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ELECTROMAGNETIC EMISSIONS TEST REPORT

according to 47CFR Part 90, subpart I
for

Telematics Wireless Ltd.

EQUIPMENT UNDER TEST:

Mobile transponder
Model:FP101TA

Document ID: TELRAD_FCC.15679_FP101TA_rev1.doc
Date of Issue: March 2005

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Contents

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1 Project information

Description of equipment under test

Test items	: Mobile transponder
Manufacturer	: Telematics Wireless Ltd.
Types (Models)	: FP101TA

Applicant information

Applicant's responsible person	: Mr. Roman Sternberg, VP marketing
Company	: Telematics Wireless Ltd.
Address	: 26 Hamelacha street
P.O.Box	: 1911
City	: Holon
Postal code	: 58117
Country	: Israel
Telephone number	:+972-3557 5750
Telefax number	:+972-3557 5753

Test performance

Project Number:	: 15679
Location	: Hermon Laboratories
Test completed	: February 8, 2005
Purpose of test	: Apparatus compliance verification in accordance with emission requirements
Test specification(s)	47CFR part 90, §§90.205, 90.209, 90.210, part 15 §15.109

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2 Summary and signatures

The EUT, FP101TA mobile transponder, was tested according to FCC part 90 subpart I, §§90.205(k), 90.209, 90.210(k)(3), part 15 §15.109 and found to comply with the standard requirements.

This test report replaces the previously issued test report identified by Doc ID:TELRAD_FCC.15679_FP101TA.

Test description	Specification reference	Tested by	Date tested	Test report paragraph	Verdict
RF output power	90.205(k)	Mr. B. Efros, test engineer	February 8, 2005	4.1	Pass
Occupied bandwidth	90.209	Mr. B. Efros, test engineer	February 8, 2005	4.2	Pass
Emission mask	90.210(k)(3)	Mr. B. Efros, test engineer	February 8, 2005	4.3	Pass
Radiated spurious emissions	90.210	Mr. B. Efros, test engineer	February 8, 2005	4.4	Pass
Radiated emissions	15.109	Mr. Y. Neuman, test engineer	September 15, 2003	4.5	Pass
Frequency stability	90.213, 2.1055	Mr. Y. Neuman, test engineer	December 1, 2003	4.6	Tested

Test report prepared by:

Mrs. Marina Cherniavsky, MScEE, certification engineer

Test report approved by:

Mr. Michael Nikishin, MScEE, group leader

Mr. Alex Usoskin, C.E.O.

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3 EUT description

3.1 General description

The EUT, a small LMS transponder, operating at 915 MHz with unipolar ASK modulation (Manchester encoded) and utilizing an internal antenna, is used to transmit data from a vehicle. Data bit rate is 500 kbps. The device is powered by 3 V internal battery.
The frequencies generated or used in the EUT are: 32.768 kHz, 8 MHz.

EUT general view

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4 Test results

4.1 Peak output power test according to part 90 §90.205(k)

DATE of TEST: February 8, 2005
AMBIENT TEMPERATURE: 21°C
RELATIVE HUMIDITY: 48 %
AIR PRESSURE: 1014 hPa
MEASUREMENT UNCERTAINTY: ±3.5 dB

Carrier frequency, MHz	Radiated measured result, dB(uV/m)	Antenna polariz.	Antenna height, m	Turntable position, °	Generator P_{out}, dBm	Cable loss, dB	Antenna gain, dBd	ERP, dBm	Limit, dBm	Margin, dB	Verdict
914.9	105.52	V	1.4	0	11.5	3.9	-0.5	7.1	44.7	-37.6	Pass
914.9	104.37	H	1.2	279	8.5	3.9	-0.5	4.1	44.7	-40.6	Pass

Notes:
Turntable position: 0^o = EUT front panel faces the receiving antenna
Margin = ERP – specification limit.
The measurements throughout substitution method were performed with RBW=120 kHz.

LIMITATION ON POWER

Operating frequency range, MHz	Maximum effective radiated power (ERP)
902 - 927.25	30 W (44.7 dBm)

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TEST PROCEDURE

The EUT was set up on a wooden 80 cm height turntable at the OATS as shown in Figure 4.1.1. The measurements were performed at 3 m test distance with log periodic antenna. To find maximum radiation the turntable was rotated 360°, measuring antenna height was changed from 1 to 4 m, and the antennas polarization was changed from vertical to horizontal.

The EUT was replaced with a substitution dipole antenna connected to a signal generator as shown in Figure 4.1.2. The measuring antenna height was changed from 1 to 4 m to find a maximum radiation. The level of the signal generator output was adjusted until the previously recorded field strength maximum reading was obtained as depicted in table above.

The equivalent power was calculated using the equation:

$$ERP\ (dBm) = P_{out\ gen}\ (dBm) - \text{cable loss}\ (dB) + G_a\ (dBd), \text{ where}$$

$P_{out\ gen}$ is the generator output power
G_a is the gain of the substitution antenna used relative to an ideal half-wave dipole antenna.

TEST EQUIPMENT USED:

HL 0034	HL 0038	HL 0091	HL 0287	HL 0415	HL 0661	HL 0812
HL 1116	HL 1430	HL 1535	HL 2299			

Full description is given in Appendix A.

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Figure 4.1.1 Setup for carrier field strength measurements

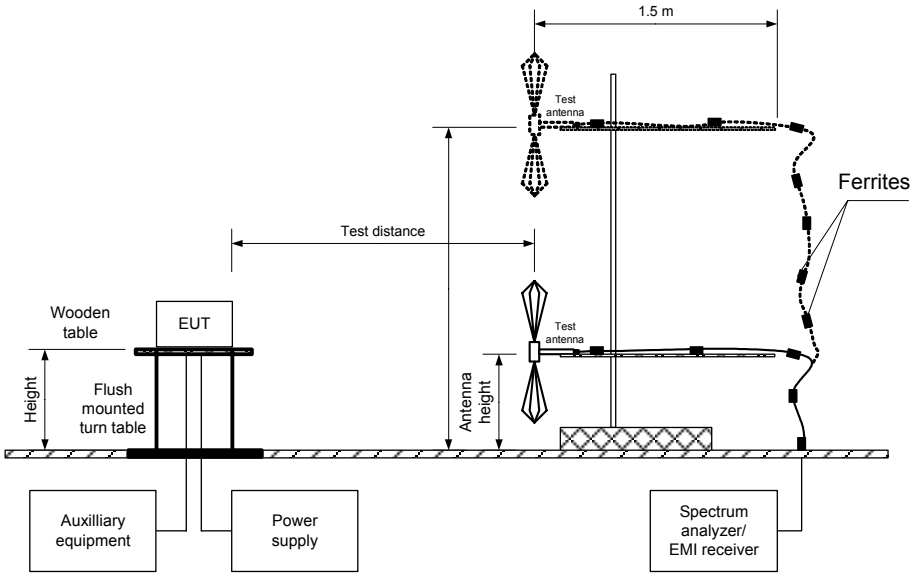
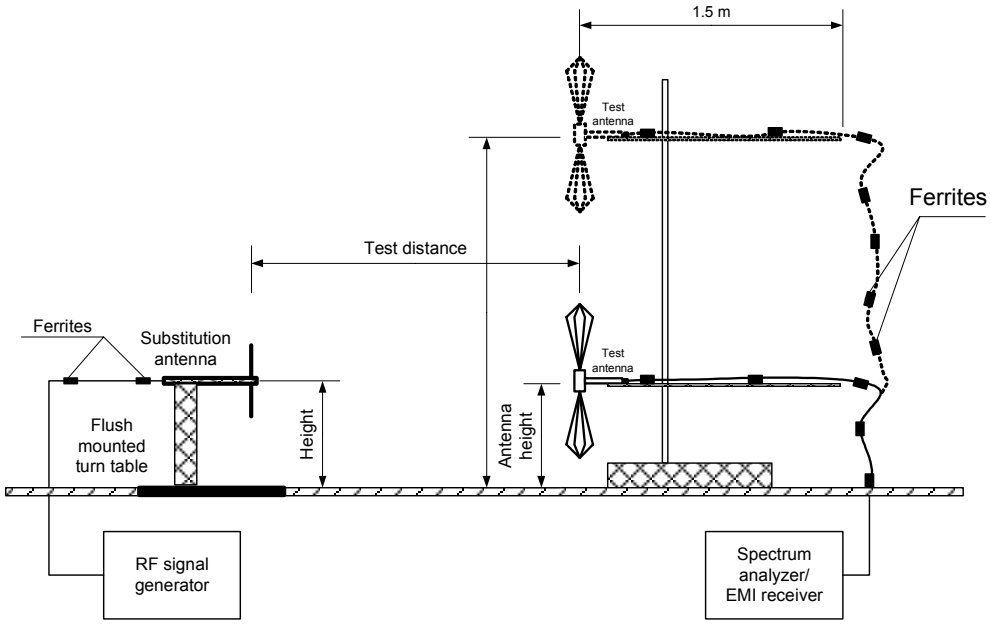


Figure 4.1.2 Setup for substitution ERP measurements



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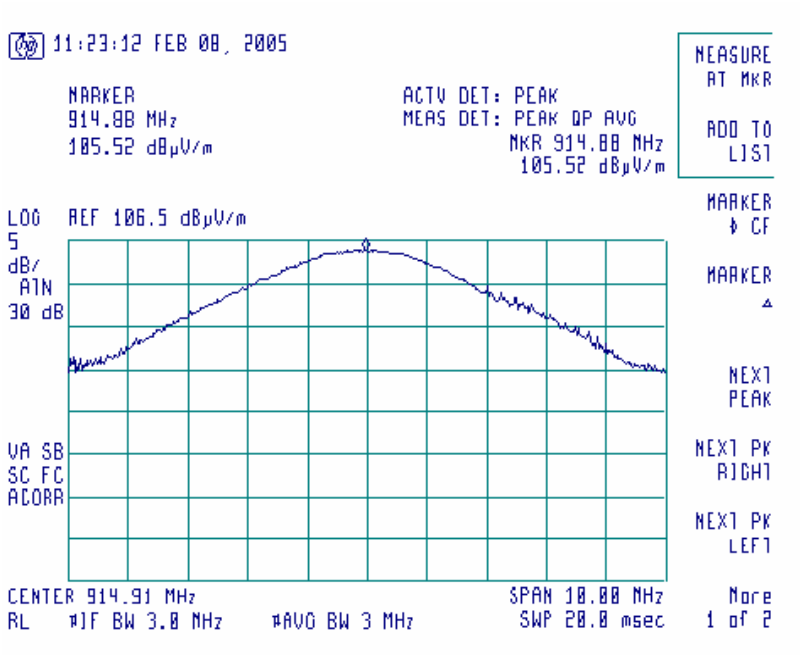
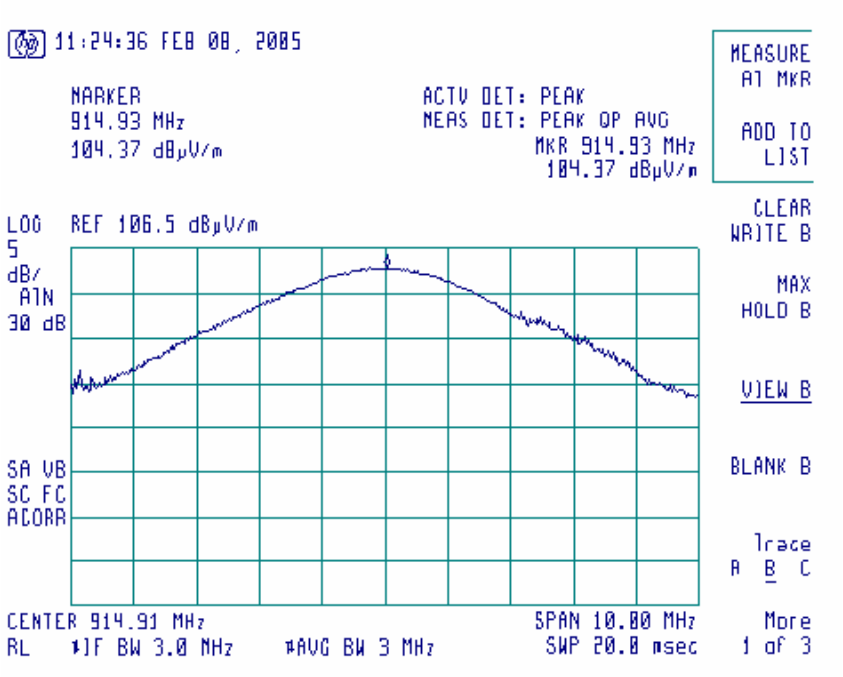
Plot 4.1.1 Transmitter carrier field strength at carrier frequency in vertical antenna polarization



Plot 4.1.2 Transmitter carrier field strength at carrier frequency in horizontal antenna polarization



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4.2 Occupied bandwidth according to part 90 §90.209(5)

METHOD OF MEASUREMENTS	ANSI C63.4 §13.1.7
DATE of TEST:	February 8, 2005
AMBIENT TEMPERATURE:	21°C
RELATIVE HUMIDITY:	48 %
AIR PRESSURE:	1014 hPa
DETECTOR USED:	Peak hold
RESOLUTION BANDWIDTH:	100 kHz
VIDEO BANDWIDTH:	300 kHz
MODULATION ENVELOPE REFERENCE POINTS:	26 dBc
MODULATION:	ASK
MODULATING SIGNAL:	PRBS
BIT RATE:	500 kbps
MEASUREMENT UNCERTAINTY:	±168 Hz

Carrier frequency, MHz	Occupied bandwidth, MHz	Limit, MHz	Margin, MHz	Verdict
914.90	6.40	12	5.60	Pass

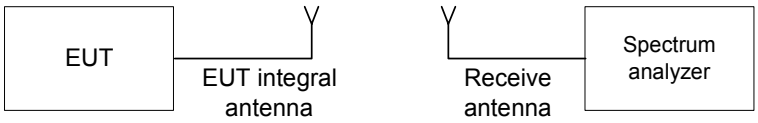
LIMIT

Operating frequency range, MHz	Authorized bandwidth, MHz
909.75 – 921.75	12

TEST PROCEDURE

The EUT was set up at open area test site (OATS) as shown in Figure 4.2.1 to transmit the unmodulated carrier and the reference peak power level was measured. The EUT was set to transmit the normally modulated carrier.
The transmitter occupied bandwidth was measured with spectrum analyzer as a frequency delta between the reference points on modulation envelope and provided in table above and the associated plot.

Figure 4.2.1 Occupied bandwidth test setup



TEST EQUIPMENT USED:

HL 0034	HL 0038	HL 0091	HL 0287	HL 0415	HL 0812	HL 1430

Full description is given in Appendix A.

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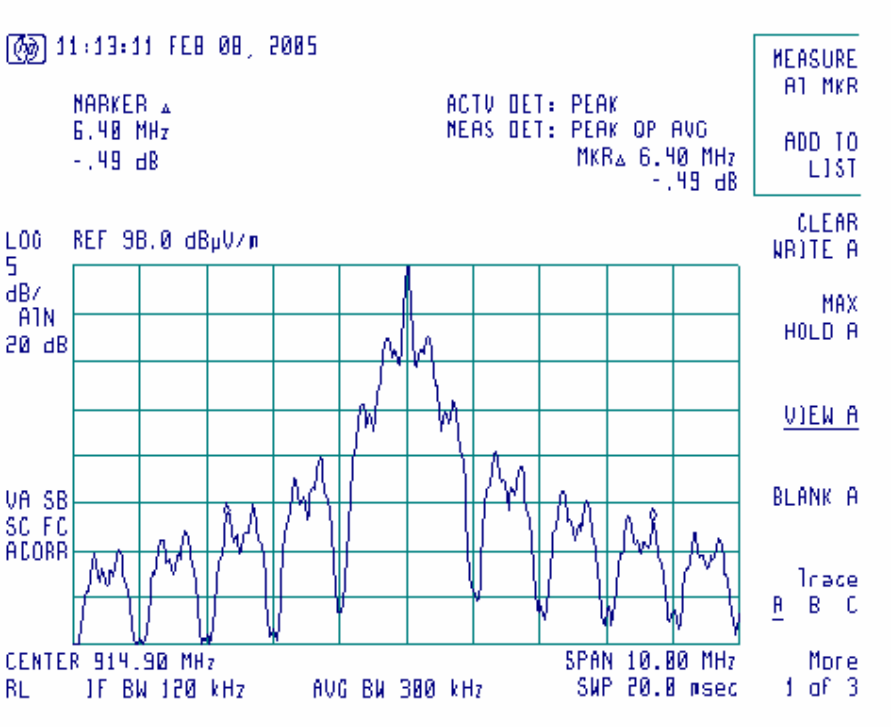
Plot 4.2.1 Occupied bandwidth test result



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4.3 Emission mask and radiated spurious emissions test according to part 90 §90.210(k)(3)

METHOD OF MEASUREMENTS	ANSI 63.4 §13.1.4
DATE of TEST:	February 8, 2005
AMBIENT TEMPERATURE:	21°C
RELATIVE HUMIDITY:	48 %
AIR PRESSURE:	1014 hPa
FREQUENCY RANGE:	9 kHz – 10 GHz
MEASUREMENT UNCERTAINTY:	±4.5 dB

The peak power of any emission shall be attenuated below the power of the highest emission contained within the licensee's sub-band in accordance with the following schedule:

1) On any frequency within the authorized bandwidth: zero dB;
2) On any frequency outside the licensee's sub-band edges: 55 + 10 log (P) dB, where (P) is the highest emission (in watts) of the transmitter inside the licensee's sub-band.

4.3.1 Test procedure

The EUT was set up on the 80 cm height wooden table in the anechoic chamber as shown in Figures 4.3.1 and 4.3.2. The measurements were performed at 3-m test distance:
with the loop antenna in the 9 kHz to 30 MHz range,
the biconical - in the 30 MHz to 200 MHz range,
the log periodic - in the 200 MHz to 1 GHz range,
the double ridged guide – in 1 GHz to 10 GHz range.

9 kHz – 30 MHz frequency range. The loop antenna was positioned with its plane vertical. The loop center was 1 meter above the ground plane. To find maximum radiation the turntable was rotated 360 and the measuring antenna was rotated about its vertical axis.

30 MHz – 10 GHz frequency range. To find maximum radiation the turntable was rotated 360°, measuring antenna height was changed from 1 to 4 m, and the antennas polarization was changed from vertical to horizontal.

The following calculated limit was applied to spurious emissions throughout the testing in transmit mode:
the specified limit 55 + 10 log (P) was converted in EIRP units – 25 dBm (or 72.4 dBμV/m equivalent field strength limit at 3 m test distance).
This limit was applied to spurious emissions throughout the following frequency ranges:
9 kHz to 909.75 MHz and 921.75 MHz to 10th harmonic.
Emissions at the lower band edge and at the higher band edge were tested, the test results are provided in Plots 4.3.2, 4.3.3. No spurious emissions except harmonics were found, the test results were recorded in Table 4.3.1 and shown in associated plots.

The ERP of harmonics was measured by substitution method at the OATS. The EUT was replaced with a substitution antenna (double ridge guide for the mentioned range) connected to signal generator as shown in Figure 4.3.3. The RF signal generator was set to the frequency of investigated spurious emission and the RF output level was preliminary adjusted to produce the same field strength as it was measured from the EUT.

The measuring antenna height was changed from 1 to 4 m to find a maximum radiation. The above procedure was performed in both, horizontal and vertical, polarizations of the test and substitution antennas. The test results were recorded in Table 4.3.2. For calculation equation refer to section 4.1.

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Figure 4.3.1 Set up for spurious emission field strength measurements in 9 kHz to 30 MHz range

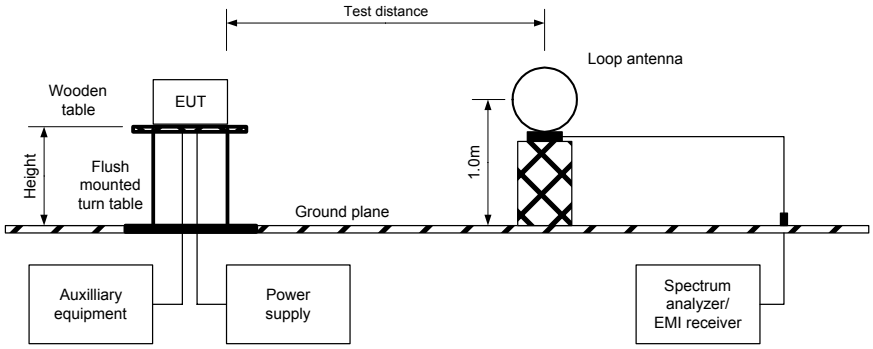

Figure 4.3.2 Set up for spurious emission field strength measurements above 30 MHz

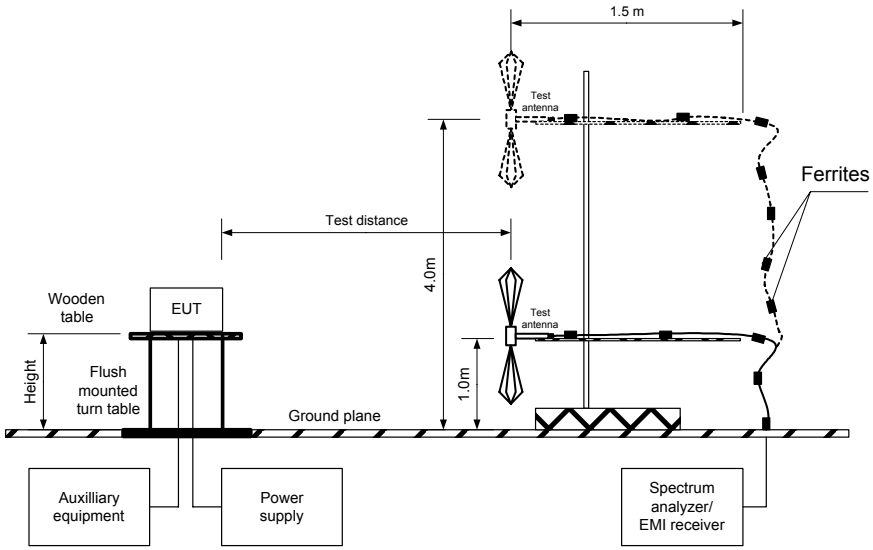

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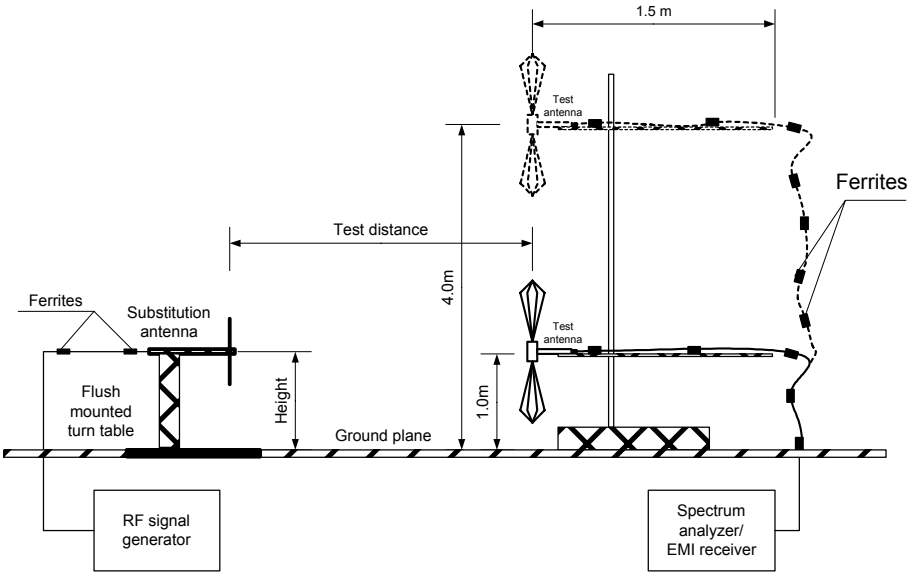
Figure 4.3.3 Setup for substitution ERP measurements of spurious



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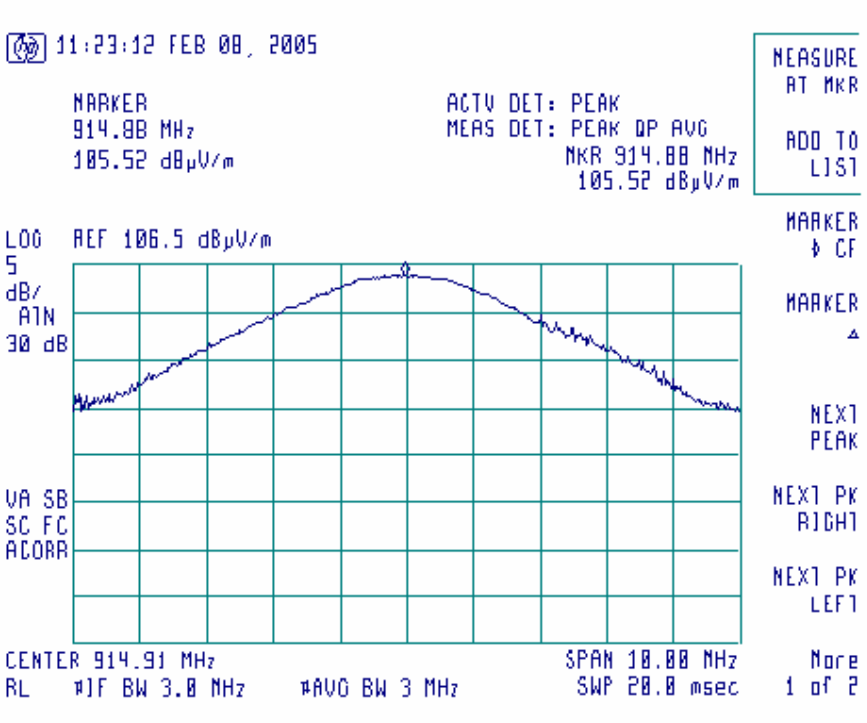
Plot 4.3.1 Emission mask test results at carrier frequency

ASSIGNED FREQUENCY RANGE:	902 - 928 MHz
DETECTOR USED:	Peak
MODULATION:	ASK
MODULATING SIGNAL:	PRBS
BIT RATE:	0.5 Mbps
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum



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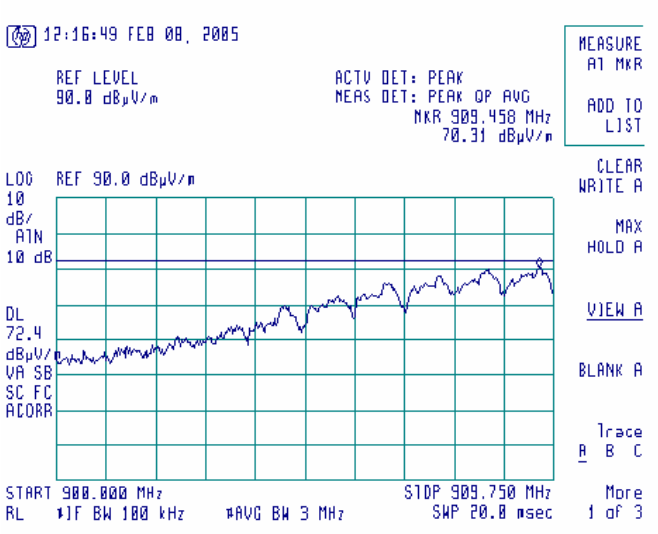
Plot 4.3.2 Emission mask test results at carrier frequency, left band edge

ASSIGNED FREQUENCY RANGE:	902 - 928 MHz
DETECTOR USED:	Peak
MODULATION:	ASK
MODULATING SIGNAL:	PRBS
BIT RATE:	0.5 Mbps
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum



Plot 4.3.3 Emission mask test results at carrier frequency, right band edge

ASSIGNED FREQUENCY RANGE:	902 - 928 MHz
DETECTOR USED:	Peak
MODULATION:	ASK
MODULATING SIGNAL:	PRBS
BIT RATE:	0.5 Mbps
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum

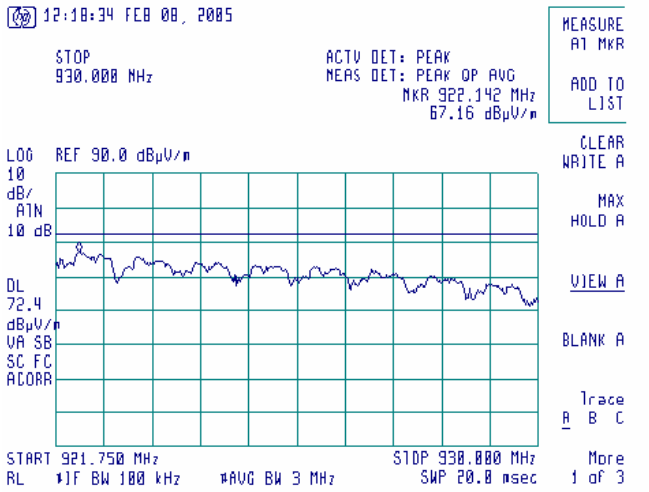


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Table 4.3.1 Spurious emission field strength test results

OPERATING FREQUENCY:	915 MHz
TEST DISTANCE:	3 m
TEST SITE:	OATS
EUT HEIGHT:	0.8 m
INVESTIGATED FREQUENCY RANGE:	0.009 – 10000 MHz
DETECTOR USED:	Peak
VIDEO BANDWIDTH:	> Resolution bandwidth
TEST ANTENNA TYPE:	Active loop (9 kHz – 30 MHz) Biconical (30 MHz – 200 MHz) Log periodic (200 MHz – 1000 MHz) Double ridged guide (above 1000 MHz)
MODULATION:	ASK
MODULATING SIGNAL:	PRBS
BIT RATE:	0.5 Mbps
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum

Frequency, MHz	Field strength, dB(μV/m)	Limit, dB(μV/m)	Margin, dB*	RBW, kHz	Antenna polarization	Antenna height, m	Turn-table position**, degrees
1829.82	55.05	72.40	-17.35	100	V	1.1	238
1829.82	52.36	72.40	-20.04	100	H	1.0	270
2744.78	43.50	72.40	-28.90	100	V	1.2	90
2744.78	42.83	72.40	-29.57	100	H	1.0	270
3659.23	44.50	72.40	-27.90	100	V	1.2	341
3659.24	52.00	72.40	-20.40	100	H	1.4	0
4574.59	43.00	72.40	-29.40	100	V	1.0	23
4574.59	52.00	72.40	-20.40	100	H	1.2	29
5488.79	55.50	72.40	-16.90	100	V	1.2	320
5488.79	61.00	72.40	-11.40	100	H	1.5	43
6403.50	65.17	72.40	-7.23	100	V	1.1	30
6403.50	62.00	72.40	-10.40	100	H	1.0	60
7318.34	59.83	72.40	-12.57	100	V	1.1	0
7318.34	61.17	72.40	-11.23	100	H	1.3	330
8233.02	67.50	72.40	-4.90	100	V	1.5	35
8233.02	61.00	72.40	-11.40	100	H	1.4	350
9149.43	47.83	72.40	-24.57	100	V	1.1	330

*- Margin = Field strength of spurious – calculated field strength limit.
**- EUT front panel refers to 0 degrees position of turntable.

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Table 4.3.2 Substitution ERP of spurious test results

OPERATING FREQUENCY:	915 MHz
TRANSMITTER CARRIER ERP:	7.1 dBm
TEST SITE:	OATS
TEST DISTANCE:	3 m
SUBSTITUTION ANTENNA HEIGHT:	0.8 m
DETECTOR USED:	Peak
VIDEO BANDWIDTH:	> Resolution bandwidth
SUBSTITUTION ANTENNA TYPE:	Tunable dipole (30 MHz – 1000 MHz) Double ridged guide (above 1000 MHz)

Frequency, MHz	Field strength, dB(μV/m)	RBW, kHz	Antenna polarization	RF generator output, dBm	Ant gain, dBd	Cable loss, dB	ERP, dBm	Attenuation below carrier, dBc	Limit, dBc	Margin, dB*	Verdict
1829.82	55.05	100.0	V	-44.10	6.30	3.40	-41.20	48.30	32.10	-16.20	Pass
5488.79	55.50	100.0	V	-45.00	8.00	4.50	-41.50	48.60	32.10	-16.50	Pass
5488.79	61.00	100.0	H	-39.00	8.00	4.50	-35.50	42.60	32.10	-10.50	Pass
6403.50	65.17	100.0	V	-35.00	8.50	5.00	-31.50	38.60	32.10	-6.50	Pass
6403.50	62.00	100.0	H	-38.20	8.50	5.60	-35.30	42.40	32.10	-10.30	Pass
7318.34	59.83	100.0	V	-40.20	8.80	5.60	-37.00	44.10	32.10	-12.00	Pass
7318.34	61.17	100.0	H	-39.00	8.80	5.30	-35.50	42.60	32.10	-10.50	Pass
8233.02	67.50	100.0	V	-31.00	8.70	7.40	-29.70	36.80	32.10	-4.70	Pass
8233.02	61.00	100.0	H	-37.40	8.70	7.40	-36.10	43.20	32.10	-11.10	Pass

*****- Margin = Spurious emission – specification limit.

TEST EQUIPMENT USED IN ANECHOIC CHAMBER:

HL 0032	HL 0034	HL 0446	HL 1424	HL 1545	HL 1826	HL 1849
HL 1850	HL 1942	HL 1984	HL 2109	HL 2259		

TEST EQUIPMENT USED AT OPEN AREA TEST SITE:

HL 0034	HL 0038	HL 0091	HL 0287	HL 0410	HL 0661	HL 1116
HL 1200	HL 1424	HL 1430	HL 1565	HL 1942	HL 1947	HL 2254
HL 2259	HL 2400	HL 2432				

Full description is given in Appendix A.

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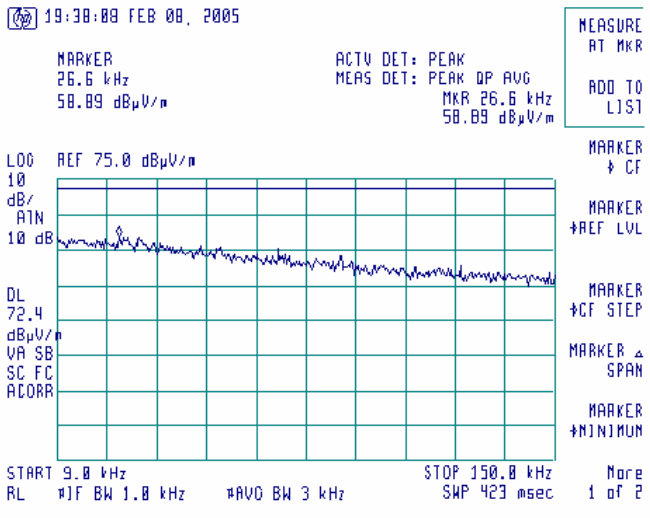
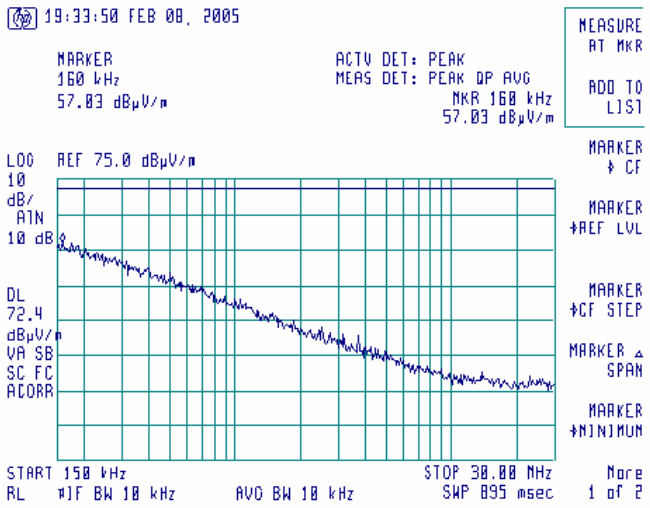
Plot 4.3.4 Radiated emission measurements in 9 - 150 kHz range

TEST SITE:	Semi anechoic chamber
ANTENNA POLARIZATION:	Vertical
TEST DISTANCE:	3 m



Plot 4.3.5 Radiated emission measurements in 0.15 - 30 MHz range

TEST SITE:	Semi anechoic chamber
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



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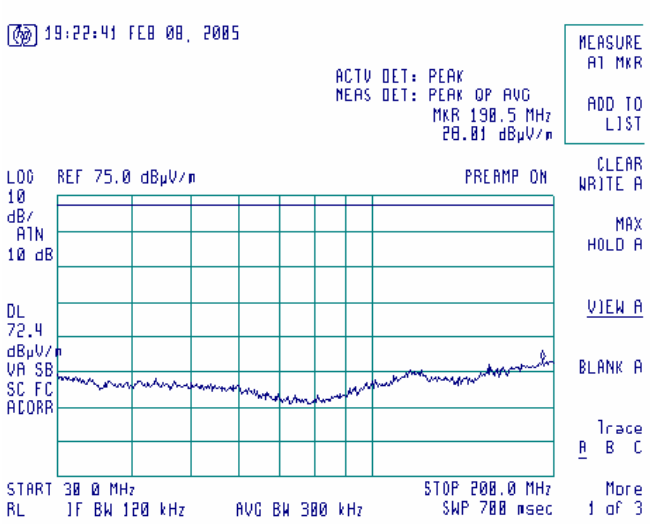
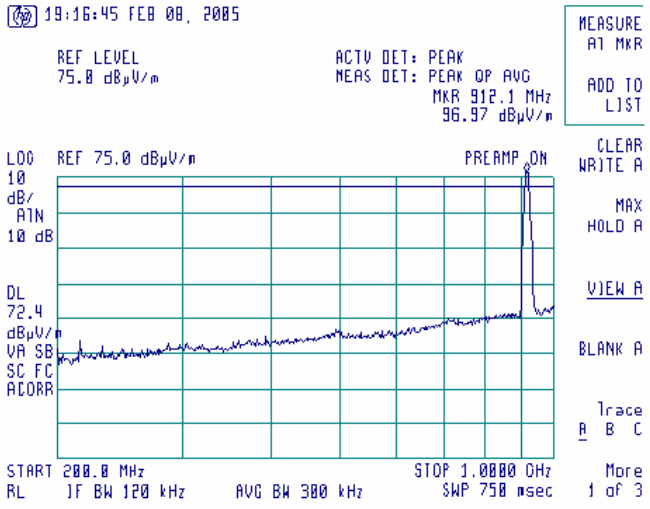
Plot 4.3.6 Radiated emission measurements in 30 – 200 MHz range

TEST SITE:	Semi anechoic chamber / OATS
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



Plot 4.3.7 Radiated emission measurements in 200 – 1000 MHz range

TEST SITE:	Semi anechoic chamber / OATS
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



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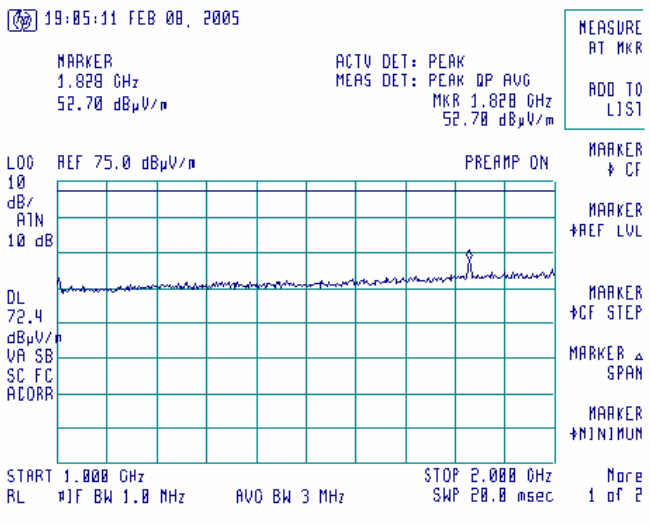
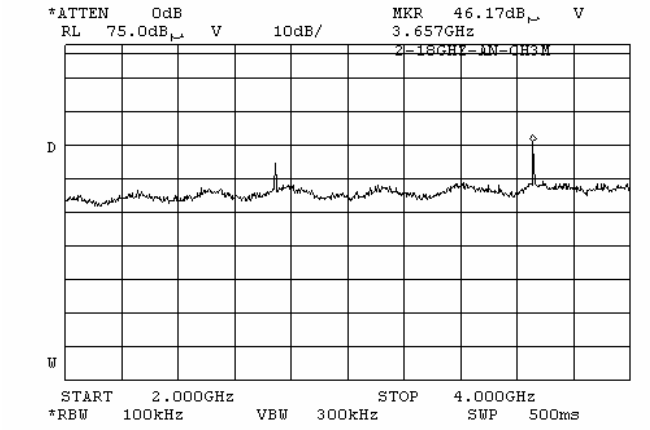
Plot 4.3.8 Radiated emission measurements in 1000 – 2000 MHz range

TEST SITE:	Semi anechoic chamber
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



Plot 4.3.9 Radiated emission measurements in 2000 – 4000 MHz range

TEST SITE:	Semi anechoic chamber
ANTENNA POLARIZATION:	Vertical and Horizontal
TEST DISTANCE:	3 m



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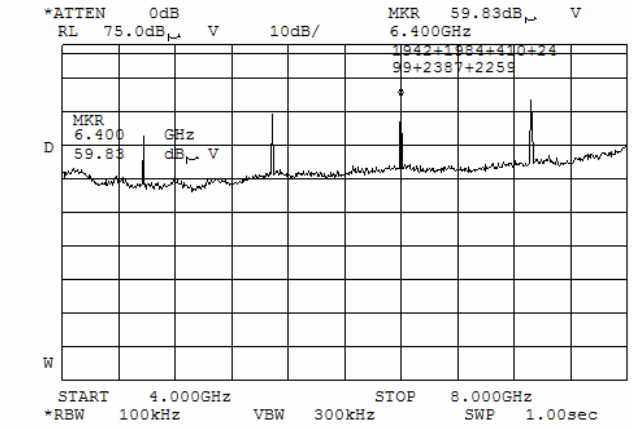
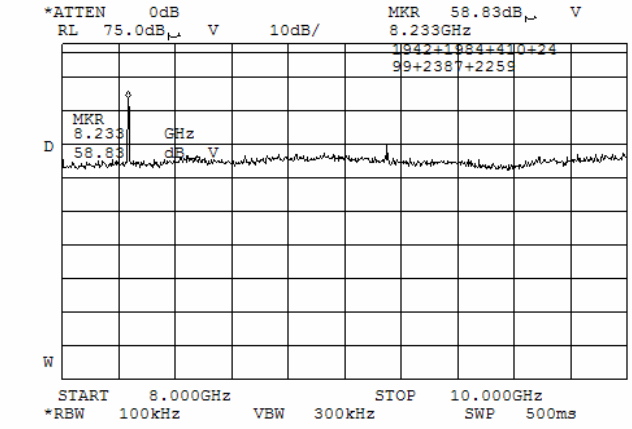
Plot 4.3.10 Radiated emission measurements in 4000 – 8000 MHz range

TEST SITE: Semi anechoic chamber
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m



Plot 4.3.11 Radiated emission measurements in 8000 – 10000 MHz range

TEST SITE: OATS
ANTENNA POLARIZATION: Vertical and Horizontal
TEST DISTANCE: 3 m



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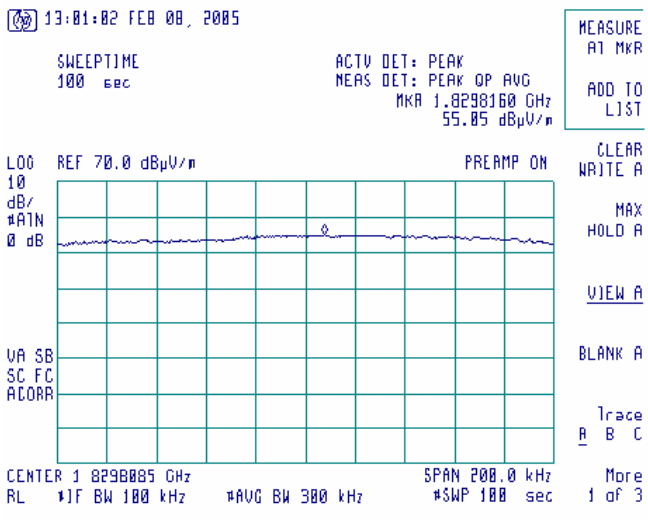
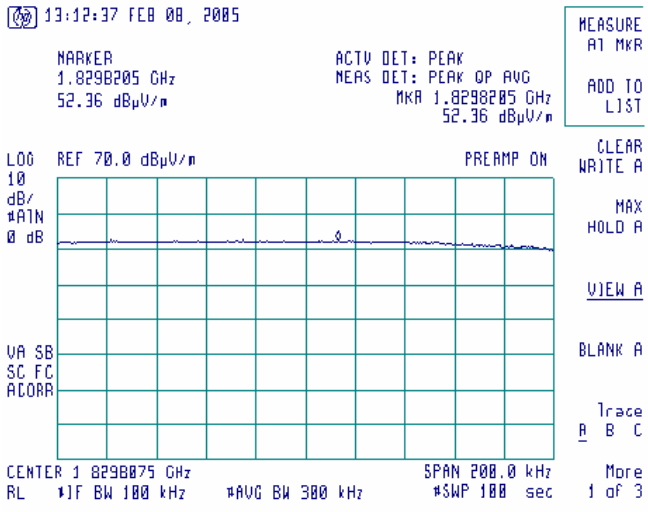
Plot 4.3.12 Radiated emission measurements at the 2nd harmonic

TEST SITE: Semi anechoic chamber
ANTENNA POLARIZATION: Vertical
TEST DISTANCE: 3 m



Plot 4.3.13 Radiated emission measurements at the 2nd harmonic

TEST SITE: Semi anechoic chamber
ANTENNA POLARIZATION: Horizontal
TEST DISTANCE: 3 m



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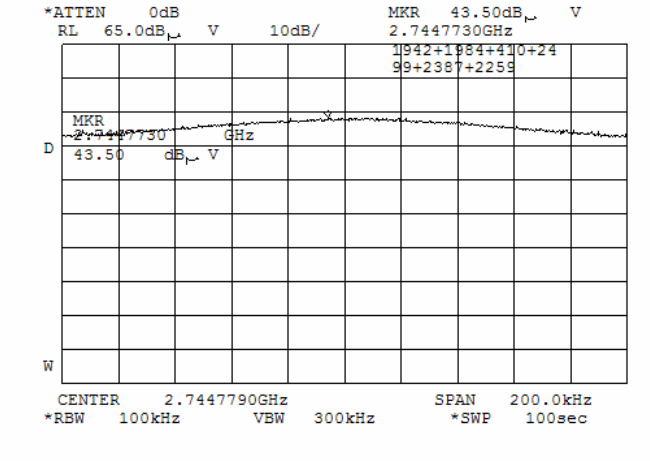
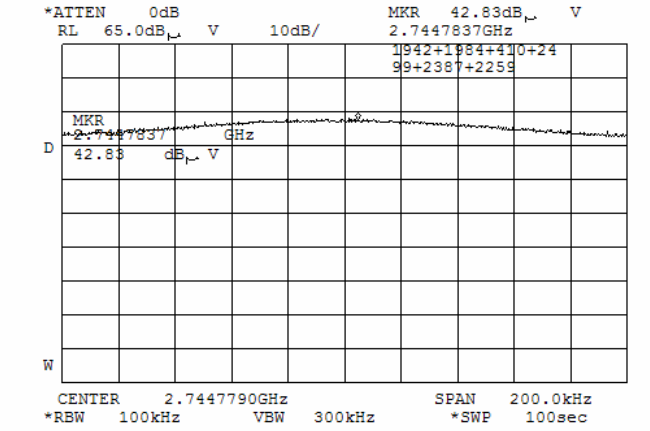
Plot 4.3.14 Radiated emission measurements at the 3rd harmonic

TEST SITE:	OATS
ANTENNA POLARIZATION:	Vertical
TEST DISTANCE:	3 m



Plot 4.3.15 Radiated emission measurements at the 3rd harmonic

TEST SITE:	OATS
ANTENNA POLARIZATION:	Horizontal
TEST DISTANCE:	3 m



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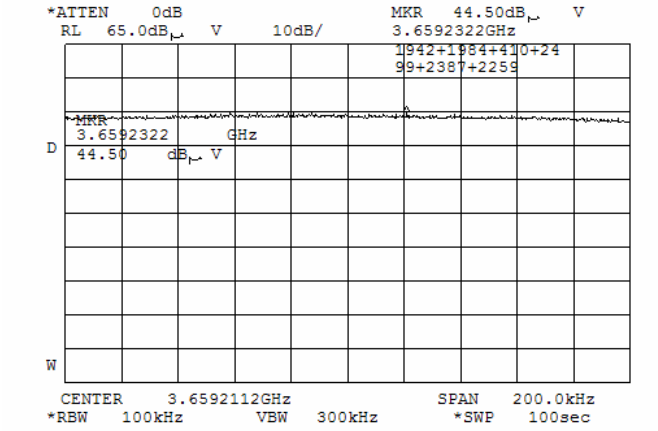
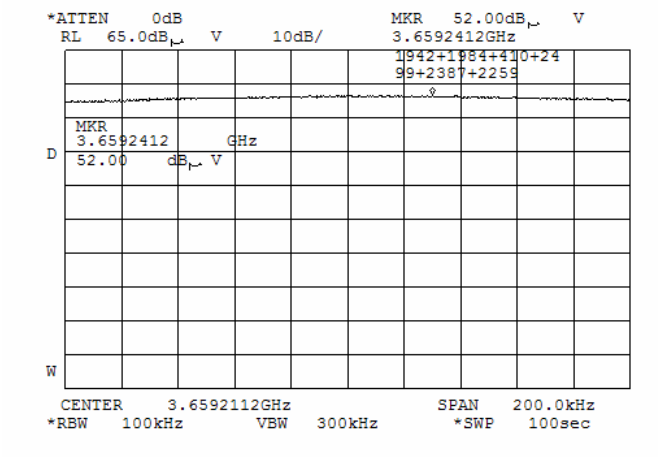
Plot 4.3.16 Radiated emission measurements at the 4th harmonic

TEST SITE:	OATS
ANTENNA POLARIZATION:	Vertical
TEST DISTANCE:	3 m



Plot 4.3.17 Radiated emission measurements at the 4th harmonic

TEST SITE:	OATS
ANTENNA POLARIZATION:	Horizontal
TEST DISTANCE:	3 m



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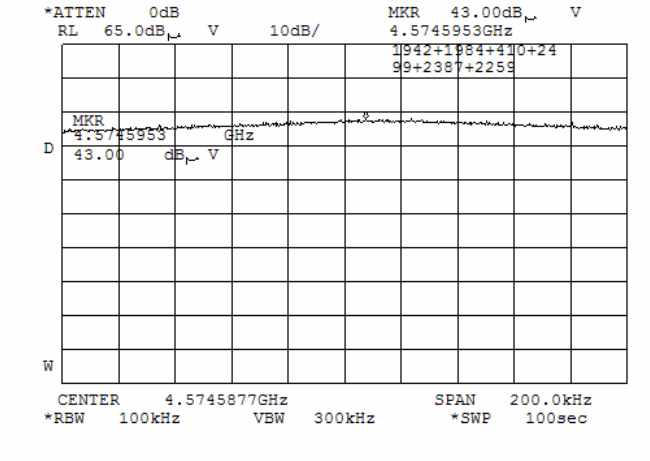
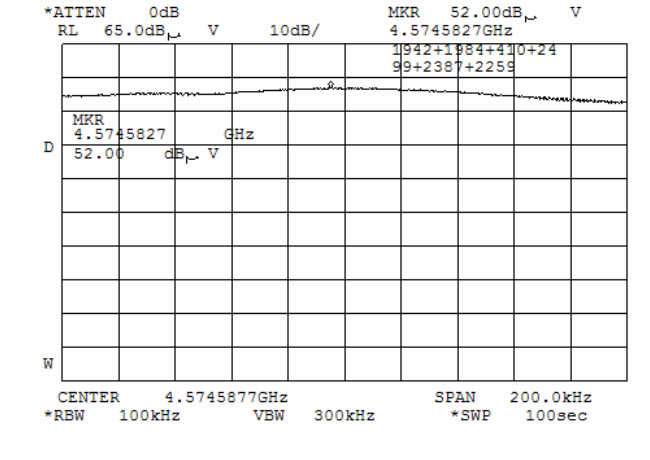
Plot 4.3.18 Radiated emission measurements at the 5th harmonic

TEST SITE: OATS
ANTENNA POLARIZATION: Vertical
TEST DISTANCE: 3 m



Plot 4.3.19 Radiated emission measurements at the 5th harmonic

TEST SITE: OATS
ANTENNA POLARIZATION: Horizontal
TEST DISTANCE: 3 m



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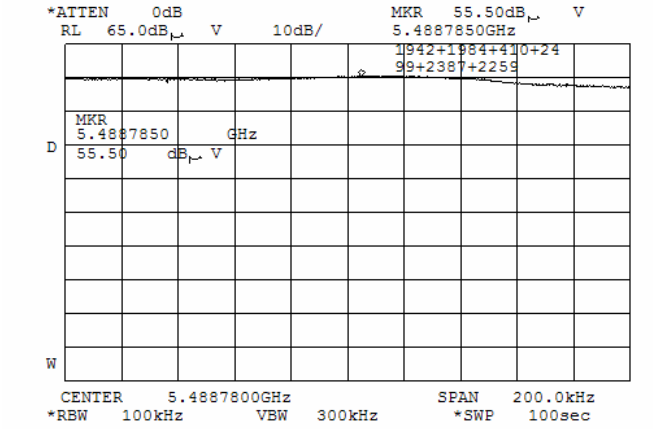
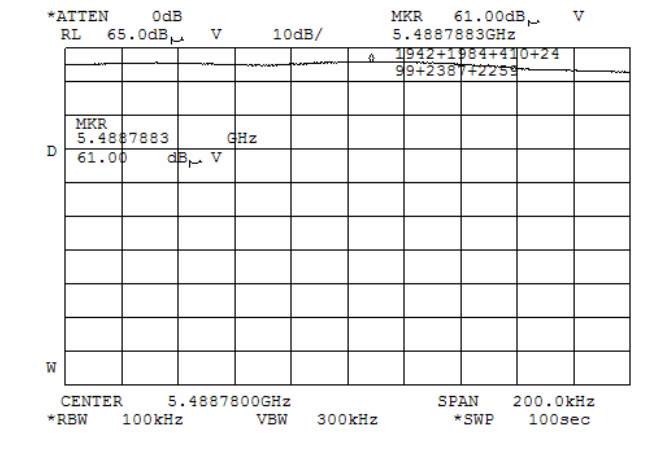
Plot 4.3.20 Radiated emission measurements at the 6th harmonic

TEST SITE:	OATS
ANTENNA POLARIZATION:	Vertical
TEST DISTANCE:	3 m



Plot 4.3.21 Radiated emission measurements at the 6th harmonic

TEST SITE:	OATS
ANTENNA POLARIZATION:	Horizontal
TEST DISTANCE:	3 m



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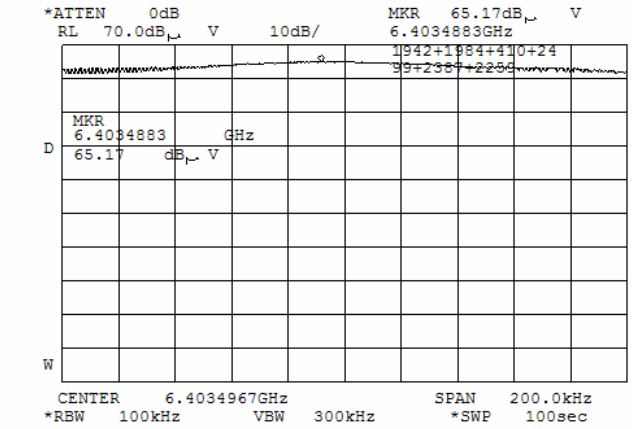
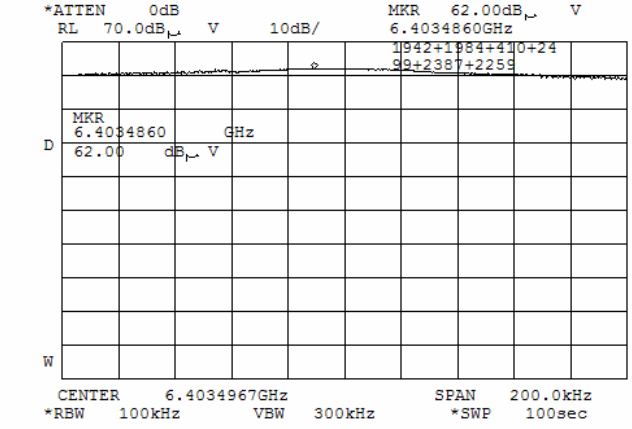
Plot 4.3.22 Radiated emission measurements at the 7th harmonic

TEST SITE: OATS
ANTENNA POLARIZATION: Vertical
TEST DISTANCE: 3 m



Plot 4.3.23 Radiated emission measurements at the 7th harmonic

TEST SITE: OATS
ANTENNA POLARIZATION: Horizontal
TEST DISTANCE: 3 m



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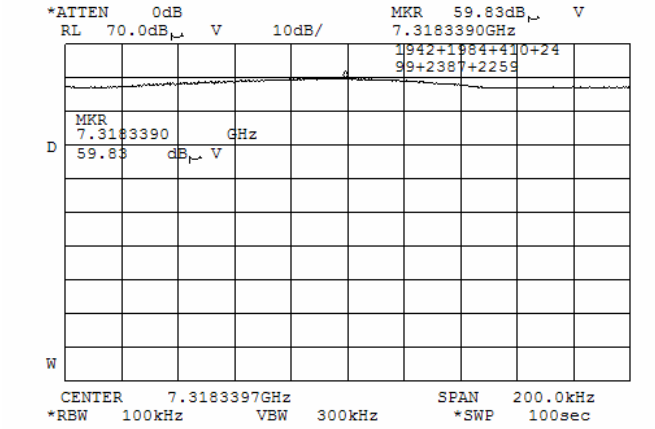
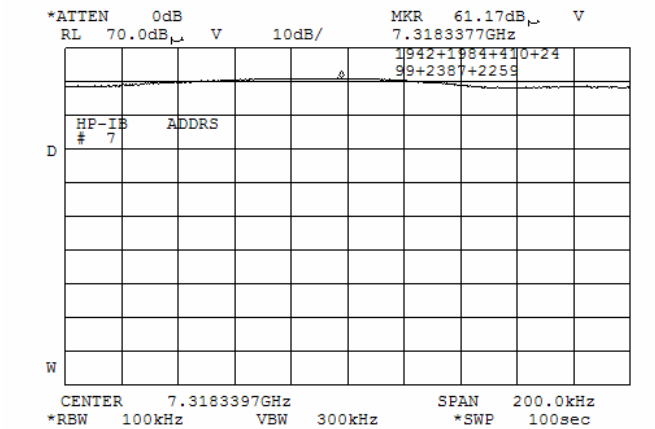
Plot 4.3.24 Radiated emission measurements at the 8th harmonic

TEST SITE: Semi anechoic chamber / OATS
ANTENNA POLARIZATION: Vertical
TEST DISTANCE: 3 m



Plot 4.3.25 Radiated emission measurements at the 8th harmonic

TEST SITE: OATS
ANTENNA POLARIZATION: Horizontal
TEST DISTANCE: 3 m



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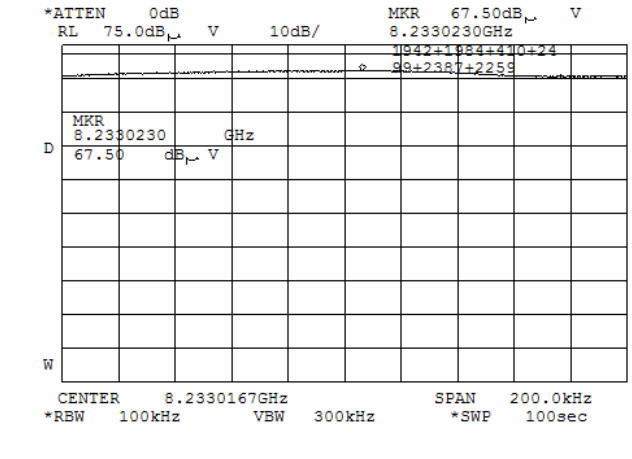
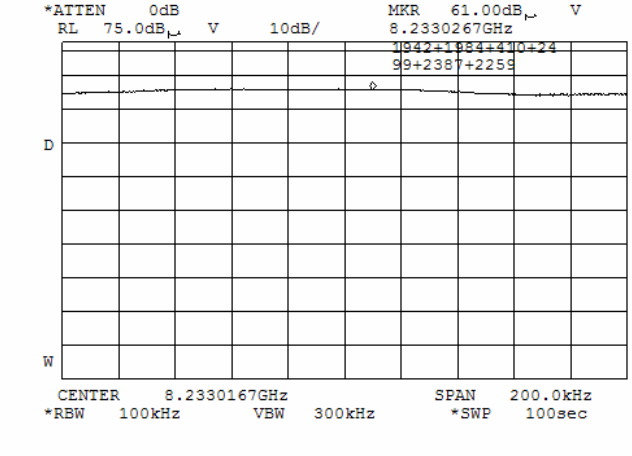
Plot 4.3.26 Radiated emission measurements at the 9th harmonic

TEST SITE: OATS
ANTENNA POLARIZATION: Horizontal
TEST DISTANCE: 3 m



Plot 4.3.27 Radiated emission measurements at the 9th harmonic

TEST SITE: OATS
ANTENNA POLARIZATION: Vertical
TEST DISTANCE: 3 m



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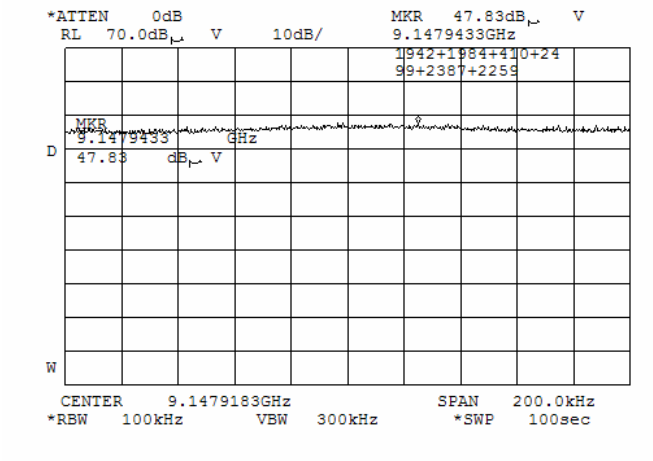
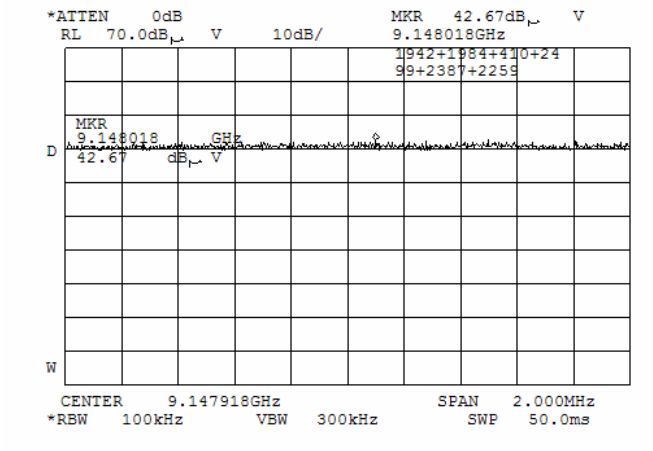
Plot 4.3.28 Radiated emission measurements at the 10th harmonic

TEST SITE: OATS
ANTENNA POLARIZATION: Vertical
TEST DISTANCE: 3 m



Plot 4.3.29 Radiated emission measurements at the 10th harmonic

TEST SITE: OATS
ANTENNA POLARIZATION: Vertical
TEST DISTANCE: 3 m



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4.4 Unintentional radiated emissions test according to §15.109

METHOD OF MEASUREMENT:	ANSI 63.4 §11.6 / ANSI 63.4 §12.1.4
TEST PERFROMED AT:	Anechoic chamber
DATE of TEST:	September 15, 2003
AMBIENT TEMPERATURE:	30°C
RELATIVE HUMIDITY:	38 %
AIR PRESSURE:	1014 hPa
DISTANCE BETWEEN ANTENNA AND EUT:	3 m
THE EUT WAS TESTED AS:	Table-top
FREQUECNY RANGE:	30 MHz – 5 GHz
DETECTOR TYPE:	Peak
MEASUREMENT UNCERTAINTY:	± 6 dB max

For test procedure and setup refer to section 4.3.

For full test results refer to associated plots. No radiated emissions from EUT were found.

LIMIT (§ 15.109)

Frequency, MHz	**Class B equipment @ 3 m dB(μV/m)**
30 - 88	40.0
88 - 216	43.5
216 - 960	46.0
960 - 5000	54.0

TEST EQUIPMENT USED:

HL 0032	HL 0034	HL 1425	HL 1553	HL 1566	HL 1826	HL 1849
HL 1850	HL 2109					

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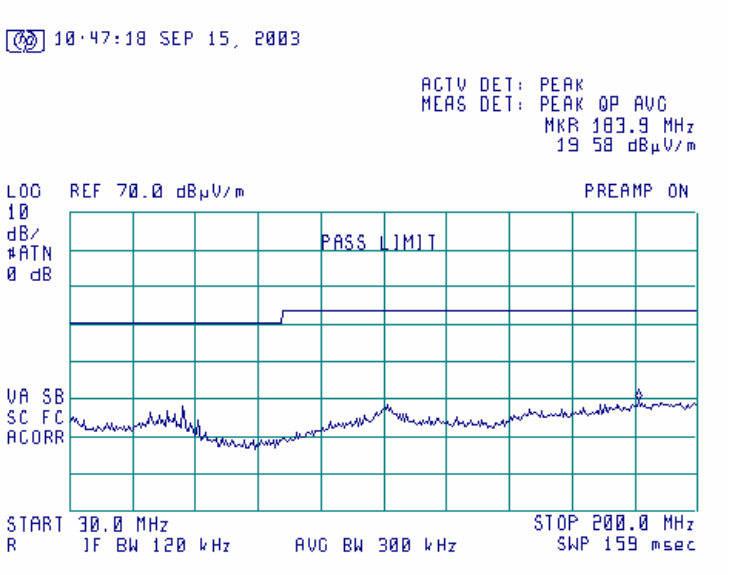
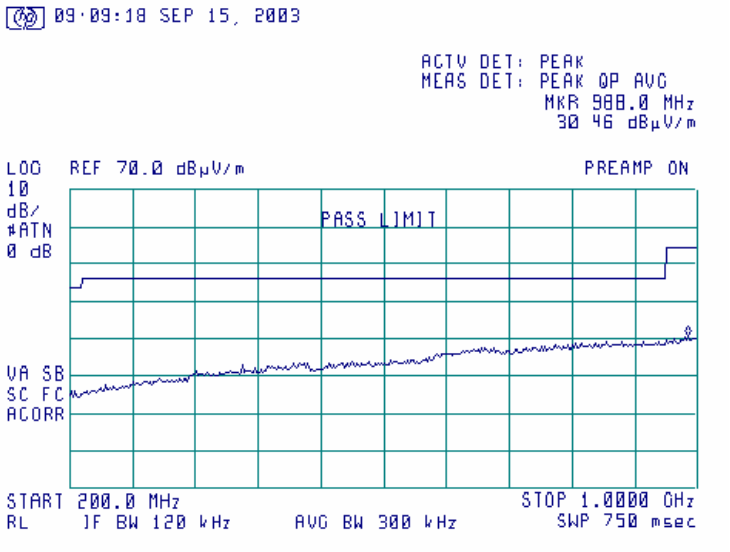
Plot 4.4.1 Radiated emission measurements in the anechoic chamber from 30 MHz to 200 MHz, vertical & horizontal antenna polarization



Plot 4.4.2 Radiated emission measurements in the anechoic chamber from 200 MHz to 1 GHz, vertical & horizontal antenna polarization



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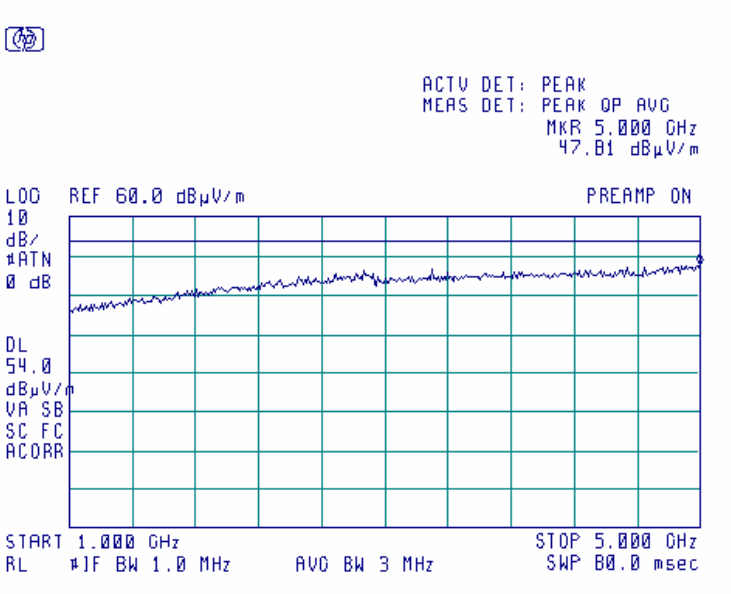
Plot 4.4.3 Radiated emission measurements in the anechoic chamber from 1000 MHz to 5 GHz, vertical & horizontal antenna polarization



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4.5 Frequency stability measurement according to §90.213

DATE of TEST: December 1, 2003
AMBIENT TEMPERATURE: 22°C
RELATIVE HUMIDITY: 46 %
AIR PRESSURE: 1015 hPa

Frequency stability test results vs supply voltage

Voltage, V	Frequency, Hz	Displacement, Hz	Time, min
Ucc=3.6 V	914 974 463	-487	startup
	914 974 851	-99	+2
	914 974 938	-12	+5
	914 974 950	0	+10
Ucc=2.7 V	914 973 658	-1292	startup
	914 973 519	-1431	+2
	914 973 491	-1459	+5
	914 973 158	-1792	+10
Ucc=4.14 V	914 973 196	-1754	startup
	914 973 174	-1776	+2
	914 973 043	-1907	+5
	914 972 978	-1972	+10

Reference frequency: 914974950 Hz

For information only: 2.5 ppm = ± 2287 Hz

TEST PROCEDURE

The EUT frequency stability was measured with variation of supply voltage or ambient temperature in the range from –30°C to +50°C.

TEST EQUIPMENT USED:

HL 0026	HL 0481	HL 0493	HL 0559	HL 1188		

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Frequency stability test results vs ambient temperature

Temperature, °C	Frequency, Hz	Displacement, Hz	Time, min
t°=30°C	914977983	3033	startup
	914977918	2968	+2
	914977863	2913	+5
	914977816	2866	+10
t°=40°C	914968710	-6240	startup
	914967483	-7467	+2
	914967228	-7722	+5
	914966866	-8084	+10
t°=50°C	914954192	-20758	startup
	914951151	-23799	+2
	914949995	-24955	+5
	914949092	-25858	+10
t°=10°C	914951324	-23626	startup
	914952083	-22867	+2
	914952457	-22493	+5
	914952291	-22659	+10
t°=0°C	914923418	-51532	startup
	914925160	-49790	+2
	914922375	-52575	+5
	914924146	-50804	+10
t°=-10°C	914889467	-85483	startup
	914893940	-81010	+2
	914888087	-86863	+5
	914890881	-84069	+10
t°=-20°C	914841543	-133407	startup
	914850746	-124204	+2
	914853269	-121681	+5
	914842357	-132593	+10
t°=-30°C	914793982	-180968	startup
	914791055	-183895	+2
	914790853	-184097	+5
	914787819	-187131	+10

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Appendix A Test equipment used for tests

HL No	Description	Manufacturer	Model	Ser. No.	Last Cal.	Due Cal.
0026	Analyzer, Spectrum, 100 Hz - 2.2 GHz	Anritsu	MS-2601A	3460	22-Sep-04	22-Sep-05
0032	Antenna, Biconical, 20 - 200 MHz	Electro-Metrics	BIA 25/30	3577	10-Jan-05	10-Jan-06
0034	Antenna, Log Periodic, 200 - 1000 MHz	Electro-Metrics	LPA 25/30	1988	10-Jan-05	10-Jan-06
0038	Antenna Mast, 1-4 meter, motorized	HL	AM - 1	028	03-Feb-05	03-Feb-06
0091	Position Controller, for Antenna Mast + Turn Table, OFTS	HL	CRL-2	032	10-Jan-05	10-Jan-06
0287	Turntable, Motorized Diameter, 2 m (OATS)	HL	TMD-2	042	10-Jan-05	10-Jan-06
0410	Cable, Coax, Microwave, DC-18 GHz, N-N, 1 m	Gore	PFP01P01039.4	9338767	11-Nov-04	11-Nov-05
0415	Cable, Coax, RF, RG-214	HL	CC-3	056	02-Dec-04	02-Dec-05
0446	Antenna, Loop active, 10kHz-30MHz	EMCO	6502	2857	11-Nov-04	11-Nov-05
0481	Power Supply 40V/1A	Horizon Electronics	DHP 40-1	50-7625	27-Feb-05	27-Feb-06
0493	Oven temperature -45…175 deg C	Thermotron	S-1.2 Mini-Max	14016	27-Feb-05	27-Feb-06
0559	Multimeter Digital	Fluke	Fluke 76	65360903	27-Feb-05	27-Feb-06
0661	Generator Swept Signal, 10 MHz to 40 GHz, + 10 dBm	Hewlett Packard	83640B	3614A00266	27-Feb-05	27-Feb-06
0812	Cable Coax, RG-214, 11.5 m, N-type connectors	HL	C214-11	148	27-Feb-05	27-Feb-06
1116	Antenna, Horn, 1-18 GHz	HL	A1-18	186	27-Feb-05	27-Feb-06
1188	Power Supply, Regulated, DC, 40V/3.0A	Power/Mate corp. PMC	0-40/3A	7K529677	16-Jun-04	16-Jun-05
1200	Quadruplexer 1-12 GHz (1-2 GHz; 2-4GHz;4-8 GHz; 8-12GHz)	Elettronica S.p.A. - Roma	UE 84	D/00240	10-Feb-05	10-Feb-06
1424	Spectrum Analyzer, 30 Hz- 40 GHz	Agilent Technologies (HP)	8564EC	3946A00219	30-Aug-04	30-Aug-05
1425	EMI Receiver, 9 kHz - 2.9 GHz, System: HL1426, HL1427	Agilent Technologies (HP)	8542E	3710A00222, 3705A00204	01-Sep-04	01-Sep-05
1430	EMI Receiver, 9 kHz - 2.9 GHz, System: HL1431, HL1432	Agilent Technologies (HP)	8542E	3807A00262,3705A00217	01-Sep-04	01-Sep-05
1535	Cable RF, 12 m	Alpha Wire	RG-214/U	1535	23-Sep-04	23-Sep-05
1545	Cable RF	Alpha Wire	RG-214/U		23-Sep-04	23-Sep-05
1553	Cable RF, 3.5 m	Alpha Wire	RG-214	1553	02-Dec-04	02-Dec-05
1565	Antenna, Dipole, Tunable 500 - 1000 MHz	Electro-Metrics	TDS-30-2	334	29-Jan-05	29-Jan-06
1566	Cable RF, 2 m	Huber-Suhner	Sucoflex 104PE	13094/4PE	02-Dec-04	02-Dec-05
1826	Antenna mast and Turntable position controller (Small Anechoic chamber)	Sh. I. Machines	CRL-4	1	02-Dec-04	02-Dec-05
1849	Antenna mast with polarity control (Small Anechoic chamber)	Sh. I. Machines	AM-F4	1849	18-Jan-05	18-Jan-06
1850	Turntable	Sh. I. Machines	TT-M-3	1850	02-Dec-04	02-Dec-05
1942	Cable 18GHz, 4 m, blue	Rhophase Microwave Limited	SPS-1803A-4000-NPS	T4658	17-Oct-04	17-Oct-05

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HL No	Description	Manufacturer	Model	Ser. No.	Last Cal.	Due Cal.
1947	Cable 18GHz, 6.5 m, blue	Rhophase Microwave Limited	NPS-1803A-6500-NPS	T4974	17-Oct-04	17-Oct-05
1984	Antenna, Double-Ridged Waveguide Horn, 1-18 GHz, 300 W, N-type	EMC Test Systems	3115	9911-5964	22-Mar-04	22-Mar-05
2109	Anechoic Chamber 6(L) x 5.5(W) x 2.95(H) m	HL	AC-2	2109	12-Dec-04	12-Dec-05
2254	Cable 40GHz, 0.8 m, blue	Rhophase Microwave Limited	KPS-1503A-800-KPS	W4907	12-Dec-04	12-Dec-05
2259	Amplifier Low Noise 2-20 GHz	Sophia Wireless	LNA0220-C	0223	12-Dec-04	12-Dec-05
2299	Cable, 9.3 m	Harbour Industries	MIL 17/60-RG142	NA	12-Dec-04	12-Dec-05
2400	Cable 40GHz, 1.5 m, green	Rhophase Microwave Limited	KPS-1503A-1500-KPS	X2946	12-Dec-04	12-Dec-05
2432	Antenna, Double-Ridged Waveguide Horn 1-18 GHz	EMC Test Systems	3115	00027177	12-Dec-04	12-Dec-05

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Appendix B Antenna factors and cable loss

Antenna factor
Double-ridged wave guide horn antenna
Model 3115, S/N 9911-5964, HL 1984

Frequency, MHz	Antenna factor, dB(1/m)
1000.0	24.7
1500.0	25.7
2000.0	27.6
2500.0	28.9
3000.0	31.2
3500.0	32.0
4000.0	32.5
4500.0	32.7
5000.0	33.6
5500.0	35.1
6000.0	35.4
6500.0	34.9
7000.0	36.1
7500.0	37.8
8000.0	38.0
8500.0	38.1
9000.0	39.1
9500.0	38.3
10000.0	38.6
10500.0	38.2
11000.0	38.7
11500.0	39.5
12000.0	40.0
12500.0	40.4
13000.0	40.5
13500.0	41.1
14000.0	41.6
14500.0	41.7
15000.0	38.7
15500.0	38.2
16000.0	38.8
16500.0	40.5
17000.0	42.5
17500.0	45.9
18000.0	49.4

Antenna factor in dB(1/m) is to be added to receiver meter reading in dB(μV) to convert it into field intensity in dB(μV/m).

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Antenna factor
Double ridged guide antenna
Hermon Laboratoriies, model A1-18, S/N 186, HL 1116

Frequency, MHz	Antenna factor. dB(1/m)
1000.0	24.6
1500.0	26.4
2000.0	29.7
2500.0	31.1
3000.0	31.5
3500.0	32.7
4000.0	36.1
4500.0	36.1
5000.0	39.9
5500.0	40.5
6000.0	40.4
6500.0	41.0
7000.0	41.2
7500.0	41.2
8000.0	44.3
8500.0	40.7
9000.0	39.3
9500.0	41.3
10000.0	42.8
10500.0	43.8
11000.0	47.0
11500.0	46.3
12000.0	43.4
12500.0	41.8
13000.0	41.9
13500.0	44.5
14000.0	44.8
14500.0	44.9
15000.0	44.4
15500.0	43.4
16000.0	42.6
16500.0	43.6
17000.0	42.3
17500.0	45.9
18000.0	45.3

Antenna factor in dB(1/m) is to be added to receiver meter reading in dB(μV) to convert it into field intensity in dB(μV/m).

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Antenna factor
Double-ridged guide horn antenna
Model 3115, serial number: 00027177, HL 2432

Frequency, MHz	Antenna factor. dB(1/m)
1000.0	24.7
1500.0	25.7
2000.0	27.8
2500.0	28.9
3000.0	30.7
3500.0	31.8
4000.0	33.0
4500.0	32.8
5000.0	34.2
5500.0	34.9
6000.0	35.2
6500.0	35.4
7000.0	36.3
7500.0	37.3
8000.0	37.5
8500.0	38.0
9000.0	38.3
9500.0	38.3
10000.0	38.7
10500.0	38.7
11000.0	38.9
11500.0	39.5
12000.0	39.5
12500.0	39.4
13000.0	40.5
13500.0	40.8
14000.0	41.5
14500.0	41.3
15000.0	40.2
15500.0	38.7
16000.0	38.5
16500.0	39.8
17000.0	41.9
17500.0	45.8
18000.0	49.1

Antenna factor in dB(1/m) is to be added to receiver meter reading in dB(μV) to convert it into field intensity in dB(μV/m).

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Antenna factor
Biconical antenna
Electro-Metrics, model BIA-25/30
Ser.No.3577

Frequency MHz	Antenna Factor dB(1/m)	Frequency MHz	Antenna Factor dB(1/m)
20	15.1	115	16.7
25	14.6	120	14.1
30	13.7	125	13.1
35	11.8	130	13.0
40	11.4	135	12.9
45	11.7	140	12.7
50	11.4	145	12.5
55	10.5	150	14.3
60	10.3	155	14.8
65	8.9	160	14.7
70	7.6	165	15.1
75	7.3	170	15.6
80	7.3	175	16.5
85	7.8	180	16.7
90	9.4	185	17.3
95	10.6	190	17.9
100	11.8	195	17.6
105	12.5	200	17.9
110	13.7		

Antenna factor in dB (1/m) is to be added to receiver meter reading in dB(μV) to convert it into field intensity in dB(μV/m).

Antenna factor
Log periodic antenna
Electro-Metrics, model LPA-25/30
Ser.No.1988

Frequency MHz	Antenna Factor dB(1/m)	Frequency MHz	Antenna Factor dB(1/m)
200	12.6	625	20.4
225	12.2	650	20.9
250	13.4	675	22.0
275	14.3	700	22.2
300	15.2	725	22.7
325	15.7	750	22.5
350	15.9	775	22.7
375	16.4	800	22.8
400	17.0	825	23.2
425	17.4	850	23.5
450	17.9	875	23.9
475	18.6	900	24.0
500	19.1	925	24.0
525	19.3	950	24.2
550	19.6	975	24.7
575	19.8	1000	25.1
600	20.0		

Antenna factor in dB(1/m) is to be added to receiver meter reading in dB(μV) to convert it into field intensity in dB(μV/m).

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Antenna factor
Active Loop Antenna
Model 6502
S/N 2857

Frequency, MHz	Magnetic antenna factor, dB	Electric antenna factor, dB
0.009	-32.8	18.7
0.010	-33.8	17.7
0.020	-38.3	13.2
0.050	-41.1	10.4
0.075	-41.3	10.2
0.100	-41.6	9.9
0.150	-41.7	9.8
0.250	-41.6	9.9
0.500	-41.8	9.8
0.750	-41.9	9.7
1.000	-41.4	10.1
2.000	-41.5	10.0
3.000	-41.4	10.2
4.000	-41.4	10.1
5.000	-41.5	10.1
10.000	-41.9	9.6
15.000	-41.9	9.6
20.000	-42.2	9.3
25.000	-42.8	8.7
30.000	-44.0	7.5

Antenna factor in dB(1/m) is to be added to receiver meter reading in dB(μV) to convert it into field intensity in dB(μV/m).

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Cable loss
Cable Coaxial, RG-58/RG-214, s/n 056, HL 0415
+ Cable Coaxial, RG-214, 11.5m, s/n 148, HL 0812

No.	Frequency, MHz	Cable loss, dB	Measured uncertainty, dB
1	20	0.73	±0.12
2	30	0.91	
3	50	1.2	
4	80	1.56	
5	100	1.76	
6	200	2.59	
7	300	3.26	
8	400	3.93	
9	500	4.42	
10	600	4.92	
11	700	5.36	
12	800	5.88	
13	900	6.41	
14	1000	6.71	
15	1500	8.63	
16	2000	10.39	

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Cable loss
RF cable 3.5 m, Alpha Wire, model RG-214, S/N 149, HL 1553

No.	Frequency, MHz	Cable loss, dB	Measurement uncertainty, dB
1	1	0.01	±0.05
2	10	0.07	
3	30	0.12	
4	50	0.22	
5	100	0.26	
6	200	0.40	
7	300	0.52	
8	400	0.60	
9	500	0.70	
10	600	0.77	
11	700	0.84	
12	800	1.00	
13	900	1.00	
14	1000	1.05	
15	2000	1.70	

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Cable loss
Cable RF, 2m, model: Sucoflex 104PE, S/N 13094/4PE, HL 1566

No.	Frequency, MHz	Cable loss, dB	Tolerance, dB	Measurement uncertainty, dB
1	30	0.10	≤ 5.0	±0.12
2	50	0.13		
3	100	0.20		
4	300	0.33		
5	500	0.45		
6	800	0.60		
7	1000	0.65		
8	1500	0.91		
9	2000	1.08		
10	2500	1.19		
11	3000	1.28		
12	3500	1.49		
13	4000	1.63		
14	4500	1.63	≤ 5.0	±0.17
15	5000	1.66		
16	5500	1.88		
17	6000	1.96		
18	6500	1.93		
19	7000	2.07		
20	7500	2.37		
21	8000	2.34		
22	8500	2.64		
23	9000	2.68		
24	9500	2.64		
25	10000	2.70		
26	10500	2.84		
27	11000	2.88		
28	11500	3.19		
29	12000	3.15		
30	12500	3.20	≤ 5.0	±0.26
31	13000	3.22		
32	13500	3.47		
33	14000	3.41		
34	14500	3.59		
35	15000	3.79		
36	15500	4.24		
37	16000	4.12		
38	16500	4.46		
39	17000	4.50		
40	17500	4.49		
41	18000	4.45		

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Cable loss
Cable 18 GHz, 4 m, blue, model: SPS-1803A-4000-NPS, S/N T4658, HL 1942

Frequency, GHz	Cable loss, dB
0.03	0.21
0.05	0.26
0.10	0.36
0.20	0.50
0.30	0.61
0.40	0.70
0.50	0.78
0.60	0.85
0.70	0.93
0.80	0.99
0.90	1.04
1.00	1.10
1.10	1.16
1.20	1.22
1.30	1.26
1.40	1.31
1.50	1.35
1.60	1.41
1.70	1.45
1.80	1.49
1.90	1.53
2.00	1.57
2.10	1.61
2.20	1.65
2.30	1.69
2.40	1.72
2.50	1.76
2.60	1.79
2.70	1.83
2.80	1.87
2.90	1.90
3.10	1.97
3.30	2.04
3.50	2.11
3.70	2.18
3.90	2.24
4.10	2.31
4.30	2.38
4.50	2.43
4.70	2.53
4.90	2.53
5.10	2.63
5.30	2.65
5.50	2.72
5.70	2.76
5.90	2.79

Frequency, GHz	Cable loss, dB
6.10	2.88
6.30	2.90
6.50	2.97
6.70	3.02
6.90	3.04
7.10	3.07
7.30	3.12
7.50	3.13
7.70	3.19
7.90	3.24
8.10	3.30
8.30	3.36
8.50	3.45
8.70	3.41
8.90	3.45
9.10	3.42
9.30	3.55
9.50	3.48
9.70	3.58
9.90	3.61
10.10	3.66
10.30	3.68
10.50	3.70
10.70	3.70
10.90	3.75
11.10	3.78
11.30	3.86
11.50	3.98
11.70	4.10
11.90	4.12
12.10	4.09
12.40	4.13
13.00	4.23
13.50	4.35
14.00	4.40
14.50	4.44
15.00	4.57
15.50	4.66
16.00	4.64
16.50	4.66
17.00	4.75
17.50	4.85
18.00	4.93

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Cable loss
Cable 18 GHz, 6.5 m, blue, model: NPS-1803A-6500-NPS, S/N T4974, HL 1947

Frequency, GHz	Cable loss, dB
0.03	0.30
0.05	0.38
0.10	0.53
0.20	0.74
0.30	0.91
0.40	1.05
0.50	1.18
0.60	1.29
0.70	1.40
0.80	1.50
0.90	1.59
1.00	1.68
1.10	1.77
1.20	1.86
1.30	1.94
1.40	2.01
1.50	2.08
1.60	2.16
1.70	2.22
1.80	2.29
1.90	2.36
2.00	2.42
2.10	2.48
2.20	2.54
2.30	2.60
2.40	2.66
2.50	2.71
2.60	2.77
2.70	2.83
2.80	2.89
2.90	2.95
3.10	3.06
3.30	3.17
3.50	3.28
3.70	3.39
3.90	3.51
4.10	3.62
4.30	3.76
4.50	3.87
4.70	4.01
4.90	4.10
5.10	4.21
5.30	4.31
5.50	4.43
5.70	4.56
5.90	4.71

Frequency, GHz	Cable loss, dB
6.10	4.87
6.30	4.95
6.50	4.94
6.70	4.88
6.90	4.87
7.10	4.83
7.30	4.85
7.50	4.86
7.70	4.91
7.90	4.96
8.10	5.03
8.30	5.08
8.50	5.13
8.70	5.21
8.90	5.22
9.10	5.34
9.30	5.35
9.50	5.52
9.70	5.51
9.90	5.66
10.10	5.70
10.30	5.78
10.50	5.79
10.70	5.82
10.90	5.86
11.10	5.94
11.30	6.06
11.50	6.21
11.70	6.44
11.90	6.61
12.10	6.76
12.40	6.68
13.00	6.66
13.50	6.81
14.00	6.90
14.50	6.90
15.00	6.97
15.50	7.17
16.00	7.28
16.50	7.27
17.00	7.38
17.50	7.68
18.00	7.92

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Cable loss
Cable 40 GHz, 0.8 m, blue, model: KPS-1503A-800-KPS, S/N W4907, HL 2254

Frequency, GHz	Cable loss, dB	Frequency, GHz	Cable loss, dB	Frequency, GHz	Cable loss, dB
0.03	0.04	5.10	0.80	15.00	1.49
0.05	0.07	5.30	0.83	15.50	1.49
0.10	0.09	5.50	0.83	16.00	1.46
0.20	0.15	5.70	0.84	16.50	1.47
0.30	0.19	5.90	0.87	17.00	1.50
0.40	0.25	6.10	0.86	17.50	1.57
0.50	0.29	6.30	0.89	18.00	1.63
0.60	0.33	6.50	0.90	18.50	1.57
0.70	0.37	6.70	0.89	19.00	1.63
0.80	0.41	6.90	0.93	19.50	1.65
0.90	0.44	7.10	0.92	20.00	1.64
1.00	0.45	7.30	0.95	20.50	1.75
1.10	0.48	7.50	0.96	21.00	1.72
1.20	0.51	7.70	0.97	21.50	1.78
1.30	0.53	7.90	1.01	22.00	1.76
1.40	0.54	8.10	1.00	22.50	1.72
1.50	0.57	8.30	1.05	23.00	1.83
1.60	0.59	8.50	1.04	23.50	1.80
1.70	0.04	8.70	1.07	24.00	1.90
1.80	0.07	8.90	1.11	24.50	1.81
1.90	0.09	9.10	1.09	25.00	1.98
2.00	0.15	9.30	1.14	25.50	1.91
2.10	0.19	9.50	1.12	26.00	2.02
2.20	0.25	9.70	1.15	26.50	1.92
2.30	0.29	9.90	1.16	27.00	1.97
2.40	0.33	10.10	1.16	28.00	2.02
2.50	0.37	10.30	1.19	29.00	1.95
2.60	0.41	10.50	1.14	30.00	1.94
2.70	0.44	10.70	1.19	31.00	2.11
2.80	0.45	10.90	1.17	32.00	2.17
2.90	0.48	11.10	1.13	33.00	2.27
3.10	0.61	11.30	1.20	34.00	2.27
3.30	0.64	11.50	1.13	35.00	2.29
3.50	0.65	11.70	1.20	36.00	2.35
3.70	0.68	11.90	1.18	37.00	2.37
3.90	0.69	12.10	1.14	38.00	2.40
4.10	0.71	12.40	1.19	39.00	2.57
4.30	0.73	13.00	1.34	40.00	2.36
4.50	0.75	13.50	1.33		
4.70	0.77	14.00	1.48		
4.90	0.79	14.50	1.45		

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Cable loss
Cable coaxial, 40GHz, 1.5 m, green, Rhophase Microwave Limited, model: KPS-1503A-1500-KPS, HL 2400

Frequency, GHz	Cable loss, dB	Frequency, GHz	Cable loss, dB	Frequency, GHz	Cable loss, dB
0.03	0.06	6.5	1.46	15.50	2.34
0.05	0.08	6.7	1.49	16.00	2.34
0.1	0.15	6.9	1.50	16.50	2.40
0.2	0.23	7.1	1.51	17.00	2.46
0.3	0.29	7.3	1.55	17.50	2.54
0.5	0.37	7.5	1.56	18.00	2.61
0.7	0.46	7.7	1.58	18.50	2.59
0.9	0.53	7.9	1.60	19.00	2.59
1.1	0.58	8.1	1.61	19.50	2.67
1.3	0.65	8.3	1.68	20.00	2.62
1.5	0.66	8.5	1.68	20.50	2.73
1.7	0.72	8.7	1.75	21.00	2.71
1.9	0.76	8.9	1.74	21.50	2.78
2.1	0.79	9.1	1.81	22.00	2.83
2.3	0.85	9.3	1.79	22.50	2.81
2.5	0.90	9.5	1.86	23.50	2.91
2.7	0.91	9.7	1.85	24.00	2.97
2.9	0.97	9.9	1.87	24.50	2.98
3.1	0.97	10.1	1.88	25.00	2.97
3.3	1.03	10.30	1.82	25.50	3.03
3.5	1.06	10.50	1.92	26.00	3.04
3.7	1.10	10.70	1.86	26.50	3.11
3.9	1.13	10.90	1.96	27.00	2.97
4.1	1.16	11.10	1.90	28.00	3.15
4.3	1.18	11.30	1.99	29.00	3.07
4.5	1.21	11.50	1.95	30.00	3.13
4.7	1.23	11.70	2.00	31.00	3.13
4.9	1.26	11.90	2.01	32.00	3.18
5.1	1.28	12.10	1.99	33.00	3.31
5.3	1.31	12.40	2.06	34.00	3.32
5.5	1.32	13.00	2.11	35.00	3.37
5.7	1.36	13.50	2.17	36.00	3.36
5.9	1.37	14.00	2.36	37.00	3.46
6.1	1.38	14.50	2.32	39.00	3.49
6.3	1.44	15.00	2.30	40.00	3.52

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Appendix C General information

Test facility description

Tests were performed at Hermon Laboratories Ltd., which is a fully independent, private, EMC, safety, environmental and telecommunication testing facility. Hermon Laboratories is listed by the Federal Communications Commission (USA) for all parts of Code of Federal Regulations 47 (CFR 47) and by Industry Canada for electromagnetic emissions (file numbers IC 2186-1 for OATS and IC 2186-2 for anechoic chamber), certified by VCCI, Japan (the registration numbers are R-808 for OATS, R-1082 for anechoic chamber, C-845 for conducted emissions site), assessed by TNO Certification EP&S (Netherlands) for a number of EMC, telecommunications, environmental, safety standards, and by AMTAC (UK) for safety of medical devices. The laboratory is accredited by American Association for Laboratory Accreditation (USA) according to ISO/IEC 17025 for electromagnetic compatibility, product safety, telecommunications testing and environmental simulation (for exact scope please refer to Certificate No. 839.01) and approved by Israel Ministry of environmental protection, radiation hazards department (Permit number 1158).

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Abbreviations and acronyms

The following abbreviations and acronyms are applicable to this test report:

ASK	amplitude shift keying
cm	centimeter
dB	decibel
dBm	decibel referred to one milliwatt
dB(μV)	decibel referred to one microvolt
dB(μV/m)	decibel referred to one microvolt per meter
EMC	electromagnetic compatibility
EUT	equipment under test
GHz	gigahertz
H	height
Hz	hertz
kHz	kilohertz
kV	kilovolt
L	length
LNA	low noise amplifier
LMS	location and monitoring service
m	meter
MHz	megahertz
NA	not applicable
QP	quasi-peak
RF	radio frequency
rms	root mean square
s	second
V	volt
W	width

Specification references

47CFR part 90: 2004	Private land mobile radio services
ANSI C63.2:96	American National Standard for Instrumentation-Electromagnetic Noise and Field Strength, 10 kHz to 40 GHz-Specifications.
ANSI C63.4:2001	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.