

FCC REPORT

Applicant: Shenzhen Vanch intelligent technology Co.,Ltd

Address of Applicant: 2 Floor,TaiHua Building B Block, Area 45,Baoan District,
Shenzhen, China

Equipment Under Test (EUT)

Product Name: Fixed Reader

Model No.: VF-642,VF-642T

FCC ID: Q5YVANCH21891501

Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.247:2011

Date of sample receipt: 13 Sep., 2012

Date of Test: 18 Sep.,2012 to 18 Jan., 2013

Date of report issued: 18 Jan., 2013

Test Result : PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Bruce Zhang
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the CCIS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

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2 Version

Version No.	Date	Description
00	18 Jan., 2013	Original

Prepared By:

Lisa chen

Report Clerk

Date:

18 Jan., 2013

Check By:

Joe. Zhou

Project Engineer

Date:

18 Jan., 2013

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4 Test Summary

Test Item	Section in CFR 47	Result
Antenna Requirement	15.203/15.247 (c)	Pass
AC Power Line Conducted Emission	15.207	Pass
Conducted Peak Output Power	15.247 (b)(1)	Pass
20dB Occupied Bandwidth	15.247 (a)(1)	Pass
Carrier Frequencies Separation	15.247 (a)(1)	Pass
Hopping Channel Number	15.247 (a)(1)	Pass
Dwell Time	15.247 (a)(1)	Pass
Pseudorandom Frequency Hopping Sequence	15.247(b)(4)&TCB Exclusion List (7 July 2002)	Pass
Radiated Emission	15.205/15.209	Pass
Band Edge	15.247(d)	Pass

Pass: The EUT complies with the essential requirements in the standard.

5 General Information

5.1 Client Information

Applicant:	Shenzhen Vanch intelligent technology Co.,Ltd
Address of Applicant:	2 Floor, TaiHua Building B Block, Area 45, Baoan District, Shenzhen, China
Manufacturer/Factory:	Shenzhen Vanch intelligent technology Co.,Ltd
Address of Manufacturer/Factory:	2 Floor, TaiHua Building B Block, Area 45, Baoan District, Shenzhen, China

5.2 General Description of E.U.T.

Product Name:	Fixed Reader
Model No.:	VF-642,VF-642T
Operation Frequency:	902.5MHz~927.5MHz
Channel numbers:	51
Channel separation:	500kHz
Modulation type:	GFSK
Antenna Type:	Converse SMA Antenna
Antenna gain:	6 dBi
AC adapter :	Model No.:WT1203000 Input:100-240V AC,50/60Hz 1.6A Output:12V DC MAX3A
Remark:	The Model no.: VF-642 and VF-642T identical inside, electrical circuit design, PCB layout, components used and internal wiring ,only being different appearance and color, we selected VF-642 for full tests.

Operation Frequency each of channel					
Channel	Frequency	Channel	Frequency	Channel	Frequency
1	902.5 MHz	21	912.5 MHz	41	922.5 MHz
2	903 MHz	22	913 MHz	42	923 MHz
3	903.5 MHz	23	913.5 MHz	43	923.5 MHz
4	904 MHz	24	914 MHz	44	924 MHz
5	904.5 MHz	25	914.5 MHz	45	924.5 MHz
6	905 MHz	26	915 MHz	46	925 MHz
7	905.5 MHz	27	915.5 MHz	47	925.5 MHz
8	906 MHz	28	916 MHz	48	926 MHz
9	906.5 MHz	29	916.5 MHz	49	926.5 MHz
10	907 MHz	30	917 MHz	50	927 MHz
11	907.5 MHz	31	917.5 MHz	51	927.5 MHz
12	908 MHz	32	918 MHz		
13	908.5 MHz	33	918.5 MHz		
14	909 MHz	34	919 MHz		
15	909.5 MHz	35	919.5 MHz		
16	910 MHz	36	920 MHz		
17	910.5 MHz	37	920.5 MHz		
18	911 MHz	38	921 MHz		
19	911.5 MHz	39	921.5 MHz		
20	912 MHz	40	922 MHz		

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The lowest channel	902.5MHz
The middle channel	915MHz
The Highest channel	927.5MHz

5.3 Test mode

Operation mode	Keep the EUT in continuous transmitting with modulation in MIMO mode.
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5.4 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

● **FCC —Registration No.:** 817957

China Certification & Inspection Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 817957, February 27, 2012

● **Industry Canada (IC)**

The 3m Semi-anechoic chamber of China Certification & Inspection Services Co., Ltd. Has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

5.5 Test Location

All tests were performed at:

China Certification & Inspection Services Co., Ltd.

Address: 1st Floor, Block No.2, Laodong Industrial Zone, Xixiang Road Baoan District, Shenzhen, China

Tel: 0755-23118282

Fax: 0755-23116366

5.6 Other Information Requested by the Customer

None.

5.7 Test Instruments list

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (dd-mm-yy)	Cal.Due date (dd-mm-yy)
1	3m Semi- Anechoic Chamber	SAEMC	9(L)*6(W)* 6(H)	CCIS0001	June 09 2012	June 08 2013
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	CCIS0002	N/A	N/A
3	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	CCIS0005	June 04 2012	June 03 2013
4	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	CCIS0006	May 30 2012	May 29 2013
5	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
6	Coaxial Cable	CCIS	N/A	CCIS0016	Apr. 01 2012	Mar. 31 2013
7	Coaxial Cable	CCIS	N/A	CCIS0017	Apr. 01 2012	Mar. 31 2013
8	Coaxial cable	CCIS	N/A	CCIS0018	Apr. 01 2012	Mar. 31 2013
9	Coaxial Cable	CCIS	N/A	CCIS0019	Apr. 01 2012	Mar. 31 2013
10	Coaxial Cable	CCIS	N/A	CCIS0087	Apr. 01 2012	Mar. 31 2013
11	Amplifier(10kHz-1.3GHz)	HP	8447D	CCIS0003	Apr. 01 2012	Mar. 31 2013
12	Amplifier(1GHz-18GHz)	Compliance Direction Systems Inc.	PAP-1G18	CCIS0011	June 09 2012	June 08 2013
13	Pre-amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	Apr. 01 2012	Mar. 31 2013
14	Horn Antenna	ETS-LINDGREN	3160	GTS217	Mar. 30 2012	Mar. 29 2013
15	Printer	HP	HP LaserJet P1007	N/A	N/A	N/A
16	Positioning Controller	UC	UC3000	CCIS0015	N/A	N/A
17	Spectrum analyzer 9k-30GHz	Rohde & Schwarz	FSP	CCIS0023	May. 29 2012	May. 28 2013
18	Loop antenna	Laplace instrument	RF300	EMC0701	Aug. 12 2012	Aug. 11 2013
19	EMI Test Receiver	Rohde & Schwarz	ESCI	CCIS0002	May 25 2012	May 24 2013

Conducted Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (dd-mm-yy)	Cal. Due date (dd-mm-yy)
1	Shielding Room	ZhongShuo Electron	11.0(L)x4.0(W)x3.0(H)	CCIS0061	June 09 2012	June 08 2013
2	EMI Test Receiver	Rohde & Schwarz	ESPI	CCIS0022	Apr 01 2012	Mar. 31 2013
3	LISN	CHASE	MN2050D	CCIS0074	Apr 01 2012	Mar. 31 2013
4	Coaxial Cable	CCIS	N/A	CCIS0086	Apr. 01 2012	Mar. 31 2013
5	EMI Test Software	AUDIX	E3	N/A	N/A	N/A

6 Test results and Measurement Data

6.1 Antenna requirement:

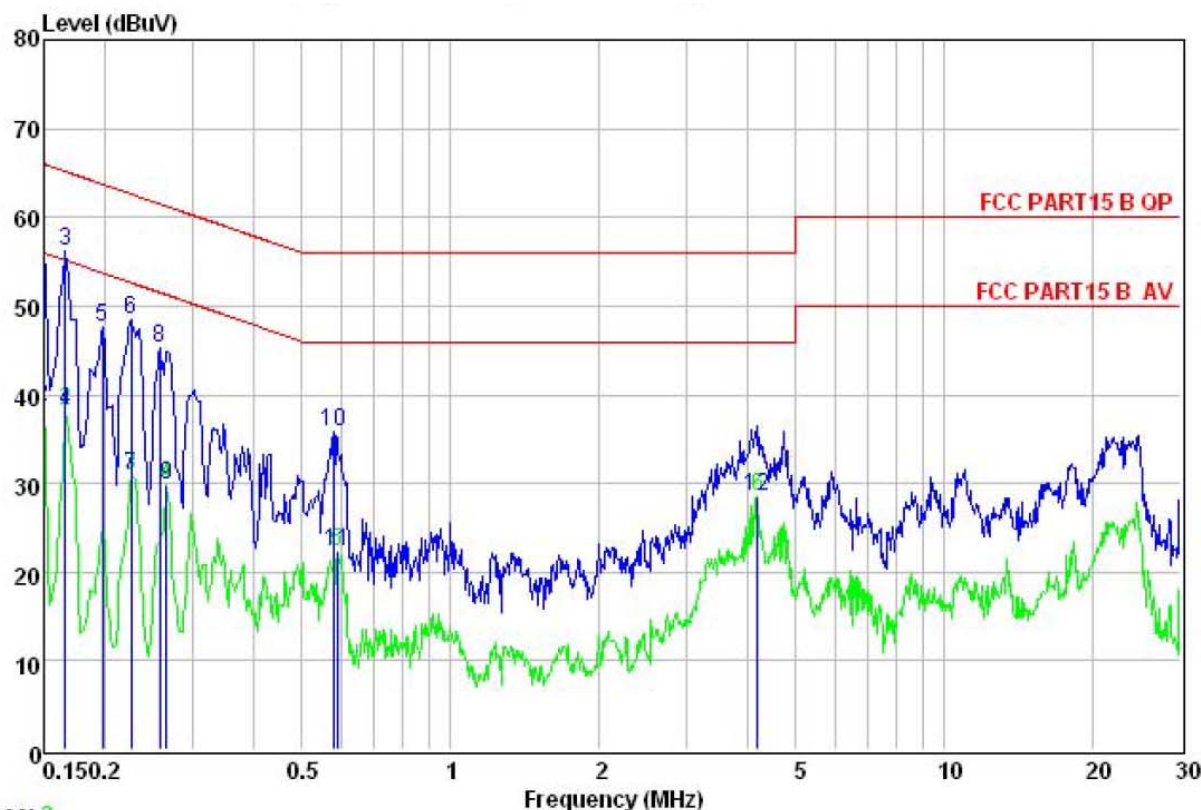
Standard requirement:	FCC Part15 C Section 15.203 /247(c)
<i>15.203 requirement:</i> <i>An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, 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.</i> <i>15.247(b) (4) requirement:</i> <i>The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional</i>	
E.U.T Antenna:	
<i>The antennas are converse SMA antennas and no consideration of replacement. The best case gain of the antenna is 6dBi.</i>	
	

6.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207			
Test Method:	ANSI C63.4:2003			
Test Frequency Range:	150kHz to 30MHz			
Class / Severity:	Class B			
Receiver setup:	RBW=9kHz, VBW=30kHz, Sweep time=auto			
Limit:	Frequency range (MHz)	Limit (dBuV)		
		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.				
Test procedure	1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). The provide a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2009 on conducted measurement.			
Test setup:	Reference Plane LISN AUX Equipment E.U.T EMI Receiver 40cm 80cm LISN Filter AC power Test table/Insulation plane Remark: E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m			
Test Instruments:	Refer to section 4.7 for details			
Test mode:	Refer to section 5.3 for details			
Test results:	Pass			

Measurement Data

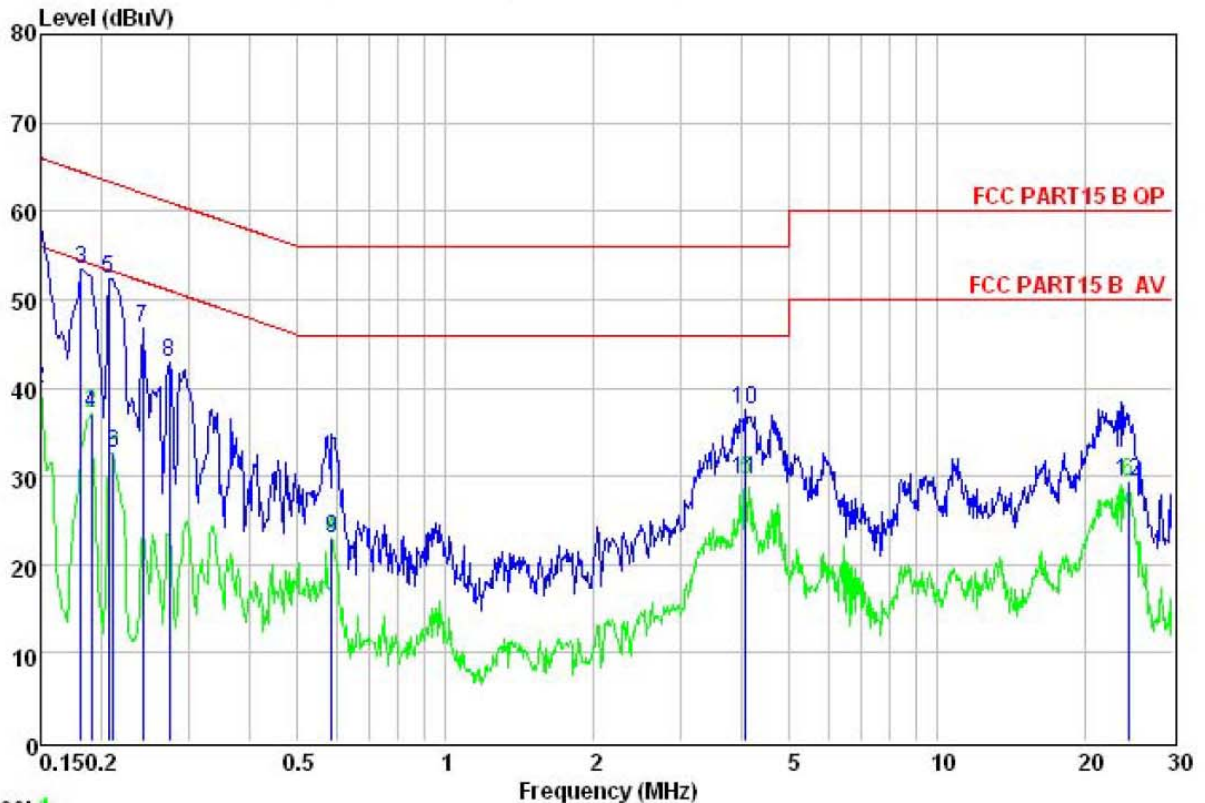
line:



Site : CCIS Conducted Test Site
 Condition : FCC PART15 B QP LISN LINE
 Job No. : 152RF
 EUT : RF ID
 Test Mode : wireless mode
 Power Rating : AC 120V/60Hz
 Environment : Temp: 23 °C Humi:56% Atmos:101KPa
 Test Engineer: Joe

	Read Freq	LISN Level	Cable Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.150	45.44	10.25	0.79	56.48	66.00	-9.52	QP
2	0.150	27.61	10.25	0.79	38.65	56.00	-17.35	Average
3	0.166	45.21	10.24	0.78	56.23	65.16	-8.93	QP
4	0.166	27.13	10.24	0.78	38.15	55.16	-17.01	Average
5	0.198	36.64	10.21	0.76	47.61	63.71	-16.10	QP
6	0.226	37.49	10.23	0.76	48.48	62.61	-14.13	QP
7	0.226	19.94	10.23	0.76	30.93	52.61	-21.68	Average
8	0.258	34.35	10.24	0.75	45.34	61.51	-16.17	QP
9	0.266	18.76	10.24	0.74	29.74	51.25	-21.51	Average
10	0.579	24.89	10.23	0.76	35.88	56.00	-20.12	QP
11	0.589	11.23	10.23	0.76	22.22	46.00	-23.78	Average
12	4.180	17.37	10.29	0.89	28.55	46.00	-17.45	Average

Neutral:



Trace: 1

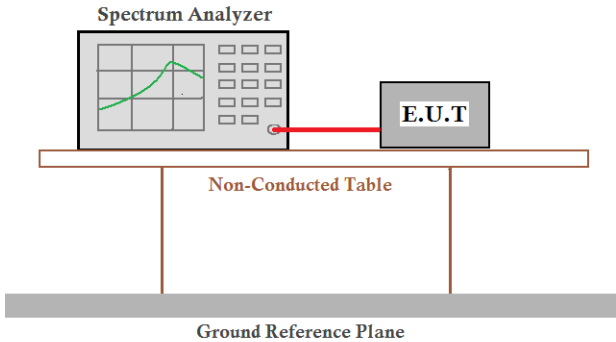
Site : CCIS Conducted Test Site
 Condition : FCC PART15 B QP LISN NEUTRAL
 Job No. : 152RF
 EUT : RF ID
 Test Mode : wireless mode
 Power Rating : AC 120V/60Hz
 Environment : Temp: 23 °C Humi:56% Atmos:101KPa
 Test Engineer: Joe

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.150	47.15	10.27	0.79	58.21	66.00	-7.79	QP
2	0.150	28.82	10.27	0.79	39.88	56.00	-16.12	Average
3	0.182	42.48	10.24	0.77	53.49	64.42	-10.93	QP
4	0.190	26.00	10.24	0.76	37.00	54.02	-17.02	Average
5	0.206	41.35	10.23	0.76	52.34	63.36	-11.02	QP
6	0.211	21.64	10.23	0.76	32.63	53.18	-20.55	Average
7	0.242	35.85	10.23	0.75	46.83	62.04	-15.21	QP
8	0.274	31.91	10.24	0.74	42.89	60.98	-18.09	QP
9	0.585	11.90	10.22	0.76	22.88	46.00	-23.12	Average
10	4.070	26.30	10.28	0.89	37.47	56.00	-18.53	QP
11	4.070	18.35	10.28	0.89	29.52	46.00	-16.48	Average
12	24.400	17.99	10.53	0.87	29.39	50.00	-20.61	Average

Notes:

1. An initial pre-scan was performed on the live and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level =Receiver Read level + LISN Factor + Cable Loss

6.3 Conducted Peak Output Power

Test Requirement:	FCC Part15 C Section 15.247 (b)(2)
Test Method:	ANSI C63.4:2003 ,DA00-705 and KDB 662911
Receiver setup:	RBW=30kHz, VBW=100kHz, Detector=Peak
Limit:	30dBm
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both are placed on a Non-Conducted Table, which is supported by two vertical legs. Below the table is a Ground Reference Plane.
Test Instruments:	Refer to section 4.7 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Measurement Data

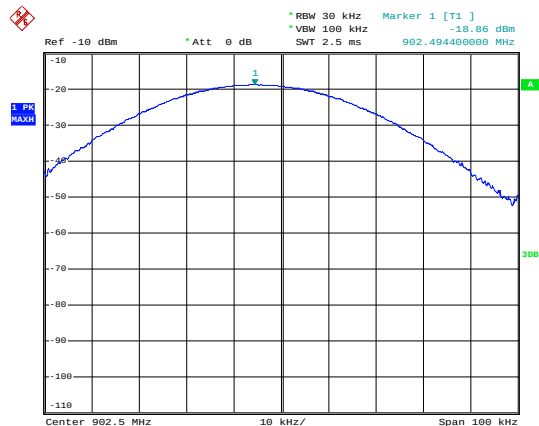
Test channel	Antenna Port	Peak Output Power (dBm)	Total Power (dBm)	Limit (dBm)	Result
Lowest	Ant 1	-18.86	-12.83	23.98	Pass
	Ant 2	-18.88			
	Ant 3	-18.84			
	Ant 4	-18.84			
Middle	Ant 1	-18.78	-12.78		
	Ant 2	-18.80			
	Ant 3	-18.84			
	Ant 4	-18.80			
Highest	Ant 1	-16.93	-10.82		
	Ant 2	-16.99			
	Ant 3	-16.94			
	Ant 4	-16.55			

Note: Limit = 30 dBm – (Directional Gain- 6)

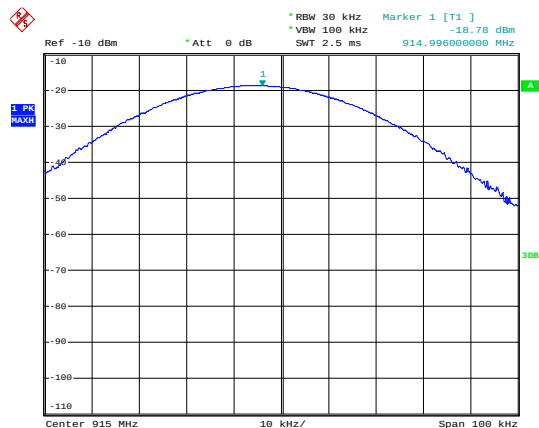
Directional Gain= 6 + 10 log (4)

Test plot as follows:

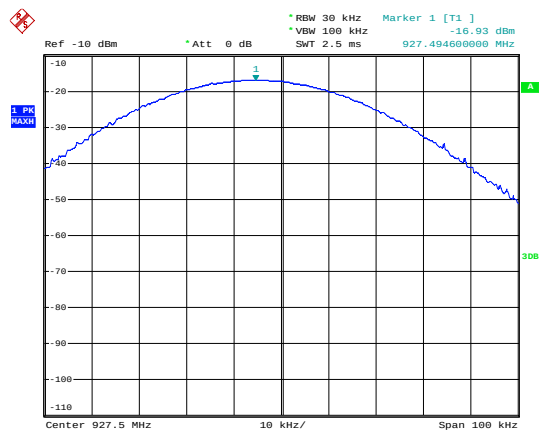
Ant 1



Lowest channel

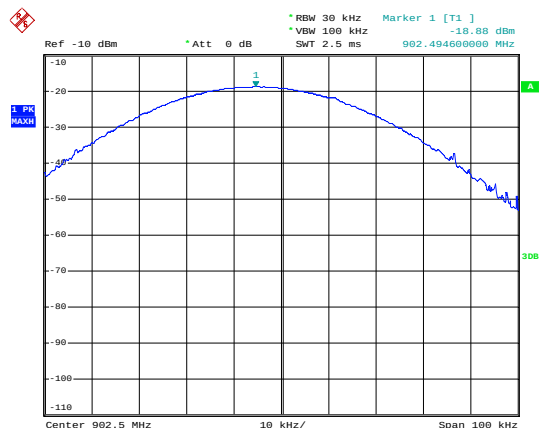


Middle channel

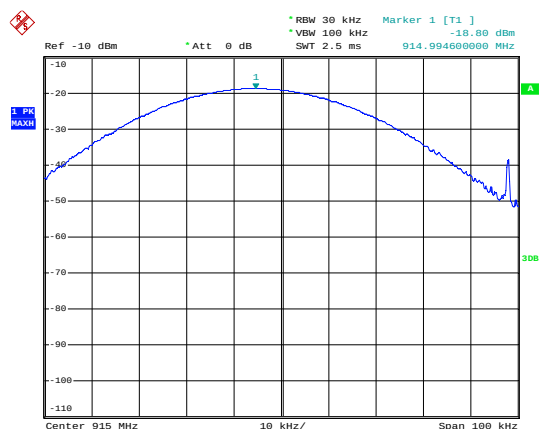


Highest channel

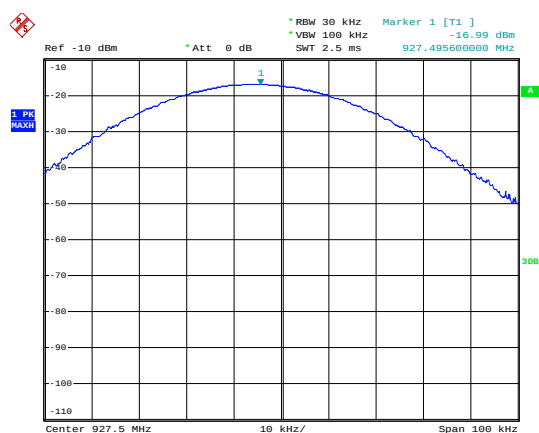
Ant 2



Lowest channel

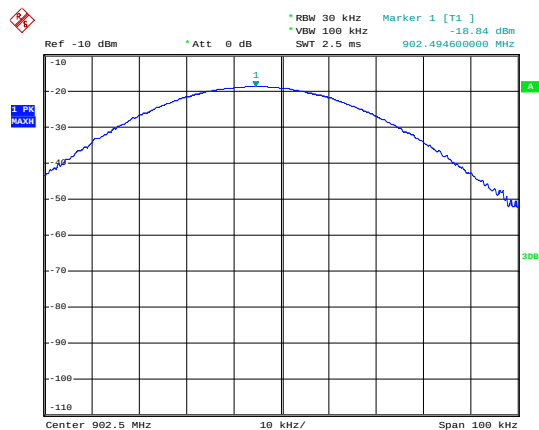


Middle channel

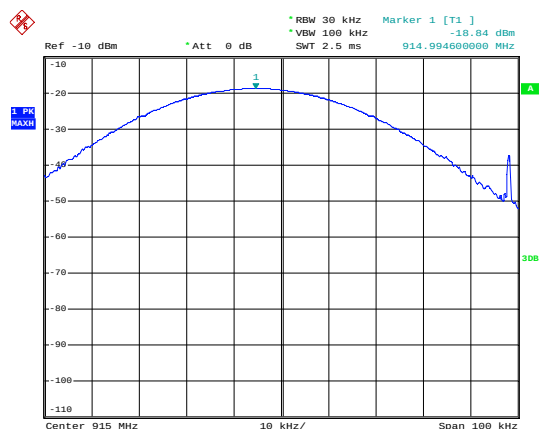


Highest channel

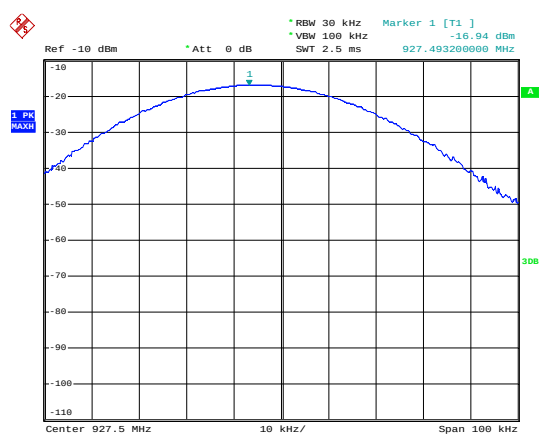
Ant 3



Lowest channel

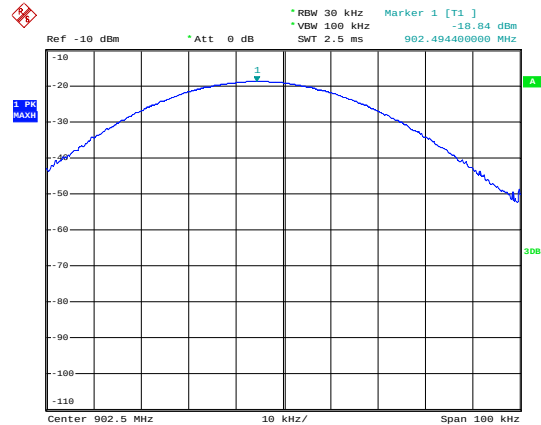


Middle channel

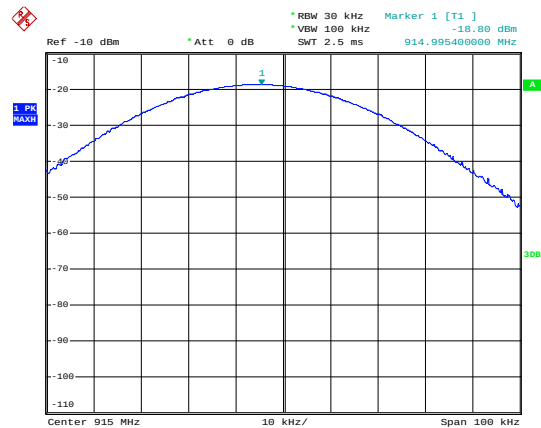


Highest channel

Ant 4

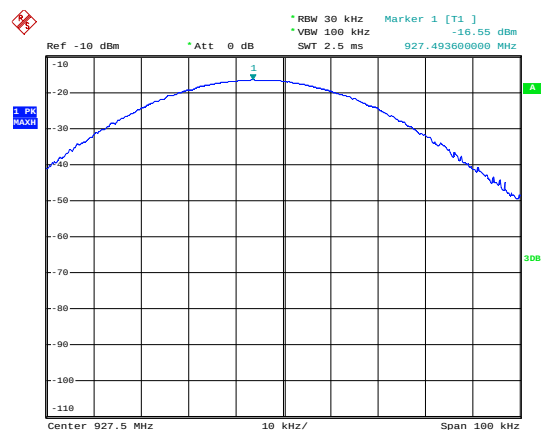


Lowest channel



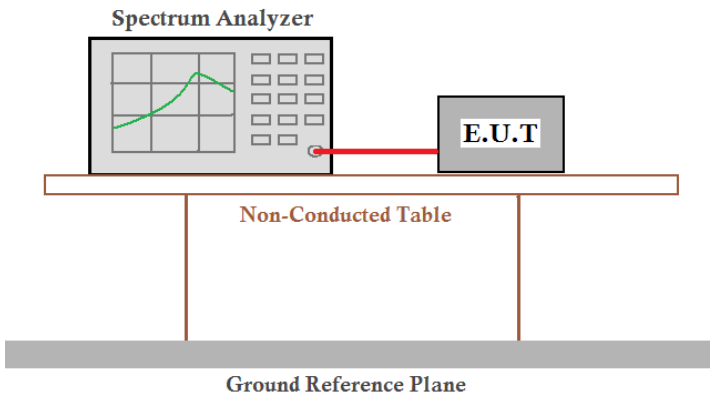
Date: 17 JAN 2012 10:42:42

Middle channel



Highest channel

6.4 20dB Occupy Bandwidth

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)(i)
Test Method:	ANSI C63.4:2003 ,DA00-705 and KDB 662911
Receiver setup:	RBW=10kHz, VBW=30kHz,detector=Peak
Limit:	N/A
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by two vertical legs. Below the table is a Ground Reference Plane.
Test Instruments:	Refer to section 4.7 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Measurement Data

Ant 1

Test channel	20dB Occupy Bandwidth (kHz)
Lowest	27.60
Middle	27.60
Highest	27.20

Ant 2

Test channel	20dB Occupy Bandwidth (kHz)
Lowest	27.60
Middle	28.00
Highest	27.60

Ant 3

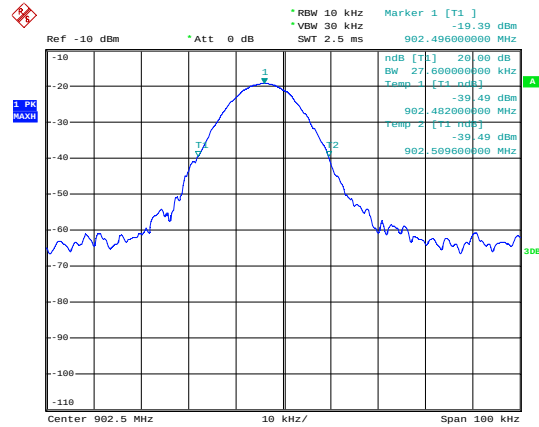
Test channel	20dB Occupy Bandwidth (kHz)
Lowest	28.00
Middle	27.40
Highest	28.00

Ant 4

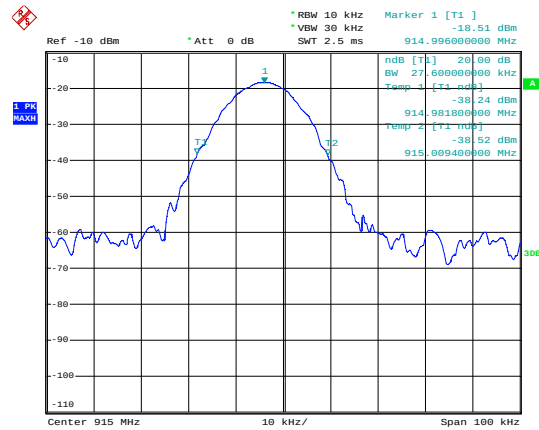
Test channel	20dB Occupy Bandwidth (kHz)
Lowest	27.40
Middle	27.40
Highest	27.40

Test plot as follows:

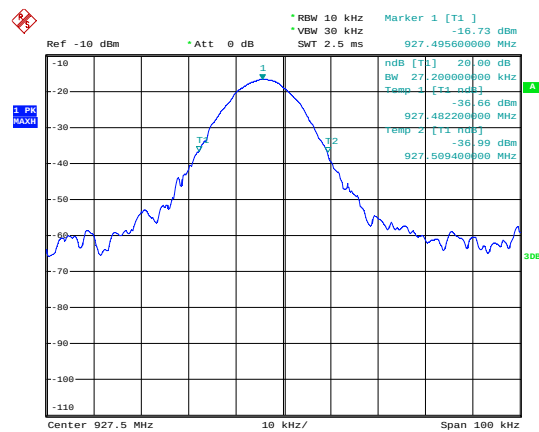
Ant 1



Lowest channel

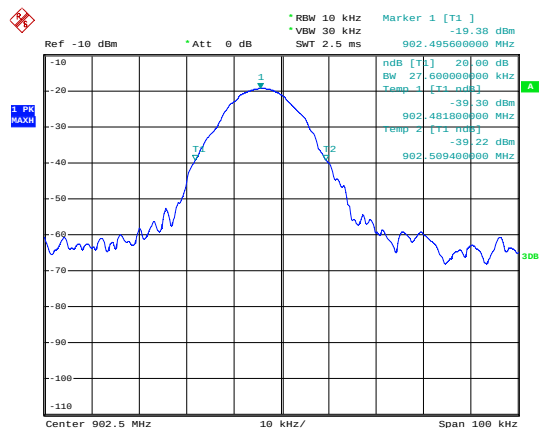


Middle channel

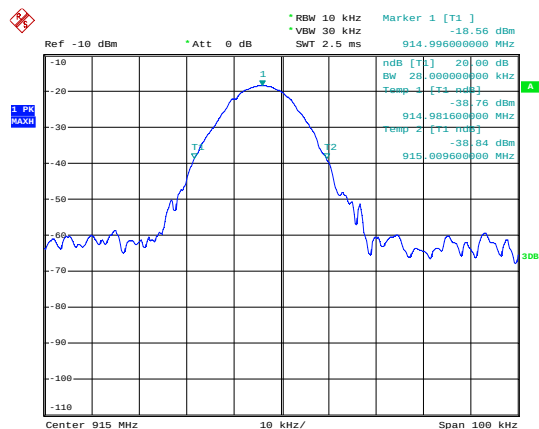


Highest channel

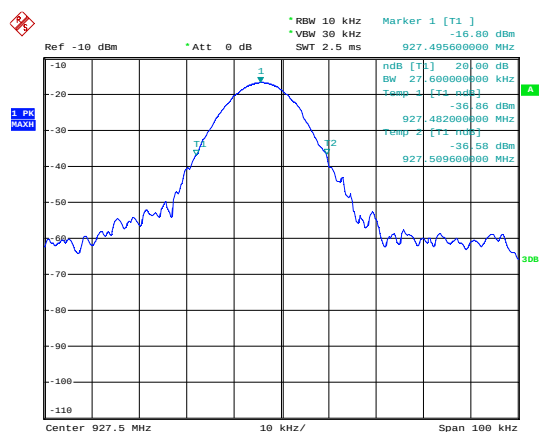
Ant 2



Lowest channel

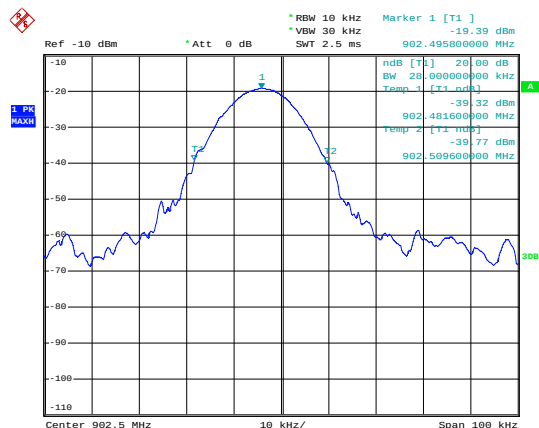


Middle channel

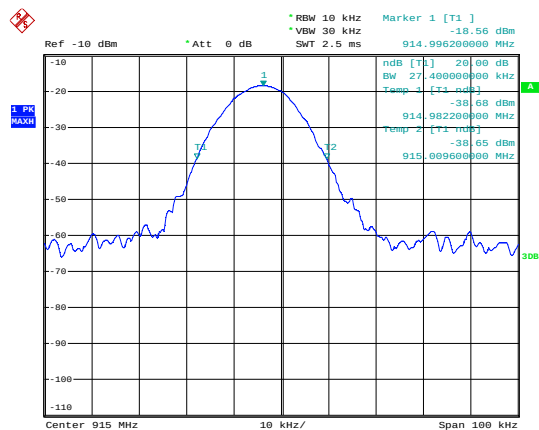


Highest channel

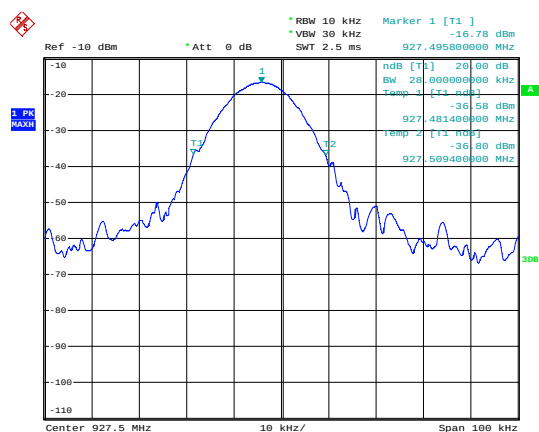
Ant 3



Lowest channel

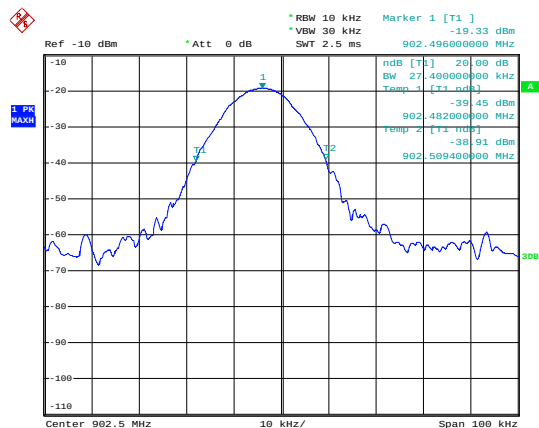


Middle channel

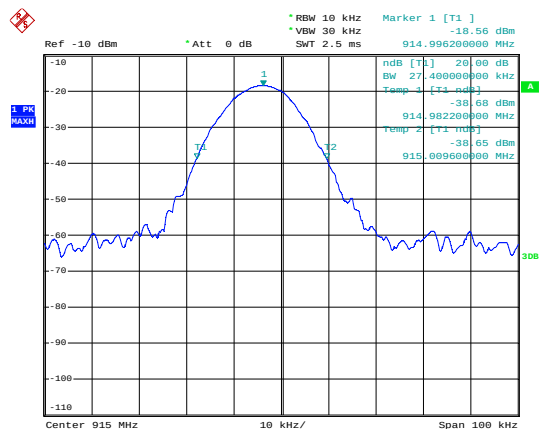


Highest channel

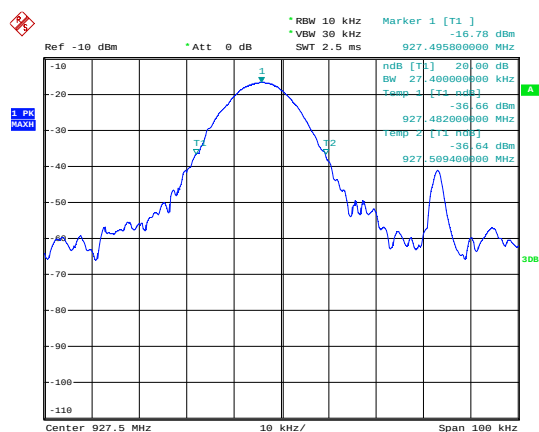
Ant 4



Lowest channel

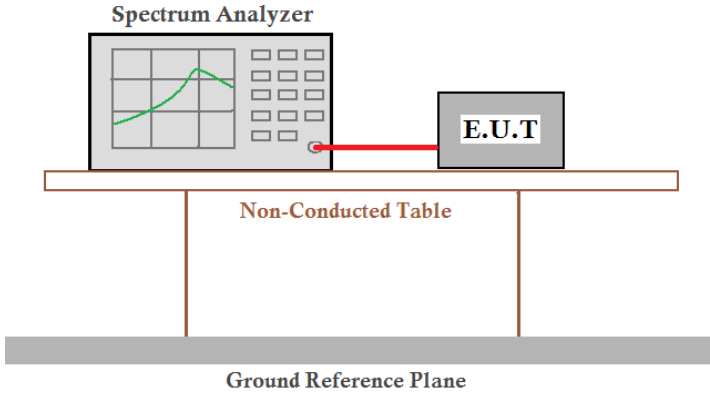


Middle channel



Highest channel

6.5 Carrier Frequencies Separation

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.4:2003 ,DA00-705 and KDB 662911
Receiver setup:	RBW=100kHz, VBW=300kHz, detector=Peak
Limit:	0.025MHz or the 20dB bandwidth (whichever is greater)
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by two vertical legs. Below the table is a Ground Reference Plane.
Test Instruments:	Refer to section 4.7 for details
Test mode:	Hopping mode
Test results:	Pass

Measurement Data

Ant 1

Test channel	Carrier Frequencies Separation (kHz)	Limit (kHz)	Result
Lowest	500	27.20	Pass
Middle	500	27.40	Pass
Highest	504	27.40	Pass

Ant 2

Test channel	Carrier Frequencies Separation (kHz)	Limit (kHz)	Result
Lowest	500	27.40	Pass
Middle	500	27.20	Pass
Highest	500	27.60	Pass

Ant 3

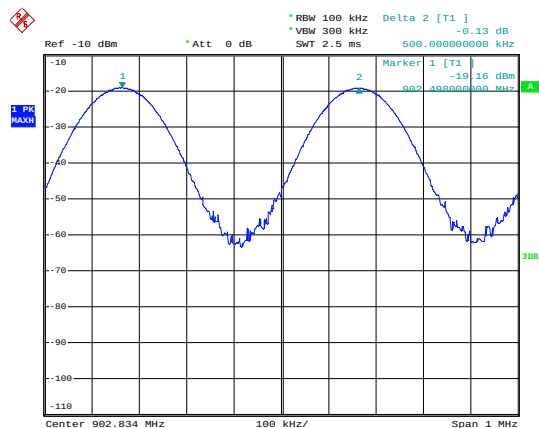
Test channel	Carrier Frequencies Separation (kHz)	Limit (kHz)	Result
Lowest	500	27.20	Pass
Middle	500	27.20	Pass
Highest	500	28.40	Pass

Ant 4

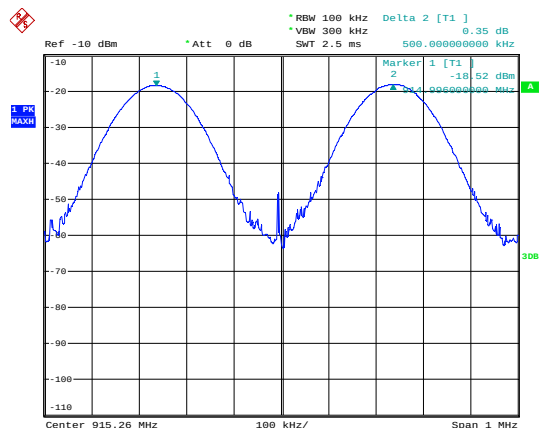
Test channel	Carrier Frequencies Separation (kHz)	Limit (kHz)	Result
Lowest	500	27.60	Pass
Middle	500	28.80	Pass
Highest	500	27.00	Pass

Test plot as follows:

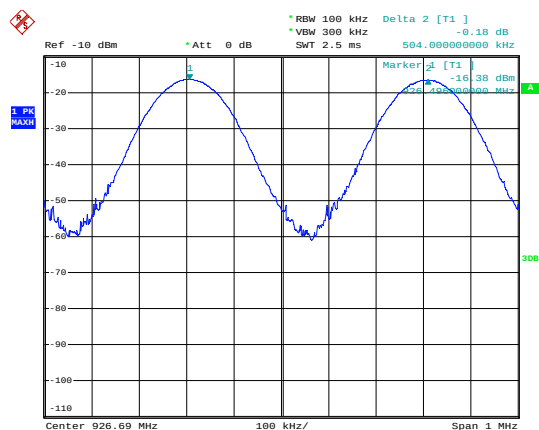
Ant 1



Lowest channel

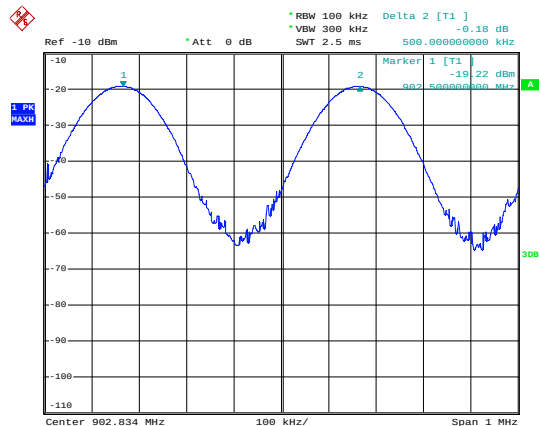


Middle channel

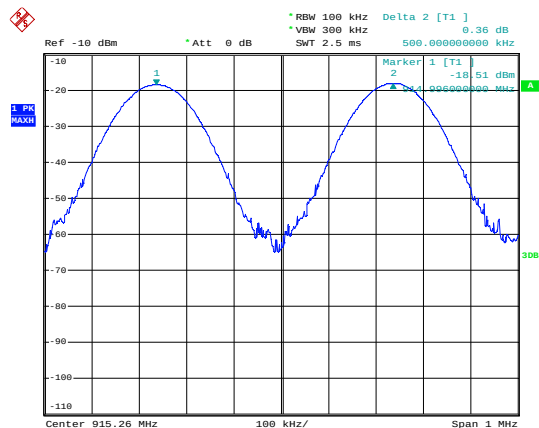


Highest channel

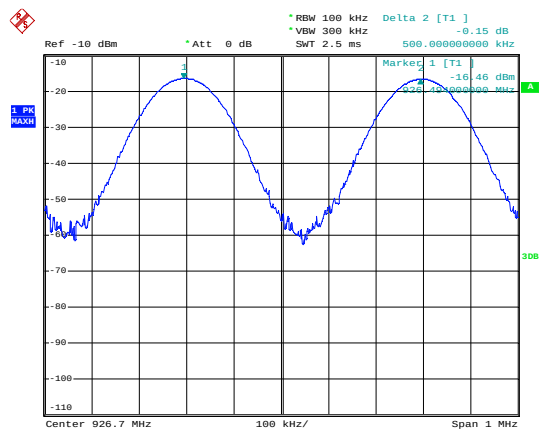
Ant 2



Lowest channel

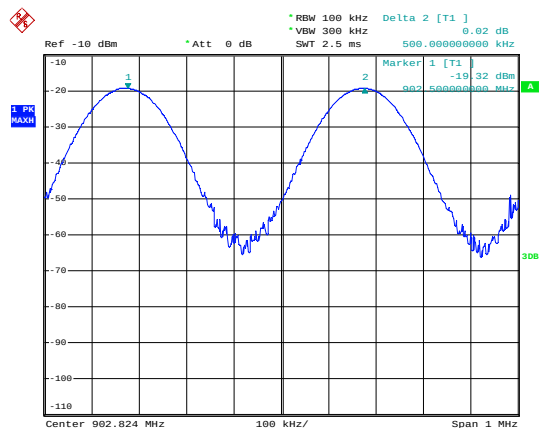


Middle channel

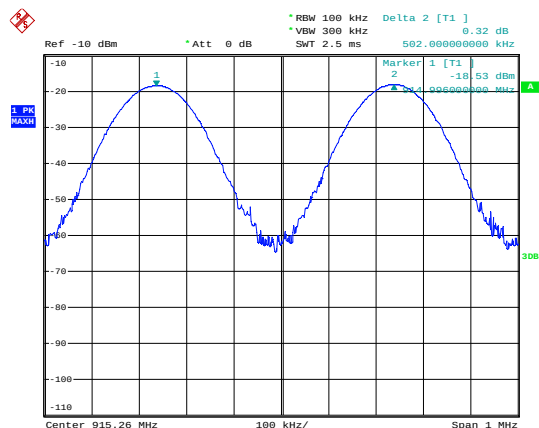


Highest channel

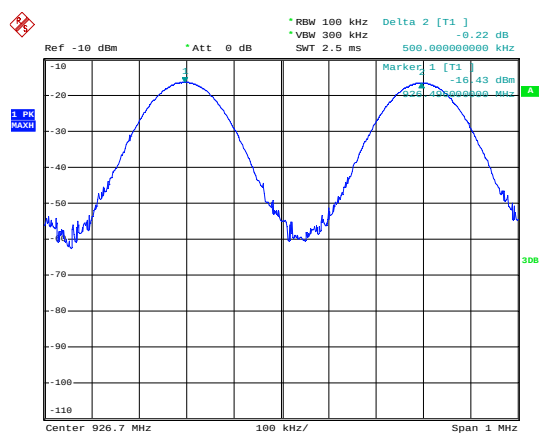
Ant 3



Lowest channel

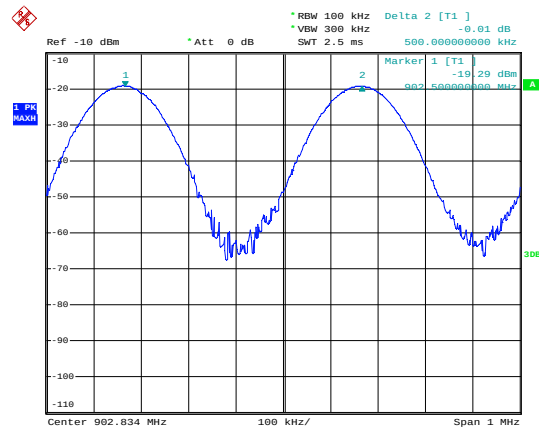


Middle channel

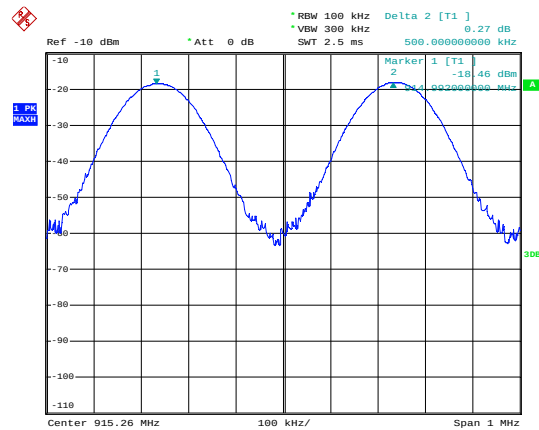


Highest channel

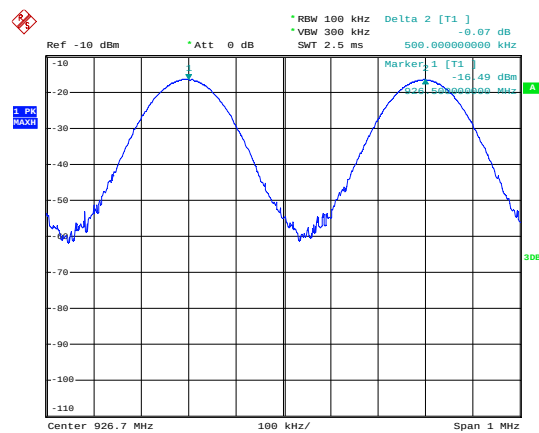
Ant 4



Lowest channel

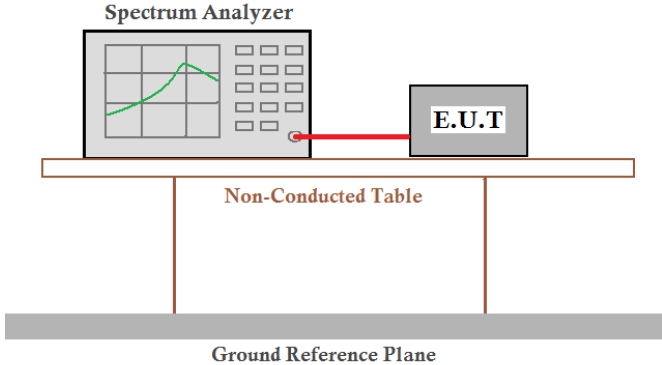


Middle channel



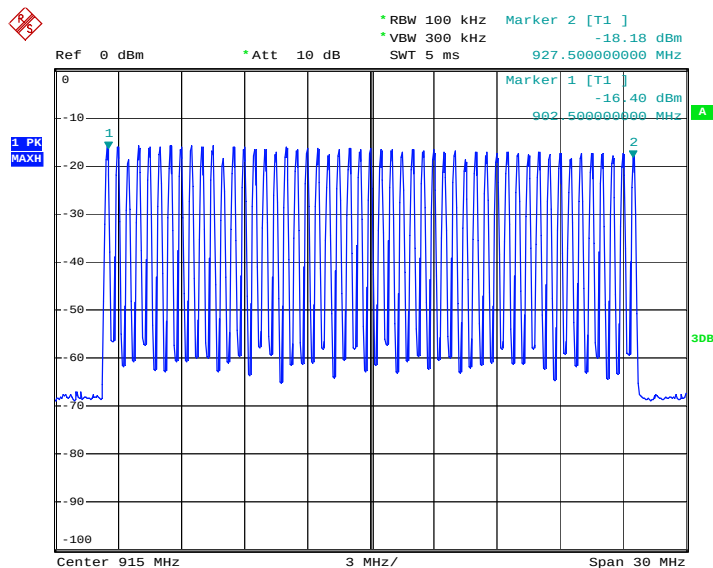
Highest channel

6.6 Hopping Channel Number

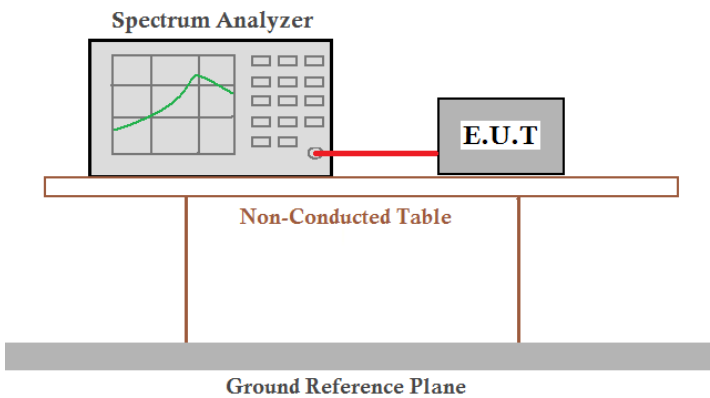
Test Requirement:	FCC Part15 C Section 15.247 (a)(1)(i)
Test Method:	ANSI C63.4:2003 ,DA00-705 and KDB 662911
Receiver setup:	RBW=100kHz, VBW=300kHz, Frequency range=902.5MHz-927.5MHz Detector=Peak
Limit:	50Channels
Test setup:	
Test Instruments:	Refer to section 4.7 for details
Test mode:	Hopping mode
Test results:	Pass

Measurement Data:

Hopping channel numbers	Limit	Result
51	50	Pass



6.7 Dwell Time

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)(i) For frequency hopping systems operating 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 cupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period;
Test Method:	ANSI C63.4:2003 ,DA00-705 and KDB 662911
Receiver setup:	RBW=100kHz, VBW=300kHz, Span=0Hz, Detector=Peak
Limit:	0.4 Second
Test mode:	Hopping transmitting with modulation.
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.
Test Instruments:	Refer to section 4.7 for details
Test mode:	Hopping mode
Test results:	Pass

Measurement Data

Ant 1

Packet	Pulse Quantity Per 20 Sec.	Dwell time (second)	Limit (second)	Result
Lowest	1	0.110	0.4	Pass
Middle	1	0.110		
Highest	1	0.108		

Ant 2

Packet	Pulse Quantity Per 20 Sec.	Dwell time (second)	Limit (second)	Result
Lowest	1	0.108	0.4	Pass
Middle	1	0.108		
Highest	1	0.109		

Ant 3

Packet	Pulse Quantity Per 20 Sec.	Dwell time (second)	Limit (second)	Result
Lowest	1	0.109	0.4	Pass
Middle	1	0.108		
Highest	1	0.111		

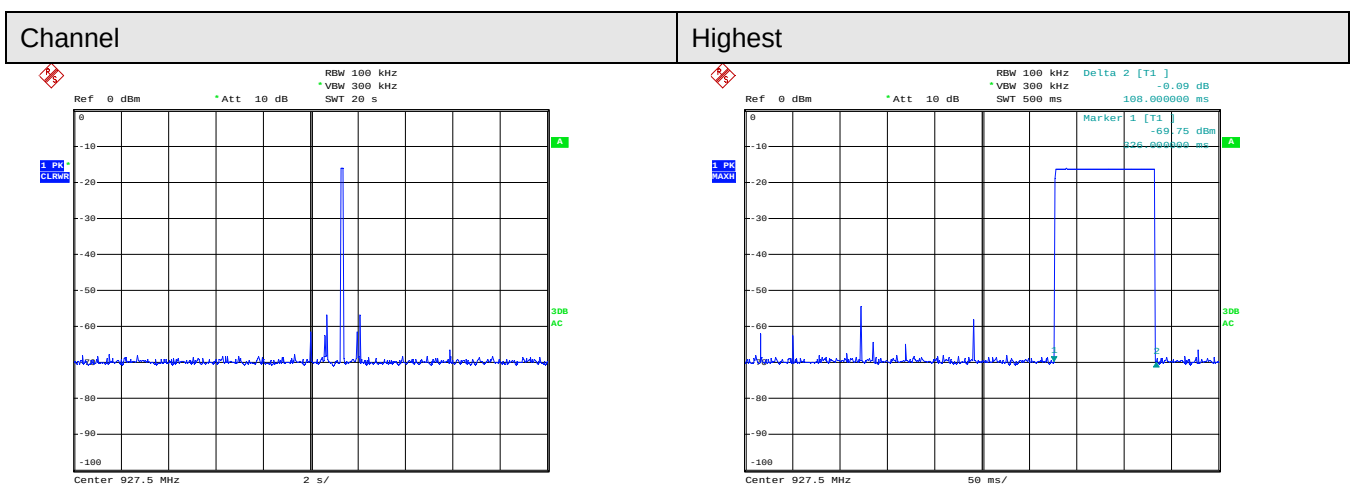
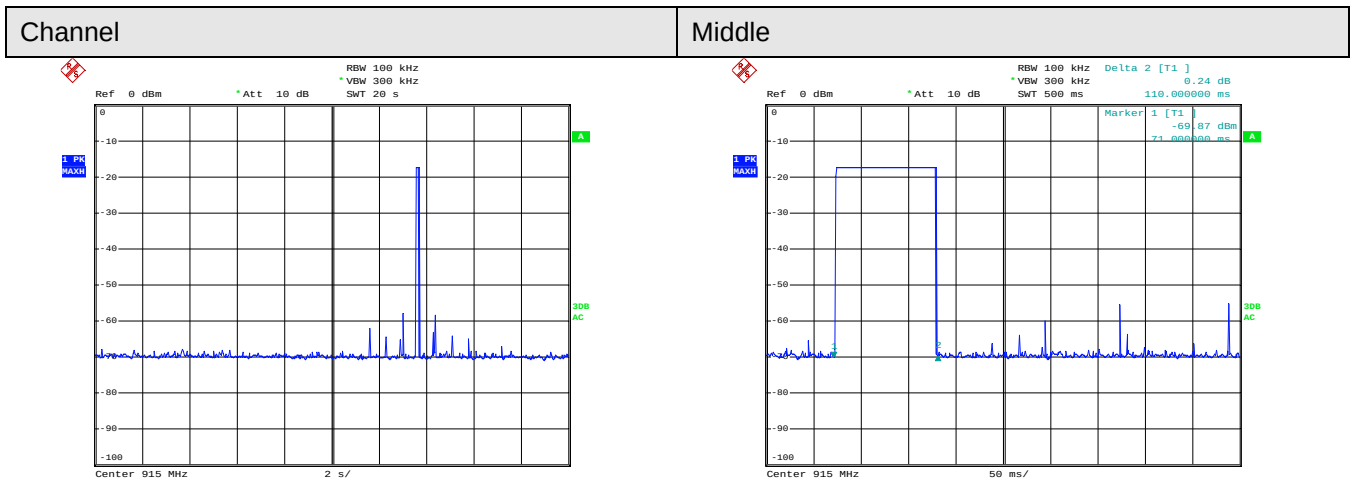
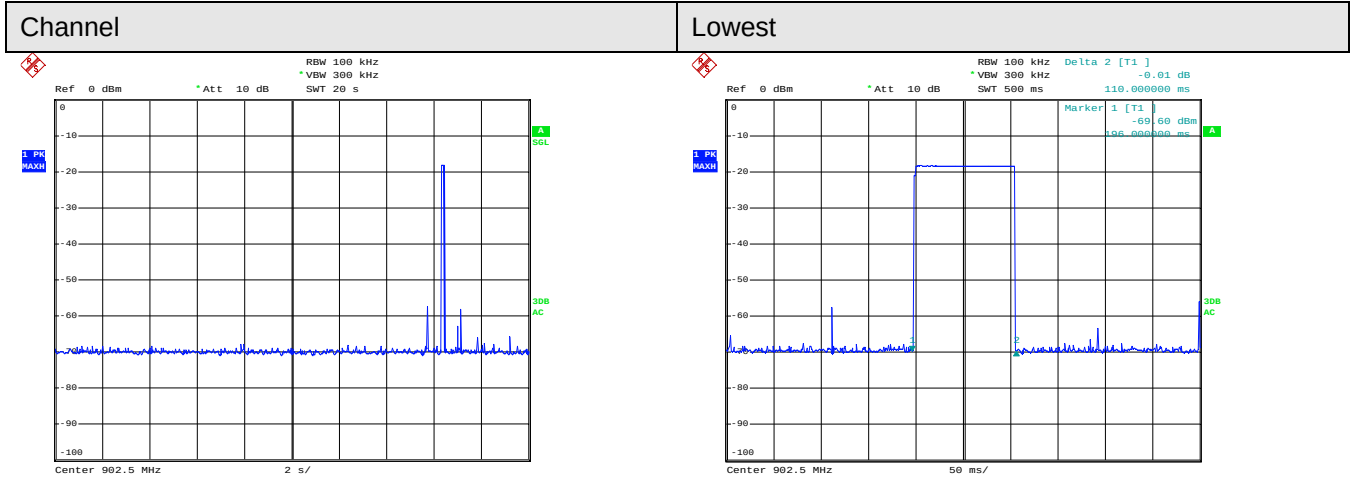
Ant 4

Packet	Pulse Quantity Per 20 Sec.	Dwell time (second)	Limit (second)	Result
Lowest	1	0.109	0.4	Pass
Middle	1	0.112		
Highest	1	0.114		

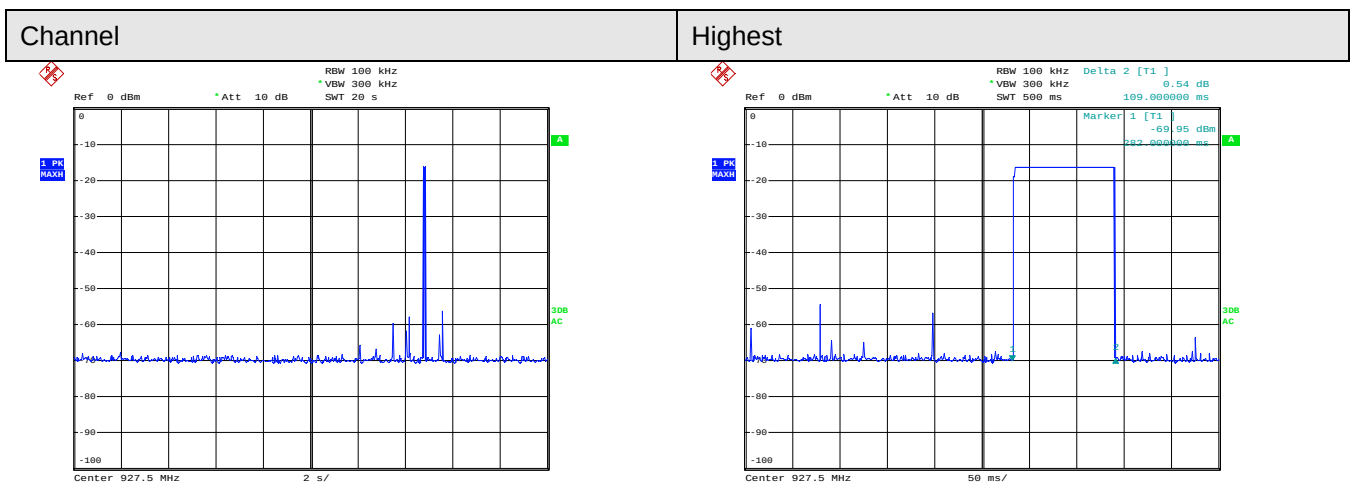
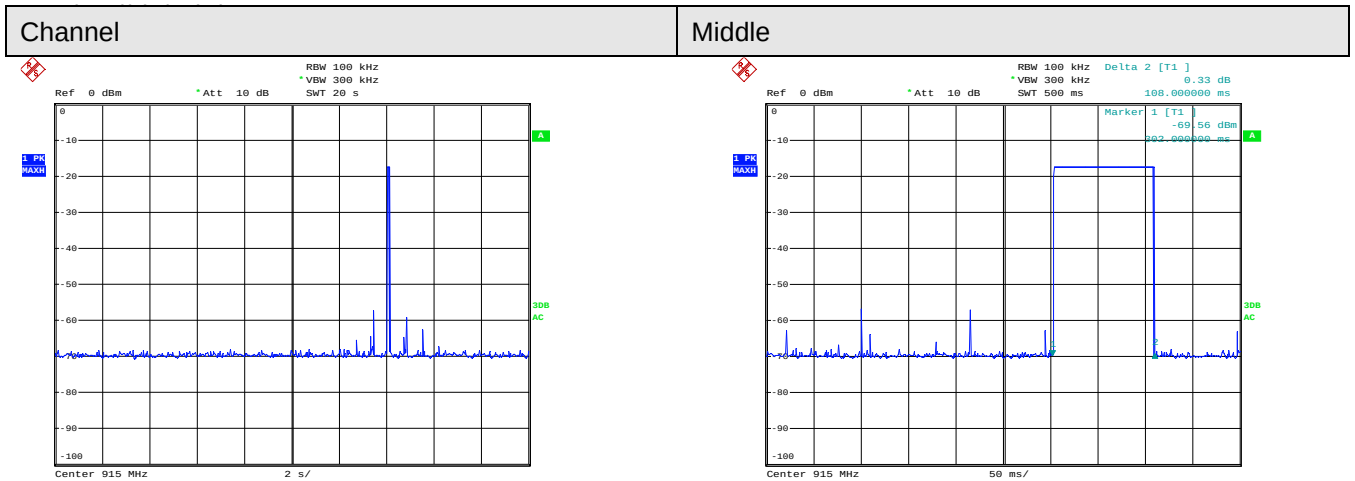
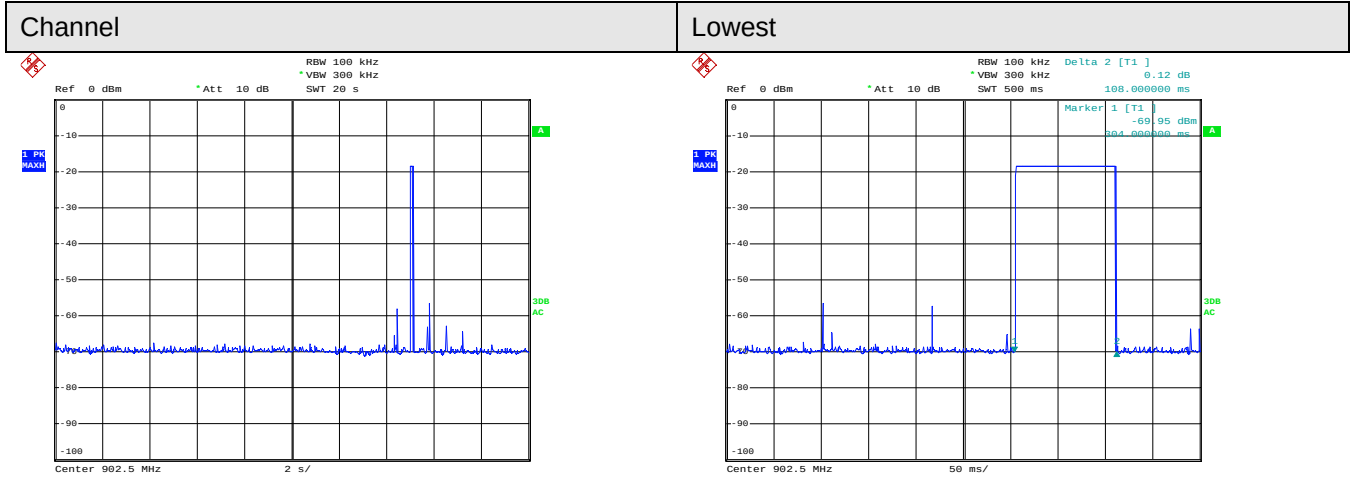
Test Result:

Test plot as follows:

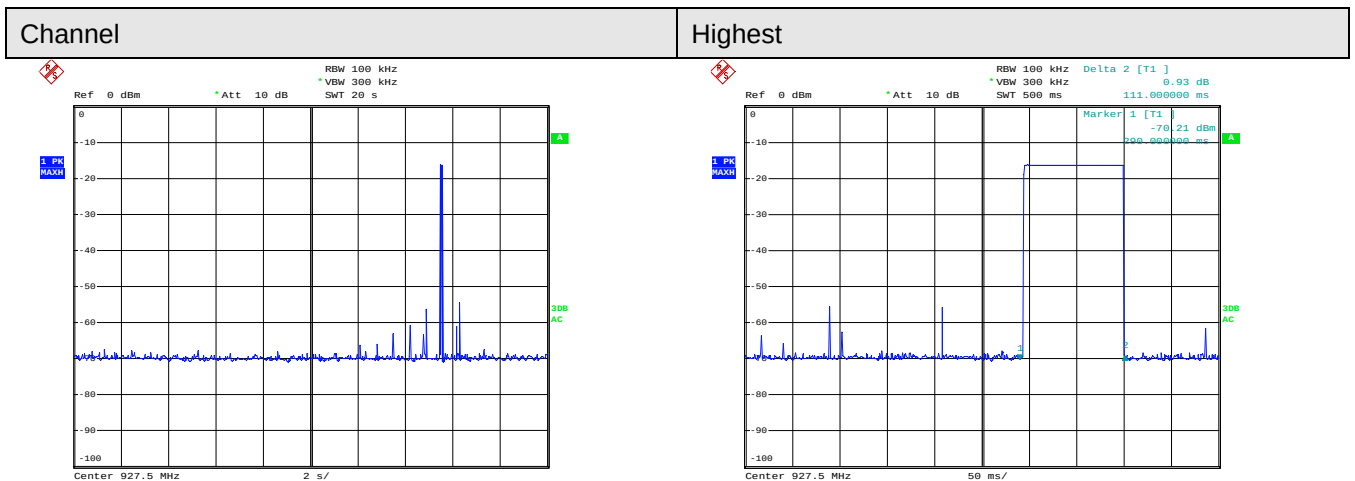
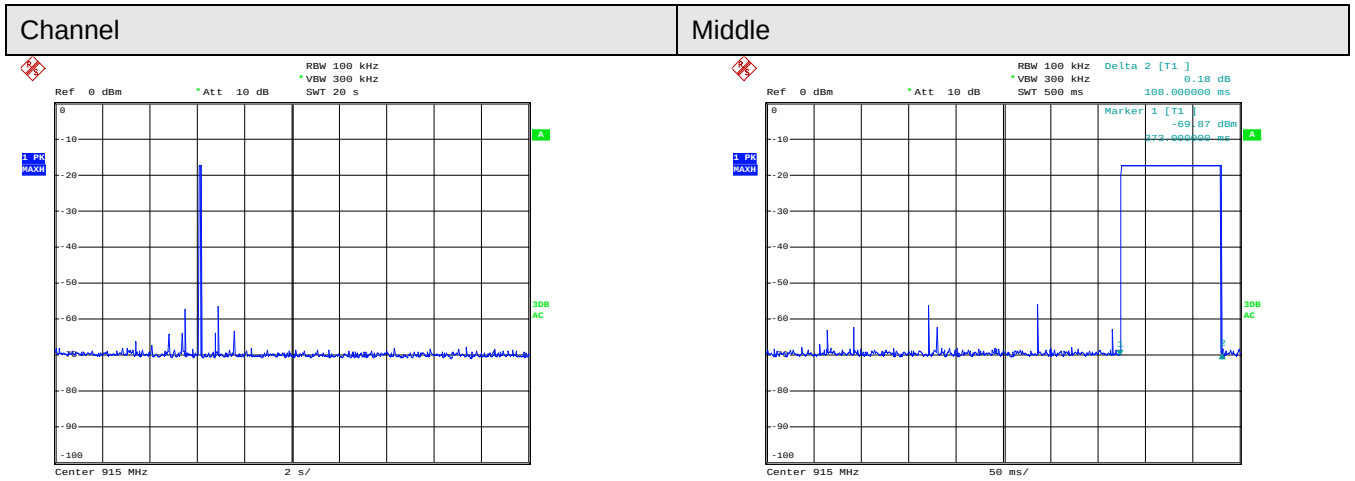
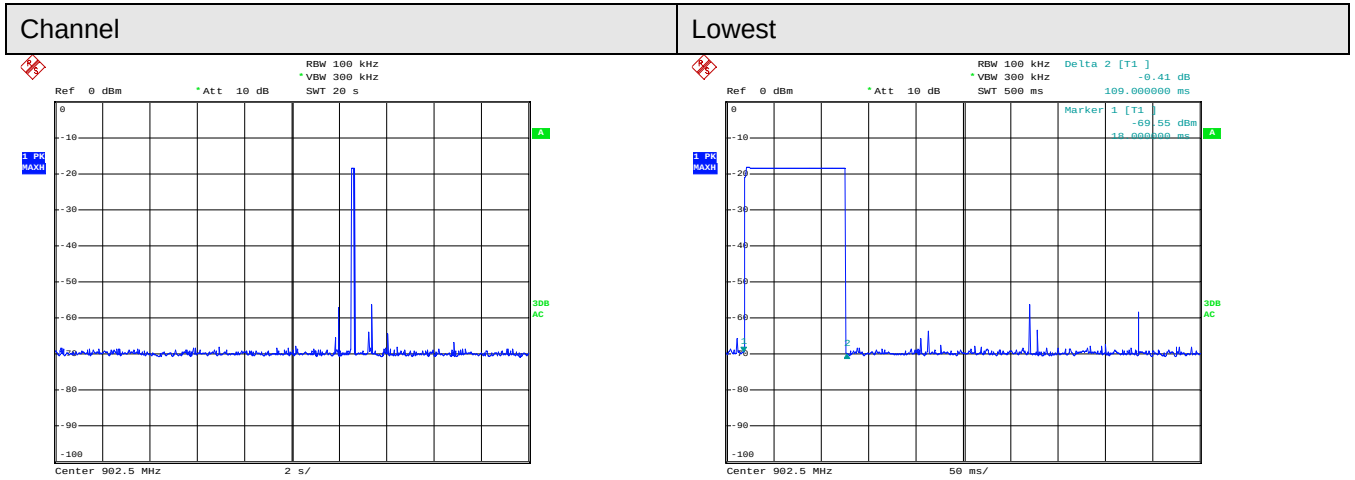
Ant 1



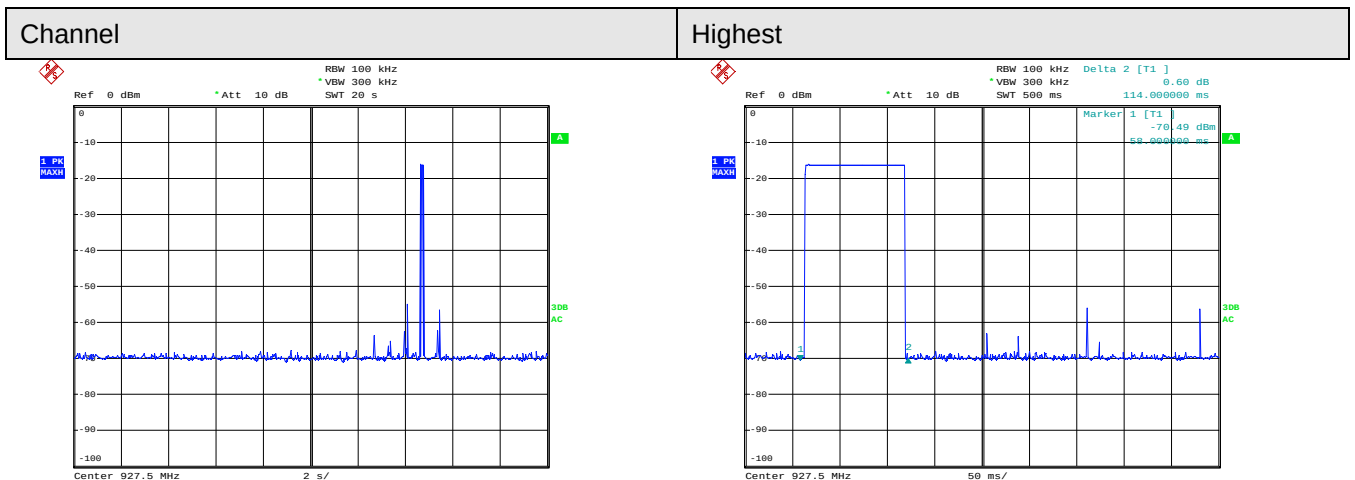
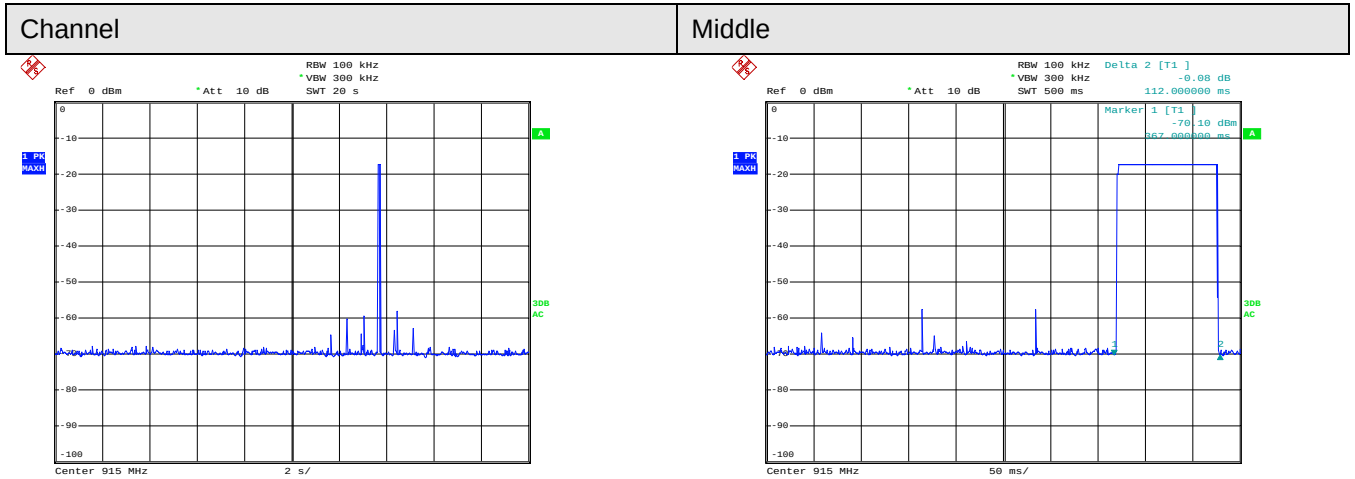
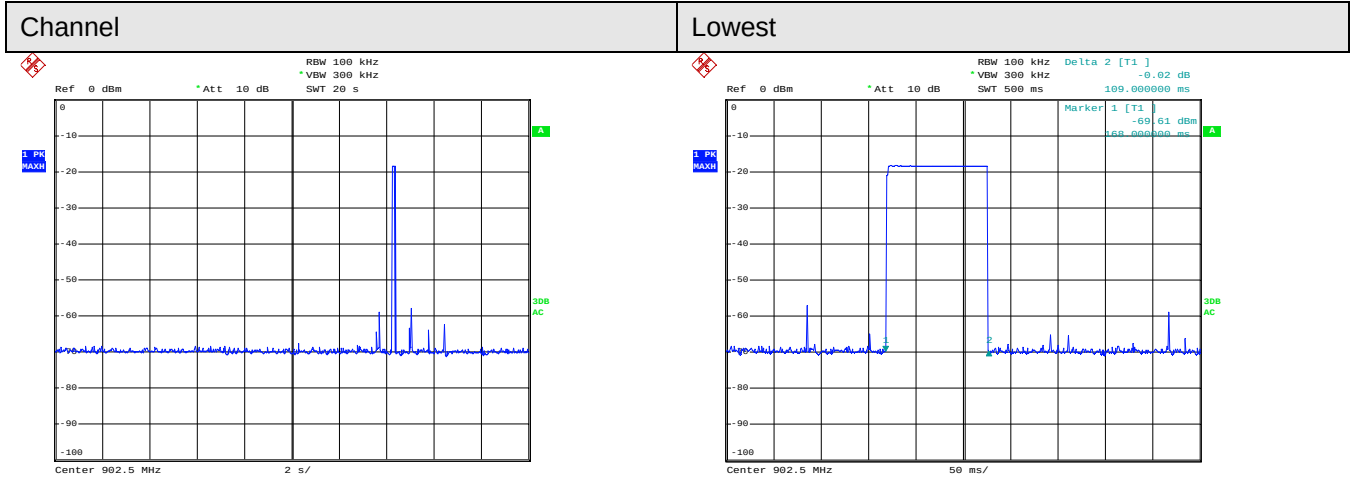
Ant 2



Ant 3



Ant 4

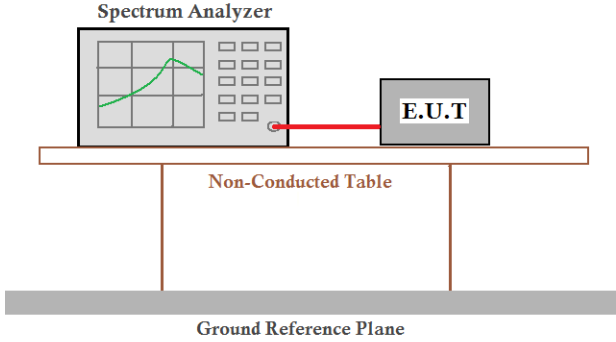


6.8 Pseudorandom Frequency Hopping Sequence

Test Requirement:	FCC Part15 C Section 15.247 (a)(1) requirement:
<i>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. For frequency hopping systems operating in the 902–928 MHz band: 1watt for systems employing at least 50 hopping channels;</i>	
EUT Pseudorandom Frequency Hopping Sequence	
<i>The EUT operating in the 902-928 MHz band which used frequency hopping systems technology, the hopping channel number is 51,the carried frequencies separated by 500kHz, and the maximum peak power is less than 1watt, when the system working, it will follow the sequence which manufacturer has been set in the system.</i>	

6.9 Band Edge

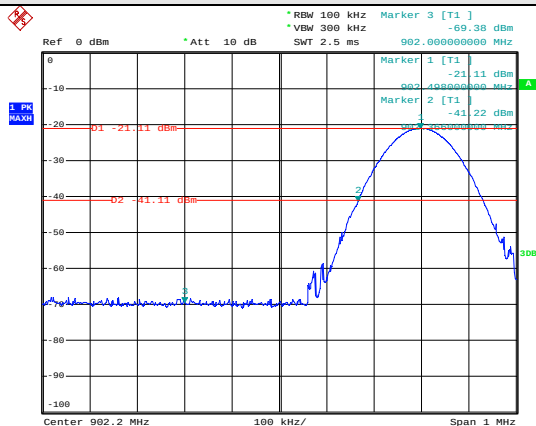
6.9.1 Conducted Emission Method

Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	ANSI C63.4:2003 ,DA00-705 and KDB 662911
Receiver setup:	RBW=100kHz, VBW=300kHz, Detector=Peak
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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.
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by a Ground Reference Plane.
Test Instruments:	Refer to section 4.7 for details
Test mode:	Non-hopping mode
Test results:	Pass

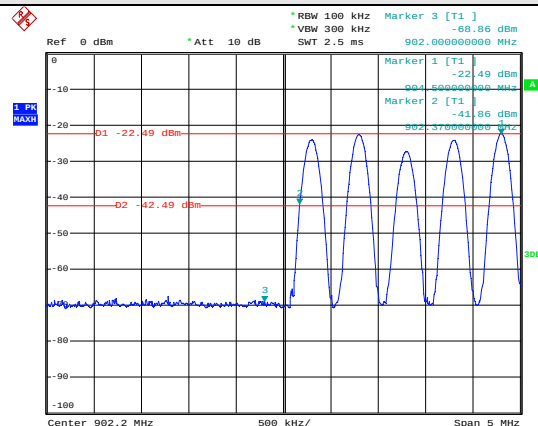
Test plot as follows:

Ant 1

Test channel:	Lowest channel
---------------	----------------

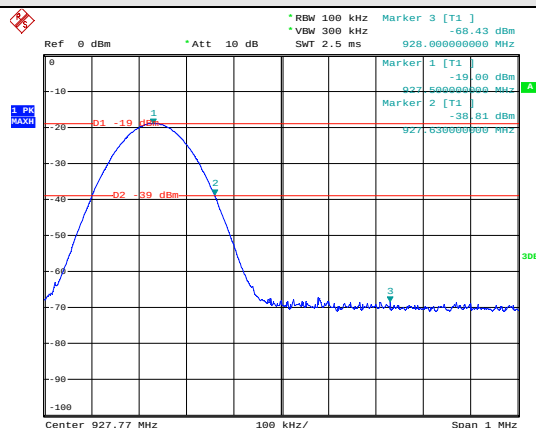


No-hopping mode

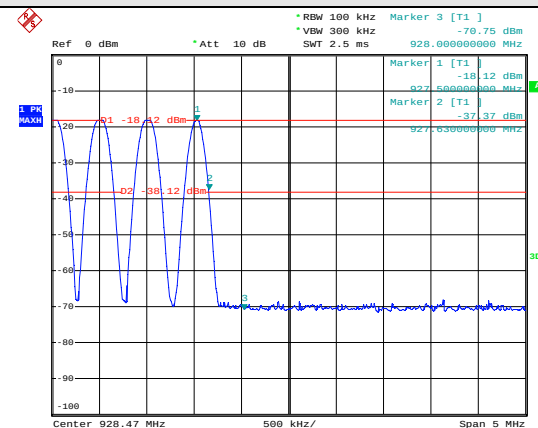


hopping mode

Test channel:	Highest channel
---------------	-----------------



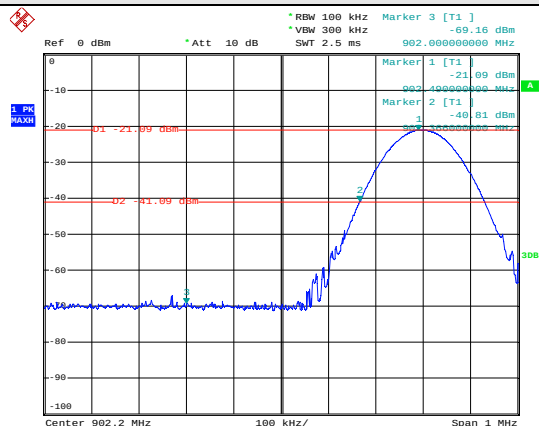
No-hopping mode



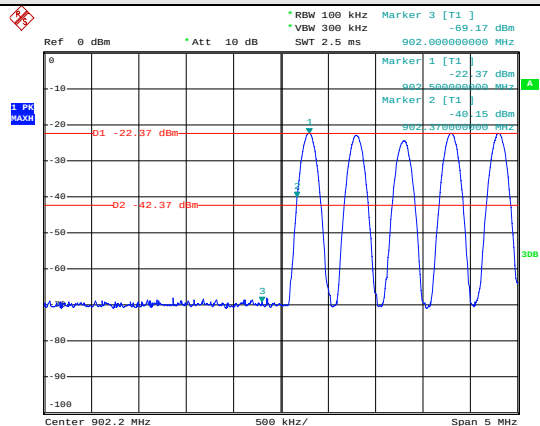
hopping mode

Ant 2

Test channel:	Lowest channel
---------------	----------------

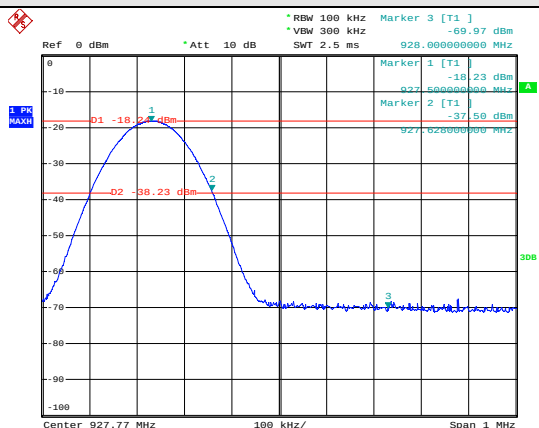


No-hopping mode

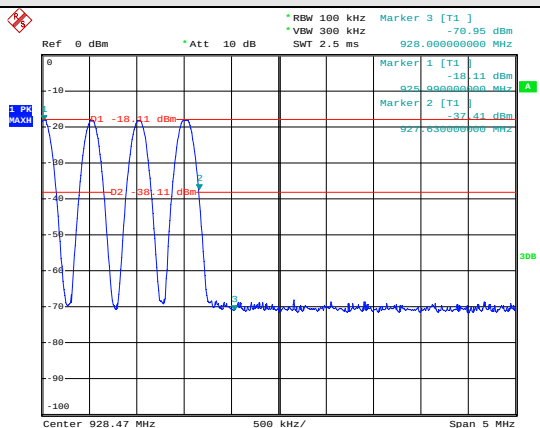


hopping mode

Test channel:	Highest channel
---------------	-----------------

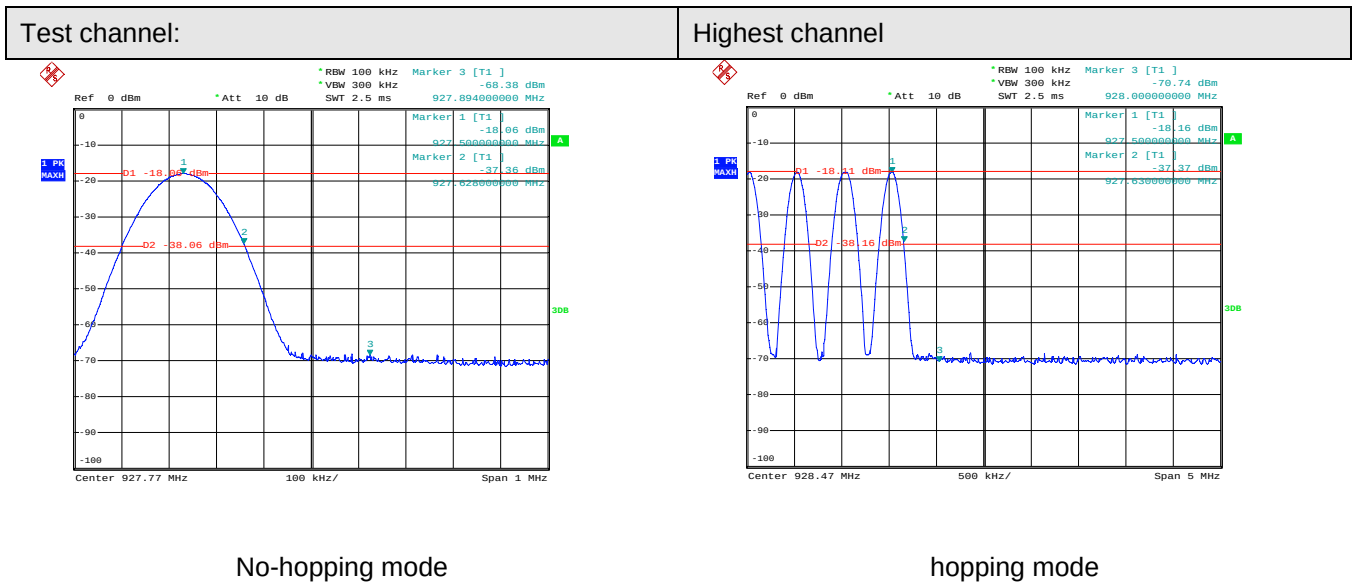
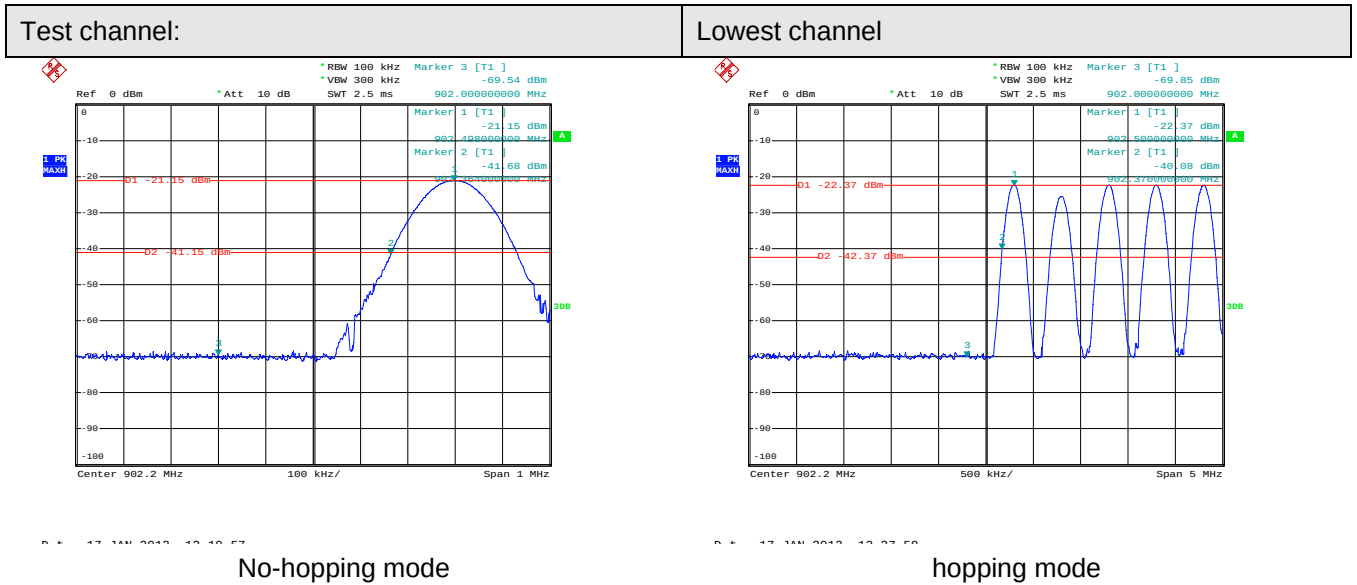


No-hopping mode



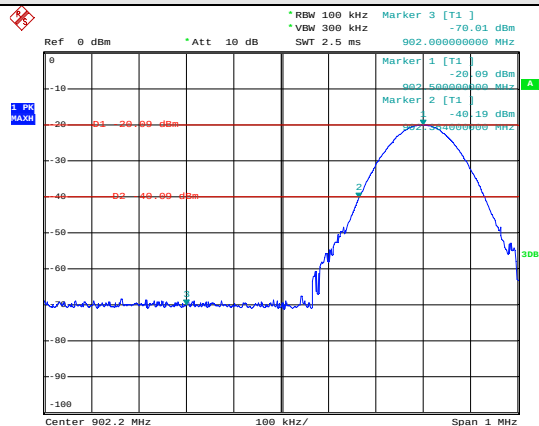
hopping mode

Ant 3

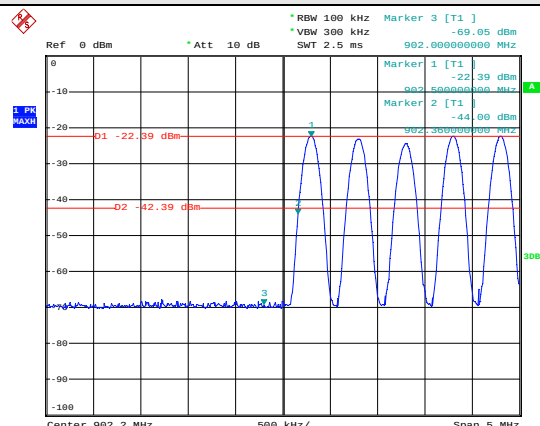


Ant 4

Test channel:	Lowest channel
---------------	----------------

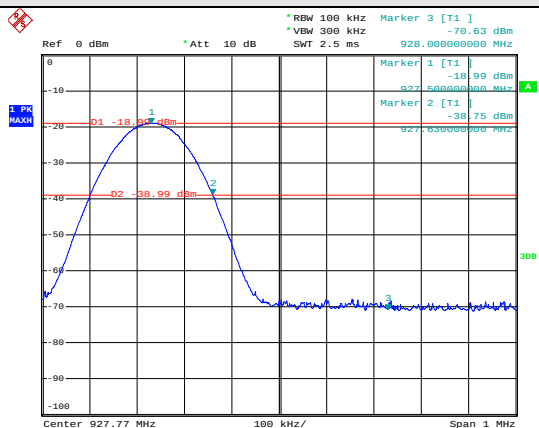


No-hopping mode

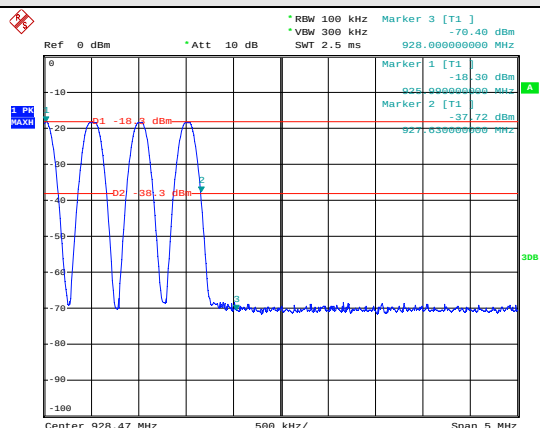


hopping mode

Test channel:	Highest channel
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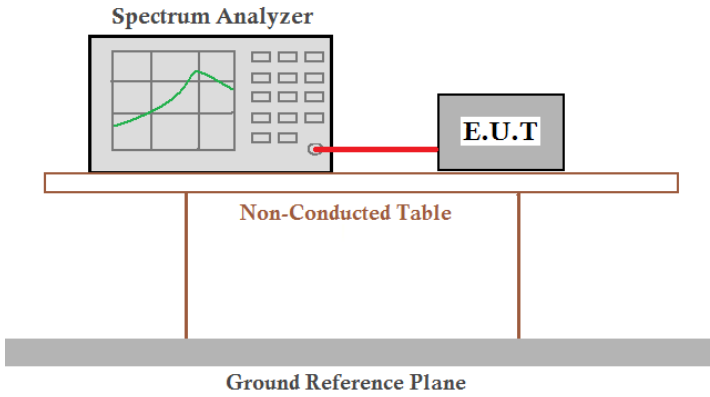
No-hopping mode



hopping mode

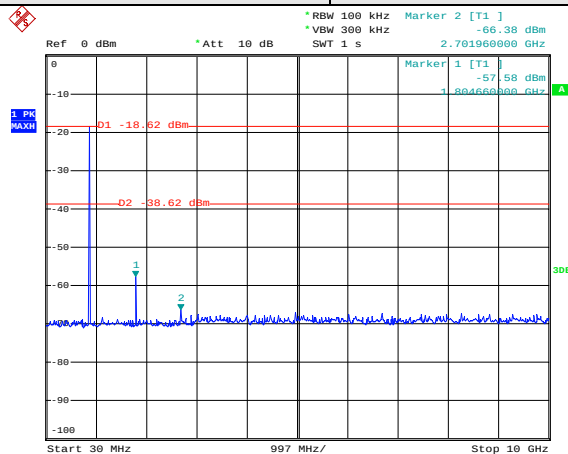
6.10 Spurious Emission

6.10.1 Conducted Emission Method

Test Requirement:	FCC Part15 C Section 15.209 & 15.205 and 247(d)
Test Method:	ANSI C63.4:2003 ,DA00-705 and KDB 662911
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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.
Test setup:	 The diagram illustrates the test setup for conducted emission measurement. A Spectrum Analyzer is connected via a red cable to an E.U.T (Equipment Under Test). Both are placed on a Non-Conducted Table, which sits on a Ground Reference Plane.
Test Instruments:	Refer to section 4.7 for details
Test mode:	Refer to section 4.3 for details
Test results:	Pass

Ant 1

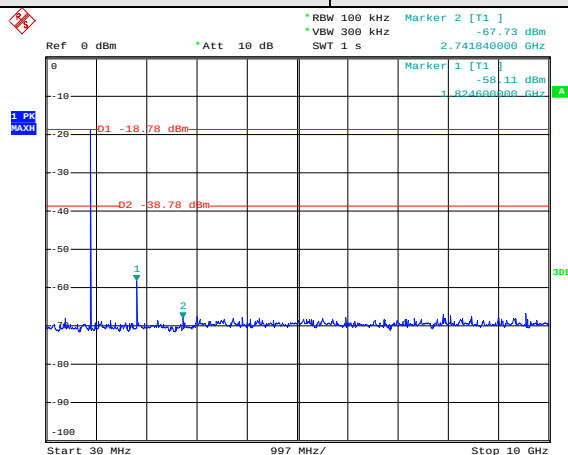
Test channel:	Lowest channel
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Date: 17. JAN. 2013 13:46:05

30MHz~10GHz

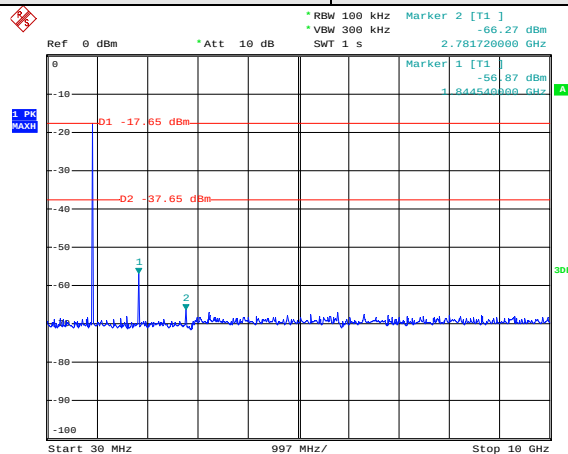
Test channel:	Middle channel
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Date: 17. JAN. 2013 13:48:21

30MHz~10GHz

Test channel:	Highest channel
---------------	-----------------

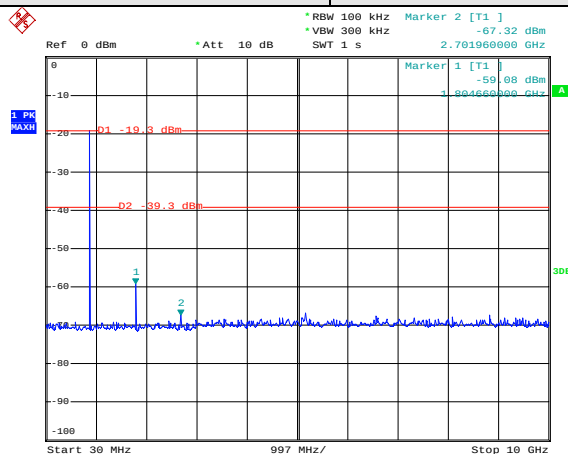


Date: 17.JAN.2013 13:50:54

30MHz~10GHz

Ant 2

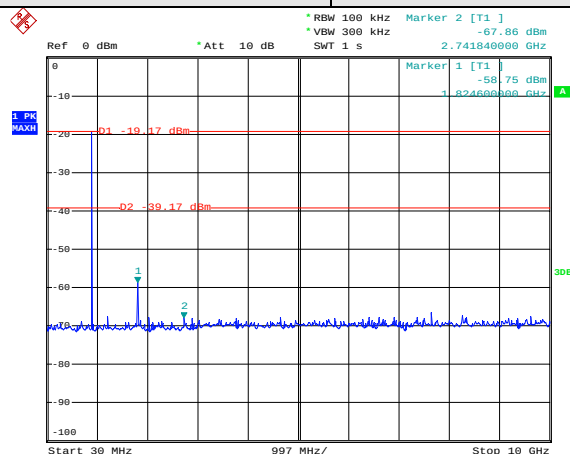
Test channel:	Lowest channel
---------------	----------------



Date: 17.JAN.2013 13:46:39

30MHz~10GHz

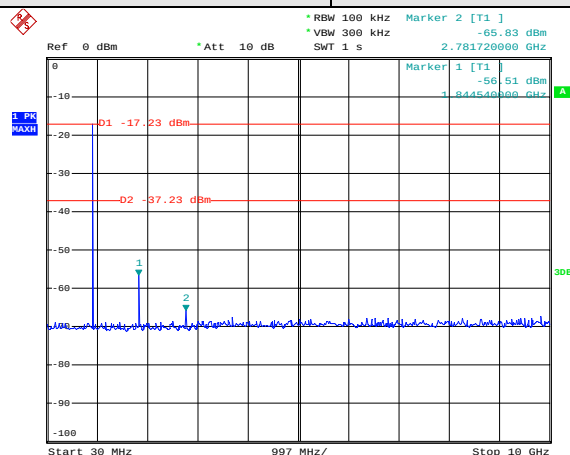
Test channel:	Middle channel
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Date: 17.JAN.2013 13:48:57

30MHz~10GHz

Test channel:	Highest channel
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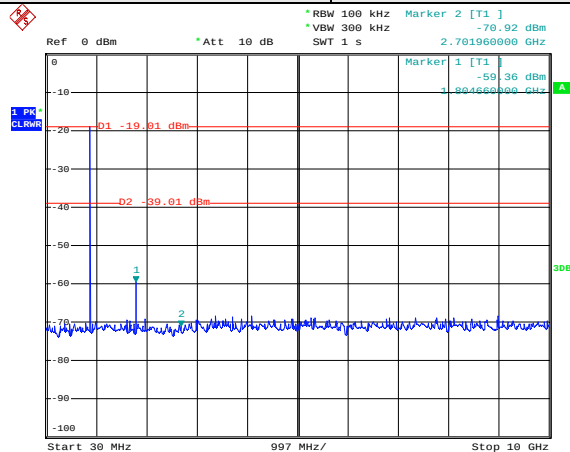


Date: 17.JAN.2013 13:51:38

30MHz~10GHz

Ant 3

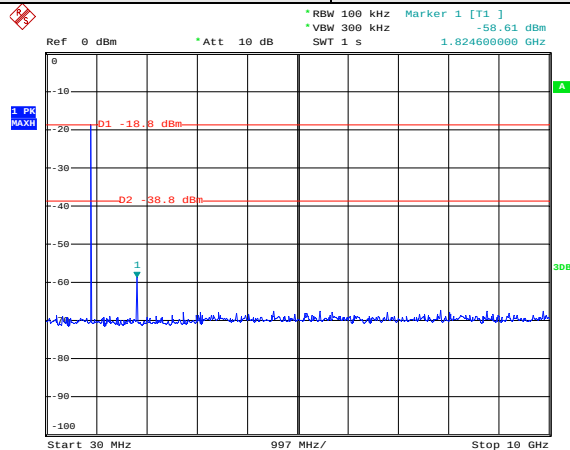
Test channel:	Lowest channel
---------------	----------------



Date: 17.JAN.2013 13:47:21

30MHz~10GHz

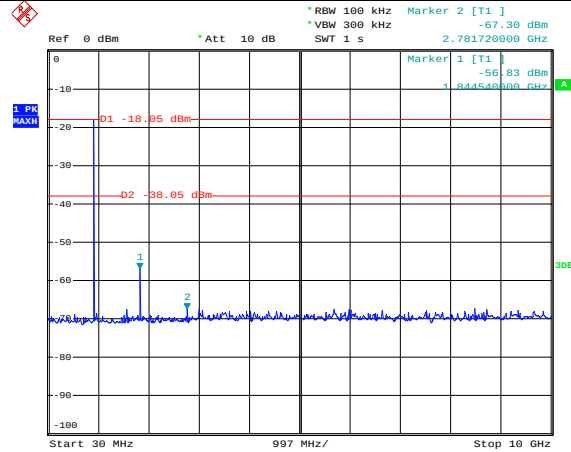
Test channel:	Middle channel
---------------	----------------



Date: 17.JAN.2013 13:49:35

30MHz~10GHz

Test channel:	Highest channel
---------------	-----------------

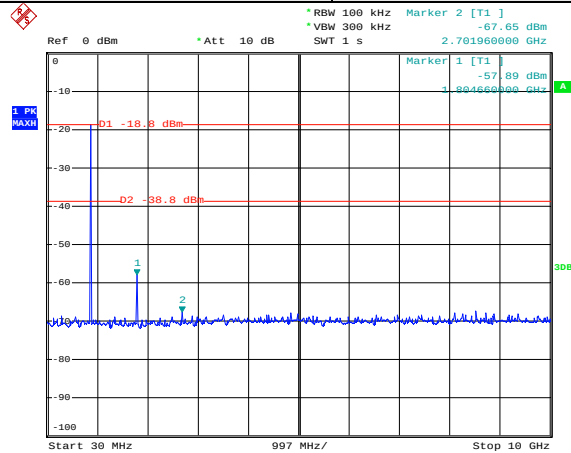


Date: 17.JAN.2013 13:52:08

30MHz~10GHz

Ant 4

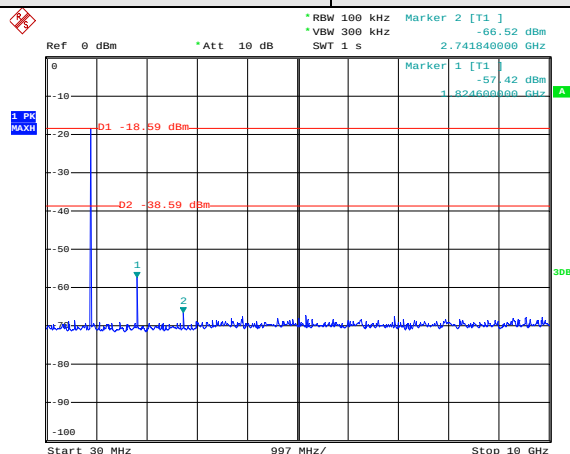
Test channel:	Lowest channel
---------------	----------------



Date: 17.JAN.2013 13:47:46

30MHz~10GHz

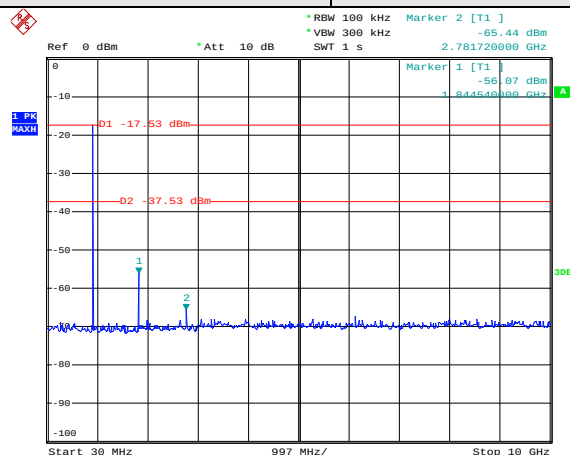
Test channel:	Middle channel
---------------	----------------



Date: 17.JAN.2013 13:50:09

30MHz~10GHz

Test channel:	Highest channel
---------------	-----------------

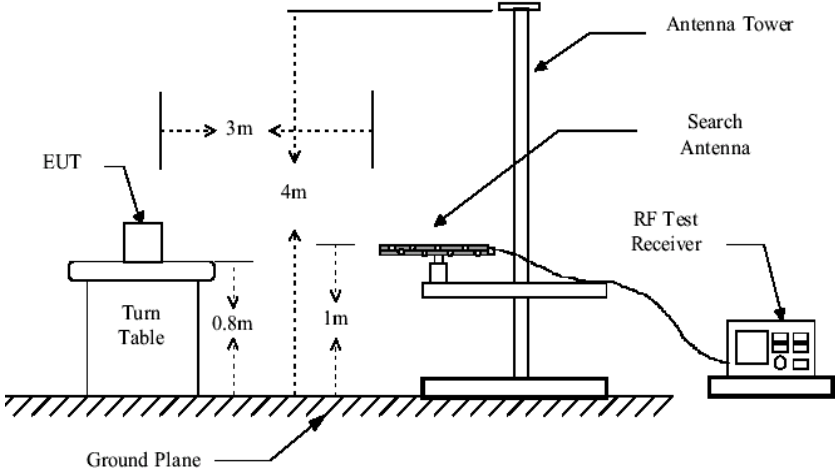
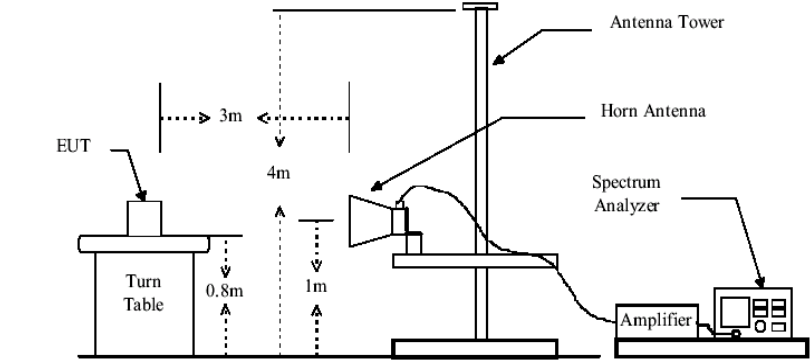


Date: 17.JAN.2013 13:52:34

30MHz~10GHz

6.11 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209 & 15.205 and 247(d)				
Test Method:	ANSI C63.4:2003 ,DA00-705 and KDB 662911				
Test Frequency Range:	30MHz to 25GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:					
	Frequency	Detector	RBW	VBW	Remark
	30MHz-1GHz	Quasi-peak	100kHz	300kHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
Peak		1MHz	10Hz	Average Value	
Limit:					
	Frequency		Limit (dBuV/m @3m)		Remark
	30MHz-88MHz		40.0		Quasi-peak Value
	88MHz-216MHz		43.5		Quasi-peak Value
	216MHz-960MHz		46.0		Quasi-peak Value
	960MHz-1GHz		54.0		Quasi-peak Value
	Above 1GHz		54.0		Average Value
74.0			Peak Value		
Test Procedure:	1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.				

Test setup:	Below 1GHz  Above 1GHz 
Test Instruments:	Refer to section 4.7 for details
Test mode:	Refer to section 4.3 for details
Test results:	Pass

30MHz~1GHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
96.10	22.01	12.90	2.00	36.91	43.50	-6.59	Horizontal
120.28	23.15	10.38	2.17	35.70	43.50	-7.80	Horizontal
199.99	27.32	10.57	2.87	40.76	43.50	-2.74	Horizontal
225.31	30.40	11.41	2.84	44.65	46.00	-1.35	Horizontal
275.16	26.71	12.55	2.87	42.13	46.00	-3.87	Horizontal
63.54	23.81	11.24	1.38	36.43	40.00	-3.57	Vertical
120.28	19.87	10.38	2.17	32.42	43.50	-11.08	Vertical
150.01	23.05	8.26	2.52	33.83	43.50	-9.67	Vertical
199.99	21.23	10.57	2.87	34.67	43.50	-8.83	Vertical
225.31	29.61	11.41	2.84	43.86	46.00	-2.14	Vertical

Above 1GHz

Test channel:	Lowest	Level:	Peak
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Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1805.00	35.00	31.78	5.32	24.09	48.29	74.00	-25.71	Vertical
2707.50	32.99	36.15	6.87	26.38	50.09	74.00	-23.91	Vertical
3610.00	30.27	37.95	8.94	25.40	52.40	74.00	-21.60	Vertical
4512.50	*					74.00		Vertical
5415.00	*					74.00		Vertical
1805.00	36.88	31.78	5.32	24.09	49.89	74.00	-24.11	Horizontal
2707.50	33.77	36.15	6.87	26.38	50.41	74.00	-23.59	Horizontal
3610.00	32.12	37.95	8.94	25.40	53.61	74.00	-20.39	Horizontal
4512.50	*					74.00		Horizontal
5415.00	*					74.00		Horizontal

Test channel:	Lowest	Level:	Average
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Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1805.00	24.23	31.78	5.32	24.09	37.52	54.00	-16.48	Vertical
2707.50	19.65	36.15	6.87	26.38	36.75	54.00	-17.25	Vertical
3610.00	18.00	37.95	8.94	25.40	40.13	54.00	-13.87	Vertical
4512.50	*					54.00		Vertical
5415.00	*					54.00		Vertical
1805.00	24.03	31.78	5.32	24.09	37.04	54.00	-16.96	Horizontal
2707.50	20.45	36.15	6.87	26.38	37.09	54.00	-16.91	Horizontal
3610.00	16.32	37.95	8.94	25.40	37.81	54.00	-16.19	Horizontal
4512.50	*					54.00		Horizontal
5415.00	*					54.00		Horizontal

Remark:

- For 30MHz~1GHz :Final Level =Receiver Read level + Antenna Factor + Cable Loss
For above 1GHz: Final Level =Receiver Read level + Antenna Factor + Cable Loss - Preamp Factor
- "*", means this data is the too weak instrument of signal is unable to test.
- The emission levels of other frequencies are very lower than the limit and not show in test report.

Test channel:	Middle	Level:	Peak
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Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1830.00	35.94	31.85	5.40	24.01	49.46	74.00	-24.54	Vertical
2745.00	34.10	36.37	6.91	26.62	51.22	74.00	-22.78	Vertical
3660.00	30.69	38.35	9.01	25.29	53.40	74.00	-20.60	Vertical
4575.00	*					74.00		Vertical
5490.00	*					74.00		Vertical
1830.00	37.89	31.85	5.40	24.01	51.13	74.00	-22.87	Horizontal
2745.00	32.90	36.37	6.91	26.62	49.56	74.00	-24.44	Horizontal
3660.00	30.95	38.35	9.01	25.29	53.02	74.00	-20.98	Horizontal
4575.00	*					74.00		Horizontal
5490.00	*					74.00		Horizontal

Test channel:	Middle	Level:	Average
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Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1830.00	25.37	31.85	5.40	24.01	38.89	54.00	-15.11	Vertical
2745.00	20.86	36.37	6.91	26.62	37.98	54.00	-16.02	Vertical
3660.00	16.99	38.35	9.01	25.29	39.70	54.00	-14.30	Vertical
4575.00	*					54.00		Vertical
5490.00	*					54.00		Vertical
1830.00	22.93	31.85	5.40	24.01	36.17	54.00	-17.83	Horizontal
2745.00	20.06	36.37	6.91	26.62	36.72	54.00	-17.28	Horizontal
3660.00	16.63	38.35	9.01	25.29	38.70	54.00	-15.30	Horizontal
4575.00	*					54.00		Horizontal
5490.00	*					54.00		Horizontal

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. “*”, means this data is the too weak instrument of signal is unable to test.
3. The emission levels of other frequencies are very lower than the limit and not show in test report.

Test channel:	Highest	Level:	Peak
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Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1855.00	35.64	31.93	5.47	23.93	49.39	74.00	-24.61	Vertical
2782.50	33.18	36.59	6.95	26.95	50.23	74.00	-23.77	Vertical
3710.00	31.07	38.81	9.07	25.22	54.37	74.00	-19.63	Vertical
4637.50	*					74.00		Vertical
5565.00	*					74.00		Vertical
1855.00	38.03	31.93	5.47	23.93	51.50	74.00	-22.50	Horizontal
2782.50	34.11	36.59	6.95	26.95	50.70	74.00	-23.30	Horizontal
3710.00	30.52	38.81	9.07	25.22	53.18	74.00	-20.82	Horizontal
4637.50	*					74.00		Horizontal
5565.00	*					74.00		Horizontal

Test channel:	Highest	Level:	Average
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Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1855.00	23.45	31.93	5.47	23.93	37.20	54.00	-16.80	Vertical
2782.50	20.92	36.59	6.95	26.95	37.97	54.00	-16.03	Vertical
3710.00	15.69	38.81	9.07	25.22	38.99	54.00	-15.01	Vertical
4637.50	*					54.00		Vertical
5565.00	*					54.00		Vertical
1855.00	22.68	31.93	5.47	23.93	36.15	54.00	-17.85	Horizontal
2782.50	19.46	36.59	6.95	26.95	36.05	54.00	-17.95	Horizontal
3710.00	15.99	38.81	9.07	25.22	38.65	54.00	-15.35	Horizontal
4637.50	*					54.00		Horizontal
5565.00	*					54.00		Horizontal

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. “*”, means this data is the too weak instrument of signal is unable to test.
3. The emission levels of other frequencies are very lower than the limit and not show in test report.