TEST REPORT

FCC RULES Part 15 Subpart C

Report File No.	: STROR-06-046
Date of Issue	: 2006-06-05
Kind of Product	: Bluetooth Serial Adaptor
Model Name	: Parani SD100
FCC ID	: S7APARANISD100
Manufacturer	: SENA Technologies, Inc.
Serial No.	: -
Test Result	: Complied

VERIFICATION OF COMPLIANCE

Applicant :	SENA Technologies, Inc.
Kind of Product :	Bluetooth Serial Adaptor
Brand Name :	-
Model Name :	Parani SD100
Model Difference :	-
Report File No. :	STROR-06-046
Date of test :	May 10, 2006 ~ June 01, 2006
Receiver EUT :	-

APPLICABLE STANDARDS	
STANDARD	**TEST RESULT**
Part 15, Subpart B and Subpart C §15.247	Complied

The above equipment was tested by SGS Testing Korea Co., Ltd. for compliance with the requirements set forth in the FCC RULES Part 15, Subpart B and Subpart C §15.247. The results of testing in this report apply to the product system that was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Tested By:  ***Date*** **June 05, 2006**

Feel Jeong

Approved By  ***Date*** **June 05, 2006**

Albert Lim

INDEX

1. GENERAL INFORMATION

1.1 General Description of EUT & Power

Kind of Product	Bluetooth Serial Adaptor
Model Name	Parani SD100
Power Supply	DC 5 V AC adapter(100 ~240 Vac)
Frequency Range	2402~2480 MHz(FHSS)
Transmit Power	12.36 dBm (FHSS)
Modulation Technique	FHSS
Number of Channels	79 CH (FHSS)
Test Modulation	Continuous RF
Operating Conditions	-20 ℃ ~ + 70 ℃
Antenna Type	Helical Antenna(left-handed SMA Type)
Antenna Gain	2 dBi

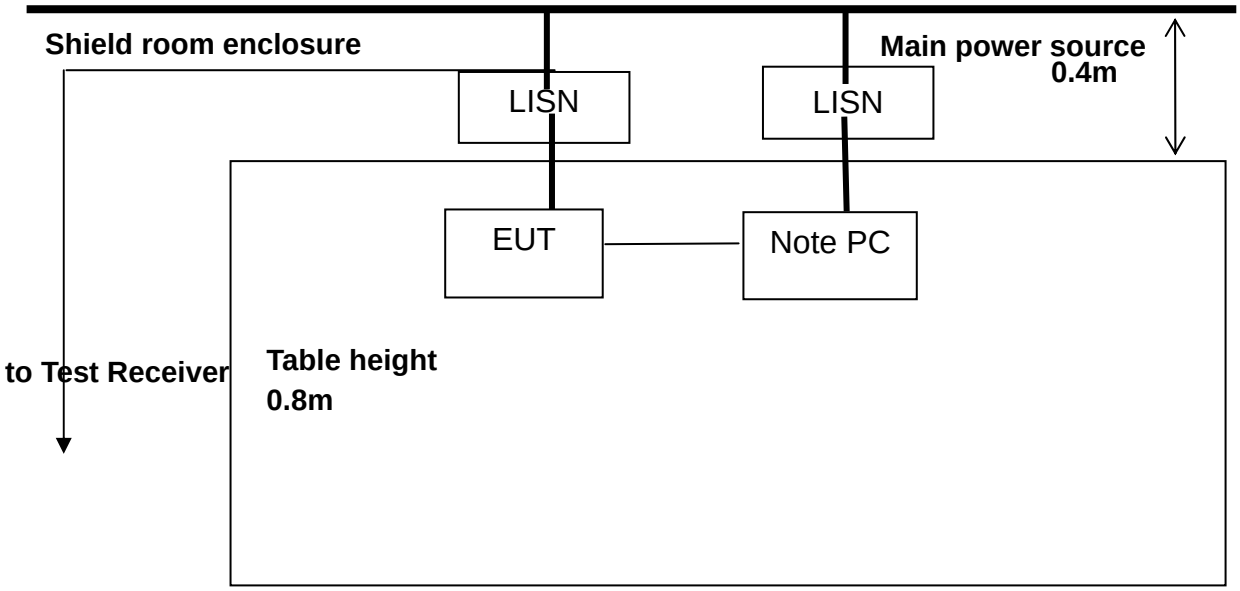
1.2 Summary of Test Results

The EUT has been tested according to the following specifications:

APPLIED STANDARD:FCC 47 C.F.R. Part15, Subpart B and Subpart C		
Standard Section	**Test Item**	**Result**
15.107 15.207	AC Power Conducted Emission	PASS
15.247(a)(1)	20 dB Bandwidth	PASS
15.247(b)(1)	Maximum Peak Output Power	PASS
15.205(a) 15.209(a) 15.247(d)	Spurious Emission, Band Edge, and Restricted Bands	PASS
15.247(a)(1)	Frequency Separation	PASS
15.247(a)(1)(iii)	Number of Hopping Frequency	PASS
15.247(a)(1)(iii)	Time of Occupancy (Dwell Time)	PASS
15.247(e)	Power Spectral Density	PASS

2. CONDUCTED POWERLINE 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/50ohm 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 (dB μ V)	
	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 Procedure

1. A preliminary scan with a spectrum monitor is performed to identify the frequency of emission that has the highest amplitude relative to the limit by operating the EUT in selected modes of operation, typical cable positions, and with a typical system configuration.
2. Record the 6 or 8 highest emissions relative to the limit.
3. Measure each frequency obtained from step 3 by a test receiver set on quasi peak detector function, and then record the accuracy frequency and emission level. If all emissions measured in the specified band are attenuated more than 20 dB from the limit, this step would be ignored, and the peak detector function would be used.
4. Confirm the highest three emissions with variation of the EUT cable configuration and record the final data.
5. Repeat all above procedures on measuring each operation mode of EUT.

2.4 Test Result

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

Humidity Level	50 %	Temperature	21 ℃

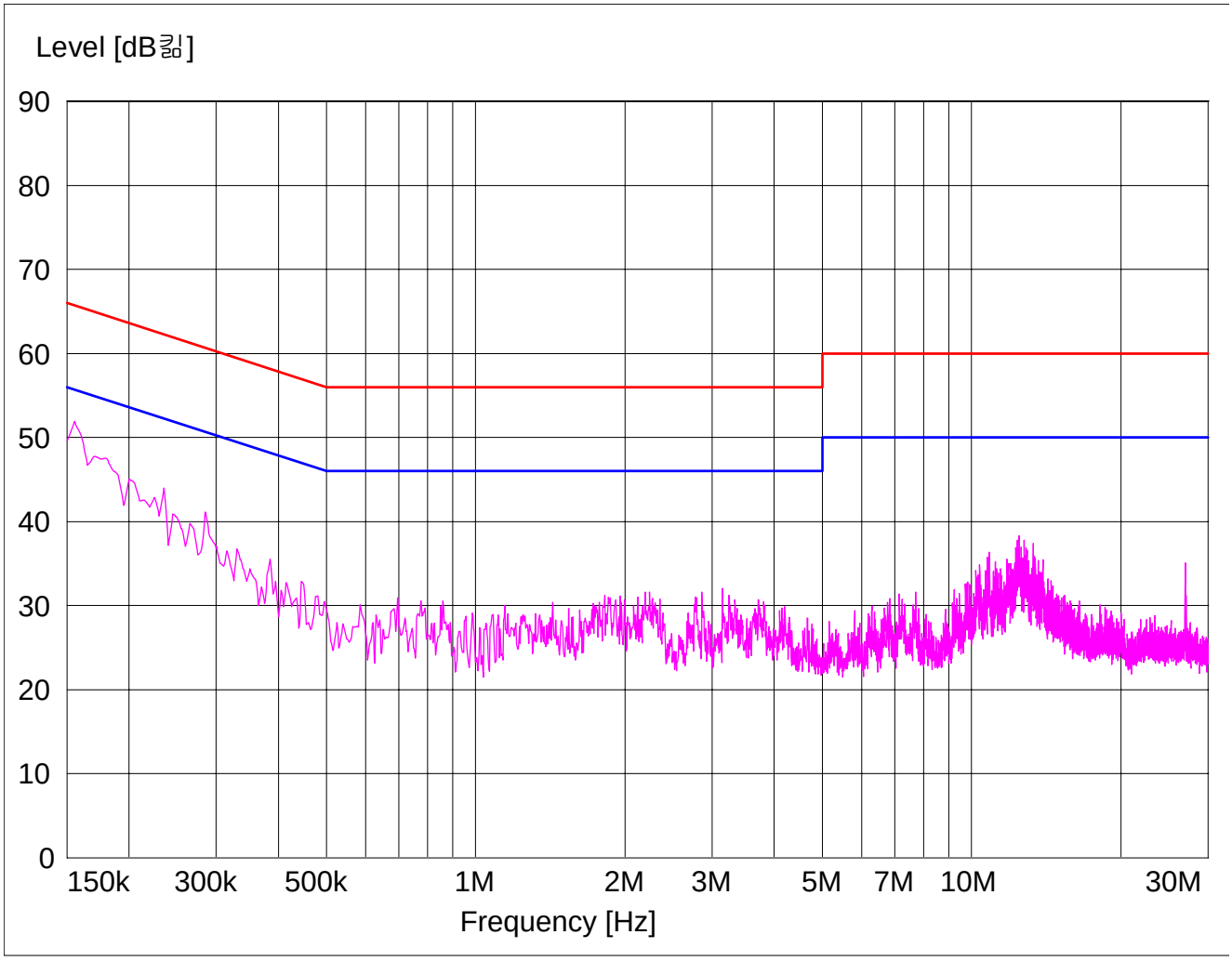
Frequency range : 0.15 MHz – 30 MHz
Measured Bandwidth : 9 kHz

FREQ. (MHz)	LEVEL(dBμV)		LINE	LIMIT(dBμV)		MARGIN(dB)	
	Q-Peak	Average		Q-Peak	Average	Q-Peak	Average
0.155	43.6	23.3	H	65.7	55.7	22.13	32.43
0.235	34.1	19.2	H	62.3	52.3	28.17	33.07
0.285	35.9	26.8	H	60.7	50.7	24.77	23.87
0.385	28.7	21.1	H	58.2	48.2	29.47	27.07
12.480	29.3	20.8	H	60.0	50.0	30.70	29.20
27.000	31.6	29.9	H	60.0	50.0	28.40	20.10
0.155	43.9	23.0	N	65.7	55.7	21.83	32.73
0.230	35.4	20.1	N	62.4	52.4	27.05	32.35
0.285	35.9	26.8	N	60.7	50.7	24.77	23.87
0.380	28.8	20.5	N	58.3	48.3	29.48	27.78
12.405	30.6	24.4	N	60.0	50.0	29.40	25.60
27.000	31.8	29.8	N	60.0	50.0	28.20	20.20

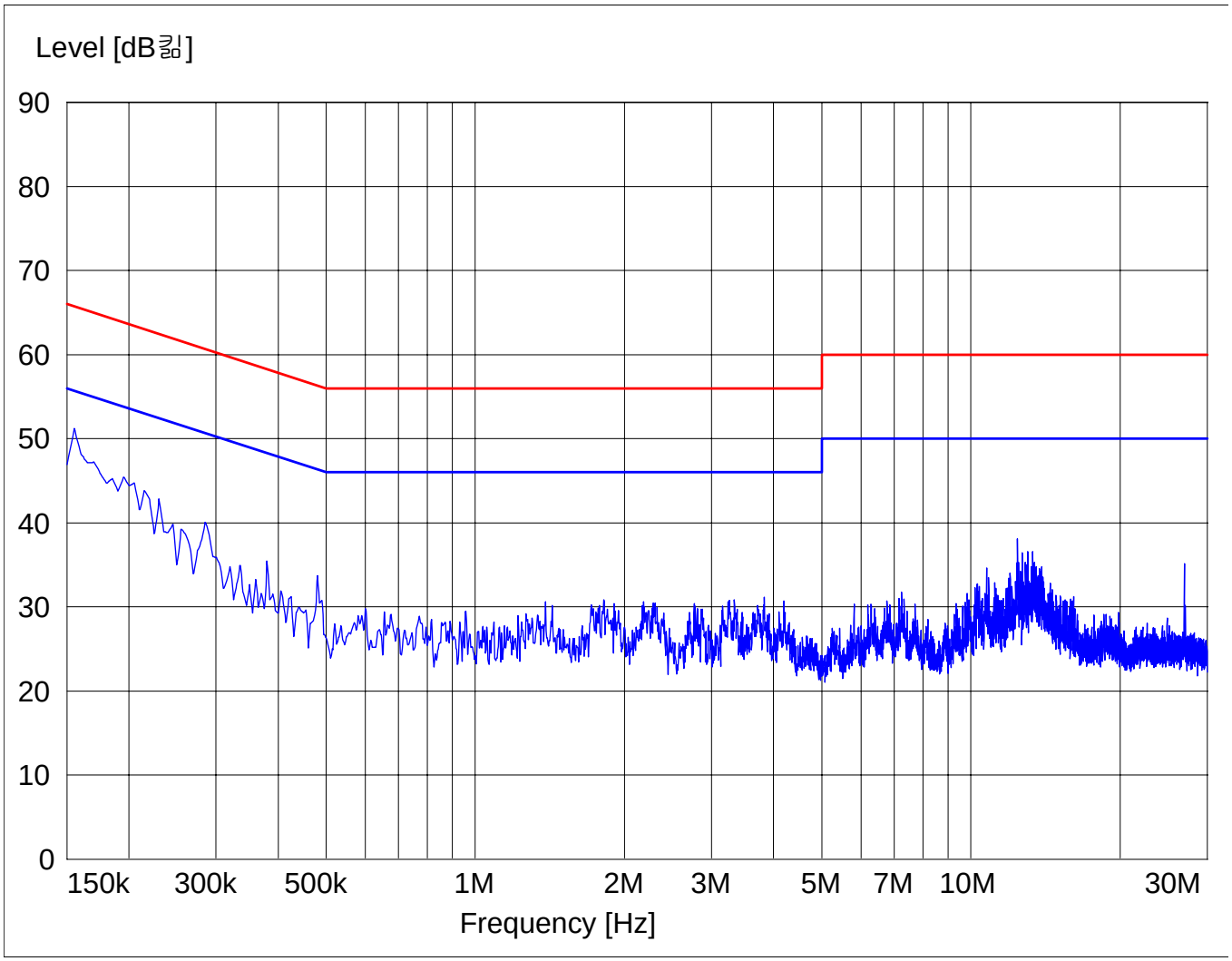
REMARKS :

1. Note : • Line (H) :Hot , • Line (N) :Neutral

Plot of Conducted Power line
Test mode: (Hot)



Test mode: (Neutral)



Test Equipment Used

EQUIPMENT	MANUFACTURER	MODEL	CAL DUE.
Two-Line V-Network	Rohde & Schwarz	ENV216	Dec.2006
Two-Line V-Network	NNB 41	Schaffner	Sep. 2006
Shielded Room	N/A	-	-
Test Receiver	Rohde & Schwarz	ESHS 10	Sep. 2006

3. SPURIOUS EMISSION, BAND EDGE, and RESTRICTED BANDS TEST

3.1 Test Setup

1) Spurious Radiated Emissions

The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 40 GHz.

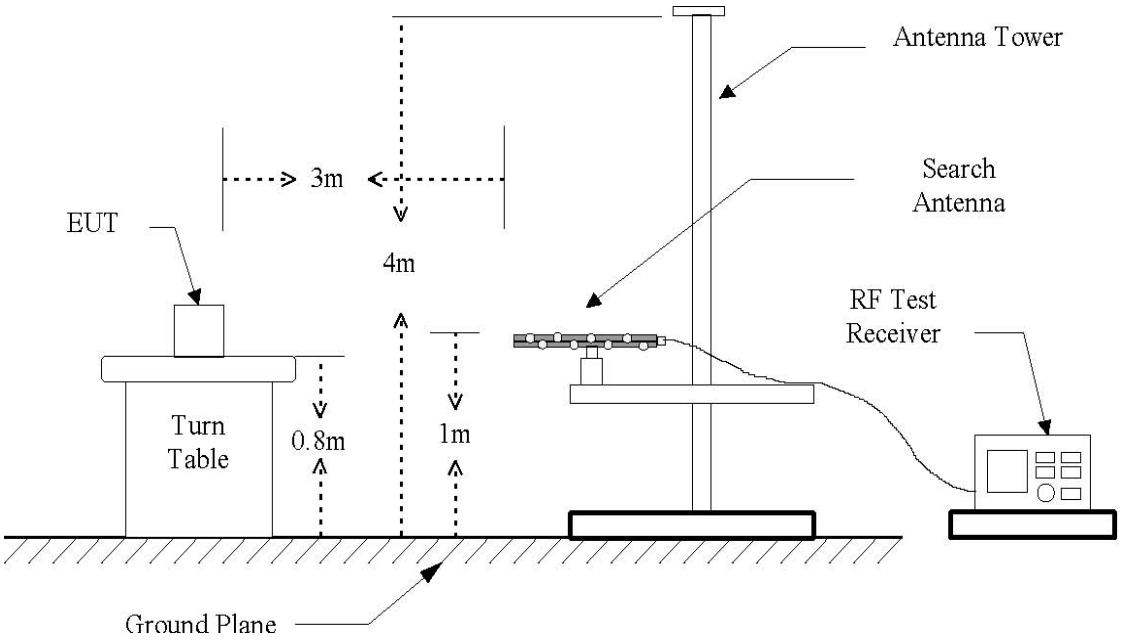


Figure 1 : Frequencies measured below 1 GHz configuration

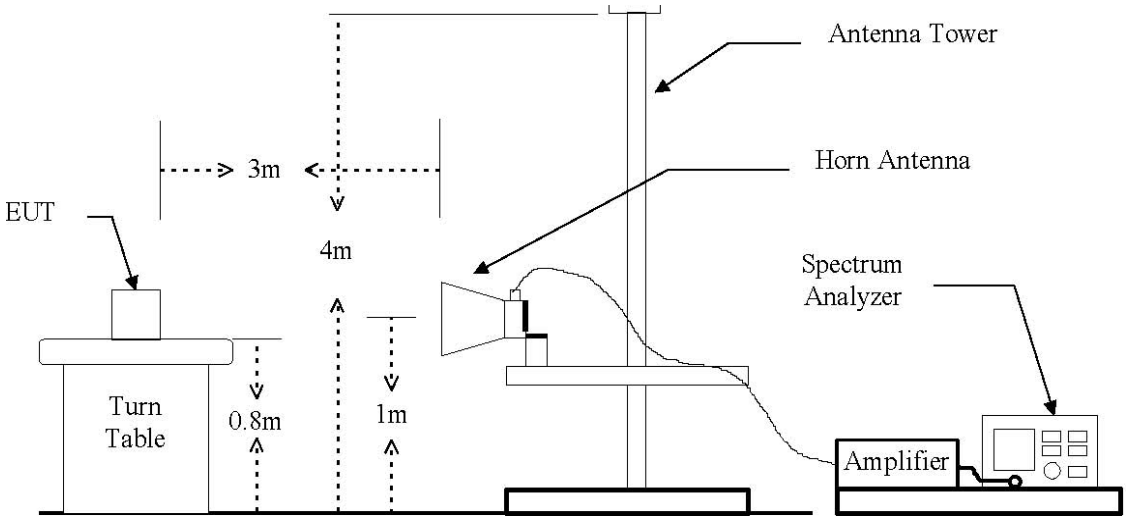
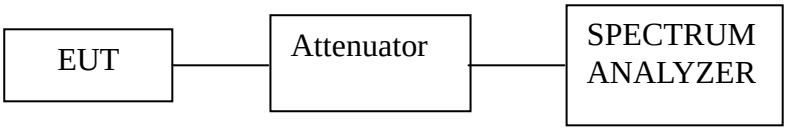


Figure 2 : Frequencies measured above 1 GHz configuration

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 (MHz)	Distance (Meters)	Radiated (dB μ V/m)	Radiated (μ V/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

According to §15.109(a), for an unintentional device, except for Class A digital devices, the field strength of radiated emission from unintentional radiators at a distance of 3 meters shall not exceed the above table.

3.3 Test Procedures

1) Spurious Radiated Emissions

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10meter open area 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 1 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 polarization 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. If the emission level of the EUT in peak mode was 10 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.

2) Spurious RF Conducted Emissions

The transmitter output was connected to the spectrum analyzer via a low loss cable.
Set both RBW and VBW of spectrum analyzer with suitable frequency span including 100 kHz bandwidth from band edge. The band edges was measured and recorded.

3.4 Test Result

1) Spurious Radiated Emissions

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.

Humidity Level	50 %	Temperature	23 ℃

Radiated Spurious Emission 30 MHz ~1000 MHz Test Data (Worst-Case Configuration)

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dBuV)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dBuV/m)	Limit (dBuV/m)	Margin (dB)
*268.700	10.4	Q.P.	V	17.62	1.72	29.74	46.0	16.26
399.412	18.4	Q.P.	H	16.65	2.06	37.11	46.0	8.89
431.700	15.0	Q.P.	H	18.01	2.16	35.16	46.0	10.84
N/A								

REMARKS :

1. All spurious emission at channels are almost the same below 1 GHz, so that the channel was chosen at representative in final test
2. "*" means the restricted band.
3. Actual = Reading + AF + CL.

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.

Humidity Level	50%	Temperature	23℃

Radiated Emission Test Data (Above 1 GHz)

1. Low Channel (2402 MHz)

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dBuV)	Detect Mode	Pol.	AF/CL (dB/m)/(dB)	Amp Gain (dB)	Actual (dBuV/m)	Limit (dBuV/m)	Margin (dB)
*2385.83	58.50	Peak	V	28.05/5.56	36.56	55.55	74.00	18.45
*2385.83	41.30	Average	V	28.05/5.56	36.56	38.35	54.00	15.65
4804.00	60.17	Peak	V	32.90/8.27	36.37	64.97	74.00	9.03
4804.00	41.17	Average	V	32.90/8.27	36.37	45.97	54.00	8.03
7206.00	50.81	Peak	V	36.70/11.22	36.47	62.26	74.00	11.74
7206.00	36.83	Average	V	36.70/11.22	36.47	48.28	54.00	5.72
9608.00	52.33	Peak	H	37.72/12.90	36.73	66.22	74.00	7.78
9608.00	36.80	Average	H	37.72/12.90	36.73	50.69	54.00	3.31
N/A								

2. Middle Channel (2441 MHz)

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dBuV)	Detect Mode	Pol.	AF/CL (dB/m)/(dB)	Amp Gain (dB)	Actual (dBuV/m)	Limit (dBuV/m)	Margin (dB)
4882.00	57.33	Peak	V	32.93/8.30	36.35	62.21	74.00	11.79
4882.00	38.83	Average	V	32.93/8.30	36.35	43.71	54.00	10.29
7323.00	50.33	Peak	V	35.85/11.63	36.50	61.31	74.00	12.69
7323.00	37.00	Average	V	35.85/11.63	36.50	47.98	54.00	6.02
9764.00	50.50	Peak	H	37.80/11.82	36.74	63.38	74.00	10.62
9764.00	36.00	Average	H	37.80/11.82	36.74	48.88	54.00	5.12
N/A								

3. High Channel (2480 MHz)

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dBuV)	Detect Mode	Pol.	AF/CL (dB/m)/(dB)	Amp Gain (dB)	Actual (dBuV/m)	Limit (dBuV/m)	Margin (dB)
*2483.50	52.00	Peak	V	28.34/5.30	36.57	59.07	74.00	14.93
*2483.50	38.15	Average	V	28.34/5.30	36.57	35.22	54.00	18.78
4960.00	58.33	Peak	V	32.97/8.32	36.34	63.28	74.00	10.72
4960.00	41.17	Average	V	32.97/8.32	36.34	46.12	54.00	7.88
7440.00	48.50	Peak	V	36.01/12.55	36.52	60.54	74.00	13.46
7440.00	35.17	Average	V	36.01/12.55	36.52	47.21	54.00	6.79
9920.00	50.40	Peak	H	37.89/12.10	36.76	63.63	74.00	10.37
9920.00	35.41	Average	H	37.89/12.10	36.76	48.64	54.00	5.36
N/A								

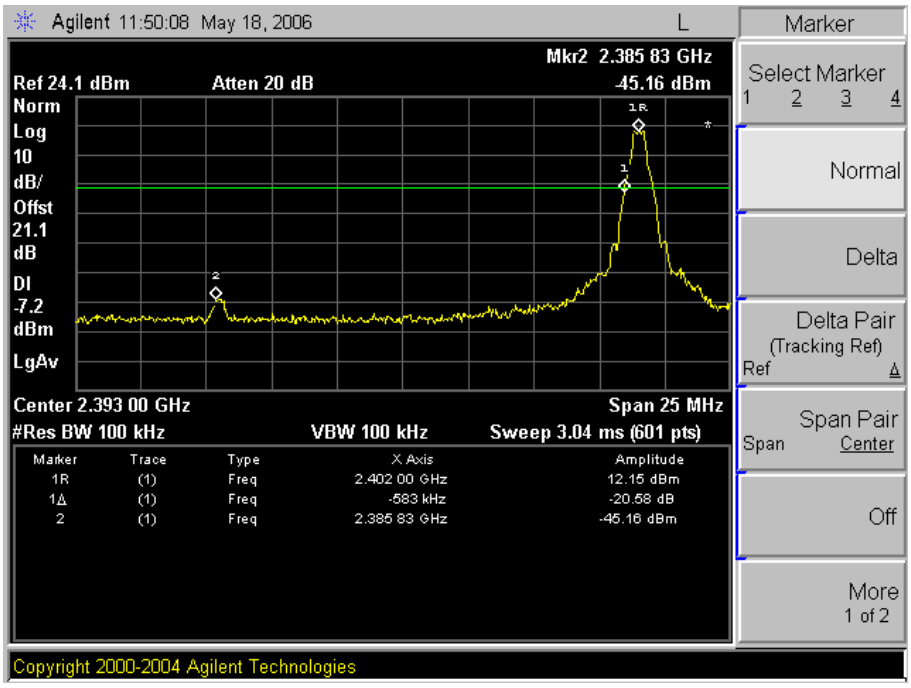
REMARKS :

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental Frequency
2. Measurements above only up to 6 maximum emission noted, or would be lesser if No specific emission from the EUT are recorded (ie: margin>25 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emission measured in frequency above 1000 MHz were made with an Instrument using Peak detector mode and average detector mode of the emission Shown in Actual FS column.
4. Spectrum setting:
   a. Peak Setting 1 GHz to 10th harmonics of fundamental, RBW=1 MHz, VBW=1 MHz, Sweep time : Auto
   b. Average Setting 1 GHz to 10th harmonics of fundamental, RBW=1 MHz, VBW=10 Hz, Sweep time : Auto
5. "*" means the restricted band.

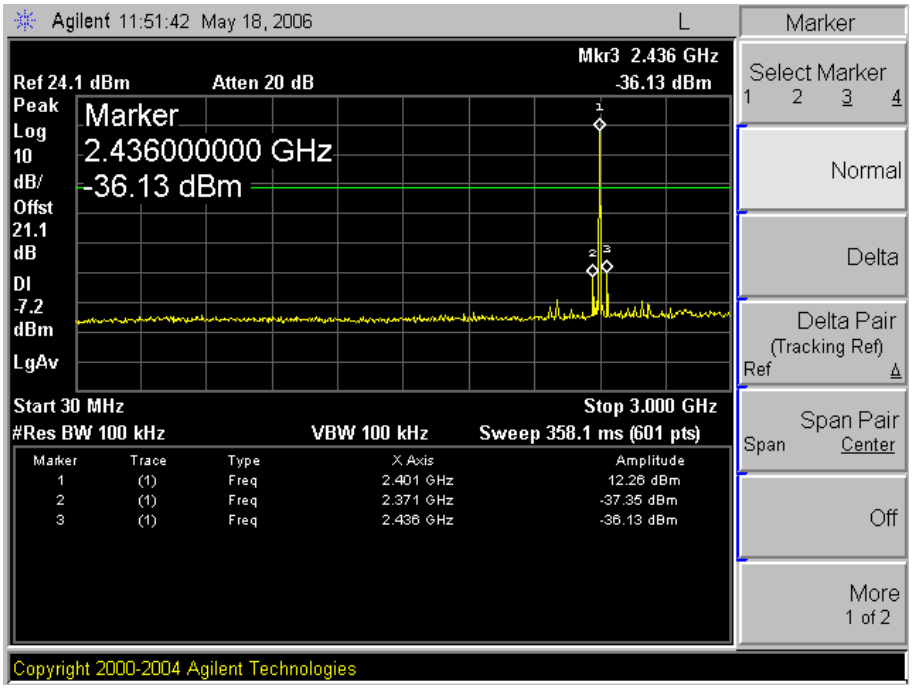
Test Equipment Used

EQUIPMENT	MANUFACTURER	MODEL	CAL DUE.
Test Receiver	Rohde & Schwarz	ESIB 26	Mar. 2007
Preamplifier	Agilent	8449B	May 2007
Log-periodic	Rohde & Schwarz	UHALP9107	Jan. 2007
Biconical Antenna	Schwarzbeck	VHA9103	Mar. 2007
Horn Antenna	Electro-Metrics	RGA-60	Apr. 2007

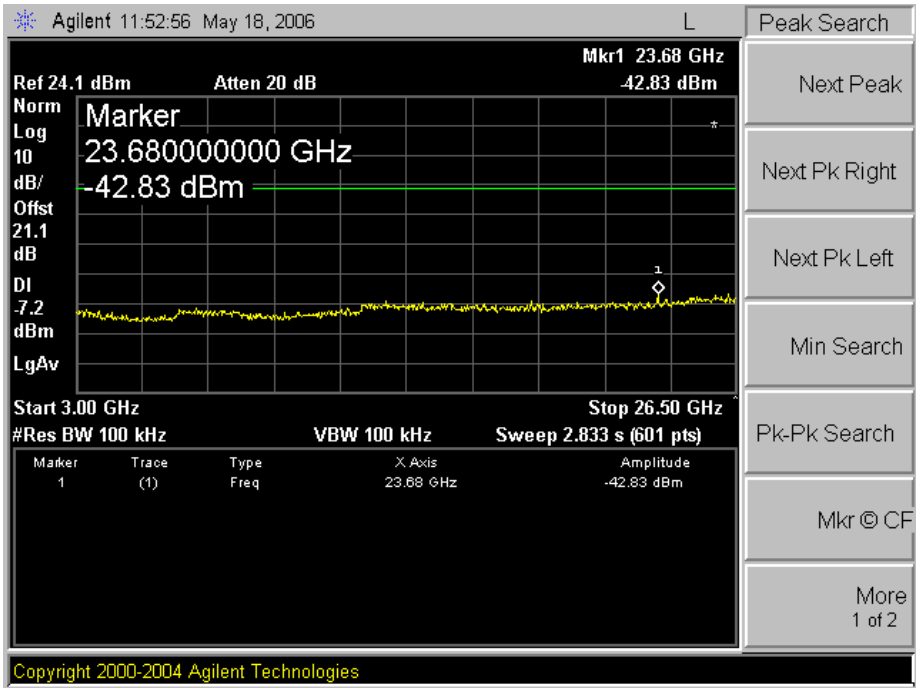
2) Spurious RF Conducted Emissions : Plot of Spurious RF Conducted Emissions



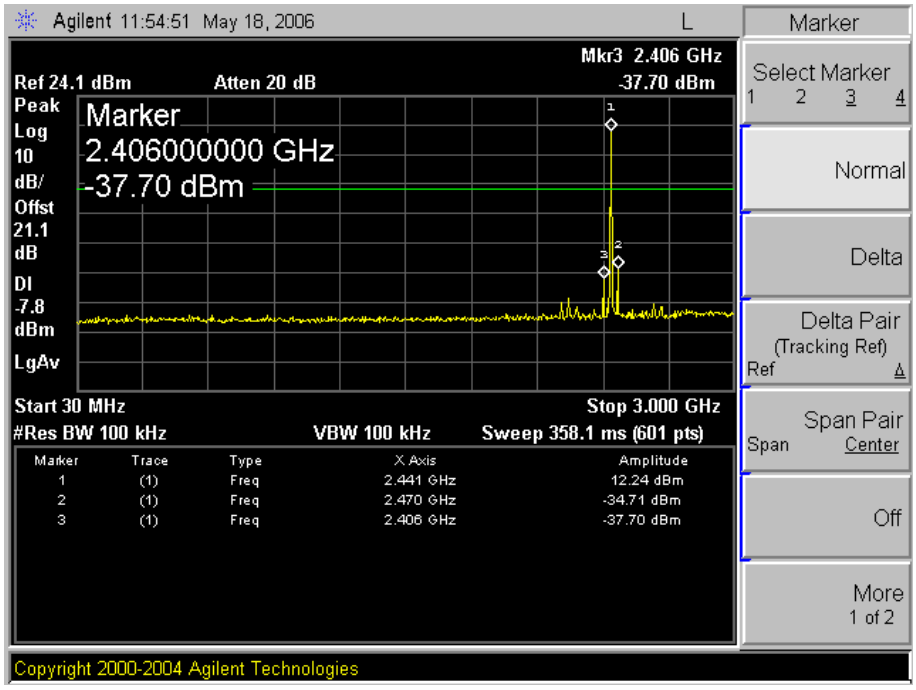
Low Channel



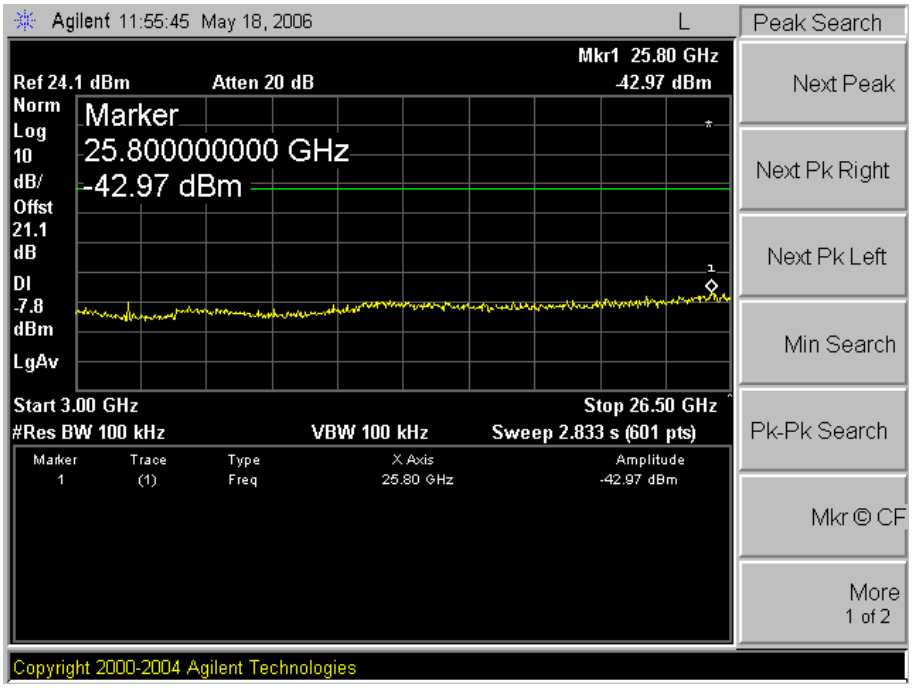
Low Channel



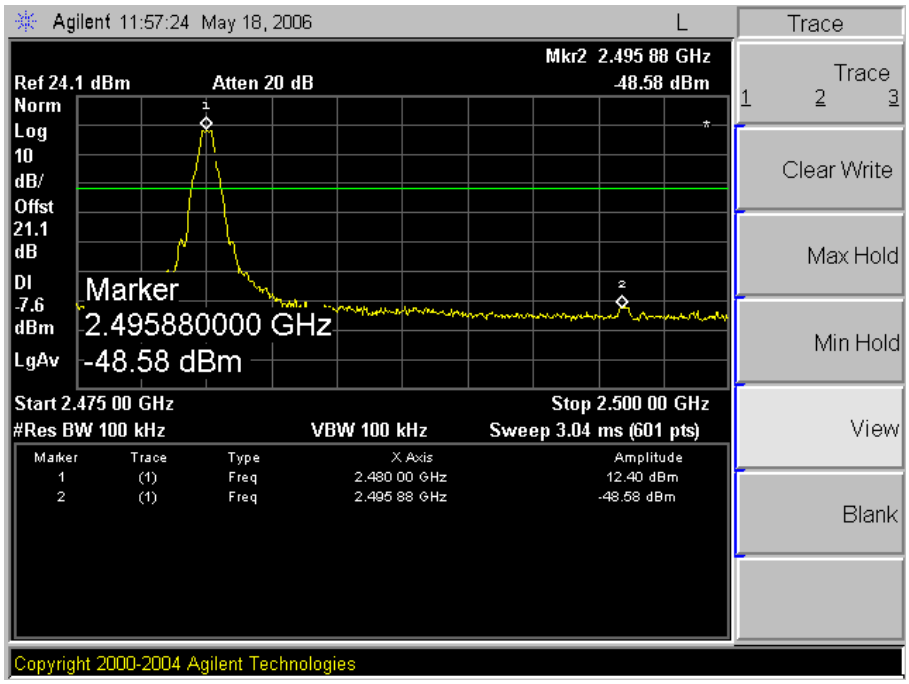
Low Channel



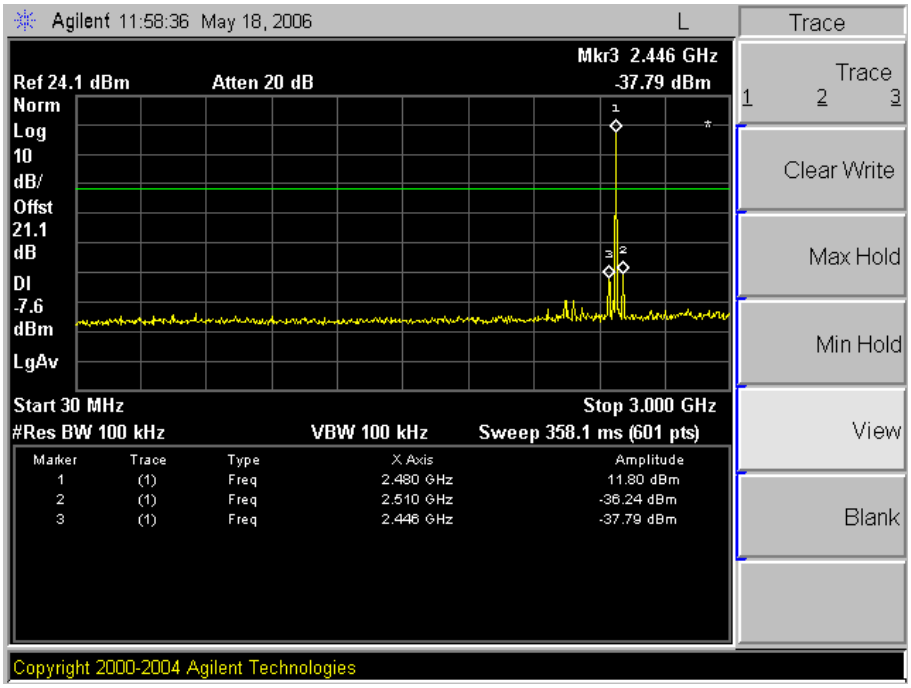
Middle Channel



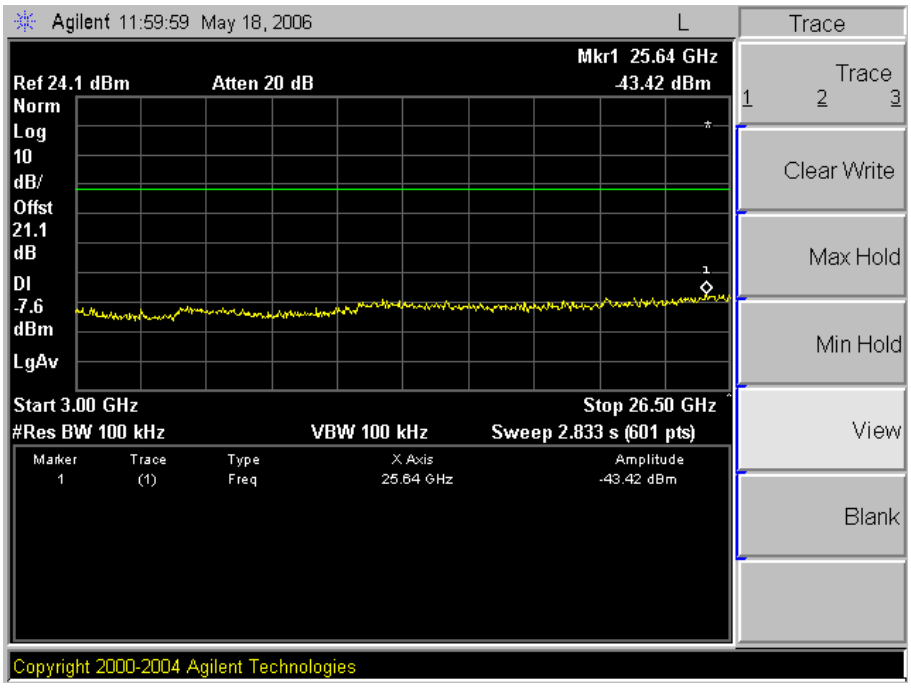
Middle Channel



High Channel



High Channel



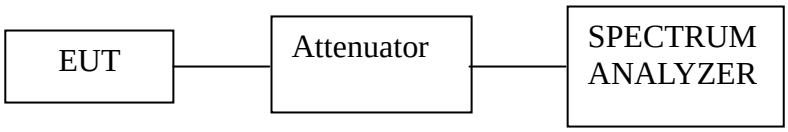
High Channel

Test Equipment Used

EQUIPMENT	MANUFACTURER	MODEL	CAL DUE.
Spectrum analyzer	Agilent	E4440A	May 2007
Attenuator	Lucas Weinschel	33-20-33	Dec.2006

4. 20 dB BANDWIDTH MEASUREMENT

4.1 Test Setup



4.2 Limits

According to §15.247(a)(1), frequency hopping systems shall have hopping channel carrier frequency separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

4.3 Test Procedure

1. The transmitter output was connected to the spectrum analyzer through an attenuator.
2. The bandwidth of the fundamental frequency was measured by spectrum analyzer with RBW=10 kHz and VBW=10 kHz.
3. The 20 dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20 dB.

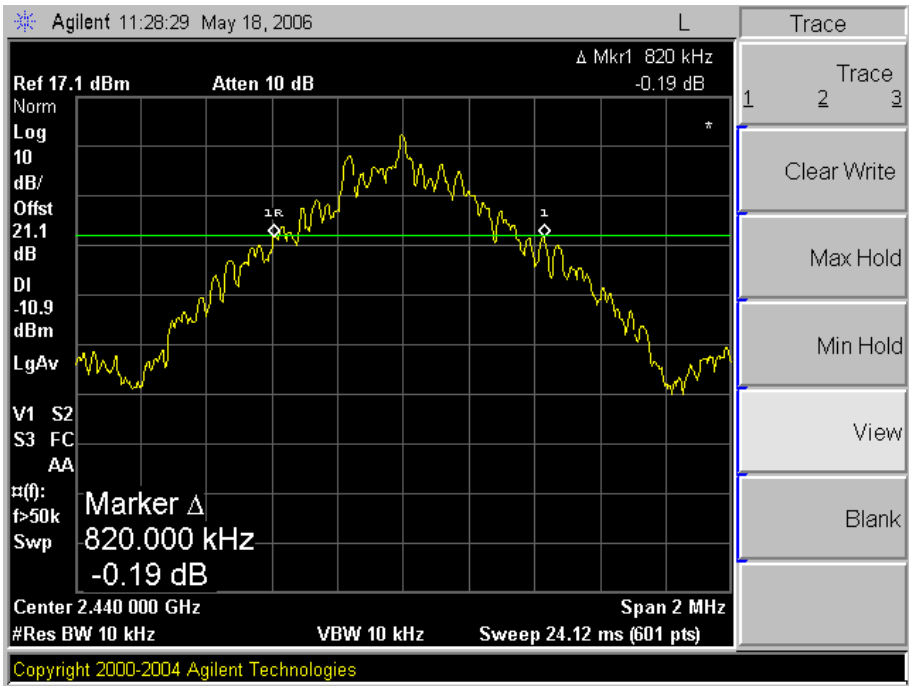
4.4 Test Result

Humidity Level	50 %	Temperature	21 ℃

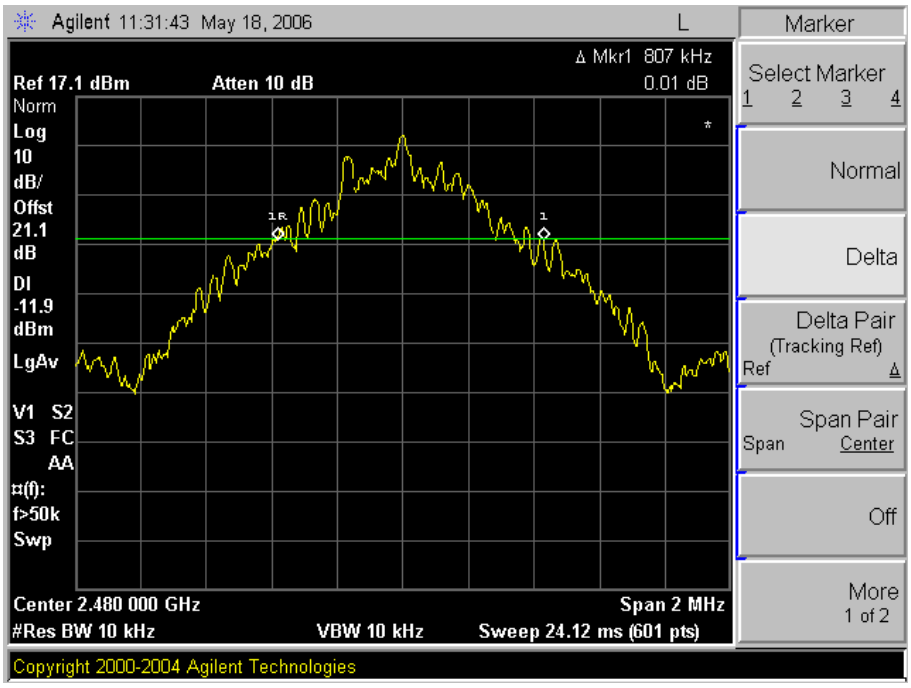
Channel	Channel Frequency (MHz)	20 dB Bandwidth (MHz)
Low	2402	0.83
Middle	2440	0.82
High	2480	0.81

Plot of 20dB Bandwidth

Low Channel



Middle Channel



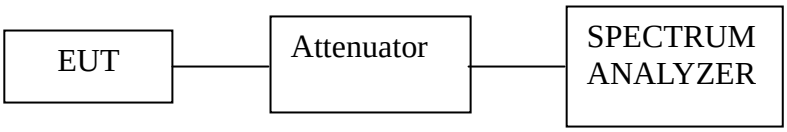
High Channel

Test Equipment Used

EQUIPMENT	MANUFACTURER	MODEL	CAL DUE.
Spectrum analyzer	Agilent	E4440A	May 2007
Attenuator	Lucas Weinschel	33-20-33	Dec.2006

5. MAXIMUM PEAK OUTPUT POWER MEASUREMENT

5.1 Test Setup



5.2 Limit

According to §15.247(b)(1), for frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

5.3 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 figure 4 without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Use the following spectrum analyzer settings:
   Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel
   RBW > the 20 dB bandwidth of the emission being measured
   VBW ≥ RBW
   Sweep = auto
   Detector function = peak
   Trace = max hold
4. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power. Plot the result on the screen of spectrum analyzer.
5. Repeat above procedures until all frequencies measured were complete.

5.4 Test Result

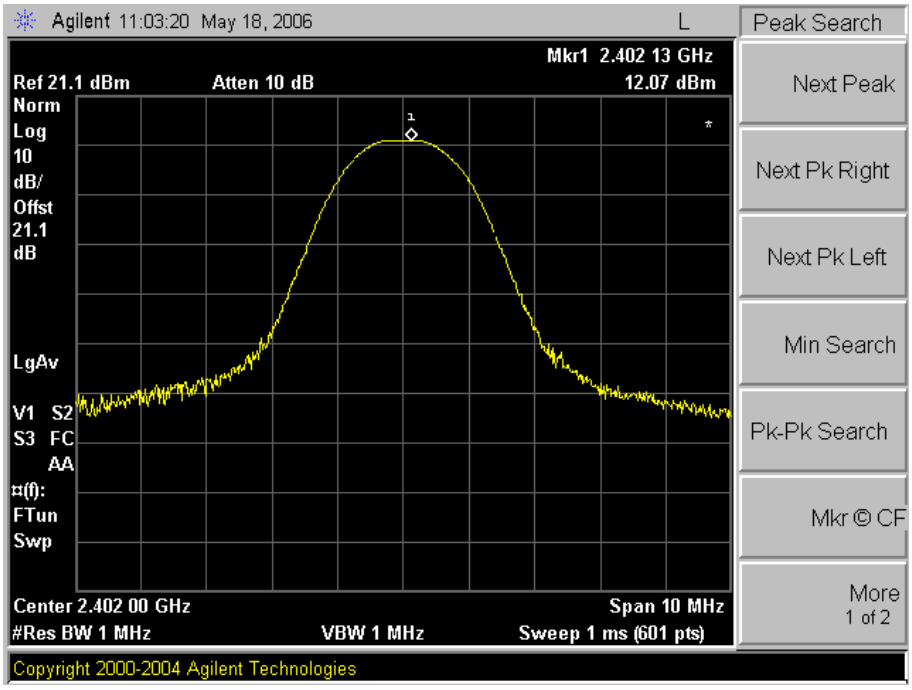
Humidity Level	51 %	Temperature	21 ℃

Channel	Channel Frequency (MHz)	Reading Power (dBm)	*Cable+ATT Loss (dB)	Output Power (mW)	Limit (W)
Low	2402	12.07	21.1	16.11	1
Middle	2440	12.26	21.1	16.83	1
High	2480	12.36	21.1	17.22	1

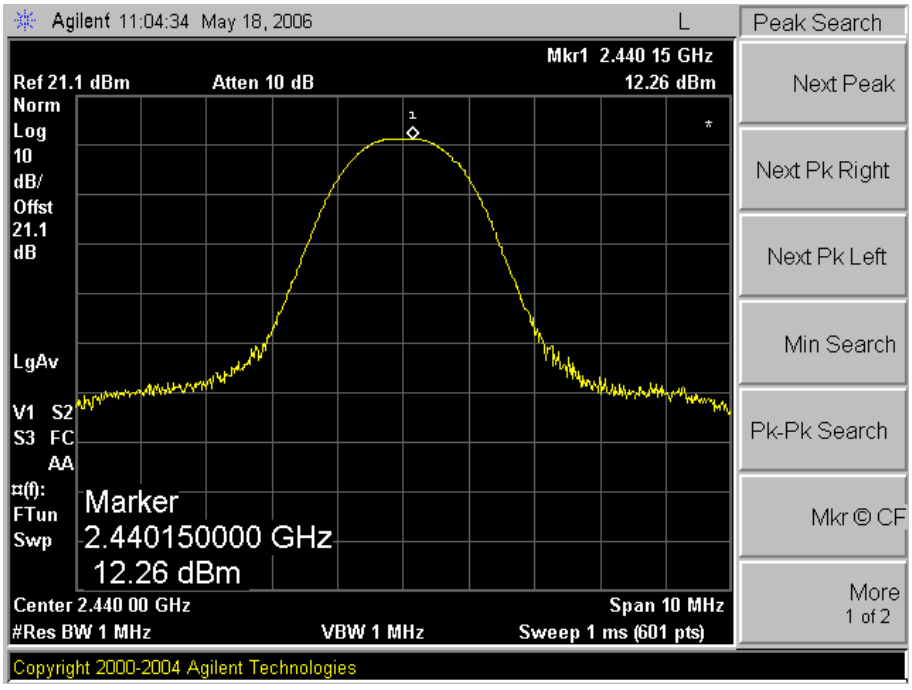
*Cable+ATT Loss offset the spectrum Analyzer.

Plot of Maximum Peak Output Power

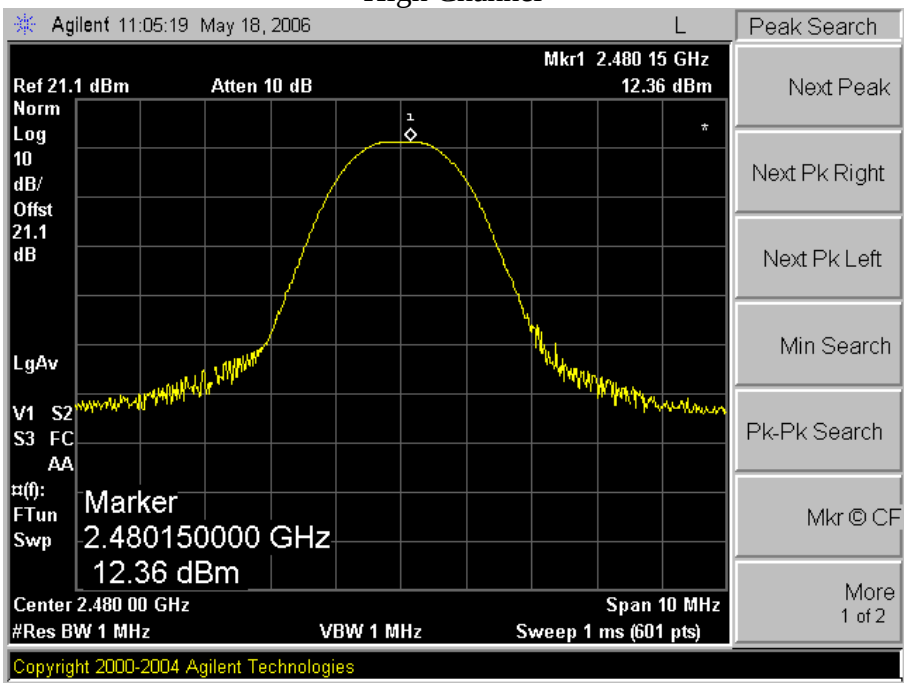
Low Channel



Middle Channel



High Channel

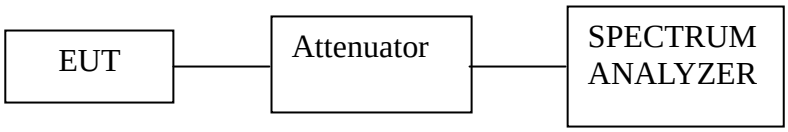


Test Equipment Used

EQUIPMENT	MANUFACTURER	MODEL	CAL DUE.
Attenuator	Lucas Weinschel	33-20-33	Dec.2006
Spectrum analyzer	Agilent	E4440A	May 2007

6. FREQUENCY SEPARATION

6.1 Test Setup



6.2 Limits

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

6.3 Test Procedure

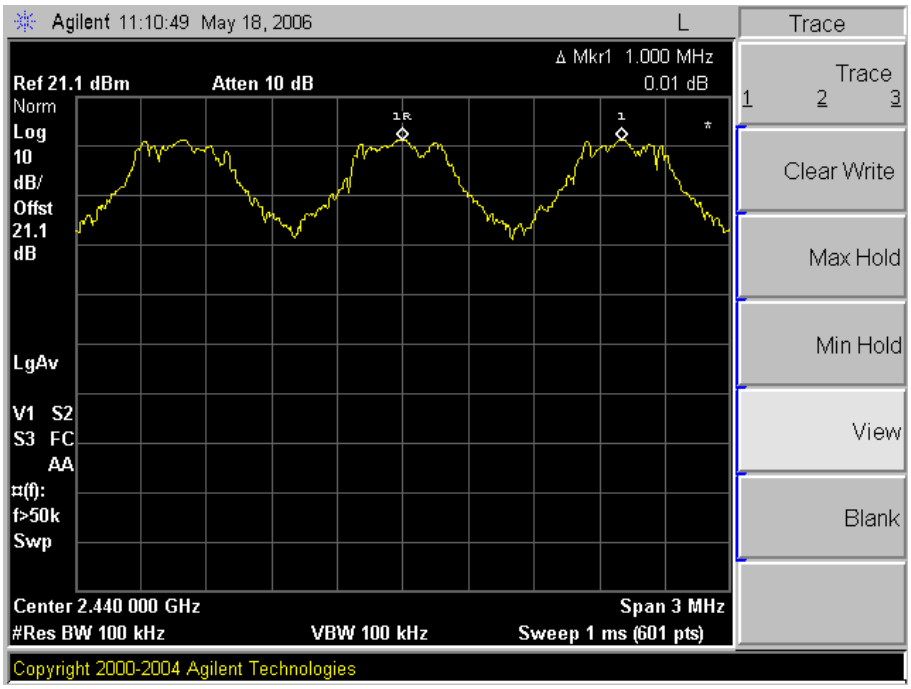
1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = middle of hopping channel.
4. Set the spectrum analyzer as
   RBW,VBW=100 kHz, Adjust Span to 5 MHz, Sweep = auto.
5. Max hold. Mark 3 Peaks of hopping channel and record the 3 peaks frequency.

6.4 Test Result

Humidity Level	50 %	Temperature	21 ℃

Channel Separation (MHz)	Limit (kHz)	Result
1	>= 25 kHz/20 dB Bandwidth	Pass

Plot of Frequency Separation

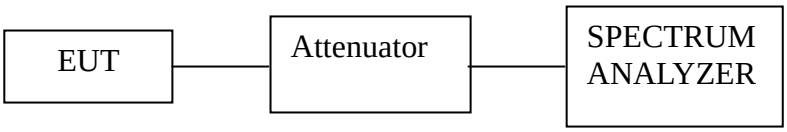


Test Equipment Used

EQUIPMENT	MANUFACTURER	MODEL	CAL DUE.
Spectrum analyzer	Agilent	E4440A	May 2007
Attenuator	Lucas Weinschel	33-20-33	Dec.2006

7. NUMBER OF HOPPING FREQUENCY

7.1 Test Set up



7.2 Limit

According to §15.247(a)(1)(iii), Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

7.3 Test Procedure

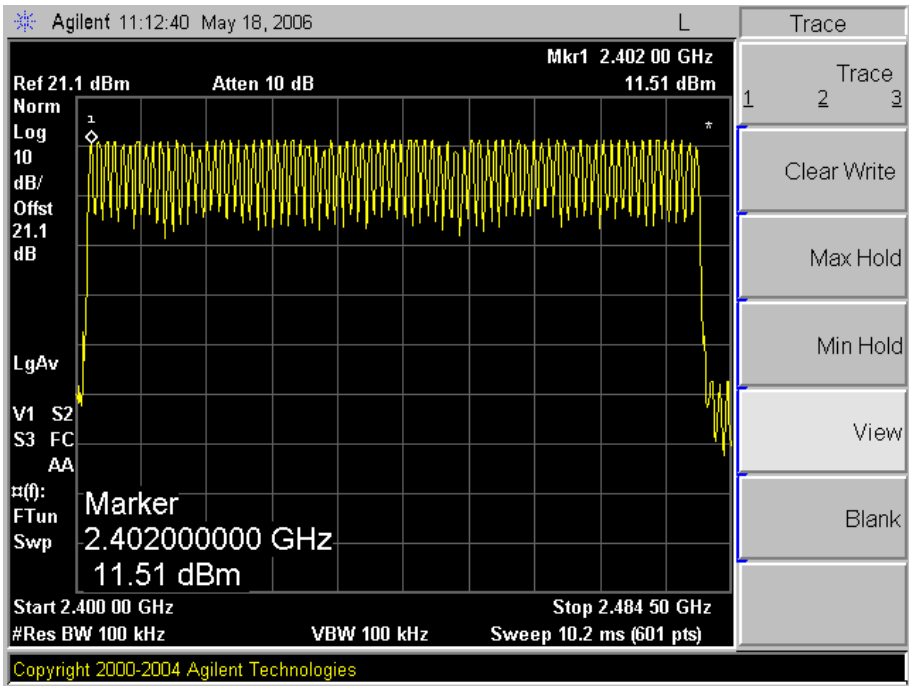
1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low RF cable from antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as
   Start=2400 MHz, Stop=2483.5 MHz
   RBW, VBW=100 kHz, Sweep = auto
4. Max hold, view and count how many channel in the band.

7.4 Test Result

Humidity Level	50 %	Temperature	21 ℃

Result(No. of CH)	Limit (No. of CH)	Result
79	>= 15	Pass

Plot of Number of hopping Frequency

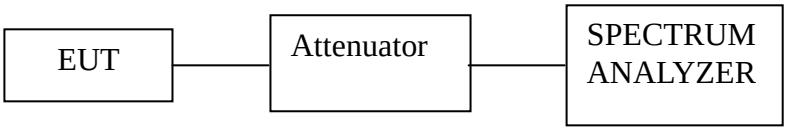


Test Equipment Used

EQUIPMENT	MANUFACTURER	MODEL	CAL DUE.
Spectrum analyzer	Agilent	E4440A	May 2007
Attenuator	Lucas Weinschel	33-20-33	Dec.2006

8. TIME OF OCCUPANCY (DWELL TIME)

8.1 Test Set up



8.2 Limit

According to §15.247(a)(1)(iii), Frequency hopping systems operating in the 2400-2483.5 MHz, the average time of occupancy on any frequency shall not greater than 0.4 s within period of 0.4seconds multiplied by the number of hopping channel employed.

8.3 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 RF cable from antenna port to the spectrum analyzer.
3. Set center frequency of the spectrum analyzer= operating frequency
   RBW, VBW=1 MHz, Span=0 Hz, Sweep = auto
4. Repeat above procedures until all frequency were measured complete.

8.4 Test Result

Humidity Level	50 %	Temperature	25 ℃

A period time=0.4(s)*79=31.6(s)

DH1

Low Channel :0.420 (ms)*(1600/(2*79))*31.6(s)=134.40(ms)
Middle Channel : 0.420 (ms)*(1600/(2*79))*31.6(s)=134.40(ms)
High Channel :0.413 (ms)*(1600/(2*79))*31.6(s)=132.16(ms)

Channel	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
Low	0.420	134.40	31.6	400	PASS
Middle	0.420	134.40	31.6	400	PASS
High	0.413	132.16	31.6	400	PASS

DH3

Low Channel :1.667 (ms)*(1600/(4*79))*31.6(s)=266.72(ms)
Middle Channel :1.667 (ms)*(1600/(4*79))*31.6(s)=266.72(ms)
High Channel :1.667 (ms)*(1600/(4*79))*31.6(s)=266.72(ms)

Channel	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
Low	1.667	266.72	31.6	400	PASS
Middle	1.667	266.72	31.6	400	PASS
High	1.667	266.72	31.6	400	PASS

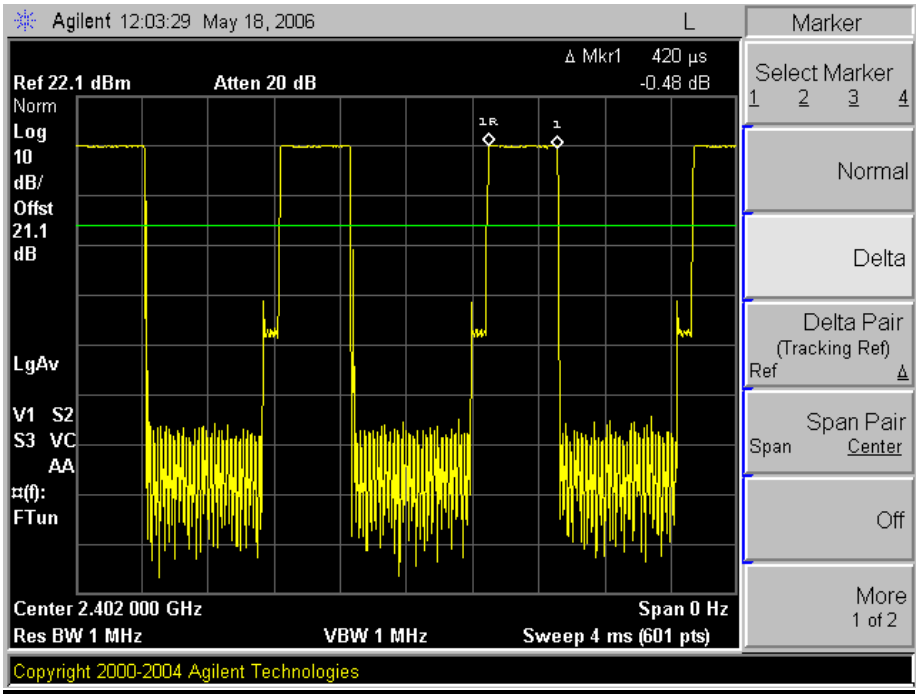
DH5

Low Channel : 2.933(ms)*(1600/(6*79))*31.6(s)=312.85(ms)
Middle Channel :2.913(ms)*(1600/(6*79))*31.6(s)=310.72(ms)
High Channel : 2.913(ms)*(1600/(6*79))*31.6(s)= 310.72 (ms)

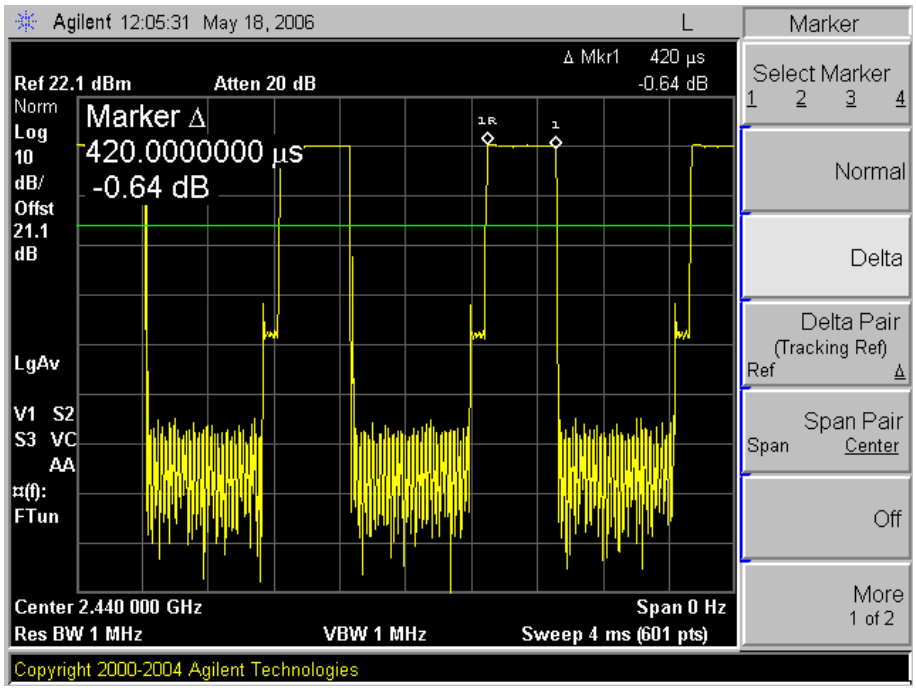
Channel	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
Low	2.933	312.85	31.6	400	PASS
Middle	2.913	310.72	31.6	400	PASS
High	2.913	310.72	31.6	400	PASS

Plot of Time of Occupancy (Dwell Time)

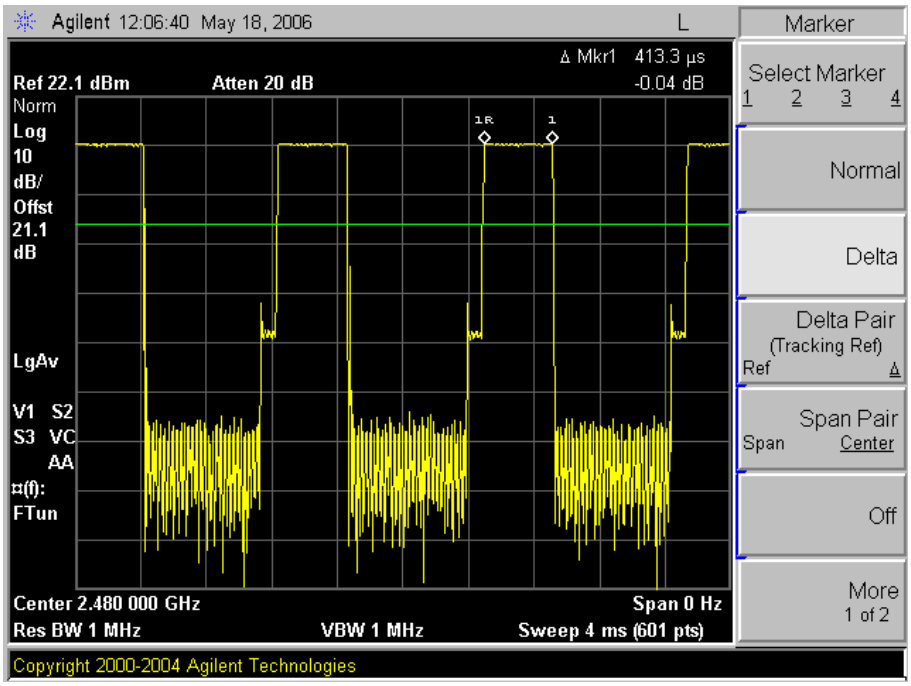
DH1



Low Channel

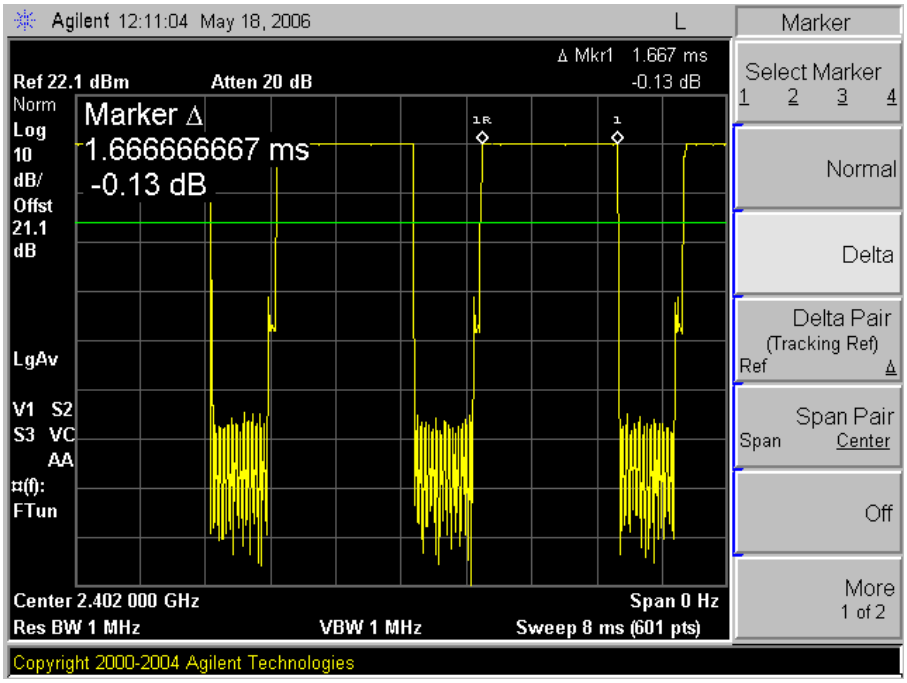


Middle Channel

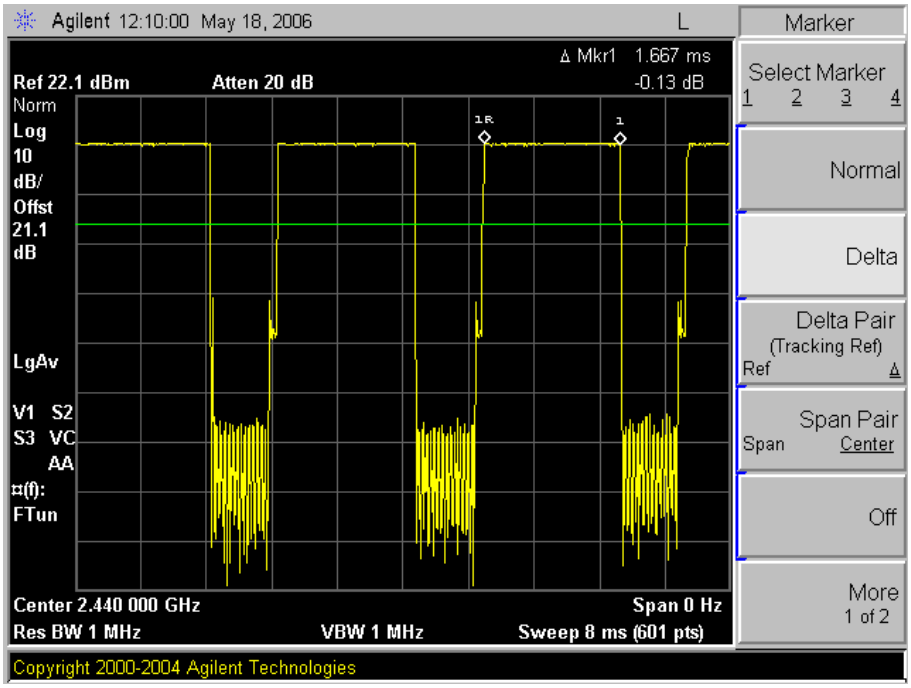


High Channel

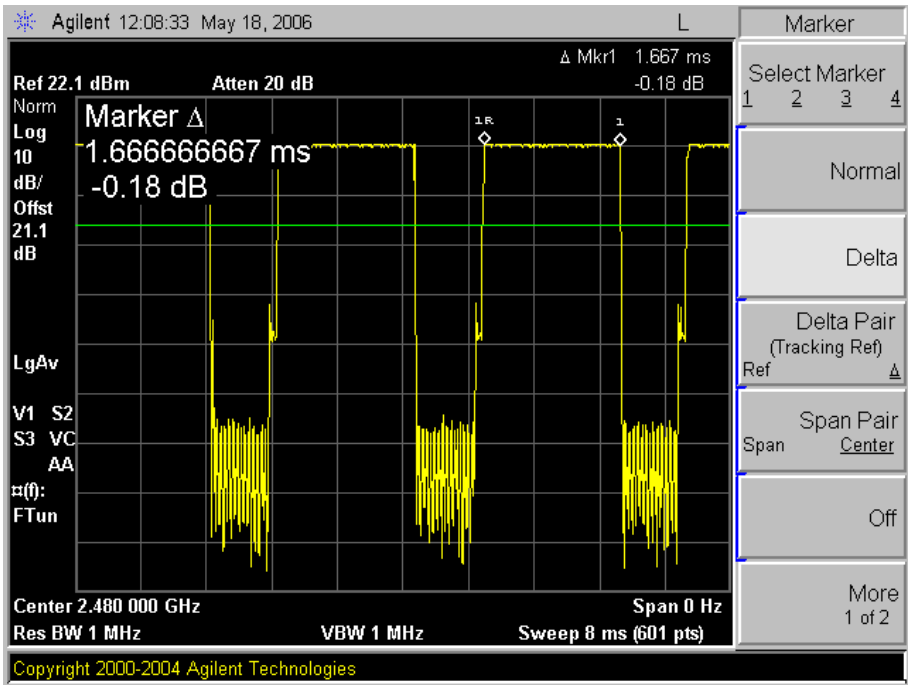
DH3



Low Channel

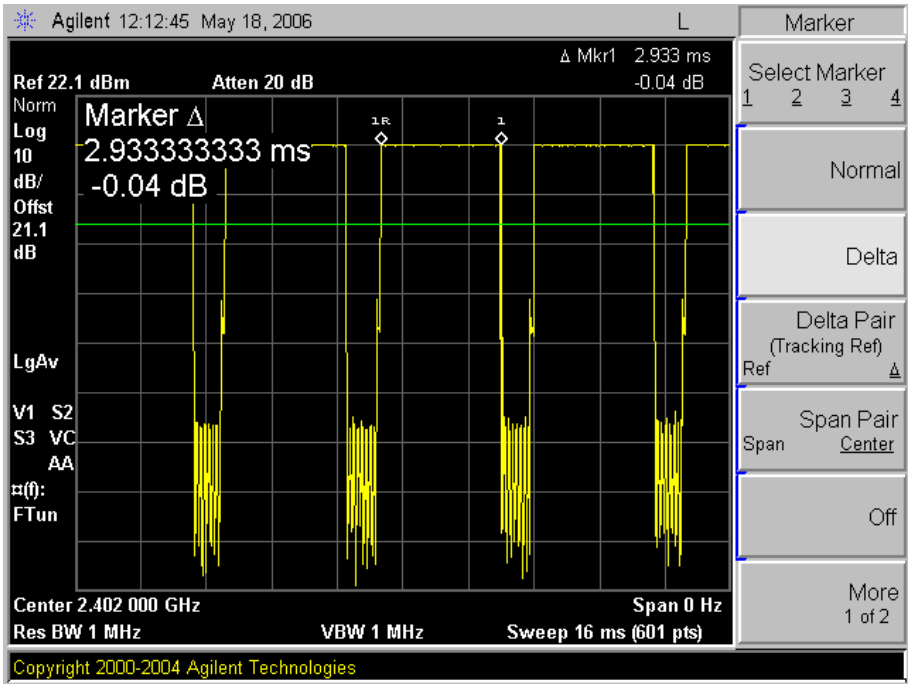


Middle Channel

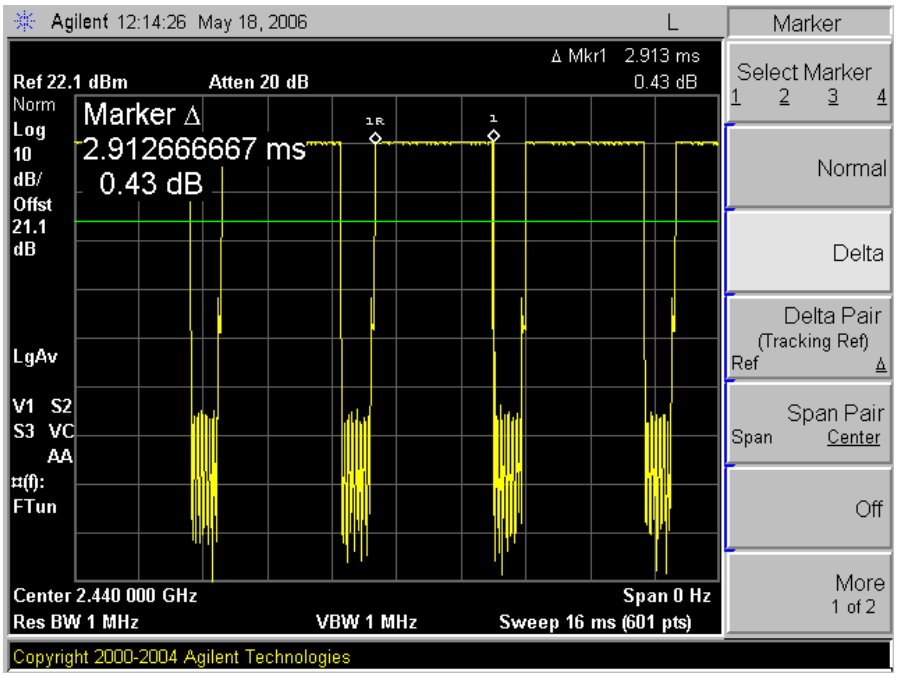


High Channel

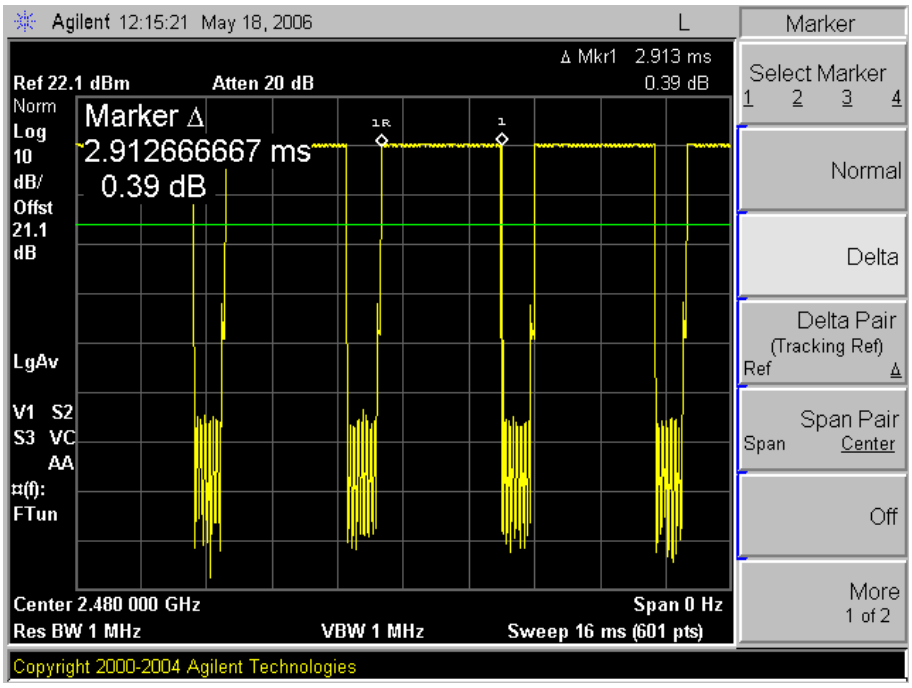
DH5



Low Channel



Middle Channel



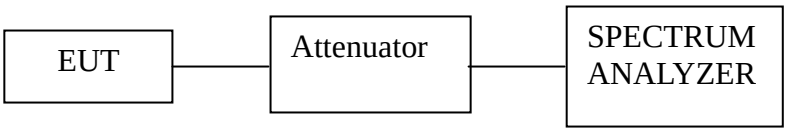
High Channel

Test Equipment Used

EQUIPMENT	MANUFACTURER	MODEL	CAL DUE.
Spectrum analyzer	Agilent	E4440A	May 2007
Attenuator	Lucas Weinschel	33-20-33	Dec.2006

9. POWER SPECTRAL DENSITY MEASUREMENT

9.1 Test Setup



9.2 Limit

According to §15.247(e), For digitally modulated system, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph(b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density

9.3 Test Procedure

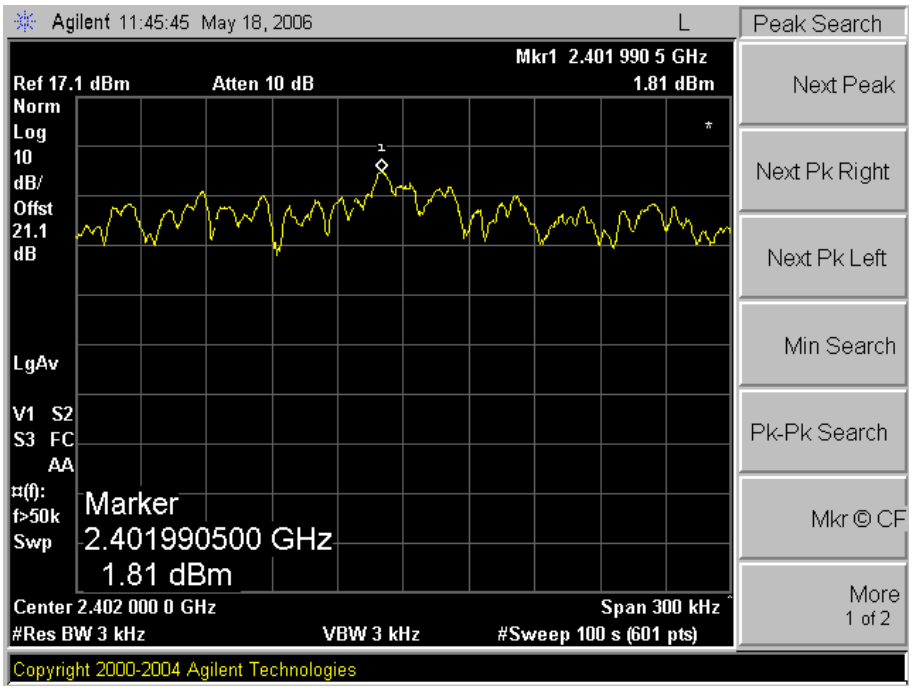
1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer
3. Set the spectrum analyzer as RBW=3 kHz, VBW=10 kHz, Span=300 kHz, Sweep=100s
4. Record the max. reading
5. Repeat above procedures until all frequency measured were complete.

9.4 Test Result

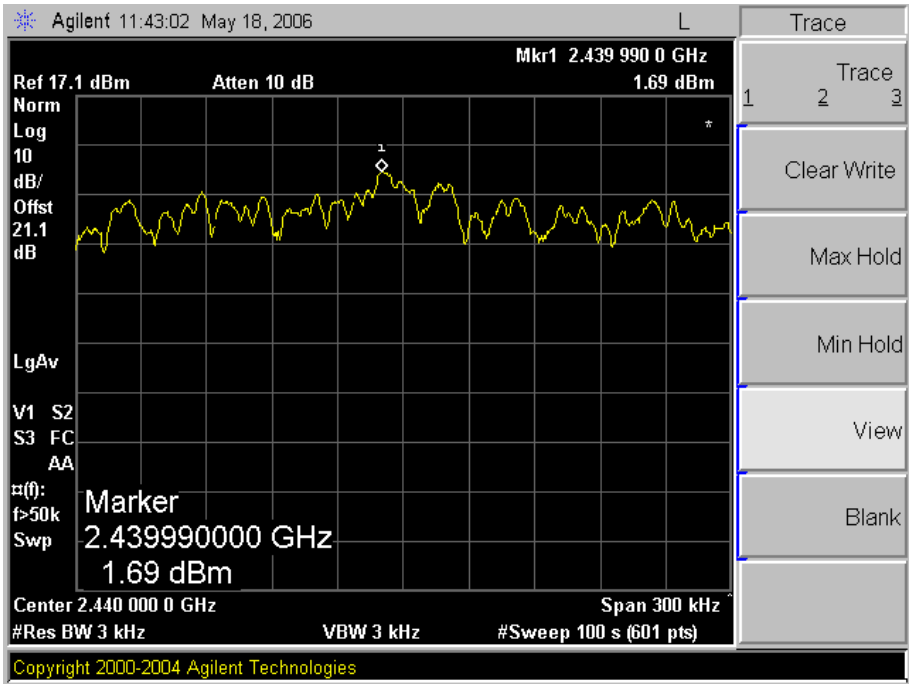
Humidity Level	50 %	Temperature	21 ℃

Channel	Channel Frequency (MHz)	Final RF Power Level in 3 kHz BW (dBm)	Maximum Limit (dBm)	Margin (dB)
Low	2402	1.81	8	6.19
Middle	2441	1.69	8	6.32
High	2480	1.29	8	6.71

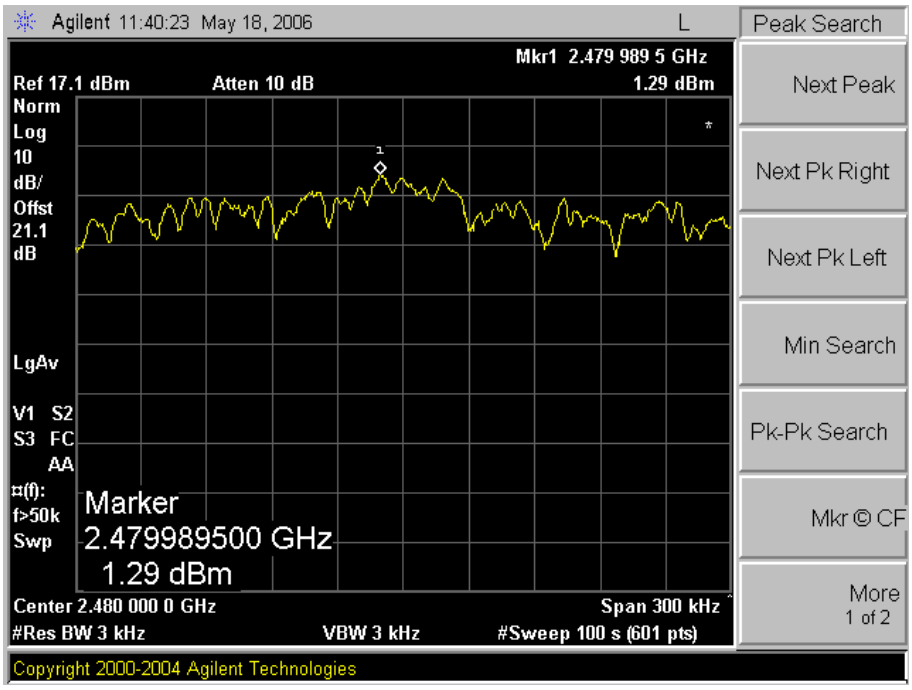
Plot of Power Spectral Density



Low Channel



Middle Channel



High Channel

Test Equipment Used

EQUIPMENT	MANUFACTURER	MODEL	CAL DUE.
Spectrum analyzer	Agilent	E4440A	May 2007
Attenuator	Lucas Weinschel	33-20-33	Dec.2006

10. ANTENNA REQUIREMENT

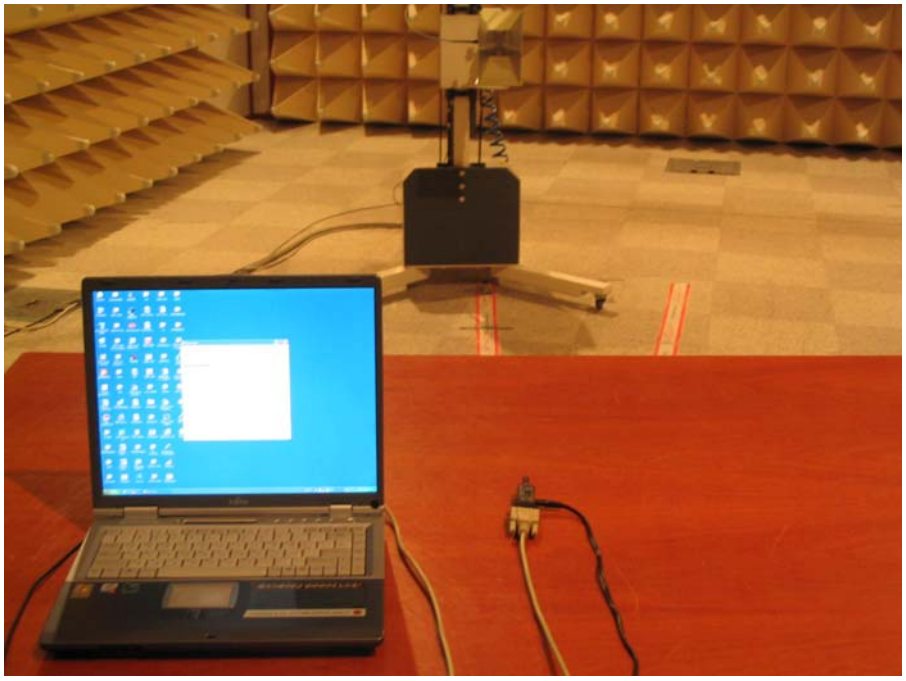
10.1 Standard Applicable

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

10.2 Antenna Connected Construction

Antenna used in this product is connected with Helical antenna gain of 2.0 dBi

12. Attachment A-1 Photo of the test set up



Attachment A-2 Photos of the test set up