TEST REPORT

Ref. Report No.
05-1341-025

Name and address of the applicant

KISCOM Co., Ltd.
#101, Keumho-Town Bldg., 49, Guro5-dong, Guro-gu, Seoul, 152-838, Korea

Standard / Test regulation

FCC Part 15, Subpart C

Test result

Pass

Incoming date : May 26, 2005

Test date : May 26, 2005 ~ June 15, 2005

Test item(s) ;

UHF –Band RFID Reader
(Spread Spectrum Transmitter)

Model/type ref. ;

KIS900W-4CH

Manufacturer ;

KISCOM Co., Ltd.

Additional information ;

-Required Authorization : Certification
-FCC ID. : S8NKIS900W-4CH

Issue date : June 16, 2005

Tested and reported by

Jeong-Min Kim, Senior Engineer

Reviewed by

Won-Seo Cho , Telecommunication Team Manager

KOREA TESTING LABORATORY

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Ⅰ. GENERAL INFORMATION

1. Applicant's Name and Mailing Address : KISCOM Co., Ltd.
#101, Keumho-Town Bldg., 49, Guro5-dong, Guro-gu,
Seoul, 152-838, Korea

2. Manufacturer's Name and Mailing Address : KISCOM Co., Ltd.
#101, Keumho-Town Bldg., 49, Guro5-dong, Guro-gu,
Seoul, 152-838, Korea

3. Equipment Descriptions

3.1 Operating Frequency : 902.6 MHz ~ 927.4 MHz (63 Channel, 400 kHz Spacing)
3.2 Antenna Configuration : Flat Panel Antenna (KIS900-AE, KIS900-AN-2H02, KIS900-AN-2V02)
Note: KIS900-AN-2H02 and KIS900-AN-2V02 are same antenna but the antenna elements are positioned perpendicularly each other.
3.3 Antenna Connector : BNC Type 8 ports (Tx: 4 ports, Rx: 4 ports)
3.4 Power Supply : DC 5 from AC 110V adapter

4. Devices of Test System

Device	Model name	Serial Number	Manufacturer
Personal Computer	DPEP P500	7951/CJN20009	Compaq
Monitor	DP15L/S	DP15HICN102768	Compaq
Mouse	M-S34	166861-001	Compaq
Keyboard	PR235BTWKO	B13BBOT39I7045	Compaq
RFID Reader	KIS900W-4CH	-	KISCOM

5. Rules and Regulations : FCC Part 15, Subpart C

6. Measuring Procedure : ANSI C63.4-2003

7. Place of Measurement : Absorber-lined room(3-Meter) of KTL

8. Date of Measurement : May 26, 2005 ~ June 15, 2005

Ⅱ. GENERAL REQUIREMENTS OF THE EUT

1. Labeling Requirement (Section 15.19)

This device complies with Part 15 of the FCC Rules. Operation is subject to following two condition : (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

1.1 Location of Label : Rear side of EUT
1.2 How Applied : Printed

2. Information to User (Section 15.21)

The following or similar statements were provided in the manual for user instruction.
Please refer page 2 of the attached manual for details.

CAUTION : Any changes or modifications in construction of this device which are not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

3. Special Accessories (Section 15.27)

3.1 Were the special Accessories provided? [ ] yes, [x] no

3.2 If yes, details for the special accessories are as follows :

3.3 If yes, were the appropriate instructions provided on the first page of the text concerned with the device?
[ ] yes, [ ] no

3.4 Are these accessories provided of the type which can be readily obtained from multiple retail outlets ?
[ ] yes, [ ] no

And therefore does the manual specify what additional components or accessories are required to used in order to comply with the Rules?
[ ] yes, [ ] no

Ⅲ. CONDUCTED EMISSION MEASUREMENT (Section 15.207)

1. Test Procedure

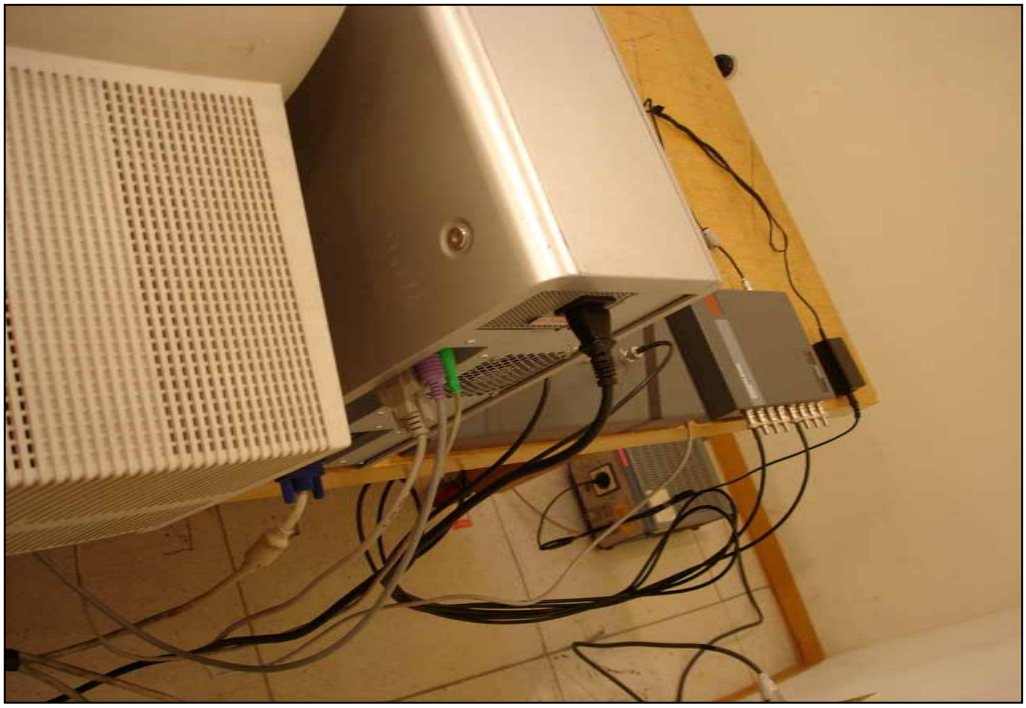
The EUT is designed to hop its full range from 902 ~ 928 MHz. Conducted emission measurements on the EUT were performed by "AC Power Line Conducted Emissions Testing" procedure as per ANSI C63.4. The EUT was set up on a wooden table 0.8 meters height, 1.0 by 1.5 meters in size, placed in the shielded enclosed with a side of wall of which constituted a vertical conducting surface of 2.2 m X 3.1 m in size to maintain 40 cm from the rear of EUT

LISN (Line Impedance Stabilization Network, R & S, ESH3-Z5, 50 ohm/50 uH) was installed and electrically boned to the conducting ground plane. The EUT was connected to the LISN.

The frequency range from 150 kHz to 30 MHz was examined and the peak values that are within 6 dB of the limit would be compared to quasi-peak values using the Quasi-Peak mode and average value using the average mode.

The position of connecting cables of the EUT was changed to find the worst case configuration during measurements. The maximum emission level from the EUT occurred in such configuration as shown in the following photograph.

2. Photograph for the test configuration



3. Sample Calculation

The emission level measured in decibels was shown in following sample calculation.

For example :

	Measured Value at 0.41 MHz	36.9 dB μV	@ Average mode
+	Cable Loss *	0.0 dB	
=	Conducted Emission	36.9 dB μV	

* In case of RG214/ RF cable 15Ft, the loss is about 0.17dB at the frequency of 30 MHz which is negligible.

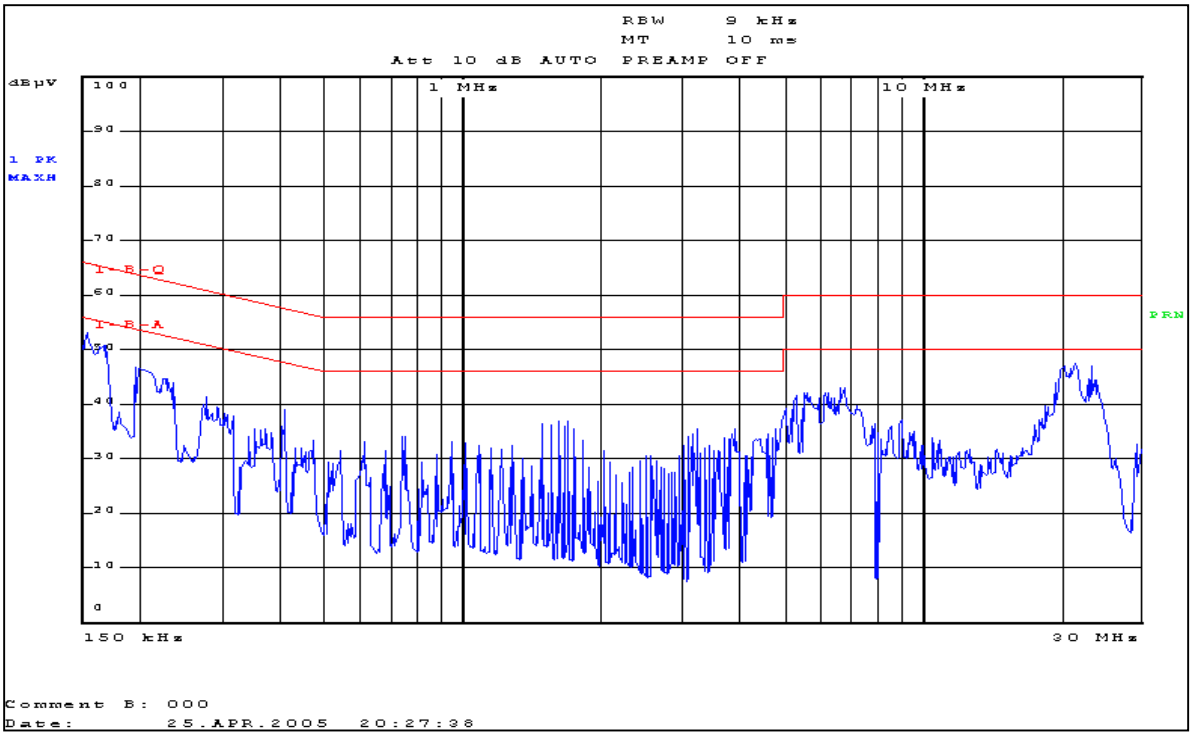
4. Measurement Data

- Operating mode : Hopping mode
- Resolution Bandwidth : x CISPR Quasi-Peak (6dB Bandwidth : 9 kHz)
  x Average (6dB Bandwidth : 9 kHz)

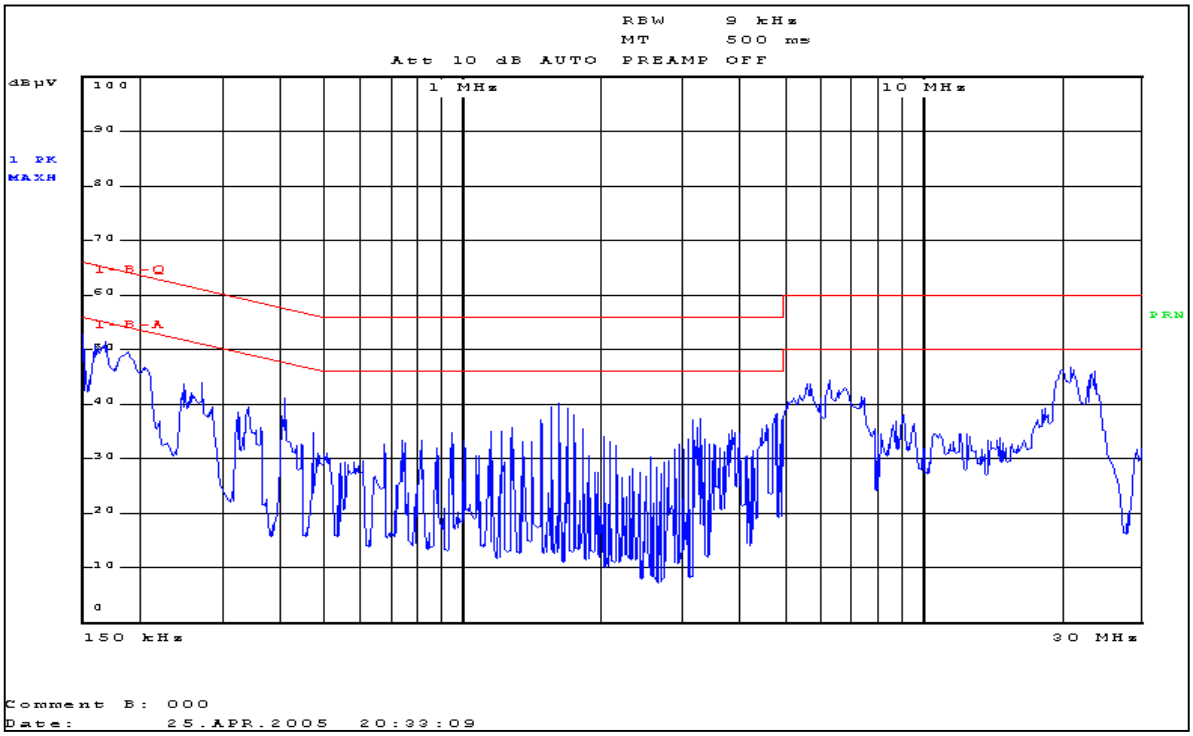
Power Lead Tested	Frequency (MHz)	Emission Level		Limit		(*) Margin	
		Q-Peak (dBμV)	Average (dBμV)	Q-Peak (dBμV)	Average (dBμV)	Q-Peak (dBμV)	Average (dBμV)
Live to Ground	0.17	40.1	13.0	65.0	55.0	-24.9	-42.0
	0.19	37.6	16.7	64.0	54.0	-26.4	-37.3
	0.27	34.2	27.9	61.1	51.1	-26.9	-23.2
	1.49	33.8	28.1	56.0	46.0	-22.2	-17.9
	5.33	37.8	28.0	60.0	50.0	-22.2	-22.0
	20.55	39.5	21.8	60.0	50.0	-20.5	-28.2
Neutral to Ground	0.17	40.5	13.4	65.0	55.0	-24.5	-41.6
	0.41	39.2	36.8	57.7	47.7	-18.5	-10.9
	1.55	38.9	31.7	56.0	46.0	-17.1	-14.3
	3.18	31.9	24.8	56.0	46.0	-24.1	-21.2
	5.75	39.1	27.2	60.0	50.0	-20.9	-22.8
	21.26	40.5	22.0	60.0	50.0	-19.5	-28.0

Note : Refer to measured graphs on next page.

* Margin(dB) : Emission Level (dB) - Limit (dB)



(Test side : Live-Ground side)



(Test side : Neutral-Ground side)

Ⅳ. RADIATED EMISSION MEASUREMENT (Section 15.209)

1. Test Procedure

1.1 Preliminary Testing for Reference

The EUT was designed to transmit on one of 63 channels in the full hopping band 902.6 to 927.4 MHz. Therefore measurements were performed with the equipment operating on three frequencies, which were the top(CH.62), middle(CH.31) and bottom(CH.0) in the band, as per Section 15.31(m).

Preliminary testing was performed in a KTL absorber-lined room to determine the emission characteristics of the EUT. The EUT was placed on the wooden table which has dimensions of 0.8 meters in height, 1 meter in length and 1.5 meters in width. Receiving antenna (Biconi-Log antenna : 30 to 1000 MHz or Horn Antenna : 1 to 18 GHz) was placed at the distance of 1 meter from the EUT.

An attempt was made to maximize the emission level with the various configurations of the EUT. Emission levels from the EUT with various configurations were examined on a spectrum analyzer connected with a RF amplifier and graphed by a plotter.

1.2 Final Radiated Emission Test at an Absorber-Lined Room

The final measurement of radiated field strength was carried out in a KTL absorber-lined Room that was listed up at FCC according to the "Radiated Emissions Testing" procedure specified by ANSI C63.4.

Based on the test results in preliminary test, measurement was made in same test set up and configurations where produced maximum emission level. Receiving antenna was installed at 3-meter distance from the EUT, and was connected to an EMI receiver or spectrum analyzer with a RF amplifier.

Turntable was rotated through 360 degrees and receiving antenna height was varied from 1 to 4 meters above the ground plane with horizontal and vertical polarization to read maximum emission level.

If necessary, the radiated emission measurements could be performed at a closer distance than specified distance to ensure higher accuracy and their results were extrapolated to the specified distance using an inverse linear distance extrapolation factor(20dB/decade) as per Section 15.31(f).

The maximum emission level from the EUT occurred in such configuration as shown in the following photograph.

2. Photograph of the test configuration

3. Sample Calculation

The emission level measured in decibels above one microvolt (dB μV) was calculated as shown in following sample calculation.

For example :

Measured Value at	1805.2 MHz	24.6 dB μV
+	Antenna Factor	26.6 dB/m
+	Cable Loss	2.5 dB
−	Preamplifier	0.0 dB
−	Distance Correction Factor *	0.0 dB
=	Radiated Emission	53.7 dB μV/m

* Extrapolated from the measured distance to the specified distance by an inverse linear distance extrapolation.

4. Measurement Data

4.1 Antenna configuration (KIS900-AE)

- Intentional Spurious Emission
- Resolution Bandwidth : x CISPR Quasi-Peak (6dB Bandwidth : 120kHz for below 1GHz)
  x Peak (3dB Bandwidth : 1MHz for above 1GHz)
- Measurement Distance : 3 Meter

channel	Frequency (MHz)	* D.M.	* A.P.	Measured Value (dBμV)	* A.F. + C.L (dB)	* A.G. (dB)	* D.C.F. (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	** Margin (dB)
Ch 0	1805.2	P	V	24.6	29.1	--	--	53.7	74	-20.3
	1805.2	A	V	14.7	29.1	--	--	43.8	54	-10.2
	*** 2707.8	P	H/V	**** <35.0	32.4	-35.0	--	<32.4	74	<-41.6
	*** 2707.8	A	H/V	**** <25.0	32.4	-35.0	--	<22.4	54	<-31.6
Ch 31	1829.2	P	V	26.5	29.2	--	--	55.7	74	-18.3
	1829.2	A	V	17.3	29.2	--	--	46.5	54	-7.5
	*** 2743.8	P	H/V	**** <35.0	32.5	-35.0	--	<32.5	74	<-41.5
	*** 2743.8	A	H/V	**** <25.0	32.5	-35.0	--	<22.5	54	<-31.5
Ch 62	1854.8	P	V	25.6	29.3	--	--	54.9	74	-19.1
	1854.8	A	V	13.8	29.3	--	--	43.1	54	-10.9
	2782.2	P	V	23.0	32.6	--	--	55.6	74	-18.4
	2782.2	A	V	12.8	32.6	--	--	45.4	54	-8.6

Note

* D.M. : Detect Mode (P : Peak, Q : Quasi-Peak, A : Average)
A.P. : Antenna Polarization (H : Horizontal, V : Vertical)
A.F. : Antenna Factor
C.L. : Cable Loss
A.G. : Amplifier Gain
D.C.F. : Distance Correction Factor

** Margin (dB) = Emission Level (dB) - Limit (dB)

*** In the case of these frequencies, the EUT was measured at 1.0m distance for sufficient sensitivity of measurement system.

**** < means less than. The observed spectrum analyzer noise floor level with RF preamplifier was 35.0 dBuV and 25.0 dBuV in peak and average mode respectively.

- Unintentional Emission
- Resolution Bandwidth : x CISPR Quasi-Peak (6dB Bandwidth : 120kHz for below 1GHz)
  x Peak (3dB Bandwidth : 1MHz for above 1GHz)
- Measurement Distance : 3 Meter

Frequency (MHz)	* D.M.	* A.P.	Measured Value (dBμV)	* A.F. + C.L (dB)	* A.G. (dB)	* D.C.F. (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	** Margin (dB)
34.9	Q	V	17.9	14.2	--	--	32.1	40.0	-7.9
48.0	Q	V	15.7	14.5	--	--	30.2	40.0	-9.8
75.2	Q	V	12.0	11.2	--	--	23.2	40.0	-16.8
176.9	Q	V	20.3	13.7	--	--	34.0	43.5	-9.5
353.8	Q	V	25.6	16.3	--	--	41.9	46.0	-4.1
442.3	Q	V	25.7	18.5	--	--	44.2	46.0	-1.8
--	--	--	--	--	--	--	--	--	--

Note
* D.M. : Detect Mode (P : Peak, Q : Quasi-Peak, A : Average)
A.P. : Antenna Polarization (H : Horizontal, V : Vertical)
A.F. : Antenna Factor
C.L. : Cable Loss
A.G. : Amplifier Gain
D.C.F. : Distance Correction Factor

** Margin (dB) = Emission Level (dB) - Limit (dB)

*** In the case of these frequencies, the EUT was measured at 1.0m distance for sufficient sensitivity of measurement system.

**** < means less than. The observed spectrum analyzer noise floor level with RF preamplifier was 35.0 dBuV and 25.0 dBuV in peak and average mode respectively.

4.2 Antenna configuration (KIS900-AN-2H02, KIS900-AN-2V02)

- Intentional Spurious Emission
- Resolution Bandwidth : x CISPR Quasi-Peak (6dB Bandwidth : 120kHz for below 1GHz)
  x Peak (3dB Bandwidth : 1MHz for above 1GHz)
- Measurement Distance : 3 Meter

channel Frequency (MHz)		* D.M.	* A.P.	Measured Value (dBμV)	* A.F. + C.L (dB)	* A.G. (dB)	* D.C.F. (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	** Margin (dB)
Ch 0	1805.2	P	V	22.7	29.1	--	--	51.8	74	-22.2
	1805.2	A	V	11.6	29.1	--	--	40.7	54	-13.3
	*** 2707.8	P	H/V	**** <35.0	32.4	-35.0	--	<32.4	74	<-41.6
	*** 2707.8	A	H/V	**** <25.0	32.4	-35.0	--	<22.4	54	<-31.6
Ch 31	1829.2	P	V	24.5	29.2	--	--	53.7	74	-20.3
	1829.2	A	V	13.9	29.2	--	--	43.1	54	-10.9
	*** 2743.8	P	H/V	**** <35.0	32.5	-35.0	--	<32.5	74	<-41.5
	*** 2743.8	A	H/V	**** <25.0	32.5	-35.0	--	<22.5	54	<-31.5
Ch 62	1854.8	P	V	26.8	29.3	--	--	56.1	74	-17.9
	1854.8	A	V	15.9	29.3	--	--	45.2	54	-8.8
	2782.2	P	V	24.2	32.6	--	--	56.8	74	-17.2
	2782.2	A	V	13.4	32.6	--	--	46.0	54	-8.0

Note

* D.M. : Detect Mode (P : Peak, Q : Quasi-Peak, A : Average)
A.P. : Antenna Polarization (H : Horizontal, V : Vertical)
A.F. : Antenna Factor
C.L. : Cable Loss
A.G. : Amplifier Gain
D.C.F. : Distance Correction Factor

** Margin (dB) = Emission Level (dB) - Limit (dB)

*** In the case of these frequencies, the EUT was measured at 1.0m distance for sufficient sensitivity of measurement system.

**** < means less than. The observed spectrum analyzer noise floor level with RF preamplifier was 35.0 dBuV and 25.0 dBuV in peak and average mode respectively.

- Unintentional Emission
- Resolution Bandwidth : x CISPR Quasi-Peak (6dB Bandwidth : 120kHz for below 1GHz)
  x Peak (3dB Bandwidth : 1MHz for above 1GHz)
- Measurement Distance : 3 Meter

Frequency (MHz)	* D.M.	* A.P.	Measured Value (dBμV)	* A.F. + C.L (dB)	* A.G. (dB)	* D.C.F. (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	** Margin (dB)
34.9	Q	V	17.8	14.2	--	--	32.0	40.0	-8.0
48.0	Q	V	15.5	14.5	--	--	30.0	40.0	-10.0
75.2	Q	V	11.8	11.2	--	--	23.0	40.0	-17.0
176.9	Q	V	20.0	13.7	--	--	33.7	43.5	-9.8
353.8	Q	V	25.9	16.3	--	--	42.2	46.0	-3.8
442.3	Q	V	25.6	18.5	--	--	44.1	46.0	-1.9
--	--	--	--	--	--	--	--	--	--

Note
* D.M. : Detect Mode (P : Peak, Q : Quasi-Peak, A : Average)
A.P. : Antenna Polarization (H : Horizontal, V : Vertical)
A.F. : Antenna Factor
C.L. : Cable Loss
A.G. : Amplifier Gain
D.C.F. : Distance Correction Factor

** Margin (dB) = Emission Level (dB) - Limit (dB)

*** In the case of these frequencies, the EUT was measured at 1.0m distance for sufficient sensitivity of measurement system.

**** < means less than. The observed spectrum analyzer noise floor level with RF preamplifier was 35.0 dBuV and 25.0 dBuV in peak and average mode respectively.

Ⅴ. 20dB BANDWIDTH & HOPPING CHANNEL SEPARATION (Section 15.247(a)(1))

1. Test Standard

Frequency hopping systems shall have hopping channel carrier frequencies separated by minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudorandomly ordered list of hopping frequencies.

2. Test Procedure

The EUT antenna was removed and the cable was connected directly into a spectrum analyzer through a 30 dB attenuator. An offset was programmed into the spectrum analyzer to compensate for the loss of the external attenuator. The spectrum analyzer resolution bandwidth was set to 30 kHz and the video bandwidth was set to 300 kHz. The 20 dB bandwidth was measured using the method function of a spectrum analyzer. The channel spacing of 2 adjacent channels was measured using a spectrum analyzer span setting of 1 MHz. The number of hopping channels was measured from 902 MHz to 928 MHz.

3. Measurement Data

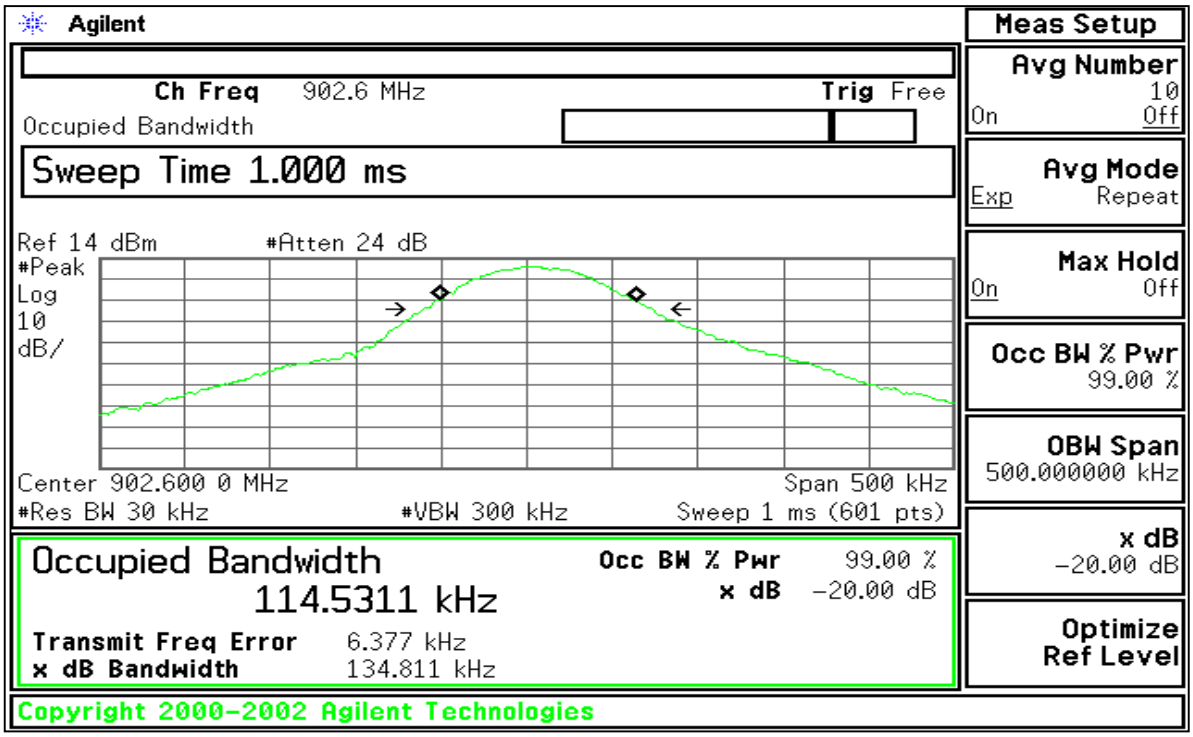
3.1 20dB Bandwidth

Channel	Frequency (MHz)	Measured Value (kHz)	Limit (kHz)	Result
Low	902.6	134.8	500	Pass
Middle	914.6	138.1	500	Pass
High	927.4	134.7	500	Pass

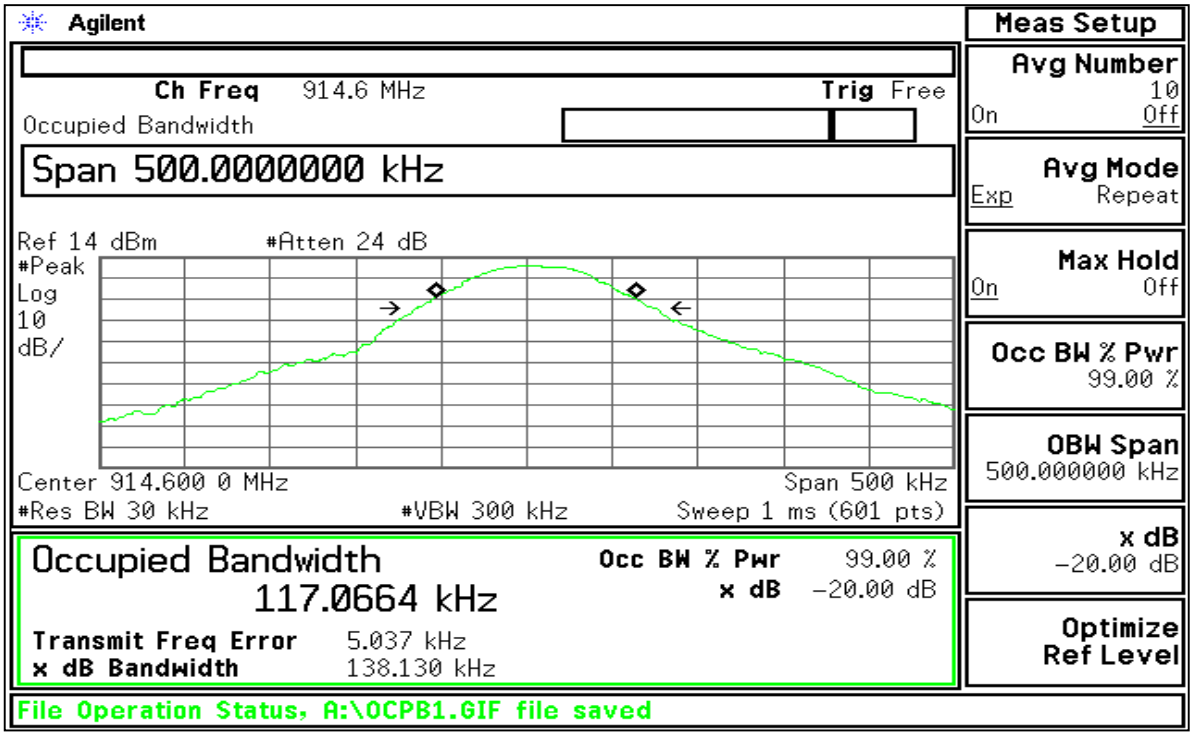
3.2 Channel Separation

Measured Value (kHz)	Limit (kHz)	Result
400.0	> 138.1	Pass

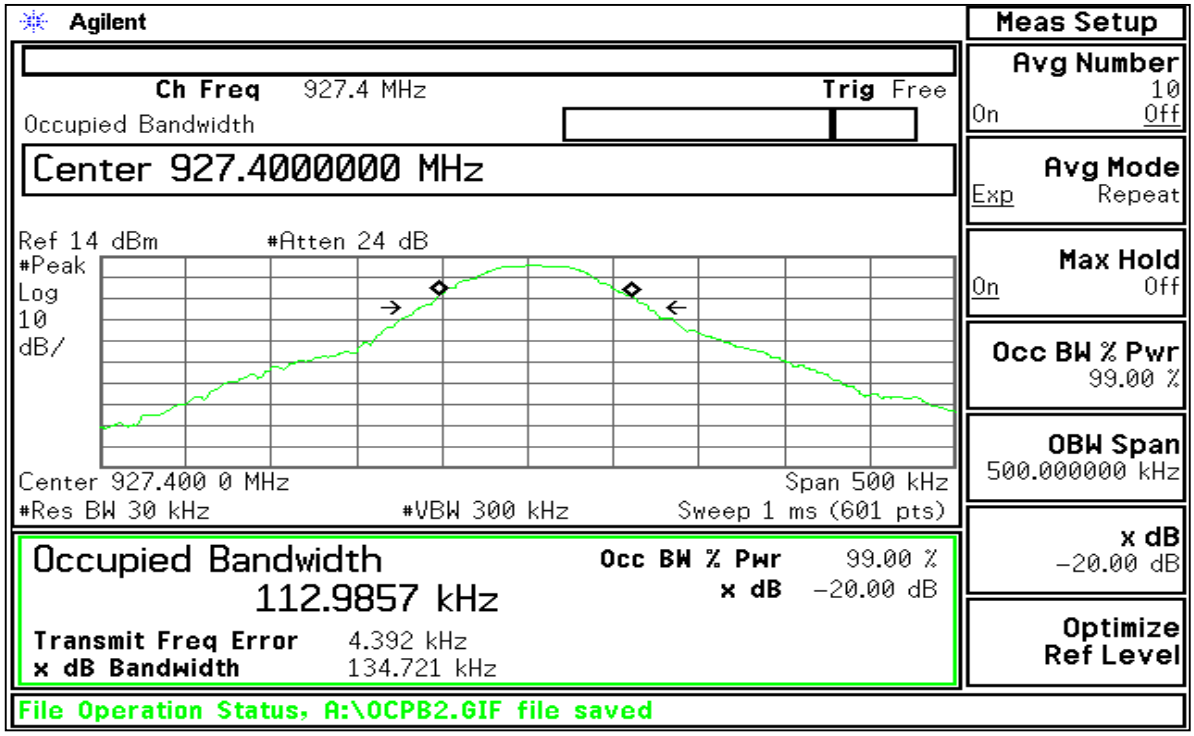
4. Measurement Plot



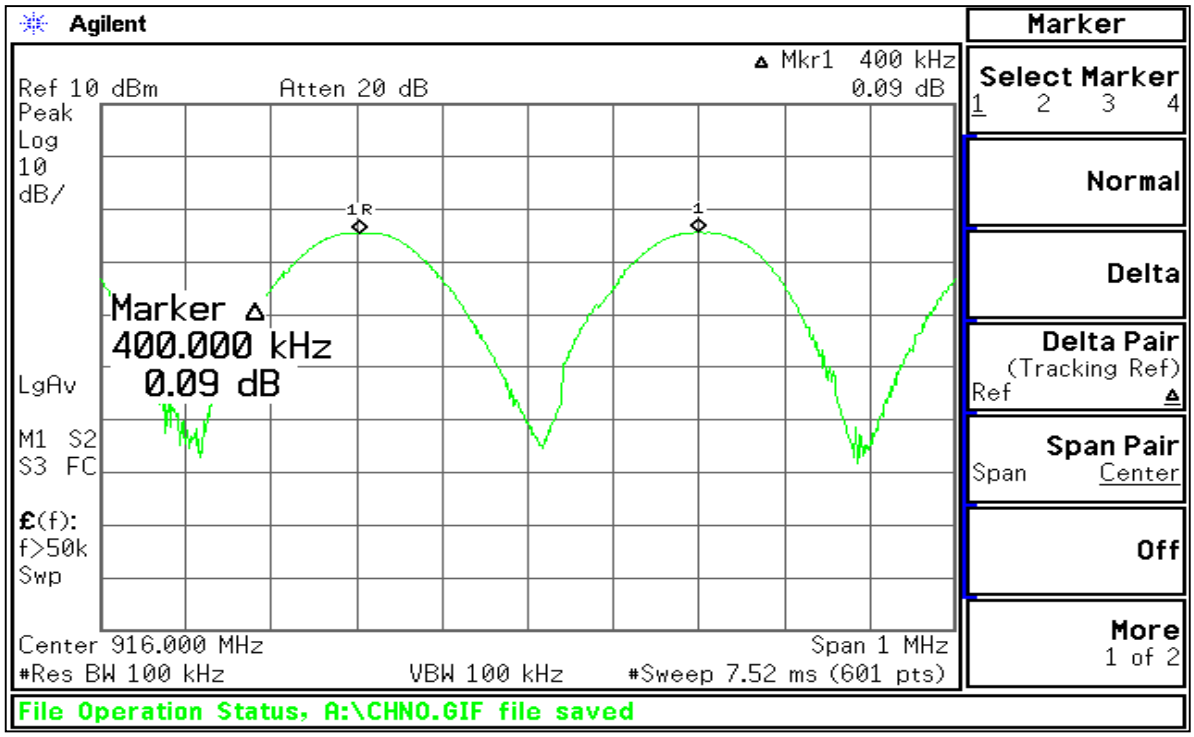
(20dB Bandwidth, Channel Low)



(20dB Bandwidth, Channel Middle)



(20dB Bandwidth, Channel High)



(Channel Separation)

Ⅵ. NUMBER OF HOPPING FREQUENCY (Section 15.247(a)(1))

1. Test Standard

For frequency hopping systems operating in the 902~928 MHz band, if the 20dB Bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies.

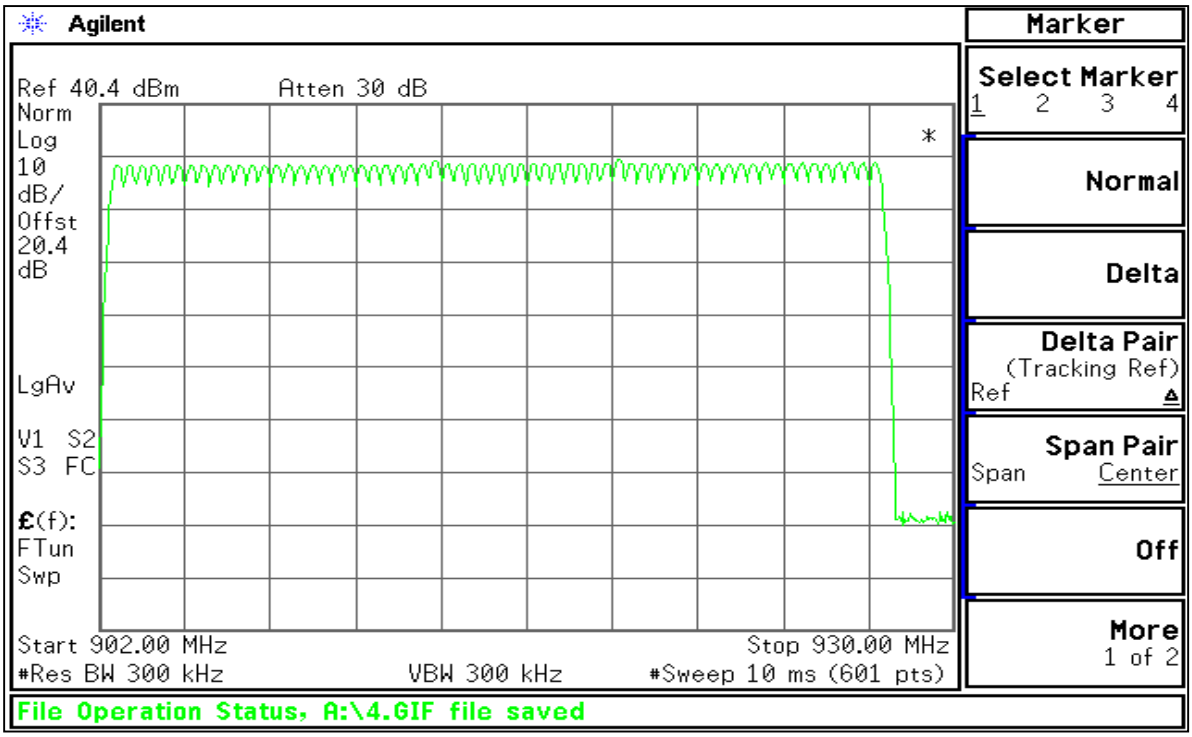
2. Test Procedure

The EUT antenna was removed and the cable was connected directly into a spectrum analyzer through a 30 dB attenuator. The spectrum analyzer resolution bandwidth was set to 100 kHz and the video bandwidth was set to 100 kHz. The number of hopping channels was measured from 902 MHz to 928 MHz.

3. Measurement Data

Measured Value (No. of channel)	Limit (No. of channel)	Result
63	50	Pass

4. Measurement Plot



(Number of Hopping Frequency)

Ⅶ. DWELL TIME (Section 15.247(a)(1))

1. Test Standard

For Frequency hopping systems operating in the 902~928 MHz band, if the 20dB 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.

2. Measurement Data

Measured Value (ms)	Limit (ms)	Result
180.576	400	Pass

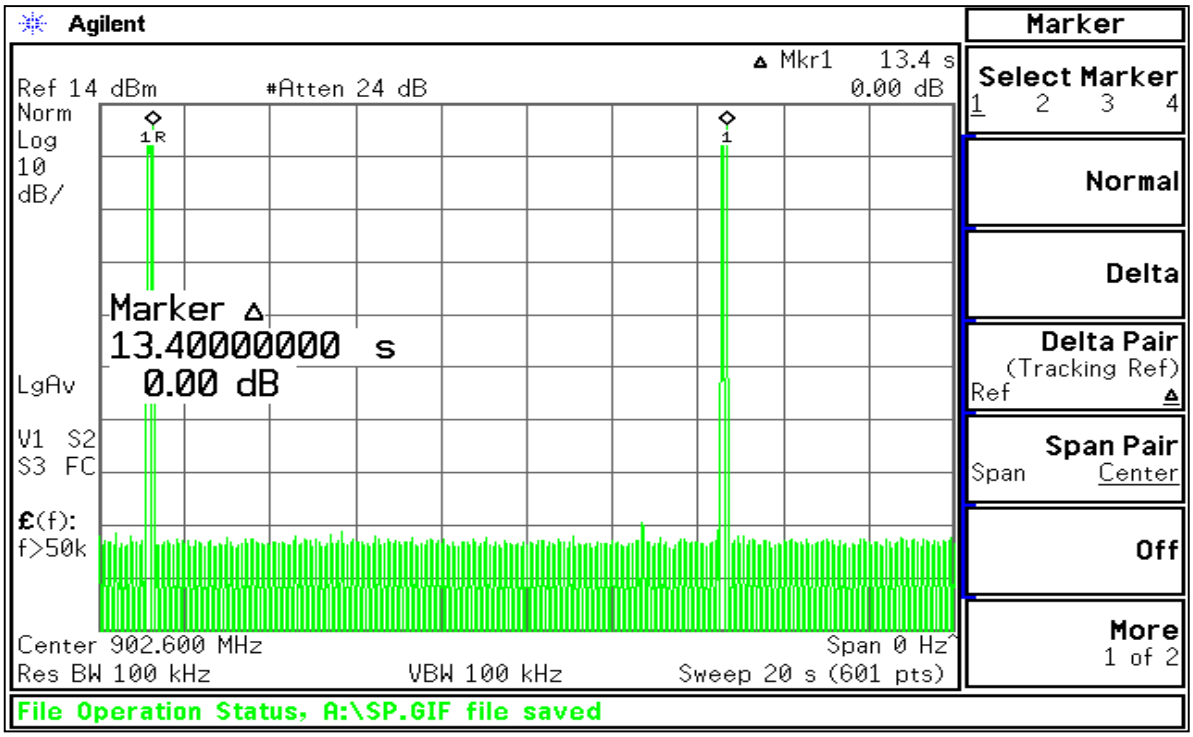
For a frequency hopping system utilizing 63 channels (N), with a channel occupancy time(T_{occ})of 96 ms and a repetition time (T_{rep}) of 13.4 s.

No of transmission cycles in specified averaging period (400 x N ms)
= (0.4 x N) / T_{rep}
= (0.4 x 63) / 13.4 s
= 1.881

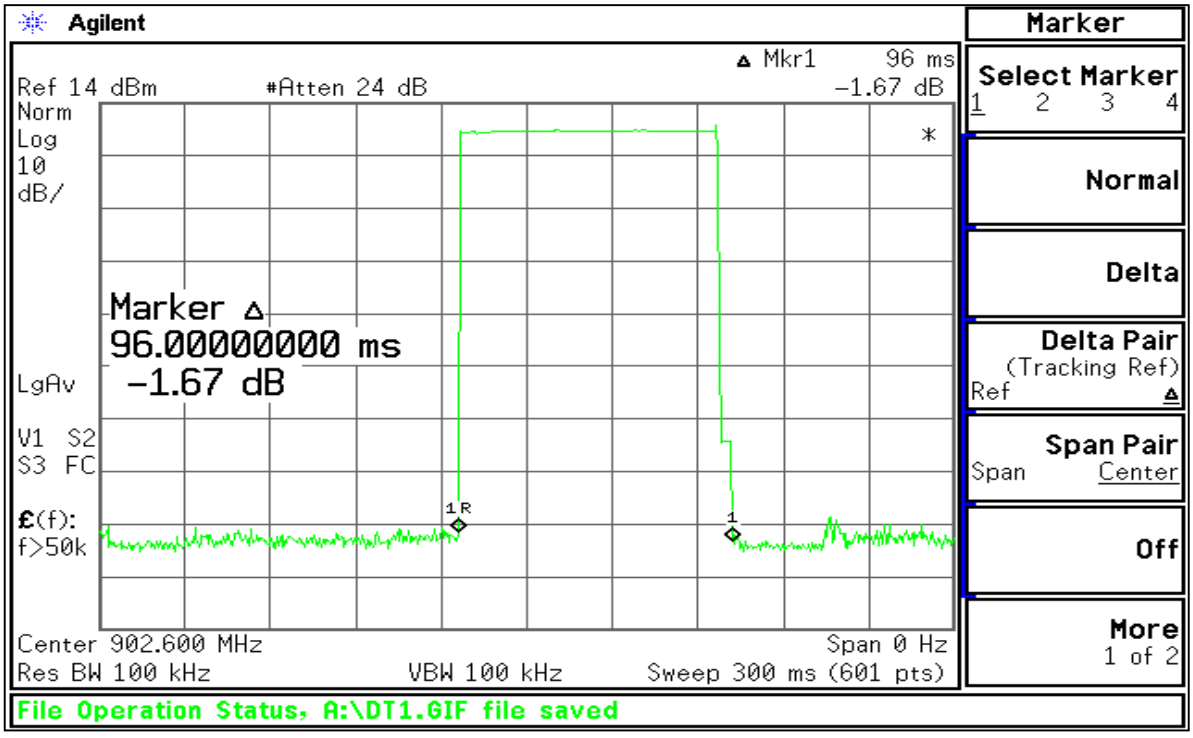
Total activation time = T_{occ} x 1.881 ms
= 96 x 1.881 ms
= 180.576 ms

Limit = 400 ms
Result : Pass

3. Measurement Plot



(Repetition Time)



(Channel Occupancy Time)

Ⅷ. MAXIMUM PEAK OUTPUT POWER (Section 15.247(b))

1. Test Standard

For Frequency hopping systems operating in the 902~928 MHz band: 1 watt for systems employing at least 50 hopping channels; and 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section.

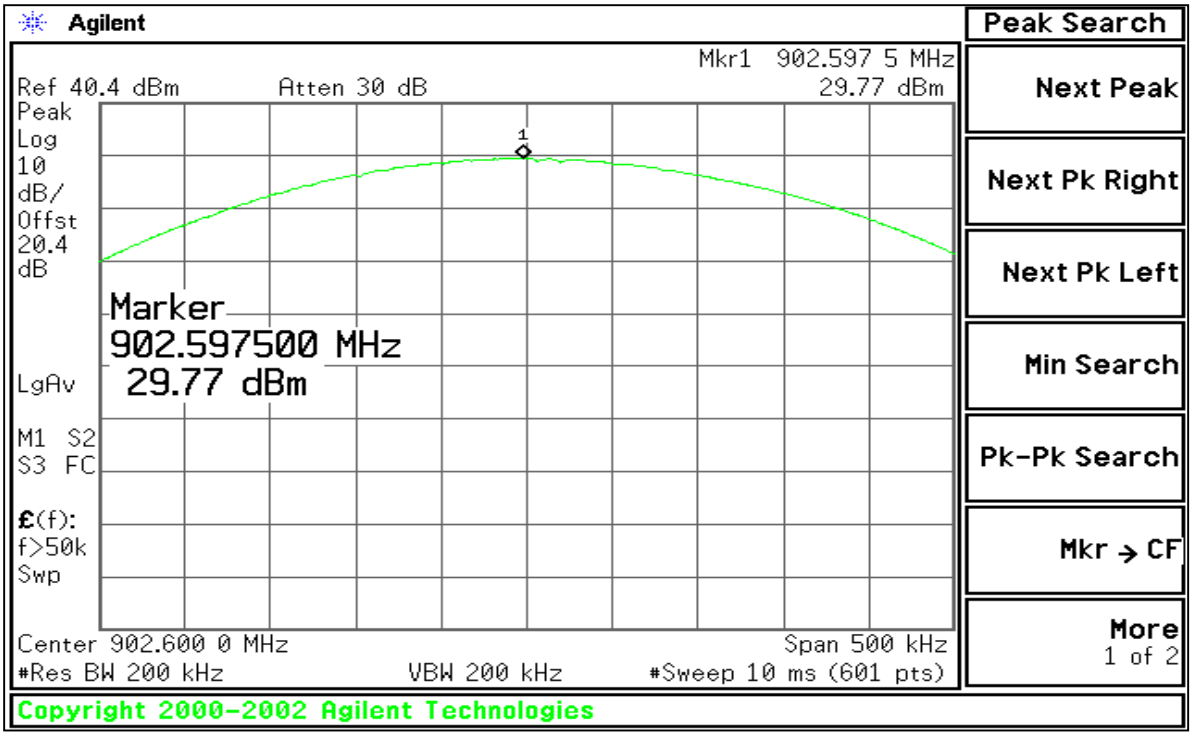
2. Test Procedure

To measure the output power the hopping sequence was stopped while the frequency dwelled on a low, high and middle channel. The output port from the transmitter was connected to an attenuator and then to the input port of the RF Spectrum Analyzer. The analyzer offset was adjusted to compensate for the attenuator and other losses in the system.

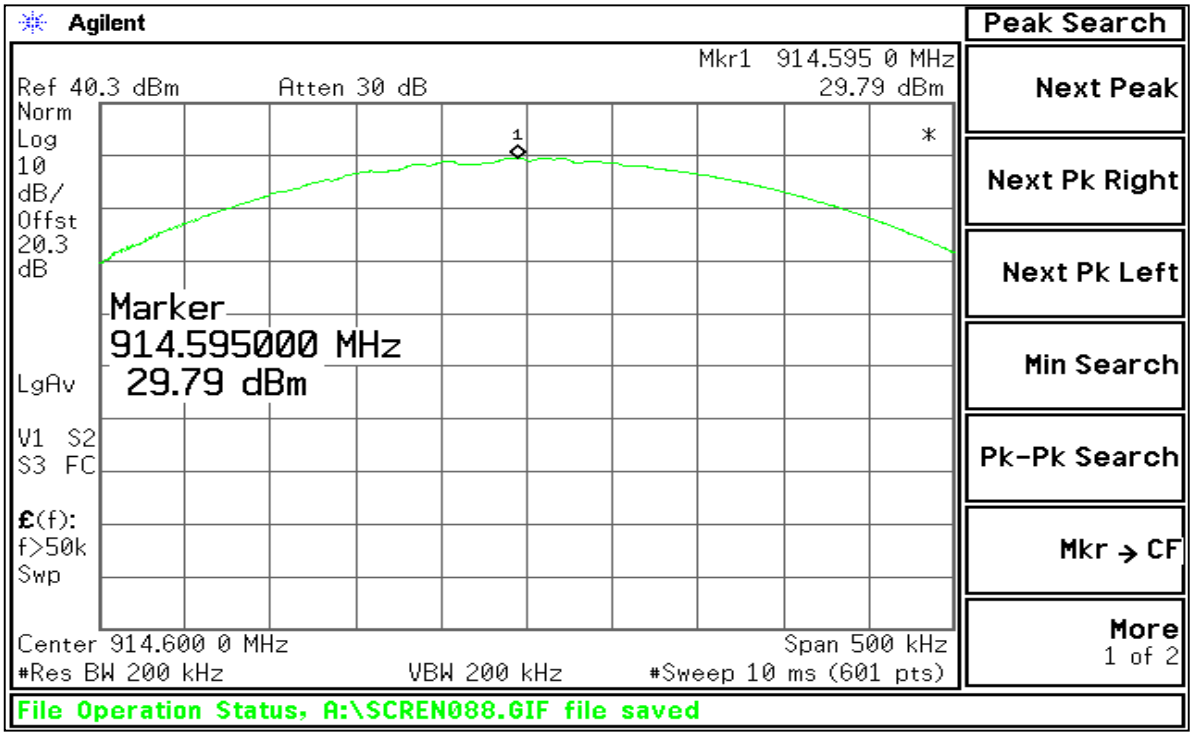
3. Measurement Data

Channel	Frequency (MHz)	Measured Value (dBm)	Measured Value (Watt)	Limit (Watt)	Result
Low	902.6	29.77	0.948	1	Pass
Middle	914.6	29.79	0.952	1	Pass
High	927.4	29.91	0.979	1	Pass

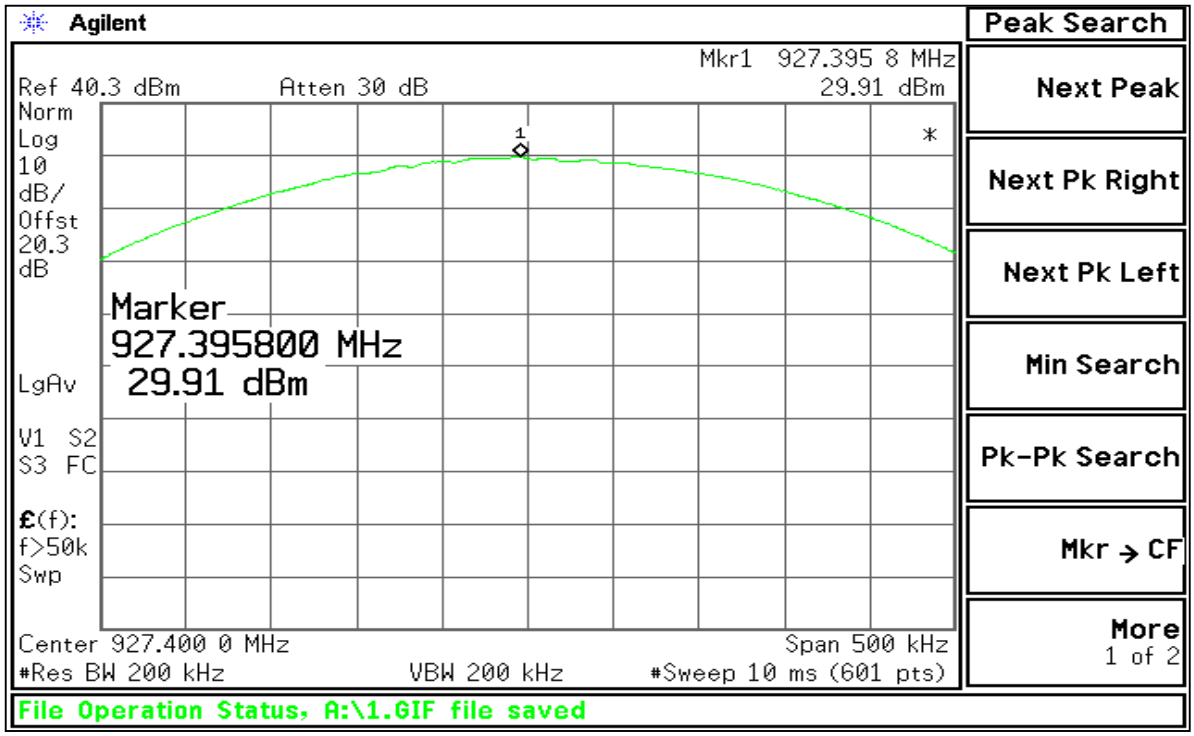
4. Measurement Plot



(Channel Low)



(Channel Middle)



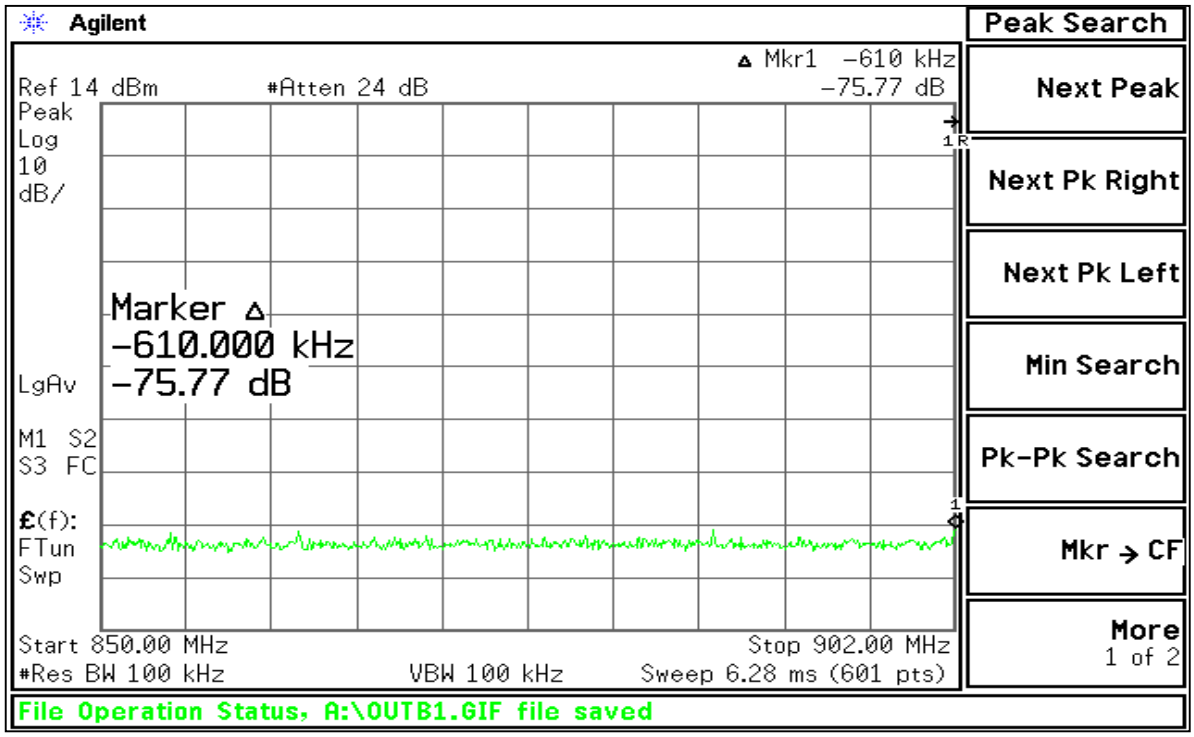
(Channel High)

Ⅸ. 100 kHz BANDWIDTH OF BAND EDGES (Section 15.247(c))

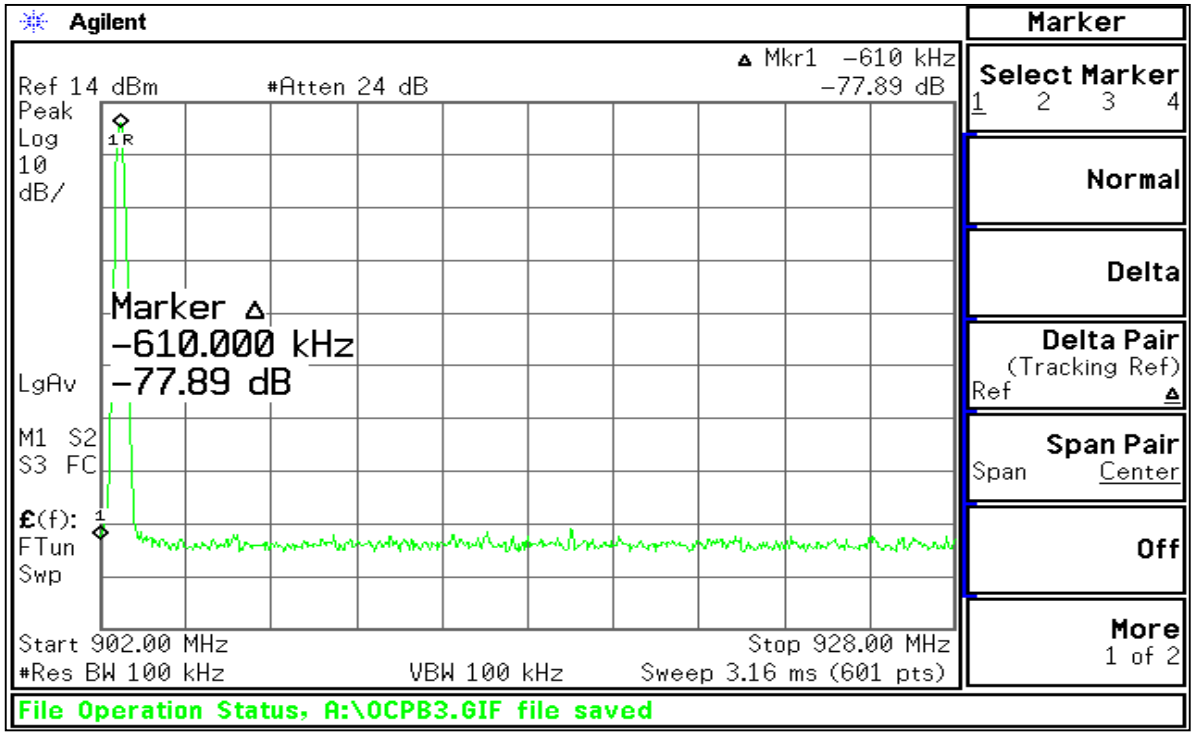
1. Test Standard

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum of 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. Attenuation below the general limits specified in section 15.209(a) is not required.

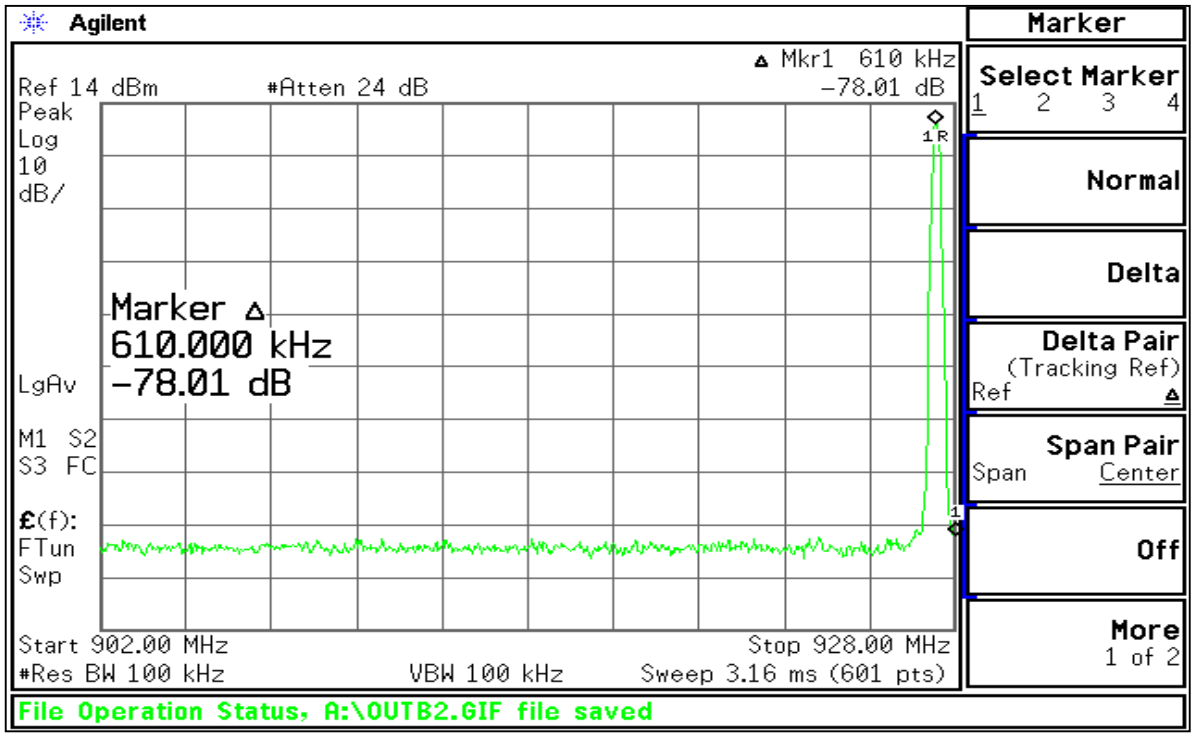
2. Measurement Plot



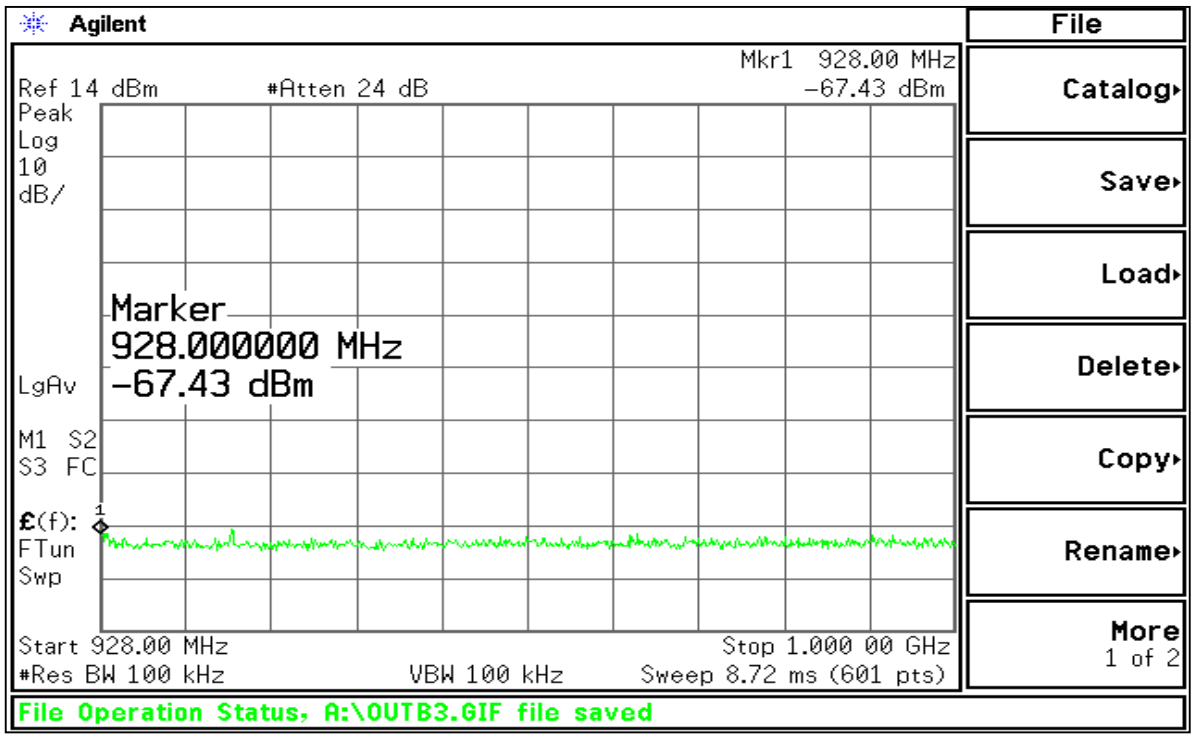
(Channel Low)



(Channel Low)



(Channel High)



(Channel High)

Ⅹ. CONDUCTED SPURIOUS EMISSION AT ANTENNA TERMINALS (Section 2.1051)

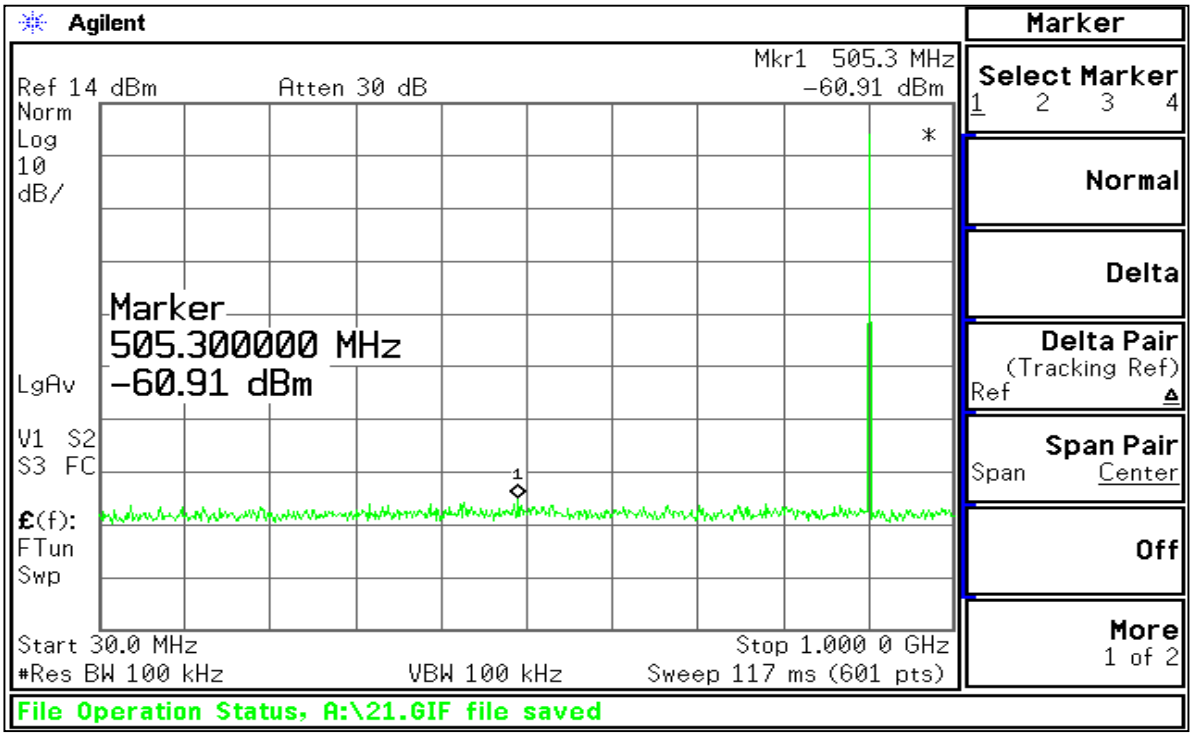
1. Test Standard

The EUT must comply with requirements for spurious emissions at antenna terminals. Per §15.247(c) all spurious emissions in any 100 kHz bandwidth outside the frequency band in which the spread spectrum device is operating shall be attenuated 20 dB below the highest power level in a 100 kHz bandwidth within the band containing the highest level of the desired power.

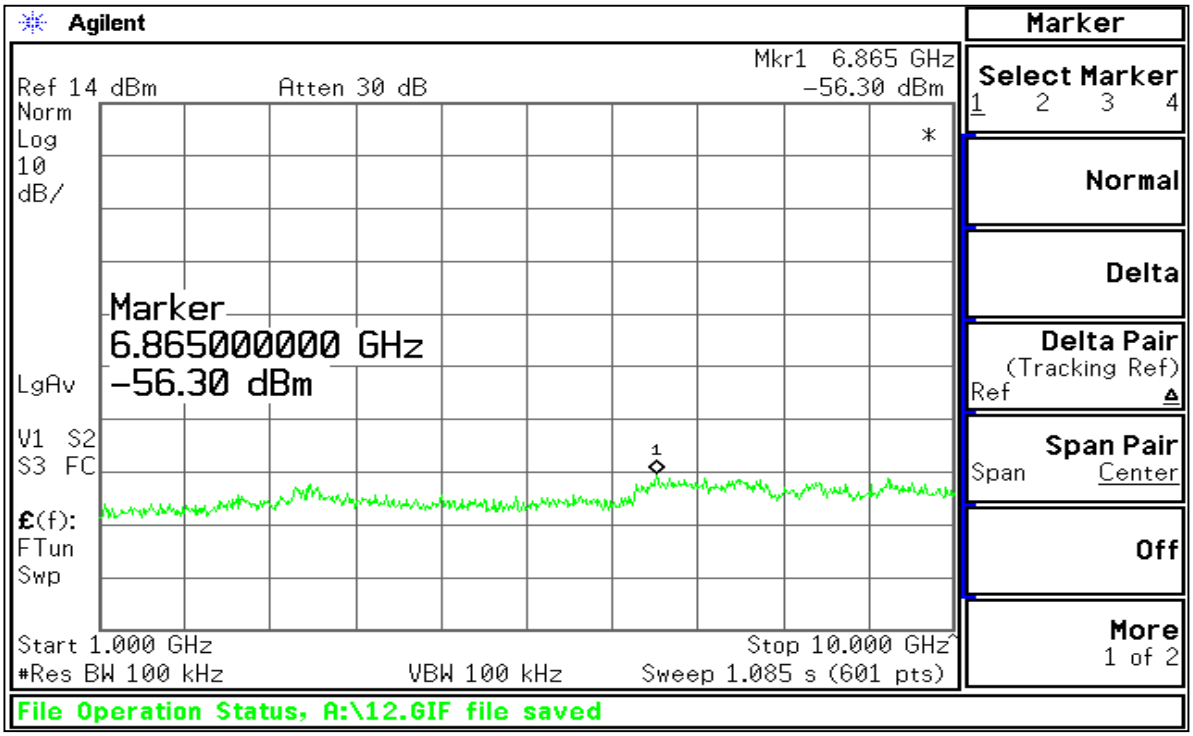
2. Test procedure

The EUT antenna was removed and the cable was connected directly into a spectrum analyzer through a 30 dB attenuator. An offset was programmed into the spectrum analyzer to compensate for the loss of the external attenuator. The spectrum analyzer resolution bandwidth was set to 100 kHz and the video bandwidth was set to 100 kHz. The amplitude of the EUT carrier frequency was measured to determine the emissions limit(20 dB below the carrier frequency amplitude). The emissions outside of the allocated frequency band were then scanned from 30 MHz up to the tenth harmonic of the carrier. Spurious emissions were measured at high power setting.

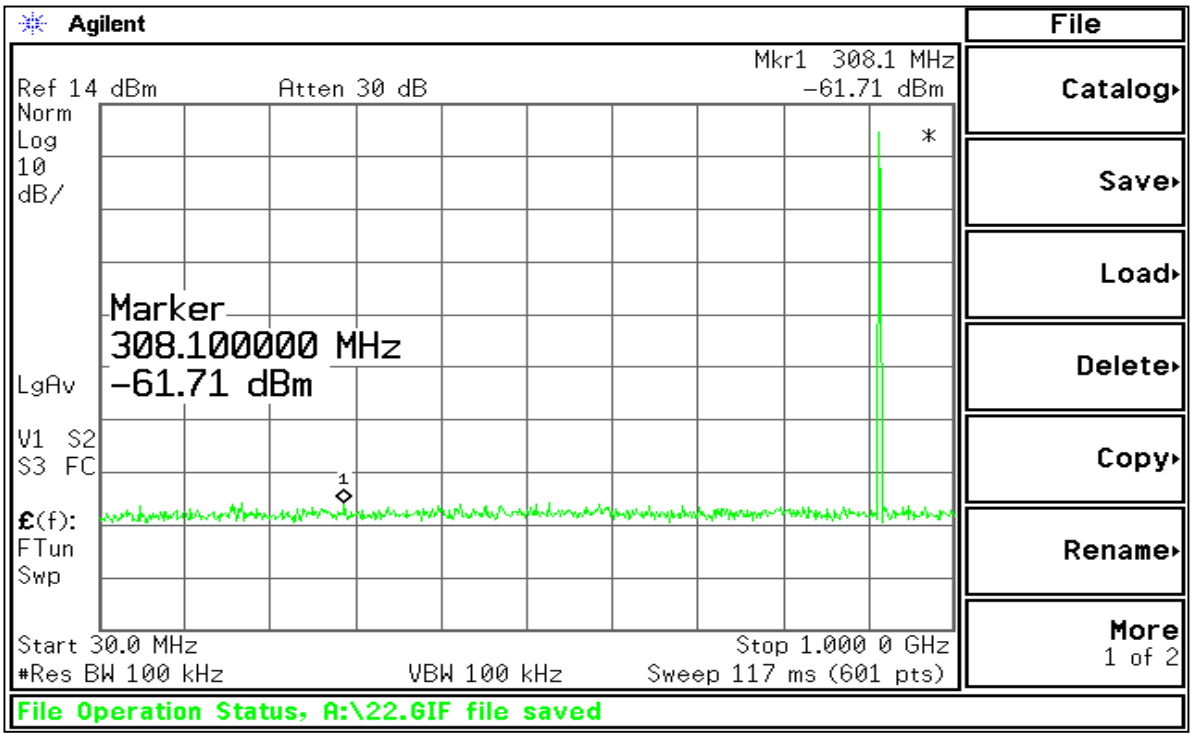
3. Measurement Plot



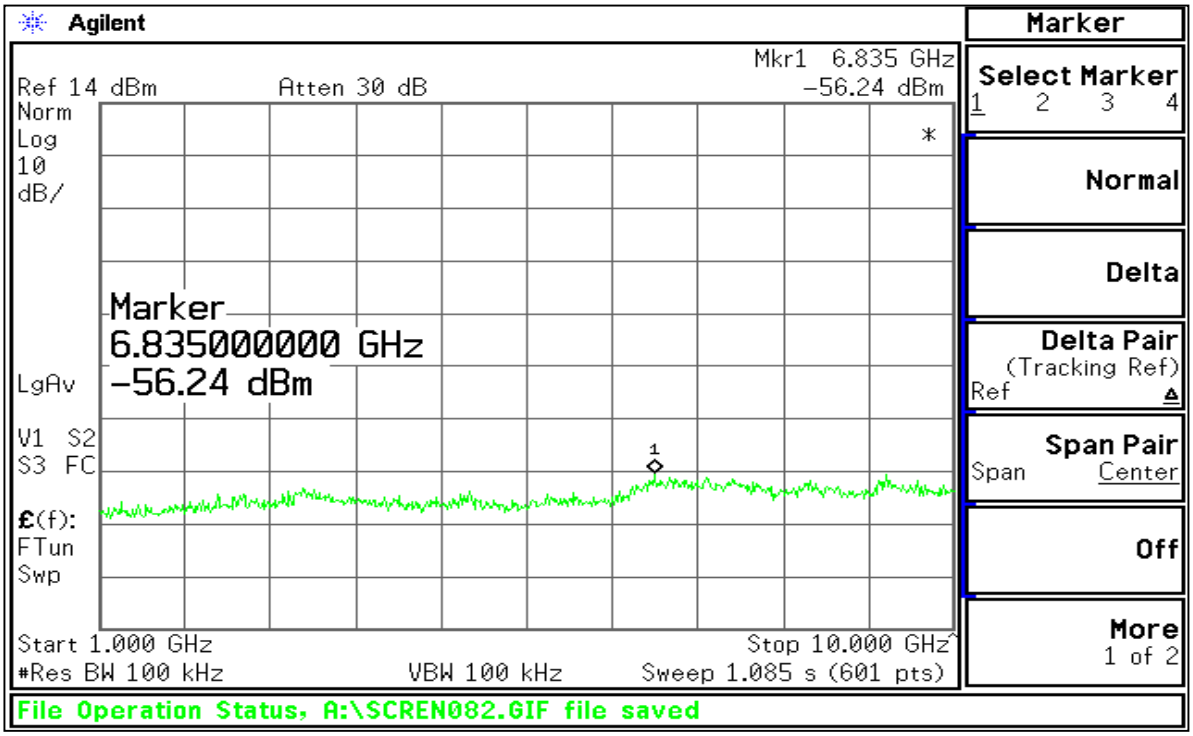
(Channel Low, 30 MHz ~ 1 GHz)



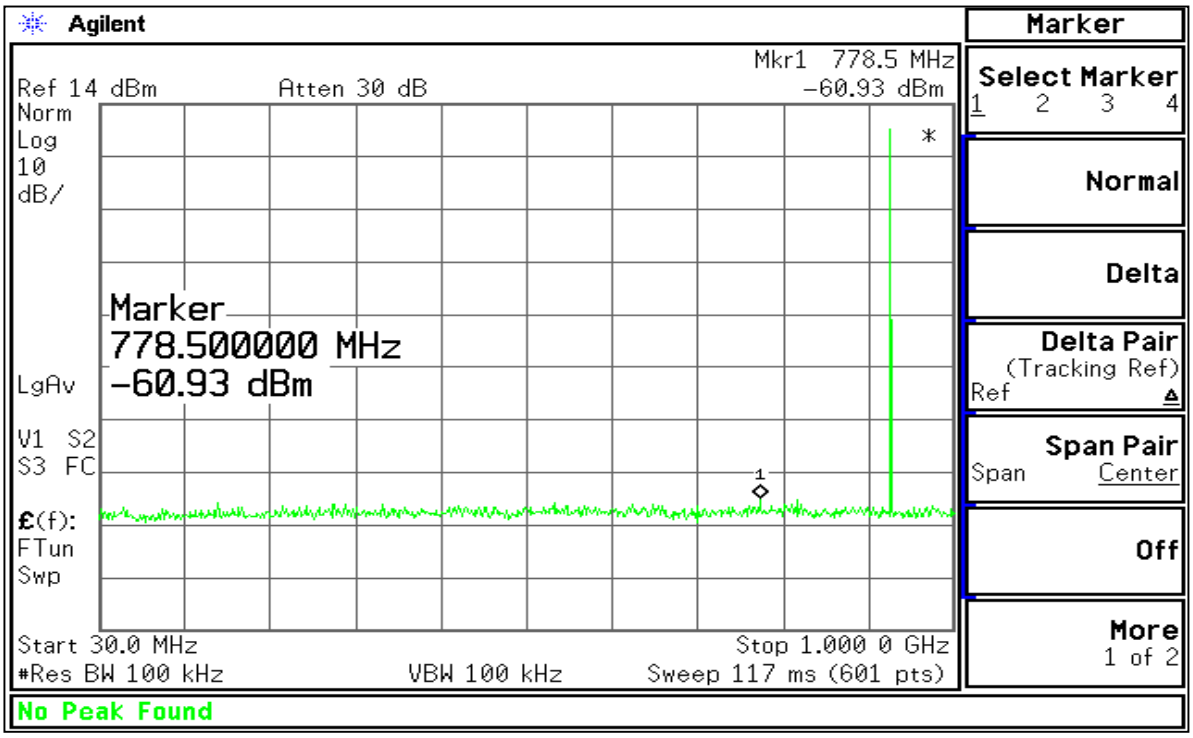
(Channel Low, 1 GHz ~ 10 GHz)



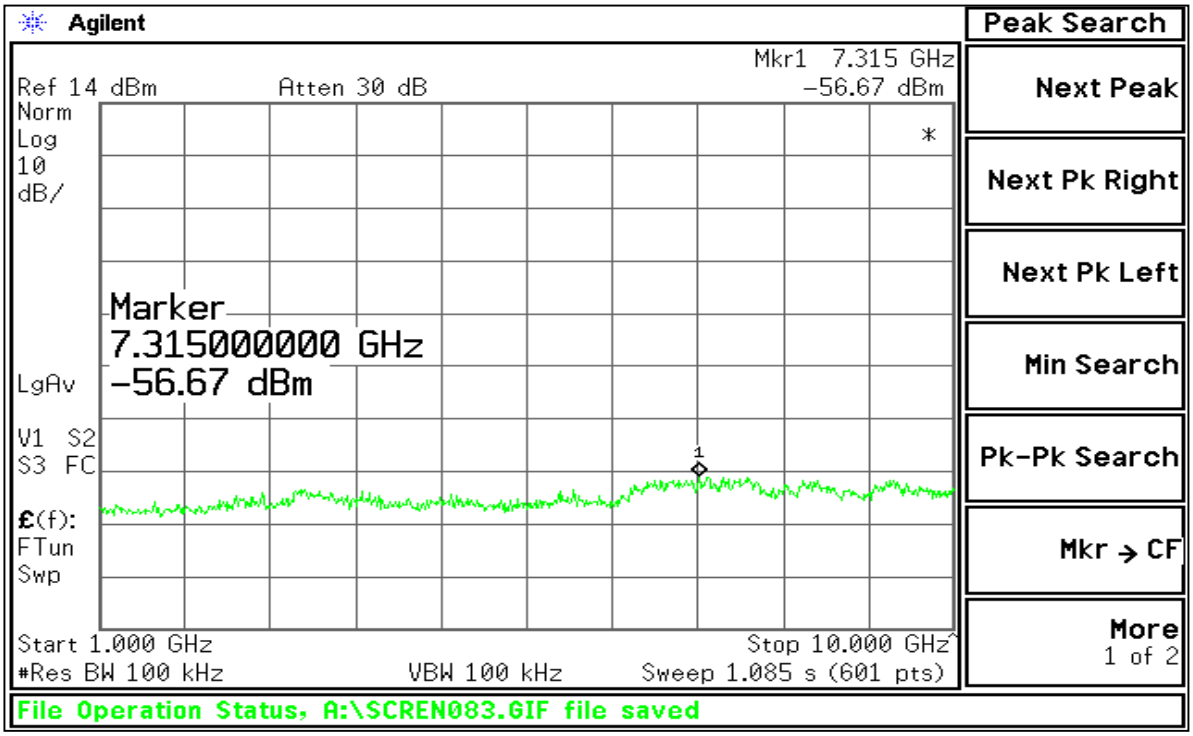
(Channel Middle, 30 MHz ~ 1 GHz)



(Channel Middle, 1 GHz ~ 10 GHz)



(Channel High, 30 MHz ~ 1 GHz)



(Channel High, 1 GHz ~ 10 GHz)

Ⅺ. TEST EQUIPMENTS USED FOR MEASUREMENTS

Equipment	Model No.	Manufacturer	Serial No.	Effective Cal. Duration
[x] EMI Receiver (20 MHz-1 GHz)	ESVS30	R & S	830516/002	03/14/05-03/14/06
[x] EMI Receiver (20 Hz-7 GHz)	ESI	R & S	835571/004	10/18/04-10/18/05
[x] Spectrum Analyzer (9 kHz-26.5 GHz)	8563A	H. P.	3222A02069	03/16/05-03/16/06
[x] Spectrum Analyzer (3 Hz-50 GHz)	E4448A	Agilent	MY43360322	03/16/05-03/16/06
[ ] Test Receiver (9 kHz-30 MHz)	ESH3	R & S	860905/001	06/18/04-06/18/05
[x] Pre-Amplifier (0.1-3000 MHz, 30 dB)	8347A	H. P.	2834A00543	05/19/05-05/19/06
[x] Pre-Amplifier (1-26.5 GHz, 35 dB)	8449B	H. P.	3008A00302	06/22/04-06/22/05
[x] LISN(50 Ω , 50 μH) (10 kHz-100 MHz)	ESH3-Z5	R & S	826789/009	05/16/05-05/16/06
[x] Coaxial Attenuator (DC-6GHz, 20dB)	3840-200	Bird Electronics	1087	04/14/05-04/14/06
[ ] Plotter	7470A	H. P.	3104A21292	-
[ ] Tuned Dipole Ant. (30 MHz-300 MHz)	VHA 9103	Schwarzbeck	-	*
[ ] Tuned Dipole Ant. (300 MHz-1 GHz)	UHA 9105	Schwarzbeck	-	*
[x] BiConi-Log Ant. (30 MHz -1 GHz)	VULB9168	Schwarzbeck	9168-167	*
[x] Horn Ant. (1 GHz-18 GHz)	3115	EMCO	-	*
[ ] Horn Ant. (18 GHz-40 GHz)	3116	EMCO	-	*
[ ] Active Loop Ant. (9 kHz-30 MHz)	6502	EMCO	2532	*
[ ] DC Power Supply	6260B	H.P.	1145A04822	-
[ ] Shielded Room (5.0 m x 4.5 m)	-	SIN-MYUNG	-	-

* Each set of antennas has been calibrated to ensure correlation with ANSI C63.5 standard. The calibration of antennas is traceable to Korea Standard Research Institute(KSRI)