



TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: Samsung WEP450

To: FCC Part 15.247: 2006 (Subpart C)
RSS-GEN Issue 2 June 2007 and RSS-210 Issue 7 June 2007

Test Report Serial No:
RFI/RPT2/RP73376JD07A

Supersedes Test Report Serial No:
RFI/RPT1/RP73376JD07A

This Test Report Is Issued Under The Authority Of Steve Flocks, Service Leader:		 pp Brian Watson
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Registered in England and Wales. Company number:2117901

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1. Customer Information

Company Name:	GN Netcom A/S
Address:	Lautrupbjerg 7 2750 Ballerup Denmark

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2. Equipment Under Test (EUT)

The following information (with the exception of the date of receipt) has been supplied by the customer:

2.1. Identification of Equipment Under Test (EUT)

Description:	Bluetooth Headset
Brand Name:	Samsung
Model Name or Number:	WEP450
Serial Number:	RF4
FCC ID Number:	A3LWEP450
Date received at RFI:	15 May 2008

Description:	Bluetooth Headset
Brand Name:	Samsung
Model Name or Number:	WEP450
Serial Number:	RAD2
FCC ID Number:	A3LWEP450
Date received at RFI:	15 May 2008

Description:	Bluetooth Headset
Brand Name:	Samsung
Model Name or Number:	WEP450
Serial Number:	Recorded as sample D (no serial number marked or stated)
FCC ID Number:	A3LWEP450
Date received at RFI:	19 August 2008

Description:	European Type 2 Pin AC Mains Charger
Brand Name:	Samsung
Model Name or Number:	ATADD10EBE 100-240V
Serial Number:	DK40329OS/3-G
Cable Length and Type:	2.0 m / multicore
Connected to Port	Charger Port

2.2. Description of EUT

The equipment under test was a Bluetooth headset.

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2.3. Modifications Incorporated in the EUT

During the course of testing the EUT was not modified.

2.4. Support Equipment

No support equipment was used to exercise the EUT during testing:

2.5. Additional Information Related to Testing

Power Supply Requirement:	V-Nom	3.7V	V-Min	3.0V	V-Max	4.2V
Tested Temperature Range:	T-Min	-20°C		T-Max	55°C	
Channel Spacing:	1000 (kHz)					
Modulation Type:	GFSK, π/4-DQPSK and + 8DPSK					
Data Rate:	1, 2, 3 Mbit/s					
Transmit Frequency Range:	2402 MHz to 2480 MHz					
Transmit Channels Tested:	Channel ID		Channel Number		Channel Frequency (MHz)	
	Bottom		0		2402	
	Middle		39		2441	
	Top		78		2480	
Receive Frequency Range:	2402 MHz to 2480 MHz					
Receive Channels Tested:	Channel ID		Channel Number		Channel Frequency (MHz)	
	Bottom		0		2402	
	Middle		39		2441	
	Top		78		2480	

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3. Test Specification, Methods and Procedures

3.1. Test Specification(s)

Reference:	FCC Part 15.247: 2006 Subpart C
Title:	Code of Federal Regulations, Part 15.247 (47CFR15) (Intentional Radiators operating within the band 2400 MHz to 2483.5 MHz)

Reference:	RSS-GEN Issue 2 June 2007
Title:	General Requirements and Information for the Certification of Radiocommunication Equipment

Reference:	RSS-210 Issue 7 June 2007
Title:	Low-power License-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment

3.2. Methods and Procedures

The methods and procedures used were as detailed in:

ANSI C63.2 (1996)

Title: American National Standard for Instrumentation - Electromagnetic Noise and Field Strength Instrumentation, 10 Hz to 40 GHz.

ANSI C63.4 (2003)

Title: American National Standard Methods of Measurement of Electromagnetic Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

ANSI C63.5 (1988)

Title: American National Standard for the Calibration of antennas used for Radiated Emission measurements in Electromagnetic Interference (EMI) control.

ANSI C63.7 (1988)

Title: American National Standard Guide for Construction of Open Area Test Sites for performing Radiated Emission Measurements.

CISPR 16-1: (1999)

Title: Specification For Radio Disturbance and Immunity Measuring Apparatus and Methods. Part 1: Radio Disturbance and Immunity Measuring Apparatus.

DA00-705 (2000)

Title: Filing and Frequency Measurement Guidelines for Frequency Hopping Spread Spectrum Systems.

3.3. Definition of Measurement Equipment

The measurement equipment used complied with the requirements of the standards referenced in the methods & procedures section above. Appendix 1 contains a list of the test equipment used.

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4. Deviations from the Test Specification

There were no deviations from the test specification.

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5. Operation and Configuration of the EUT during Testing

5.1. Operating Modes

The EUT was tested in the following operating modes, unless otherwise stated:

- Preliminary tests were performed with the EUT transmitting in Basic Rate and EDR modes. EDR Mode was found to have a wider bandwidth and higher power. All further transmitter testing was performed with the EUT in EDR mode as this was proved to be the worst case.
- AC conducted emissions testing was performed in RX/idle mode only as inserting the charger causes the EUT to stop transmitting and turn off.

5.2. Configuration and Peripherals

The EUT was tested in the following configuration:

- In Bluetooth test mode controlled by a Bluetooth tester.

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6. Summary of Test Results

Range of Measurements	FCC Reference	IC Reference	Port Type	Result
Idle Mode AC Conducted Emissions (150 kHz to 30 MHz)	C.F.R. 47 FCC Part 15: 2006 Section 15.107	RSS-Gen 7.2.2	AC Mains	Complied
Idle Mode Radiated Spurious Emissions	C.F.R. 47 FCC Part 15: 2006 Section 15.109	RSS-Gen 4.10 RSS-Gen 6.0	Antenna	Complied
Transmitter 20 dB Bandwidth	C.F.R. 47 FCC Part 15: 2006 Section 15.247(a)(1)	RSS-Gen 4.6.1	Antenna	Complied
Transmitter Carrier Frequency Separation	C.F.R. 47 FCC Part 15: 2006 Section 15.247(a)(1)	RSS-210 A8.1(b)	Antenna	Complied
Transmitter Average Time of Occupancy	C.F.R. 47 FCC Part 15: 2006 Section 15.247(a)(1)(iii)	RSS-210 A8.1(d)	Antenna	Complied
Transmitter Maximum Peak Output Power	C.F.R. 47 FCC Part 15: 2006 Section 15.247(b)(1)	RSS-Gen 4.8 RSS-210 A8.4(2)	Antenna	Complied
Transmitter Radiated Emissions	C.F.R. 47 FCC Part 15: 2006 Sections 15.247(d) & 15.209(a)	RSS-Gen 4.9 RSS-210 A8.5	Antenna	Complied
Transmitter Band Edge Radiated Emissions	C.F.R. 47 FCC Part 15: 2006 Sections 15.247(d) & 15.209(a)	RSS-Gen 2.2 RSS-Gen 4.9 RSS-210 A8.5	Antenna	Complied

6.1. Location of Tests

All the measurements described in this report were performed at the premises of RFI Global Services Ltd, Ewhurst Park, Ramsdell, Basingstoke, Hampshire, RG26 5RQ.

6.2. Site Registration Numbers

- FCC: 90895
- Industry Canada: 3485

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7. Measurements, Examinations and Derived Results

7.1. General Comments

This section contains test results only.

Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to section 8 for details of measurement uncertainties.

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7.2. Test Results**7.2.1. Idle Mode AC Conducted Spurious Emissions: Section 15.107**

Ambient Temperature: 17°C

Relative Humidity: 43%

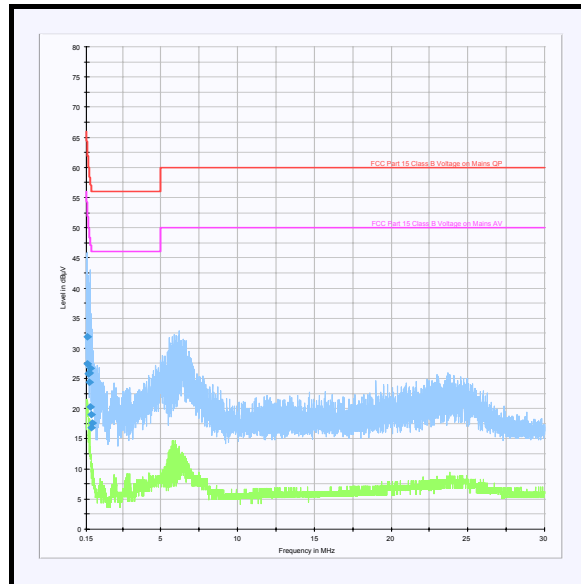
Quasi-Peak Detector Measurements on Live and Neutral Lines

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.186000	Live	31.9	32.3	64.2	Complied
0.246000	Neutral	27.5	34.4	61.9	Complied
0.258000	Neutral	25.7	35.8	61.5	Complied
0.314000	Neutral	24.4	35.5	59.9	Complied
0.374000	Live	25.9	32.5	58.4	Complied
0.386000	Live	26.6	31.5	58.1	Complied
0.422000	Live	20.3	37.1	57.4	Complied
0.442000	Live	19.0	38.0	57.0	Complied
0.486000	Live	16.8	39.4	56.2	Complied
0.506000	Live	17.6	38.4	56.0	Complied

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Idle Mode Conducted Emissions (Continued)

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

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7.2.2. Idle Mode Radiated Spurious Emissions: Section 15.109

Ambient Temperature: 15°C

Relative Humidity: 44%

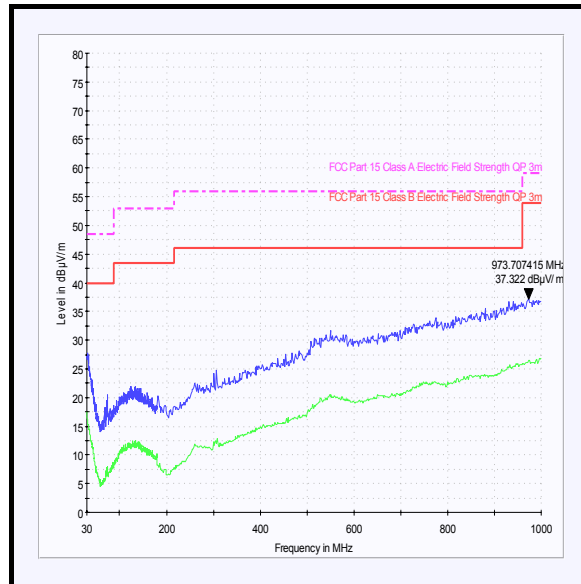
Results:**Electric Field Strength Measurements (Frequency Range: 30 MHz to 1000 MHz)**

Frequency (MHz)	Antenna Polarity	Quasi-Peak Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
973.707	V	37.3	54.0	16.7	Complied

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Idle Mode Radiated Spurious Emissions (Continued)

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

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7.2.3. Idle Mode Radiated Spurious Emissions: Section 15.109 (Continued)**Electric Field Strength Measurements (Frequency Range: 1 GHz to 12.75 GHz)****Highest Peak Level:**

Frequency (GHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
12.228457	V	38.9	5.1	44.0	54.0	10.0	Complied

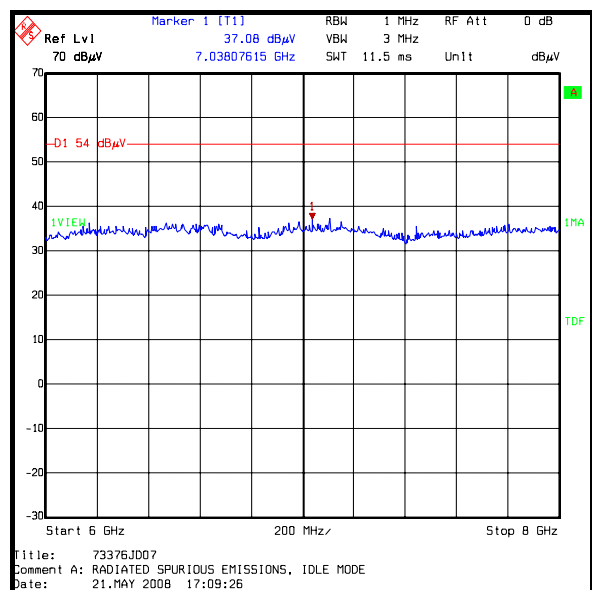
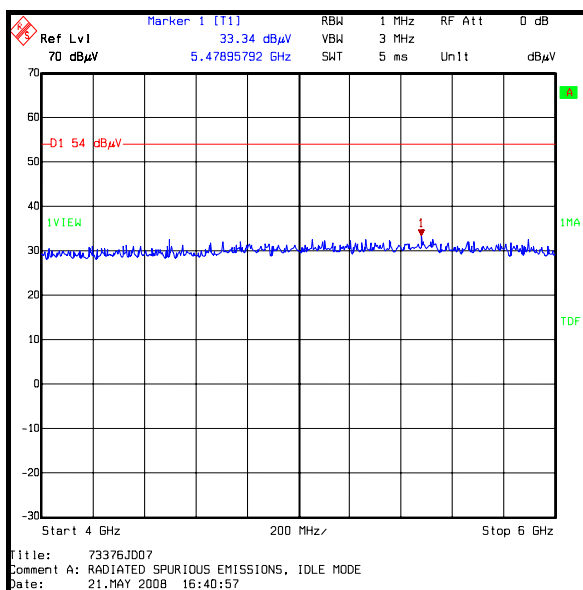
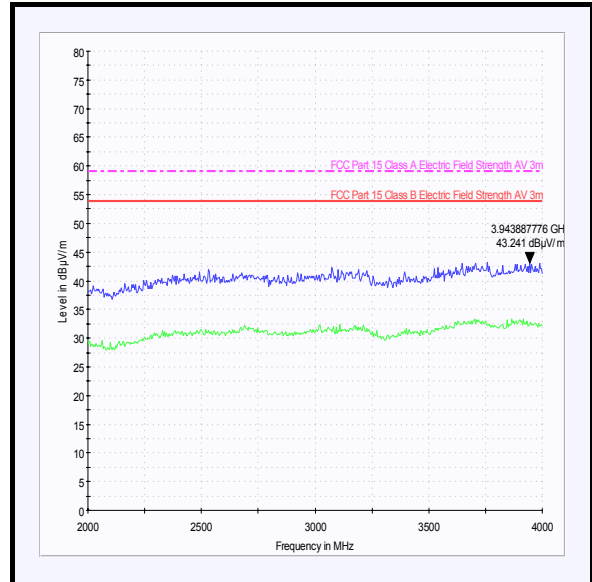
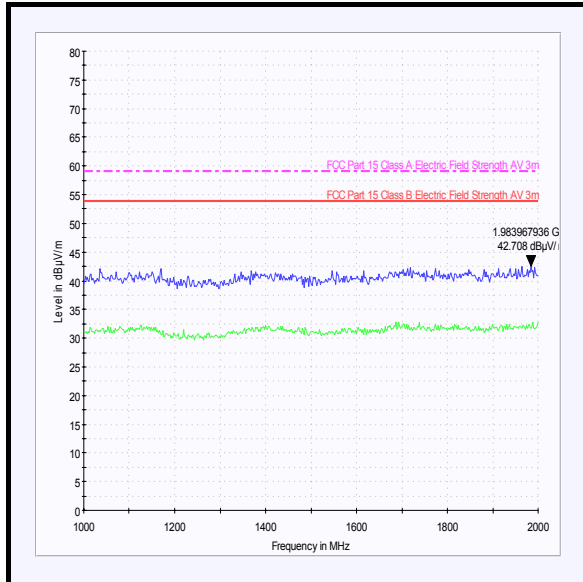
Note(s):

1. **Note: No spurious emissions were detected above the noise floor of the measuring receiver; therefore, the highest peak noise floor reading of the measuring receiver was recorded as shown in the table above.*
***Note: The peak level was compared to the average limit as opposed to being compared to the peak limit because this is the more onerous limit.*

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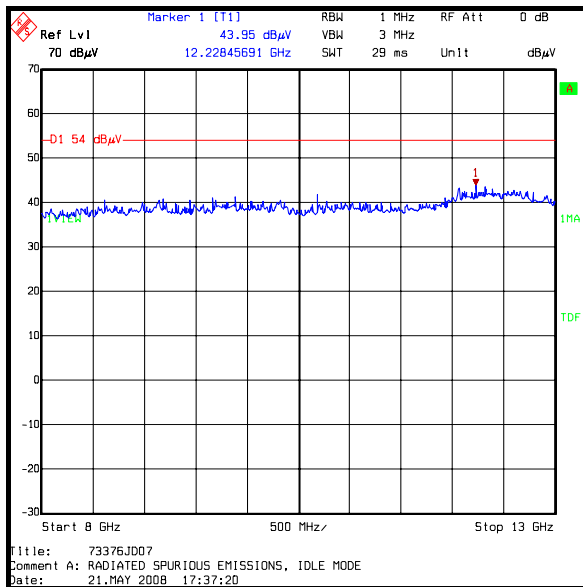
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Idle Mode Radiated Spurious Emissions (Continued)

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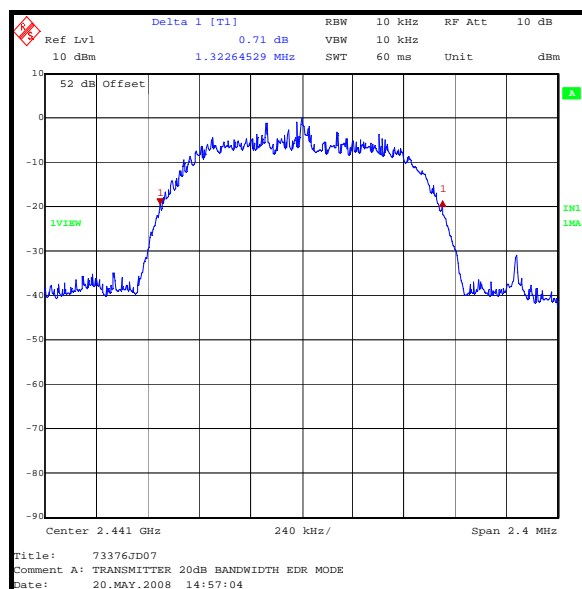
7.2.4. Transmitter 20 dB Bandwidth: Section 15.247(a)(1)

Ambient Temperature: 18°C

Relative Humidity: 37%

Results: EDR Mode

Transmitter 20 dB Bandwidth (kHz)	Limit (kHz)
1322.645	None specified



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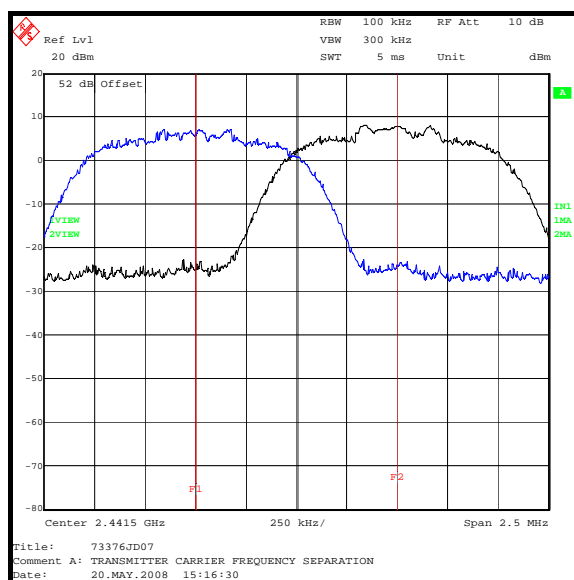
7.2.5. Transmitter Carrier Frequency Separation: Section 15.247(a)(1)

Ambient Temperature: 18°C

Relative Humidity: 37%

Results: EDR Mode

Transmitter Carrier Frequency Separation (kHz)	Limit ($>^{2/3}$ of 20 dB BW) (kHz)	Margin (kHz)	Result
1000	881.763	118.237	Complied



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7.2.6. Transmitter Average Time of Occupancy: Section 15.247(a)(1)(iii)

Ambient Temperature: 18°C

Relative Humidity: 37%

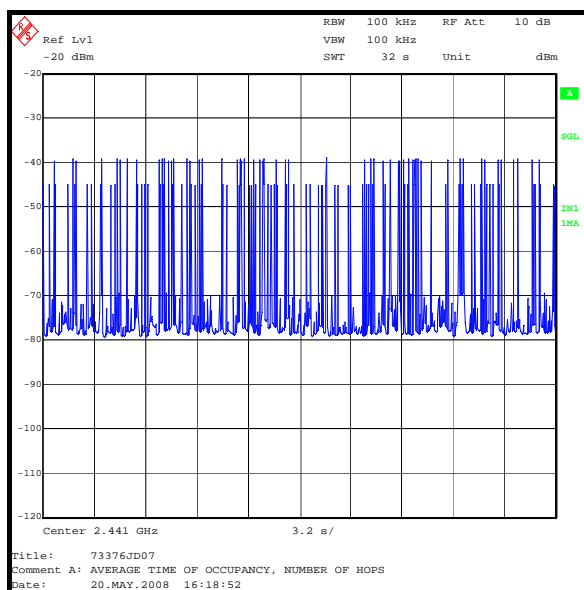
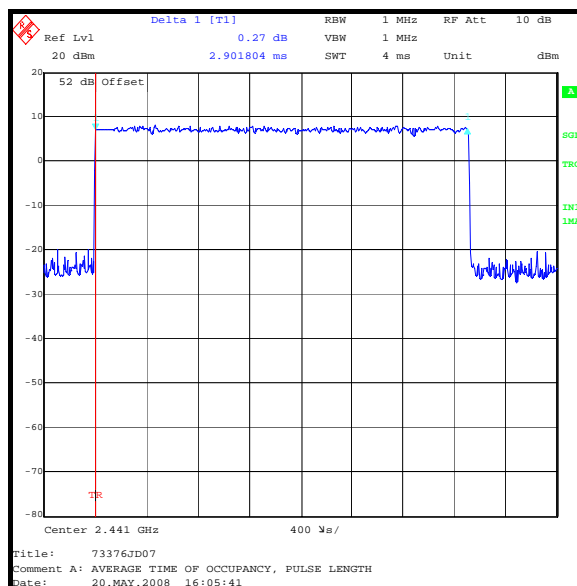
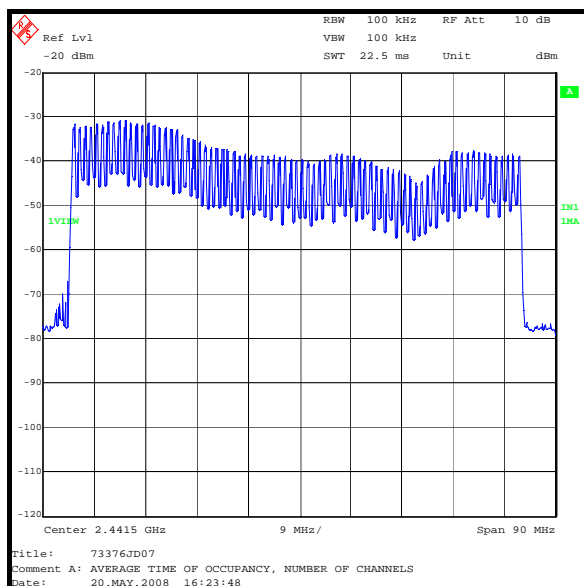
Results:

Emission Width (μs)	Number of Hops in 31.6 Seconds	Average Time of Occupancy (s)	Limit (s)	Margin (s)	Result
2901.804	65	0.188	0.4	0.212	Complied

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Transmitter Average Time of Occupancy – Continued

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7.2.7. Transmitter Maximum Peak Output Power: (EIRP) Section 15.247(b)(1)

Ambient Temperature: 24°C

Relative Humidity: 45%

Results:**Battery Powered Devices EDR Mode**

Channel	EIRP (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	-0.5	21.0	21.5	Complied
Middle	1.0	21.0	20.0	Complied
Top	0.1	21.0	20.9	Complied

Note(s):

1. These tests were performed radiated; therefore the EUT antenna gain is encompassed in the final result and not measurable.

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7.2.8. Transmitter Radiated Emissions: Section 15.247(d) and 15.209(a)

Ambient Temperature: 15°C

Relative Humidity: 44%

Tests were performed using the test methods detailed in ANSI C63.4 Section 8 and Public Notice DA 00-705 (March 30, 2000).

Results:**Electric Field Strength Measurements: 30 MHz to 1000 MHz****Top Channel**

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
932.635	V	37.3	54.0	16.7	Complied

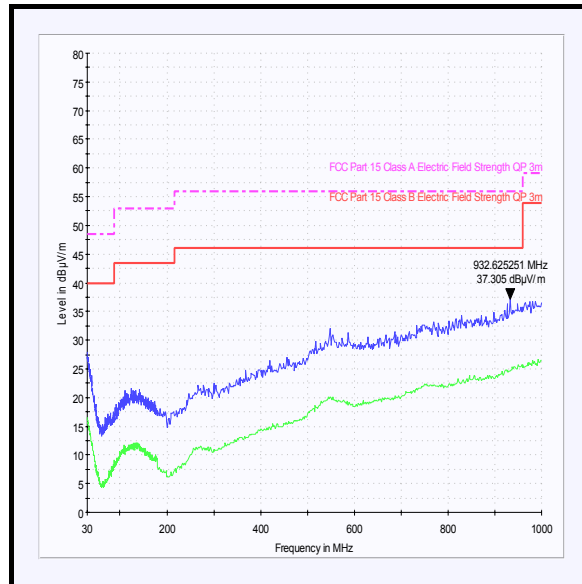
Note(s):

- *Note: No spurious emissions were detected above the noise floor of the measuring receiver; therefore, the highest peak noise floor reading of the measuring receiver was recorded as shown in the table above.
**Note: The peak level was compared to the average limit as opposed to being compared to the peak limit because this is the more onerous limit.*
- All emissions shown on the plot were investigated and found to be noise floor or ambient..*

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Transmitter Radiated Emissions (Continued)

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

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Transmitter Radiated Emissions: Section 15.247(d) and 15.209(a) (Continued)**Electric Field Strength Measurements (Frequency Range: 1 GHz to 26.5 GHz)**
(Emissions Occurring in the Restricted Bands)**Highest Peak Level: Bottom Channel**

Frequency (GHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
4.803739	V	48.6	10.2	58.8	74.0	15.2	Complied

Highest Average Level: Bottom Channel

Frequency (GHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
4.803739	V	38.0	10.2	48.2	54.0	5.8	Complied

Highest Peak Level: Middle Channel

Frequency (GHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
4.881739	V	49.6	10.7	60.3	74.0	13.7	Complied
7.322218	V	35.3	19.6	54.9	74.0	19.1	Complied

Highest Average Level: Middle Channel

Frequency (GHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
4.881739	V	39.7	10.7	50.4	54.0	3.6	Complied
7.322218	V	24.1	19.6	43.7	54.0	10.3	Complied

Highest Peak Level: Top Channel

Frequency (GHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
4959.659	V	44.7	10.5	55.2	74.0	18.8	Complied
7.439246	V	31.1	19.9	51.0	74.0	23.0	Complied

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Transmitter Radiated Emissions: Section 15.247(d) and 15.209(a) (Continued)**Highest Average Level: Top Channel**

Frequency (GHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
4.959659	V	34.9	10.5	45.4	54.0	8.6	Complied
7.439246	V	20.6	19.9	40.5	54.0	13.5	Complied

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Transmitter Radiated Emissions: Section 15.247(d) and 15.209(a) (Continued)**Highest Peak Level: Hopping Mode**

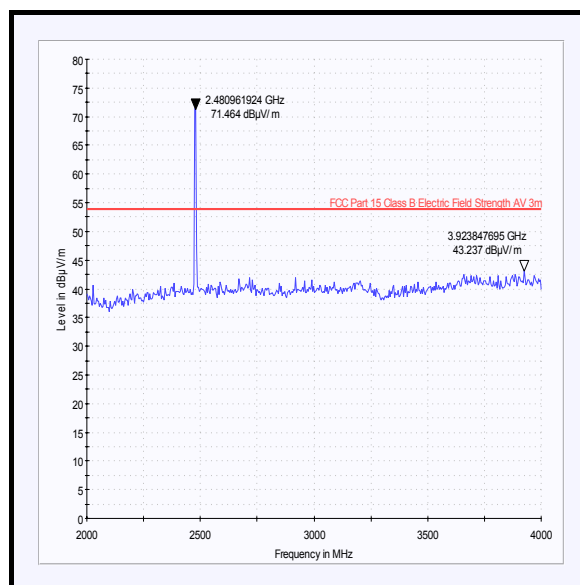
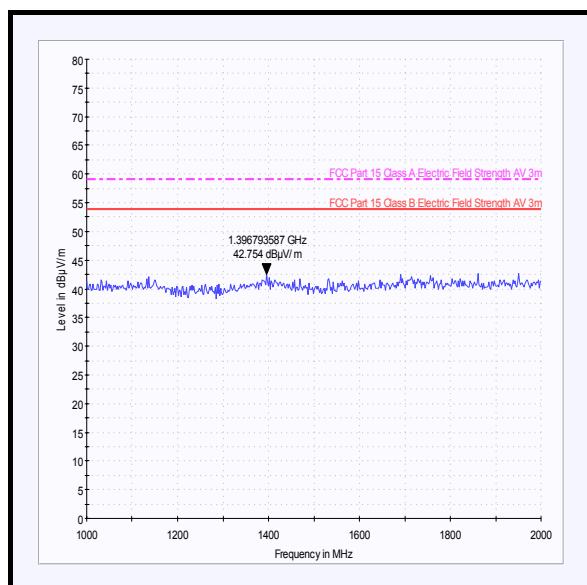
Frequency (GHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
4.839759	V	48.0	10.4	58.4	74.0	15.6	Complied
7.322464	V	32.0	19.6	51.6	74.0	22.4	Complied

Highest Average Level: Hopping Mode

Frequency (GHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
4.839759	V	28.2	10.4	38.4	54.0	15.6	Complied
7.322464	V	16.3	19.6	35.9	54.0	18.1	Complied

Highest Peak Level: Bottom Channel

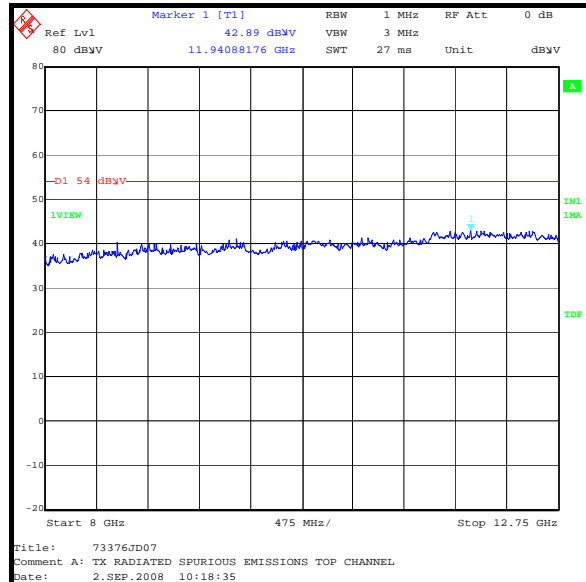
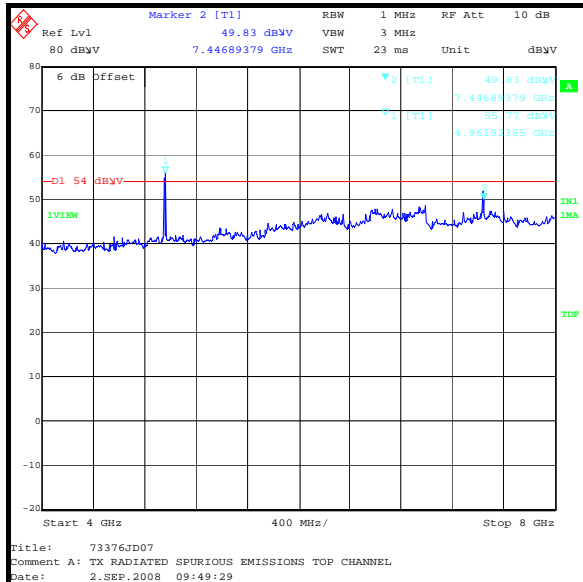
Frequency (GHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	-20 dBc Limit (dB μ V/m)	Margin (dB)	Result
7.205218	V	34.0	18.6	52.6	74.7	22.1	Complied

Transmitter Radiated Emissions (Continued)

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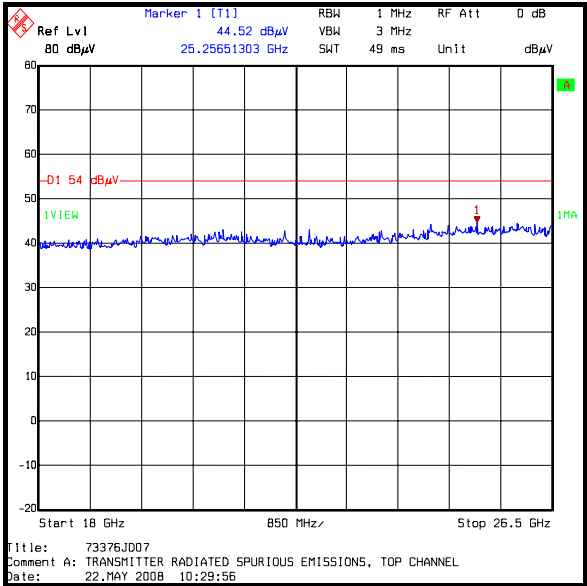
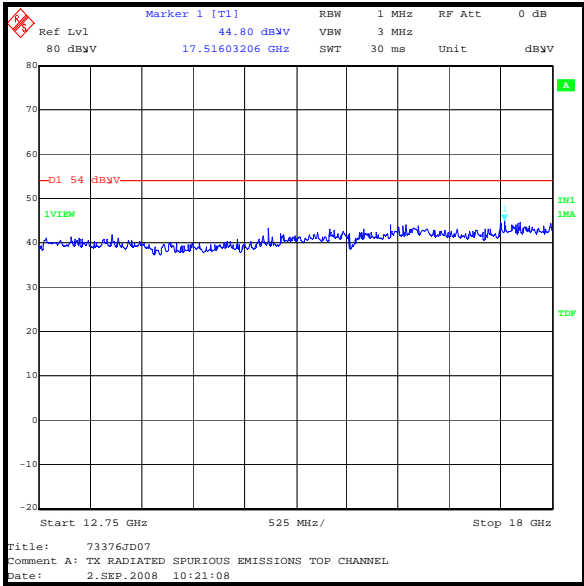
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Transmitter Radiated Emissions (Continued)



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7.2.9. Transmitter Band Edge Radiated Emissions: Section 15.247(d) & 15.209(a)

Ambient Temperature: 24°C

Relative Humidity: 45%

Results:**Electric Field Strength Measurements****Peak Power Level Hopping Mode:**

Frequency (MHz)	Antenna Polarity	Detector Level (dBμV)	Transducer Factor (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2400.0	V	46.7	4.1	50.8	*74.7	23.9	Complied
2483.5	V	56.0	4.9	60.9	74.0	13.1	Complied

Average Power Level Hopping Mode:

Frequency (MHz)	Antenna Polarity	Detector Level (dBμV)	Transducer Factor (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2483.5	V	42.2	4.9	47.1	54.0	6.9	Complied

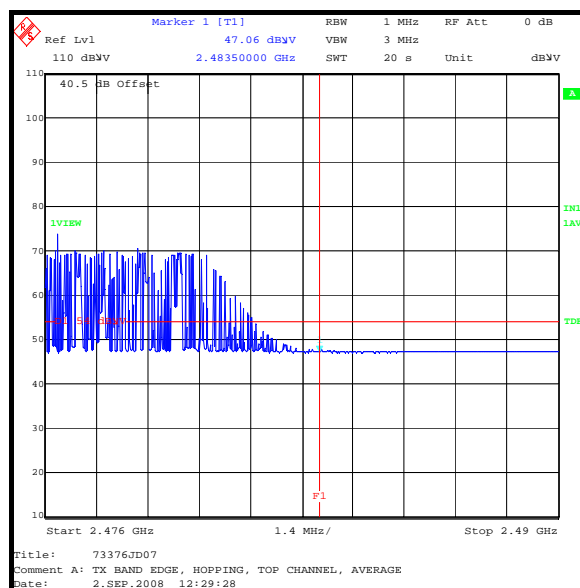
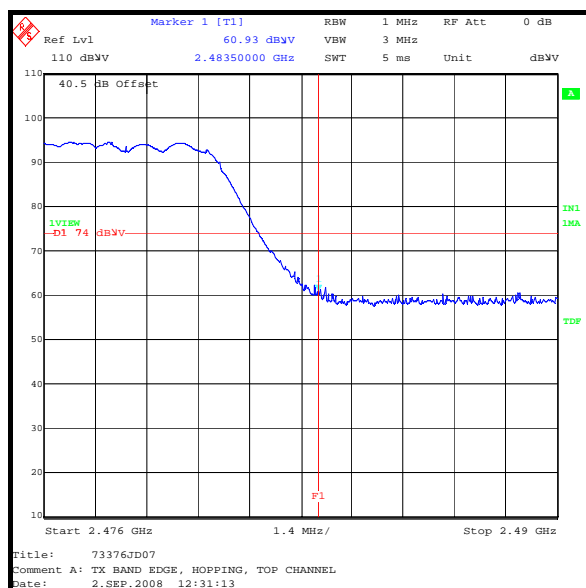
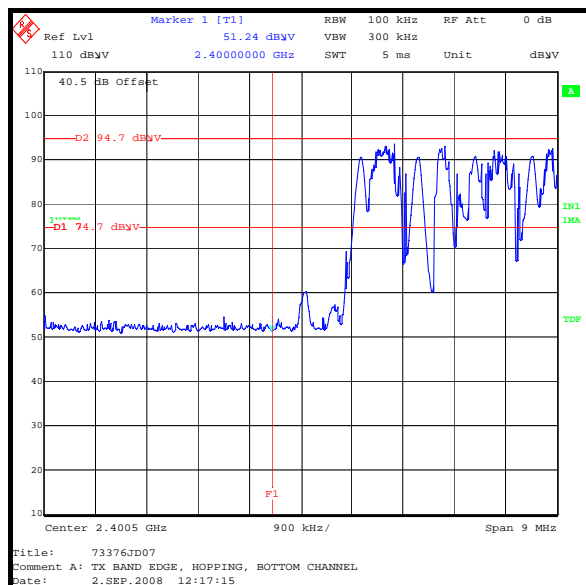
Note(s):

1. * -20 dBc limit

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Transmitter Band Edge Radiated Emissions: Section 15.247(d) & 15.209(a) (Continued)**Results:****Peak Power Level Static Mode:**

Frequency (MHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2400.0	V	49.2	4.1	53.3	74.7 *	21.4	Complied
2483.5	V	57.3	4.9	62.2	74.0	11.8	Complied

Average Power Level Static Mode:

Frequency (MHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2843.5	V	44.5	4.9	49.4	54.0	4.6	Complied

Note(s):

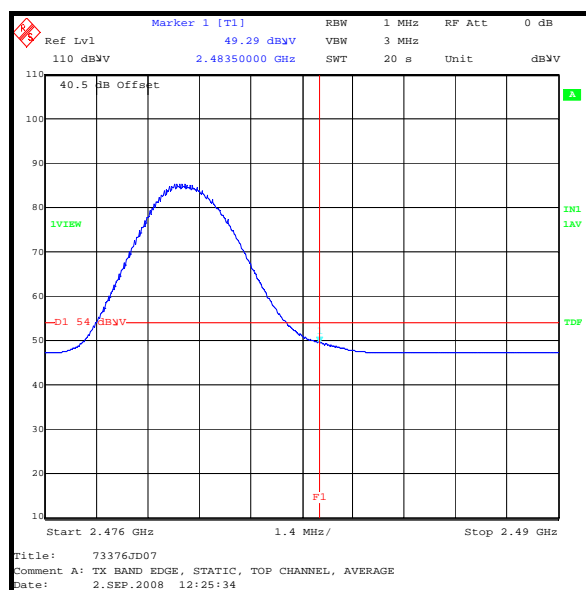
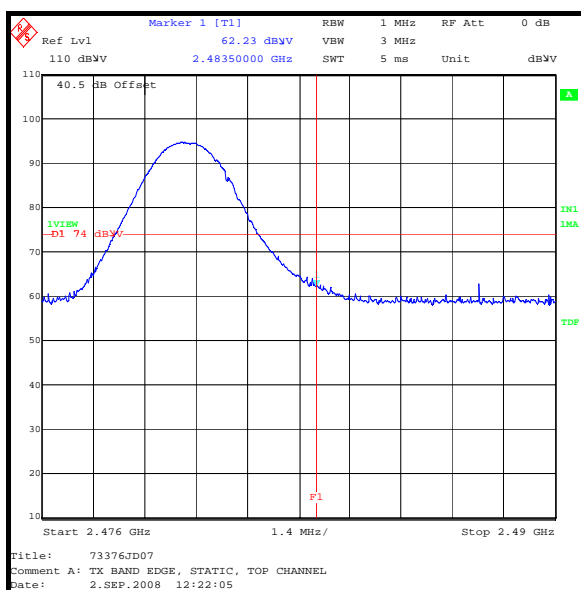
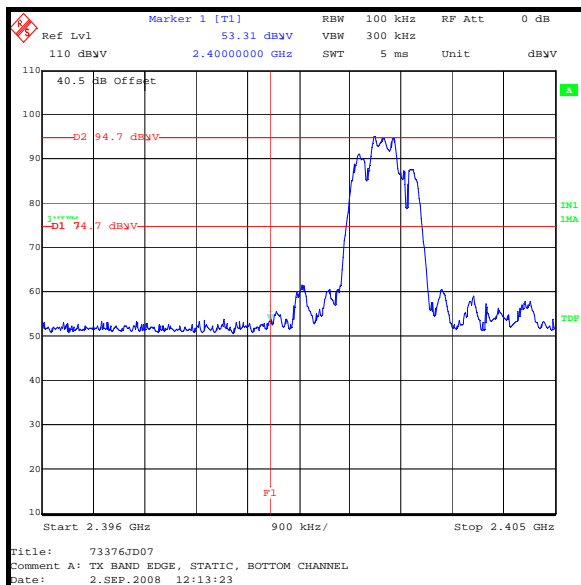
1. * -20 dBc limit

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Transmitter Band Edge Radiated Emissions (Continued)



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8. Measurement Uncertainty

No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently, the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

The uncertainty of the result may need to be taken into account when interpreting the measurement results.

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor, such that a confidence level of approximately 95% is maintained. For the purposes of this document “approximately” is interpreted as meaning “effectively” or “for most practical purposes”.

Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
AC Conducted Spurious Emissions	0.15 MHz to 30 MHz	95%	+/- 3.25 dB
Transmitter Maximum Peak Output Power	Not Applicable	95%	+/- 2.94 dB
Conducted Emissions Antenna Port	30 MHz to 40 GHz	95%	+/- 2.62 dB
Transmitter Carrier Frequency Separation	Not Applicable	95%	+/- 0.01 ppm
Transmitter Average Time of Occupancy	Not Applicable	95%	+/- 10 %
20 dB Bandwidth	Not Applicable	95%	+/- 0.12 %
Radiated Spurious Emissions	30 MHz to 1000 MHz	95%	+/- 5.26 dB
Radiated Spurious Emissions	1 GHz to 40 GHz	95%	+/- 2.94 dB

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty, the published guidance of the appropriate accreditation body is followed.

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Appendix 1. Test Equipment Used

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
A028	Antenna	Eaton	91888-2	304	08 Jun 2006	36
A031	Antenna	Eaton	91889-2	557	08 Jun 2006	36
A1534	Pre Amplifier	Hewlett Packard	8449B OPT H02	3008A00405	Calibrated before use	-
A1793	Pre Amplifier	A.H.Systems Inc.	PAM-0118	183	03 Jul 2008	12
A1829	Pulse Limiter	Rhode & Schwarz	ESH3-Z2	100671	16 Jan 2008	12
A239	Attenuator	Schaffner	6806-17-B	NONE	Calibration not required	-
A253	Antenna	Flann Microwave	12240-20	128	17 Nov 2006	36
A254	Antenna	Flann Microwave	14240-20	139	17 Nov 2006	36
A255	Antenna	Flann Microwave	16240-20	519	17 Nov 2006	36
A436	Antenna	Flann	20240-20	330	24 Apr 2006	36
A469	WG22 Variable attenuator	Mid Century Microwave	None	None	Calibrated before use	-
A490	Antenna	Chase	CBL6111A	1590	07 Feb 2008	12
A649	Single Phase LISN	Rohde & Schwarz	ESH3-Z5	825562/008	07 Mar 2008	12
C1025	Cable	Rosenberger	FA210A-1-020m	FA00B 7564	Calibrated before use	12
C1080	Rosenberger Cable 3m	Rosenberger	FA210A1030M 5050	28464-1	24 Apr 2008	-
C1083	Cable	Rosenberger	001	2799	24 Apr 2008	12
C1167	Cable	Rosenberger Micro-Coax	FA210A103000 7070	43190-01	05 Jun 2008	12
C1262	Cable	Rosenberger	FA210A007500 8080	49356-2	20 Apr 2008	12
C172	Cable	Rosenberger	UFA210A-1-1181-70x70	None	Calibrated before use	-
C454	Cable	Rosenberger	RG142XX-001-RFIB	C454-10081998	20 Apr 2008	12
M1124	Spectrum Analyser	Rohde & Schwarz	ESIB26	100046K	19 Feb 2008	12
M1242	Spectrum Analyser	Rohde & Schwarz, Inc.	FSEM30	845986/022	29 Nov 2007	12

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RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
M1379	Test Receiver	Rohde and Schwarz	ESIB7	100330	14 Aug 2008	12
M1447	CBT	Rohde and Schwarz	1153.9000.35	100329	24 Jan 2008	12
S202	Site 2	RFI	2	S202-15011990	28 Jan 2008	12

NB In accordance with UKAS requirements, all the measurement equipment is on a calibration schedule.

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Appendix 2. Test Configuration Drawings

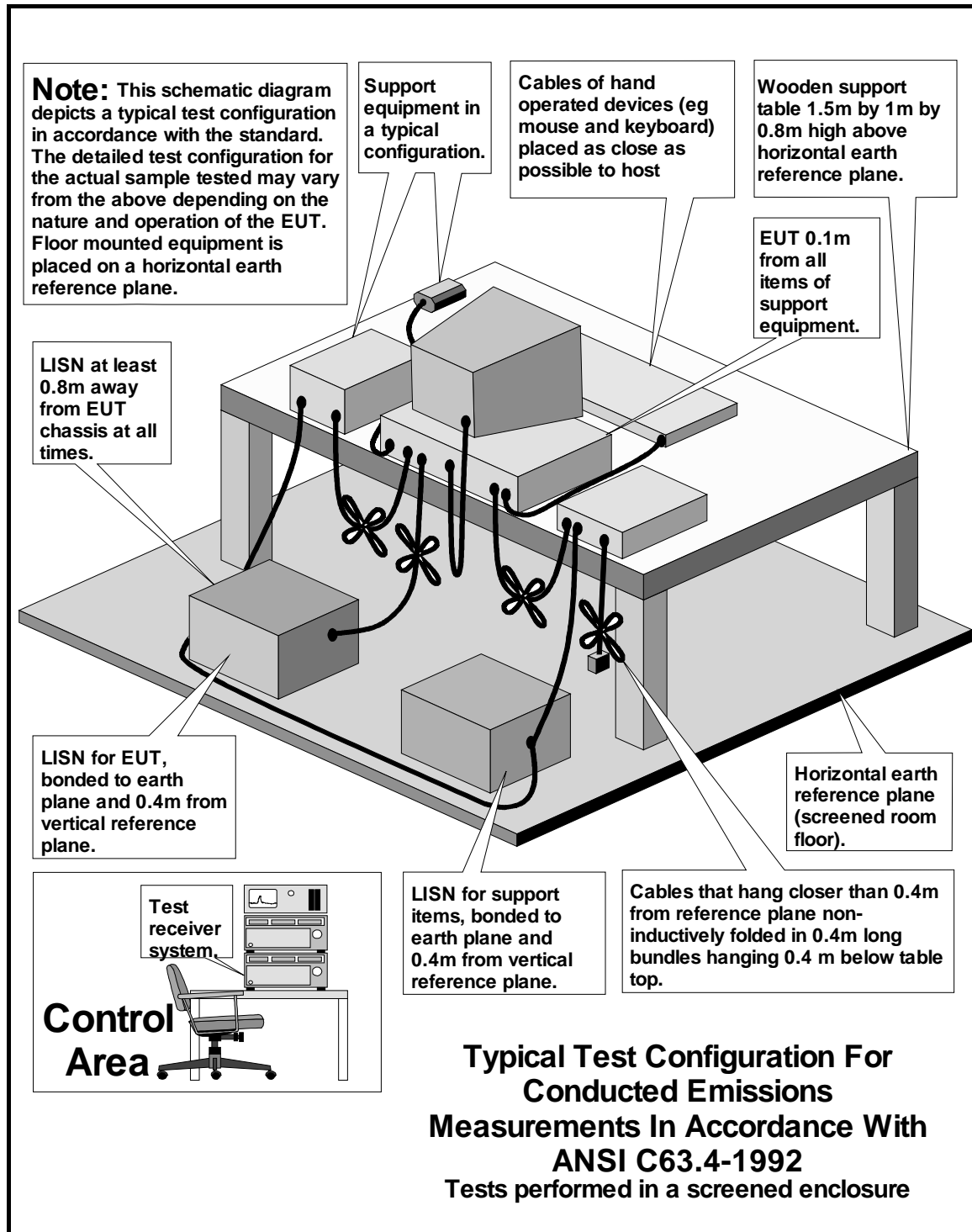
This appendix contains the following drawings:

Drawing Reference Number	Title
DRG\73376JD07\EMICON	Test configuration for measurement of conducted emissions.
DRG\73376JD07\EMIRAD	Test configuration for measurement of radiated emissions.

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DRG\73376JD07\EMICON

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DRG\73376JD07\EMIRAD