U-Pass Co., Ltd.
● **Company Address**	: No.602, Tower B.Daebang triplaon Business center, 158, Haneulmaeul-ro, Ilsandong-gu, Goyang-si, Gyeonggi-do, 10355, Republic of Korea
● **Phone/Fax**	: Tel No. : +82-31-926-7845 Fax No. : +82-31-926-7849

1.3 EUT Description

● **Equipment**	: UHF RFID READER
● **Model(s)**	: SST-US-URFR01A
● **Operation Frequency**	: 902 ~ 928 MHz
● **Number of Channels**	: 50
● **Modulation Method**	: PR-ASK
● **Input Voltage**	: DC 24 V
● **Antenna Peak Gain**	: 10.89 dBi

1.4 Other Information

● **FCC Rule Part(s)**	: Part 15 Subpart C §15.247
● **FCC ID**	: 2AABFSST-US-URFR01A
● **Test Procedure**	: ANSI C63.10-2013, DA 00-705
● **Date of Test**	: January 03, 2017 to January 13, 2017
● **Place of Test**	: BWS TECH Inc. (FCC Registration Number : 287786) #23, Gokhyeon-ro 480 Beon-gil, Mohyeon-myeon, Cheoin-gu, Yongin-si, Gyeonggi-do, 17031, Republic of Korea TEL: +82 31 333 5997 FAX: +82 31 333 0017

2. Description of Test Facility

Site Description

Test Lab. :

Accredited by Industry Canada, February 10, 2015
The Certificate Registration Number is 4963A-2.

Accredited by FCC, June 21, 2016
The Certificate Registration Number is 287786.

Accredited by VCCI, September 11, 2015
The Certificate Registration Number is C-4326

Accredited by RRA(EMC,RF, SAR), June 21, 2016
The Certificate Registration Number is KR0017

Accredited by KOLAS(KS Q ISO/IEC 17025), April 08, 2016
The Certificate Registration Number is KT174

Name of Firm : BWS TECH Inc.

Site Location : #23, Gokhyeon-ro 480 Beon-gil, Mohyeon-myeon, Cheoin-gu, Yongin-si, Gyeonggi-do 449-853, South Korea

3. Test Methodology

The tests documented in this report were performed in accordance with ANSI C63.10: 2013 and the requirements of FCC Rules Part 15.207, 15.209 and 15.247.
Radio testing was performed according to DA 00-705.

3.1 EUT Configuration

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

3.2 EUT Exercise

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.

3.3 FCC Part 15.205 Restricted Bands of Operations

(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	2655 - 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 0.490-0.510MHz.
2 Above 38.6

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

3.4 Description of Test Modes

The EUT has been tested under operating condition.
After verification, all tests were carried out with the worst case(port),
The lowest, middle and highest channel were tested.

4. Summary of Test Results

Spread Spectrum Transmitter (DSS)				
Clause	**TEST Description**	**Standard Section**	**Requirements**	**Result**
5.1	**Number of Channels**	§15.247(a)(1)	≥ 50 Channel Number	Pass
5.2	**Hopping Channel Separation**	§15.247(a)(1)	≥ 25kHz or the 20dB bandwidth of the hopping channel	Pass
5.3	**Dwell Time of Each Channel**	§15.247(a)(1)	≤ 0.4 s	Pass
5.4	**20dB Bandwidth**	§15.247(a)(1)	≤ 500 kHz	Pass
5.5	**Maximum Peak Conducted Output Power**	§15.247(b)(2)	≤ 1W	Pass
5.6	**Conducted Spurious Emission & Band Edges Measurement**	§15.247(d)	≥ 20dBc/100kHz	Pass
5.7	**Radiated Spurious Emission**	§15.247(d), §15.209(a), §15.35(b)	§15.209, §15.247(d)	Pass
5.8	**AC Power Conducted Emission**	§15.207	§15.207(a)	Pass
5.9	**Antenna Application**	§15.247(b)(4), §15.203	§15.247(b), §15.203	Pass

5. Test Data

5.1 Number of Channels

5.1.1 Test Equipment

EQUIPMENT	MODEL	MANUFACTURE	SERIAL NUMBER	Calibration Due date (year/month/date)	Calibration Interval
Spectrum Analyzer	FSP13	ROHED&SCHWARZ	100251	2017/10/04	1 Year
D.M.M	732-01	Yokogawa	9861286	2017/11/10	1 Year

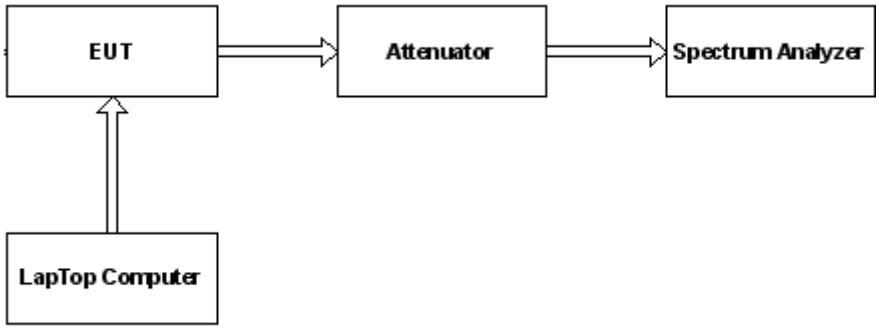
5.1.2 Test Limit

Frequency hopping systems in the 902 - 928 MHz band shall use at least 50 channels.

5.1.3 Test Procedure

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Enable the EUT hopping function.
5. Use the following spectrum analyzer settings: Span = the frequency band of operation; RBW ≥ 1% of the span; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
6. The number of hopping frequency used is defined as the number of total channel.
7. Record the measurement data derived from spectrum analyzer.

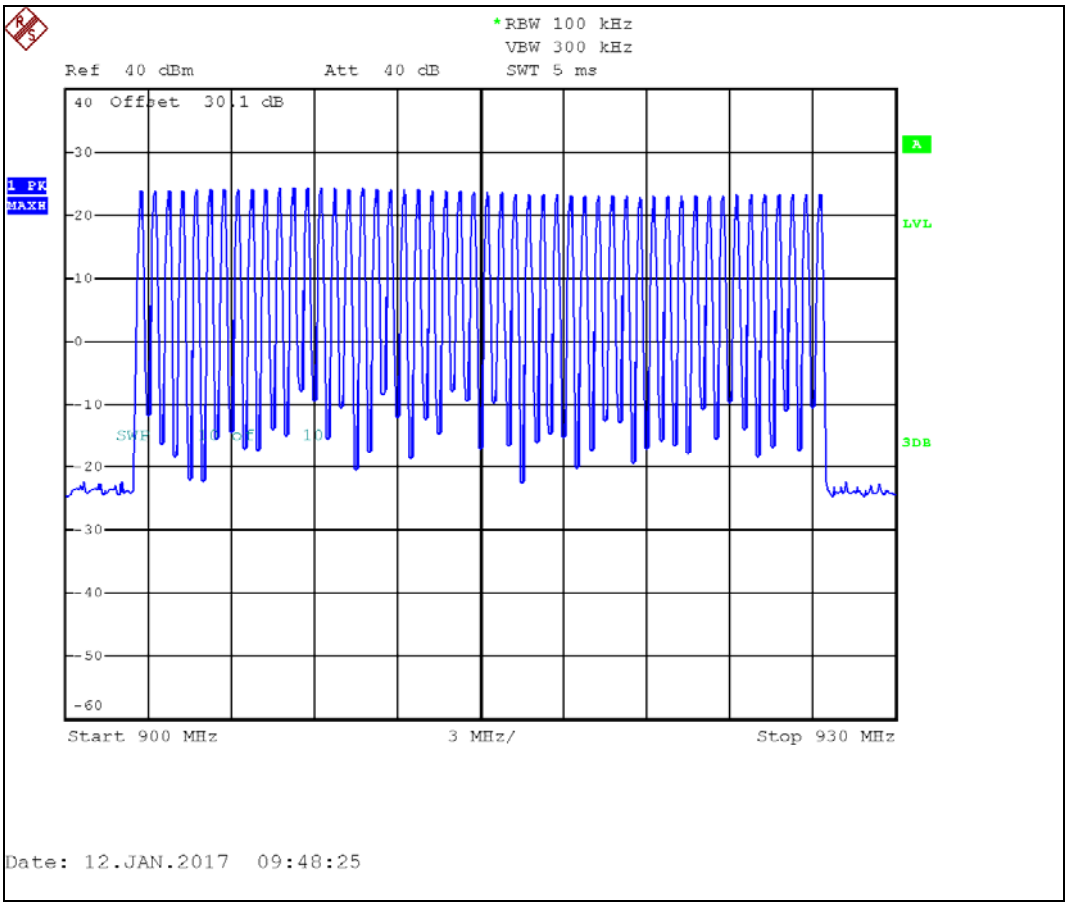
5.1.4 Block Diagram of Test Setup



5.1.5 Test Result

Frequency(MHz)	Result	Limit
902 - 928	50	≥ 50

5.1.6 Test Plots



5.2 Hopping Channel Separation

5.2.1 Test Equipment

EQUIPMENT	MODEL	MANUFACTURE	SERIAL NUMBER	Calibration Due date (year/month/date)	Calibration Interval
Spectrum Analyzer	FSP13	ROHED&SCHWARZ	100251	2017/10/04	1 Year
D.M.M	732-01	Yokogawa	9861286	2017/11/10	1 Year

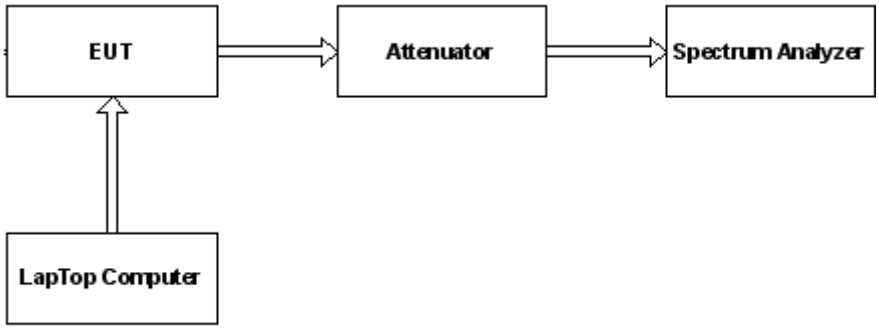
5.2.2 Test Limit

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25kHz or the 20dB bandwidth of the hopping channel, whichever is greater.

5.2.3 Test Procedure

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The Path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Enable the EUT hopping function.
5. Use the following spectrum analyzer settings:
   Span = wide enough to capture the peaks of two adjacent channels; RBW ≥ 1% of the span; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
6. Measure and record the results in the test report.

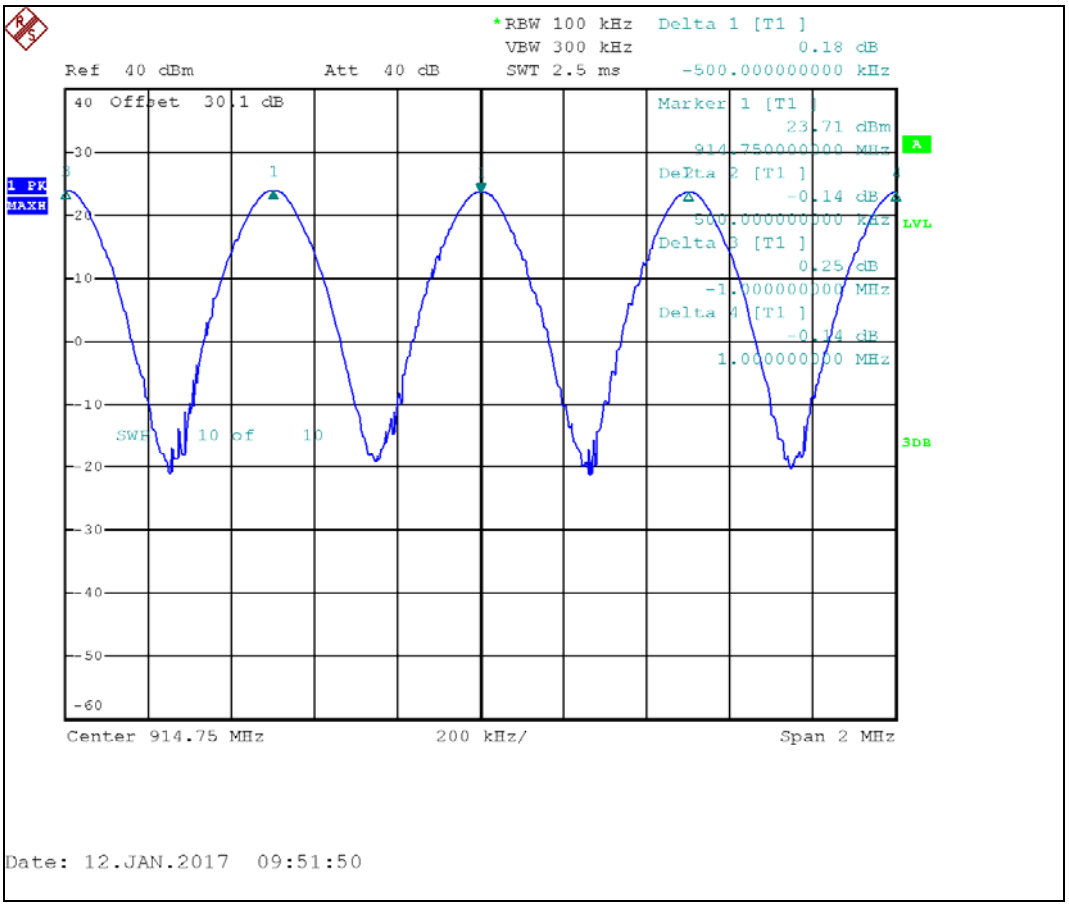
5.2.4 Block Diagram of Test Setup



5.2.5 Test Result

Frequency(MHz)	Result(kHz)	Limit(kHz)
902 - 928	500	≥ 174(20dB bandwidth)

5.2.6 Test Plots



5.3 Dwell Time of Each Channel

5.3.1 Test Equipment

EQUIPMENT	MODEL	MANUFACTURE	SERIAL NUMBER	Calibration Due date (year/month/date)	Calibration Interval
Spectrum Analyzer	FSP13	ROHED&SCHWARZ	100251	2017/10/04	1 Year
D.M.M	732-01	Yokogawa	9861286	2017/11/10	1 Year

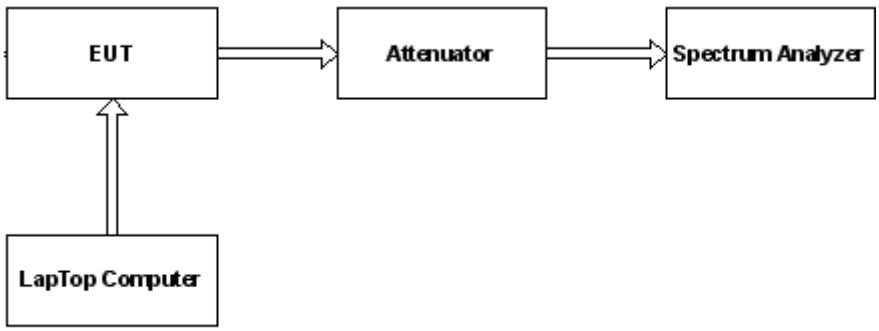
5.3.2 Test Limit

For frequency hopping systems operating in the 902 - 928MHz band, the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period.

5.3.3 Test Procedure

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Enable the EUT hopping function.
5. Use the following spectrum analyzer settings: Span = zero span, centered on a hopping channel; RBW = 100 kHz; VBW ≥ RBW; Sweep = as necessary to capture the entire dwell time per hopping channel; Detector function = peak; Trace = max hold.
6. Measure and record the results in the test report.

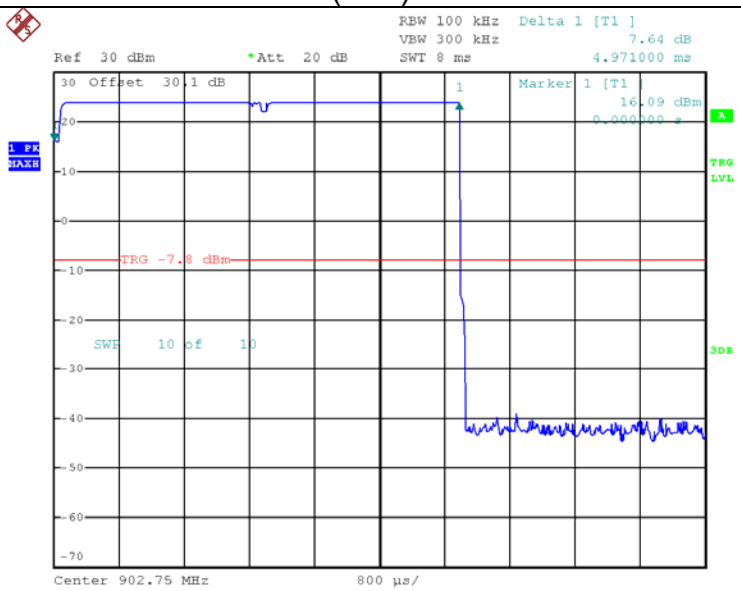
5.3.4 Block Diagram of Test Setup

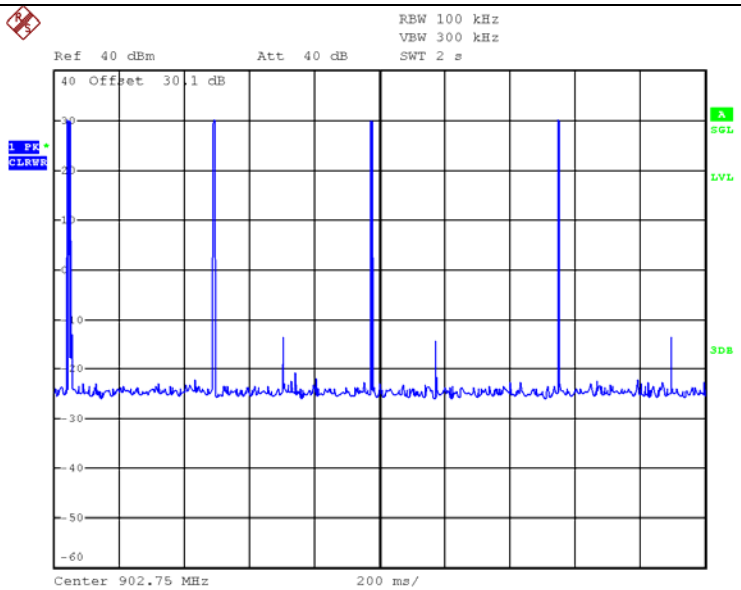


5.3.5 Test Result

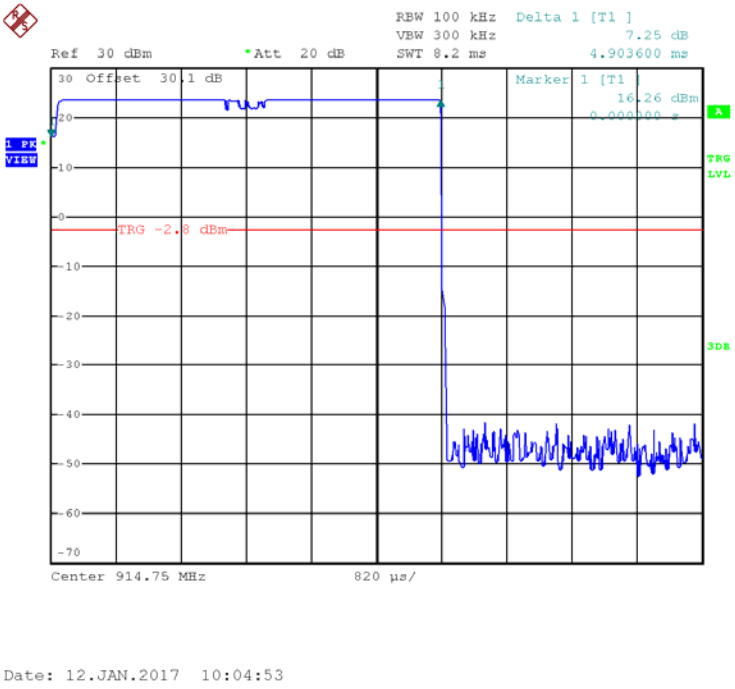
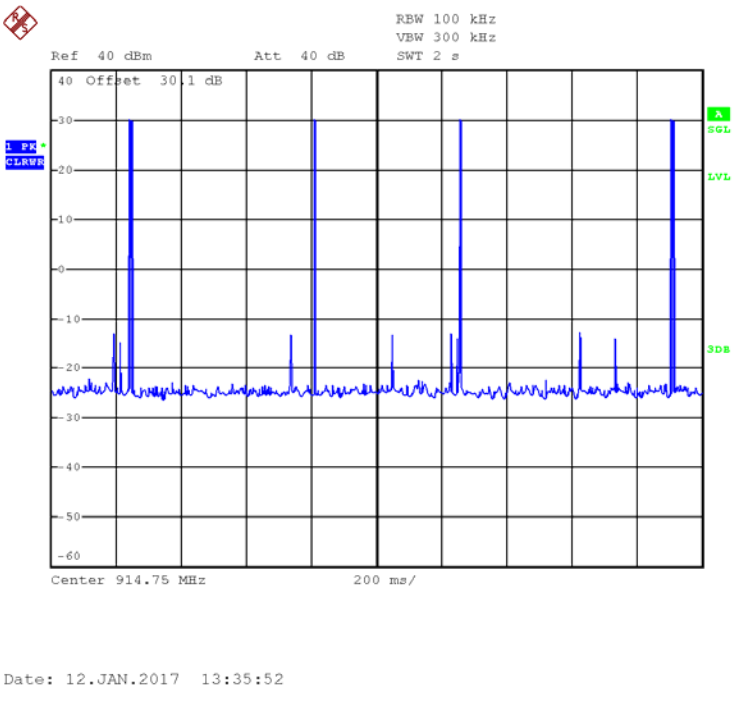
Frequency(MHz)	Pulse Width(msec)	Number of Pulse in 2(20) seconds	Result(sec)	Limit(sec)
902.75	4.971	4(40)	0.199	≤ 0.4
914.75	4.904	4(40)	0.196	≤ 0.4
927.25	4.955	4(40)	0.198	≤ 0.4

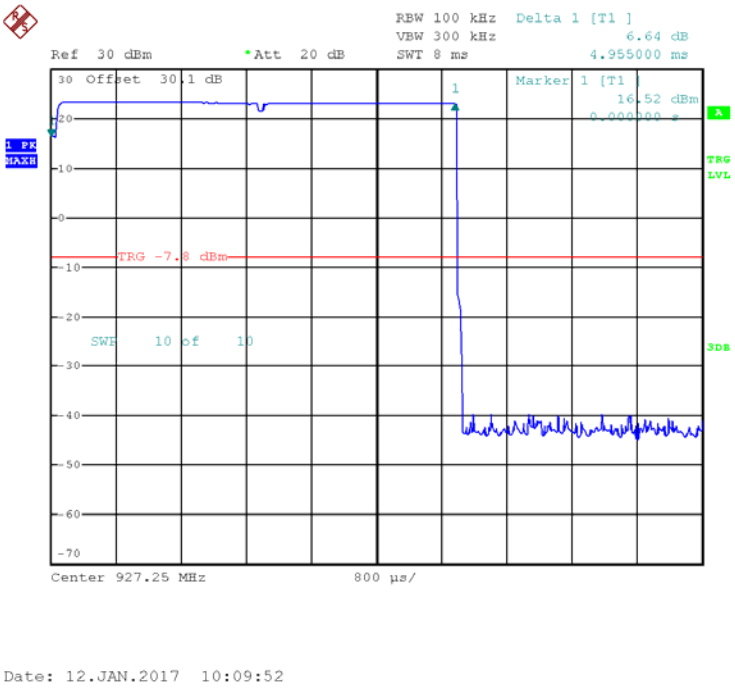
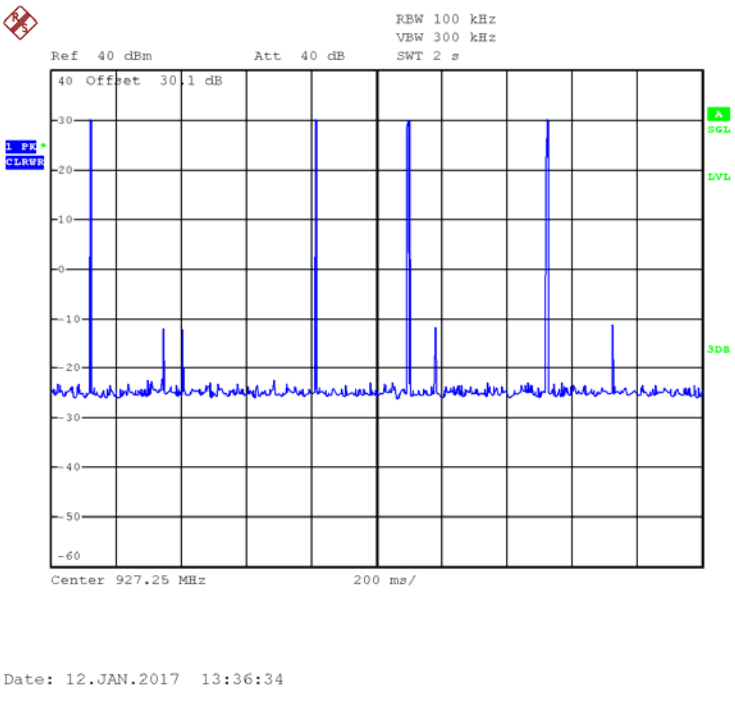
5.3.6 Test Plots

<table>
<tr><th colspan="2">902.75 MHz (Low)</th></tr>
<tr><td>Pulse Width</td><td> 

Date: 12.JAN.2017 10:09:00</td></tr>
<tr><td>Pulse in 2 sec</td><td> 

Date: 12.JAN.2017 13:35:35</td></tr>
</table>

914.75 MHz (Middle)	
Pulse Width	
Pulse in 2 sec	

927.25 MHz (High)	
Pulse Width	
Pulse in 2 sec	

5.4 20dB Bandwidth

5.4.1 Test Equipment

EQUIPMENT	MODEL	MANUFACTURE	SERIAL NUMBER	Calibration Due date (year/month/date)	Calibration Interval
Spectrum Analyzer	FSP13	ROHED&SCHWARZ	100251	2017/10/04	1 Year
D.M.M	732-01	Yokogawa	9861286	2017/11/10	1 Year

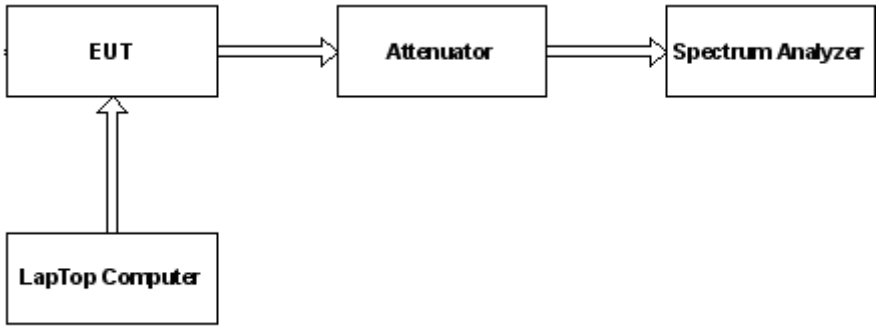
5.4.2 Test Limit

The 20 dB bandwidth of the hopping channel is less than 500 kHz.

5.4.3 Test Procedure

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Use the following spectrum analyzer settings for 20dB Bandwidth measurement. Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel; RBW ≥ 1% of the 20 dB bandwidth; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
5. Measure and record the results in the test report.

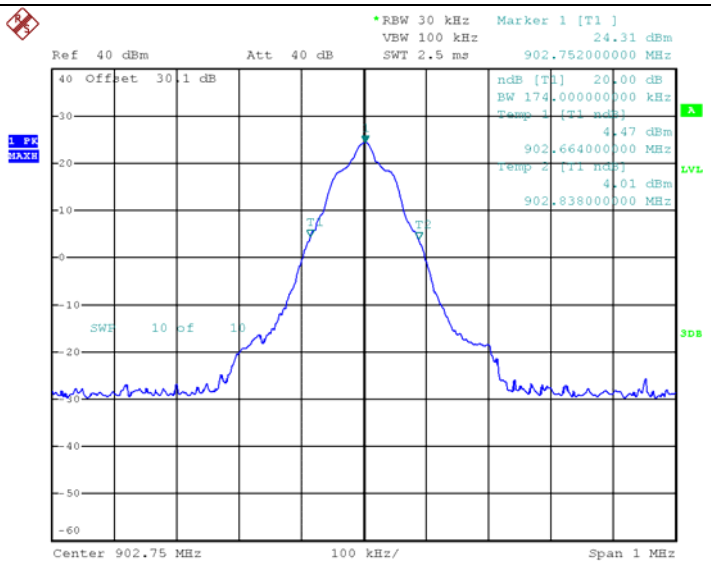
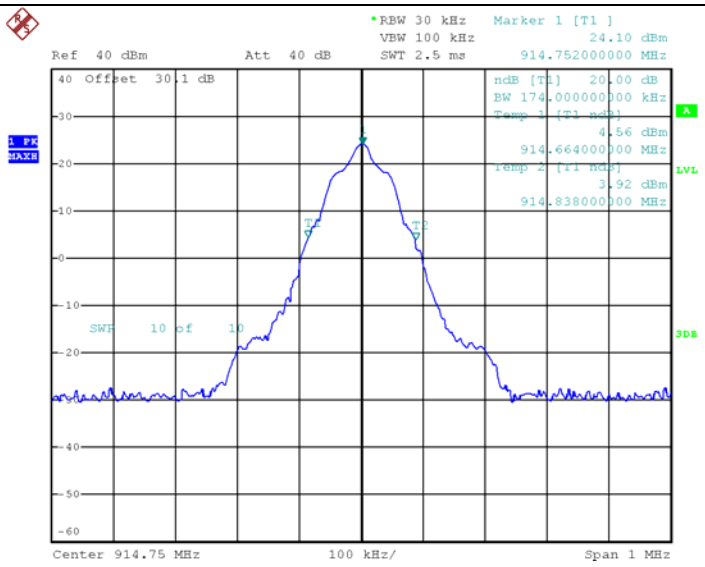
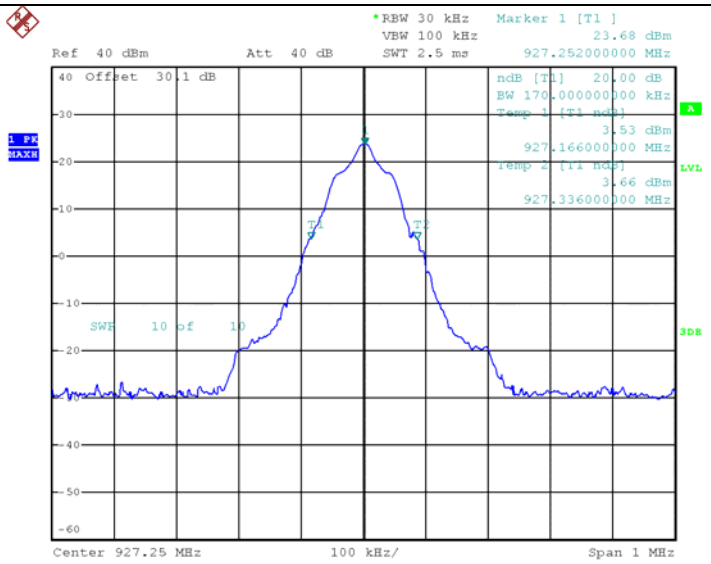
5.4.4 Block Diagram of Test Setup



5.4.5 Test Result

Channel	Frequency(MHz)	20 dB Bandwidth(kHz)	Limit(kHz)
Low	902.75	174	500
Mid	914.75	174	500
High	927.25	170	500

5.4.6 Test Plots

20dB Bandwidth	
902.75 MHz (Low)	
914.75 MHz (Middle)	
927.25 MHz (High)	

5.5 Maximum Peak Conducted Output Power

5.5.1 Test Equipment

EQUIPMENT	MODEL	MANUFACTURE	SERIAL NUMBER	Calibration Due date (year/month/date)	Calibration Interval
Spectrum Analyzer	FSP13	ROHED&SCHWARZ	100251	2017/10/04	1 Year
D.M.M	732-01	Yokogawa	9861286	2017/11/10	1 Year

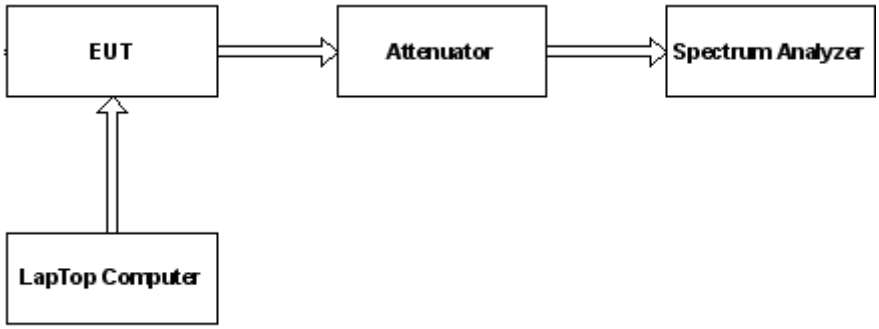
5.5.2 Test Limit

For frequency hopping systems operating in the 902 - 928 MHz band, the maximum peak conducted output power of the intentional radiator shall not exceed 1Watt for systems employing at least 50 hopping channels.

5.5.3 Test Procedure

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power with cable loss and record the results in the test report.
5. Measure and record the results in the test report.

5.5.4 Block Diagram of Test Setup

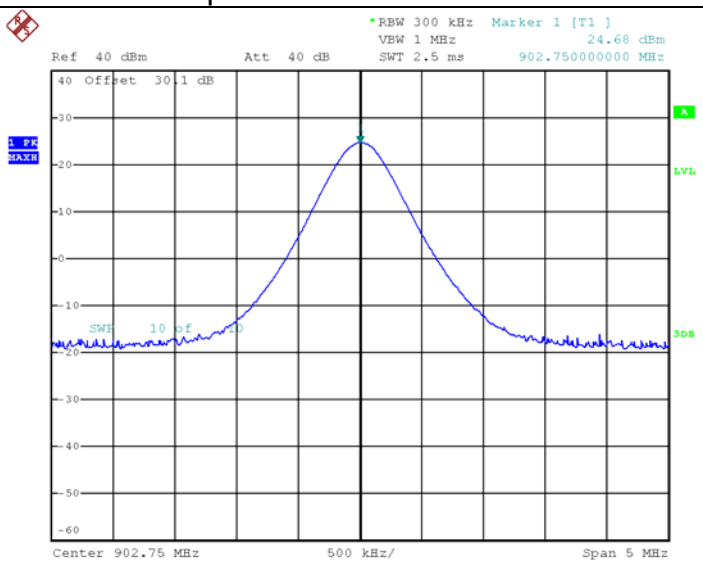
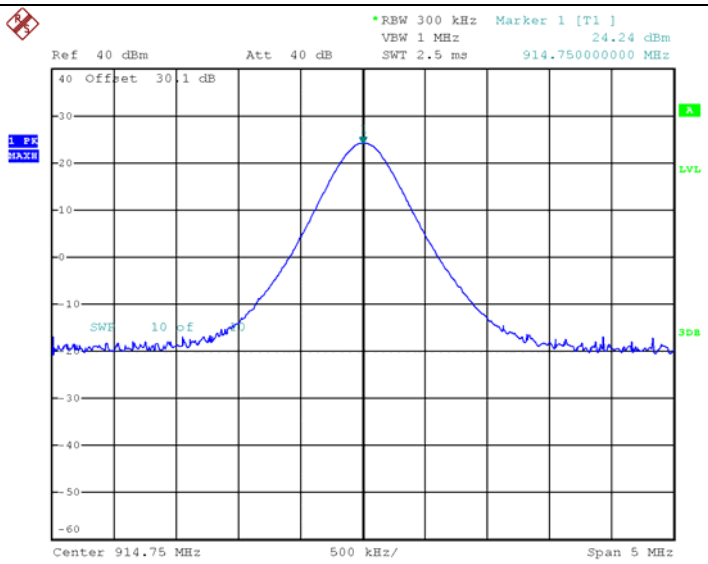
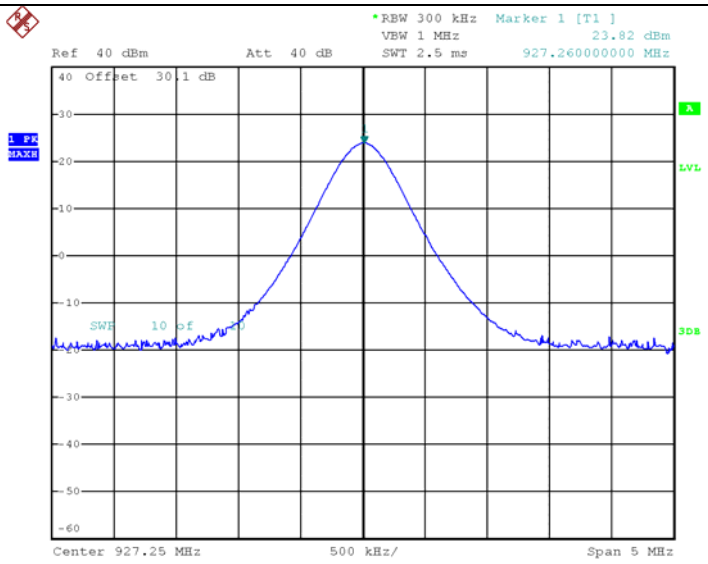


5.5.5 Test Result

Channel	Frequency(MHz)	Peak output Power(dBm)	Limit(dBm)
Low	902.75	24.68	25.11
Mid	914.75	24.24	25.11
High	927.25	23.82	25.11

Note: If transmitting antennas of directional gain greater than 6dBi is used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the direction gain of the antenna exceeds 6dBi.
As the directional gain of the EUT is 10.89 dBi, the limit was reduced by the amount(4.89 dBi) which the direction gain of the antenna (10.89 dBi) exceeds 6dBi. (30 dBm - 4.89 dBi = 25.11 dBm)

5.5.6 Test Plots

Peak Output Power	
902.75 MHz (Low)	
914.75 MHz (Middle)	
927.25 MHz (High)	

5.6 Conducted Spurious emissions & Band Edge Measurement

5.6.1 Test Equipment

EQUIPMENT	MODEL	MANUFACTURE	SERIAL NUMBER	Calibration Due date (year/month/date)	Calibration Interval
Spectrum Analyzer	FSP13	ROHED&SCHWARZ	100251	2017/10/04	1 Year
D.M.M	732-01	Yokogawa	9861286	2017/11/10	1 Year

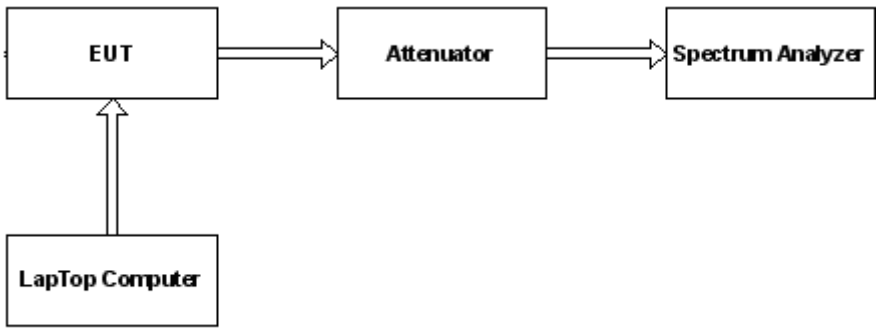
5.6.2 Test Limit

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.

5.6.3 Test Procedure

1. The testing follows the guidelines in Band-edge Compliance of RF Conducted Emissions of FCC Public Notice DA 00-705 Measurement Guidelines.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Use the following spectrum analyzer settings:
   Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span. ; RBW = 100 kHz ; VBW ≥ RBW ; Sweep = auto ; Detector function = peak ; Trace = max hold
4. Allow the trace to stabilize.
5. Measure and record the results in the test report.

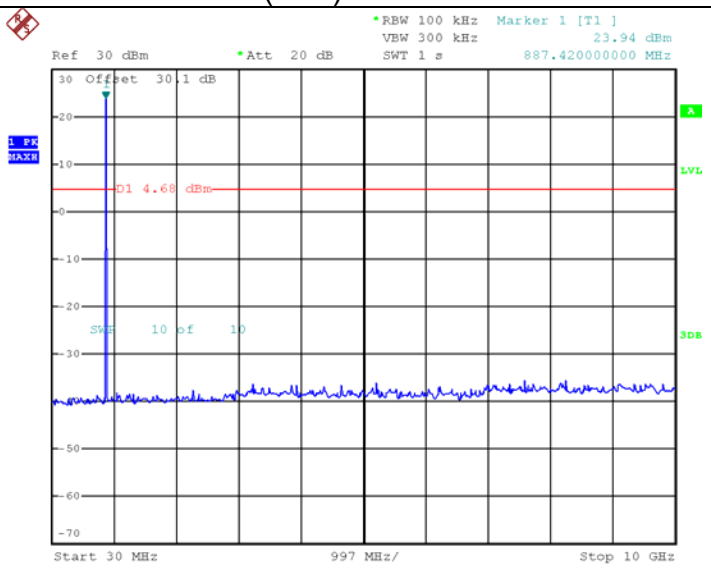
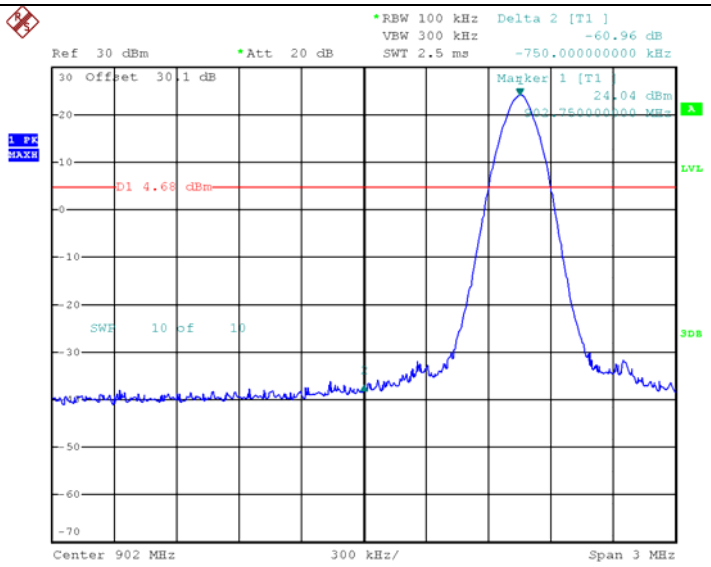
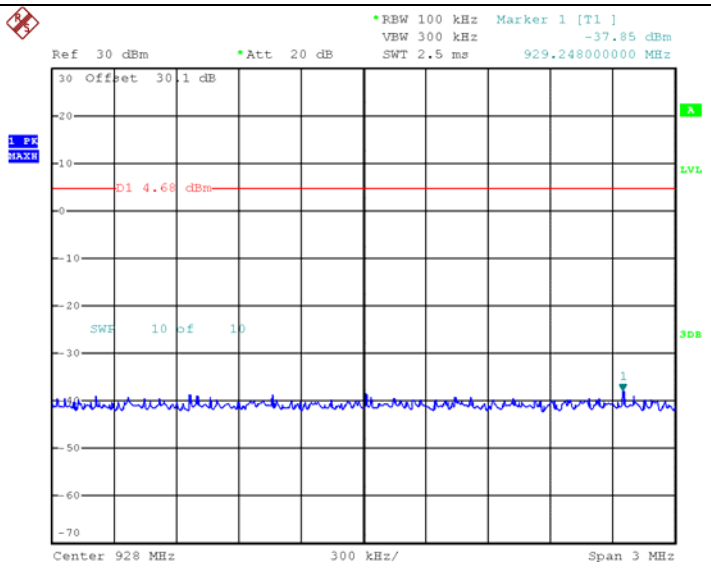
5.6.4 Block Diagram of Test Setup

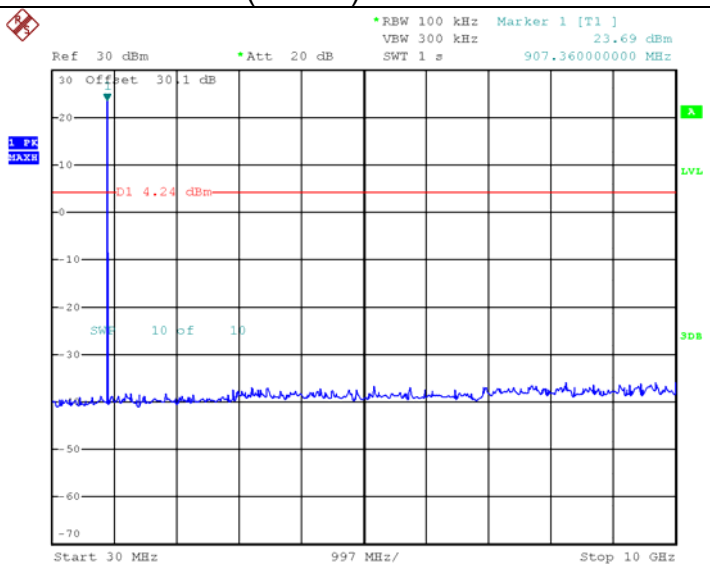
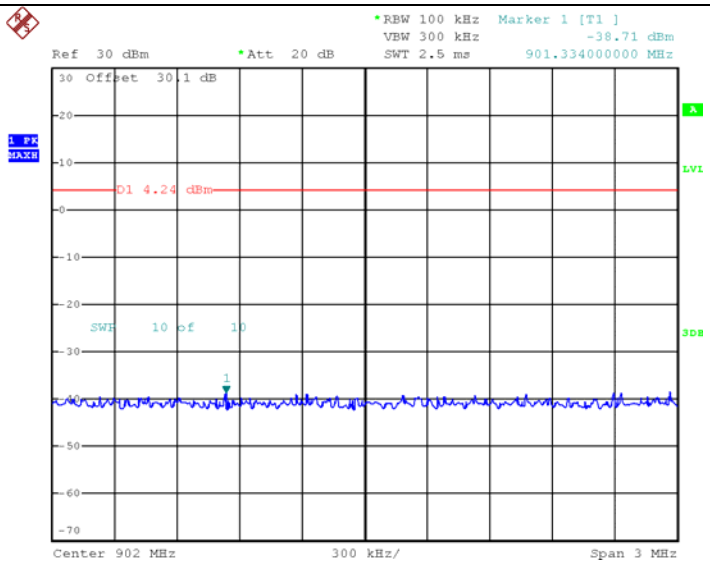
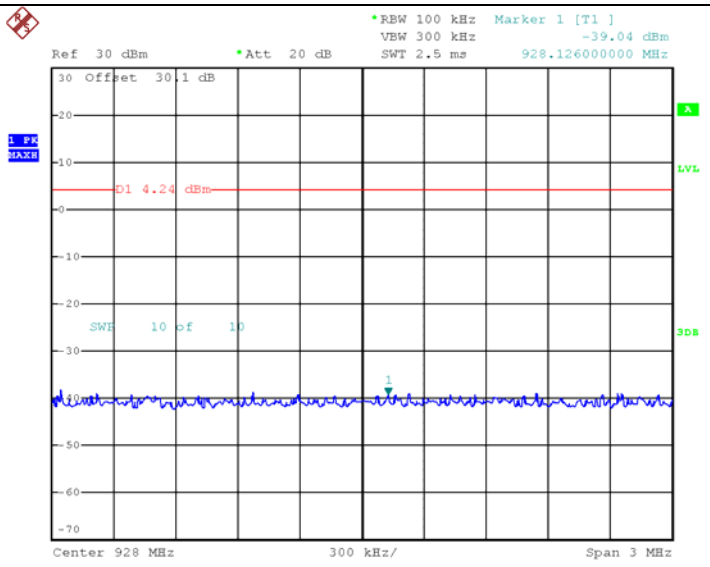


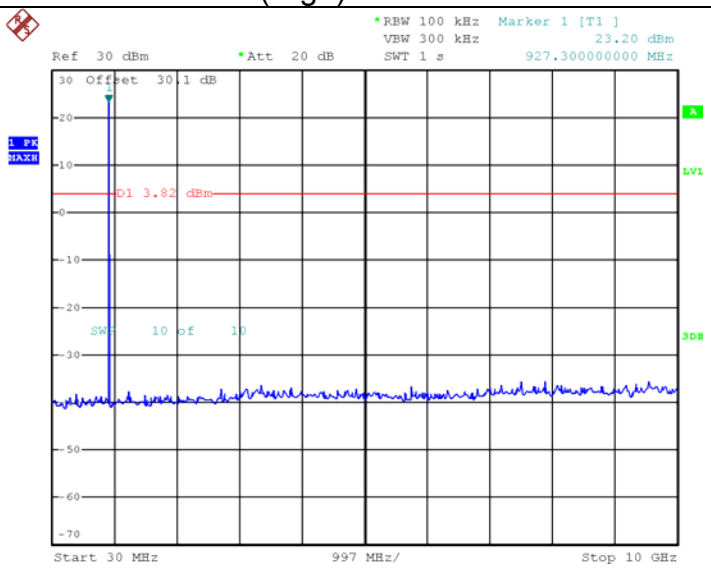
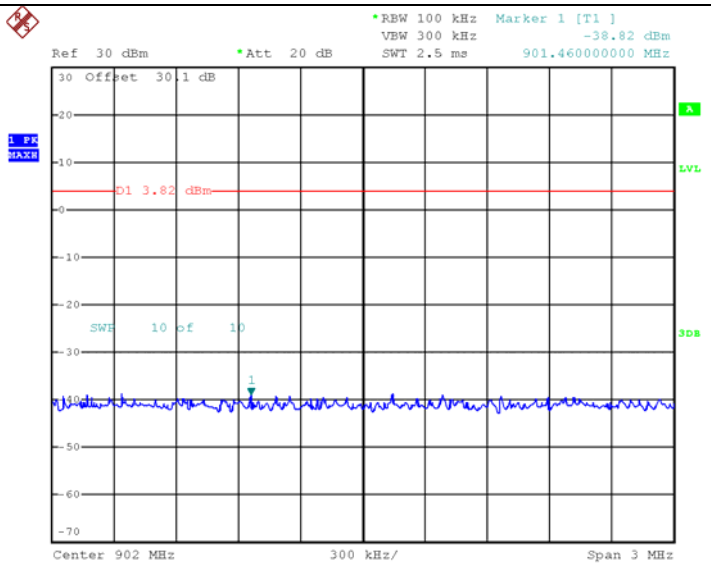
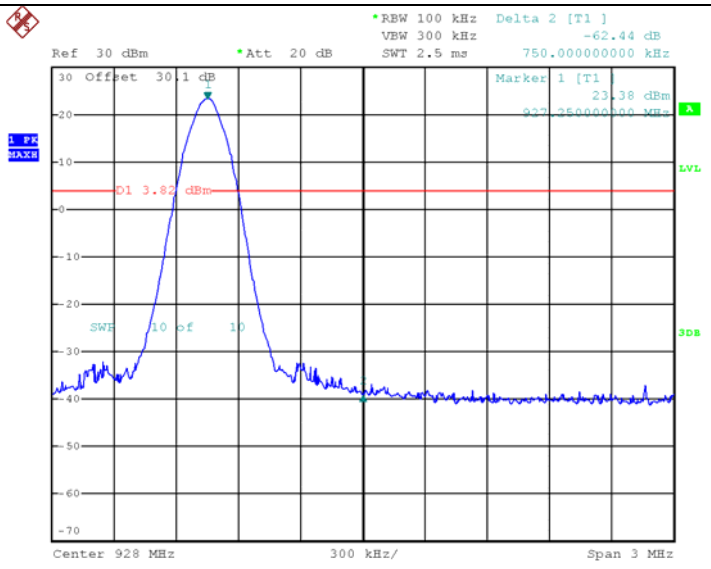
5.6.5 Test Result

Channel	Frequency(MHz)	Result	Limit(dBc)
Low	902.75	Pass	> 20
Mid	914.75	Pass	> 20
High	927.25	Pass	> 20

5.6.6 Test Plots

902.75 MHz (Low)	
30 MHz ~ 10 GHz	
902MHz Band Edge	
928MHz Band Edge	

914.75 MHz (Middle)	
30 MHz ~ 10 GHz	
902MHz Band Edge	
928MHz Band Edge	

927.25 MHz (High)	
30 MHz ~ 10 GHz	
902MHz Band Edge	
928MHz Band Edge	

5.7 Radiated Spurious emissions

5.7.1 Test Equipment

EQUIPMENT	MODEL	MANUFACTURE	SERIAL NUMBER	Calibration Due date (year/month/date)	Calibration Interval
EMI Receiver	ESR	Rohde & Schwarz	101320	2017/03/25	1 Year
Bilog Antenna	VULB9160	Schwarzbeck	9160-3052	2017/10/06	2 Year
Antenna Mast(4m)	AM-4.0	MATURO	AM4.0/225/17240915	-	-
Antenna Mast(2m)	AM-2.5	MATURO	AM2.5/226/17240915	-	-
Positioner Controller	CO2000	MATURO	NCU/459/17240915		-
Loop Antenna	HEH2-Z2	Rohde & Schwarz	881056/6	2017/01/06	2 Year
Horn Antenna	BBHA 9120 D	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D 234	2017/09/03	2 Year
Horn Antenna	BBHA 9170	SCHWARZBECK MESS-ELEKTRONIK	BBHA9170157	2017/11/14	2 Year
Amplifier	LPA-10-20	RF Bay	11160801	2017/03/25	1 Year
RF Amplifier	PAM-118A	COM-POWER	551019	2017/07/20	1 Year
RE_10 m CHAMBER #1	N/A	SY Corp.	N/A	N/A	-

5.7.2 Test Limit

According to FCC section 15.247(d), radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the radiated emission limits specified in FCC section 15.209(a)
According to FCC section 15.209(a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Note:
1. For above 1000 MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding th 20dB above the maximum permitted average limit.
2. For above 1000 MHz, limit field strength of harmonics: 54dBuV/m@3m (AV) and 74dbuV/m@3m (PK)

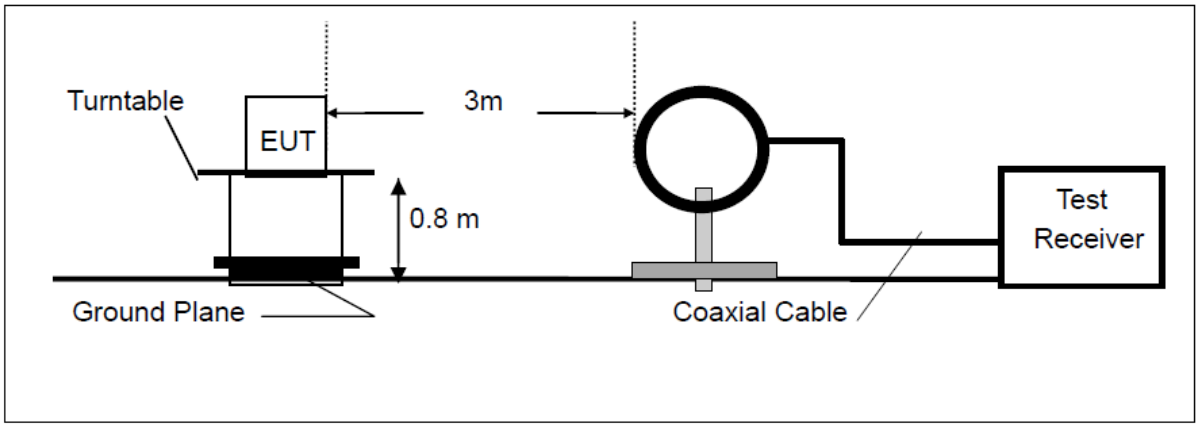
In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), also should comply with the radiated emission limits specified in Section 15.209(a)(above table).

5.7.3 Test Procedure

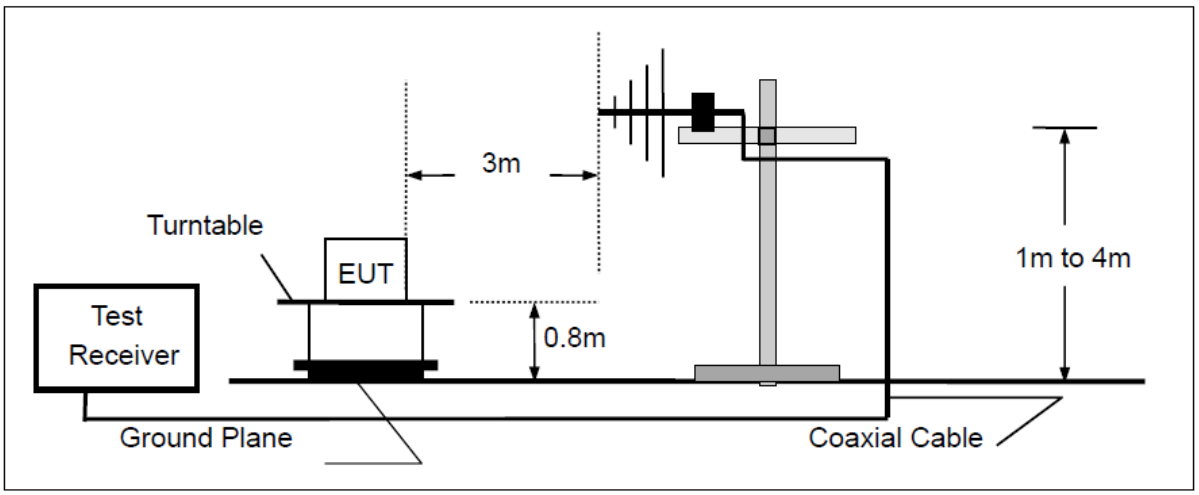
1. The testing follows the guidelines in Spurious Radiated Emissions of FCC Public Notice DA 00-705 Measurement Guidelines.
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
5. Set to the maximum power setting and enable the EUT transmit continuously.
6. Use the following spectrum analyzer settings:
   (1) Span shall wide enough to fully capture the emission being measured;
   (2) Set RBW=100 kHz for f < 1 GHz, RBW=1MHz for f>1GHz ; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold for peak
   (3) For average measurement: use duty cycle correction factor method per 15.35(c).
   Duty cycle = On time/100 milliseconds
   On time = N1*L1+N2*L2+...+Nn-1*LNn-1+Nn*Ln
   Where N1 is number of type 1 pulses, L1 is length of type 1 pulses, etc.
   Average Emission Level = Peak Emission Level + 20*log(Duty cycle)
7. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

5.7.4 Block Diagram of Test Setup

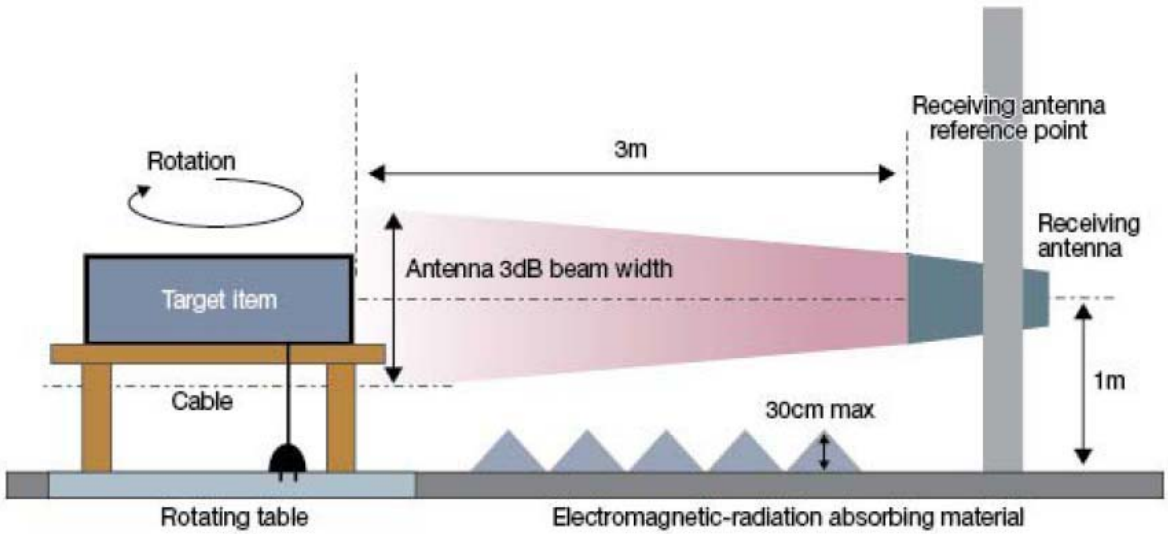
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz



5.7.5 Test Result

5.7.5.1 Frequency Below 30MHz & Above 1GHz

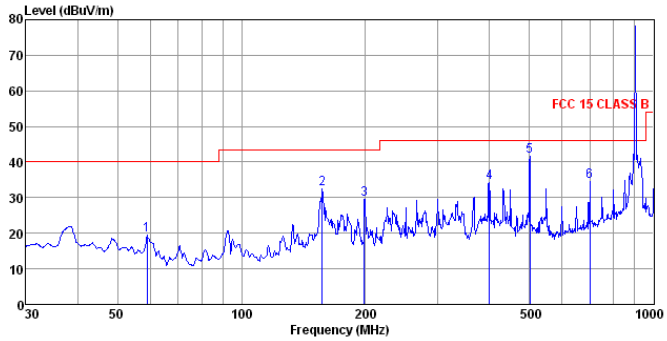
Frequency [MHz]	Reading [dB μV]	Polari-zation [H/V]	Correction Factor [dB]	Result [dB μV/m]	Limit [dB μV/m]	Margin [dB]	State
-	-	-	-	-	-	-	PASS

Remark: §15.31(o)_The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this part.

5.7.5.2 Frequency Below 1000MHz

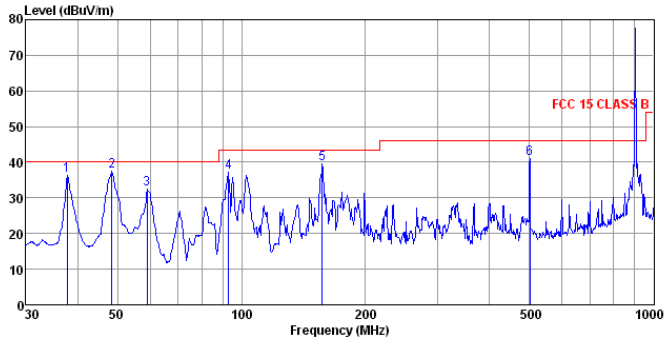
902.75 MHz (Low)

Horizontal



	Freq	Read Level	Antenna Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	
1	59.03	42.38	9.55	0.08	19.46	40.00	-20.54	Peak
2	157.01	46.40	17.89	0.32	32.35	43.50	-11.15	Peak
3	198.59	50.80	10.58	0.42	29.50	43.50	-14.00	Peak
4	399.03	49.66	15.72	0.80	34.23	46.00	-11.77	Peak
5	501.18	53.90	18.24	0.89	41.53	46.00	-4.47	Peak
6	699.30	44.51	20.80	1.07	34.60	46.00	-11.40	Peak

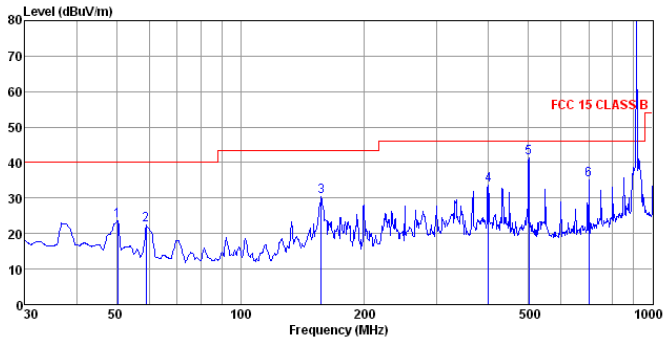
Vertical



	Freq	Read Level	Antenna Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	
1	37.81	58.78	10.34	0.03	36.42	40.00	-3.58	Peak
2	48.50	60.11	9.84	0.05	37.36	40.00	-2.64	Peak
3	59.03	55.43	9.55	0.08	32.51	40.00	-7.49	Peak
4	93.11	59.06	10.16	0.16	37.12	43.50	-6.38	Peak
5	157.01	53.62	17.89	0.32	39.57	43.50	-3.93	Peak
6	501.18	53.39	18.24	0.89	41.02	46.00	-4.98	Peak

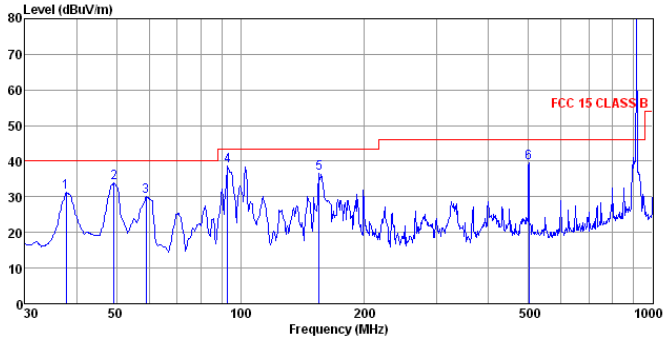
914.75 MHz (Middle)

Horizontal



	Freq	Read Level	Antenna Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	
1	50.41	46.47	9.75	0.06	23.65	40.00	-16.35	Peak
2	59.03	45.29	9.55	0.08	22.37	40.00	-17.63	Peak
3	157.01	44.39	17.89	0.32	30.34	43.50	-13.16	Peak
4	399.03	48.96	15.72	0.80	33.53	46.00	-12.47	Peak
5	501.18	53.62	18.24	0.89	41.25	46.00	-4.75	Peak
6	699.30	45.09	20.80	1.07	35.18	46.00	-10.82	Peak

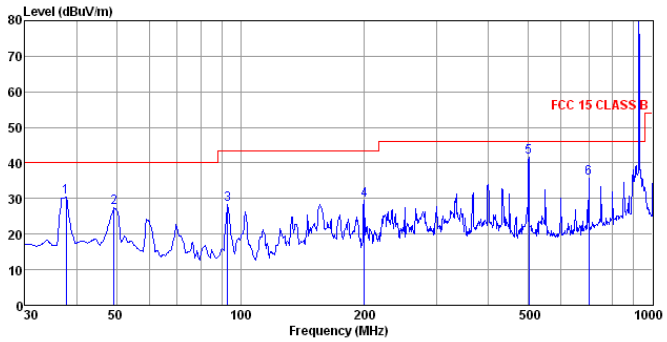
Vertical



	Freq	Read Level	Antenna Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	
1	37.81	53.62	10.34	0.03	31.26	40.00	-8.74	Peak
2	49.36	56.65	9.79	0.06	33.87	40.00	-6.13	Peak
3	59.03	53.03	9.55	0.08	30.11	40.00	-9.89	Peak
4	93.11	60.72	10.16	0.16	38.78	43.50	-4.72	Peak
5	155.36	50.81	17.67	0.31	36.53	43.50	-6.97	Peak
6	501.18	52.00	18.24	0.89	39.63	46.00	-6.37	Peak

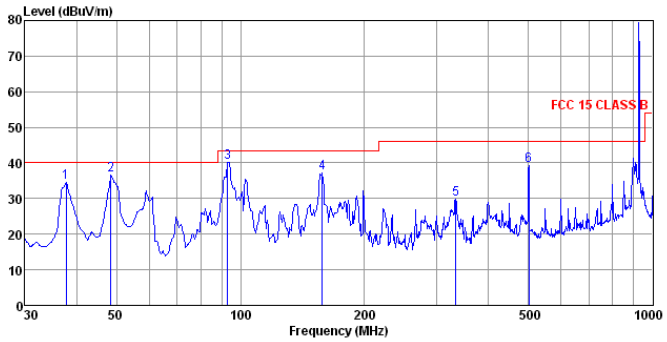
927.25 MHz (High)

Horizontal



	Freq	Read Level	Antenna Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	
1	37.81	52.65	10.34	0.03	30.29	40.00	-9.71	Peak
2	49.36	50.20	9.79	0.06	27.42	40.00	-12.58	Peak
3	93.11	50.22	10.16	0.16	28.28	43.50	-15.22	Peak
4	199.99	51.10	10.43	0.42	29.65	43.50	-13.85	Peak
5	501.18	53.99	18.24	0.89	41.62	46.00	-4.38	Peak
6	699.30	45.71	20.80	1.07	35.80	46.00	-10.20	Peak

Vertical



	Freq	Read Level	Antenna Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	
1	37.81	56.78	10.34	0.03	34.42	40.00	-5.58	Peak
2	48.50	59.42	9.84	0.05	36.67	40.00	-3.33	Peak
3	93.11	62.22	10.16	0.16	40.28	43.50	-3.22	Peak
4	158.11	51.21	18.04	0.32	37.31	43.50	-6.19	Peak
5	332.52	47.40	14.12	0.64	29.91	46.00	-16.09	Peak
6	501.18	51.66	18.24	0.89	39.29	46.00	-6.71	Peak

5.8 AC Power Conducted Emission

5.8.1 Test Equipment

EQUIPMENT	MODEL	MANUFACTURE	SERIAL NUMBER	Calibration Due date (year/month/date)	Calibration Interval
Test Receiver	ESPI	ROHDE & SCHWARZ	100063	2017/01/08	1 year
#2 Conducted Cable_2.7m	N/A	N/A	N/A	2017/01/08	1 year
LISN	LN2-16N	EMCIS	LN16004	2017/03/24	1 year
ISN	CAT3-8158	SCHWARZBECK	79	2017/11/25	1 year
HIGH VOLTAGE PROBE	TK9420	SCHWARZBECK	9420-587	2017/05/15	1 year
INJECTION PROBE	F-120-9A	FCC	289	2018/01/05	1 year
CURRENT PROBE	F-16	FCC	63	2018/01/05	1 year

5.8.2 Test Limit

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

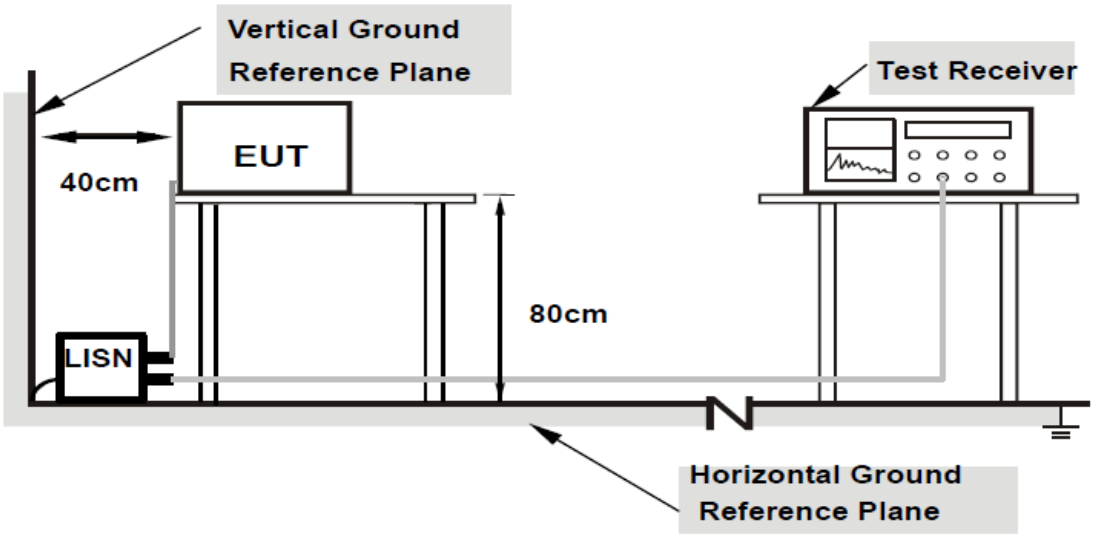
Frequency of emission(MHz)	Conducted limit(dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

5.8.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network(LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

5.8.4 Measurement Set-Up



5.8.5 Test Result

Conducted Test Report — BWS TECH EMC Team

BWS TECH INC.

EMI Measurement Test Report

Device Under Test: SST-US-URFR01A
Operating Conditions: L1
Test Specification: FCC PART 15 SUBPART C CLASS A
Comment:

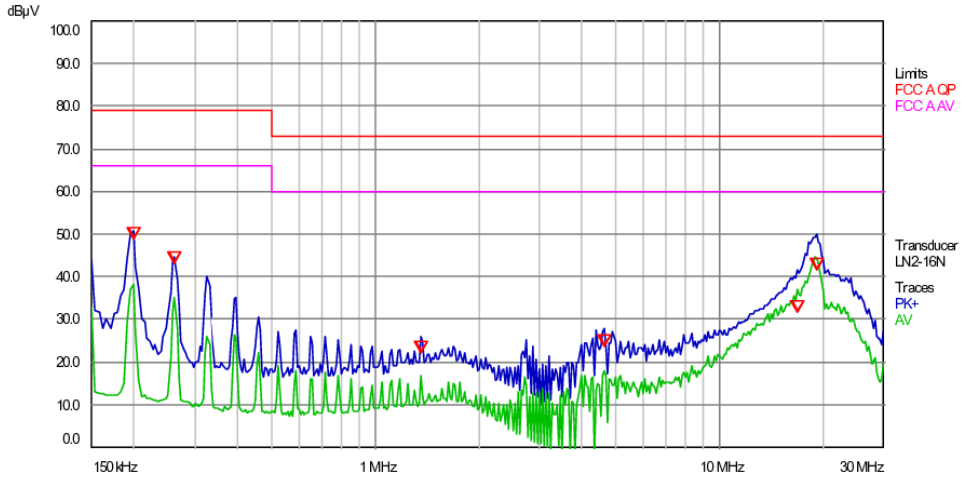
Scan Settings (3 Ranges)

Frequencies			Receiver Settings			
Start	**Stop**	**Step**	**Res BW**	**M-Time**	**Atten**	**Preamp**
150 kHz	500 kHz	4 kHz	9 kHz (6dB)	50 ms	Auto	Off
500 kHz	5 MHz	4 kHz	9 kHz (6dB)	20 ms	Auto	Off
5 MHz	30 MHz	4 kHz	9 kHz (6dB)	10 ms	20 dB	Off

Final Measurement

Detectors: QP, CA
Peaks: 10
Meas Time: 1 s
Acc. Margin: 3 dB

Pre-measurement Graph



1 of 2

Conducted Test Report BWS TECH EMC Team

Final Measurement Results

Trace	Frequency (MHz)	Level (dBµV)	Limit (dBµV)	Delta Limit (dB)	Delta Ref (dB)	Comment
1 QP	0.198	48.92	79.00	-30.08		
1 QP	0.262	43.22	79.00	-35.78		
1 QP	1.36	22.23	73.00	-50.77		
1 QP	4.636	23.54	73.00	-49.46		
1 QP	16.908	31.87	73.00	-41.13		
1 QP	19.128	41.72	73.00	-31.28		

* = limit exceeded

Conducted Test Report BWS TECH EMC Team

BWS TECH INC.

EMI Measurement Test Report

Device Under Test SST-US-URFR01A
Operating Conditions N
Test Specification FCC PART 15 SUBPART C CLASS A
Comment

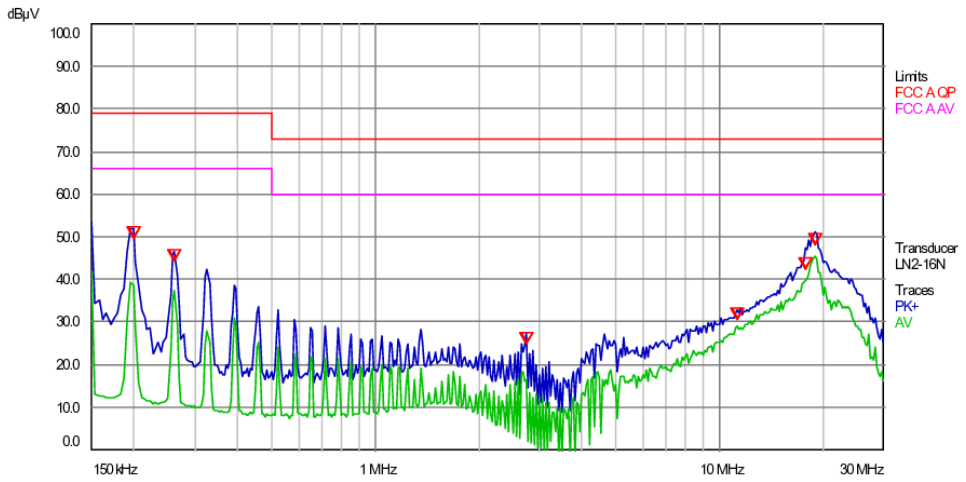
Scan Settings (3 Ranges)

Frequencies			Receiver Settings			
Start	Stop	Step	Res BW	M-Time	Atten	Preamp
150 kHz	500 kHz	4 kHz	9 kHz (6dB)	50 ms	Auto	Off
500 kHz	5 MHz	4 kHz	9 kHz (6dB)	20 ms	Auto	Off
5 MHz	30 MHz	4 kHz	9 kHz (6dB)	10 ms	20 dB	Off

Final Measurement

Detectors: QP, CA
Peaks: 10
Meas Time: 1 s
Acc. Margin: 3 dB

Pre-measurement Graph



Conducted Test Report BWS TECH EMC Team

Final Measurement Results

Trace	Frequency (MHz)	Level (dBµV)	Limit (dBµV)	Delta Limit (dB)	Delta Ref (dB)	Comment
1 QP	0.198	49.64	79.00	-29.36		
1 QP	0.262	44.46	79.00	-34.54		
1 QP	2.74	24.81	73.00	-48.19		
1 QP	11.284	30.62	73.00	-42.38		
1 QP	17.808	42.33	73.00	-30.67		
1 QP	18.98	47.98	73.00	-25.02		

* = limit exceeded

5.9 Antenna Requirement

5.9.1 Antenna Requirement

For intentional device, according to FCC 47 CFR 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. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

Standard	Requirement
FCC CFR Part 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

Model	Antenna Type	Frequency	Antenna Gain
ANBIT-RFID-915M21/08-US	Micro-Strip Patch Type	902 - 928 MHz	10.89 dBi

Note: The limit of the maximum peak conducted output power was reduced by the amount which the direction gain of the antenna exceeds 6dBi.

5.9.2 Result

PASS