


 <div style="float: right; text-align: right;"> Organizzazione con Sistema di Gestione certificato Company with Management System certified ISO 9001:2008  </div> <p><i>ELECTROMAGNETIC COMPATIBILITY ELECTRICAL SAFETY LASER SPECTROSCOPY ENVIRONMENTAL PHYSIC</i></p>		
G.S.D. Srl PISA - Italy	Test Report n. FCC-11693	Rev. 02
Manufacturer	TERTIUM Technology S.r.l.	
Address	Via G. B. Picotti, 8 56124 Pisa Italy	
Test Family Name	BlueBerry	
Testing Laboratory Name	G.S.D. S.r.l.	
Address	Via Marmiceto, 8 56121 Ospedaletto Pisa (PI) Italy	
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FCC Listed: Registration Number: 424037		
Location and Date of Issue	Pisa, 2011 July 18	
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1. MANUFACTURER AND EUT IDENTIFICATION¹	
Manufacturer	TERTIUM Technology S.r.l..
Address	Via G. B. Picotti, 8 56124 Pisa Italy
Test Family Name	BlueBerry
Date of reception	2011 March 03
Sampling	Laboratory sample for certification
Test Item Description	RFID Device
Nominal Input Voltage	5 Vdc Li-ion Batteries rechargeable batteries via micro USB
EUT Dimensions	7.5cm x 4.0cm
FCC ID	Y6D0793573982315U

¹A detailed documentation is preserved in the internal fascicle.



*Fig. 1.1
Equipment Photo*



EUT Dimension1 Photo



EUT Dimension1 Photo

2. REFERENCE STANDARDS

Tests and measurements are performed accordingly to the reference standards given in the table below:

<i>TEST</i>	<i>STANDARD</i>
Emissions: Conducted and Radiated – Section 15.207 and 15.209	FCC Rules and Regulations, Title 47 (2008) Part 15 – Sub part B ANSI C63.4 – American National Standard for Methods of Measuring of Radio-Noise Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz – 40 GHz
Operation within the band 902-928 MHz: Alternative Test Procedures 15.247 (b) and (c) , and (a) Bandwidth and average time of occupancy, Band Edge 15.247 (d)	FCC Rules and Regulations, Title 47 (2008) Part 15 – Sub part B DA 00-705 (30 March 2010) – Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems ANSI C63.4 – American National Standard for Methods of Measuring of Radio-Noise Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz – 40 GHz
Maximum Permissible Exposure	OET Bulletin 65 Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields FCC Rules and Regulations, Title 47 (2008) Part 15 – Sub part B DA 00-705 (30 March 2010) – Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems

3. RESULT, CONDITION, MEASUREMENT UNCERTAINTYSummary of Test Results

<i>TEST</i>	<i>RESULT</i>
Emissions: conducted Section 15.207	Pass
Emissions: radiated Section 15.209	Pass
Bandwidth and Average Time of Occupancy Section 15.247 (a)	Pass
Operation within the band 902-928 MHz: Section 15.247 (b) and (c)	Pass
Band Edge Section 15.247 (d)	Pass

Measurement uncertainty

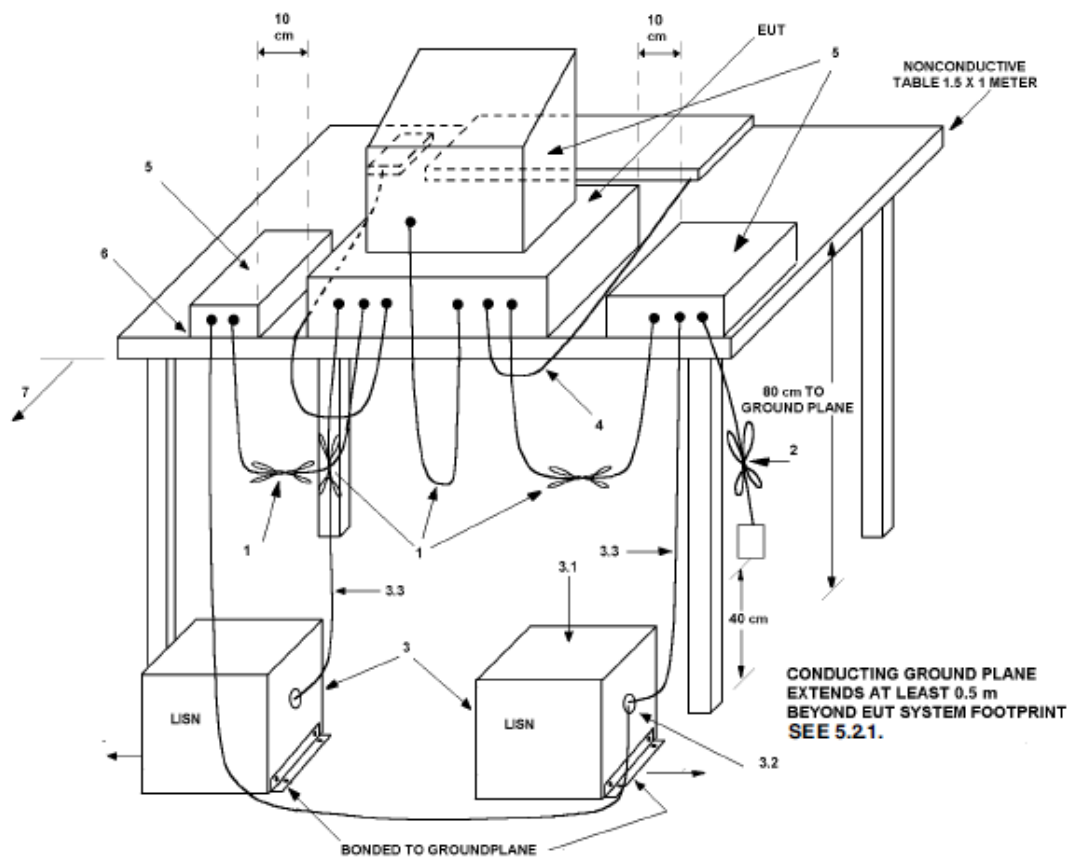
<i>TEST</i>	<i>EXPANDED UNCERTAINTY</i>
Conducted Emission – 50Ω/50μH AMN (150 kHz - 30 MHz)	± 3.5 dB
Radiated Emission – (Semianechoic Room) (30 MHz - 18 GHz)	± 4.7 dB

Climatic Conditions

<i>PARAMETER</i>	<i>VALUE</i>
Temperature	(293 ± 3) K
Relative humidity	(50 ± 5) %

Extensions

The results refer only to the sampled EUT and under the specified conditions.



Conducted and Radiated EUT Test Set-up example (ANSI C63.4 2003)

4. RADIATED EMISSIONS

In the following table you can find the limits established by the reference standard:

FREQUENCY RANGE (MHz)	<i>Field Strenght</i> <i>QUASI-PEAK LIMITS</i> [dB (μV/m)]
30 ÷ 88	40
88 ÷ 216	43,5
216 ÷ 960	46
Above 960	54

Test Equipment

EQUIPMENT	MANUFACTURER	MODEL	CAL. DUE
EMI Receiver	HP	HP8546A	01/2012
EMI Receiver Filter Section	HP	HP85460A	01/2012
Anechoic Chamber	Comtest	CSA01	01/2012
Bilog Antenna	Schaffner	CBL6112B	01/2012
Horn Antenna	EMCO	3115	01/2012
Controllor	Deisel	HD100	01/2012
Turn Table	Deisel	MA240	01/2012
LISN	GSD	NTW06	01/2012

Test procedure: RE22R02

Tests performed with equipment stand-alone and conncted to a Personal Computer.

Notes

Azimuth position EUT-Antenna corresponding to 0° identifies the rotating table orientation (TT) in which the instrument to be tested shows the front part turned towards the antenna. Positive grades individuate clockwise rotations of TT when this one is observed from the top. For negative degrees, TT rotation is anticlockwise.

Antenna height respect to the mass plane is conventionally individuated with: MA=XXX where XXX indicates the height (always positive for e>100) expressed in cm.

Antenna horizontal polarisation is indicated by POL=H.

Antenna vertical polarisation is indicated by POL=V.

EUT was tested in the three ortogonal planes.

Results and conclusions

In all the operative conditions, equipment complied with the standard limits. Graphics in following figures show the most significant registrations of the performed measurements.

Job Number	FCC-11693
Test Name	Radiated Emissions
EUT Name	TERTIUM Technology S.r.l. - BlueBerry



ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKR 896.8 MHz
 106.79 dBμV/m

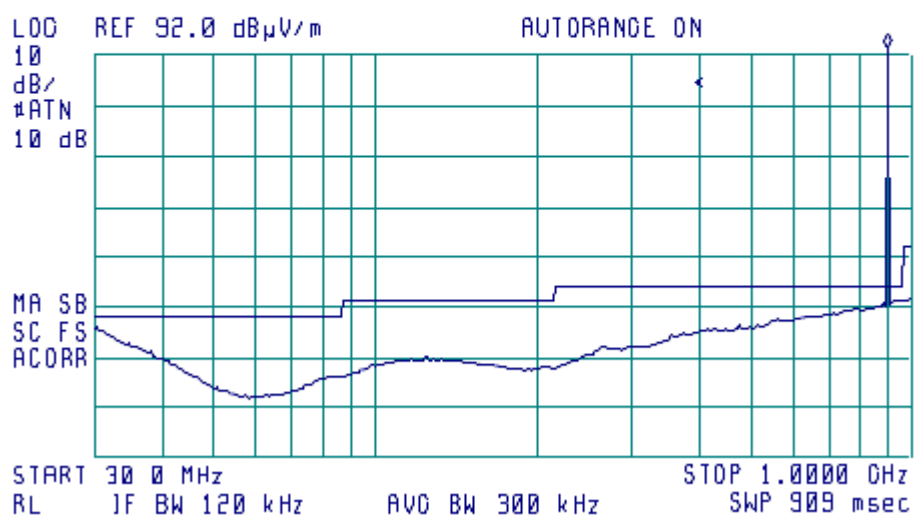


Fig. 4.1

Record of the measurement of radiated emissions (PK).

Maximum disturbance determined in the frequency range 30 – 1000 MHz, Pol. H.

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Job Number	FCC-11693
Test Name	Radiated Emissions
EUT Name	TERTIUM Technology S.r.l. - BlueBerry



ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKR 896.8 MHz
 95.92 dB μ V/m

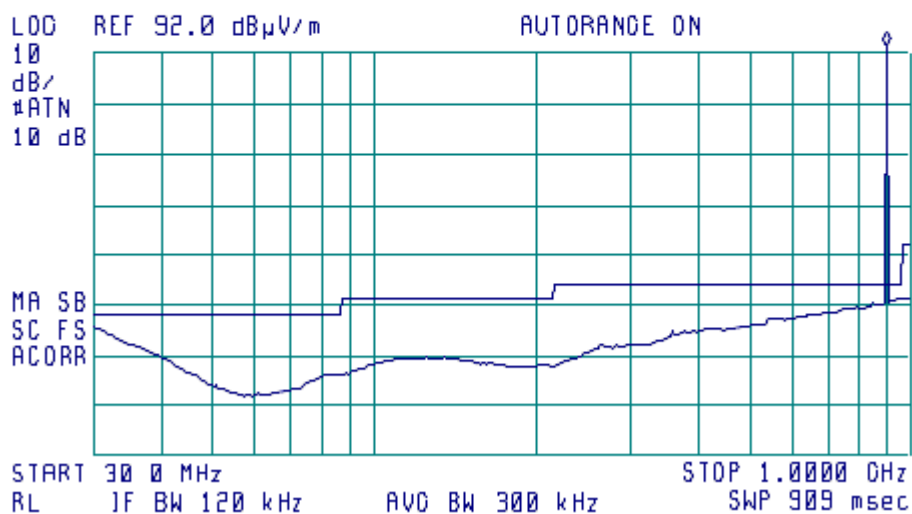


Fig. 4.2

Record of the measurement of radiated emissions (PK).

Maximum disturbance determined in the frequency range 30 – 1000 MHz, Pol. V.

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Job Number	FCC-11693
Test Name	Radiated Emissions
EUT Name	TERTIUM Technology S.r.l. - BlueBerry



ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKR 865.5 MHz
 85.82 dB μ V/m

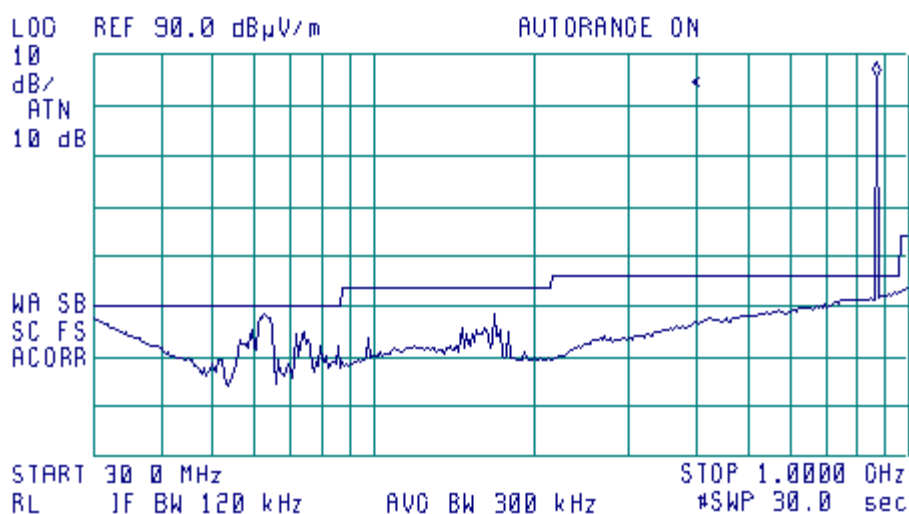


Fig. 4.3

Record of the measurement of radiated emissions (PK).

Maximum disturbance determined in the frequency range 30 – 1000 MHz, Pol. V.
 EUT Connected to Personal Computer and Operating.

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Job Number	FCC-11693
Test Name	Radiated Emissions
EUT Name	TERTIUM Technology S.r.l. - BlueBerry



ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 865.5 MHz
98.46 dBμV/m

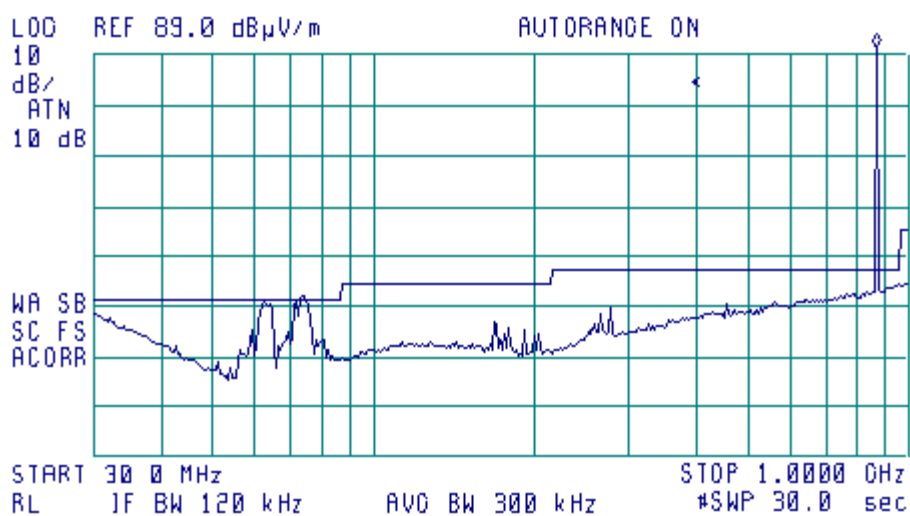


Fig. 4.4

Record of the measurement of radiated emissions (PK).

*Maximum disturbance determined in the frequency range 30 – 1000 MHz, Pol. H.
EUT Connected to Personal Computer and Operating.*

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Job Number FCC-11693
 Test Name Radiated Emissions
 EUT Name TERTIUM Technology S.r.l. - BlueBerry

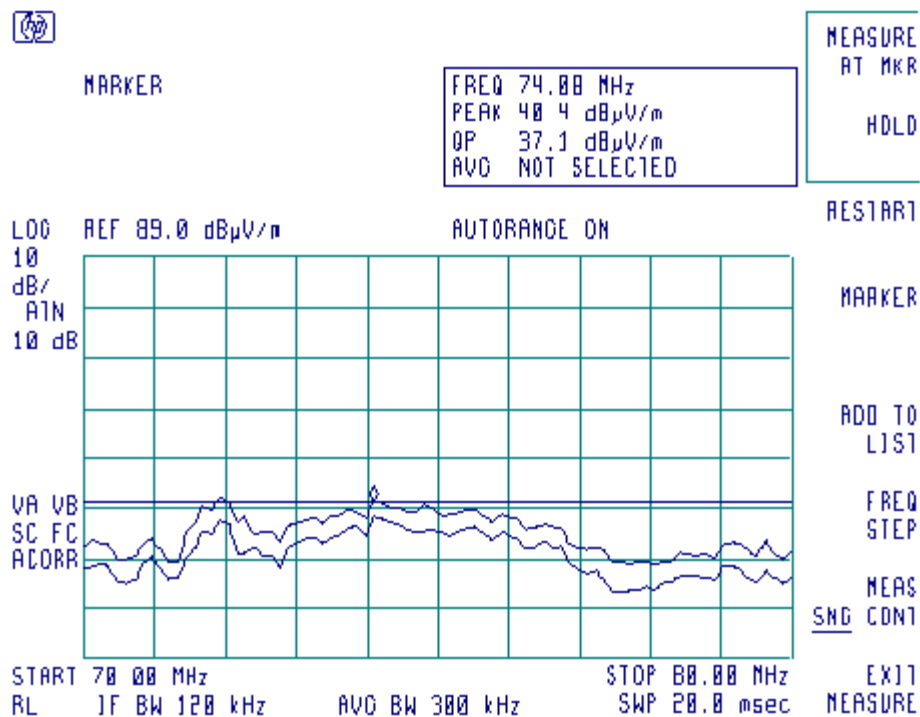


Fig. 4.5

Record of the measurement of radiated emissions (PK).

Maximum disturbance determined in the frequency range 30 – 1000 MHz, Pol. H: Stepped Measurement.

EUT Connected to Personal Computer and Operating.

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5. POWERLINE CONDUCTED EMISSIONS

Equipment shall meet the limits below when using a CISPR16 quasi-peak and average detector receivers.

FCC, 15.107, Class B Limit

FREQUENCY RANGE (MHz)	QUASI-PEAK LIMIT [dB (μV)]	AVERAGE LIMIT [dB (μV)]
0.15 ÷ 0.50	66 ÷ 56 ^(*)	56 ÷ 46 ^(*)
0.50 ÷ 5	56	46
5 ÷ 30	60	50

^(*) Limit decreasing linearly with logarithm of frequency

Test Equipment

EQUIPMENT	MANUFACTURER	MODEL	CAL. DUE
EMI Receiver	HP	HP8546A	
EMI Receiver Filter Section	HP	HP85460A	
Screened Room	GSD	CSC01	
Transient Limiter	HP	11947A	01/2012
LISN	GSD	GSDA01	01/2012

Test procedure: CE22R01

The EUT power cable was connected to a LISN and the monitored output of the LISN was connected to a spectrum analyzer by a transient limiter. The conducted emissions from 150 kHz to 30 MHz were monitored and compared to the specification limits

Test method

Test method was in accordance with the reference standard.

EUT modes of operations were tested in order to achieve the maximum level of emission.

Results

Equipment complied with the test specification limits.

Graphics in following figures show some registrations of the frequency spectrum of the conducted emissions.

Job Number	FCC-11693
Test Name	Powerline Conducted Emissions
	FCC, 15.207, Class B Limit
EUT Name	BlueBerry



ACTV DET: PEAK
MEAS DET: PEAK QP AVG

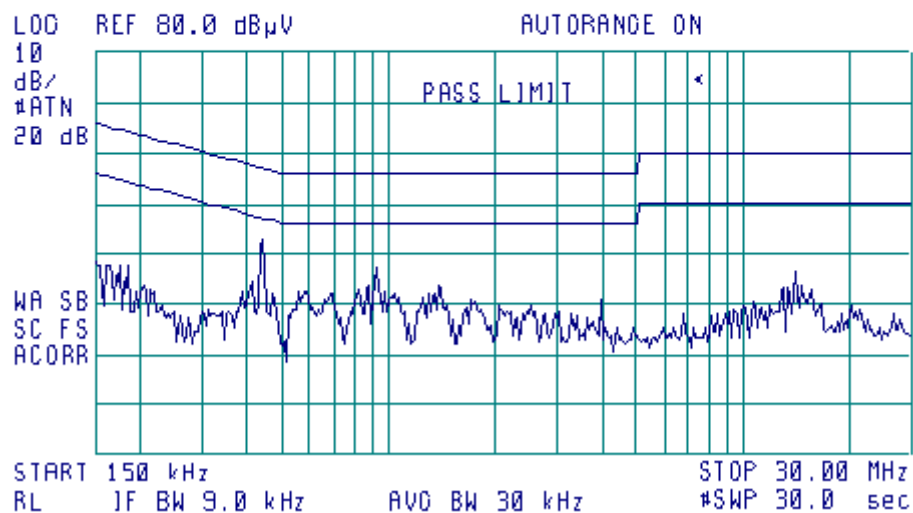


Fig. 4.1

B Band (0.15 – 30 MHz): phase 1

Job Number	FCC-11693
Test Name	Powerline Conducted Emissions
	FCC, 15.207, Class B Limit
EUT Name	BlueBerry



ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKR 450 kHz
 42.00 dBμV

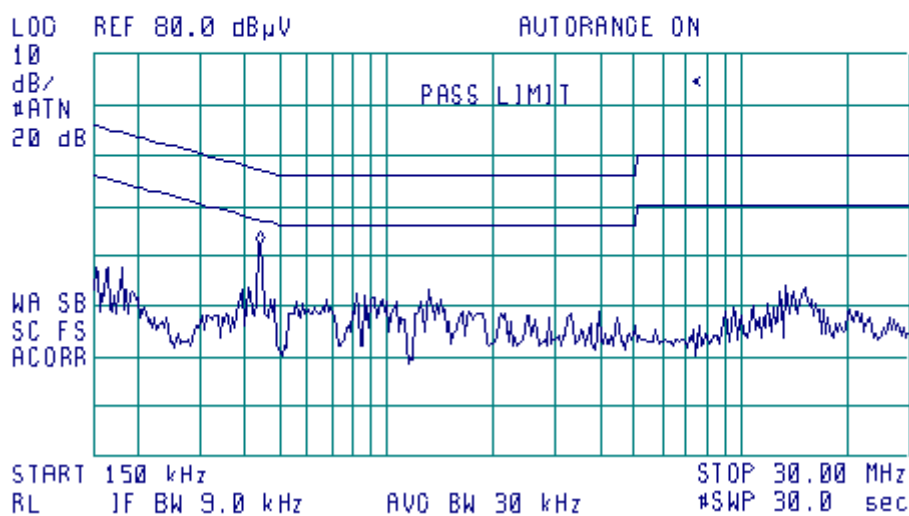


Fig. 4.1

B Band (0.15 – 30 MHz): phase 2

6. OPERATION WITHIN THE BAND 902-928 MHz: PEAK OUTPUT POWER – SPURIOUS RF EMISSION – BAND EDGE

Peak Output Power

Equipment shall meet the limits below .

<i>FREQUENCY RANGE</i> (MHz)	RF power output W/dBm
902 - 928	1.0/30.0
Channel	Output Power
0	0.029 / 14,6
25	0.013 / 11.1
49	0.011 / 10.2

Spurious Emissions

Nr Harmonics	AV Level (dBμV/m)						AV Limits (dBμV/m)	Remark
	Ch 0		Ch 25		Ch 49			
	F (MHz)	(dBμV/m)	F (MHz)	(dBμV/m)	F (MHz)	(dBμV/m)		
2	1805.5	--	1830.5	--	1854.5	--	54.0	
3		--		--		--	54.0	
4		--		--		--	54.0	
5		--		--		--	54.0	
6		--		--		--	54.0	
7		--		--		--	54.0	
8		--		--		--	54.0	
9		--		--		--	54.0	
10		--		--		--	54.0	

Note: Levels below 20 dB of limits are indicated with (--).

Nr Harmonics	Peak Level (dBμV/m)						AV Limits (dBμV/m)	Remark
	Ch 0		Ch 25		Ch 49			
	F (MHz)	(dBμV/m)	F (MHz)	(dBμV/m)	F (MHz)	(dBμV/m)		
2	1805.5	--	1830.5	--	1854.5	--	74.0	
3		--		--		--	74.0	
4		--		--		--	74.0	
5		--		--		--	74.0	
6		--		--		--	74.0	
7		--		--		--	74.0	
8		--		--		--	74.0	
9		--		--		--	74.0	
10		--		--		--	74.0	

Note: Levels below 20 dB of limits are indicated with (--).

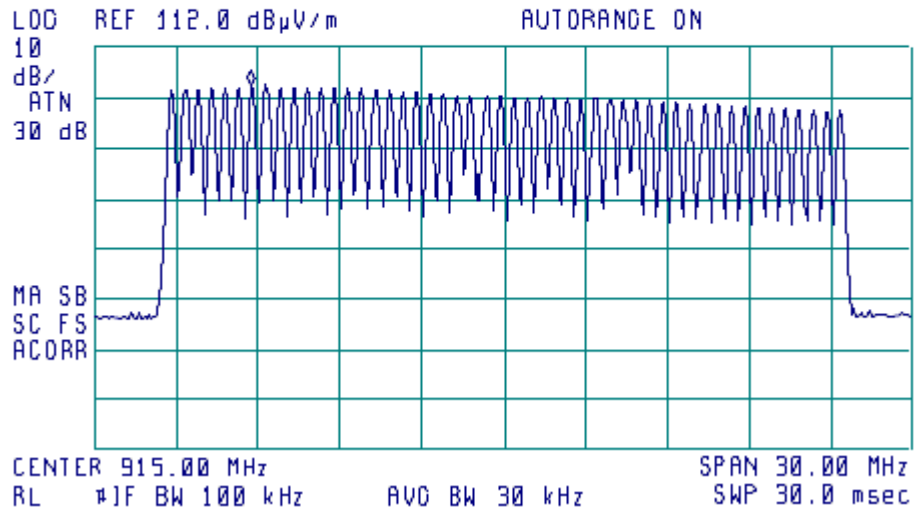
Band Edge

Emissions must be within the band 902-928 MHz.

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.



ACTV DET: PEAK
MEAS DET: PEAK QP
MKR 905.78 MHz
104.54 dBμV/m



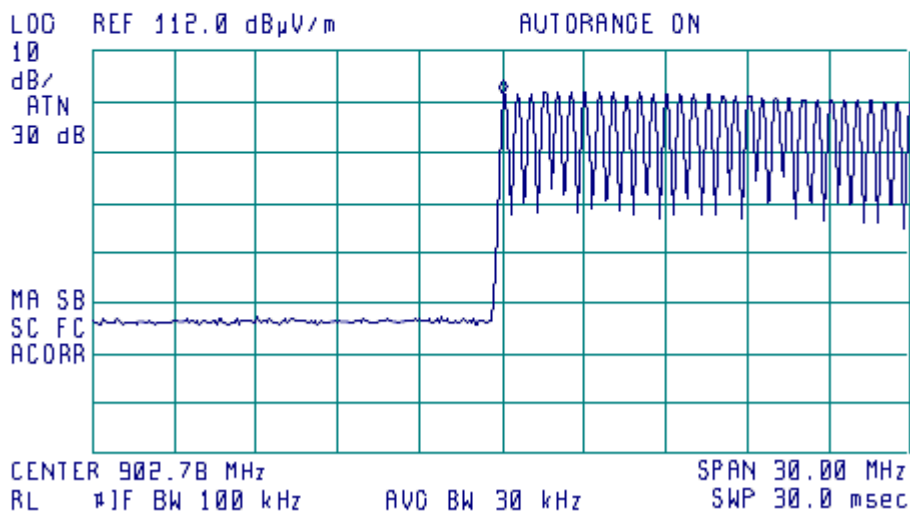
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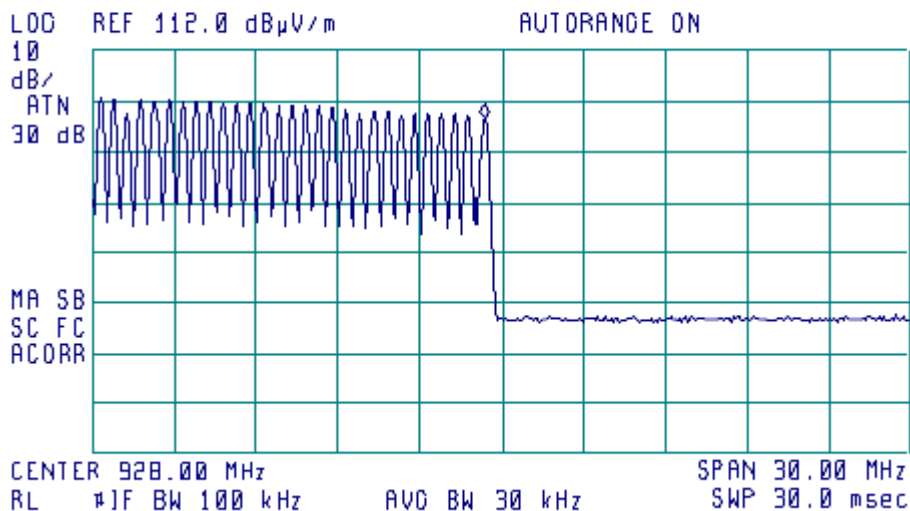
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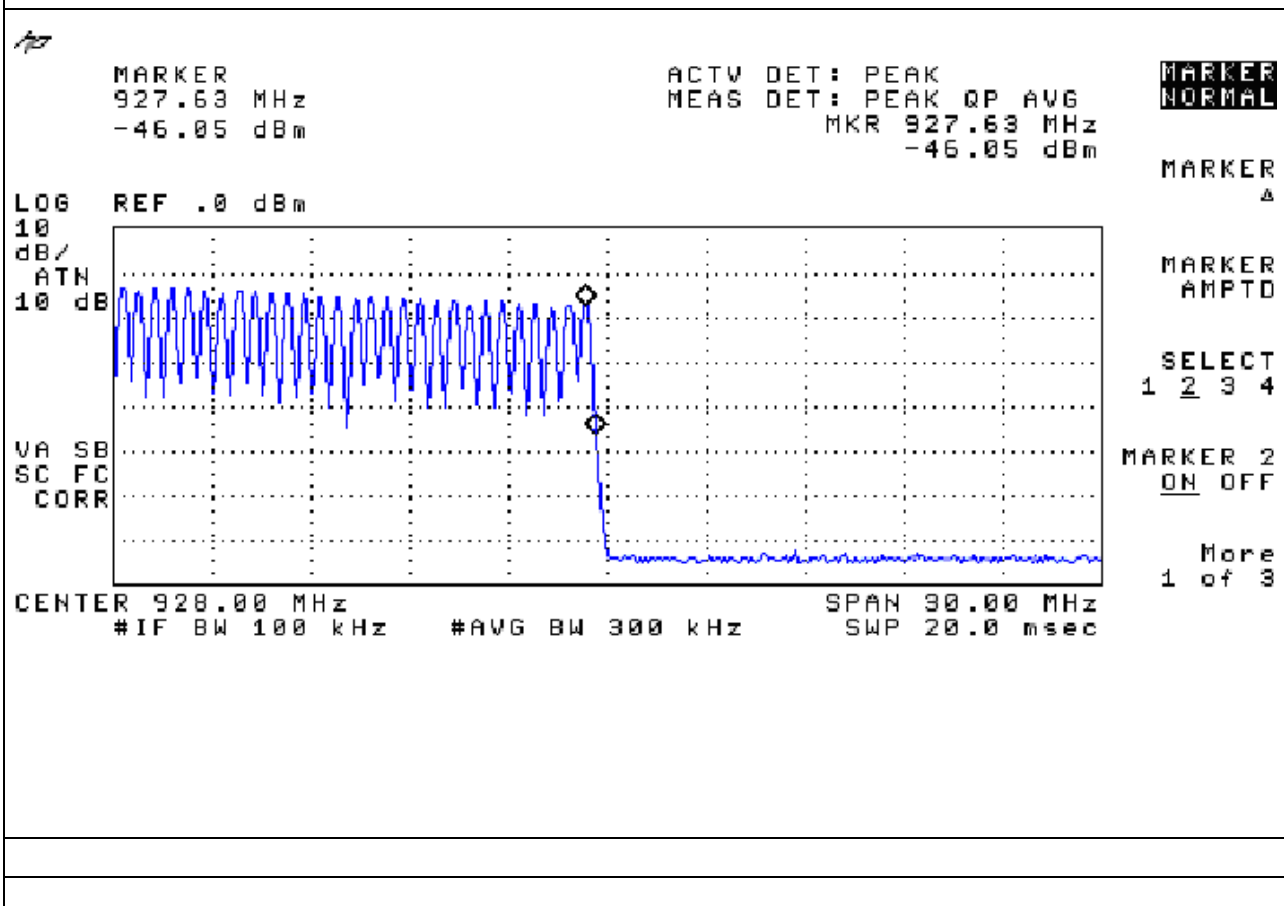
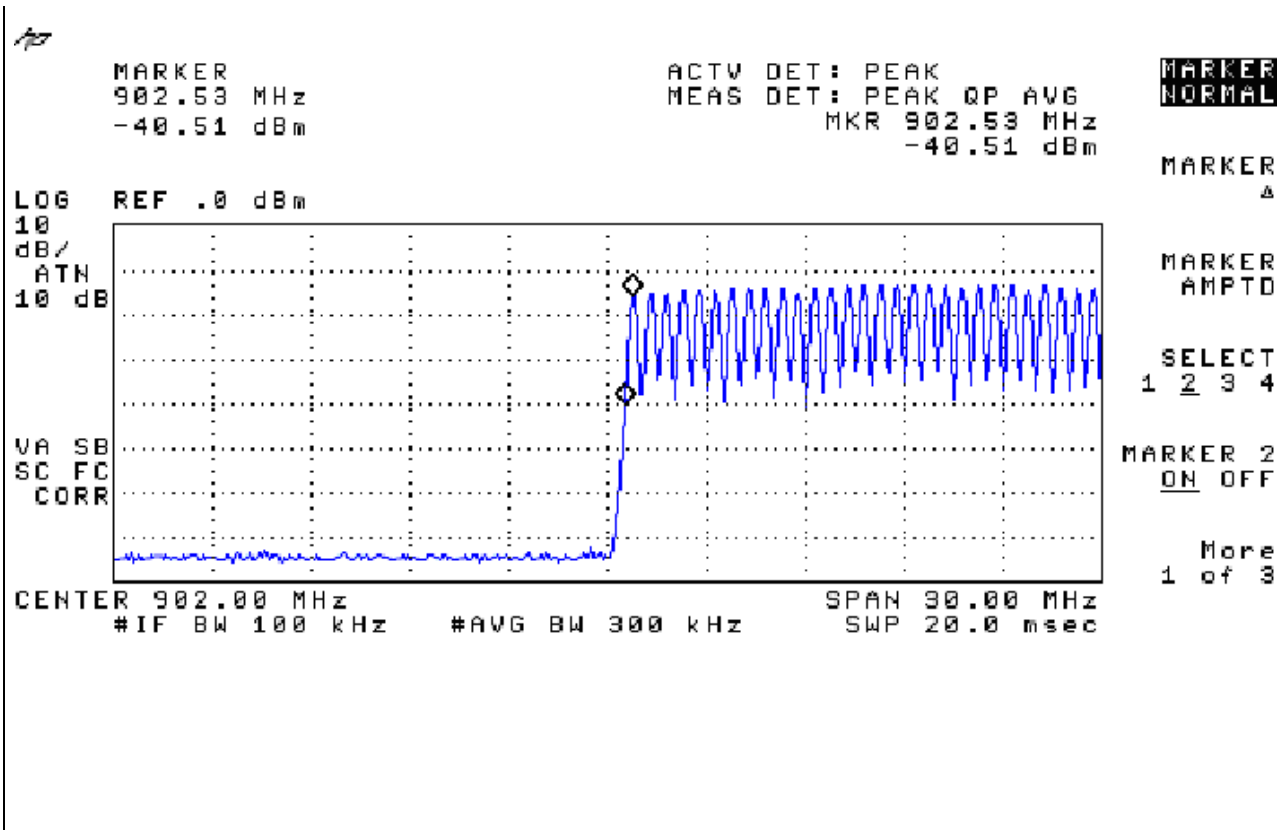


ACTV DET: PEAK
MEAS DET: PEAK QP
MKR 902.78 MHz
103.53 dB μ V/m



ACTV DET: PEAK
MEAS DET: PEAK QP
MKR 927.33 MHz
98.69 dB μ V/m





<u>Test Equipment</u>			
EQUIPMENT	MANUFACTURER	MODEL	CAL. DUE
EMI Receiver	HP	HP8546A	01/2012
EMI Receiver Filter Section	HP	HP85460A	01/2012
Anechoic Chamber	Comtest	CSA01	01/2012
Bilog Antenna	Schaffner	CBL6112B	01/2012
Horn Antenna	EMCO	3115	01/2012
Controller	Deisel	HD100	01/2012
Turn Table	Deisel	MA240	01/2012
LISN	GSD	NTW06	01/2012
<u>Test procedure: CE22R01</u>			

7. BANDWIDTH AND AVERAGE TIME OF OCCUPANCY

Equipment shall meet the limits below .

Systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period.

Bandwidth

Channel	Frequency	Bandwidth
0	902.743 MHz	86.5 kHz
25	914.737 MHz	86.3 kHz
49	927.237 MHz	87.6 kHz

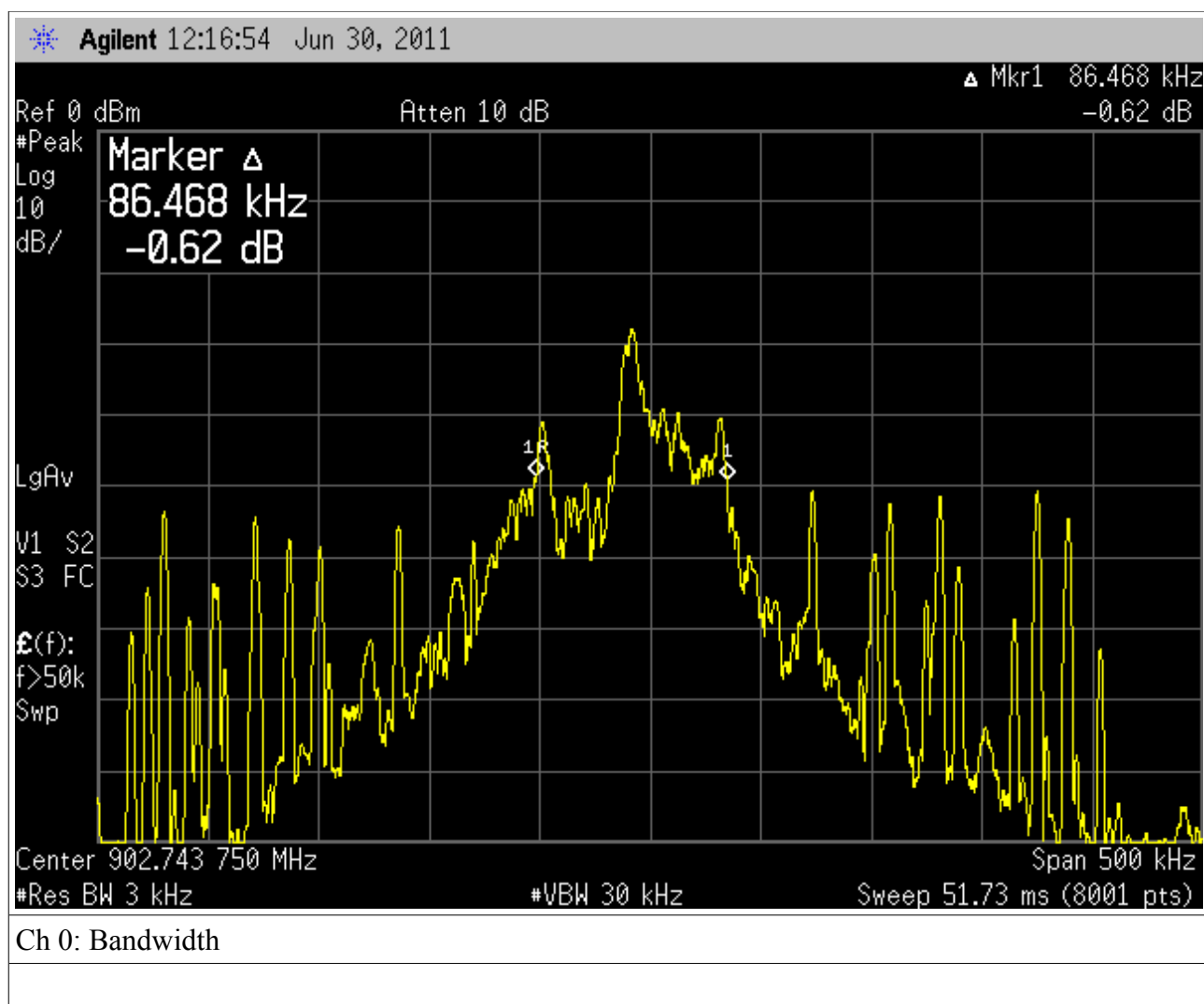
Average Time of Occupancy:

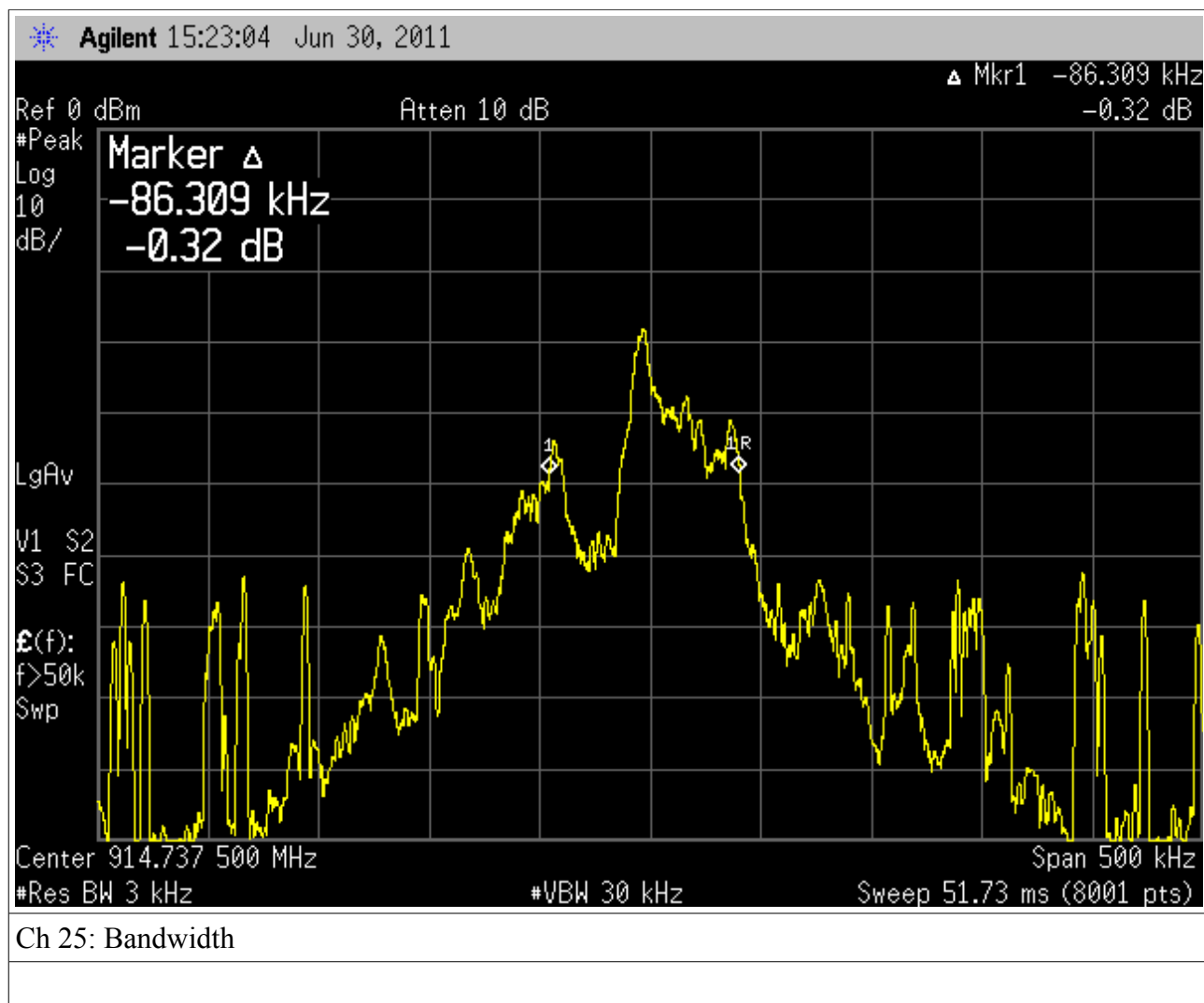
Channel	Dwell Time	Time Between Two Transmission	Nr. of hopping Frequencies	Nr. of Transmission for channel	Time of Occupancy
25	10.2 msec	18.6 msec	50	20s/0.0186/50 = 21.5	21.5x10.2= 219.4 msec

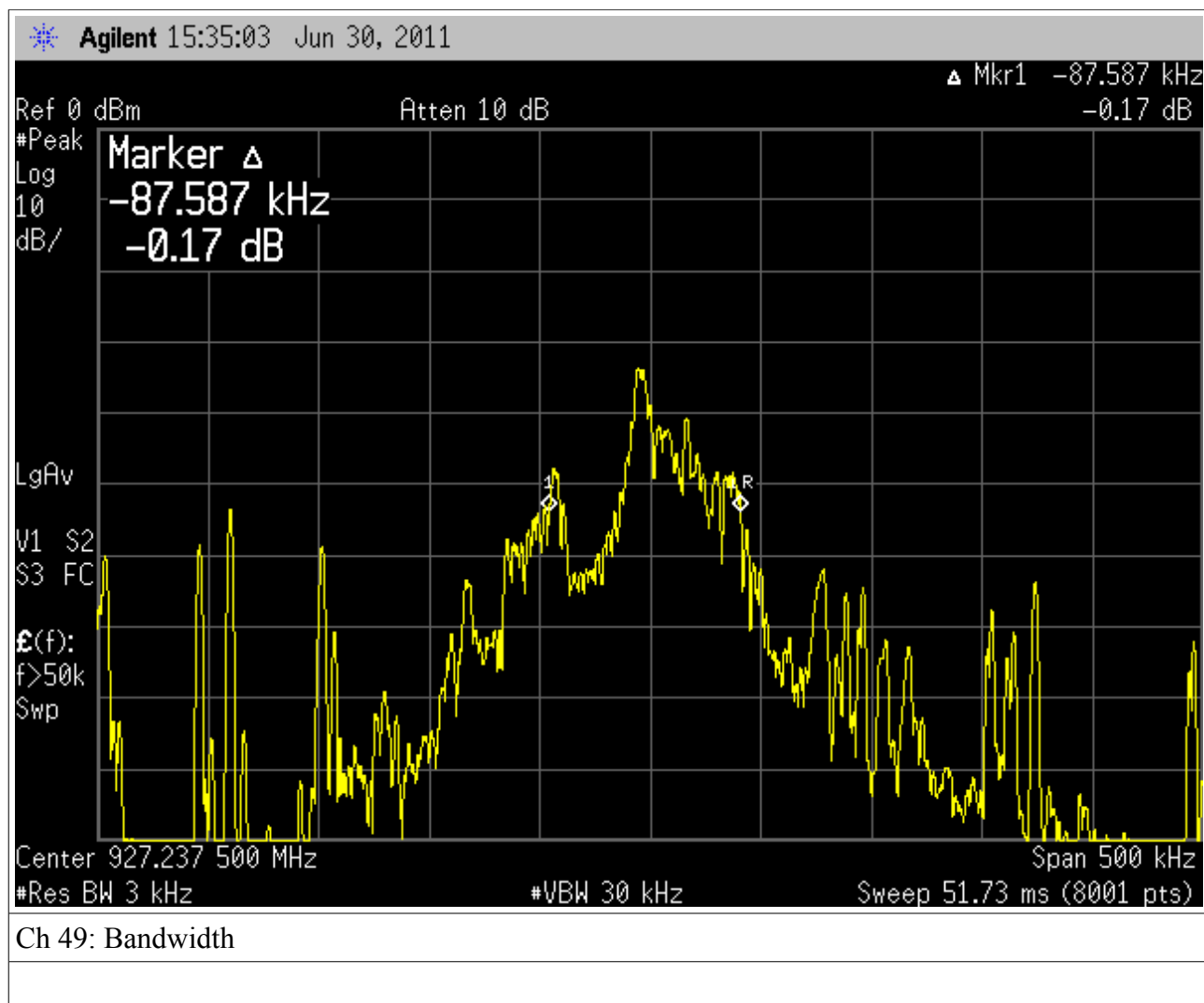
Test Equipment

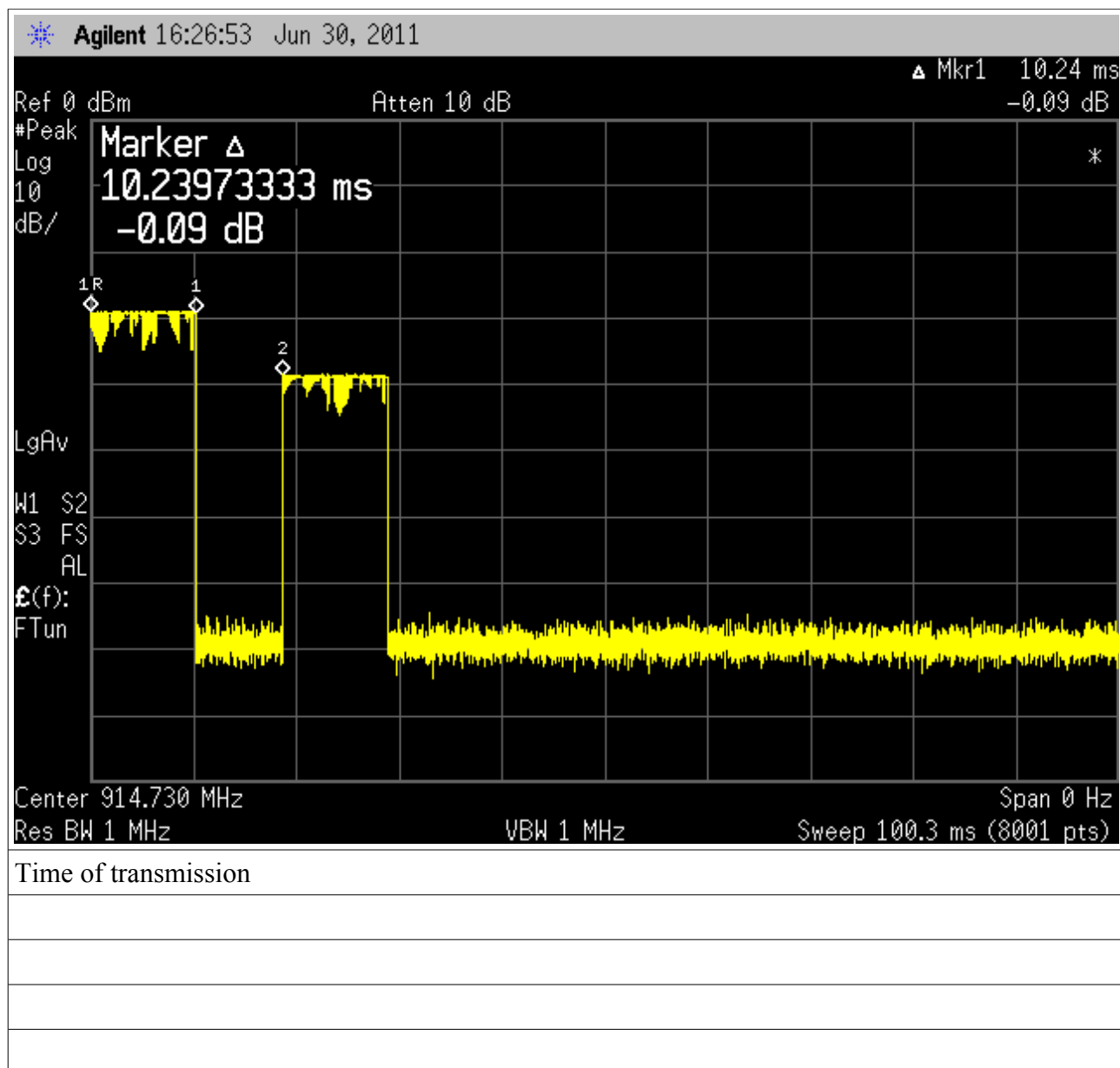
EQUIPMENT	MANUFACTURER	MODEL	CAL. DUE
EMI Receiver	HP	HP8546A	01/2012
EMI Receiver Filter Section	HP	HP85460A	01/2012
Anechoic Chamber	Comtest	CSA01	01/2012
Bilog Antenna	Schaffner	CBL6112B	01/2012
Horn Antenna	EMCO	3115	01/2012
Controller	Deisel	HD100	01/2012
Turn Table	Deisel	MA240	01/2012
LISN	GSD	NTW06	01/2012

Test procedure: CE22R01









8. MAXIMUM PERMISSIBLE EXPOSURE			
Equipment shall meet the limits below .			
915/1500 mW/cm ² = 0.061 mW/cm ² max at 20 cm of distance			
Result			
Power Density Limit mW/cm ²	Output Power (erp) mW	Power Density at 20cm mW/cm ²	Remark
0.61	29	0.009	-
(*) OET Bulletin 65			
Test procedure: RE22R01			

9. PHOTO

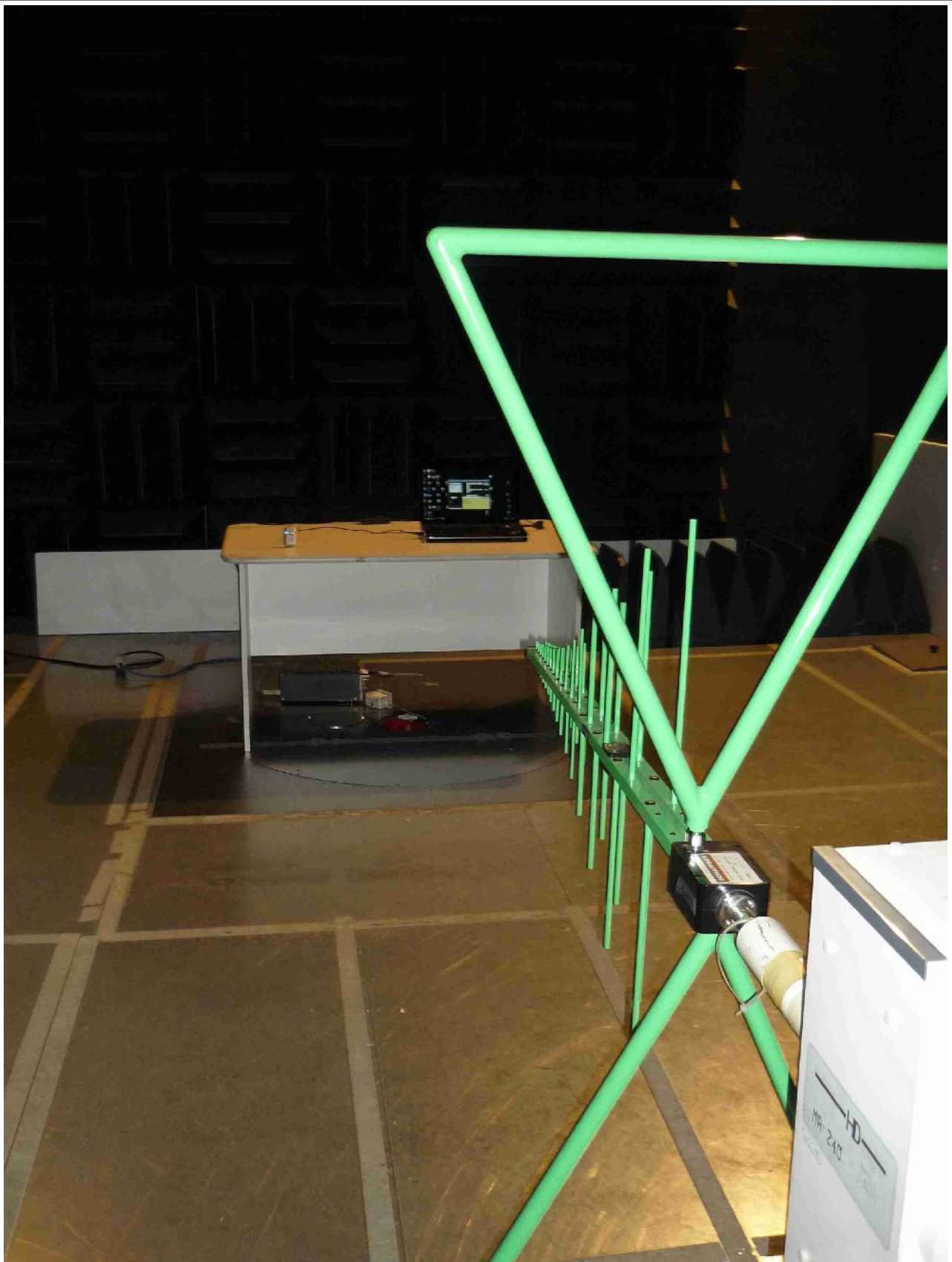


Fig. 9.1
Test Set-up

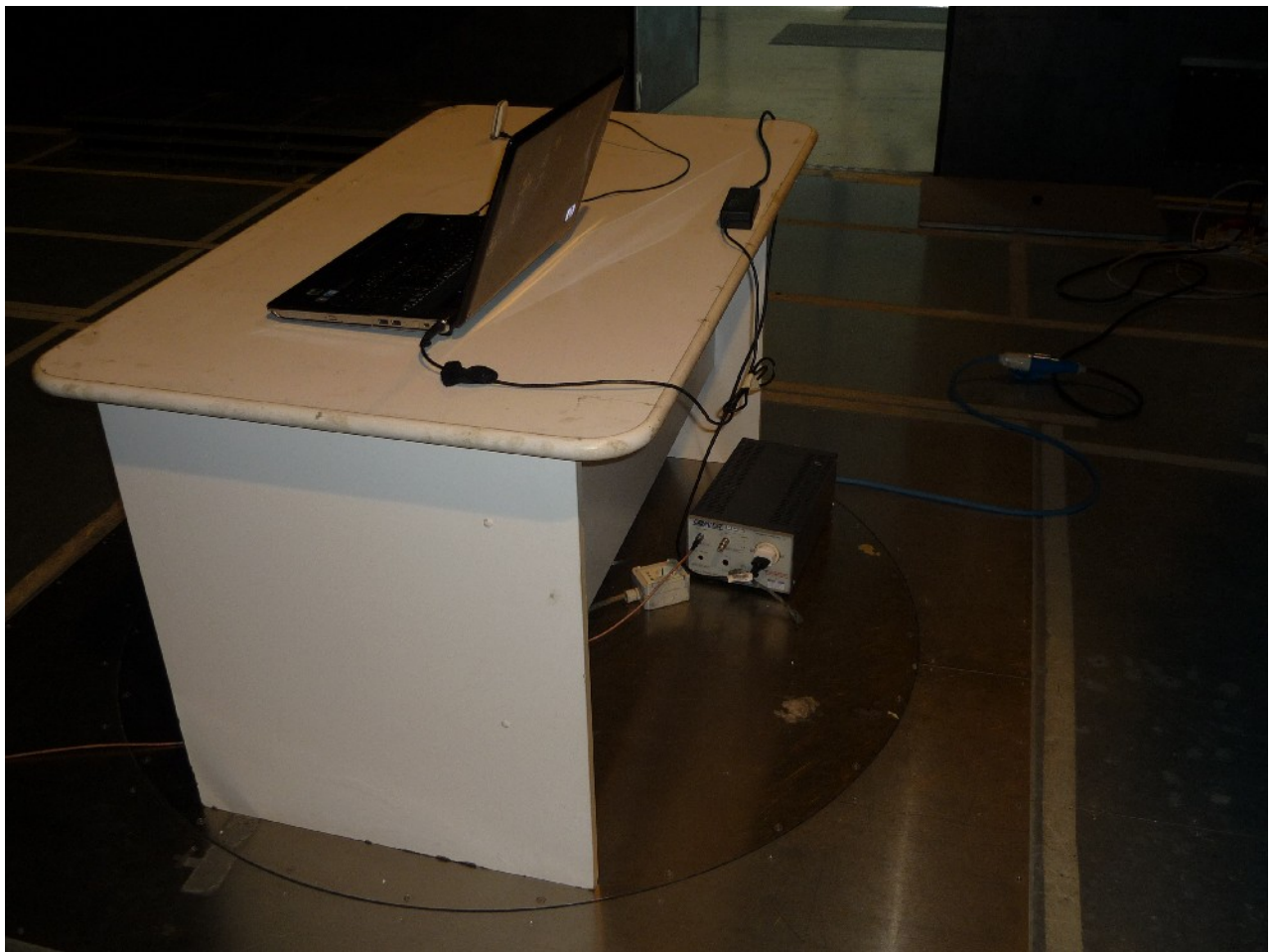


Fig. 9.2

Equipment Under Test



Radiated Emissions with PC Test Set-up



Conducted Emissions with PC Test Set-up