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Electrical

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RADIO TEST REPORT

according to 47CFR Part 15, §15.247 and subpart B
for

Tadiran Telematics Ltd.

EQUIPMENT UNDER TEST:

TransMeter Water

model: 250FH

Document ID: TADRAD_FCC.15187.doc
Date of Issue: July 2002

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1 Project information

Description of equipment under test

Test items	: TransMeter Water
Manufacturer	: Tadiran-Telematics Ltd
Equipment serial number	: 001188
Types (Models)	: 250FH
Hardware revision	: A1
Software revision	: A1
Equipment FCC code[1]	: DSS

Applicant information

Applicant's responsible person	: Mr. Uzi Erman
Company	: Tadiran-Telematics Ltd
Address	: 26 Hamelaha St.
Postal code	: 58117
City	: Holon
Country	: Israel
Telephone number	: +972 (0) 3 5575755
Telefax number	: +972 (0) 3 5575753

Test performance

Project Number:	: 15187
Location	: Hermon Laboratories
Receipt date	: July 9, 2002
Test performed	: July 9, 2002
Purpose of test	Apparatus compliance verification in accordance with emission requirements
Test specification(s)	47CFR Part 15, §15.247 and subpart B

[1] FCC Equipment codes – see Appendix D

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2 Summary of tests

The tests listed in the table below were performed. The EUT was found complying with the limits of 47CFR Part 15, §15.247 and subpart B.

Parameter	Subclause	C	NC	NT	NA	Tested by	Date tested	Remarks
Transmitter characteristics, §15.247								
Frequency hopping systems								
Occupied bandwidth of hopping channels	(a)(1) (i – iii)	**X**				Mrs. E. Pitt, test engineer	July 9, 2002	
Hopping channel frequency separation	(a)(1)	**X**				Mrs. E. Pitt, test engineer	July 9, 2002	
Number of hopping channels	(a)(1) (i – iii)	**X**				Mrs. E. Pitt, test engineer	July 9, 2002	
Average time of occupancy	(a)(1) (i – iii)	**X**				Mrs. E. Pitt, test engineer	July 9, 2002	
Maximum peak output power	b(1), b(2), b(3)	**X**				Mrs. E. Pitt, test engineer	July 9, 2002	
Exposure compliance requirements	b(4)	**X**						Evaluation
Spurious emissions (conducted)	c				**X**			
Spurious emissions (radiated)	c	**X**				Mrs. E. Pitt, test engineer	July 9, 2002	
Spurious emissions (radiated) in restricted bands	15.209, 15.205(a,c)	**X**				Mrs. E. Pitt, test engineer	July 9, 2002	
Direct sequence systems - NA								
Minimum 6 dB bandwidth	a(2)							
Maximum peak output power	b(1)							
Exposure compliance requirements	b(4)							
Spurious emissions (conducted)	c							
Spurious emissions (radiated)	c							
Spurious emissions (radiated) in restricted bands	15.209, 15.205(a,c)							

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Parameter	Subclause	C	NC	NT	NA	Tested by	Date tested	Remarks
Peak power spectral density	d							
Processing gain	e(2)							
Hybrid systems - NA								
Processing gain from the combined techniques	f							
Average time of occupancy at direct sequence operation turned off	f							
Peak power spectral density at frequency hopping operation turned off:	f							
Maximum peak output power	b (1) – (3)							
Exposure compliance requirements	b(4)							
Spurious emissions (conducted)	c							
Spurious emissions (radiated)	c							
Spurious emissions (radiated) in restricted bands	c, 15.209, 15.205(a,c)							
Unintentional radiation, §15.107, §15.109								
Conducted emissions	15.107				**X**			
Radiated emissions	15.109	**X**				Mrs. E. Pitt, test engineer	July 9, 2002	
General conditions under Part 15								
The Intentional radiator operates in 905 - 924 MHz frequency range.	15.247	**X**						
The hopping sequence meets the requirement specified in the definition of a frequency hopping spread spectrum system	15.247, a(1)	**X**				For an example of a hopping sequence see Appendix D.		
Each of the hopping channels is used equally on average	15.247 a(1)	**X**						
The associated receiver complies with the requirement that its input bandwidth (either RF or IF) matches the bandwidth of the transmitted signal	15.247 a(1)	**X**						
The EUT is designed to be capable of operating as a true frequency hopping system	15.247(g)	**X**						

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Parameter		Subclause	C	NC	NT	NA	Tested by	Date tested	Remarks
The EUT does not have the ability to be coordinated with other FHSS systems in an effort to avoid the simultaneous occupancy of individual hopping frequencies by multiple transmitters		15.247(h)	X						
Examined frequencies:		15.31(m)							
Near the top	923.175 MHz								
Near the middle	916.3 MHz								
Near the bottom	905.6 MHz								
The intentional radiator has permanently attached antenna or antenna that uses a unique coupling to the intentional radiator.		15.203	X						
The intentional radiator has a standard connector and must be professionally installed. To demonstrate that professional installation is required, the following three points must be addressed: (a) the application (or intended use) of the EUT; (b) the installation requirements of the EUT, and (c) the method by which the EUT will be marketed.		15.203				X			
No antenna other than that furnished by the responsible party can be used with the device.		15.203	X						
Antenna technical characteristics, as referred to in "Transmitter description" table in the test report		15.204	X						
NOTE: C: The parameter is compliant with the requirements. NC: The parameter is not compliant with the requirements. NT: The parameter is not tested. NA: The test of this parameter is not applicable.									

Test report prepared by: Mrs. V. Mednikov, certification engineer

Test report approved by: Mr. A. Usoskin, QA manager

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3 EUT description

3.1 General description

The EUT, TMW 250FH, is a water meter with a built-in 2-way RF communicator. The RF capabilities enable transmission of meter readings and some extra information to a collecting unit.
The TMW 250FH consists of two parts: spread spectrum frequency hopping transceiver with integral antenna and a microcontroller.
The device is intended for installation with antenna in horizontal position and powered by two internal 3.6 V lithium batteries.

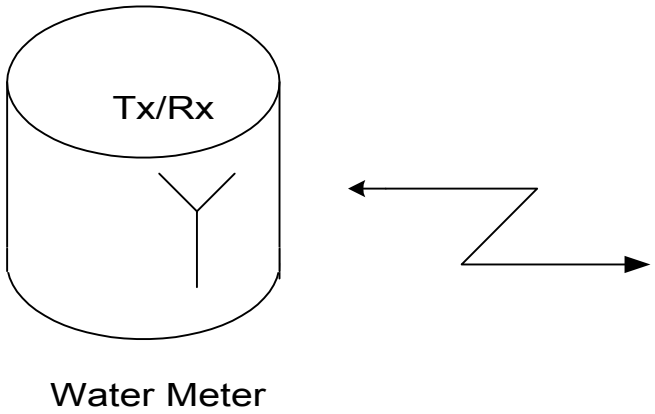
3.2 EUT test configuration

The EUT test configuration is shown in Figure 3.2.1, clock and oscillator frequencies are provided in Table 3.2.1.

Table 3.2.1 EUT operating frequencies

Frequency	Card Id					
852.3 MHz	LO1					
53.3 MHz	LO2					
26.6353 MHz	clock1					
32.768 kHz	clock2					

Figure 3.2.1



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3.3 Transmitter description

Type of equipment						
X	Stand-alone (Equipment with or without its own control provisions)					
	Combined equipment (Equipment where the radio part is fully integrated within another type of equipment)					
	Plug-in card (Equipment intended for a variety of host systems)					
	Other:					
Operating frequency range	905 - 924 MHz					
Spread spectrum technique used						
X	Frequency hopping (FHSS)					
	Direct sequence (DSSS)					
	Combined					
Spread spectrum parameters*						
DSSS	chip sequence length (bits)					
	spectrum width (MHz)					
FHSS	total number of hops (units)	26				
	dwell time (milliseconds)	3.5				
	bandwidth per hop (MHz)	0.475				
	max. separation of hops (MHz)	0.8				
Transmitter aggregate data rate (bits per second)				60 kbit/s		
Normal test signal				transmit protocol, FSK		
Maximum rated output power						
At transmitter permanent external 50 Ω rf output connector (dBm)						
Effective radiated power (for equipment with integral antenna) (dBm)				18		
Is transmitter output power variable?	**X**	No				
		Yes		continuous variable		
				stepped variable		
				stepsize (dB):.....		
				minimum RF power (dBm):.....		
				maximum RF power (dBm):.....		
Transmitter power source						
	Battery	**Nominal rated voltage (VDC)**		**3.6**		
X	Nickel Cadmium					
	Lithium					
	Other					
	DC	**Nominal rated voltage (VDC)**				
	AC mains	**Nominal rated voltage (VAC)**				
Is there common power source for transmitter and receiver				**X**	yes		no

Antenna technical characteristics						
			Type	**Manufacturer**	**Model number**	**Gain**
Integral		with temporary RF connector	PIFA	Telematics	NA	2.5 dBi
	X	without temporary RF connector				
External						

External antenna connection - NA			
	standard connector		unique coupling

* If more than 1 variant of any spectrum parameter may be used, provide all variations of these parameters.

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4 Test results

4.1 Occupied bandwidth of hopping channels and channel carrier frequencies separation according to § 15.247(a)(1)

METHOD OF MEASUREMENTS	ANSI 63.4 §13.1.7
DATE:	July 9, 2002
RELATIVE HUMIDITY:	42 %
AMBIENT TEMPERATURE:	24 °C
OPERATING FREQUENCY RANGE	905-924 MHz
MODULATION TECHNIQUE	FHSS
HOPPING FUNCTION	Enabled

Carrier frequency, MHz	Measured 20 dB bandwidth, kHz	Reference to Plot in Appendix A
905.6	310	A1
916.3	375	A2
923.175	475	A3
Measurement uncertainty, ppm	± 0.21	

Frequency range	Channel carrier frequency separation	Reference to Plot in Appendix A
905 – 924	530 kHz	A4
Measurement uncertainty, dB		

TEST EQUIPMENT USED:

HL 0038	HL 0569	HL 0590	HL 0812	HL 1430	HL 1552	HL 1871

LIMIT

Operating frequency range, MHz	Allowed bandwidth	Channel carrier frequency separation (minimum)
902-928	≤ 500 kHz @ 20 dBc	25 kHz or 20 dB bandwidth, which is greater
2400-2483.5; 5275-5850	≤ 1 MHz @ 20 dBc	
2400-2483.5	> 1 MHz @ 20 dBc	

TEST PROCEDURE

The EUT was set up as shown in Figure 4.1.1. The measuring antenna was connected to spectrum analyzer, which settings are shown in Plots.

The measurements were performed in normal mode of operation for carrier (channel) frequency at low and high edges and at the middle of the frequency band.

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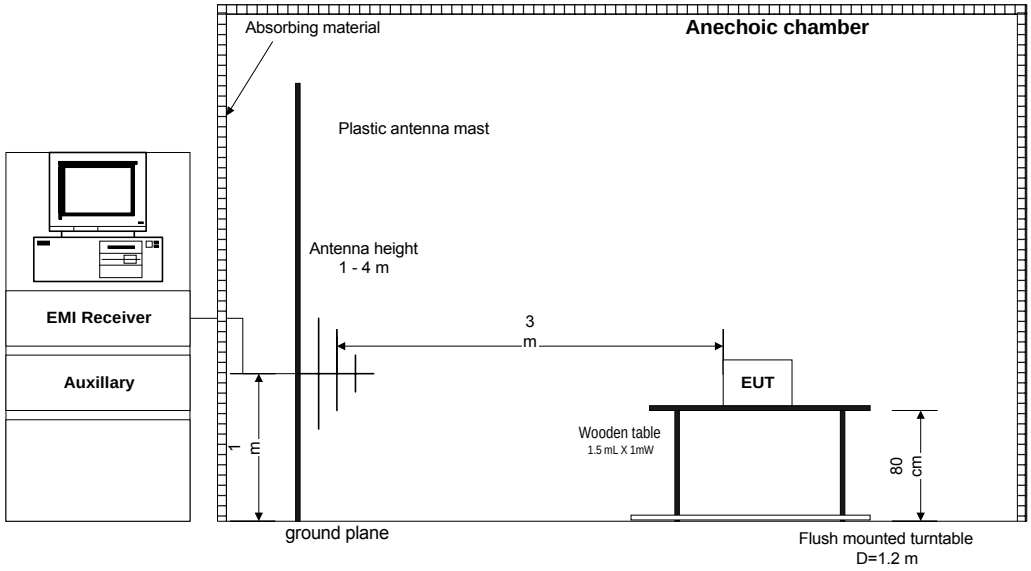
Figure 4.1.1



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4.2 Number of hopping channels according to § 15.247(a)(1)

METHOD OF MEASUREMENT	ANSI 63.4 §13.1.7
DATE:	July 9, 2002
RELATIVE HUMIDITY:	42 %
AMBIENT TEMPERATURE:	24 °C
OPERATING FREQUENCY RANGE	905-924 MHz
MODULATION TECHNIQUE	FHSS
HOPPING FUNCTION	Enabled

Occupied frequency range	Measured 20 dB BW, kHz	Number of channels	Reference to Plot in Appendix A
905-924	310	26	A4
Measurement uncertainty, dB		NA	

TEST EQUIPMENT USED:

HL 0038	HL 0569	HL 0590	HL 0812	HL 1430	HL 1552	HL 1871

LIMIT

Operating frequency range, MHz	20 dB bandwidth	Number of frequencies
902-928	< 250 kHz	≥ 50
	≥ 250 kHz	≥ 25
2400-2483.5; 5275-5850	≤ 1 MHz	≥ 75
2400-2483.5	> 1 MHz	≥ 15 non-overlapping channels with total span ≥ 75 MHz

TEST PROCEDURE

The setup was the same as in Paragraph 4.1. The measuring antenna was connected to spectrum analyzer, which settings are shown in Plots.

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4.3 Average time of hopping frequency occupancy according to § 15.247(a)(1), (f)

METHOD OF MEASUREMENT	ANSI 63.4 §13.1.7
DATE:	July 9, 2002
RELATIVE HUMIDITY:	42 %
AMBIENT TEMPERATURE:	24°C
OPERATING FREQUENCY RANGE	905-924 MHz
MODULATION TECHNIQUE	FHSS
HOPPING FUNCTION	Enabled

Carrier frequency, MHz	Time period between two successive transmissions	Tx ON	Average time of occupancy	Reference to Plot in Appendix A
916.3	6 s	3.53 ms	≤7.06 ms	A5, A6
Measurement uncertainty, ppm		± 0.21		

TEST EQUIPMENT USED:

HL 0038	HL 0569	HL 0590	HL 0812	HL 1430	HL 1552	HL 1871

4.3.1 Average factor calculation, §15.35

According to TMW-250FH specifications, the maximal length of transmit protocol (including extended data packet) is 364 bit (@ 60 kbit/s), hence the maximal Tx ON is 364/60000 = 6 ms

Tx ON	Duty cycle	Average factor
6 ms	0.06	-24.4
Measurement uncertainty (1% of sweep time)		0.15 ms

LIMIT

Operating frequency range, MHz	Number of frequencies	Average time of occupancy
902-928	≥ 50	≤ 0.4 s within 20 s period
	≥ 25	≤ 0.4 s within 10 s period
2400-2483.5; 5275-5850	≥ 75	≤ 0.4 s within 30 s period
2400-2483.5	≥ 15 non-overlapping channels with total span ≥ 75 MHz	≤ 0.4 s within the time required to hop through all channels

TEST PROCEDURE
The setup was the same as in Paragraph 4.1. The measuring antenna was connected to spectrum analyzer, which settings are shown in Plots.

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4.4 Maximum peak output power test according to §15.247 (b)(1), (b)(2), (b)(3)

METHOD OF MEASUREMENTS	ANSI 63.4 §13.1.4
DATE:	July 9, 2002
RELATIVE HUMIDITY:	42 %
AMBIENT TEMPERATURE:	24 °C
OPERATING FREQUENCY RANGE	905-924 MHz
MODULATION TECHNIQUE	FHSS
HOPPING FUNCTION	Enabled

Carrier frequency, MHz	Peak output power, dBm	Limit, dBm	Margin, dB	Reference to Plots in Appendix A
905.6	14.79	24	9.21	A7
916.3	15.09	24	8.91	A8
923.175	15.16	24	8.84	A9
Measurement uncertainty, dB		+0.36/-0.38 dB		

TEST EQUIPMENT USED:

HL 0038	HL 0569	HL 0590	HL 0661	HL 0812	HL 1430	HL 1552
HL 1565	HL 1871	HL 1939				

LIMIT

Operating frequency range, MHz	Number of hopping channels	Maximum peak output power*, W
902-928 (hopping)	≥ 50	1
	< 50	0.25
2400-2483.5 (hopping)	≥ 75	1
	other admissible	0.125
5275-5850 (hopping)	any admissible	1
902-928; 2400-2483.5; 5275-5850 (direct sequence)	NA	1

* Notes to table
1. If transmitting antennas of directional gain greater than 6 dB are used, the peak output power shall be reduced below the stated values by the amount in dB that the directional gain of the antenna exceeds 6 dBi with the following exceptions:
   a) Systems operating in the 2400-2483.5 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi;
   b) Systems operating in the 5725-5850 MHz band, that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter peak output power;
   c) Fixed, point-to-point operation as used in paragraphs a) and b) of Notes, excludes the use of point-to-multipoint systems, omnidirectional applications, and multiple co-located intentional radiators transmitting the same information.

   For more details see 15.247 (b)(3).

TEST PROCEDURE
Field strength of carrier was measured at 3 m test distance.
The EUT was placed on a wooden 80 cm height turntable. 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 peak output power was calculated as referred to in pages 23 to 25.

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4.5 Exposure limit according to §15.247(b)(4) and §1.1310

Limit for power density for general population/uncontrolled exposure is P = 0.6 mW/cm^2

The power density **P (mW/cm^2) = PT / 4π r^2**, where

PT - the transmitted power, which is equal to the transmitter output plus antenna gain.
PT =15.16 + 2.5 = 17.66 dBm = 58 mW

The minimum safe distance “r”, where RF exposure does not exceed FCC permissible limit, is 2.8 cm.

$$r = \sqrt{PT / (P \times 4\pi)} = \sqrt{[58 / (0.6 \times 12.56)]} = 2.8$$

Conclusion: The public cannot be exposed to dangerous RF level.

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4.6 Out of band radiated emissions test according to §15.247(c)

METHOD OF MEASUREMENTS	ANSI 63.4 §13.1.4
DATE:	July 9, 2002
RELATIVE HUMIDITY:	42 %
AMBIENT TEMPERATURE:	24 °C
RATED RF OUTPUT POWER	18 dBm
TEST DISTANCE	3 m
OPERATING FREQUENCY RANGE	905-924 MHz
MODULATION TECHNIQUE	FHSS
HOPPING FUNCTION	Enabled
FREQUENCY RANGE*	9 kHz – 9.5 GHz

*The frequency spectrum was investigated from 9 kHz up to the tenth harmonic of the highest fundamental frequency.

No spurious emissions except 3rd harmonic were found. For test results refer to Appendix A, Plots A10 to A22.

TEST EQUIPMENT USED:

HL 0041	HL 0446	HL 0465	HL 0521	HL 0554	HL 0589	HL 0590
HL 0604	HL 1004	HL 1200	HL 1424	HL 1871	HL 1942	

LIMIT

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 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

TEST PROCEDURE

9 kHz – 30 MHz frequency range. The EUT was placed on a wooden 80 cm height turntable. 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 – 9.5 GHz frequency range. The EUT was placed on a wooden 80 cm height turntable. 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.

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4.7 Radiated emissions which fall in restricted bands test according to §15.247(c) and § 15.205, §15.209(a)

METHOD OF MEASUREMENTS	ANSI 63.4 §13.1.4/ §13.1.5
DATE:	July 9, 2002
RELATIVE HUMIDITY:	42 %
AMBIENT TEMPERATURE:	24 °C
RATED RF OUTPUT POWER	18 dBm
TEST DISTANCE	3 m
OPERATING FREQUENCY RANGE	905-924 MHz
MODULATION TECHNIQUE	FHSS
HOPPING FUNCTION	Enabled
FREQUENCY RANGE*	9 kHz – 9.5 GHz

*The frequency spectrum was investigated from 9 kHz up to the tenth harmonic of the highest fundamental frequency.

Peak detector, RBW = VBW = 1 MHz

Frequency, MHz	Antenna type	Antenna polarization	Radiated emission, dB (µV/m)	Limit, dB(µV/m)	Margin, dB	Reference to Plots in Appendix A
2748	Horn	Vertical	56.8	74	17.2	A17
Measurement uncertainty, dB			± 2.36 dB			

Peak detector + average factor (refer to paragraph 4.3.1)

Frequency, MHz	Antenna type	Antenna polarization	Radiated emission, dB (µV/m)	Limit, dB(µV/m)	Margin, dB	Reference to Plots in Appendix A
2748	Horn	Vertical	32.4	54	21.6	NA
Measurement uncertainty, dB			± 2.36 dB			

Notes to table:
Margin = dB below (negative if above) specification limit.
RBW = resolution bandwidth;
VBW = video bandwidth.

TEST EQUIPMENT USED:

HL 0041	HL 0446	HL 0465	HL 0521	HL 0554	HL 0589	HL 0590
HL 0604	HL 1004	HL 1200	HL 1424	HL 1871	HL 1942	

LIMIT

Radiated emissions, which fall in the restricted bands, must comply with §15.209(a) limits.

TEST PROCEDURE

9 kHz – 30 MHz frequency range. The EUT was placed on a wooden 80 cm height turntable. 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 – 9.5 GHz frequency range. The EUT was placed on a wooden 80 cm height turntable. 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.

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4.8 Unintentional radiated emissions test according to §15.109

METHOD OF MEASUREMENT:	ANSI 63.4 §11.6 / ANSI 63.4 §12.1.4
TEST PERFROMED IN:	ANECHOIC CHAMBER
DATE:	July 9, 2002
RELATIVE HUMIDITY:	42 %
AMBIENT TEMPERATURE:	24 °C
DISTANCE BETWEEN ANTENNA AND EUT:	3 m
THE EUT WAS TESTED AS:	TABLE-TOP
FREQUECNY RANGE:	30 MHz – 5 GHz
DETECTOR TYPE:	QUASI-PEAK
RESOLUTION BANDWIDTH:	120 kHz
OPERATING MODE	RECEIVING

	The EUT highest used frequency (not including operating frequency), MHz	**Upper frequency of measurement range, MHz**
	Below 1.705	30
	1.705 – 108	1000
	108 – 500	2000
X	500 – 1000	5000
	Above 1000	5^{th} harmonic of the highest frequency or 40 GHz, whichever is lower

Frequency, MHz	**Antenna polarization**	**Antenna height, m**	**Turntable position (^{o})**	**Radiated emissions, dB (µV/m)**	**Limit, dB (µV/m)**	**Margin, dB**	**Reference to Plots in Appendix A**
952.3	Vertical	1.0	16	35.5	46	10.5	A23 to A25
Measurement uncertainty, dB				+5.42 dB/-5.26 dB			

Table abbreviations:
Antenna polarization: V = vertical, H = horizontal
Turntable position: 0^o = EUT front panel faces the receiving antenna

TEST EQUIPMENT USED:

HL 0041	HL 0465	HL 0521	HL 0589	HL 1004	HL 1947	

LIMIT (§ 15.109)

Frequency, MHz	**Class A equipment @ 10 m dB(µV/m)**	**Class B equipment @ 3 m dB(µV/m)**
30 - 88	39.0	40
88 - 216	43.5	43.5
216 - 960	46.4	46
960 - 5000	49.5	54

TEST PROCEDURE

The EUT was placed on a wooden 80 cm height turntable. To find maximum radiation the turntable was rotated 360^o, measuring antenna height was changed from 1 to 4 m, and the antennas polarization was changed from vertical to horizontal.

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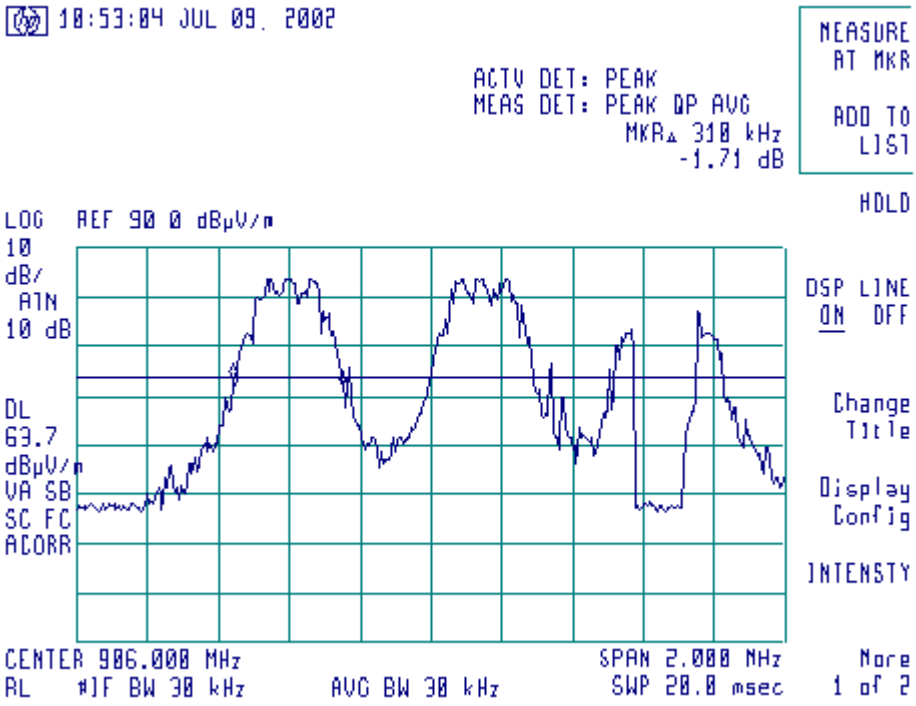
Appendix A Plots

Plot A 1

20 dB bandwidth for hopping system



Notes
External attenuation 20 dB
Fmin = 905.59 MHz

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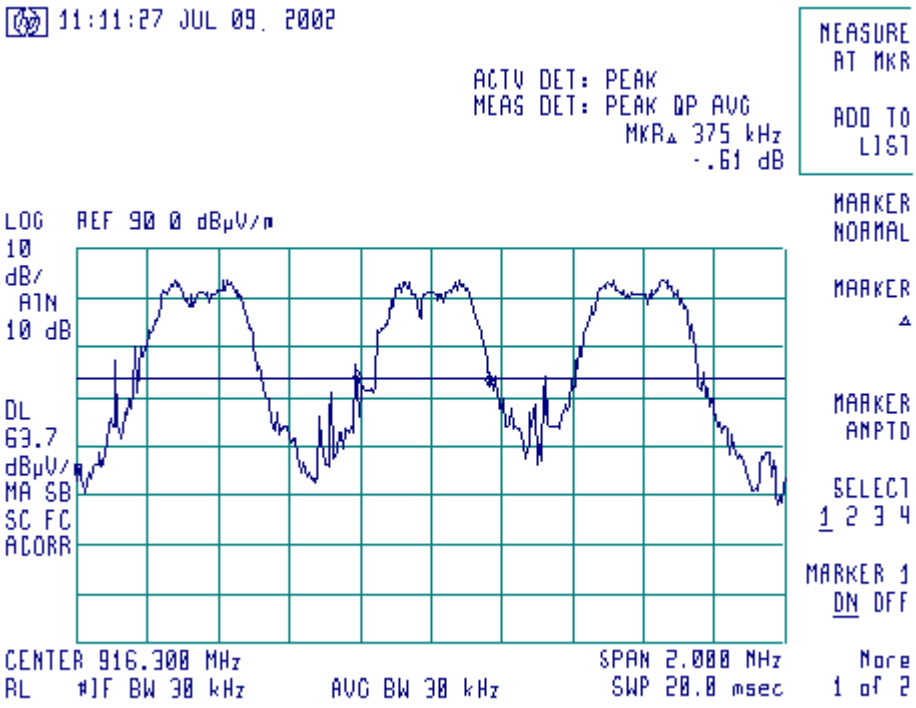
Plot A 2

20 dB bandwidth for hopping system



Notes
External attenuation 20 dB
Fmiddle = 916.3 MHz

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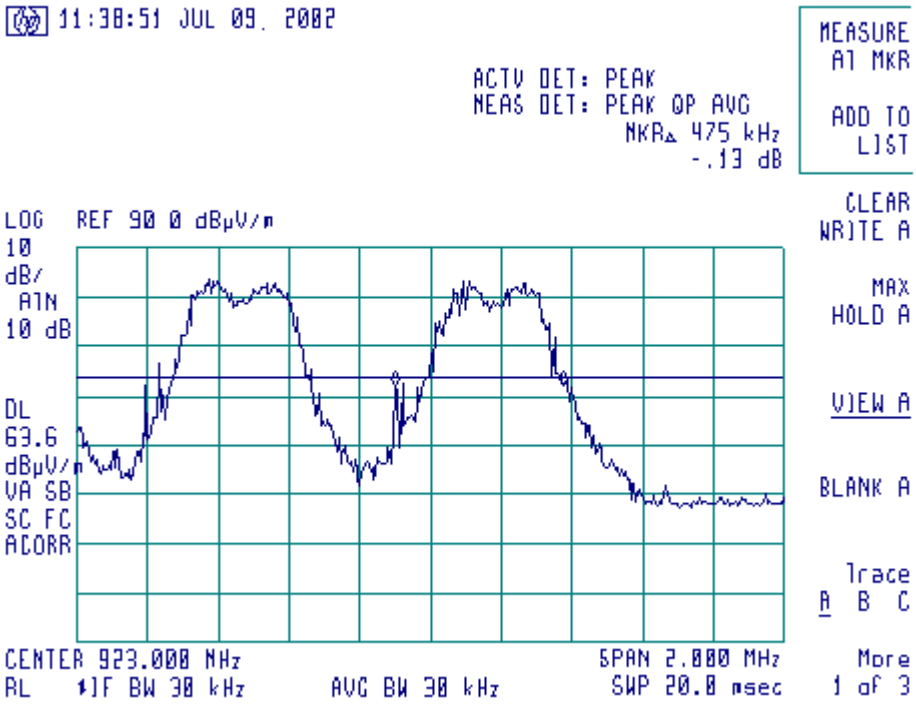
Plot A 3

20 dB bandwidth for hopping system



Notes
External attenuation 20 dB
Fhigh = 923.175 MHz

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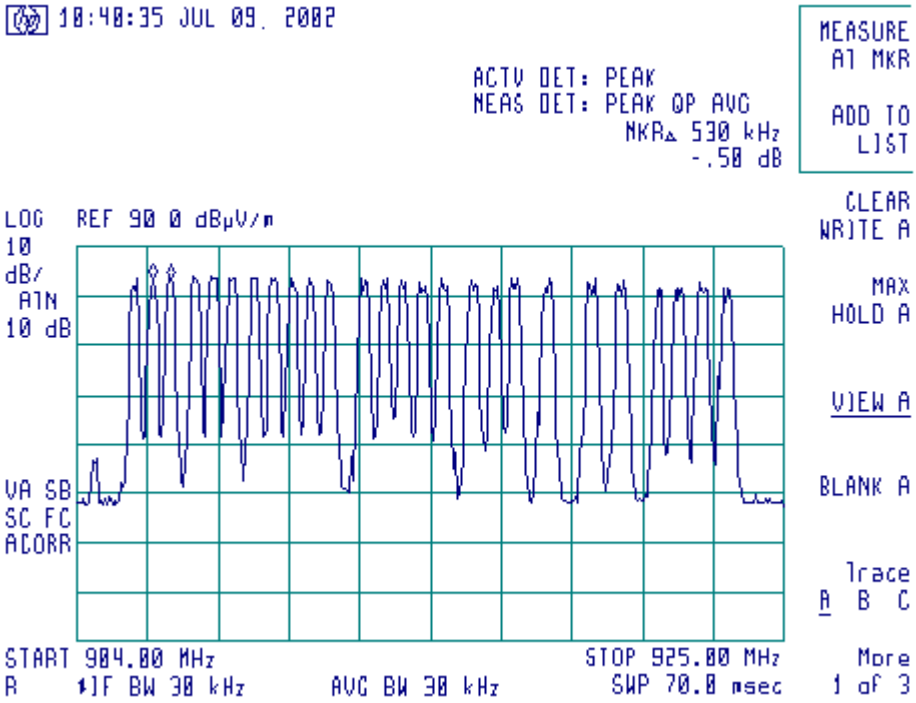
Plot A 4

Frequency separation



Notes
External attenuation 20 dB
Total number of hops = 26

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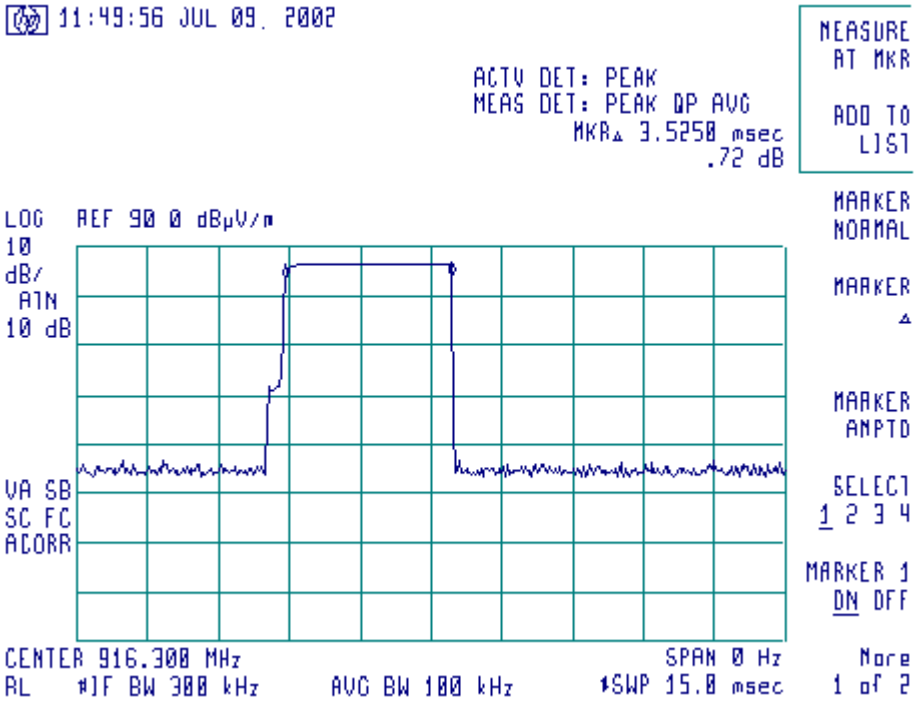
Plot A 5

Average time of hopping frequency occupancy



Notes
External attenuation 20 dB
Fmiddle= 916.3 MHz

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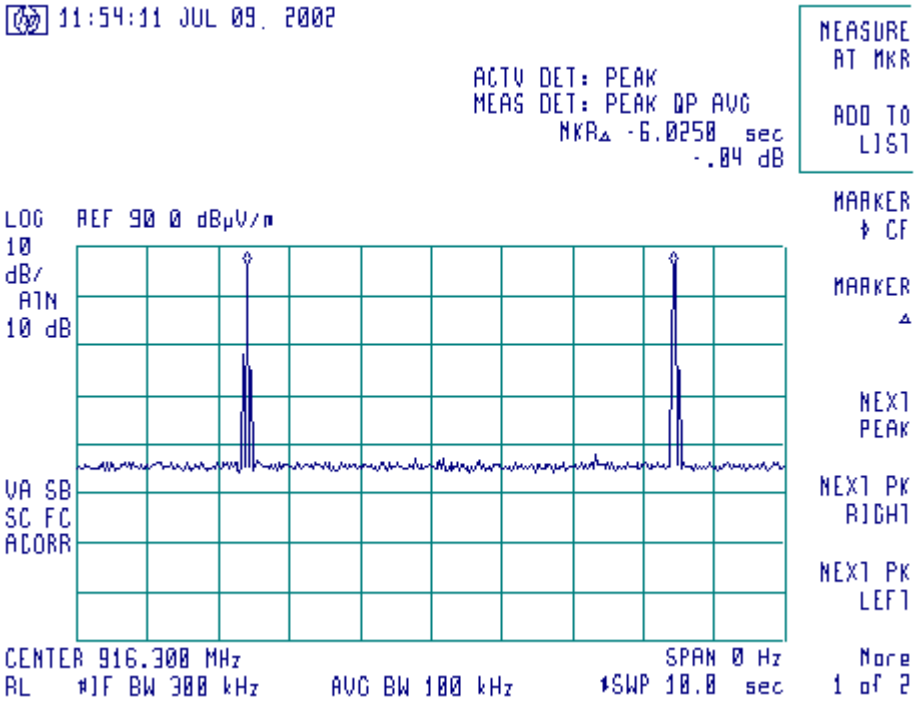
Plot A 6

Average time of hopping frequency occupancy



Notes
External attenuation 20 dB
Fmiddle= 916.3 MHz

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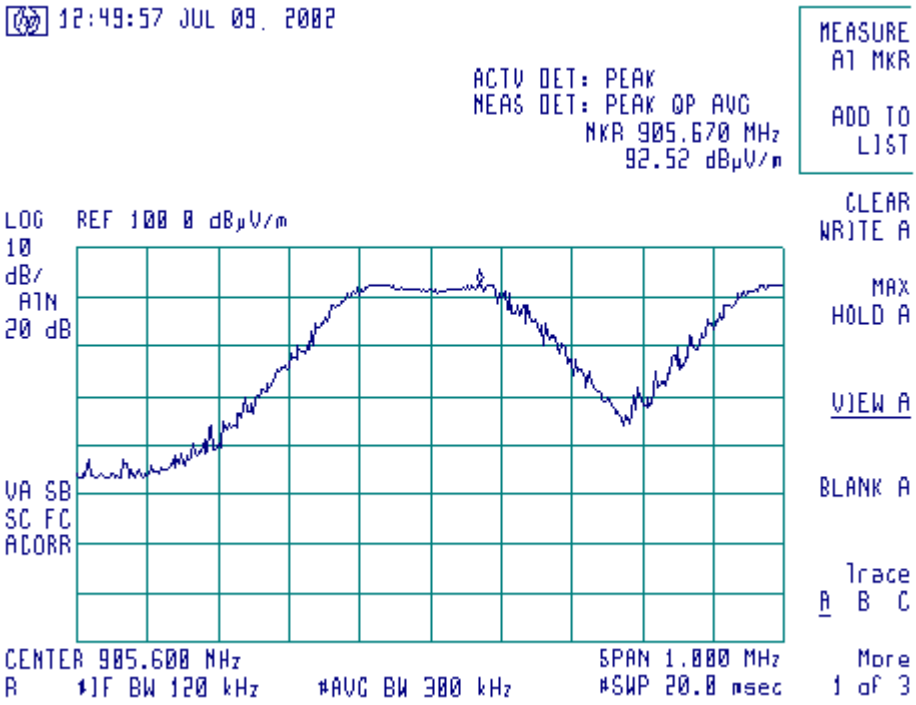
Plot A 7

Peak output power measurements



Notes
External attenuation: 20 dB
Fmin= 905.6 MHz
Antenna polarization: vertical
E = 92.52 + 20 = 112.52 dB(µV/m) @ 3 m
Calculation of peak output power: 112.52 – 95.23 – 2.5 (Antenna gain) = 14.79 dBm

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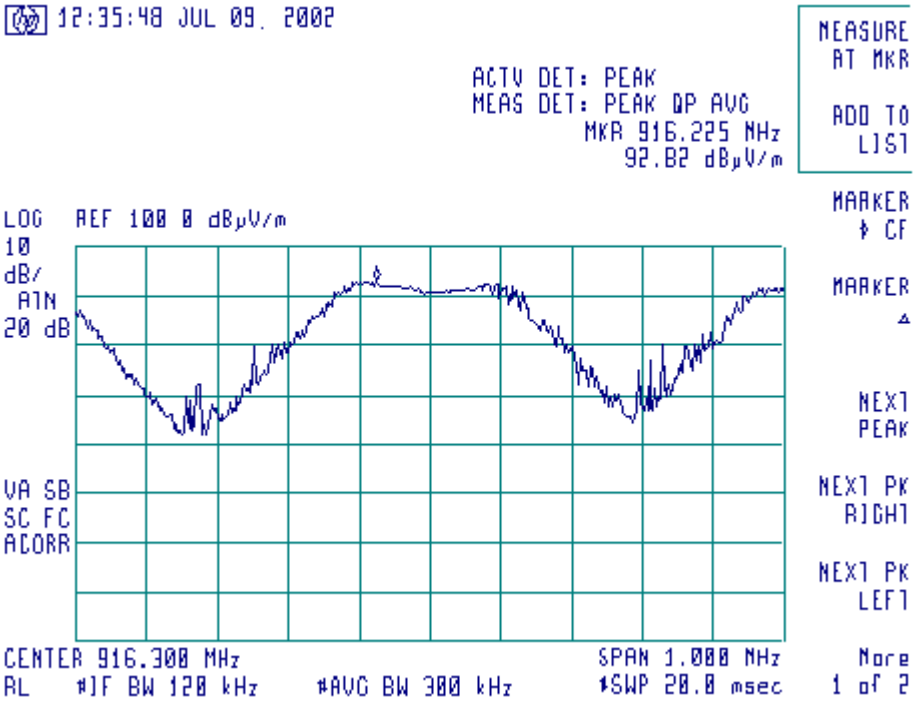
Plot A 8

Peak output power measurements



Notes
External attenuation 20 dB
Fmiddle= 916.3 MHz
Antenna polarization: vertical
E = 92.82 + 20 = 112.82 dB(µV/m) @ 3 m
Calculation of peak output power: 112.82 – 95.23 – 2.5 (Antenna gain) = 15.09 dBm

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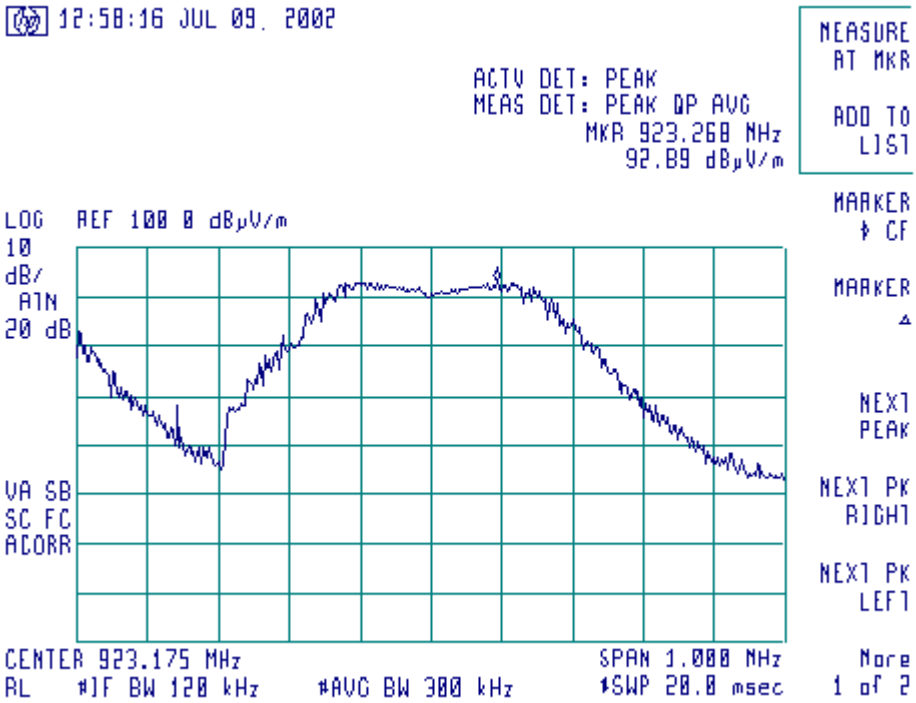
Plot A 9

Peak output power measurements



Notes
External attenuation: 20 dB
Fhigh= 923.175 MHz
Antenna polarization: vertical
E = 92.89 + 20 = 112.89 dB(µV/m) @ 3 m
Calculation of peak output power: 112.89 – 95.23 – 2.5 (Antenna gain) = 15.16 dBm

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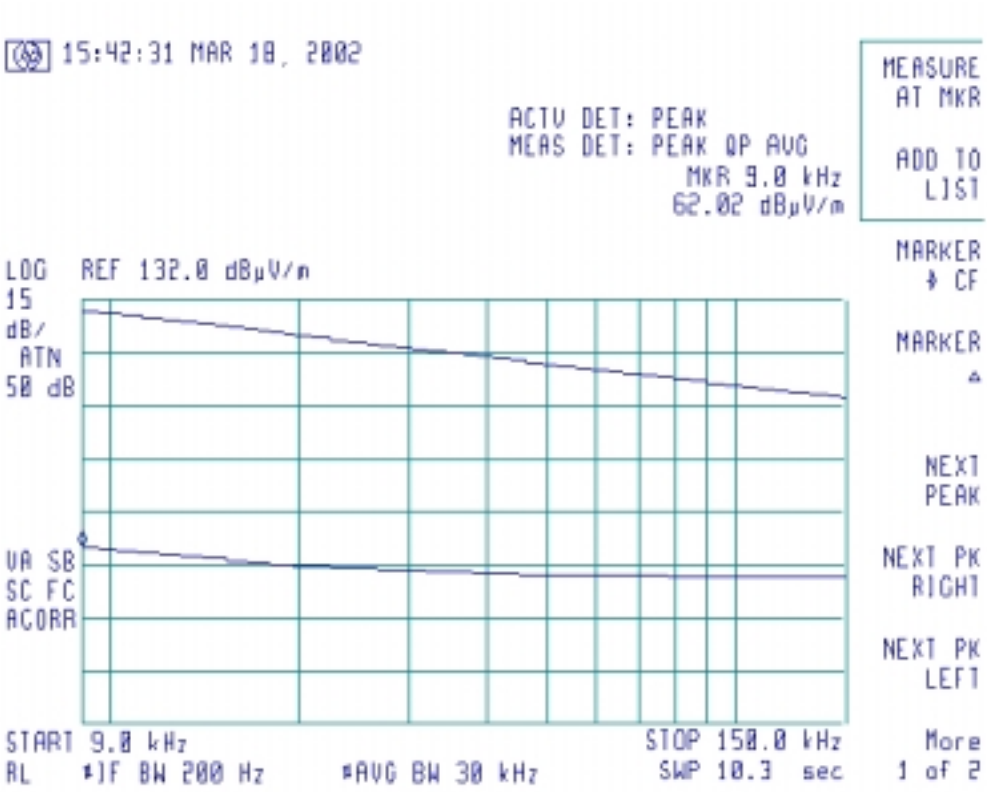
Plot A 10

Spurious emission measurements
9 kHz – 150 kHz frequency range



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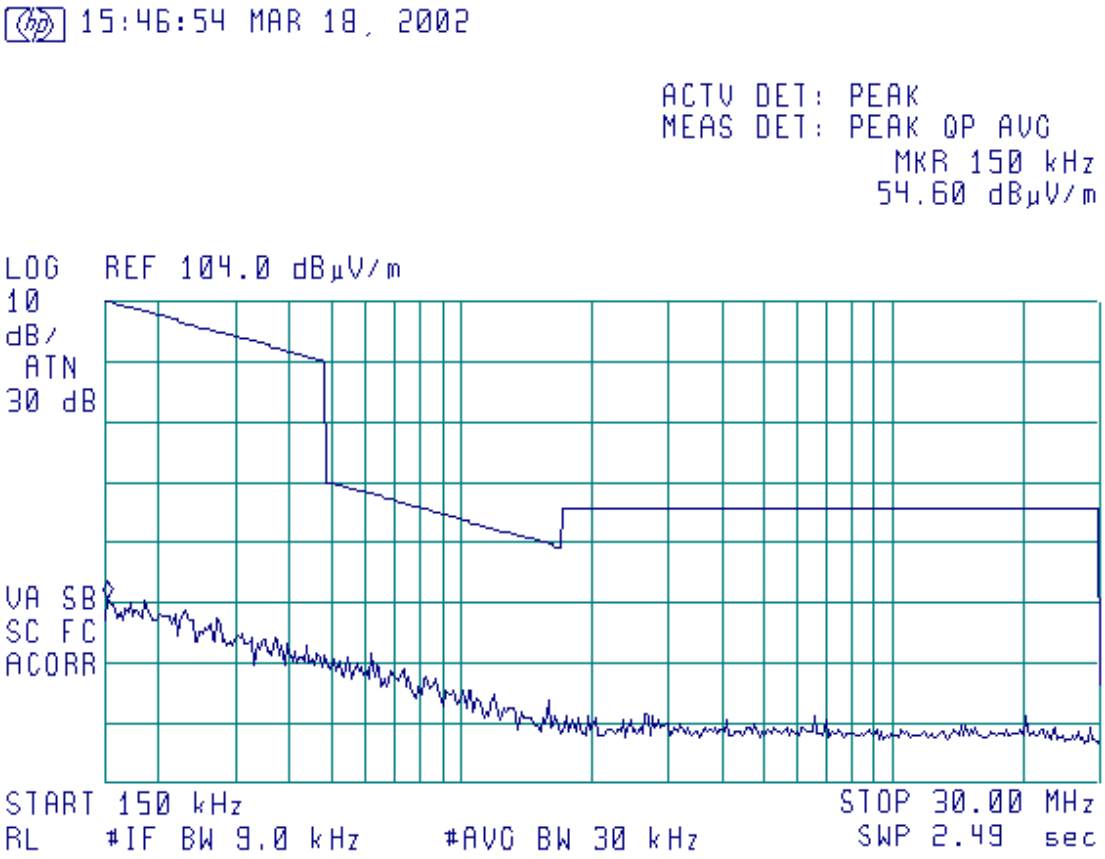
Plot A 11

Spurious emission measurements
150 kHz – 30 MHz frequency range



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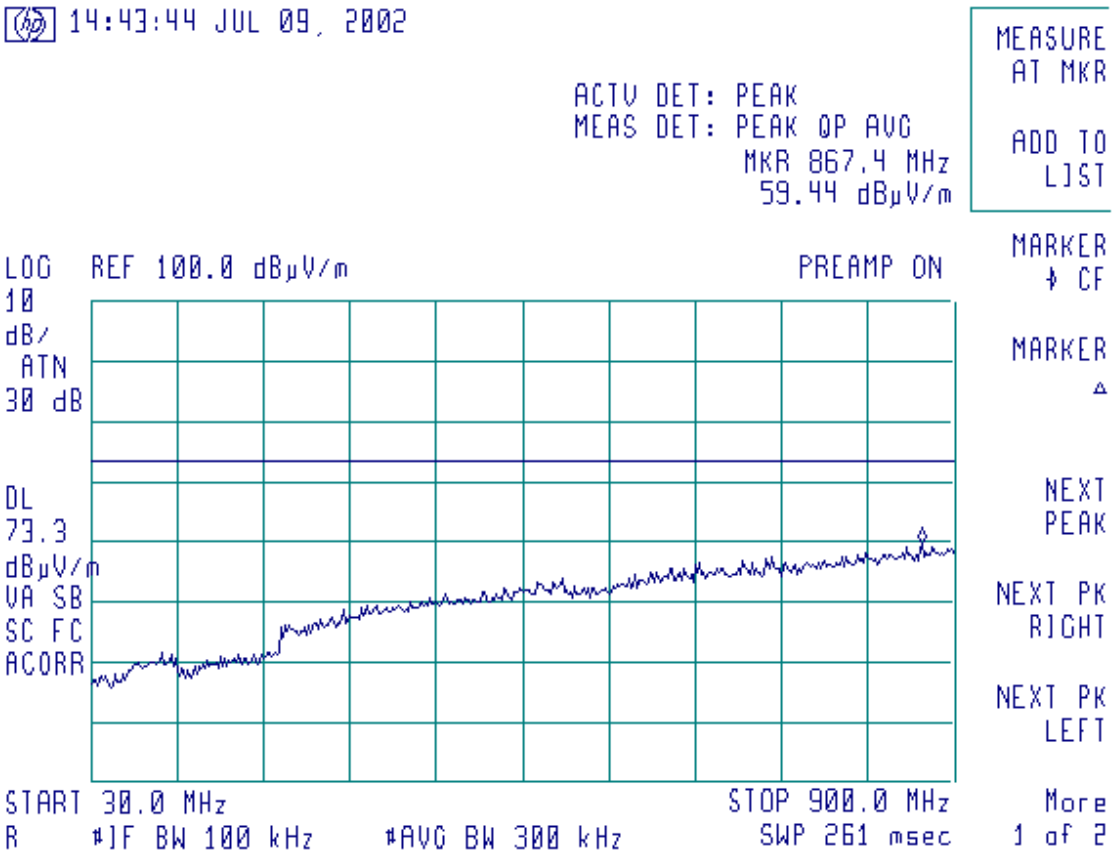
Plot A 12

Spurious emission measurements
30 MHz – 900 MHz frequency range



Notes
External attenuation: 20 dB

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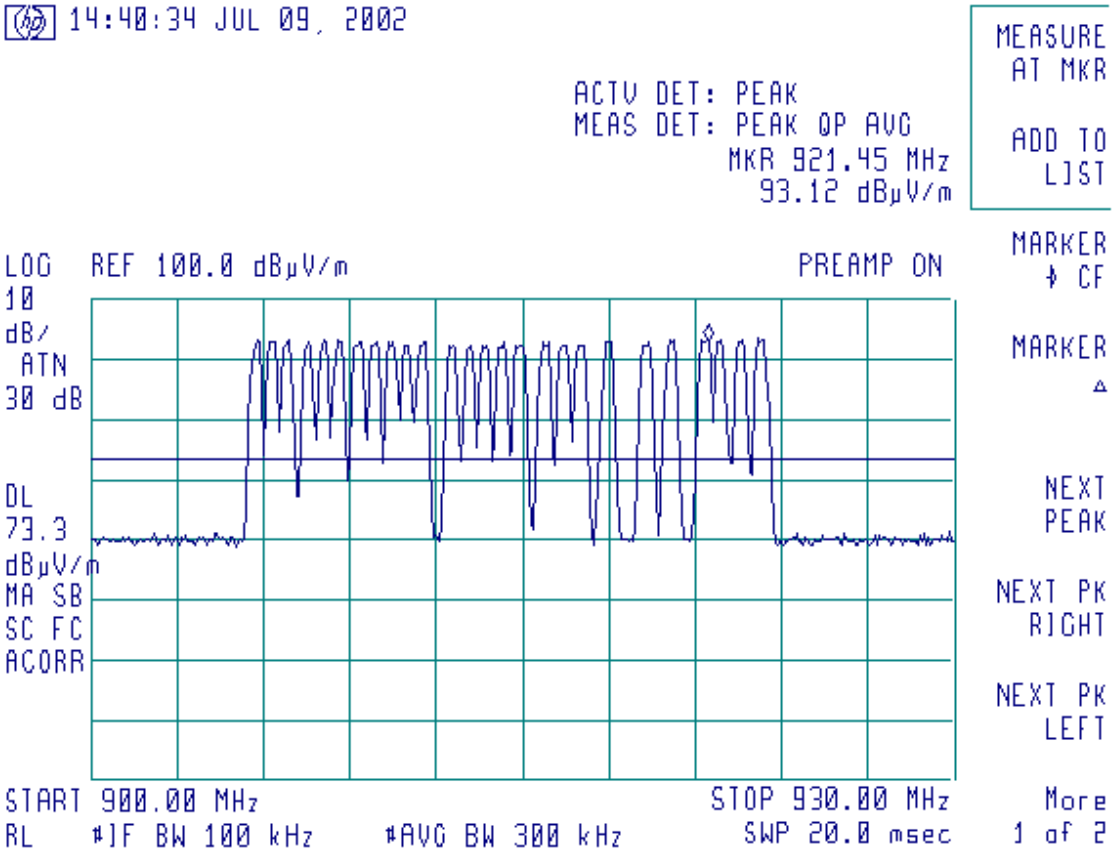
Plot A 13

Spurious emission measurements
900 MHz – 930 MHz frequency range



Notes
External attenuation: 20 dB

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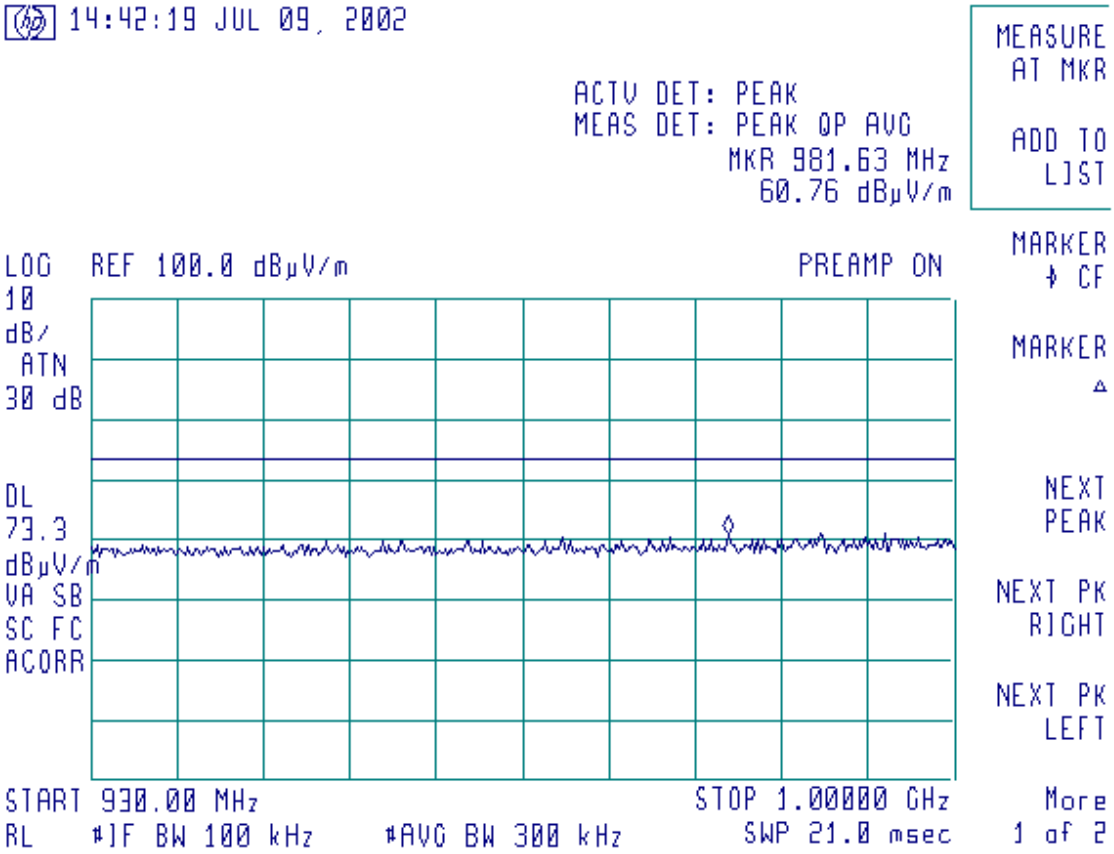
Plot A 14

Spurious emission measurements
930 MHz – 1000 MHz frequency range



Notes
External attenuation: 20 dB

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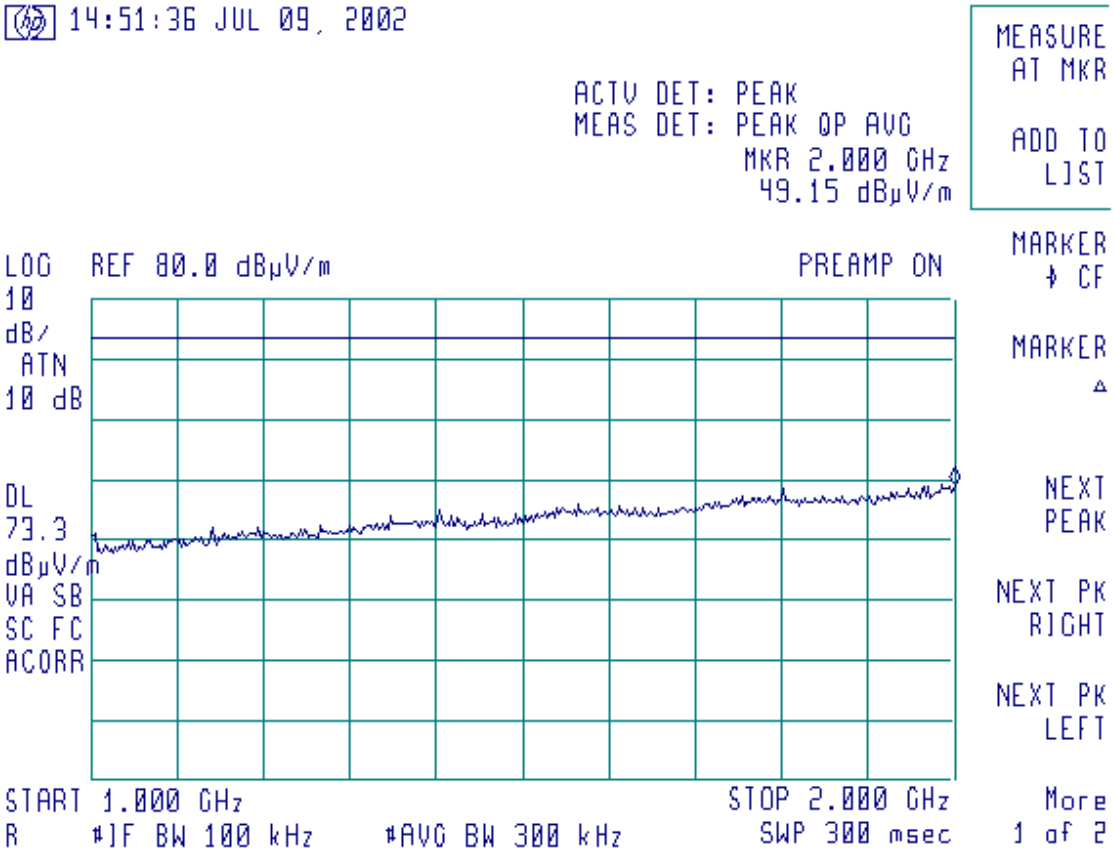
Plot A 15

Spurious emission measurements
1 GHz – 2 GHz frequency range



Notes
External attenuation: 20 dB

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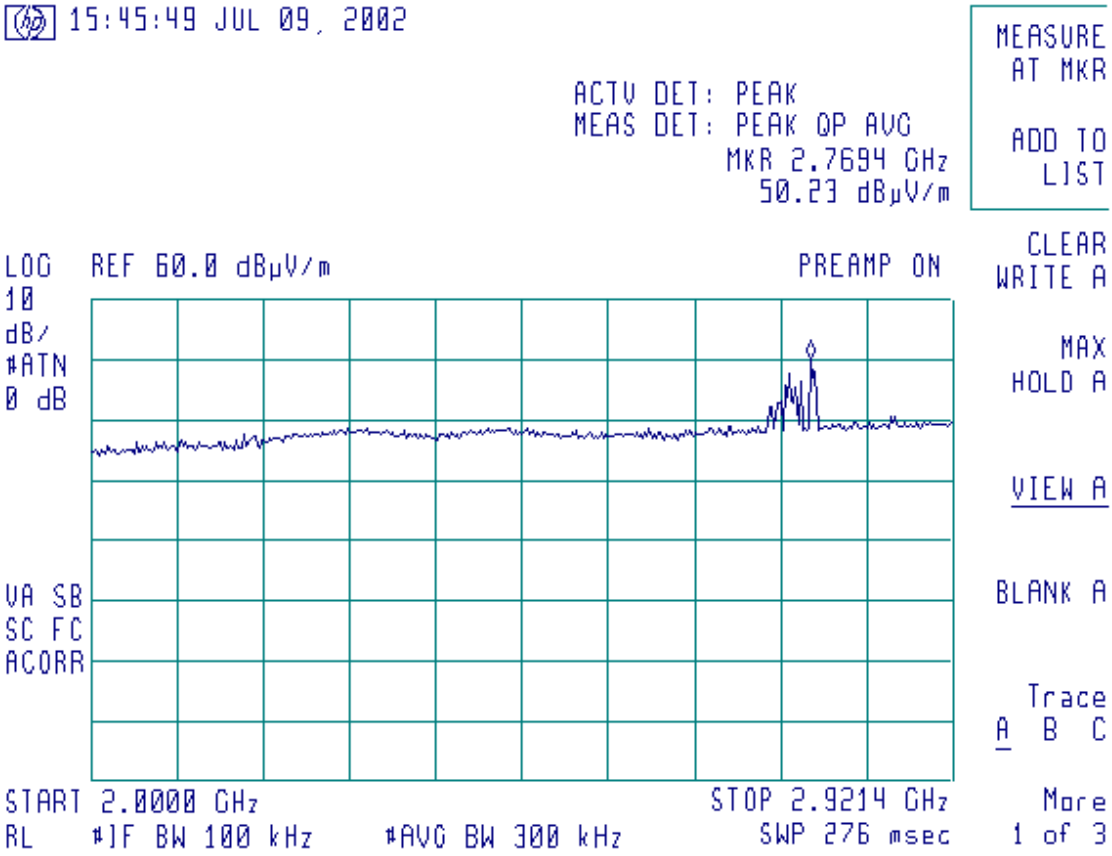
Plot A 16

Spurious emission measurements
2 GHz – 2.9214 GHz frequency range



Notes
Without external attenuation

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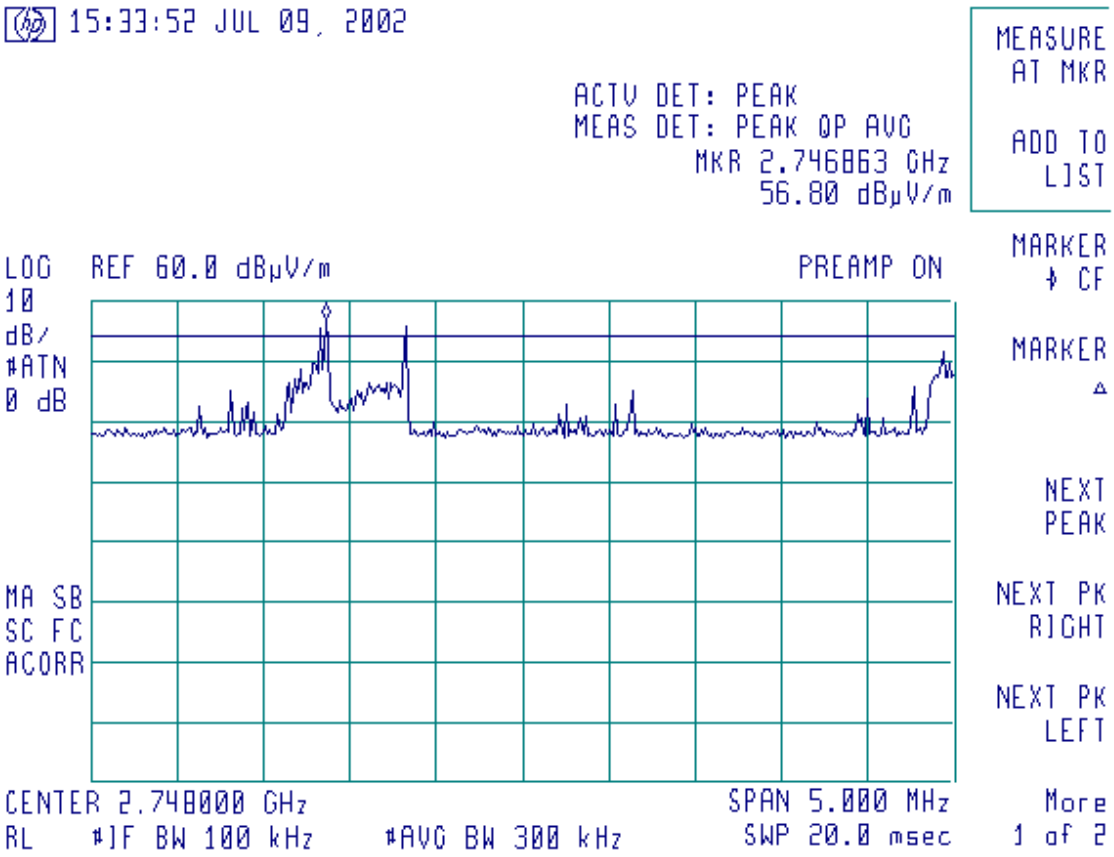
Plot A 17

Spurious emission measurements
2.748 GHz - center frequency



Notes
Without external attenuation

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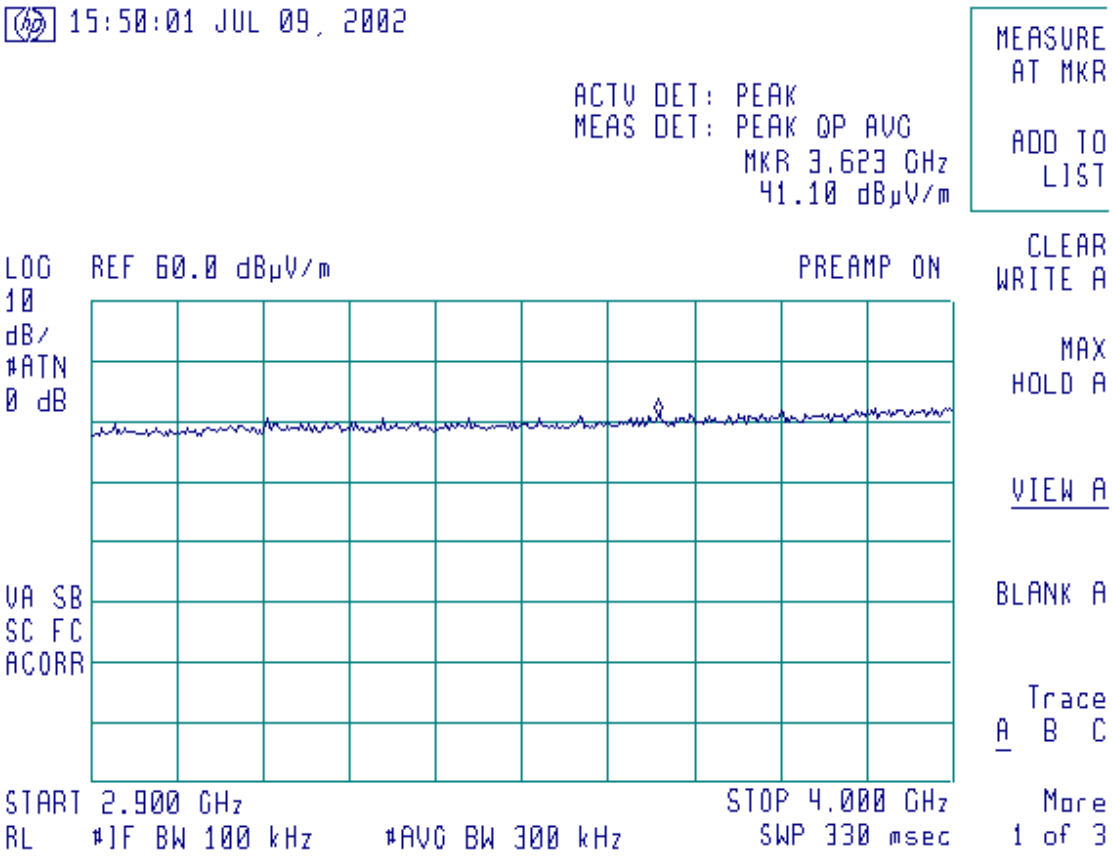
Plot A 18

Spurious emission measurements
2.9 GHz – 4 GHz frequency range



Notes
Without external attenuation

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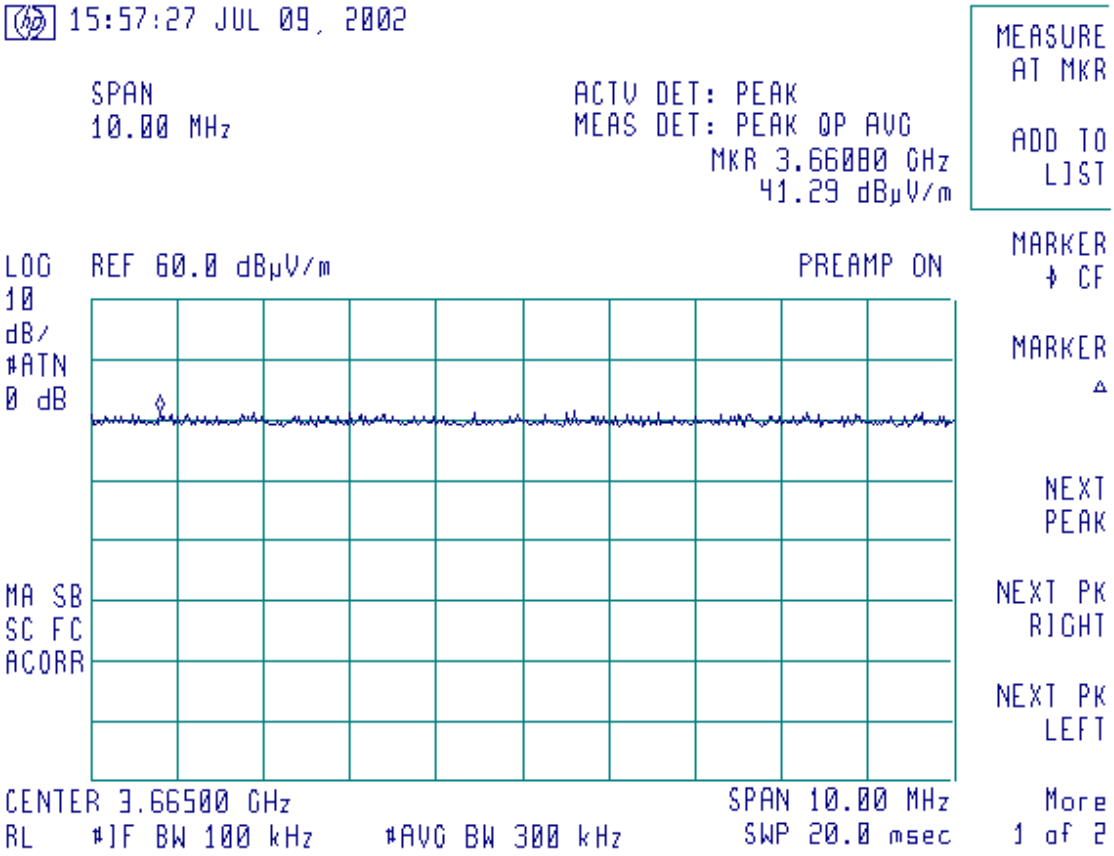
Plot A 19

Spurious emission measurements
3.6 GHz – center frequency



Notes
Without external attenuation

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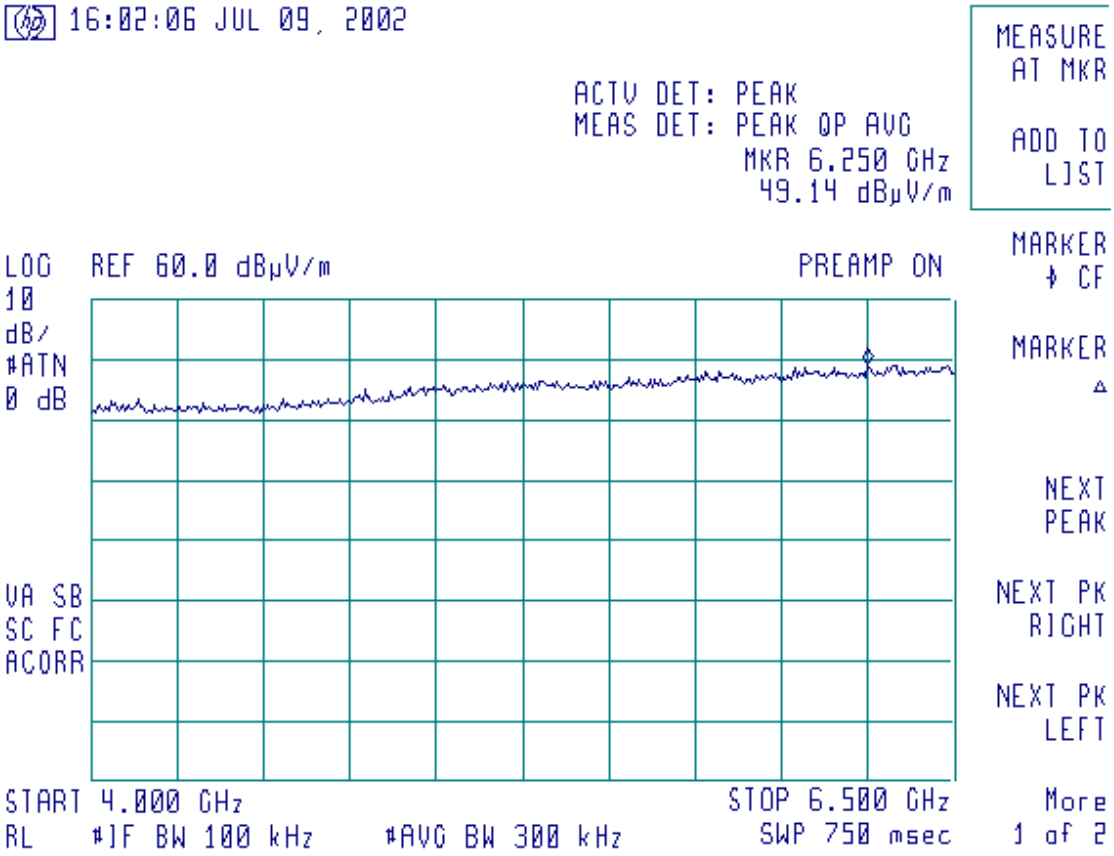
Plot A 20

Spurious emission measurements
4 GHz – 6.5 GHz frequency range



Notes
Without external attenuation

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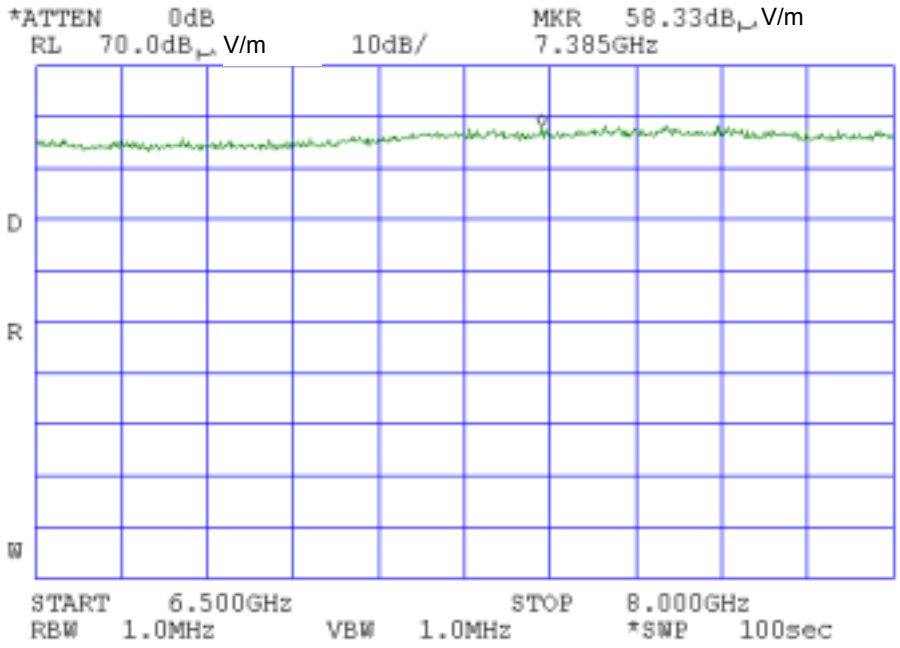
Plot A 21

Spurious emission measurements
6.5 GHz – 8 GHz frequency range



Notes
Without external attenuation

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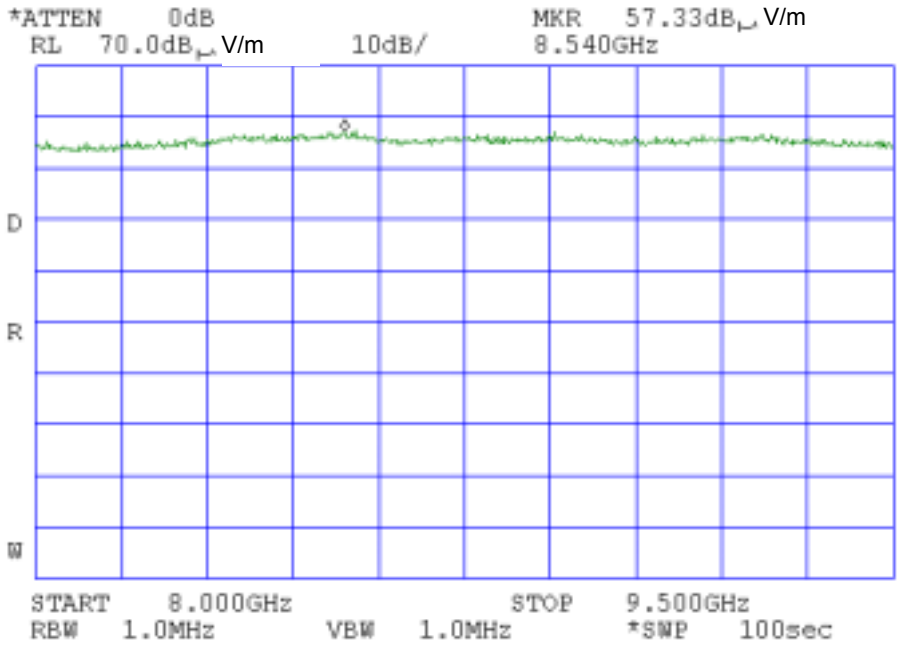
Plot A 22

Spurious emission measurements
8 GHz – 9.5 GHz frequency range



Notes
Without external attenuation

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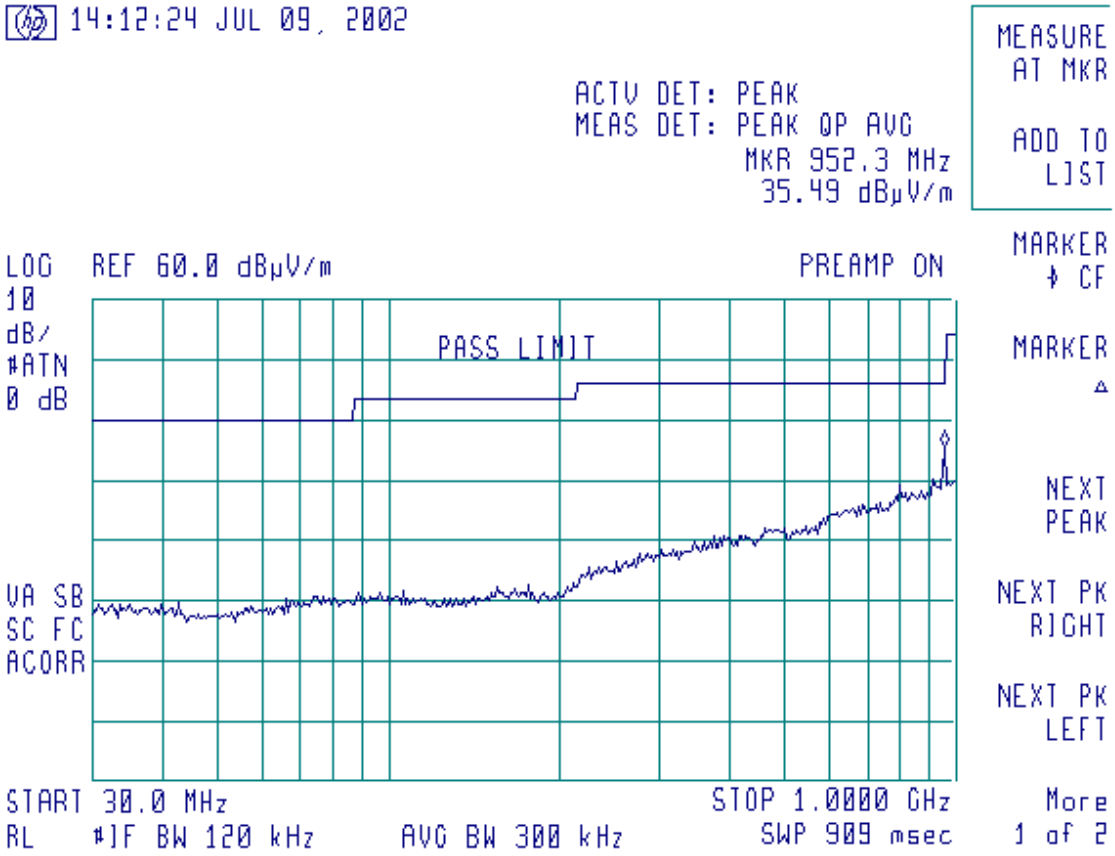
Plot A 23

Unintentional radiation measurements
30 MHz – 1000 MHz frequency range



Notes
Mode: Rx
Antenna. Polarization-Vertical & Horizontal

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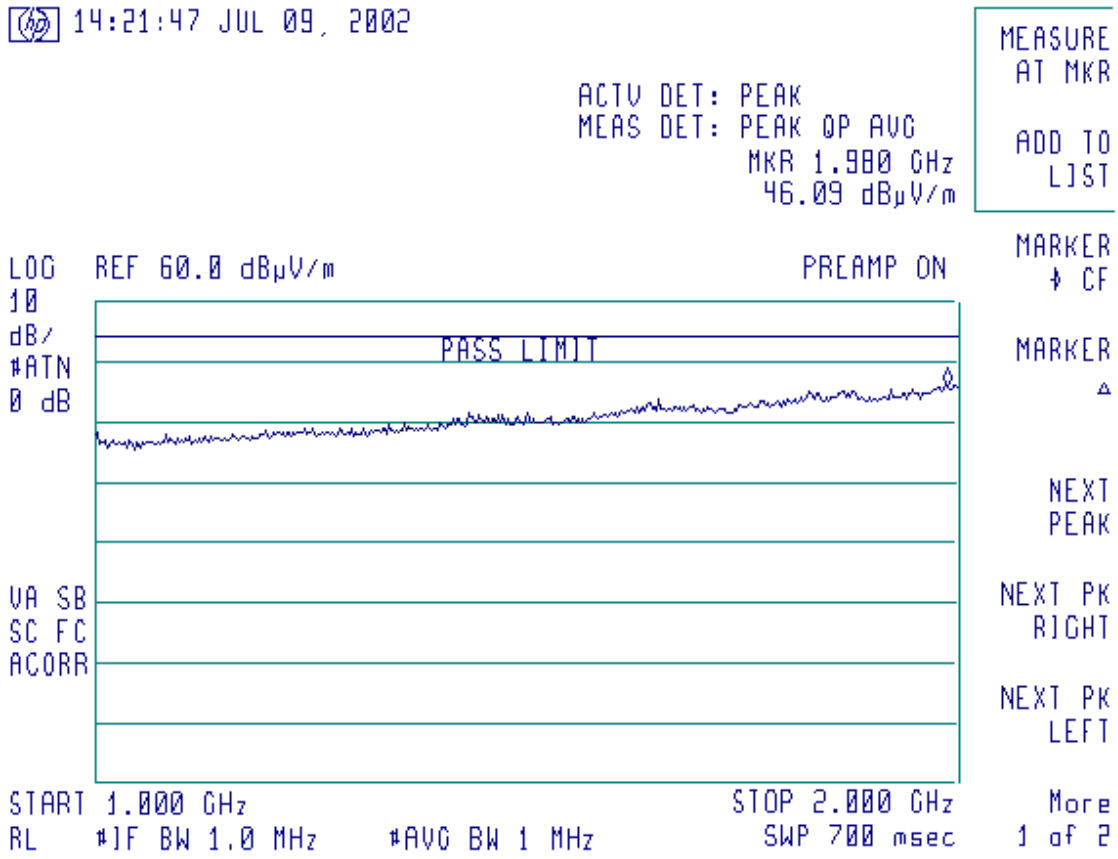
Plot A 24

Unintentional radiation measurements
1000 MHz – 2000 MHz frequency range



Notes
Mode: Rx
Antenna. Polarization-Vertical & Horizontal

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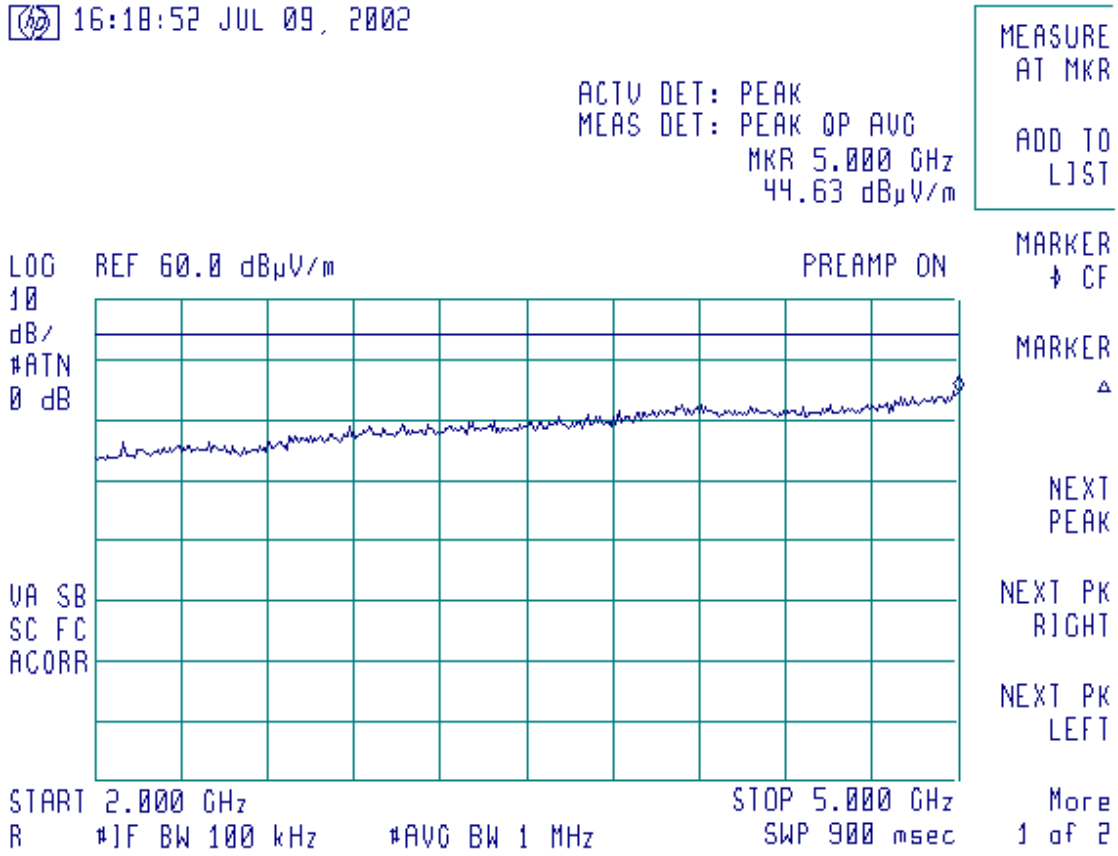
Plot A 25

Unintentional radiation measurements
2000 MHz – 5000 MHz frequency range



Notes
Mode: Rx
Antenna. Polarization-Vertical & Horizontal

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Appendix B Setup photographs

SPURIOUS EMISSIONS MEASUREMENTS WITH LOOP ANTENNA

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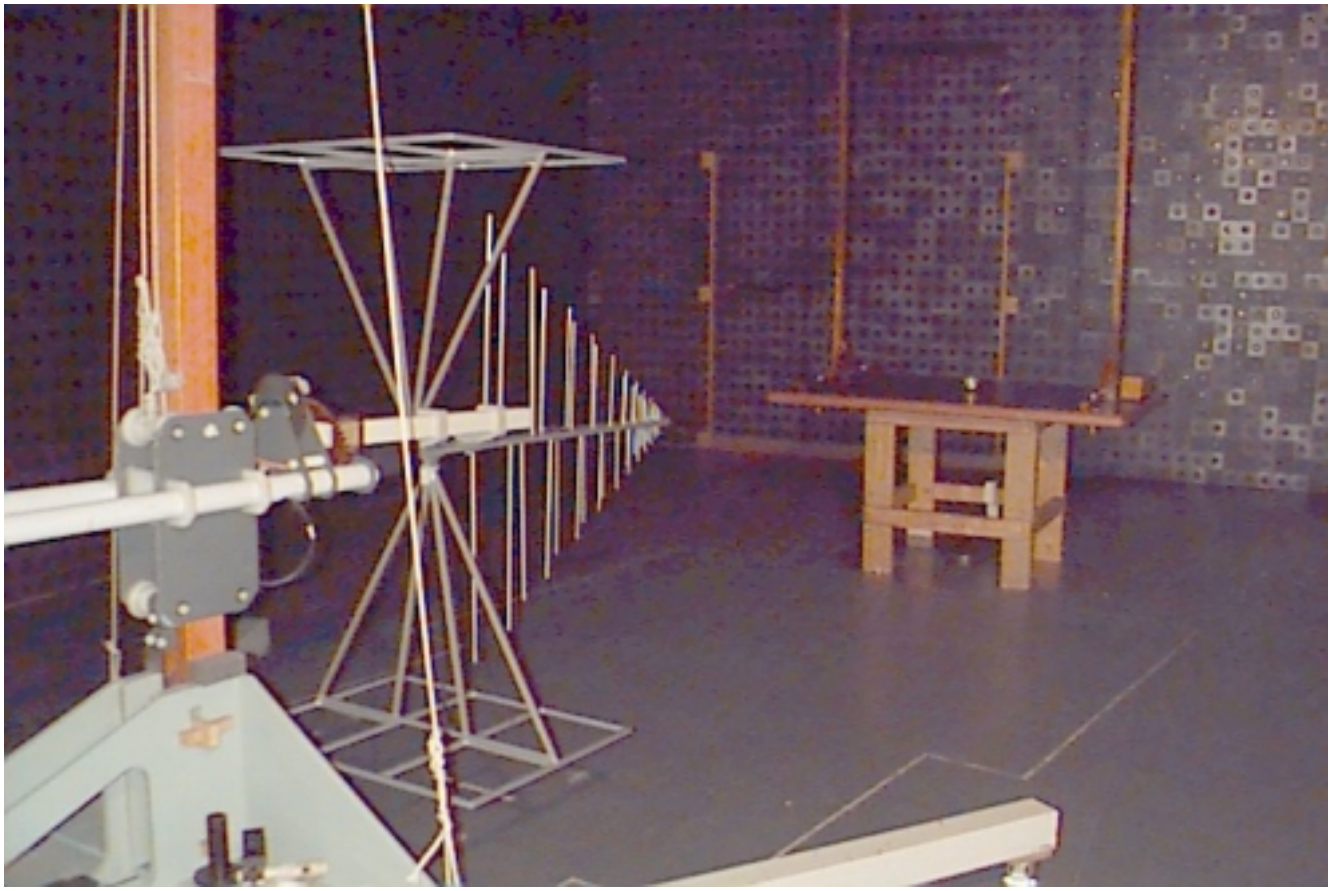
SPURIOUS EMISSIONS MEASUREMENTS WITH BICONILOG ANTENNA



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SPURIOUS EMISSIONS MEASUREMENTS WITH HORN ANTENNA

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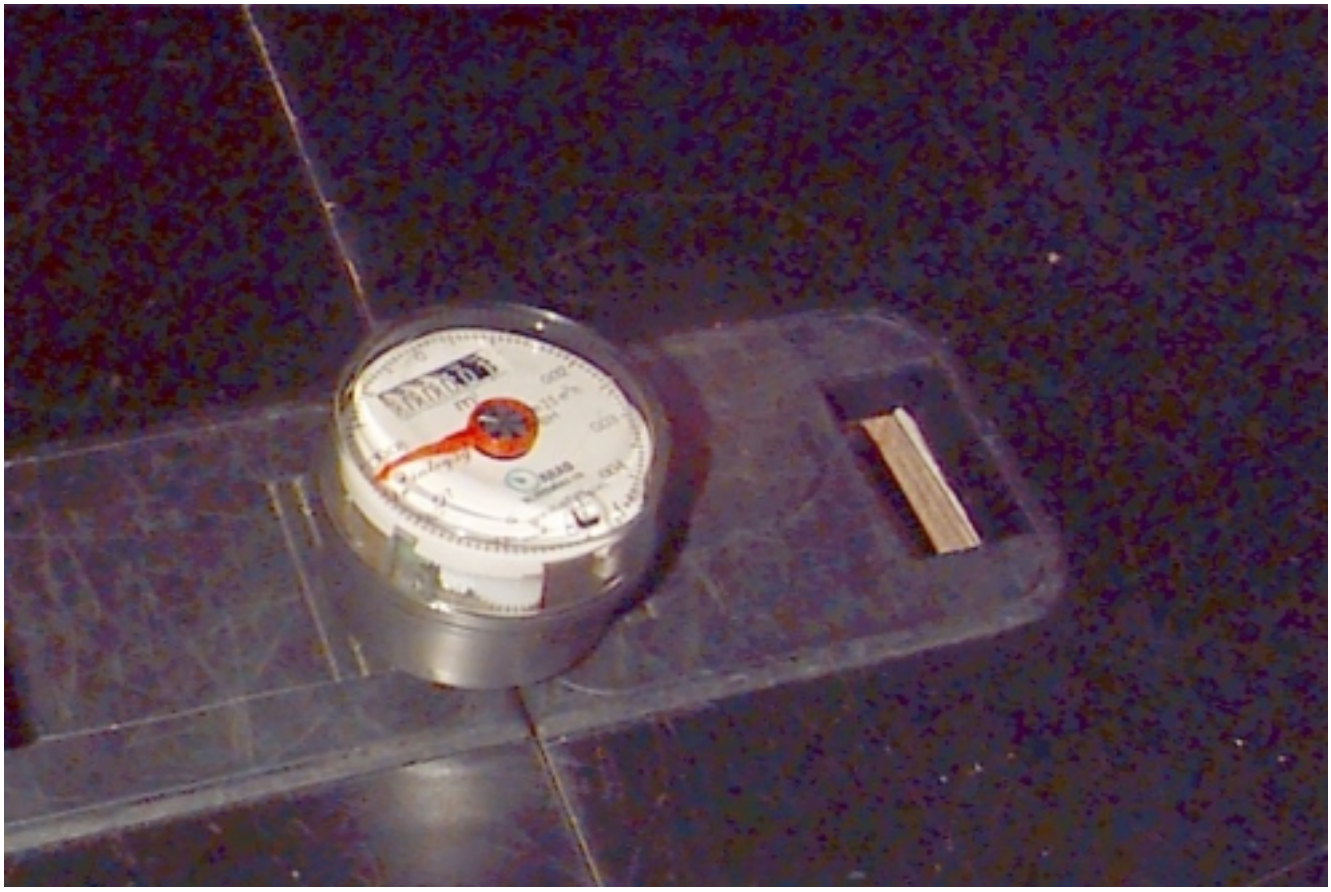
SPURIOUS EMISSIONS MEASUREMENTS, SETUP



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PEAK OUTPUT POWER MEASUREMENTS, SETUP

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Appendix C Example of hopping frequency

Frequency Hopping Sequence Table

	Frequency [MHz]	Frequency Assignment
1.	916.2999	F1
2.	913.0274	F2
3.	909.1516	F3
4.	910.3006	F4
5.	907.3999	F5
6.	920.0465	F6
7.	914.7650	F7
8.	913.5562	F8
9.	911.3666	F9
10.	915.6513	F10
11.	917. 8524	F11
12.	908.4797	F12
13.	905.6002	F13
14.	922.4692	F14
15.	916.8810	F15
16.	919.1790	F16
17.	912.4007	F17
18.	907.9308	F18
19.	906.6656	F19
20.	910.8174	F20
21.	921.2262	F21
22.	906.1438	F22
23.	923.1750	F23
24.	921.7514	F24
25.	909.7223	F25
26.	914.1498	F26

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Appendix D Test equipment used for tests

HL Serial No.	Description	Manufacturer information			Due Calibr. Month/ year
		Name	Model No.	Serial No.	
0038	Antenna Mast, 1-4 m	Hermon Labs	AM-1	028	2/03 Check
0041	Double ridged guide antenna, 1-18 GHz	Electro-Metrics	RGA 50/60	2811	3/03
0446	Active Loop Antenna 10 kHz-30 MHz	Electro-Mechanics	6502	2857	10/02
0465	Anechoic Chamber 9 (L) x 6.5 (W) x 5.5 (H) m	Hermon Labs	AC-1	023	11/02 check
0521	Spectrum Analyzer with RF filter section (EMI Receiver 9 kHz - 6.5 GHz)	Hewlett Packard	8546A	0319	9/02
0554	Amplifier, 2 – 18 GHz RF	Miteq	AFD-4	4300	12/02
0569	Antenna, Log Periodic, 200-1000MHz	Electro-Metrics	LPA 25/30	1953	1/03
0589	Cable Coaxial, GORE A2POL118.2, 3m	Hermon Labs	GORE-3	589	12/02
0590	Attenuator 10 dB, 50 Ohm, N-type, 2W	Elisra Electronic Systems	MW2100-N-Type	10	01/03
0604	Antenna Biconilog Log-Periodic/T Bow-Tie, 26 - 2000 MHz	EMCO	3141	9611-1011	01/03
0661	Generator Swept Signal, 10MHz to 40GHz+ 10dBm	Hewlett Packard	83640B	0266	9/02
0812	Cable, coax, RG-214, 11.5 m, N-type connectors	Hermon Labs	C214-11	148	5/03
1004	Cable coaxial, ANDREW PSWJ4, 6 m	Hermon Labs	ANDREW-6	163	12/02
1200	Quadruplexer	Elettronica	UE 84	0240	4/03 check
1424	Spectrum analyzer, 30 Hz - 40 GHz	Agilent Technologies	8564EC	3946A00219	8/02
1430	EMI Receiver System, 9 kHz - 2.9 GHz	Agilent Technologies	8542E	3807A00262	9/02
1552	Cable RF, 8 m	Alpha wire	RG-214	NA	5/03
1565	Antenna, Dipole, Tunable 500 - 1000 MHz	Electro-Metrics	TDS-30-2	334	1/03
1871	Attenuator, 50 Ohm, 2W, DC-8 GHz, 10 dB	Midwest Microwave	ATT 0217-10-NNN-02	NA	01/03
1939	Cable 40 GHz, 1.5 m, green	Rhophase Microwave Ltd.	KPS-1503A-1500-KPS	T4664	10/02
1942	Cable 18 GHz, 4 m, blue	Rhophase Microwave Ltd	SPS-1803A-4000-NPS	T4658	10/02
1947	Cable 18 GHz, 6.5 m, blue	Rhophase Microwave Ltd	NPS-1803A-6500-NPS	T4974	10/02

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Appendix E Test equipment correction factors

Antenna factor, Active Loop Antenna
Model 6502
S/N 2857

Frequency, MHz	Antenna Factor, dB
0.009	-32.8
0.010	-33.8
0.020	-38.3
0.050	-41.1
0.075	-41.3
0.100	-41.6
0.150	-41.7
0.250	-41.6
0.500	-41.8
0.750	-41.9
1.000	-41.4
2.000	-41.5
3.000	-41.4
4.000	-41.4
5.000	-41.5
10.000	-41.9
15.000	-41.9
20.000	-42.2
25.000	-42.8
30.000	-44.0

Antenna factor is to be added to receiver meter reading in dB(μV) to convert to field intensity in dB(μV)/meter

Antenna factor, 3 m test distance
Log periodic antenna
Electro-Metrics, model LPA-25/30
Ser.No.1953

Frequency MHz	Antenna Factor dB(1/m)	Frequency MHz	Antenna Factor dB(1/m)
200	15.2	625	25.2
225	15.1	650	25.8
250	16.3	675	27.2
275	17.2	700	27.6
300	19.6	725	27.6
325	18.4	750	27.6
350	19.0	775	28.0
375	20.0	800	28.2
400	20.9	825	29.4
425	21.3	850	29.9
450	22.1	875	30.0
475	22.7	900	30.4
500	23.2	925	30.6
525	23.9	950	30.8
550	24.2	975	31.6
575	24.6	1000	32.1
600	24.7		

Antenna factor is to be added to receiver meter reading in dB(μV) to convert to field intensity in dB(μV/meter)

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Antenna Factor
Biconilog Antenna EMCO Model 3141
Ser.No.1011

Frequency, MHz	Antenna Factor, dB(1/m)	Frequency, MHz	Antenna Factor, dB(1/m)
26	7.8	940	24.0
28	7.8	960	24.1
30	7.8	980	24.5
40	7.2	1000	24.9
60	7.1	1020	25.0
70	8.5	1040	25.2
80	9.4	1060	25.4
90	9.8	1080	25.6
100	9.7	1100	25.7
110	9.3	1120	26.0
120	8.8	1140	26.4
130	8.7	1160	27.0
140	9.2	1180	27.0
150	9.8	1200	26.7
160	10.2	1220	26.5
170	10.4	1240	26.5
180	10.4	1260	26.5
190	10.3	1280	26.6
200	10.6	1300	27.0
220	11.6	1320	27.8
240	12.4	1340	28.3
260	12.8	1360	28.2
280	13.7	1380	27.9
300	14.7	1400	27.9
320	15.2	1420	27.9
340	15.4	1440	27.8
360	16.1	1460	27.8
380	16.4	1480	28.0
400	16.6	1500	28.5
420	16.7	1520	28.9
440	17.0	1540	29.6
460	17.7	1560	29.8
480	18.1	1580	29.6
500	18.5	1600	29.5
520	19.1	1620	29.3
540	19.5	1640	29.2
560	19.8	1660	29.4
580	20.6	1680	29.6
600	21.3	1700	29.8
620	21.5	1720	30.3
640	21.2	1740	30.8
660	21.4	1760	31.1
680	21.9	1780	31.0
700	22.2	1800	30.9
720	22.2	1820	30.7
740	22.1	1840	30.6
760	22.3	1860	30.6
780	22.6	1880	30.6
800	22.7	1900	30.6
820	22.9	1920	30.7
840	23.1	1940	30.9
860	23.4	1960	31.2
880	23.8	1980	31.6
900	24.1	2000	32.0
920	24.1		

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

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Antenna Factor
Double Ridged Guide Antenna
Model RGA-50/60
S/N 2811

Frequency, MHz	Antenna Factor, dB
1000	24.3
1500	25.4
2000	28.4
2500	29.2
3000	30.5
3500	31.6
4000	33.7
4500	32.2
5000	34.5
5500	34.5
6000	34.6
6500	35.3
7000	35.5
7500	35.9
8000	36.6
8500	37.3
9000	37.7
9500	37.7
10000	38.2
10500	38.5
11000	39.0
11500	40.1
12000	40.2
12500	39.3
13000	39.9
13500	40.6
14000	41.1
14500	40.5
15000	39.9
15500	37.8
16000	39.1
16500	41.1
17000	41.7
17500	45.1
18000	44.3

Antenna factor is to be added to receiver meter reading in dB(μV) to convert to field intensity in dB(μV)/meter

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Cable Coaxial, GORE A2P01POL118, 2.3 m, model:GORE-3, s/n 176 (HL 0589)
+ Cable Coaxial, ANDREW PSWJ4, 6m, model: ANDREW-6, s/n 163 (HL 1004)
Calibration data

No.	Parameter	SET, MHz	Measured, dB	Deviation, dB	Tolerance (Specification), dB	Meas. Uncert., dB	Notes
1	Insertion	30	0.33	-			
2	Loss	50	0.40	-			
3		100	0.57	-			
4		300	0.97	-			
5		500	1.25	-			
6		800	1.59	-			
7		1000	1.81	-			
8		1200	1.97	-	≤ 6.5	±0.12	
9		1400	2.15	-			
10		1600	2.28	-			
11		1800	2.43	-			
12		2000	2.61	-			
13		2200	2.75	-			
14		2400	2.89	-			
15		2600	2.97	-			
16	Insertion	2800	3.21	-	≤ 6.5	±0.12	
17	Loss	3000	3.32	-			
18		3300	3.47	-			
19		3600	3.62	-			
20		3900	3.84	-			
21		4200	3.92	-		±0.17	
22		4500	4.07	-			
23		4800	4.36	-			
24		5100	4.62	-			
25		5400	4.78	-			
26		5700	5.16	-			
27		6000	5.67	-			
28		6500	5.99	-			

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Cable 18GHz, 6.5 m, blue, model: NPS-1803A-6500-NPS, s/n T4974 (HL 1947)
Calibration data

Frequency, GHz	Insertion Loss, dB
	HL1947
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	Insertion Loss, dB
	HL1947
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 18GHz, 4 m, blue, model: SPS-1803A-4000-NPS, s/nT4658 (HL 1942)
Calibration data

Frequency, GHz	Insertion Loss, dB
	HL1942
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	Insertion Loss, dB
	HL1942
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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Calibration data, cable HL 1552

Manufacturer	Model	Description	HL Serial No./
Alpha Wire	C-56(RG-214-8m)	Cable RF, 8 m	1552

No.	Parameter	SET	Measured attenuation	Deviation	Tolerance (Specification)	Meas. Uncert.	Notes
1	10 kHz		0.01 dB			±0.05 dB	
2	100 kHz		0.01 dB			±0.05 dB	
3	1 MHz		0.03 dB			±0.05 dB	
4	10 MHz		0.12 dB			±0.05 dB	
5	20 MHz		0.23 dB			±0.05 dB	
6	30 MHz		0.30 dB			±0.05 dB	
7	40 MHz		0.32 dB			±0.05 dB	
8	50 MHz		0.34 dB			±0.05 dB	
9	60 MHz		0.39 dB			±0.05 dB	
10	70 MHz		0.43 dB			±0.05 dB	
11	80 MHz		0.48 dB			±0.05 dB	
12	90 MHz		0.50 dB			±0.05 dB	
13	100 MHz		0.55dB			±0.05 dB	
14	200 MHz		0.78 dB			±0.05 dB	
15	300 MHz		1.04 dB			±0.05 dB	
16	400 MHz		1.16 dB			±0.05 dB	
17	500 MHz		1.33 dB			±0.05 dB	
18	600 MHz		1.51 dB			±0.05 dB	
19	700 MHz		1.65 dB			±0.05 dB	
20	800 MHz		1.77 dB			±0.05 dB	
21	900 MHz		1.92 dB			±0.05 dB	
22	1000 MHz		2.04 dB			±0.05 dB	
23	1200 MHz		2.26 dB			±0.05 dB	
24	1400 MHz		2.49 dB			±0.05 dB	
25	1600 MHz		2.74 dB			±0.05 dB	
26	1800 MHz		2.94 dB			±0.05 dB	
27	2000 MHz		3.18 dB			±0.05 dB	
28	2500 MHz		3.65 dB			±0.05 dB	
29	2900 MHz		4.08 dB			±0.05 dB	

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Calibration data, cable HL 1939

Frequency, GHz	Insertion Loss, dB				
	HL1936	HL1937	HL1938	HL1939	HL1940
0.03	0.06	0.07	0.07	0.12	0.13
0.05	0.07	0.08	0.09	0.15	0.14
0.10	0.10	0.11	0.11	0.20	0.19
0.20	0.14	0.14	0.15	0.27	0.25
0.30	0.18	0.18	0.19	0.33	0.31
0.40	0.20	0.20	0.22	0.39	0.37
0.50	0.23	0.23	0.24	0.43	0.41
0.60	0.26	0.26	0.28	0.48	0.46
0.70	0.28	0.28	0.30	0.52	0.49
0.80	0.31	0.30	0.32	0.55	0.53
0.90	0.32	0.32	0.34	0.59	0.56
1.00	0.34	0.33	0.35	0.62	0.59
1.10	0.36	0.36	0.38	0.65	0.62
1.20	0.38	0.38	0.39	0.68	0.65
1.30	0.39	0.38	0.40	0.70	0.68
1.40	0.40	0.40	0.42	0.73	0.70
1.50	0.42	0.41	0.43	0.76	0.73
1.60	0.44	0.43	0.45	0.79	0.76
1.70	0.44	0.44	0.45	0.80	0.77
1.80	0.45	0.45	0.46	0.82	0.80
1.90	0.47	0.47	0.48	0.84	0.82
2.00	0.47	0.46	0.48	0.86	0.84
2.10	0.48	0.46	0.49	0.88	0.85
2.20	0.50	0.48	0.50	0.89	0.87
2.30	0.50	0.48	0.51	0.91	0.88
2.40	0.51	0.49	0.52	0.93	0.90
2.50	0.52	0.50	0.53	0.95	0.91
2.60	0.53	0.51	0.54	0.97	0.93
2.70	0.54	0.52	0.55	0.98	0.95
2.80	0.56	0.53	0.56	1.01	0.97
2.90	0.56	0.53	0.56	1.02	0.98
3.10	0.57	0.55	0.58	1.05	1.02
3.30	0.59	0.57	0.60	1.09	1.05
3.50	0.61	0.59	0.62	1.12	1.09
3.70	0.63	0.61	0.64	1.17	1.12
3.90	0.65	0.63	0.66	1.18	1.15
4.10	0.67	0.65	0.69	1.23	1.18
4.30	0.68	0.66	0.69	1.25	1.21
4.50	0.72	0.68	0.71	1.29	1.24
4.70	0.73	0.69	0.76	1.31	1.29
4.90	0.71	0.69	0.75	1.32	1.27

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5.10	0.75	0.71	0.73	1.36	1.33
5.30	0.79	0.73	0.76	1.38	1.33
5.50	0.77	0.74	0.80	1.44	1.38
5.70	0.78	0.79	0.79	1.44	1.41
5.90	0.83	0.79	0.81	1.50	1.43
6.10	0.84	0.81	0.84	1.51	1.50
6.30	0.83	0.87	0.83	1.57	1.47
6.50	0.84	0.85	0.85	1.57	1.56
6.70	0.84	0.82	0.86	1.58	1.50
6.90	0.84	0.87	0.84	1.60	1.53
7.10	0.85	0.85	0.88	1.58	1.53
7.30	0.85	0.82	0.88	1.62	1.56
7.50	0.90	0.87	0.88	1.62	1.59
7.70	0.92	0.88	0.97	1.68	1.62
7.90	0.93	0.89	0.99	1.69	1.68
8.10	0.98	0.92	0.95	1.73	1.67
8.30	0.98	0.91	0.99	1.73	1.70
8.50	0.95	0.94	0.99	1.77	1.69
8.70	0.98	0.93	0.95	1.75	1.70
8.90	0.94	0.89	0.95	1.77	1.68
9.10	0.93	0.93	0.94	1.76	1.70
9.30	1.00	0.93	0.95	1.81	1.70
9.50	0.98	0.92	1.04	1.85	1.77
9.70	1.01	1.00	1.05	1.86	1.80
9.90	1.15	1.03	1.04	1.95	1.88

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Cable loss
Cable RG-214 (0812, 0813)

Frequency, MHz	Cable Loss,dB		Frequency, MHz	Cable Loss,dB		Frequency, MHz	Cable Loss,dB		Frequency, MHz	Cable Loss,	
	3 m	10 m		3 m	10 m		3 m	10 m		3 m	10 m
30	0.8	0.8	115	1.8	1.8	200	2.5	2.6	625	4.7	5.0
35	0.9	0.9	120	1.8	1.8	225	2.7	2.8	650	4.8	5.2
40	1.0	1.0	125	1.8	1.9	250	2.8	2.9	675	4.9	5.3
45	1.1	1.1	130	1.9	1.9	275	2.9	3.1	700	5.0	5.4
50	1.1	1.1	135	1.9	2.0	300	3.0	3.2	725	5.1	5.6
55	1.2	1.2	140	1.9	2.0	325	3.1	3.4	750	5.2	5.7
60	1.3	1.3	145	2.0	2.1	350	3.3	3.6	775	5.3	5.8
65	1.3	1.3	150	2.0	2.1	375	3.5	3.8	800	5.4	5.9
70	1.4	1.4	155	2.1	2.2	400	3.6	3.9	825	5.6	6.0
75	1.4	1.4	160	2.1	2.2	425	3.7	4.0	850	5.7	6.1
80	1.5	1.5	165	2.2	2.3	450	3.8	4.1	875	5.9	6.2
85	1.5	1.5	170	2.2	2.3	475	3.9	4.2	900	6.0	6.3
90	1.6	1.6	175	2.3	2.4	500	4.0	4.3	925	6.1	6.4
95	1.6	1.6	180	2.3	2.4	525	4.1	4.4	950	6.2	6.5
100	1.7	1.7	185	2.4	2.5	550	4.2	4.6	975	6.3	6.6
105	1.7	1.7	190	2.5	2.6	575	4.4	4.8	1000	6.4	6.7
110	1.7	1.7	195	2.5	2.6	600	4.6	4.9			

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Appendix F General information

Test facility description

Tests were performed at Hermon Laboratories Ltd., which is a fully independent, private EMC, Safety 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, 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).

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Abbreviations and acronyms

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

AC	alternating current
AE	auxiliary equipment
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
LISN	line impedance stabilization network
m	meter
MHz	megahertz
NA	not applicable
QP	quasi-peak
RF	radio frequency
RE	radiated emission
rms	root mean square
s	second
V	volt
W	width

Specification references

47CFR part 15: 2001	Radio Frequency Devices
ANSI C63.2:96	American National Standard for Instrumentation-Electromagnetic Noise and Field Strength, 10 kHz to 40 GHz-Specifications.
ANSI C63.4:92	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.