HCT CO., LTD.
Product Compliance Division
TEL : +82 31 639 8518 FAX : +82 31 639 8525

CERTIFICATE OF COMPLIANCE

FCC PART 15.247 Certification

Applicant Name:
MAXFOR Technology Inc.

Address:
#E 809, Bundang, Techno-Park, 151, Yatap-Dong, Bundang-Gu, Seongnam-City, Gyeonggi-Do, 463-760, Korea

Date of Issue:
February 24, 2010

Test Site/Location:
HCT.CO., LTD., San 136-1 Ami-ri, Bubal-eup, Icheon-si, Kyungki-do, Korea

Test Report No.: HCTR1002FR31

HCT FRN: 0005866421

IC Recognition No.: 5944A-1

FCC ID: X6VMTMCM3300MSP

APPLICANT: MAXFOR Technology Inc.

FCC Rule Part(s):	Part 15.247
Application Type:	Certification
EUT Type:	network module
Model(s):	MTM-CM3300MSP
Frequency Range:	2405-2480 MHz (DSSS)
FCC Classification:	Digital Transmission System (DTS)
Max. RF Output Power:	-15.53 dBm(0.028 mW)

Engineering Statement:

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.

HCT.CO., LTD. Certifies that no party to this application has been denied FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998,21 U.S. C.862

Hyo Sun Kwak

Report prepared by
: Hyo Sun Kwak
Test engineer of RF Team

Sang Jun Lee

Approved by
: Sang Jun Lee
Manager of RF Team

Table of Contents

1. GENERAL INFORMATION 3
2. EUT DESCRIPTION 3
3. TEST METHODOLOGY 4
3.1 EUT CONFIGURATION 4
3.2 EUT EXERCISE 4
3.3 GENERAL TEST PROCEDURES 4
3.4 DESCRIPTION OF TEST MODES 4
4. INSTRUMENT CALIBRATION 5
5. FACILITIES AND ACCREDITATIONS 5
5.1 FACILITIES 5
5.2 EQUIPMENT 5
6. ANTENNA REQUIREMENTS 6
7. TEST RESULT 7
7.1 6dB Bandwidth Measurement 7
7.2 Output Power Measurement 10
7.3 Power Spectral Density 13
7.4 Out of Band Emissions at the Band Edge/ Conducted Spurious Emissions 16
7.5 Radiated Measurement. 21
7.5.1 Radiated Spurious Emissions. 21
7.5.2 Radiated Restricted Band Edge Measurements 29
8. LIST OF TEST EQUIPMENT 30

1. GENERAL INFORMATION

Applicant:	MAXFOR Technology Inc.
Address:	#E 809, Bundang, Techno-Park, 151, Yatap-Dong, Bundang-Gu, Seongnam-City, Gyeonggi-Do, 463-760, Korea
FCC ID:	X6VMTMCM3300MSP
EUT:	network module
Model:	MTM-CM3300MSP
Date of Test:	February 01, 2010
Contact person:	Name: Joong Deok Choi Phone #: TEL :+82-31-601-3533 / FAX : +82-31-705-4653

2. EUT DESCRIPTION

Product	network module	
Model Name	MTM-CM3300MSP	
Power Supply	DC 3.3 V	
Frequency Range	2405 ~ 2480 MHz (DSSS)	
Max. RF Output Power	-15.53 dBm(0.028 mW)	
Modulation Type	DSSS	
Antenna Specification	Manufacturer: WINIZEN Co., Ltd. Antenna type: Dipole Antenna Peak Gain : 5.49 dBi	Manufacturer: WINIZEN Co., Ltd. Antenna type: Dipole Antenna Peak Gain : 3.37 dBi

3. TEST METHODOLOGY

The measurement procedure described in the American National Standard for Methods of Measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz(ANSI C63.4-2003)

3.1 EUT CONFIGURATION

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

3.2 EUT EXERCISE

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

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4. (Version :2003) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 13.1.4.1 of ANSI C63.4. (Version: 2003)

3.4 DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Channel low, mid and high with highest data rate (worst case) is chosen for full testing.

4. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipments, which is traceable to recognized national standards.

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

The open area test site and conducted measurement facility used to collect the radiated data are located at the 254-1,Maekok-Ri, Hobup-Myun, Ichon-Si, Kyoungki-Do, 467-701, KOREA. The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2003) and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated June 10, 2009 (Registration Number: 90661)

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements. Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods.”

6. ANTENNA REQUIREMENTS

According to FCC 47 CFR §15.203:

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section."

* The antennas of this E.U.T is an antenna that uses a unique coupling.

*The E.U.T Complies with the requirement of §15.203

7. TEST RESULT

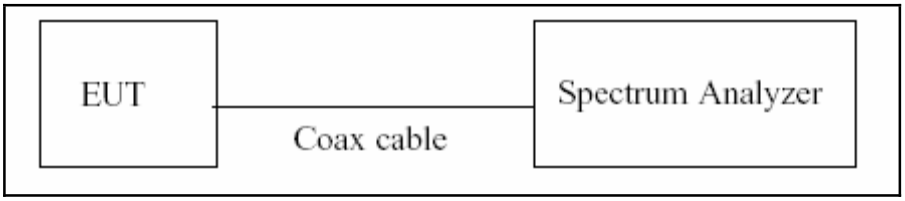
7.1 6dB Bandwidth Measurement

Test Requirements and limit, §15.247(a)(2)

The bandwidth at 6dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the receive antenna while the EUT is operating in transmission mode at the appropriate frequencies.

The minimum permissible 6dB bandwidth is 500 kHz.

▣ TEST CONFIGURATION



▣ TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to

RBW: 100 kHz

VBW: 100 kHz

SPAN: 5 MHz

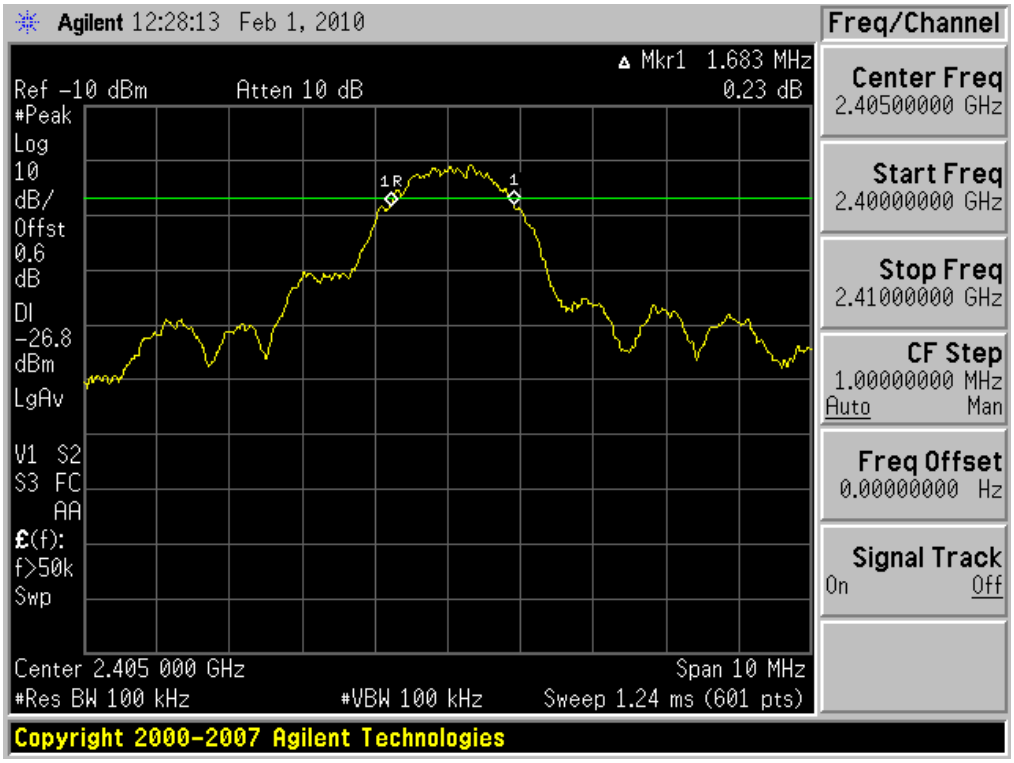
▣ TEST RESULTS

Conducted 6dB Bandwidth Measurements

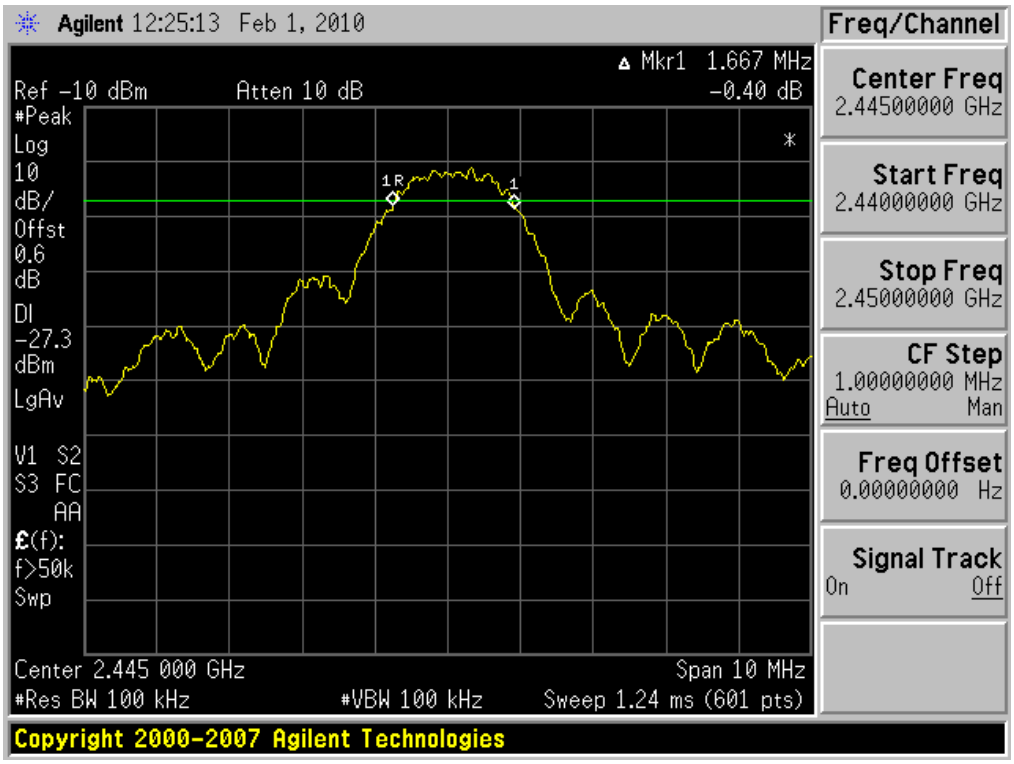
Frequency [MHz]	Channel No.	Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
2405	11	1.683	0.500	Pass
2445	19	1.667	0.500	Pass
2480	26	1.650	0.500	Pass

▣ RESULT PLOTS

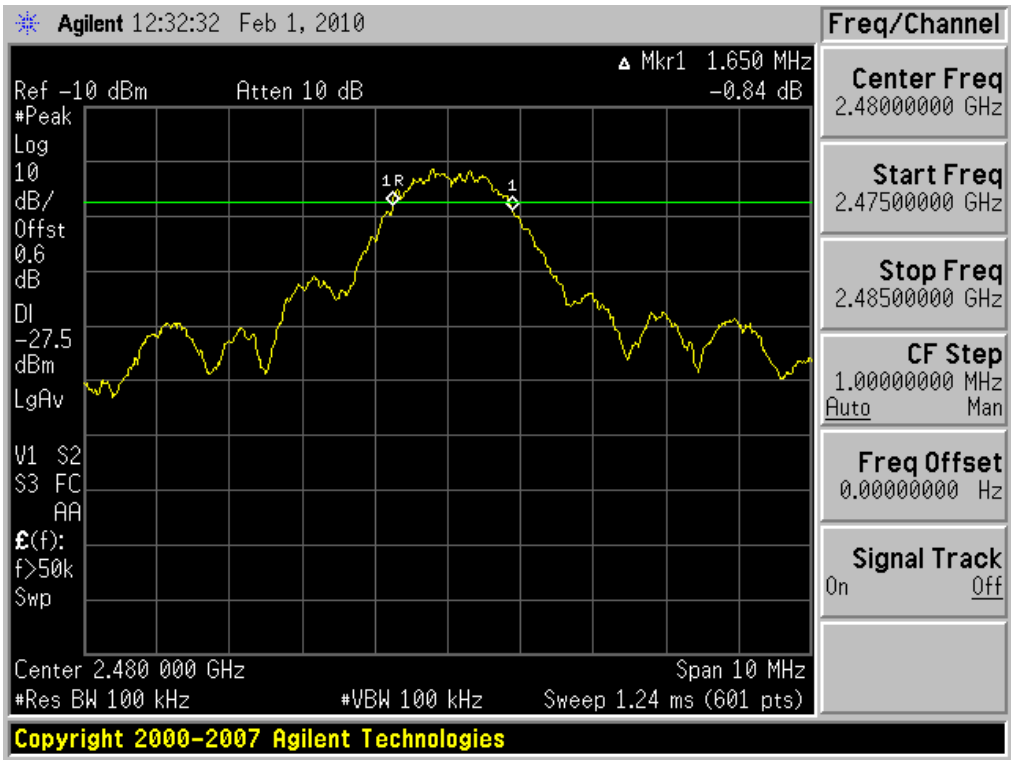
6dB Bandwidth plot (CH 11)



6dB Bandwidth plot (CH 18)



6dB Bandwidth plot (802.11b-CH 26)



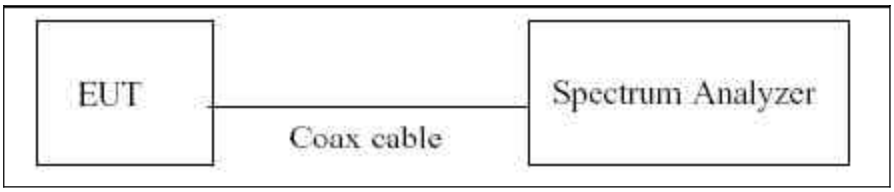
7.2 Output Power Measurement

Test Requirements and limit, §15.247(b)(3)

A transmitter antenna terminal of EUT is connected to the input of a Spectrum Analyzer. Measurement is made while the EUT is operating in transmission mode at the appropriate frequencies.

The maximum permissible conducted output power is 1 Watt.

▣ TEST CONFIGURATION



▣ TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer.
The Spectrum Analyzer is set to
RBW: 1 MHz
VBW: 1 MHz
SPAN: 5 MHz
Detector Mode = Peak

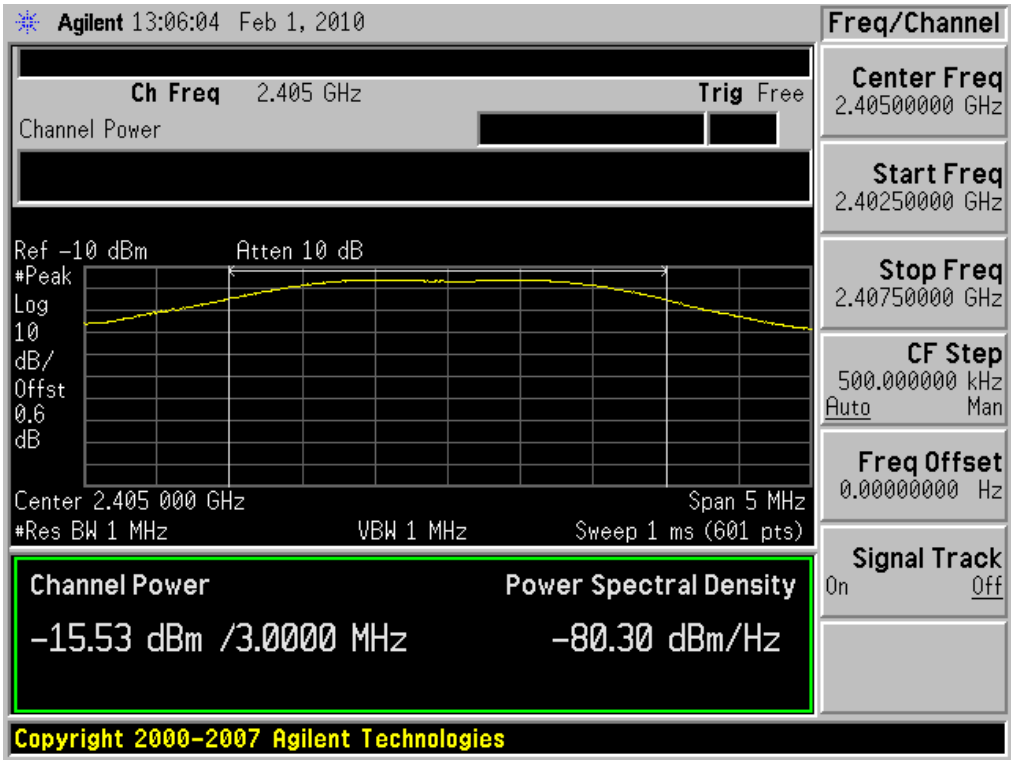
▣ TEST RESULTS

Conducted Output Power Measurements

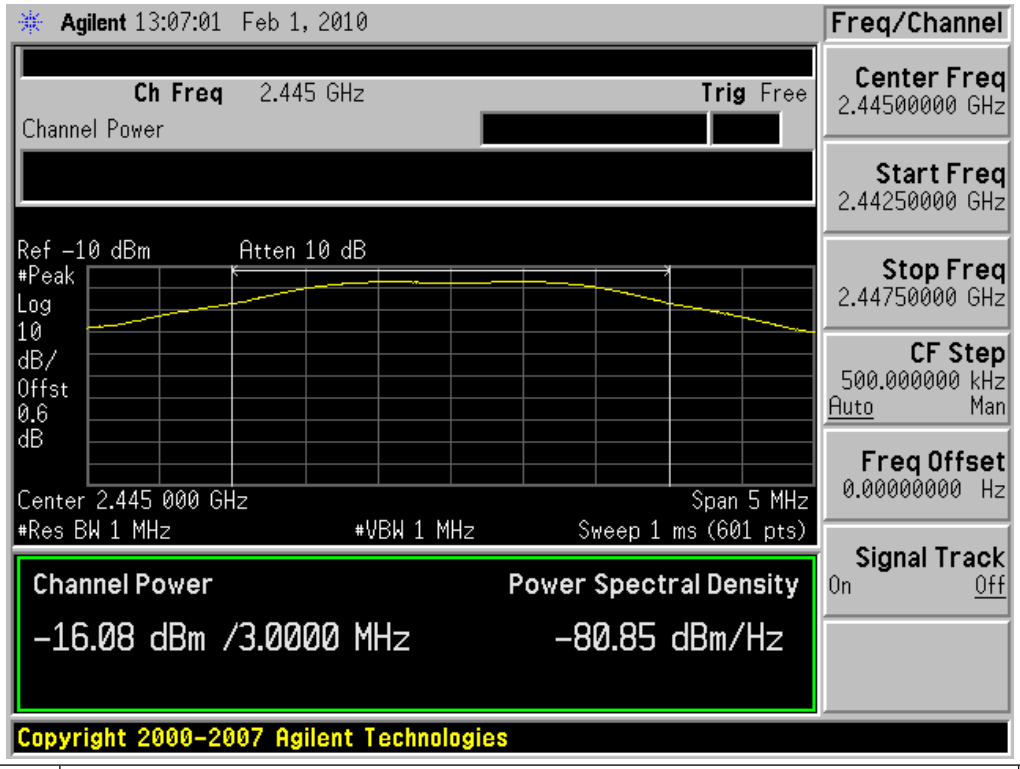
Frequency[MHz]	

▣ RESULT PLOTS

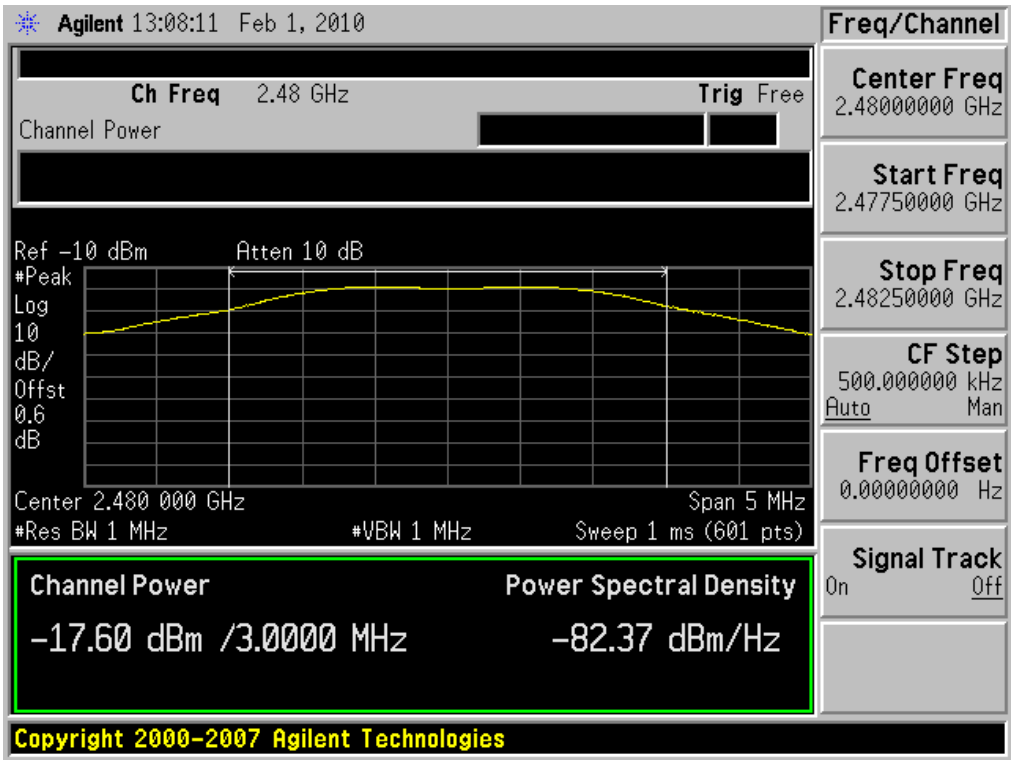
Conducted Output Power (CH 11)



Conducted Output Power (CH 18)



Conducted Output Power (CH 26)



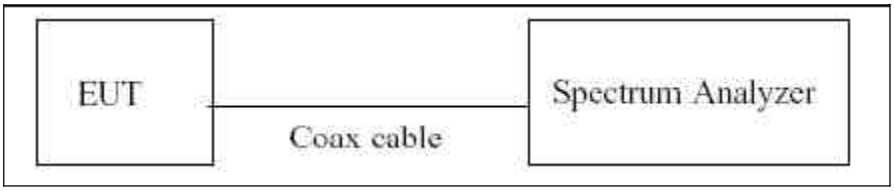
7.3 Power Spectral Density

Test Requirements and limit, §15.247(e)

The peak power density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating in transmission mode at the appropriate frequencies.

The maximum permissible power spectral density is 8 dBm in any 3 KHz band.

▣ TEST CONFIGURATION



▣ TEST PROCEDURE

The spectrum analyzer is set to :

1. Span = 300 kHz
2. RBW = 3 kHz
3. VBW = 3 kHz
4. Sweep = 100 sec
5. Detector Mode = Peak

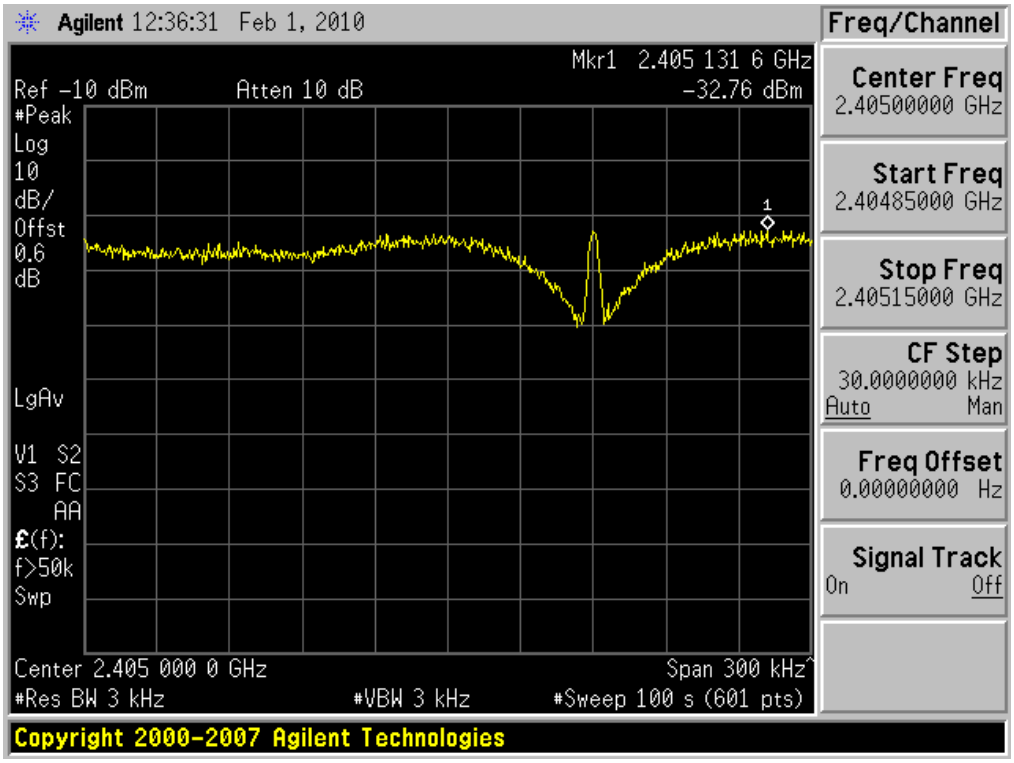
▣ TEST RESULTS

Conducted Power Density Measurements

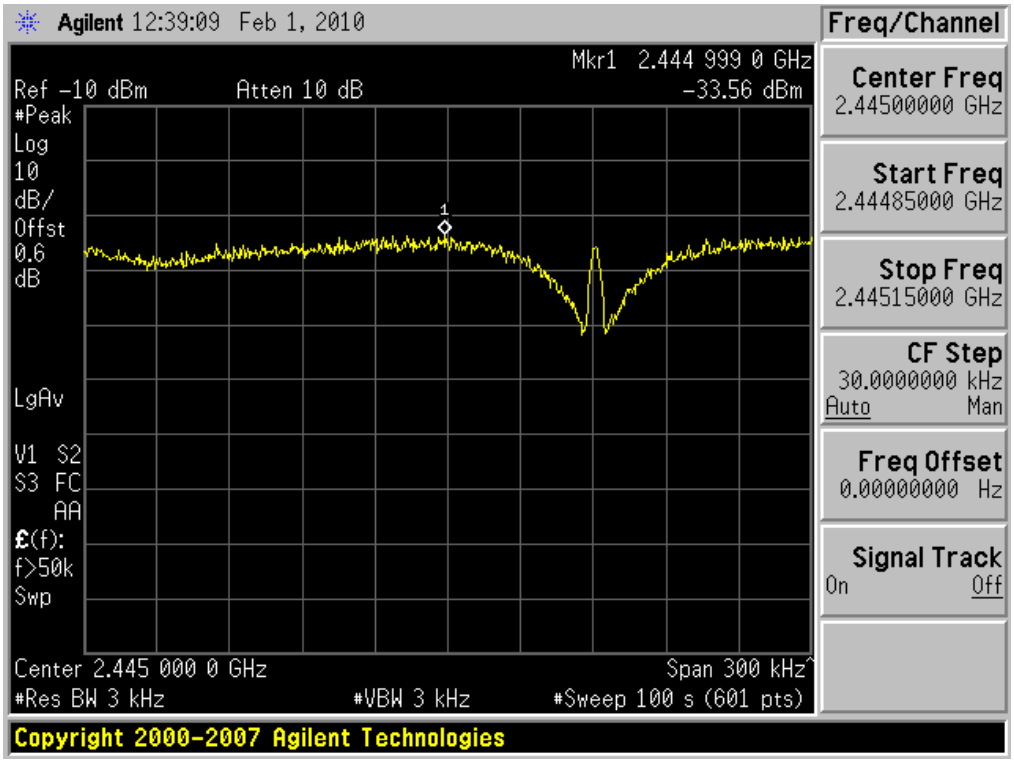
Frequency (MHz)	Channel No.	Measured Power Spectral Density [dBm]	Maximum Permissible Power Density [dBm / 3 KHz]	Pass/Fail
2405	11	-32.76	8.0	Pass
2445	19	-33.56	8.0	Pass
2480	26	-34.31	8.0	Pass

▣ RESULT PLOTS

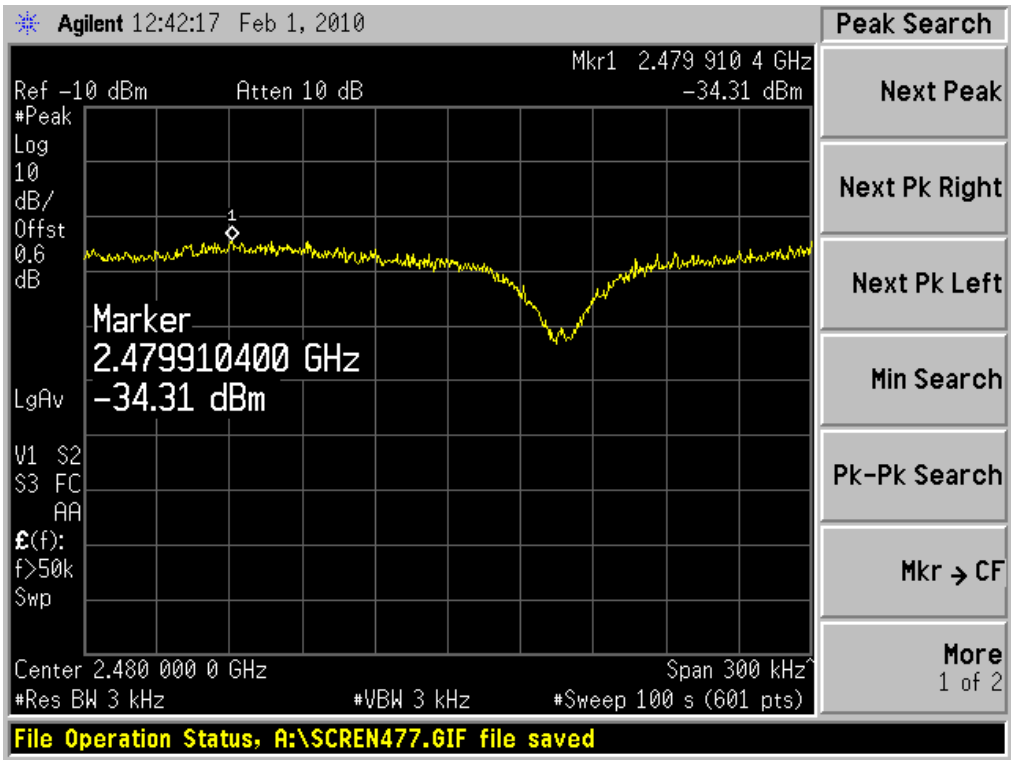
Power Spectral Density (CH 11)



Power Spectral Density (CH 18)



Power Spectral Density (CH 26)

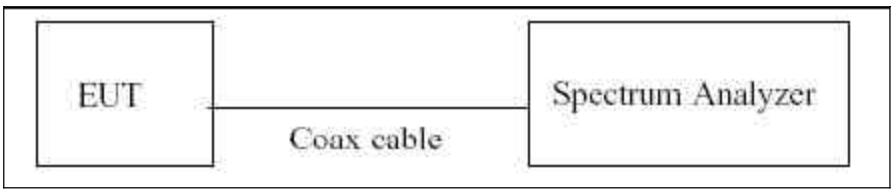


7.4 Out of Band Emissions at the Band Edge/ Conducted Spurious Emissions

Test Requirements and limit, §15.247(d)

§15.247 (c) 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 20dB 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 §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in§ 15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

▣ TEST CONFIGURATION



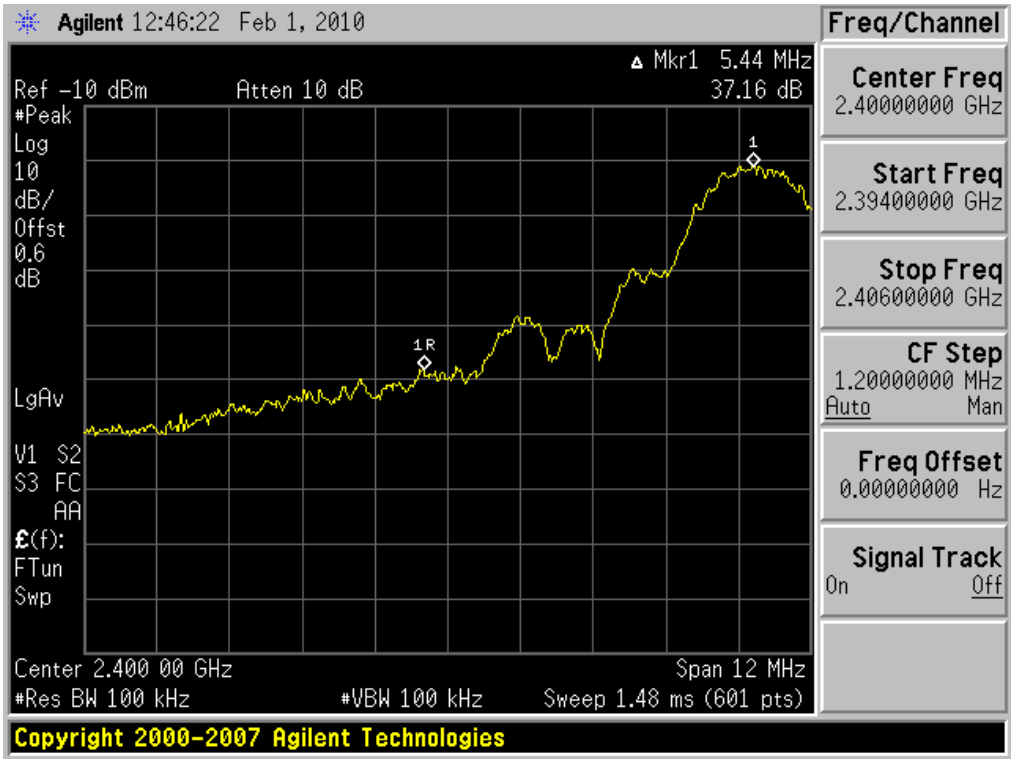
▣ TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.
Detector Mode is set to a peak detector Mode.

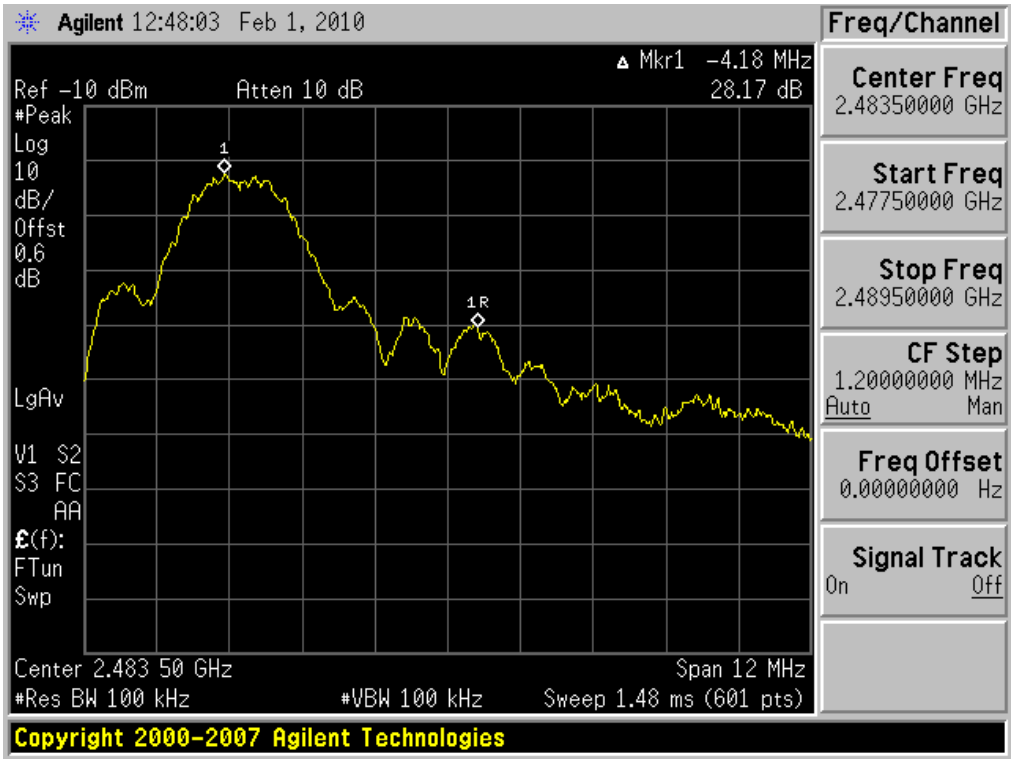
Measurements are made over the 30 MHz to 26 GHz range with the transmitter set to the lowest, middle, and highest channels.

▣ RESULT PLOTS

BandEdge (CH 11)

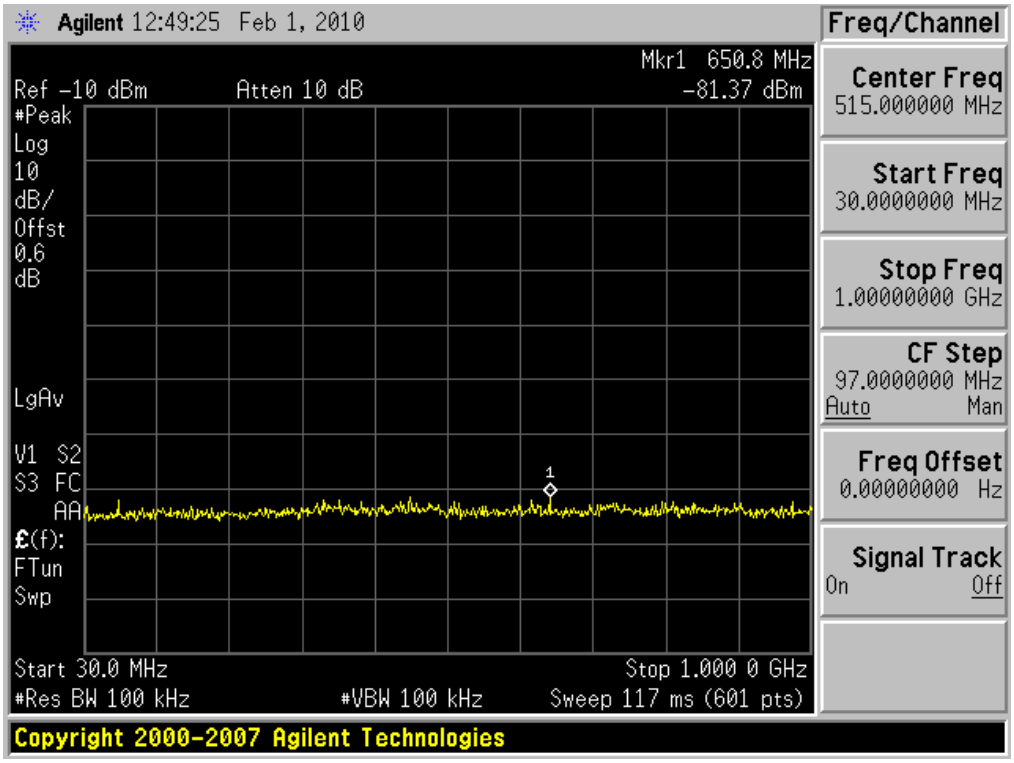


BandEdge (CH 26)

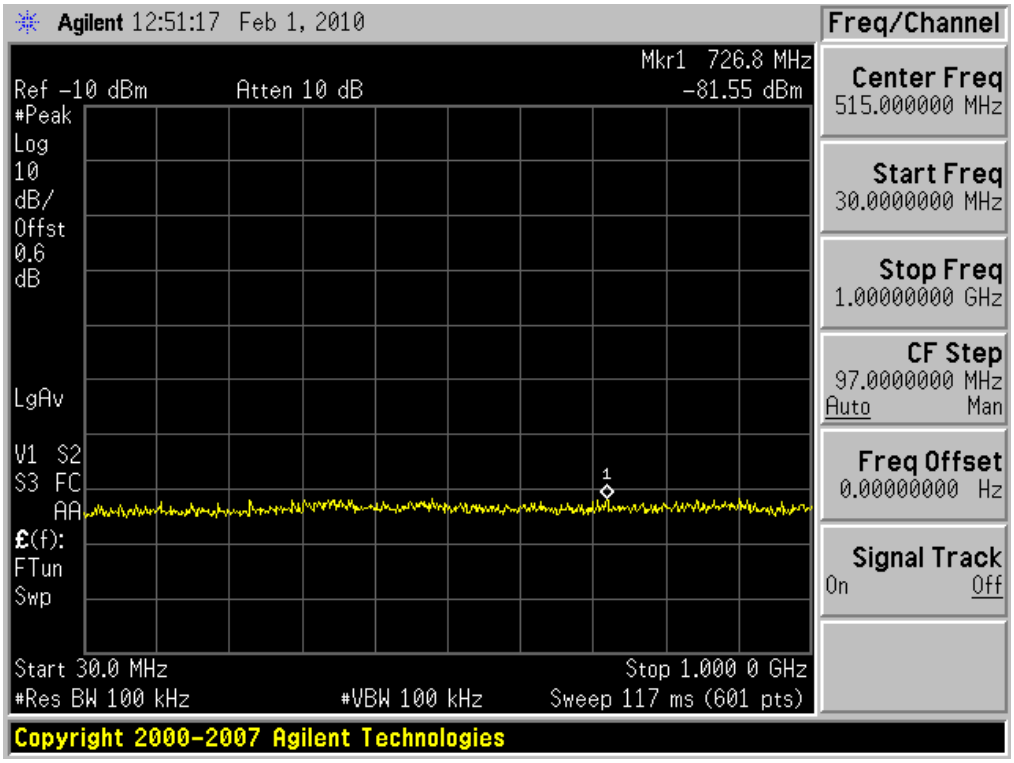


30 MHz ~ 1 GHz

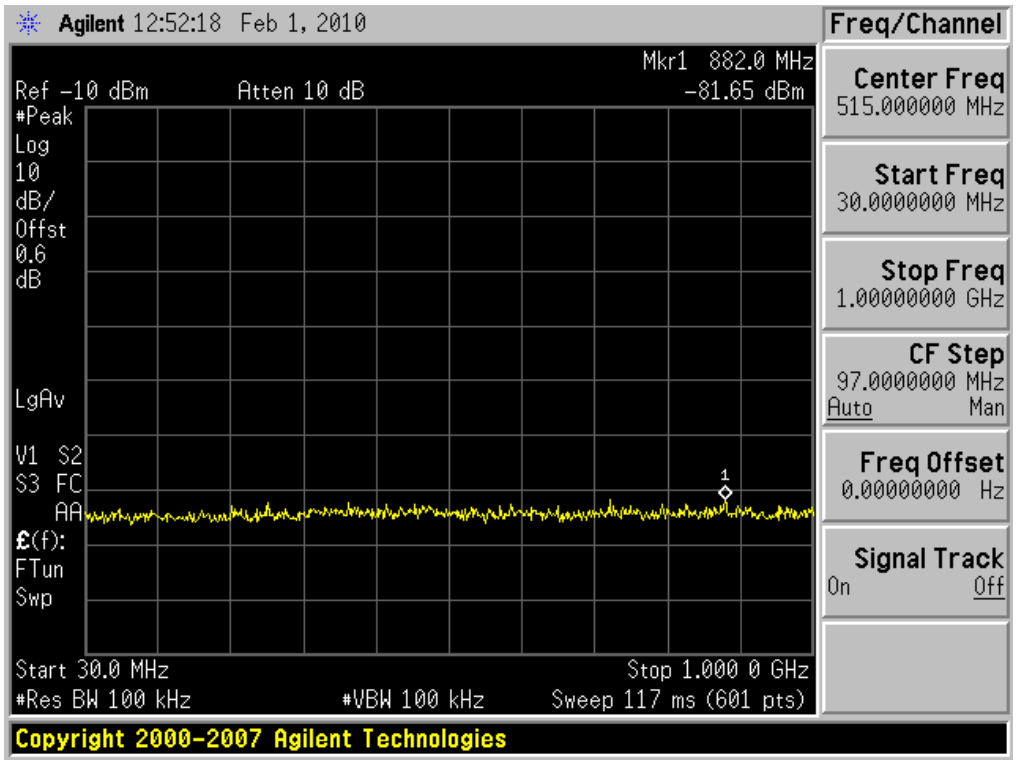
Conducted Spurious Emission (CH11)



Conducted Spurious Emission (CH19)

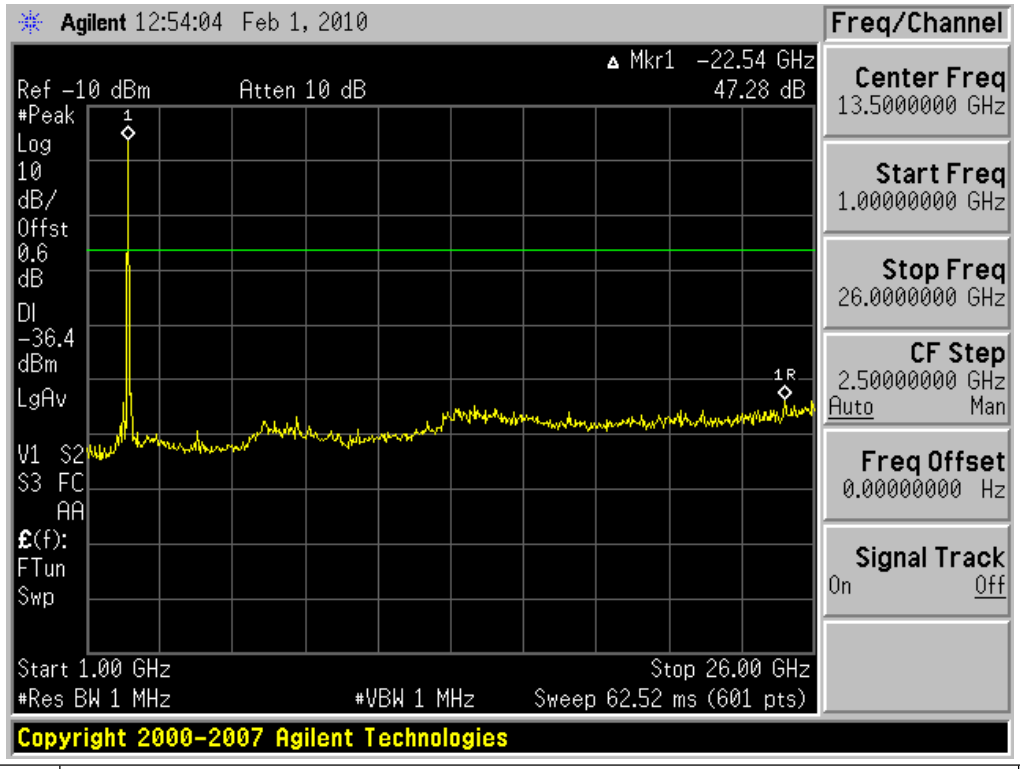


Conducted Spurious Emission (CH26)

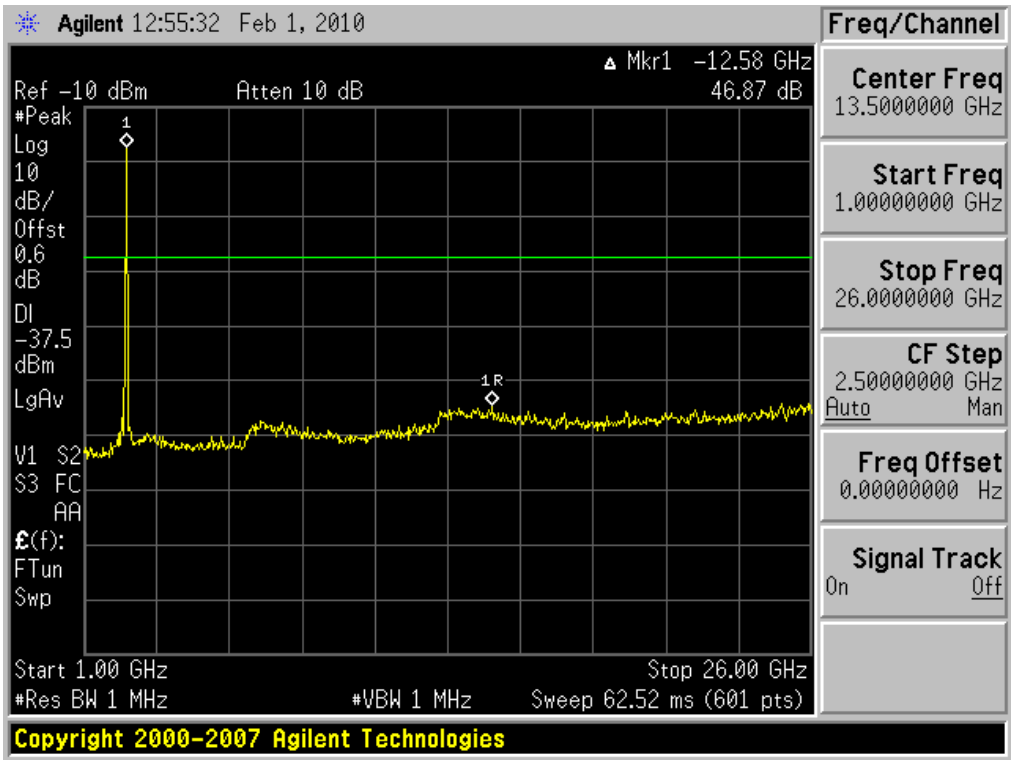


1 GHz ~ 26 GHz

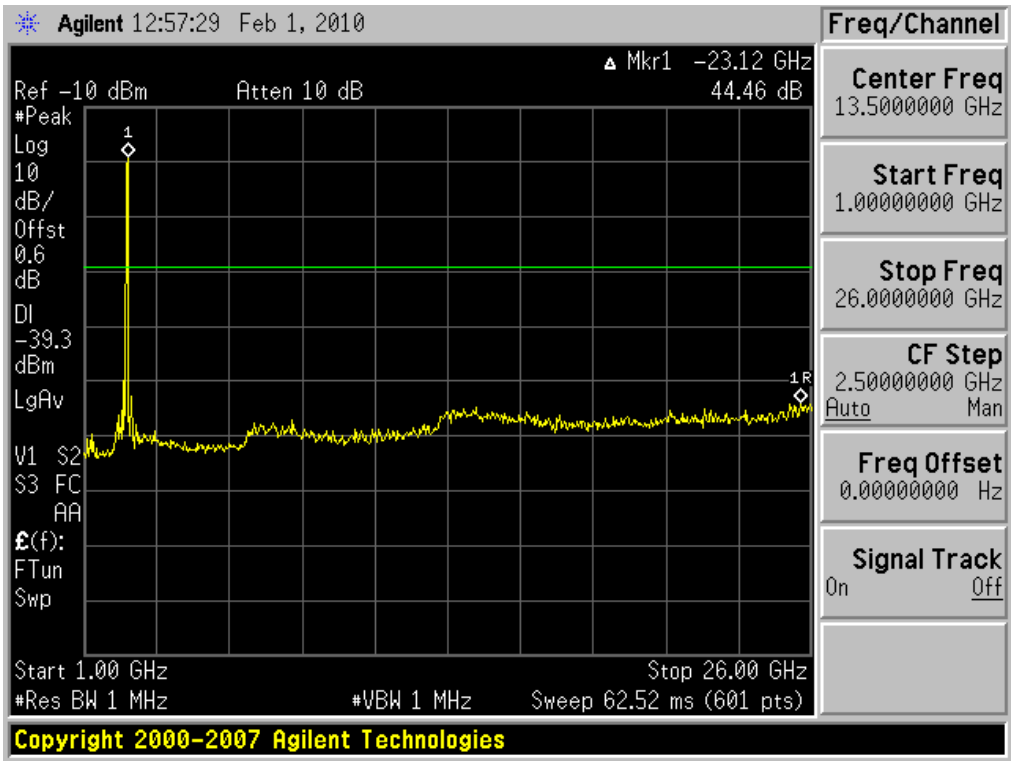
Conducted Spurious Emission (CH11)



Conducted Spurious Emission (CH19)



Conducted Spurious Emission (CH26)



7.5 Radiated Measurement.

7.5.1 Radiated Spurious Emissions.

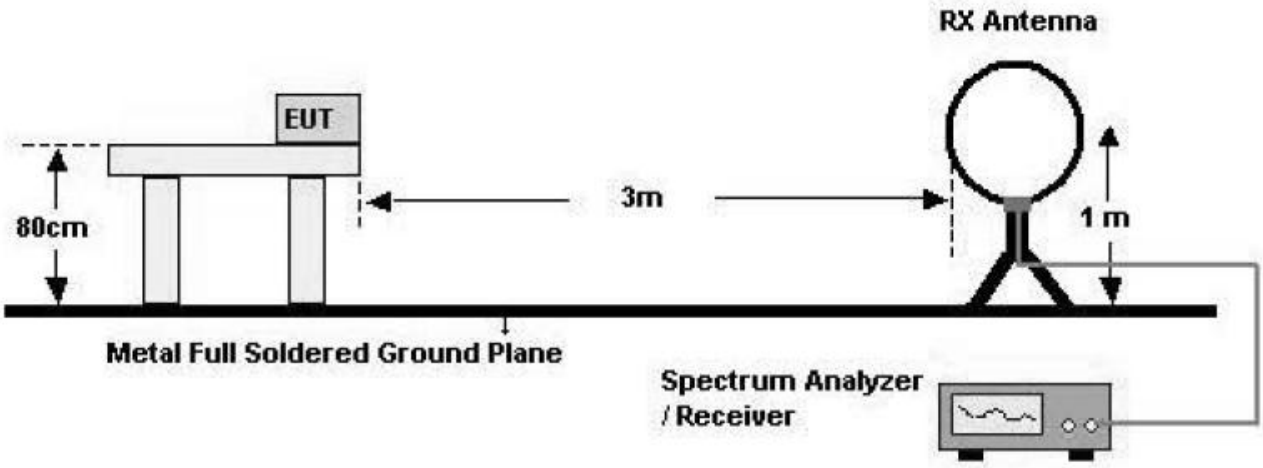
Test Requirements and limit, §15.247(d)

1. 20dBc in any 100kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed

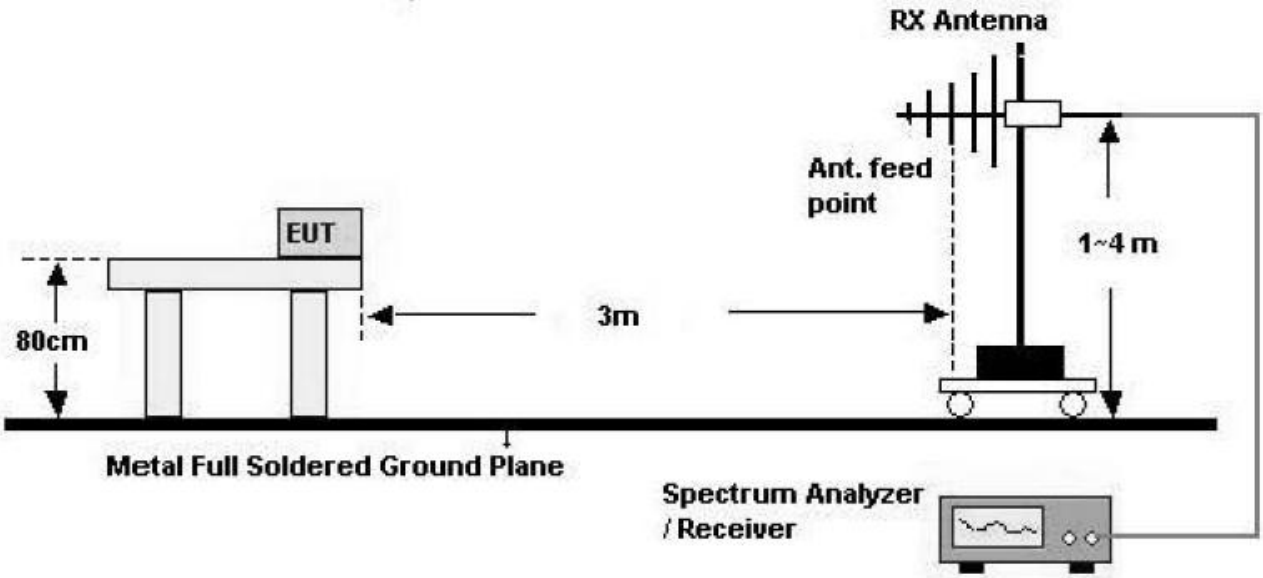
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

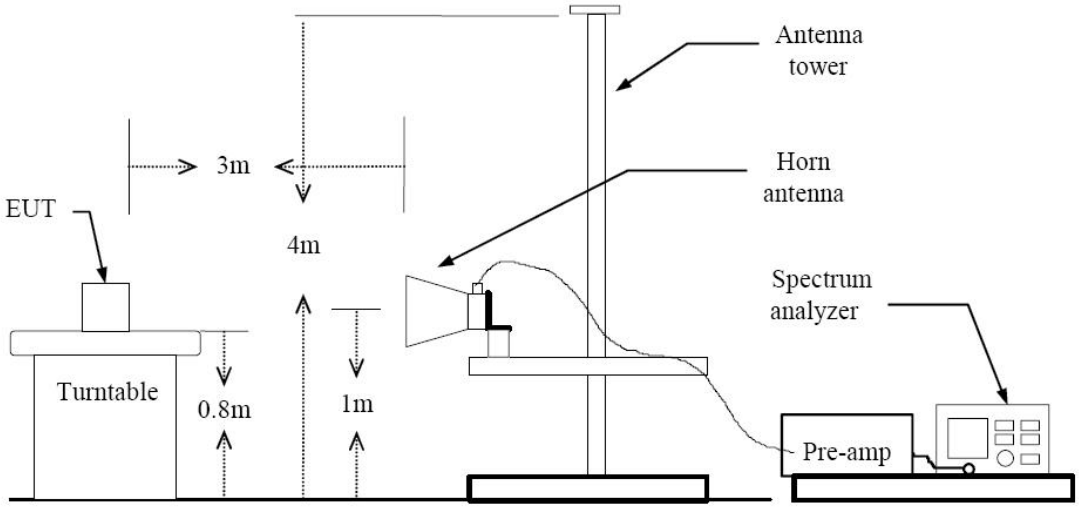
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8 m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.

TEST RESULTS

9 kHz – 30MHz

Operation Mode: Normal Link

The reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.

Notes:

1. Measuring frequencies from 9 kHz to the 30MHz.
2. Distance extrapolation factor = 40 log (specific distance / test distance) (dB)
3. Limit line = specific Limits (dBuV) + Distance extrapolation factor

TEST RESULTS

Below 1 GHz

Operation Mode: Normal Link

Frequency MHz	Reading dBuV	Ant. Factor dB/m	Cable Loss dB	ANT POL (H/V)	Total dBuV/m	Limit dBuV/m	Margin dB
82.38	20.9	8.4	1.0	V	30.32	40.0	9.7
431.58	14.6	16.1	2.2	H	32.93	46.0	13.1

Notes:

1. Measuring frequencies from 30 MHz to the 1 GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Quasi peak detector mode.

Above 1 GHz

Dipole antenna (5 dBi)

Operation Frequency : 2405 MHz

Channel No. : 11 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4810	43.59	10.13	V	53.72	74	20.28	PK
4810	35.03	10.13	V	45.16	54	8.84	AV
7215	38.63	10.72	V	49.35	74	24.65	PK
7215	26.46	10.72	V	37.18	54	16.82	AV
4810	41.61	10.13	H	51.74	74	22.26	PK
4810	34.36	10.13	H	44.49	54	9.51	AV
7215	38.61	10.72	H	49.33	74	24.67	PK
7215	26.54	10.72	H	37.26	54	16.74	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz 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 – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
   b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 10 Hz.

Dipole antenna (5 dBi)

Operation Frequency : 2445 MHz

Channel No. : 19 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4880	44.56	10.35	V	54.91	74	19.09	PK
4880	35.54	10.35	V	45.89	54	8.11	AV
7320	37.65	10.72	V	48.37	74	25.63	PK
7320	25.28	10.72	V	36.00	54	18.00	AV
4880	43.17	10.35	H	53.52	74	20.48	PK
4880	35.37	10.35	H	45.72	54	8.28	AV
7320	37.12	10.72	H	47.84	74	26.16	PK
7320	25.29	10.72	H	36.01	54	17.99	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions 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 – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
   b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 10 Hz.

Dipole antenna (5 dBi)

Operation Frequency : 2480 MHz

Channel No. : 26 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4960	43.92	10.60	V	54.52	74	19.48	PK
4960	34.75	10.60	V	45.35	54	8.65	AV
7440	38.99	10.72	V	49.71	74	24.29	PK
7440	26.33	10.72	V	37.05	54	16.95	AV
4960	42.87	10.60	H	53.47	74	20.53	PK
4960	34.46	10.60	H	45.06	54	8.94	AV
7440	38.46	10.72	H	49.18	74	24.82	PK
7440	26.35	10.72	H	37.07	54	16.93	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz 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 – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
   b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 10 Hz.

7.5.2 Radiated Restricted Band Edge Measurements

Test Requirements and limit, §15.247(d)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in section 15.209(a) (See section 15.205(c)).

Dipole antenna (5 dBi)

Operating Frequency	2405 MHz, 2480 MHz
Channel No.	11 Ch, 26 Ch

Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
2347.50	41.58	5.88	H	47.46	74	26.54	PK
2347.50	35.48	5.88	H	41.36	54	12.64	AV
2358.70	42.06	5.95	V	48.01	74	25.99	PK
2358.70	35.92	5.95	V	41.87	54	12.13	AV
2484.80	42.87	6.69	H	49.56	74	24.44	PK
2484.80	36.10	6.69	H	42.79	54	11.21	AV
2486.70	42.65	6.70	V	49.35	74	24.65	PK
2486.70	35.94	6.70	V	42.64	54	11.36	AV

Notes:

1. Spectrum setting:
   a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
   b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 10 Hz.

8. LIST OF TEST EQUIPMENT

Manufacturer	Model / Equipment	Cal Interval	Calibration Due	Serial No.
Rohde & Schwarz	ESH2-Z5/ LISN	Annual	04/10/2010	861741/013
Rohde & Schwarz	ESH3-Z6/ LISN	Annual	06/13/2010	100329
Schwarzbeck	VULB 9160/ TRILOG Antenna	Biennial	12/18/2010	9160-3150
HD	MA240/ Antenna Position Tower	N/A	N/A	556
EMCO	1050/ Turn Table	N/A	N/A	114
HD GmbH	HD 100/ Controller	N/A	N/A	13
HD GmbH	KMS 560/ SlideBar	N/A	N/A	12
Rohde & Schwarz	ESH3-Z2/ PULSE LIMITER	Annual	10/30/2010	375.8810.352
MITEQ	AMF-60-0010 1800-35-20P/AMP	Annual	05/20/2010	1200937
Schwarzbeck	BBHA 9120D/ Horn Antenna	Biennial	03/26/2010	147
Rohde & Schwarz	FSP30 / Spectrum Analyzer	Annual	07/31/2010	839117/011
Agilent	E4440A / Spectrum Analyzer	Annual	12/23/2010	US45303008
Agilent	E4416A /Power Meter	Annual	01/14/2011	GB41291412
Wainwright Instrument	WHF3.3/18G-10EF / High Pass Filter	Annual	06/29/2010	1
Hewlett Packard	11636B/Power Divider	Annual	12/24/2010	11377
DIGITAL	EP-3010 /DC POWER SUPPLY	Annual	01/08/2011	3110117
ITECH	IT6720 / DC POWER SUPPLY	Annual	12/01/2010	010002156287001199
TESCOM	TC-3000A / BLUETOOTH TESTER	Annual	01/11/2011	3000A490112
Rohde & Schwarz	CBT / BLUETOOTH TESTER	Annual	06/22/2010	100422