TEST REPORT

OF

FCC Part 15 Subpart B&C §15.247

FCC ID : VUF- NARU-RFID0001

Equipment Under Test	:	U-ways (RFID Smart Device)
Model Name	:	Naru_rfid_0001
Serial No.	:	N/A
Applicant	:	Naru Technology Co.,Ltd.
Manufacturer	:	Naru Technology Co.,Ltd.
Date of Test(s)	:	2007-11-16 ~ 2007-11-26
Date of Issue	:	2007-11-27

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

Tested By: **Date** **2007-11-27**

Geoffrey Do

Approved By **Date** **2007-11-27**

Denny Ham

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1. General Information

1.1. Testing Laboratory

SGS Testing Korea Co., Ltd.
Wireless Div. 2FL, 18-34, Sanbon-dong, Gunpo-si, Gyeonggi-do, Korea 435-040
www.electrolab.kr.sgs.com
Telephone : +82 +31 428 5700
FAX : +82 +31 427 2371

1.2. Details of Applicant

Applicant : Naru Technology Co.,Ltd.
Address : 83/10,682,gojan-dong,namdong-gu,incheon,korea, 405-819
Contact Person : Jae-Heung-Yi
Phone No. : 82-32-818-1890
Fax No. : 82-32-818-1891

1.3. Description of EUT

Kind of Product	U-ways (RFID Smart Device)
Model Name	Naru_rfid_0001
Serial Number	N/A
Power Supply	AC 100 V ~ 240 V (Output : DC 12 V)
Frequency Range	902 MHz ~ 928 MHz
Modulation Technique	ASK
Number of Channels	63
Operating Conditions	-20℃ ~ 50℃
Antenna Type	Special connect type(Patch ANT)
Antenna Gain	Max 5.23 dBi

1.4. Details of modification

- Manufacture added several ferrite cores on the ant cable. We use them during the radiation test.
- The cable loss of RF antenna is included in the antenna gain.

1.5. Test Equipment List

EQUIPMENT	MANUFACTURER	MODEL	CAL DUE.
Signal Generator	Agilent	E4438C	May 2008
Spectrum Analyzer	Agilent	E4440A	May 2008
Spectrum Analyzer	H.P.	8565E	Dec. 2007
Amplifier	H.P	OPT H64	July 2008
Preamplifier	Agilent	8449B	May 2008
Attenuator	Agilent	8494B	May 2008
Tunable notch Filter	Wainwright Instruments Gmbh	WRCT880/960-0.2/40-5 SSK	May 2008
High Pass Filter	Wainwright Instruments Gmbh	WHK3.0/18G-11S	Jan. 2008
Two-Line V-Network	Rohde & Schwarz	NNB 41	Sep. 2008
Test Receiver	Rohde & Schwarz	ESVS10	April 2008
Ultra-Broadband Antenna	Rohde & Schwarz	HL562	Sep. 2008
Horn Antenna	Electro-Metrics	RGA-60	Dec. 2007
Anechoic Chamber	SY Corporation	L x W x H 6.5 x 3.6 x 3.6	Aug. 2008

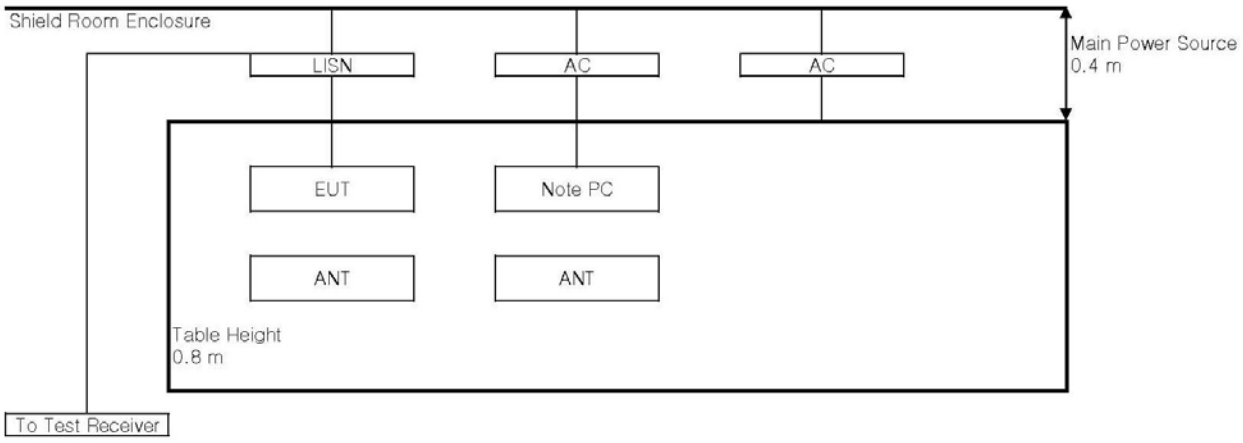
1.6. Summary of Test Results

The EUT has been tested according to the following specifications:

APPLIED STANDARD:FCC Part 15, Subpart B & Subpart C		
Standard Section	**Test Item**	**Result**
15.107(a)	AC Power Conducted Emission	Complied
15.247(a)(1)(i)	20 dB Bandwidth	Complied
15.247(a)(1)(i)	Number of Hopping Channels	Complied
15.247(a)(1)	Channel Separation	Complied
15.247(a)(1)(i)	Dwell Time	Complied
15.247(b)(2)	Maximum Peak Output Power	Complied
15.205(a) 15.209(a) 15.247(d)	Spurious Emission, Band Edge and Restricted Bands	Complied
15.247(i) 1.1307(b)(1)	RF Exposure	Complied

2. Conducted Power Line Test

2.1. Test Setup



2.2. Limit

According to §15.107(a) for an intentional radiator 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, as measured using a 50 uH/50 ohm line impedance stabilization network(LISN).
Compliance with the provision of this paragraph shall on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower applies at the boundary between the frequency ranges.

Frequency of Emission (MHz)	Conducted limit (dBμV)	
	Qausi-peak	Average
0.15 – 0.50	66-56*	56-46*
0.50 – 5.00	56	46
5.00 – 30.0	60	50

* Decreases with the logarithm of the frequency.

2.3. Test Procedures

Radiated emissions from the EUT were measured according to the dictates of ANSI C63.4:2003

The test procedure is performed in a 6.5m × 3.6m× 3.6m (L×W×H) shielded room. The EUT along with its peripherals were placed on a 1.0m(W)× 1.5m(L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.
The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room. All peripherals were connected to the second LISN and the chassis ground also bounded to the horizontal ground plane of shielded room. The excess power cable between the EUT and the LISN was bundled. The power cables of peripherals were unbundled. All connecting cables of EUT and peripherals were moved to find the maximum emission.

2.4. Test Results

The following table shows the highest levels of conducted emissions on both phase of Hot and Neutral line.

Ambient temperature : 21℃ Relative humidity : 43%

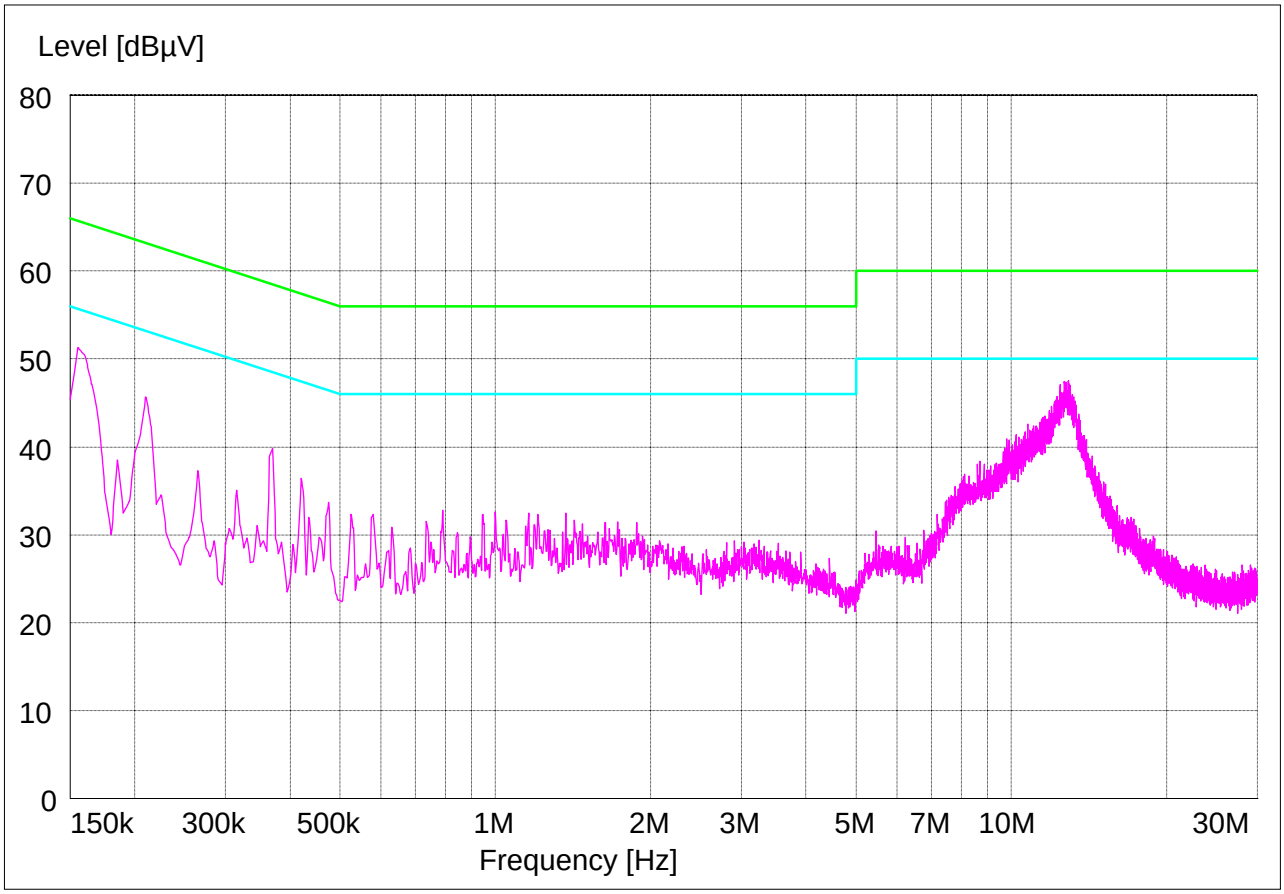
Frequency range : 0.15 MHz – 30 MHz
Measured Bandwidth : 9 kHz

FREQ.	LEVEL(dBuV)		LINE	LIMIT(dBuV)		MARGIN(dB)	
(MHz)	Q-Peak	Average		Q-Peak	Average	Q-Peak	Average
0.16	50.10	42.80	N	65.46	55.46	15.36	12.66
0.21	44.40	37.80	N	63.21	53.21	18.81	15.41
0.37	38.50	37.20	N	58.50	48.50	20.00	11.30
11.40	37.90	32.30	N	60.00	50.00	22.10	17.70
12.30	41.20	36.50	N	60.00	50.00	18.80	13.50
12.92	42.30	37.50	N	60.00	50.00	17.70	12.50
0.16	49.40	39.20	H	65.46	55.46	16.06	16.26
0.21	42.60	31.40	H	63.21	53.21	20.61	21.81
0.37	33.20	28.80	H	58.50	48.50	25.30	19.70
11.40	38.70	31.70	H	60.00	50.00	21.30	18.30
12.30	40.10	34.40	H	60.00	50.00	19.90	15.60
12.92	40.20	35.40	H	60.00	50.00	19.80	14.60

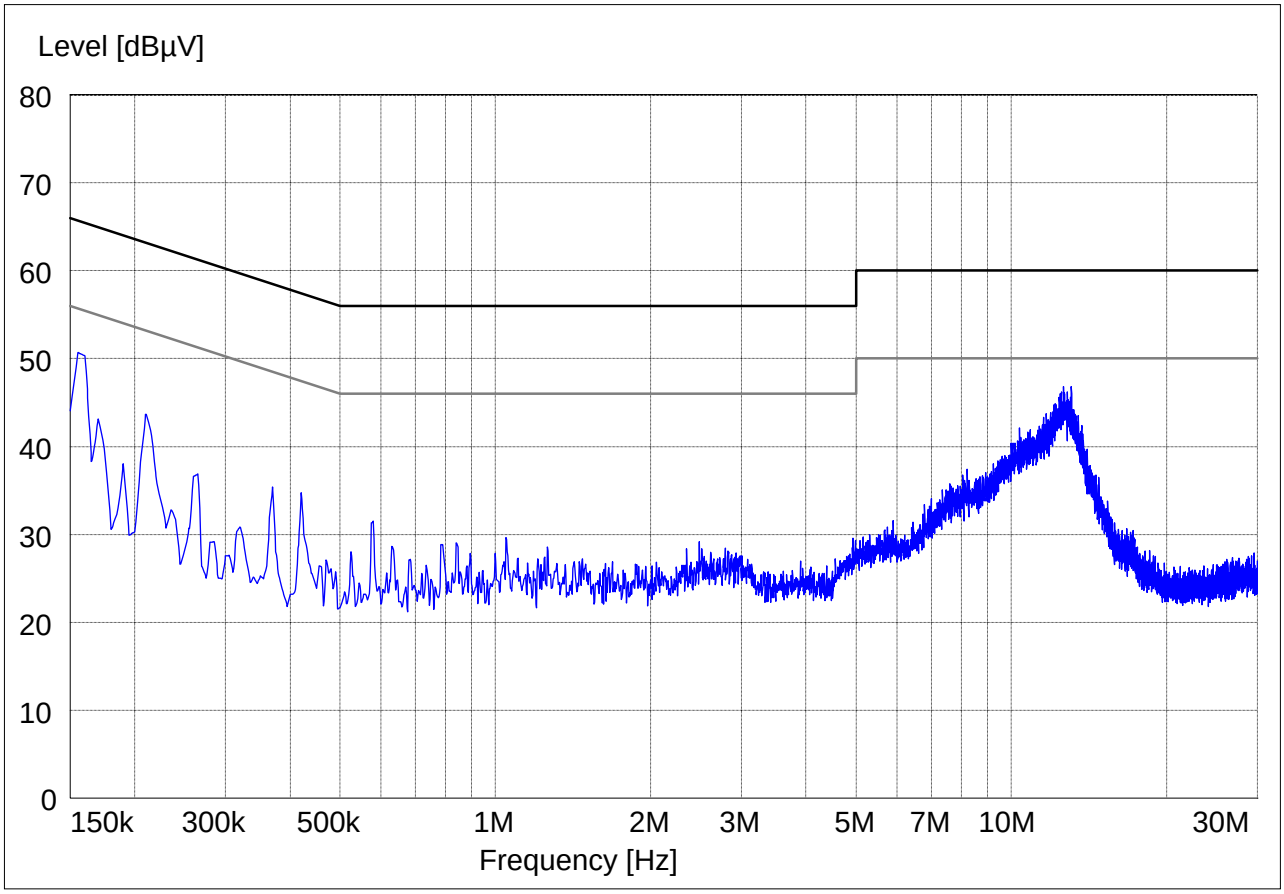
Note ;
Line (H) : Hot
Line (N) : Neutral

Plot of Conducted Power line

Test mode : (Hot)



Test mode : (Neutral)

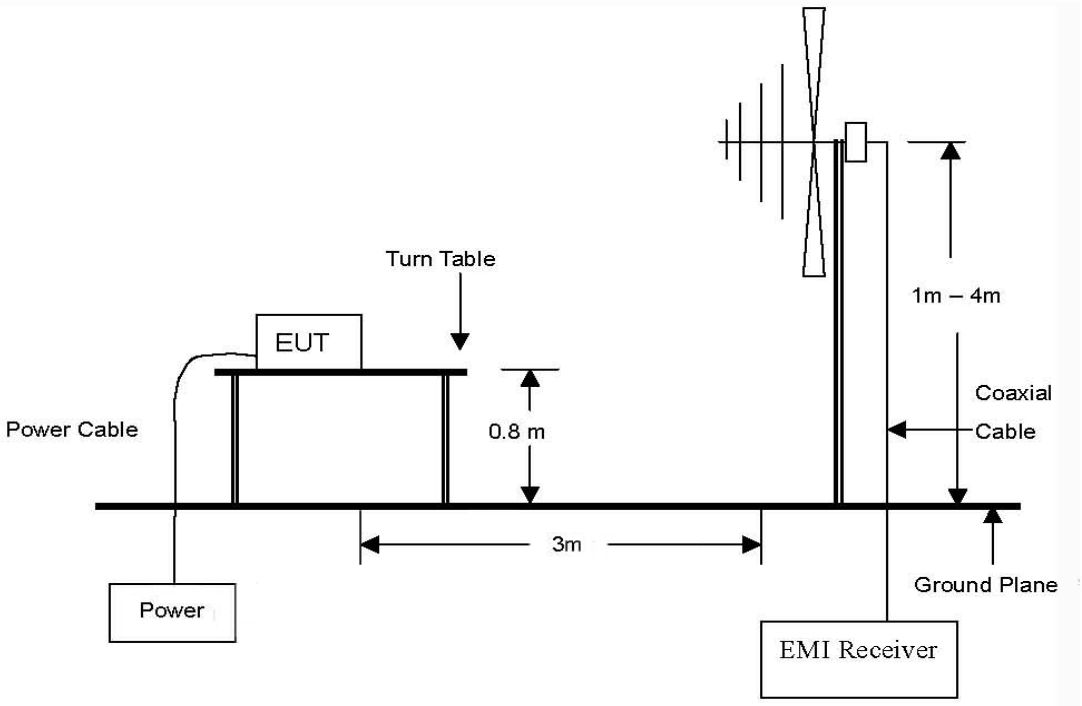


3. Spurious Emission, Band Edge and Restricted Band Test

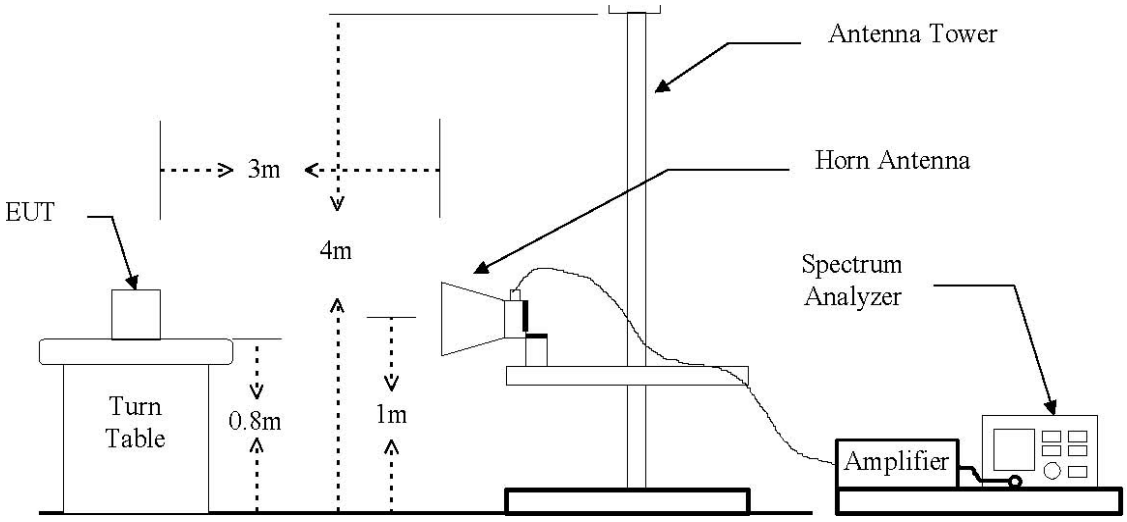
3.1. Test Setup

3.1.1. Spurious Radiated Emissions

The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz Emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission from 1 GHz to 18 GHz Emissions.



3.1.2. Spurious RF Conducted Emissions

3.2. Limit

According to §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 emission which in the restricted band, as define in section §15.205(a), must also comply the radiated emission limits specified in section §15.209(a) (see section §15.205(c))
According to § 15.209(a), for an intentional radiator devices, the general required of field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values：

Frequency of Emission (MHz)	Distance (Meters)	Field Strength (dBμV/m)	Field Strength (μV/m)
30 - 88	3	40.0	100
88 – 216	3	43.5	150
216 – 960	3	46.0	200
Above 960	3	54.0	500

3.3. Test Procedures

Radiated emissions from the EUT were measured according to the dictates of ANSI C63.4:2003

3.3.1. Test Procedures for Spurious Radiated Emissions

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
2. During performing radiated emission below 1 GHz, the EUT was set 3 meters away from the interference receiving antenna, which was mounted on the top of a variable-height antenna tower. During performing radiated emission above 1 GHz, the EUT was set 3 meter away from the interference-receiving antenna.
3. The antenna is a broadband antenna, and its 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 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 20 dB 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 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

NOTE ;

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1 GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz for Peak detection and frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1 GHz.

3.3.2. Test Procedures for Spurious RF Conducted Emissions

1. The transmitter output was connected to the spectrum analyzer through an attenuator.
2. The bandwidth of the fundamental frequency was measured with the spectrum analyzer using RBW=100 kHz, VBW=100 kHz.

3.4. Test Results

Ambient temperature : 21℃ Relative humidity : 43%

3.4.1. Spurious Radiated Emission (30 MHz ~ 1000 MHz)

The frequency spectrum from 30 MHz to 1000 MHz was investigated. All emissions are not reported much lower than the prescribed limits. All reading values are quasi-peak values.

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dBuV)	Detect Mode	Pol.	AF (dB/m)	Amp Gain+CL (dB)	Actual (dBuV/m)	Limit (dBuV/m)	Margin (dB)
386.475	52.90	P	H	13.07	-24.95	41.02	46.00	4.98
677.475	51.60	P	H	18.19	-24.98	44.81	46.00	1.19
733.250	52.94	P	H	19.04	-24.70	47.28	66.00	18.72
733.250	49.32	A	H	19.04	-24.70	43.66	46.00	2.34
789.025	51.10	P	H	19.55	-24.29	46.36	66.00	19.64
Above 1000	Not Detected							

Remark:

1. According to technical experience, all spurious emission at channel Low, Middle and High are almost the same below 1GHz, so the spurious emission test result of the channel Low was chosen as representative in finial test.
2. "*" means the restricted band.
3. Actual = Reading + AF + CL.

3.4.2. Spurious Radiated Emission (Above 1000 MHz)

The frequency spectrum above 1000 MHz was investigated. All emissions are not reported much lower than the prescribed limits. Reading values are both peak and average values.

A. Low Channel (902.6 MHz)

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dBuV)	Detect Mode	Pol.	AF (dB/m)	Amp Gain+CL (dB)	Actual (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1805.20	57.44	P	H	26.25	-28.55	55.14	74.00	18.86
1806.20	53.21	A	H	26.25	-28.55	50.91	54.00	3.09
2707.80	48.59	P	H	29.01	-27.62	49.99	74.00	4.01
3610.40	51.09	P	H	31.50	-26.59	56.00	74.00	18.00
3610.40	46.41	A	H	31.50	-26.59	51.32	54.00	2.68
4513.00	45.48	P	H	32.76	-25.04	53.20	74.00	20.80
Above 5000	Not Detected							

B. Middle Channel (915.0 MHz)

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dBuV)	Detect Mode	Pol.	AF (dB/m)	Amp Gain+CL (dB)	Actual (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1830.00	55.29	P	H	26.33	-28.59	53.02	74.00	20.98
1830.00	52.46	A	H	26.33	-28.59	50.19	54.00	3.81
2745.00	34.28	P	H	29.13	-27.45	35.95	74.00	18.05
3660.00	31.45	P	H	31.63	-25.95	37.13	74.00	16.87
4575.00	43.88	P	H	32.79	-24.79	51.88	74.00	2.12
5490.00	30.87	P	H	33.62	-24.13	40.36	74.00	13.64
Above 6000	Not Detected							

C. High Channel (927.4 MHz)

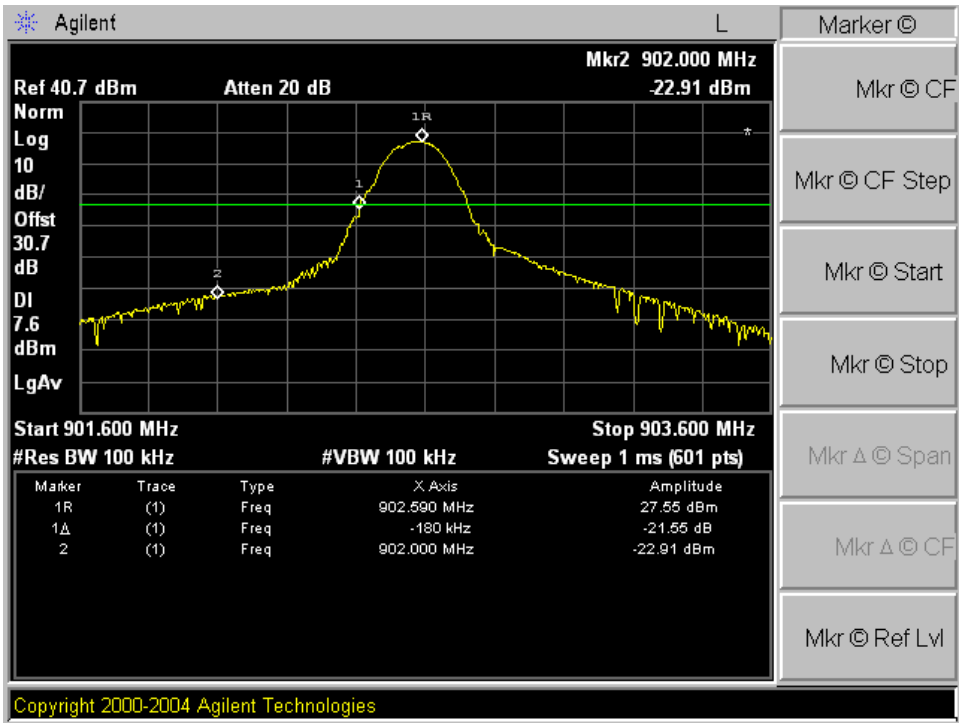
Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dBuV)	Detect Mode	Pol.	AF (dB/m)	Amp Gain+CL (dB)	Actual (dBuV/m)	Limit (dBuV/m)	Margin (dB)
960.00*	32.41	P	H	21.41	-23.46	30.35	74.00	23.65
1854.80	58.64	P	H	26.41	-28.64	56.41	74.00	17.59
1854.80	55.11	A	H	26.41	-28.64	52.88	54.00	1.12
2782.20	48.59	P	H	29.24	-27.29	50.54	74.00	23.46
3709.60	52.74	P	H	31.76	-25.46	59.04	74.00	14.96
3709.60	46.55	A	H	31.76	-25.46	52.85	54.00	1.15
4637.00	47.27	P	H	32.82	-24.85	55.24	74.00	18.76
Above 6000	Not Detected							

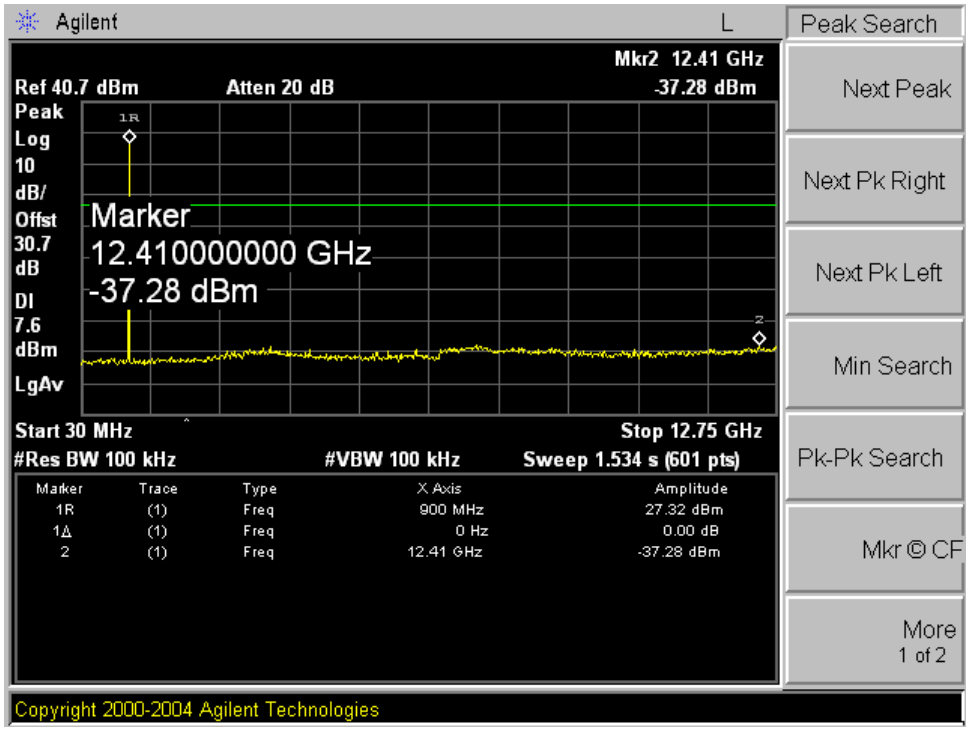
Remark:

1. "*" means the restricted band.
2. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental Frequency.
3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using peak/average detector mode.
4. Average test would be performed if the peak result were greater than the average limit.
5. Actual = Reading + AF – Amp Gain + CL

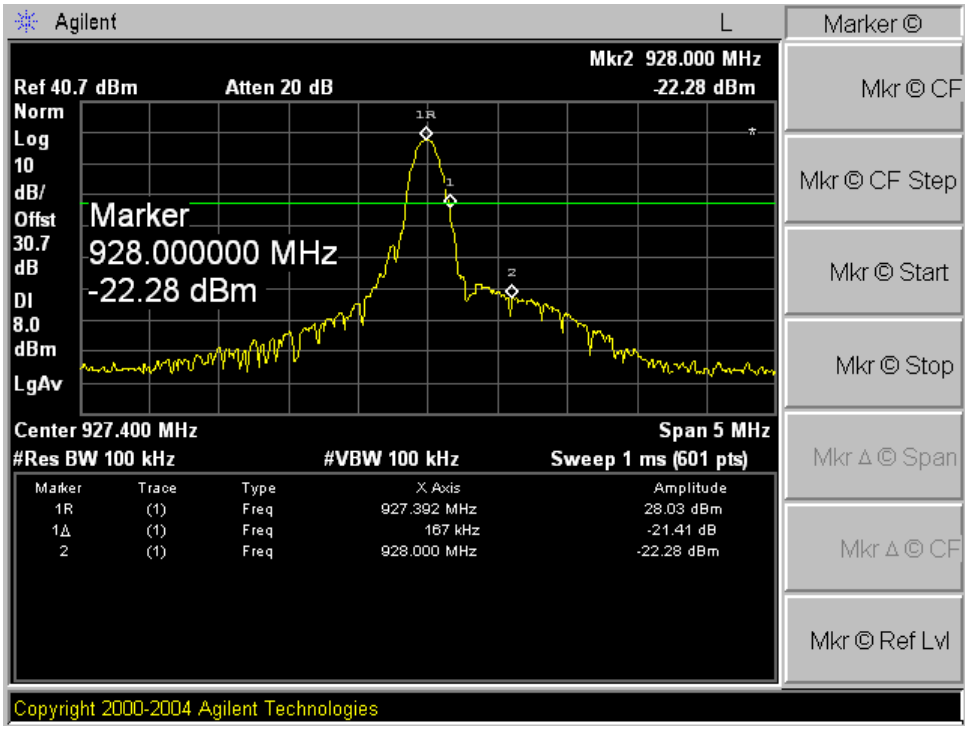
3.4.3. Spurious RF Conducted Emissions: Plot of Spurious RF Conducted Emission

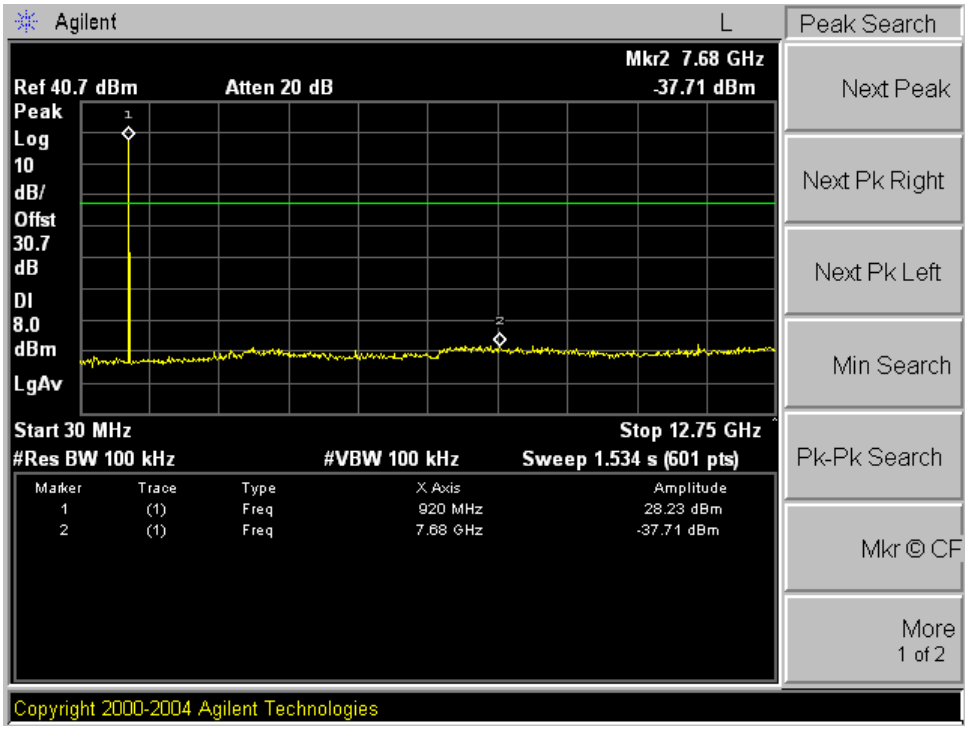
Low Channel





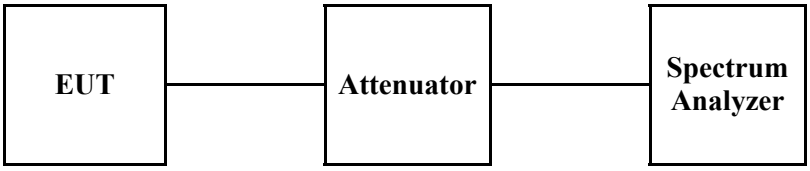
High Channel





4. 20 dB Bandwidth

4.1. Test Setup



4.2. Limit

According to §15.247(a)(2), The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

4.3. Test Procedure

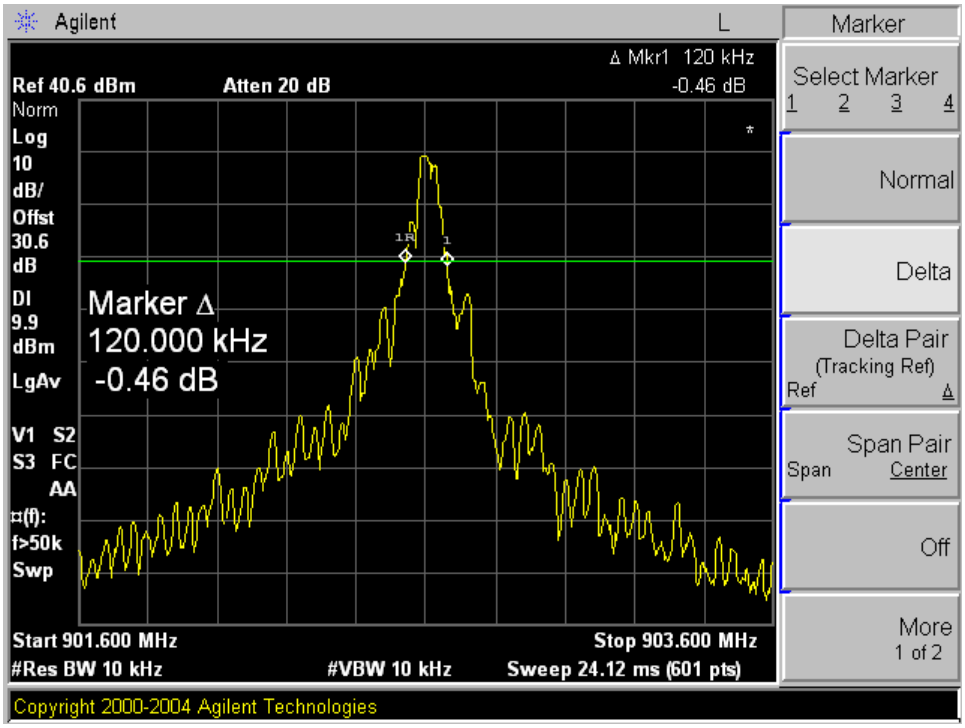
1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW = 10 kHz, VBW = RBW, Span = 2 MHz, Sweep = auto.
4. Mark the peak frequency and –20dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

4.4. Test Results

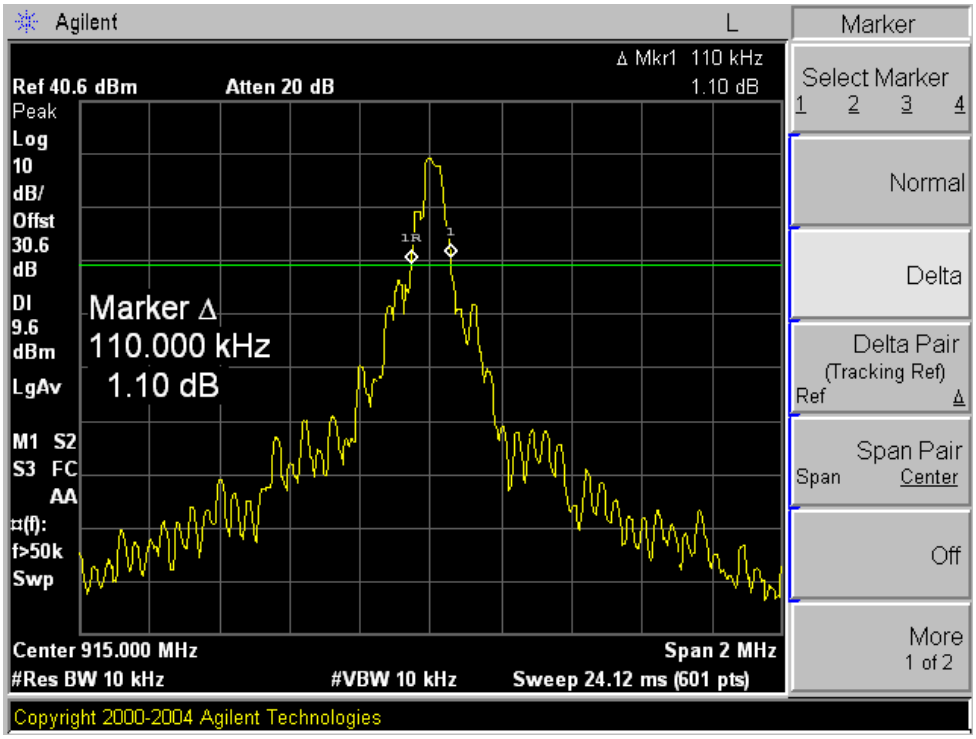
Ambient temperature : 22℃ Relative humidity : 44%

Channel	Channel Frequency (MHz)	20 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	902.6	0.12	0.5
Middle	915.0	0.11	
High	927.4	0.14	

Low Channel



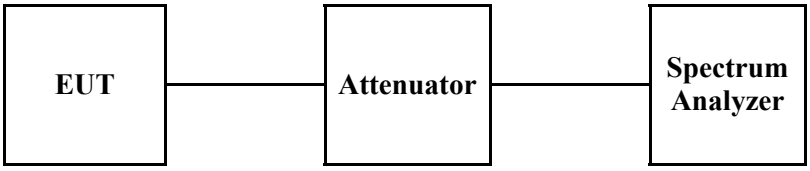
Middle Channel



High Channel

5. Number of Hopping Frequency

5.1. Test Setup



5.2. Limit

§15.247(a)(1)(i) if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies.

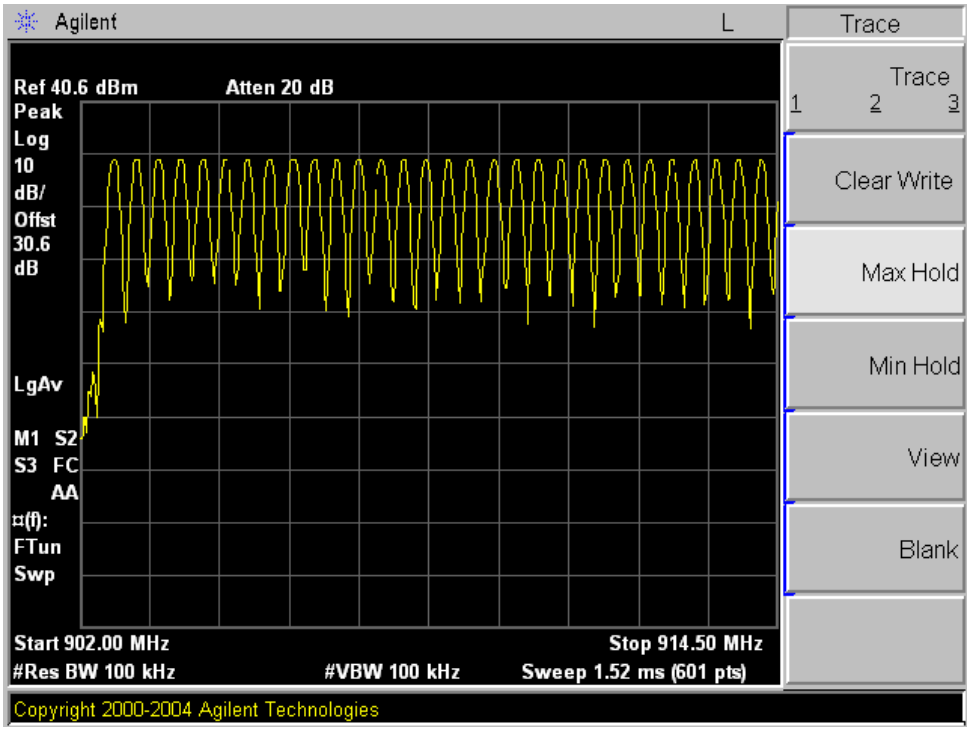
5.3. Test Procedure

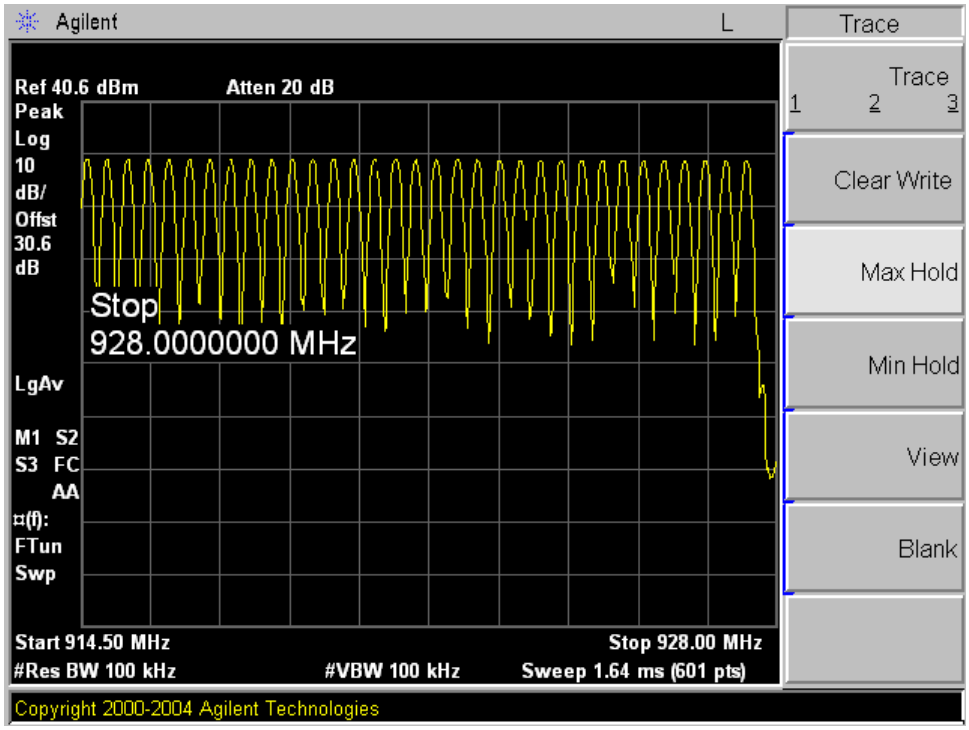
1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna the port to the Spectrum analyzer
3. Set spectrum analyzer Start=902 MHz, Stop=914.5 MHz, Sweep=auto and Start=914.5 MHz, Stop= 928 MHz, Sweep=auto.
4. Set the spectrum analyzer as RBW, VBW=100 kHz.
5. Max hold, view and count how many channel in the band.

5.4. Test Results

Ambient temperature : 22℃ Relative humidity : 44%

Number of Hopping Frequency	Limit	Remark
63	>= 50	Refer to the attached plot.





6. Hopping Channel Separation

6.1. Test Setup

6.2. Limit

§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.

6.3. Test Procedure

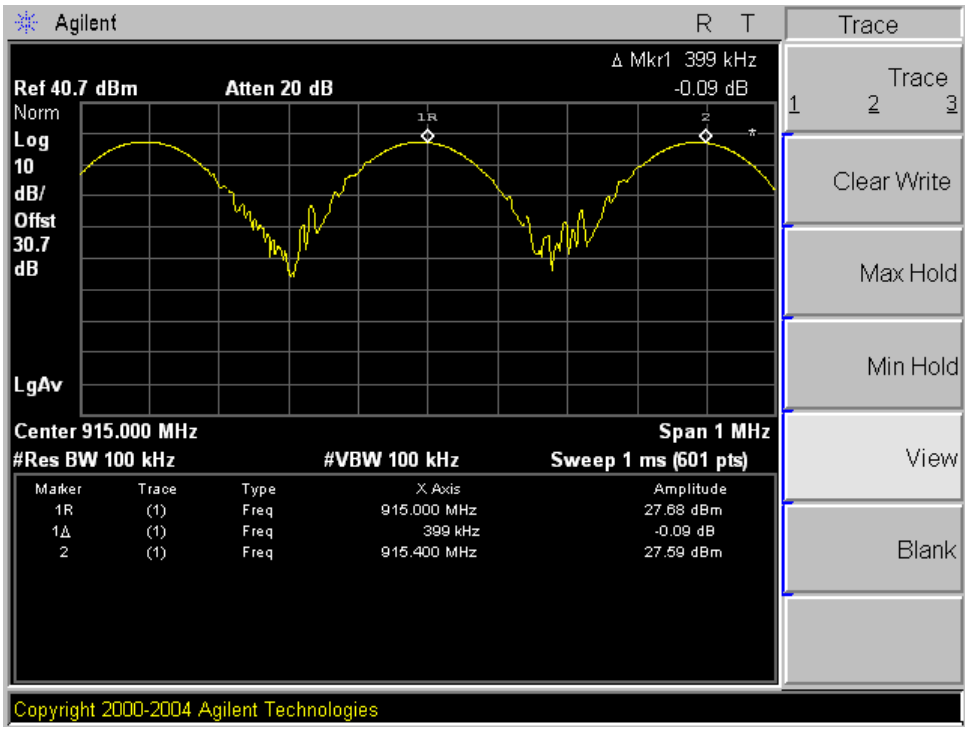
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in test setup without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range.
3. By using the Max Hold function record the separation of adjacent channels.
4. Measure the frequency difference of these two adjacent channels by spectrum analyzer MARK function. And then plot the result on spectrum analyzer screen.
5. Repeat above procedures until all frequencies measured were complete.
6. Set center frequency of spectrum analyzer = middle of hopping channel.
7. Set the spectrum analyzer as RBW=100 kHz, VBW=100 kHz, Span=1 MHz and Sweep = auto.

6.4. Test Results

Ambient temperature : 22℃ Relative humidity : 44%

Channel	Channel Frequency (MHz)	Measured (kHz)
Middle	915.0	339

Middle Channel



7. Dwell Time

7.1. Test Set up

7.2. Limit

§15.247(a)(1)(i) 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;
if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period.

7.3. Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in test setup without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable.
3. Adjust the center frequency of spectrum analyzer on any frequency be measured and set spectrum analyzer to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
4. Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.
5. Repeat above procedures until all frequencies measured were complete.

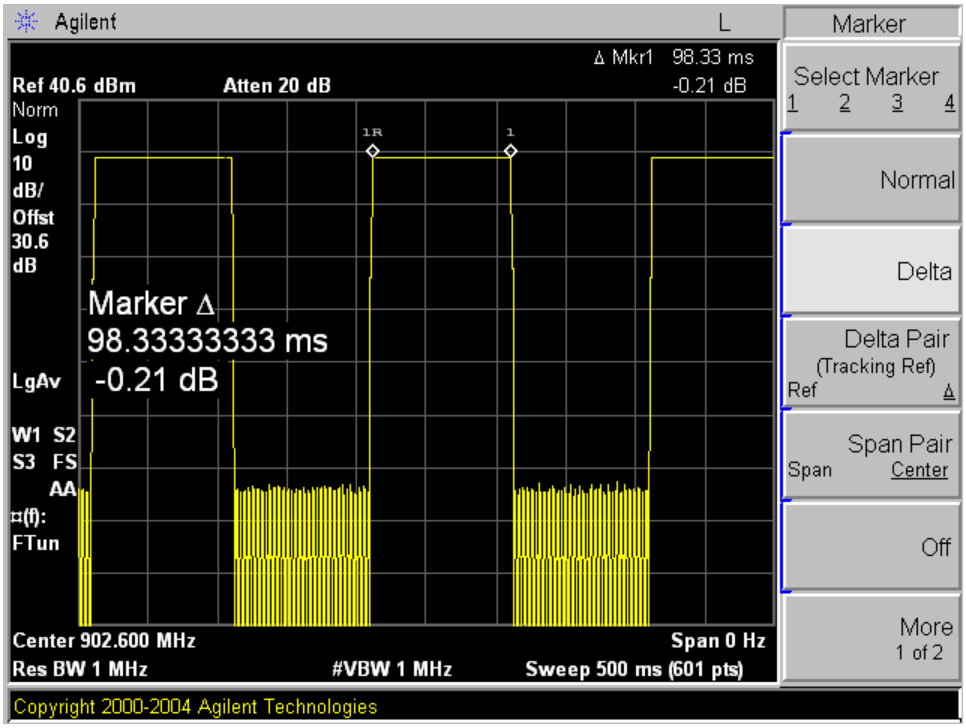
7.4. Test Results

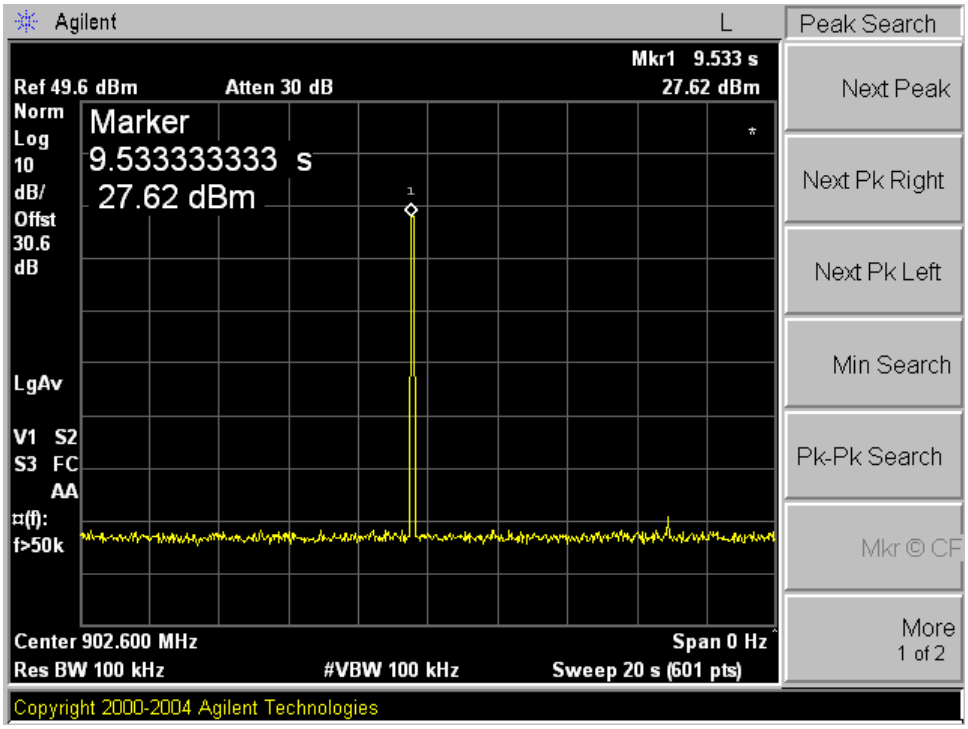
Ambient temperature : 22℃ Relative humidity : 44%

8.4.1. Packet Type : Long

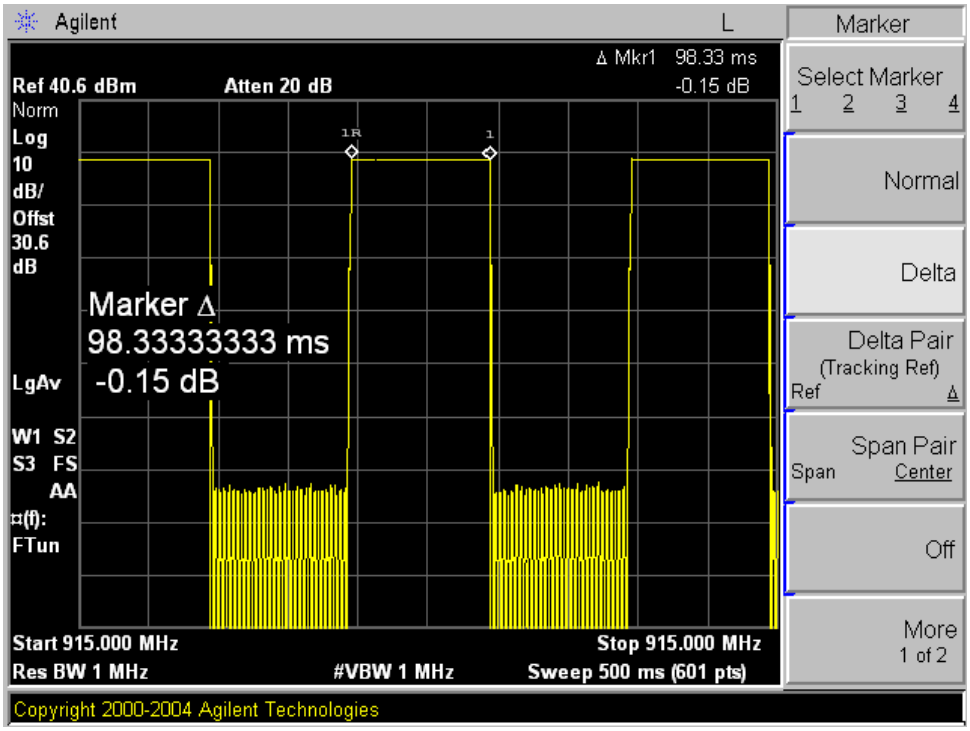
Frequency (MHz)	Dwell Time (ms)	Limit (ms)
902.6	98.3	400
915.0	98.3	400
927.4	98.3	400

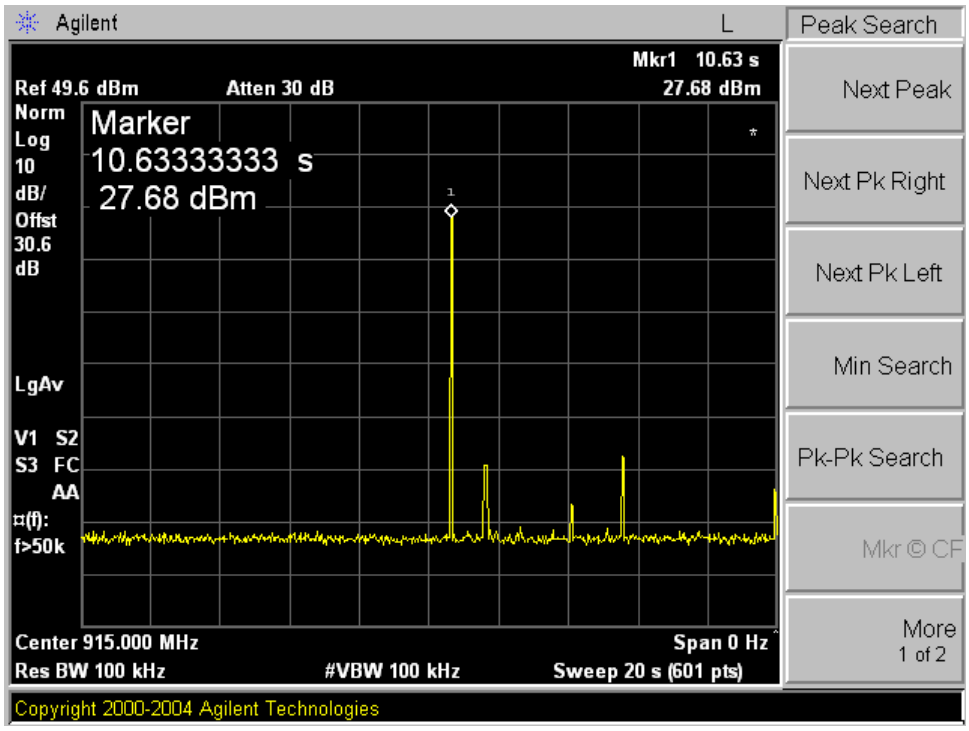
Low Channel


Agilent
L
Marker
Δ Mkr1 98.33 ms
-0.21 dB
Ref 40.6 dBm
Atten 20 dB
Norm
Log
10
dB/
Offst
30.6
dB
Marker Δ
98.33333333 ms
-0.21 dB
LgAv
W1 S2
S3 FS
AA
¤(f):
FTun
Center 902.600 MHz
Res BW 1 MHz
#VBW 1 MHz
Span 0 Hz
Sweep 500 ms (601 pts)
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Δ
Span Pair
Span Center
Off
More
1 of 2
Copyright 2000-2004 Agilent Technologies

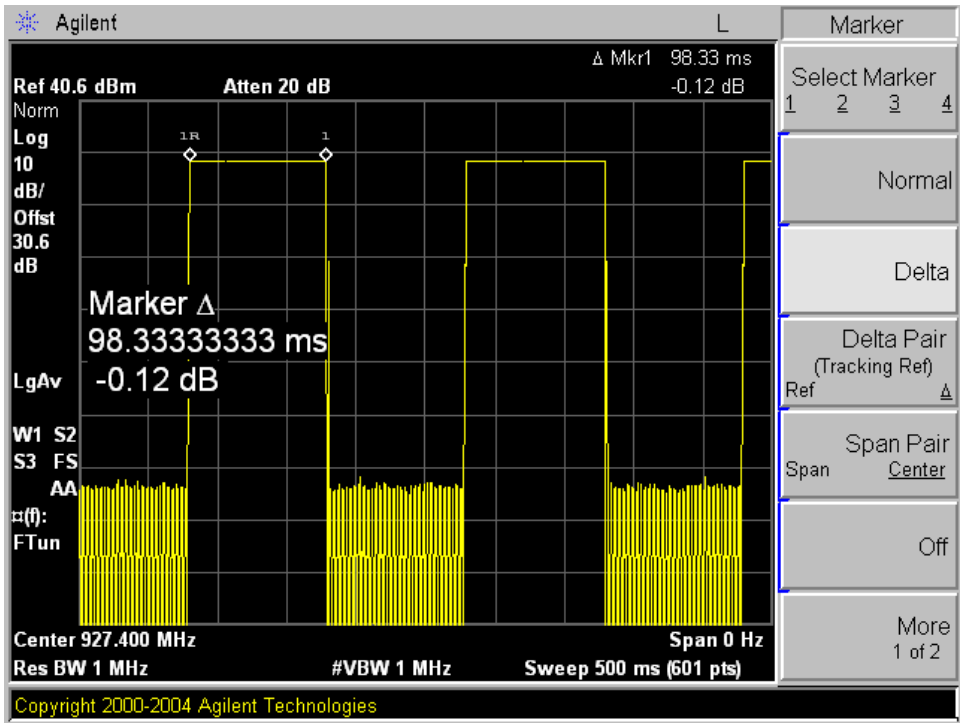

Agilent
L
Peak Search
Mkr1 9.533 s
27.62 dBm
Ref 49.6 dBm
Atten 30 dB
Norm
Log
10
dB/
Offst
30.6
dB
Marker
9.533333333 s
27.62 dBm
LgAv
V1 S2
S3 FC
AA
¤(f):
f>50k
Center 902.600 MHz
Res BW 100 kHz
#VBW 100 kHz
Span 0 Hz
Sweep 20 s (601 pts)
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr © CF
More
1 of 2
Copyright 2000-2004 Agilent Technologies

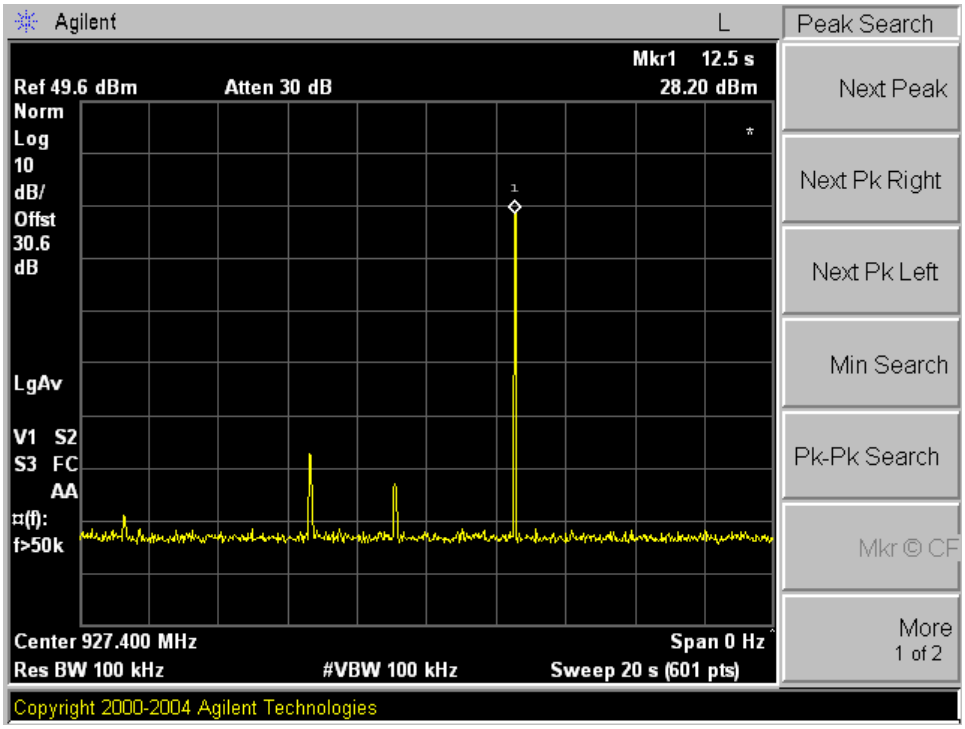
Middle Channel





High Channel

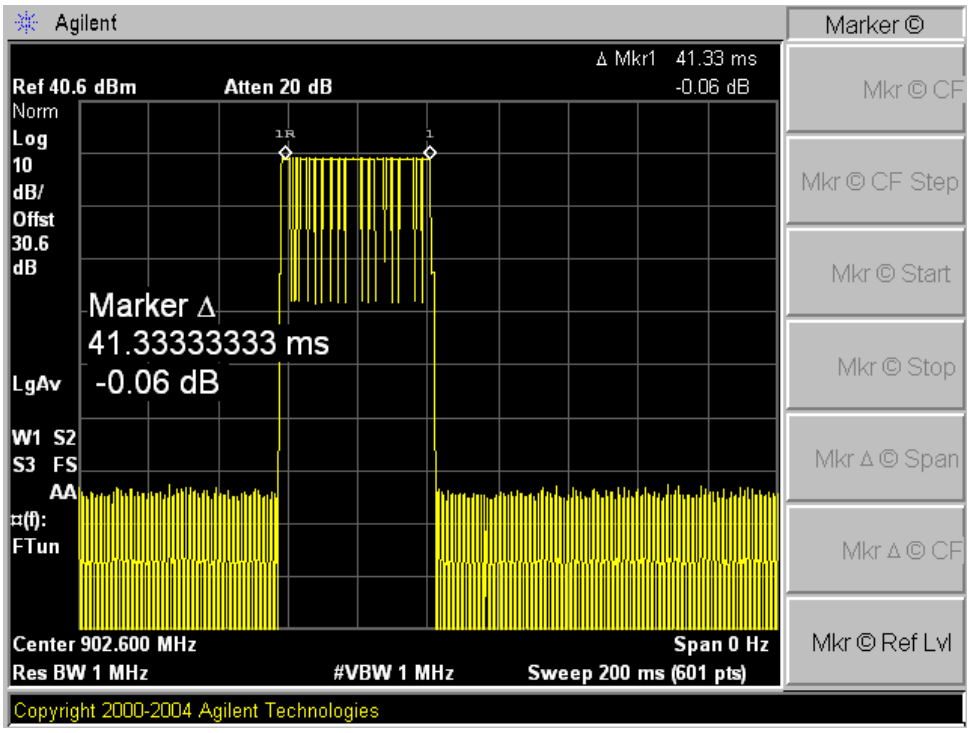


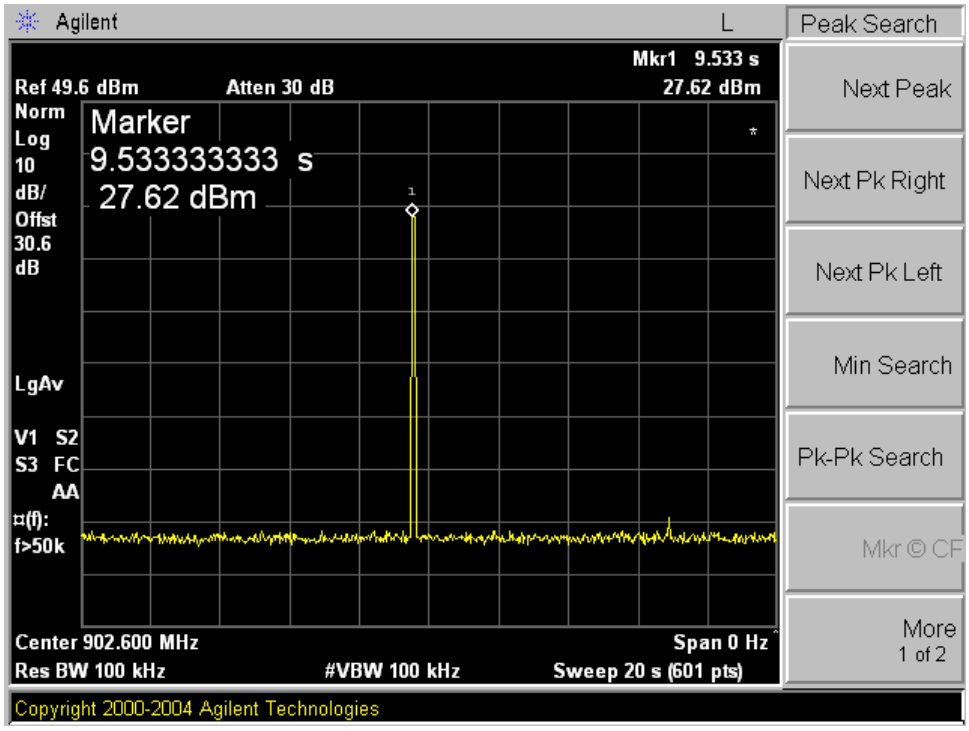


8.4.2. Packet Type : Short

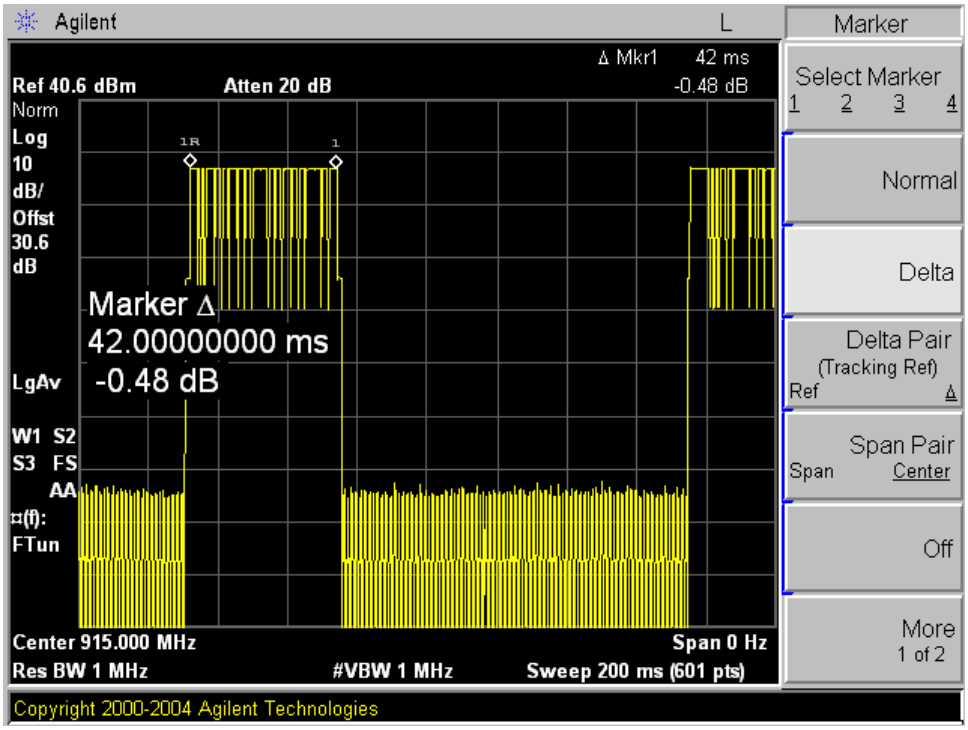
Frequency (MHz)	Dwell Time (ms)	Limit (ms)
902.6	41.3	400
915.0	42.0	400
927.4	42.5	400

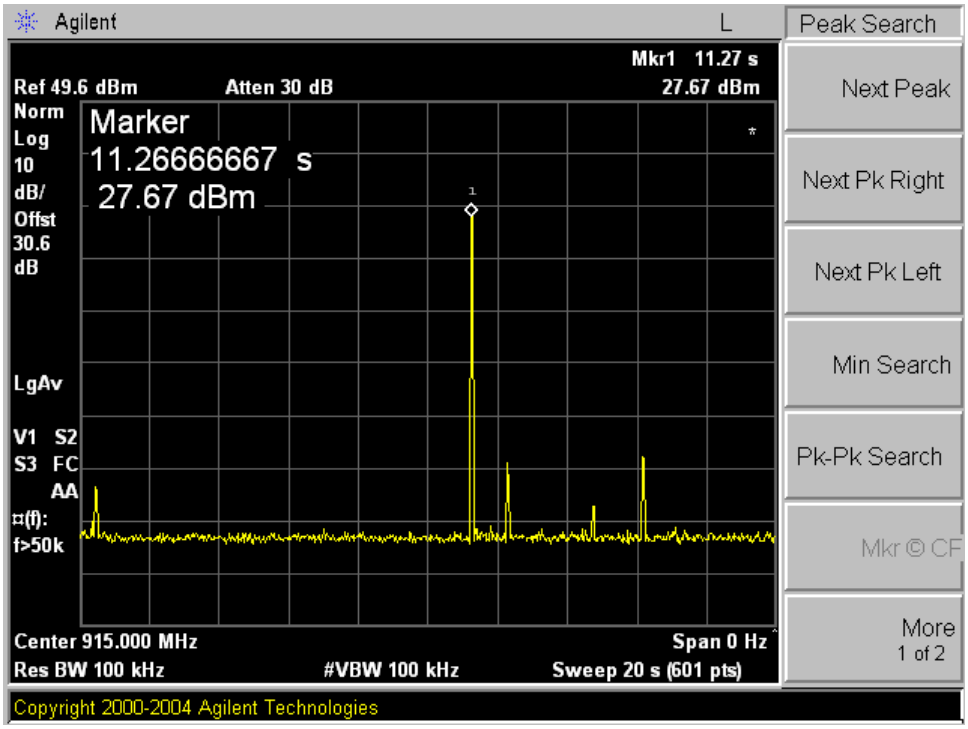
Low Channel



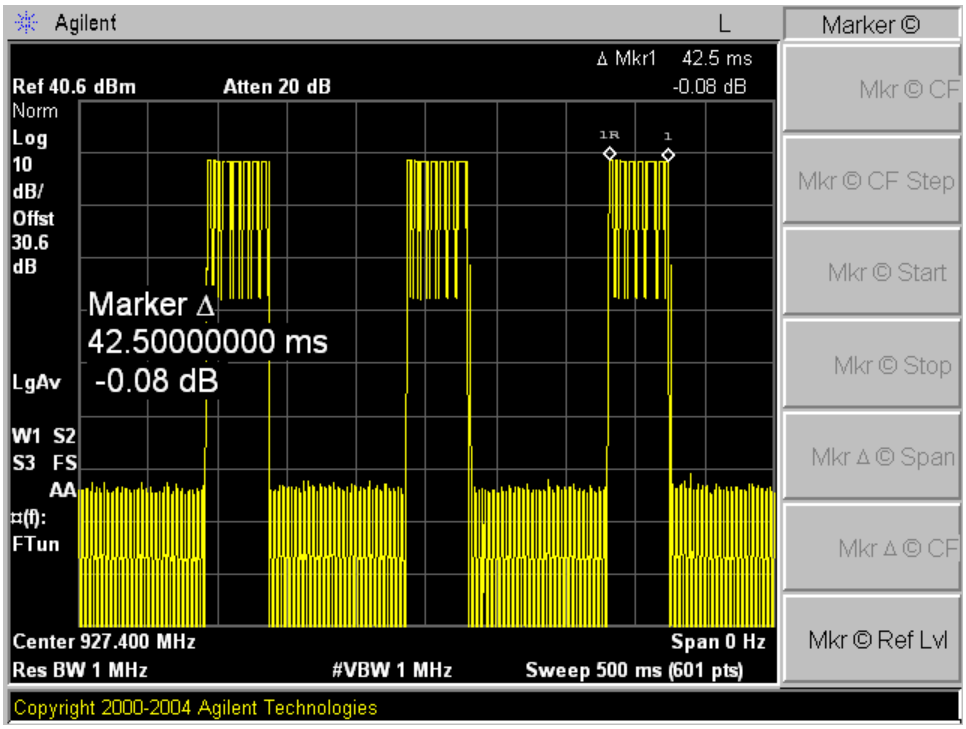


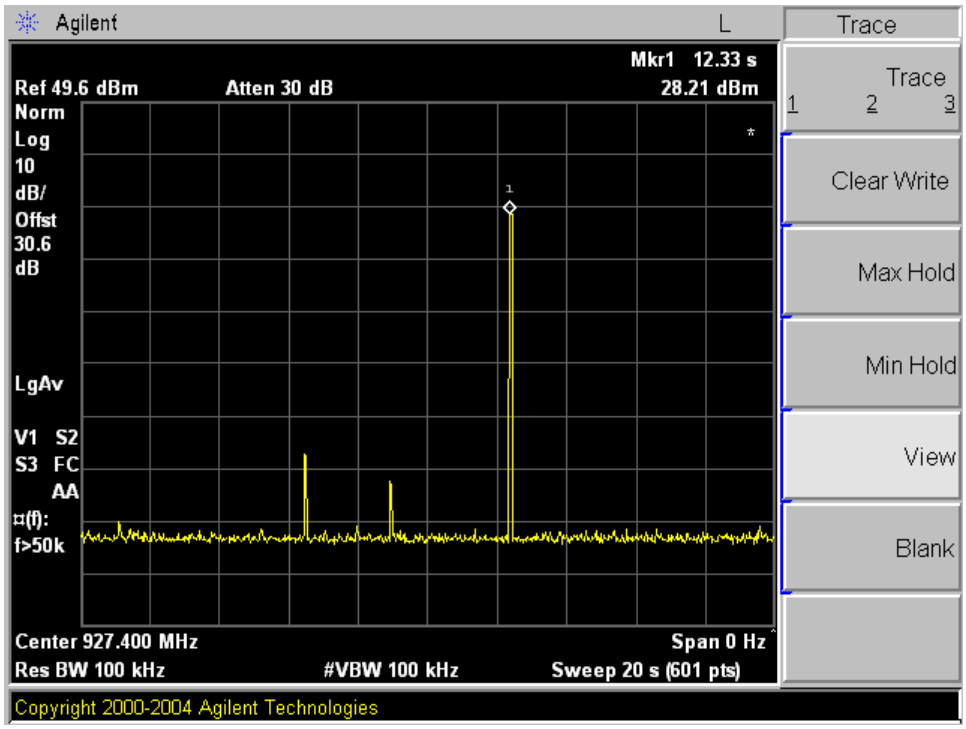
Middle Channel





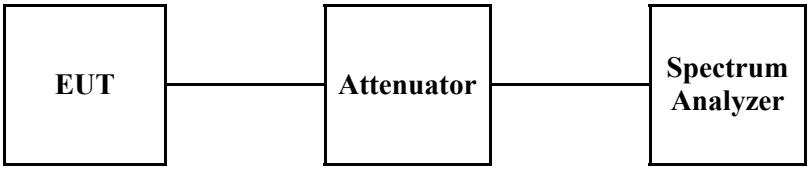
High Channel





8. Maximum Peak Output Power Measurement

8.1. Test Setup



8.2. Limit

According to §15.247(b)(2), 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section.

8.3. Test Procedure

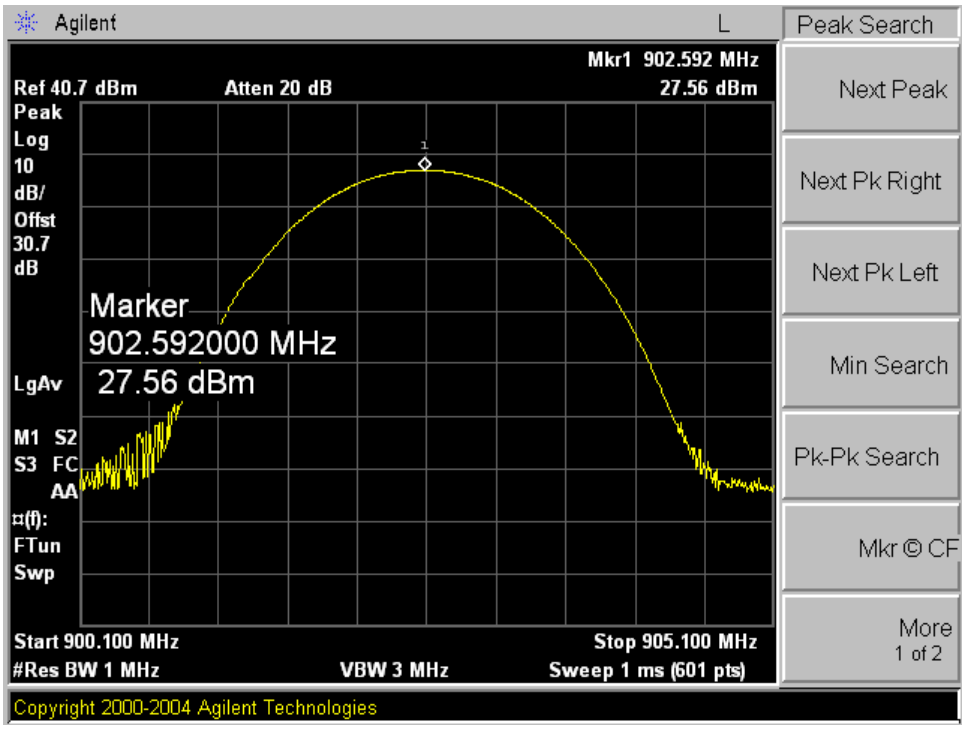
1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the Spectrum analyzer as RBW = 1 MHz, VBW = 1 MHz, Span = Auto.

8.4. Test Results

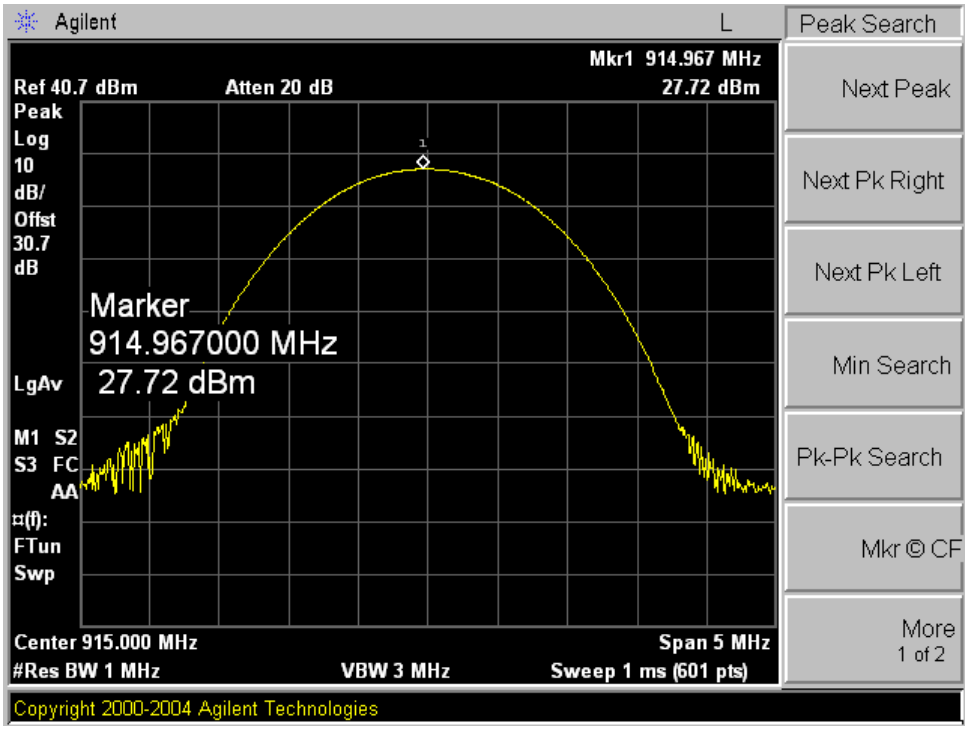
Ambient temperature : 21℃ Relative humidity : 44%

Channel	Channel Frequency (MHz)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Margin (dB)
Low	902.6	27.56	30	2.44
Middle	915.0	27.72		2.28
High	927.4	28.13		1.87

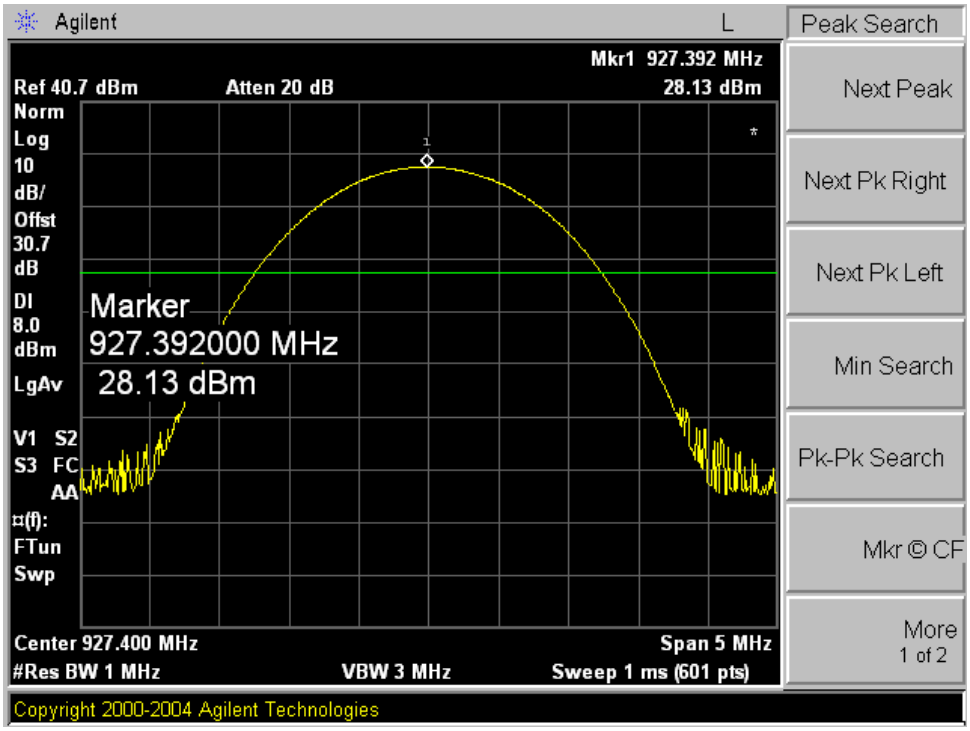
Low Channel



Middle Channel



High Channel



9. Antenna Requirement

9.1. Standard Applicable

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 6 dBi are used, the power shall be reduced by the amount in dB that the gain of the antenna exceeds 6 dBi.

9.2. Antenna Connected Construction

The antenna type of this product is Special connect (Patch antenna) and the peak max gain of this antenna is 5.23 dBi.

10. RF Exposure Evaluation

According to FCC 1.1310 : The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in §1.1307(b)

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength(V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Average Time
(A) Limits for Occupational /Control Exposures				
300 – 1500	--	--	F/300	6
1500 - 100000	--	--	5	6
(B) Limits for General Population/Uncontrol Exposures				
300 – 1500	--	--	F/1500	6
1500 - 100000	--	--	1	30

10.1. Friis transmission formula : Pd = (Pout*G)/(4*pi*R^2)

Where Pd = power density in mW/cm^2
Pout = output power to antenna in mW
G = gain of antenna in linear scale
Pi = 3.1416
R = distance between observation point and center of the radiator in cm

Pd the limit of MPE, 1 mW/cm^2. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

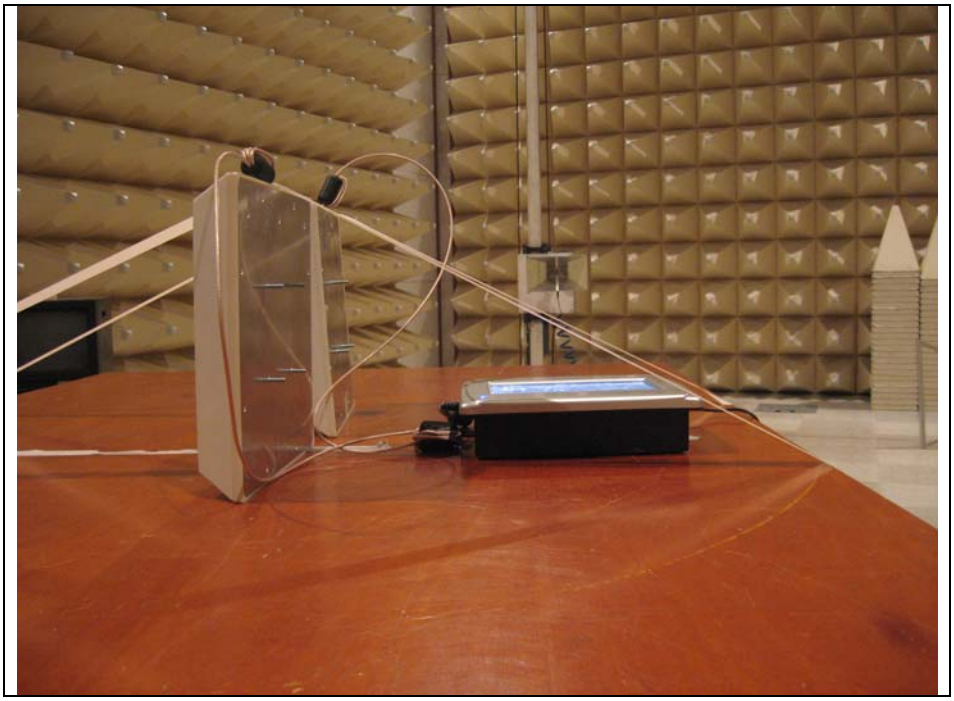
10.2. Test Result of RF Exposure Evaluation

Channel	Channel Frequency (MHz)	Output Peak Power to Antenna (dBm)	Antenna Gain (dBi)	Power Density at 20cm (mW/cm^2)	LIMITS (mW/cm^2)
Low	902.6	27.56	5.23	0.38	0.62
Middle	915.0	27.72	5.23	0.39	0.61
High	927.4	28.13	5.23	0.43	0.62

NOTE :

The power density Pd (4th column) at a distance of 20cm calculated from the friis transmission formula is far below the limit of 1 mW/ cm^2.

Appendix A-1. Photo of Field Strength & Radiated Emission Test



Appendix A -2. Photos of Conducted Power Line Test