DELTA Test Report

DANAK
TEST Reg. no. 19

Emission tests to FCC requirements of TrackMan II

Performed for Interactive Sports Games A/S

DANAK-198415 Rev. A
Project no.: A503808-1
Page 1 of 47
including 6 annexes

03 August 2006

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Title	Emission tests to FCC requirements of TrackMan II
Test object	TrackMan II 10500 - 10550 MHz Field Disturbance Sensor
FCC ID	SFX-TMAN
Report no.	DANAK-198415 Rev. A
Project no.	A503808-1
Test period	05 May 2006 to 14 June 2006
Client	Interactive Sports Games A/S Staktoften 2 2950 Vedbaek Denmark Telephone: +45 45 57 08 50 Fax: +45 45 74 00 39
Contact person	Mr. Bjørn Andersen bva@isg.dk
Manufacturer	Interactive Sports Games A/S
Specifications	47 CFR Part 15, Subpart C - Intentional Radiators
Results	The equipment was in compliance with the requirements.
Test personnel	Henrik Egeberg Nielsen Claus Rømer Andersen
Date	03 August 2006

Responsible

Claus R Andersen

Claus Rømer Andersen
Project Manager - EMC
DELTA

This report is a revision of the original test report DANAK-198415 dated 30 June 2006. The revision has been made due to the following corrections:

On page 13 MHz has been corrected to GHz in the first column
On page 15 mV/m has been corrected to V/m in the third column.

Table of contents Page

1. Summaries

1.1 Technical report summary

The tests reported in this document have been performed to demonstrate compliance with the requirements of 47 CFR Part 15, Section 15.245 Operation within the bands 902-928 MHz, 2435-2465 MHz, 5785-5815 MHz, 10500-10550 MHz and 24075-24175 MHz.

This report contains measurement data from tests performed at DELTA, Hørsholm, Denmark. DELTA is a FCC listed (Reg. no.: 90529) and DANAK accredited test laboratory.

1.1.1 Applicable FCC rules for test

47 CFR, Part 15, Subpart C - Intentional Radiators:

- 15.205 Emission in restricted bands
- 15.207 Conducted limits
- 15.209 Radiated emission limits, general requirements
- 15.215 Additional provisions to the general radiated emission limitations
- 15.245 Operation within the bands 902-928 MHz, 2435-2465 MHz, 5785-5815 MHz, 10500-10550 MHz and 24075-24175 MHz.

The methods and procedures have been applied as specified in:

- 15.31 Measurement standards.

The following procedure has been used during the measurements reported in this document:

- ANSI C63.4: Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

Furthermore, the requirements of the following have been applied:

- 15.33 Frequency range of radiated measurements
- 15.35 Measurement detector functions and bandwidths.

1.2 Summary of tests

The results of the tests can be summarized as follows:

Tests	**Reference (47 CFR Part 15)**	**Results**
Conducted emission, AC mains	15.207	Passed
Radiated electromagnetic field emission	15.209	Passed
Radiated emission limits, additional provisions	15.215 15.245	Passed
Emission in restricted bands	15.205	Passed

Abbreviations

Failed	:	The requirements are not met.
Passed	:	The requirements are met.
Not done	:	No test was performed.
N/A	:	Not applicable.
Not relevant	:	The test was not relevant for the test object.

The given results are based on a shared risk principle with respect to the measurement uncertainty.

Conclusion

The test objects mentioned in this report meet the requirements of the standard stated below as to the test phenomena mentioned above:

- Title 47 of the Code of Federal Regulations, Part 15, Subpart C - Intentional Radiators.

The test results relate only to the objects tested.

2. Test objects and auxiliary equipment

The test object is a field disturbance sensor installed in a cabinet. Information from the field disturbance sensor is transmitted to a PC using an USB2 connection.

The field disturbance sensor can be set to any frequency within the frequency band 10.50 to 10.55 GHz. The change of frequency is performed by the manufacturer and can not be performed by the user.

Tests are performed using three test objects: one set to the lowest used frequency, one set to the centre frequency and one set to the highest frequency.

The field disturbance sensor is designed for the purpose of measuring properties of sport balls and will only be used at sport facilities or at sport equipment manufacturers test facilities.

2.1 Test object - Field Disturbance Sensor (Tx & Rx)

Category	Field Disturbance Sensor
Manufacturer	Interactive Sports Games A/S
Model / type	TrackMan II
Part no.	-
Serial no.	0604 3 007
FCC ID	SFX-TMAN
Supply voltage	12 VDC
Operational mode	Tx at 10.5005 GHz

2.2 Test object - Field Disturbance Sensor (Tx & Rx)

Category	Field Disturbance Sensor
Manufacturer	Interactive Sports Games A/S
Model / type	TrackMan II
Part no.	-
Serial no.	0604 3 008
FCC ID	SFX-TMAN
Supply voltage	12 VDC
Operational mode	Tx at 10.5250 GHz

2.3 Test object - Field Disturbance Sensor (Tx & Rx)

Category	Field Disturbance Sensor
Manufacturer	Interactive Sports Games A/S
Model / type	TrackMan II
Part no.	-
Serial no.	0604 3 009
FCC ID	SFX-TMAN
Supply voltage	12 VDC
Operational mode	Tx at 10.5495 GHz

2.4 Test object - Power adapter for Field Disturbance Sensor

Category	AC/DC Converter
Manufacturer	GlobTek Inc.
Model / type	GT-21148-3012-T2
Part no.	TR9KE2500LTW-Y
Serial no.	04096330/05
FCC ID	-
Supply voltage	115 VAC
Operational mode	Supplying 12 VDC

2.5 Auxiliary equipment - PC

Manufacturer	Panasonic
Model / type	Toughbook, CF-29
Part no.	CF-29LTQGZL2
Serial no.	6CKCB16129
FCC ID	-

2.6 Auxiliary equipment - Power adapter for PC

Manufacturer	Panasonic
Model / type	CF-AA1653A M4
Part no.	SEB100P3-15.6C
Serial no.	1653AM405Z26872D
FCC ID	-

3. General test conditions

3.1 Test setup during test

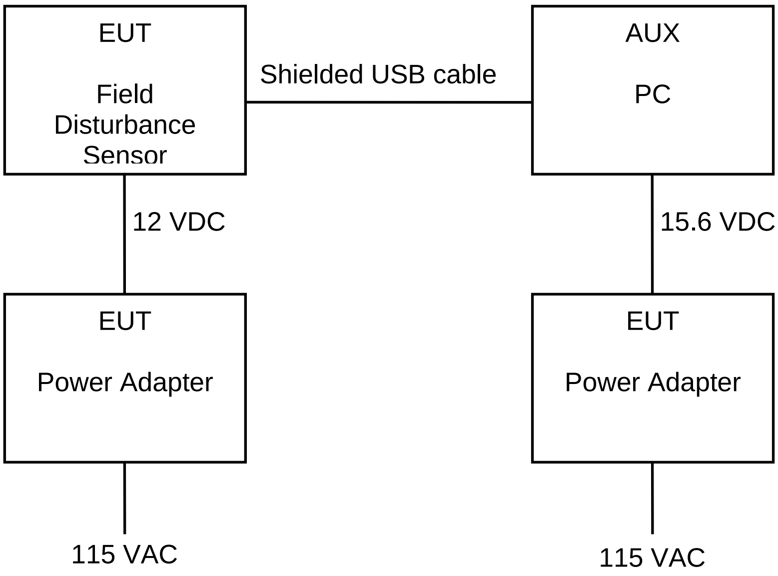


Figure 3.1 Test setup during test.

The antenna of the field disturbance sensor is mounted internally and behind a cover.

The test object will transmit un-modulated carrier. Reflected signals will produce a Doppler signal that is converted and transmitted to the PC for calculation. In the test object a camera is installed, too. Images are captured continuously and transmitted to the PC, where they are displayed.

3.2 Modifications before test

The following modifications were performed before test:

- The controller PCB was grounded, using existing spacers.
- A ferrite was inserted on the internal USB cable connected to the controller PCB.
- The USB and DC cables were fixated.

4. Tests and results

4.1 Conducted emission, AC mains (FCC Part 15, Subpart C)

	Requirements	
Specification	FCC Rules and Regulations Part 15, Subpart C	
Test set-up	ANSI C63.4:2003	
Frequency range	0.15-30 MHz	
Limit: (quasi-peak)	Quasi-peak	Average
0.15-0.5 MHz	66-56 Decreases with log of freq.	56-46 Decreases with log of freq.
0.5-5 MHz	56	46
5-30 MHz	60	50
Photos Test record sheets		Annex 2 Annex 3

Results

The test object is in compliance with the requirements.

Comments

The field disturbance sensor was supplied from the power adapter.

Measurements were performed on the 10.5005 GHz and the 10.5250 GHz field disturbance sensors.

4.2 Radiated electromagnetic field (FCC Part 15, Subpart C)

	Requirements	
Specification	FCC Rules and Regulations Part 15, Subpart C	
Test set-up	ANSI C63.4:2003	
Measuring distance	3 m	
Frequency range	30-40.000 MHz	
Limits: As specified in 15.209(a)	30-88 MHz: 88-216 MHz: 216-960 MHz: Above 960 MHz:	40 dBµV/m 43.5 dBµV/m 46 dBµV/m 54 dBµV/m
Measurement uncertainty (k = 2) <1 GHz Measurement uncertainty (k = 2) >1 GHz		2.6 dB 4.9 dB
Below 1 GHz the limits apply to measurements performed using a quasi-peak detector. Above 1 GHz the limits apply to measurements of spurious emission performed with an average detector. Furthermore, the peak level must be no higher than 20 dB above the average limit.		
Photos Test record sheets		Annex 2 Annex 4

In the frequency range 30 MHz - 2.75 GHz measurements were performed on the 10.5250 GHz field disturbance sensor.
In the frequency range 2.75 - 40 GHz measurements were performed on the 10.5005 GHz, 10.5250 GHz and the 10.4950 GHz field disturbance sensors.

On plots from the R&S receiver, found as A4-portrait plots, statements like "Ant 1 m vertical" or "4 m horizontal" indicate the elevation of the antenna during exploratory measurements.

Measurements 30 - 1000 MHz were performed using a test receiver with quasi peak detector.

Measurements 1 - 2.75 GHz were performed using a test receiver with average detector. The tabulated values on the plot are the measured average values using a resolution bandwidth of 1 MHz.

Measurements 2.75 - 18 GHz are shown as spectrum analyser plots in peak-hold mode, where all heights and polarities are maximized together to produce one plot. Peak-to-Average factor is established to be 0 dB, because un-modulated carrier is transmitted.

Therefore, average emission values are 0 dB lower than indicated on the spectrum analyser plots.

This is as a worst-case situation also assumed for possible harmonics from the digital processor.

Measurements from 18 - 40 GHz showed only harmonics from the transmitter.
The measurements were performed in a laboratory and recorded using a spectrum analyser. The test object was scanned with hand-held standard gain horn antennas at a distance of approximately 0.2 m. During the scans the bandwidth was lowered in order to lower the noise floor. In the band 18 - 26.5 GHz the bandwidth was 100 kHz. In the band 26.5 - 40 GHz the bandwidth was 10 kHz.
The maximum position and polarity was found and final measurements made there with the horn antenna placed at a distance of 1 meter. This optimisation was made on each significant frequency.

Results

The emission was within the specified limits.

Spurious emission 30 - 1000 MHz in tabular form:
(For spectral plots, see Annex 4).

Tx freq. [MHz]	Spurious freq. [MHz]	Polarisation	Field strength QP [dBµV/m]	Margin [dB]	Note
10.5250	86.25	V	30.8	9.2	-
10.5250	336.02	H	41.8	4.2	-
10.5250	432.04	H	44.1	1.9	-
10.5250	480.04	H	38.4	7.6	-
10.5250	528.04	H	37.5	8.5	-
10.5250	624.05	H	42.2	3.8	-
10.5250	960.00	V	38.7	7.3	(R)

(R) means frequency in restricted band, as defined in 15.205.

Spurious emission 1 - 40 GHz in tabular form:
(For spectral plots, see Annex 4)

Tx freq. [GHz]	Spurious freq. [MHz]	Polarisation	Field strength Peak [dBµV/m]	Field strength Average [dBµV/m]	Margin Av [dB]	Note
10.5250	1200.10	V	43.0	43.0	10.9	(R)
10.5250	1296.17	V	47.9	47.9	6.0	-
10.5250	1695.68	H	43.6	43.6	10.3	-
10.5250	21003	-	62.0	62.0	15.5	2^{nd} har.
10.5250	31501	-	62.8	62.8	14.7	3^{rd} har.
10.5005	21050	-	64.1	64.1	13.4	2^{nd} har.
10.5005	31575	-	67.0	67.0	10.3	3^{rd} har.
10.5495	21099	-	63.8	63.8	13.7	2^{nd} har.
10.5495	31648	-	64.6	64.6	12.9	3^{rd} har.

(R) means frequency in restricted band, as defined in 15.205.
The limit on all harmonics is 7.5 mV/m or 77.5 dBµV/m. Peak limit is 20 dB above average limit or 74 dBµV/m.

Comments

Measurements of spurious emission were performed with CW carrier.

4.3 Occupied bandwidth

With reference to 15.215(c), the 20 dB bandwidth of the emission shall be contained within the designated frequency band (10.50 - 10.55 GHz).

The occupied bandwidth was measured in 10 kHz resolution bandwidth.

Measurements were performed on the lowest and the highest Tx frequency, including frequency drift during warm-up.

Occupied bandwidth

(For spectral plots, see Annex 5)

Tx frequency	Lower band edge	Upper band edge	Occupied bandwidth
10.5005	10.5003240	10.5003777	0.0537 MHz
10.5495	10.5491903	10.5492497	0.0594 MHz

The occupied bandwidth is within the specifications.

4.4 Peak output field strength

With reference to 15.245(b), the peak output field strength is limited to 2500 mV/m or 128 dBµV/m at a distance of 3 m.

Measurements were performed on the lowest, middle and the highest Tx frequency

Peak output field strength

(For spectral plots, see Annex 6)

Tx frequency	Field strength, at 3 m [dBµV/m]	Field strength, at 3 m [V/m]	Margin [dB]
10.5005	120.9	1.109	7.1
10.5250	120.6	1.075	7.4
10.5495	121.0	1.122	7.0

The peak output field strength is within the specifications.

Annex 1

List of instruments

NO.	DESCRIPTION	MANUFACTURER	TYPE NO.
29461	ARTIFICIAL MAINS NETWORK	ROHDE & SCHWARZ	ESH2/Z5
29494	MICROWAVE CABLE, FIXED ROOM 1 CABLE	SUHNER	SUCOFLEX 104
29797	BILOG ANTENNA, 30-2000 MHz	CHASE ELECTRICS LTD	CBL 6111A
29861	EMI-SOFTWARE Ver. 1.60	ROHDE & SCHWARZ	ES-K1, PART: 1026.6790.02
29876	RIDGED GUIDE HORN ANTENNA, 1-12.75 (18) GHz	EMCO	3115
29916	AUTOMATIC TEST RECEIVER, 9 kHz - 2.75 GHz	ROHDE & SCHWARZ	ESCS 30 1102.4500.30
49037	BROADBAND MICROWAVE PREAMPLIFIER, 1-12.8 GHz	MITEQ / DELTA	AMF-5D-001128-35-11P
49086	REMI EMISSION SOFTWARE PACKAGE v. 2.133, ROOM 5	NeWeTec	REMI
49321	SPECTRUM ANALYZER, 50 GHz WITH OPTION 006	HEWLETT-PACKARD	8565E
49326	STANDARD GAIN HORN, 26.5-40.0GHz	NARDA	V637
49329	STANDARD GAIN HORN, 18-26.5GHz	NARDA	638
49332	STANDARD GAIN HORN, 8.20-12.4GHz	NARDA	640
49387	40 GHz MICROWAVE CABLE, 30 cm	MIDWEST MICRO-WAVE INTERNA-TIONAL LTD	CSY-KMKM-44-001-FS
49388	40 GHz MICROWAVE CABLE, 60 cm	MIDWEST MICRO-WAVE INTERNA-TIONAL LTD	CSY-KMKM-44-002-FS
49421	IMPULSE VOLTAGE LIMITER	ROHDE & SCHWARZ	ESH3/Z2

Annex 2

Photos

Photo A2.1 Conducted emission, AC mains.

Photo A2.2 Conducted emission, AC mains.

Photo A2.3 Radiated electromagnetic field, 30-1000 MHz.

Photo A2.4 Radiated electromagnetic field 1-12.75 GHz and peak output field strength.

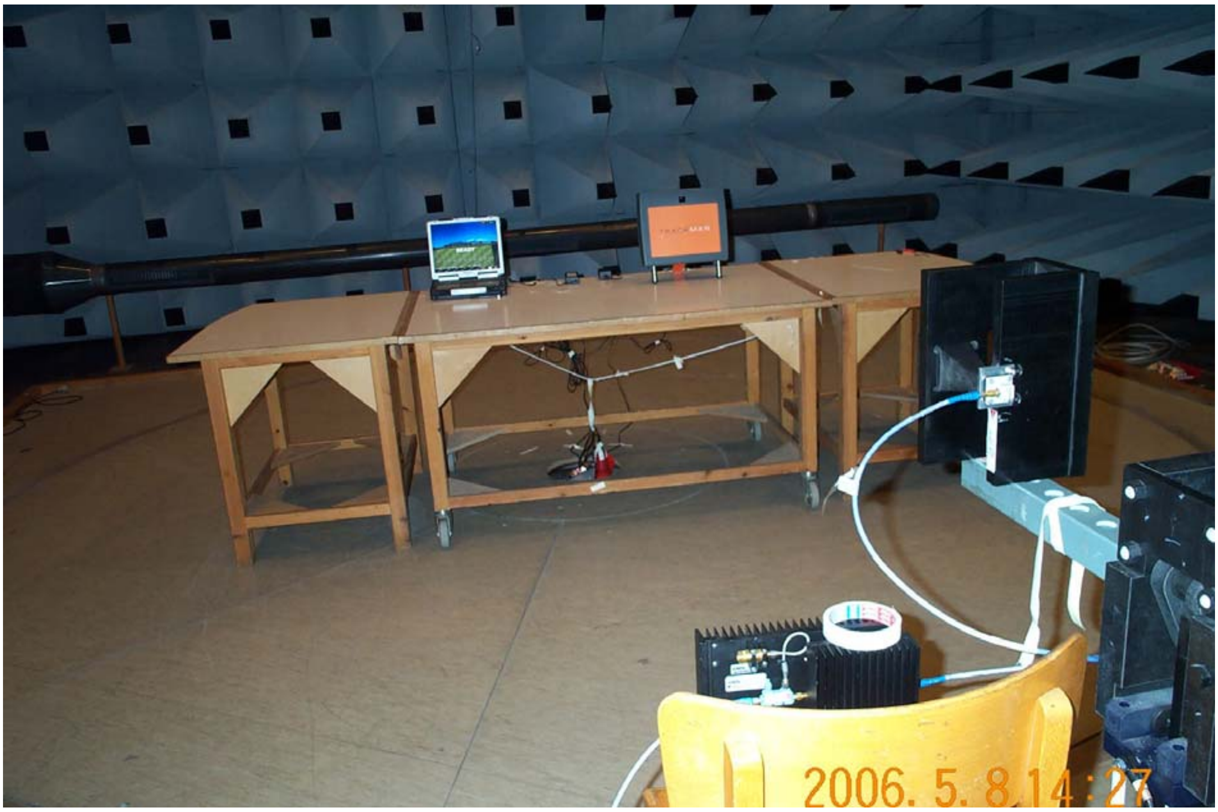


Photo A2.5 Radiated electromagnetic field, 12.75-18 GHz.

Photo A2.6 Radiated electromagnetic field, 18-40 GHz.

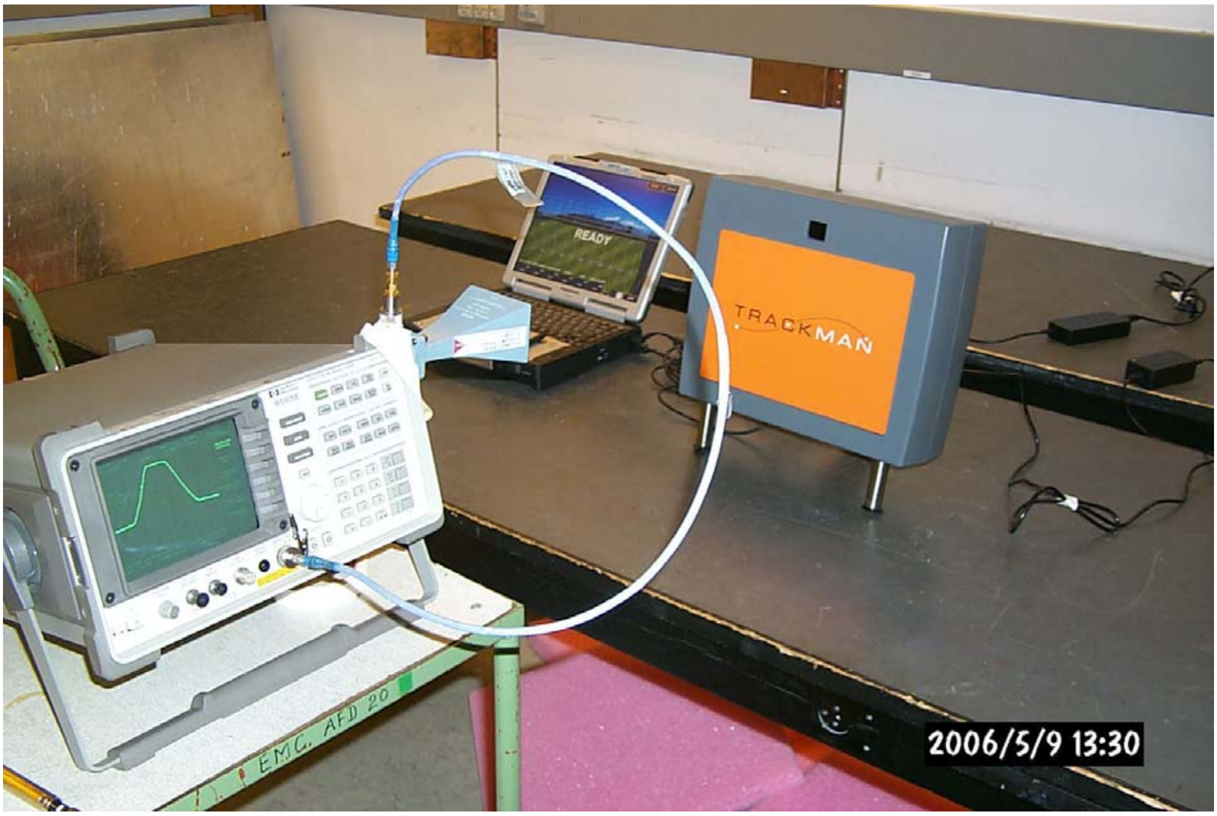
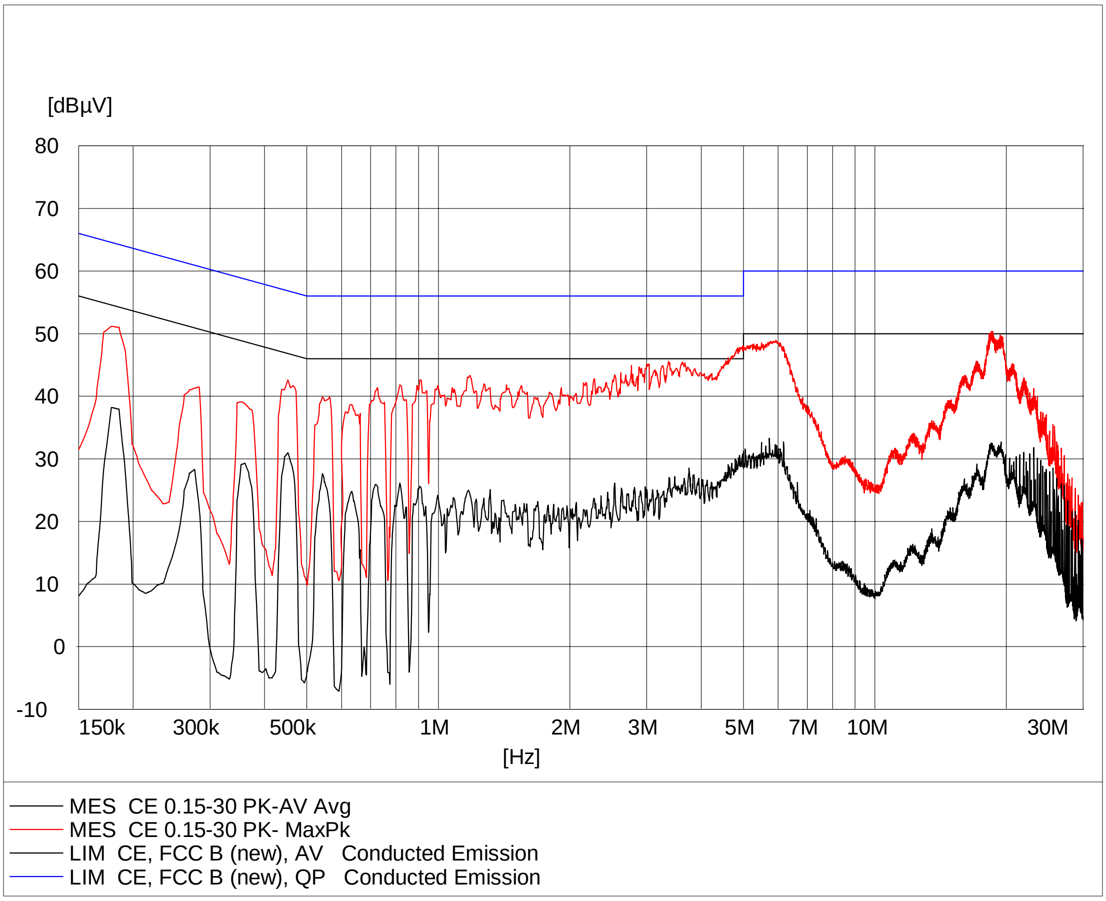


Photo A2.7 Occupied bandwidth.

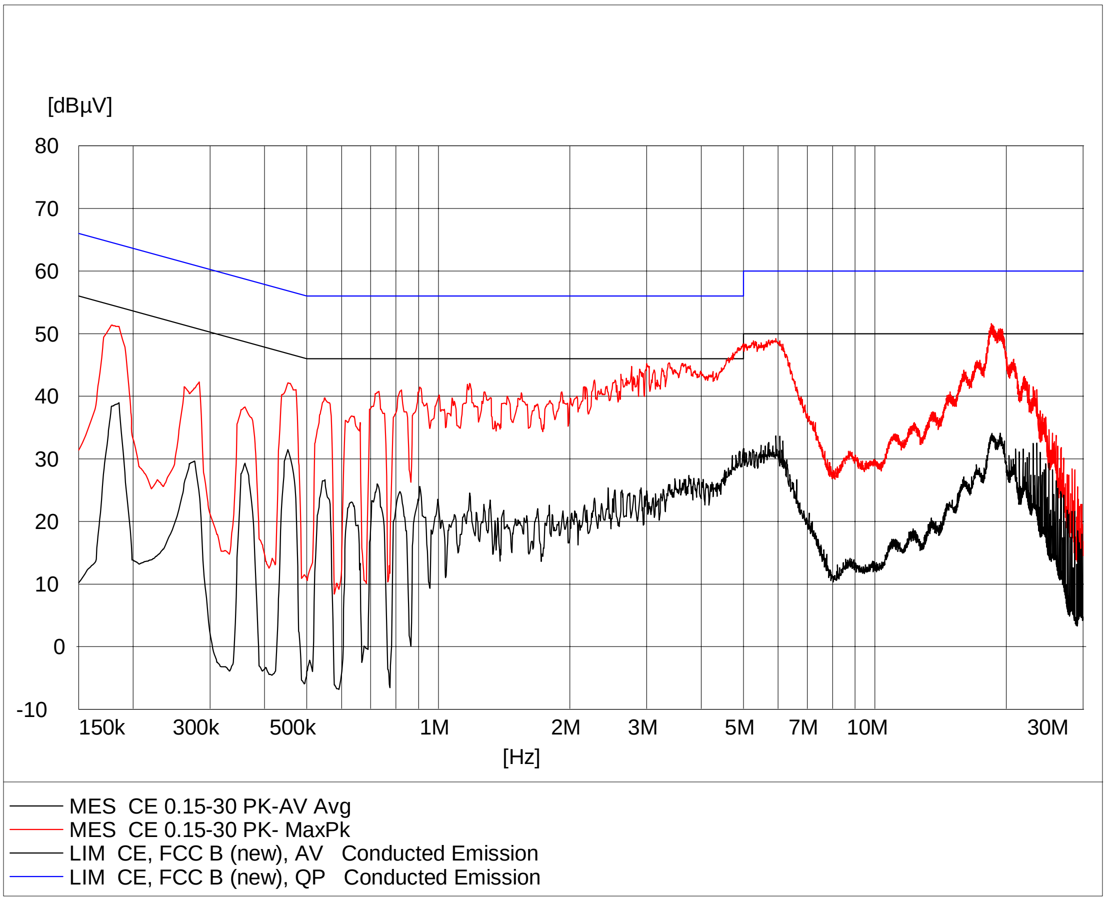
Annex 3

Test record sheets regarding conducted emission, AC mains

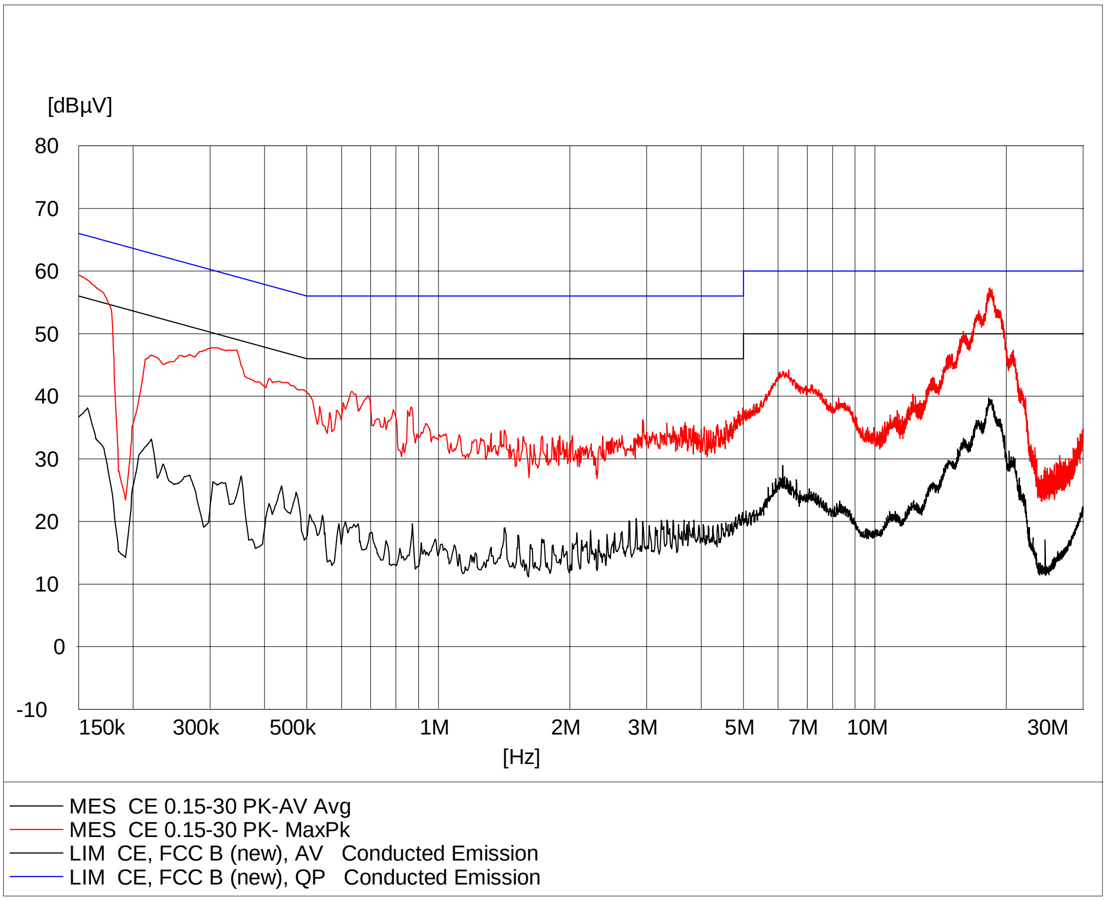
```
EUT:                  Tman II. 10.5495 GHz
Manufacturer:         ISG
Operating Condition: Line no.: Neutral. 120 VAC
Test Site:            EMC-5
Operator:             HEN - A503808
Test Specification:   FCC part 15 sub C
Comment:              Sheet 28
Start of Test:        2006-05-08
```



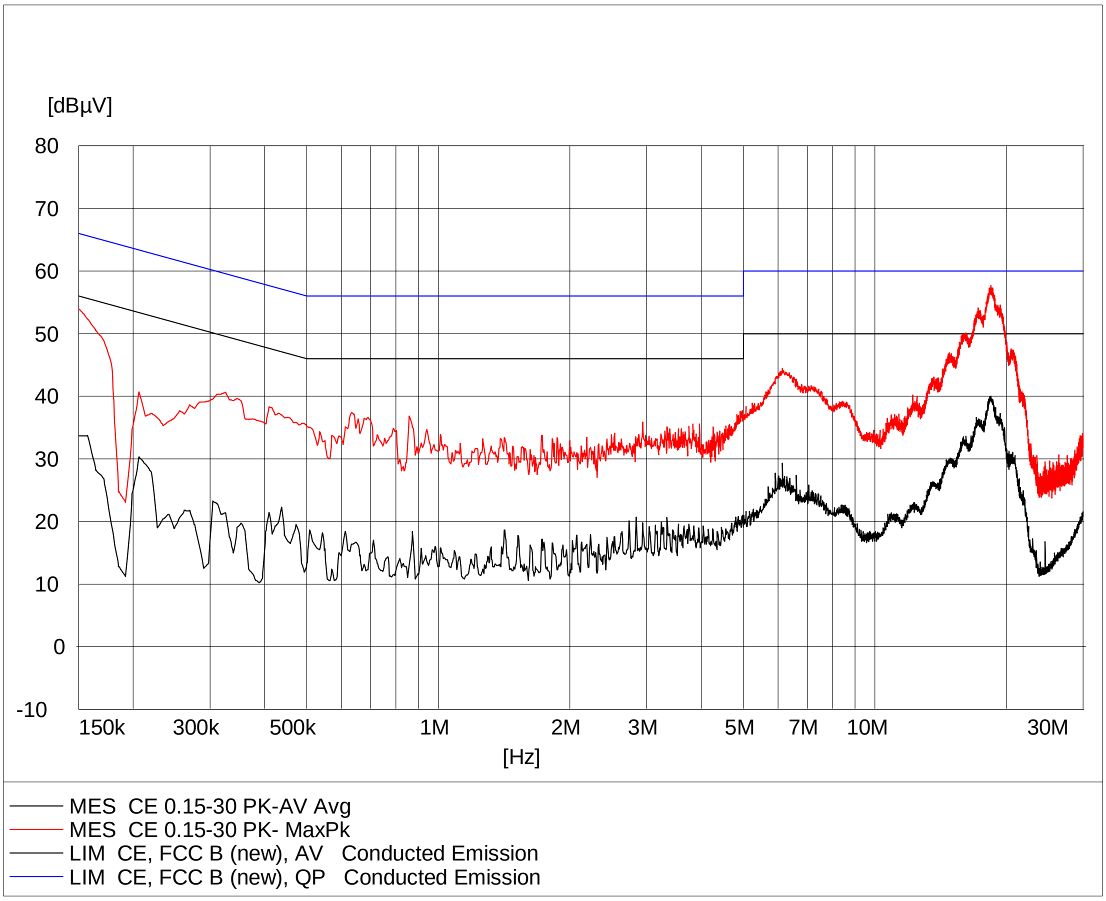
EUT:	Tman II. 10.5495 GHz
Manufacturer:	ISG
Operating Condition:	Line no.: Line 1. 120 VAC
Test Site:	EMC-5
Operator:	HEN - A503808
Test Specification:	FCC part 15 sub C
Comment:	Sheet 29
Start of Test:	2006-05-08



EUT: Panasonic ToughBook CF29
Manufacturer: ISG
Operating Condition: Line no.: Neutral. 120 VAC
Test Site: EMC-5
Operator: HEN - A503808
Test Specification: FCC part 15 sub C
Comment: Sheet 30
Start of Test: 2006-05-08



EUT: Panasonic ToughBook CF29
Manufacturer: ISG
Operating Condition: Line no.: Line 1. 120 VAC
Test Site: EMC-5
Operator: HEN - A503808
Test Specification: FCC part 15 sub C
Comment: Sheet 31
Start of Test: 2006-05-08



Annex 4

Test record sheets regarding radiated electromagnetic field

```
EUT:                     Tman II. 10.525 GHz
Manufacturer:            ISG
Operating Condition:     Ant. 1 m vertical. 120 VAC
Test Site:               EMC-5
Operator:                HEN - A503808
Test Specification:      FCC part 15 sub C
Comment:                 Sheet 12
Start of Test:           2006-05-05
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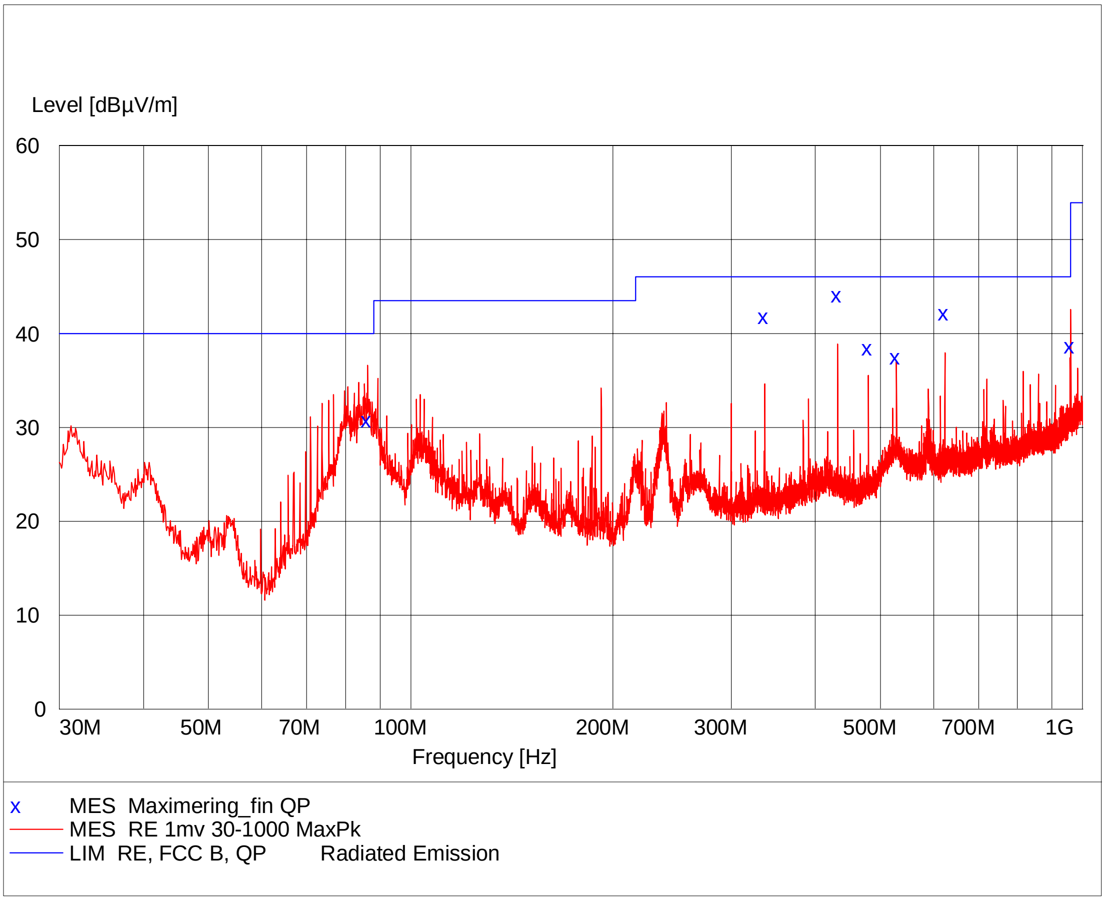
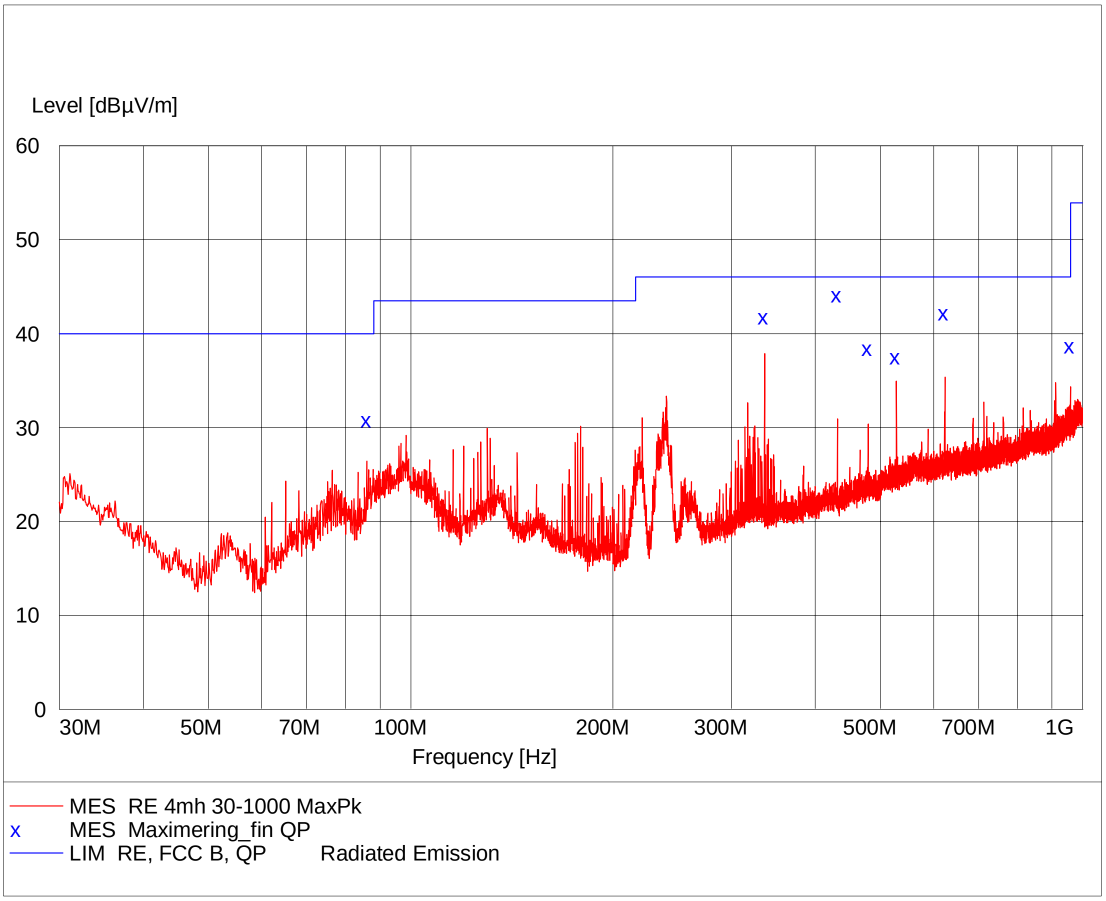


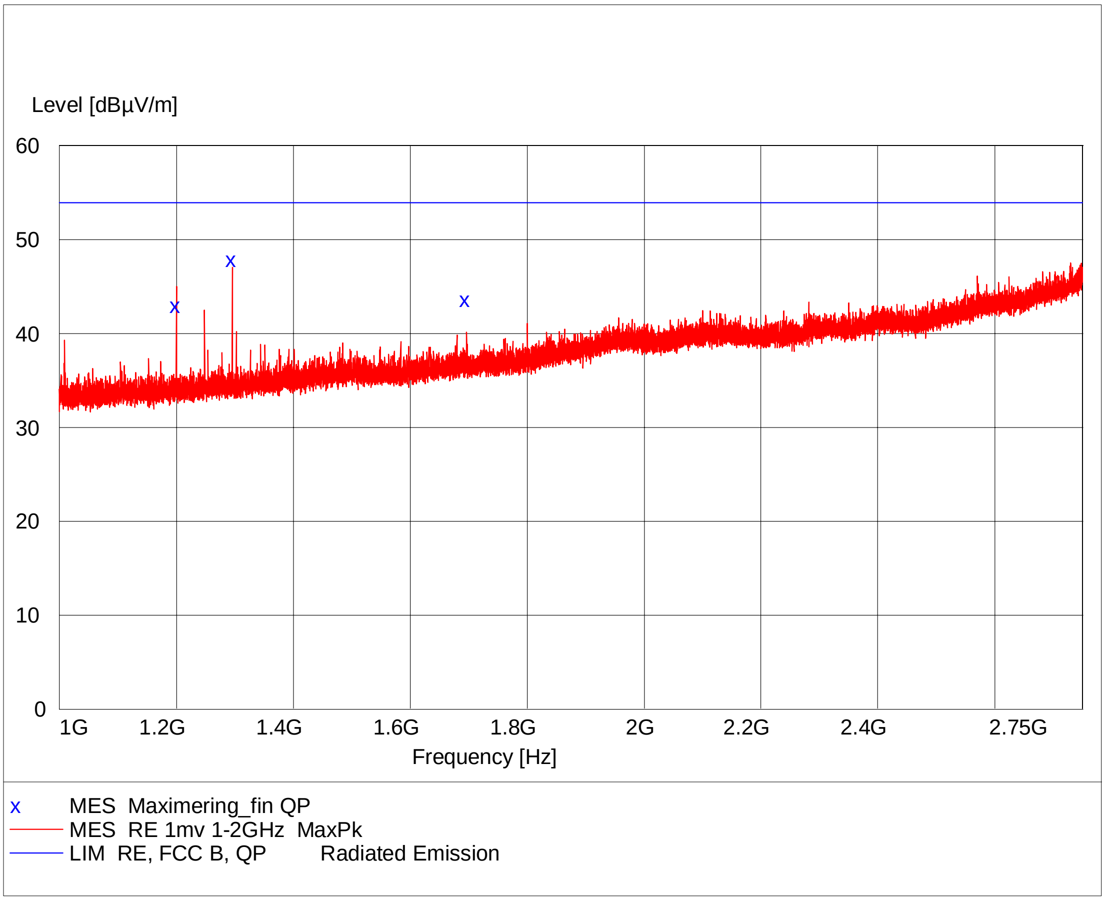
MEASUREMENT RESULT: "Maximering_fin QP"
2006-05-05 15:16

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
86.250000	30.80	10.9	40.0	9.2	123.0	61.00	VERTICAL
336.020000	41.80	17.4	46.0	4.2	101.0	173.00	HORIZONTAL
432.040000	44.10	19.6	46.0	1.9	180.0	151.00	HORIZONTAL
480.040000	38.40	20.5	46.0	7.6	101.0	63.00	HORIZONTAL
528.040000	37.50	21.7	46.0	8.5	141.0	358.00	HORIZONTAL
624.050000	42.20	23.7	46.0	3.8	101.0	322.00	HORIZONTAL
960.000000	38.70	28.2	46.0	7.3	163.0	173.00	VERTICAL

EUT:	Tman II. 10.525 GHz
Manufacturer:	ISG
Operating Condition:	Ant. 3 m horizontal. 120 VAC
Test Site:	EMC-5
Operator:	HEN - A503808
Test Specification:	FCC part 15 sub C
Comment:	Sheet 13
Start of Test:	2006-05-05



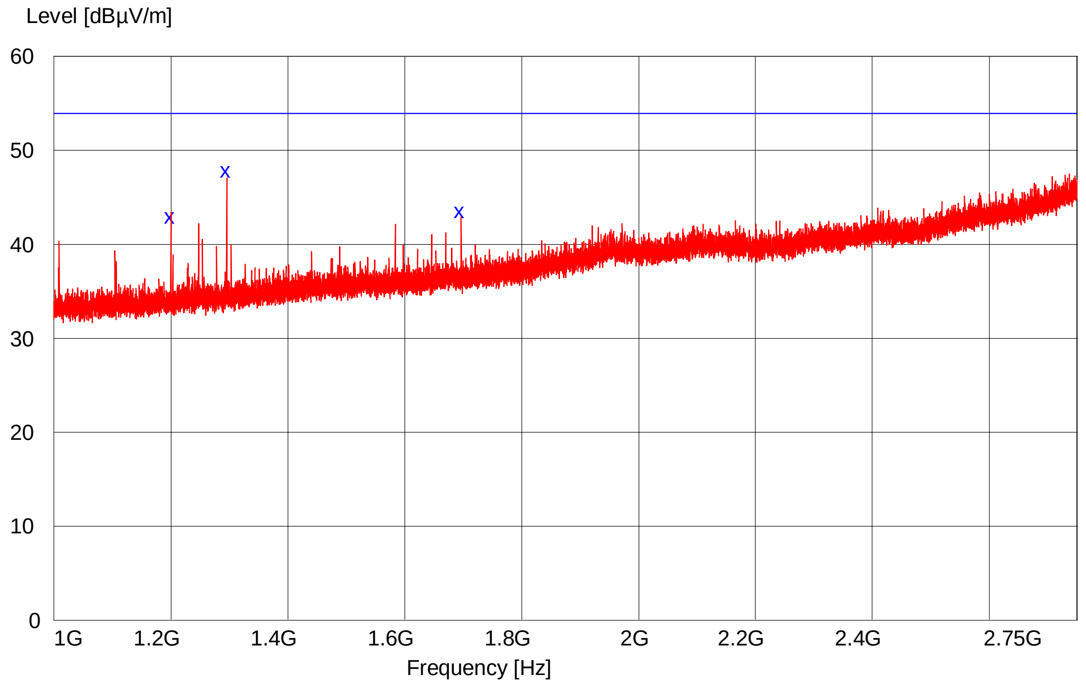
```
EUT:                    Tman II. 10.525 GHz
Manufacturer:           ISG
Operating Condition:    Ant. 1 m vertical. 120 VAC
Test Site:              EMC-5
Operator:               HEN - A503808
Test Specification:     FCC part 15 sub C
Comment:                Sheet 14
Start of Test:          2006-05-05
```



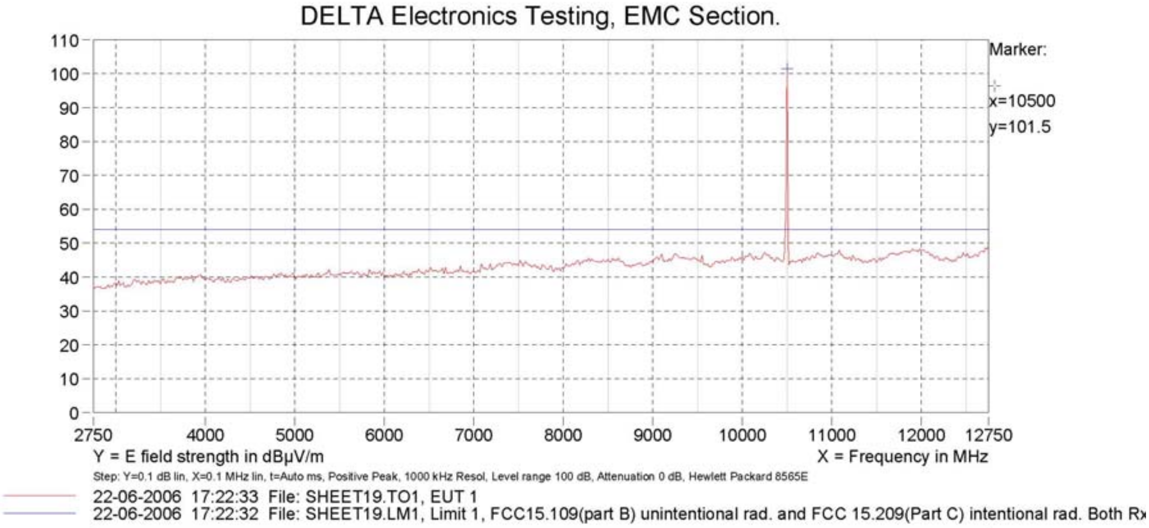
MEASUREMENT RESULT: "Maximering_fin QP"
2006-05-05 16:13

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
1200.100000	43.00	30.3	53.9	10.9	112.0	347.00	VERTICAL
1296.170000	47.90	30.7	53.9	6.0	101.0	328.00	VERTICAL
1695.680000	43.60	33.0	53.9	10.3	119.0	148.00	HORIZONTAL

```
EUT:                     Tman II. 10.525 GHz
Manufacturer:            ISG
Operating Condition:     Ant. 2 m horizontal. 120 VAC
Test Site:               EMC-5
Operator:                HEN - A503808
Test Specification:      FCC part 15 sub C
Comment:                 Sheet 15
Start of Test:           2006-05-05
```



MES RE 4mh 1-2GHz MaxPk
x MES Maximering_fin QP
LIM RE, FCC B, QP Radiated Emission



ISG
TMan II. 10.5005 GHz

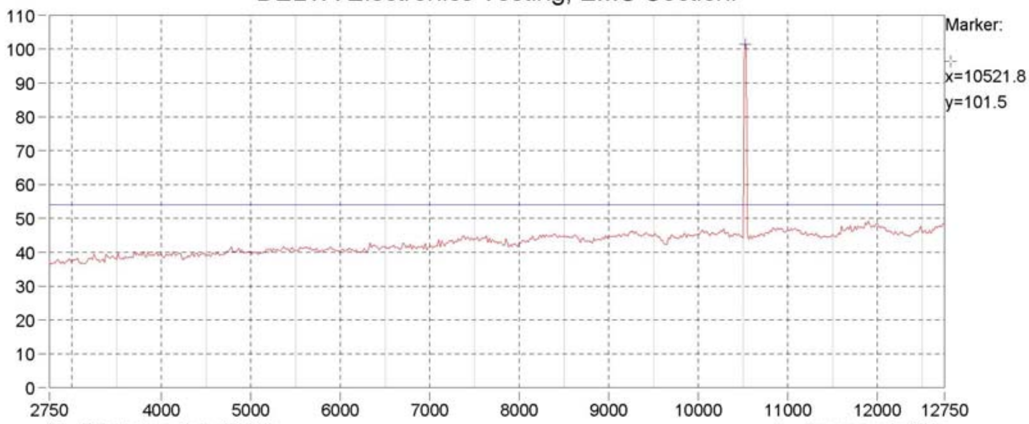
ant 1-3 meter horizontal and vertical. T.T. 0-360 deg.

FCC part 15 sub C

Project no: A503808 - HEN

Sheet 19

DELTA Electronics Testing, EMC Section.



Step: Y=0.1 dB lin, X=0.1 MHz lin, t=Auto ms, Positive Peak, 1000 kHz Resol, Level range 100 dB, Attenuation 0 dB, Hewlett Packard 8565E

22-06-2006 17:18:55 File: SHEET16.TO1, EUT 1
22-06-2006 17:18:54 File: SHEET16.LM1, Limit 1, FCC15.109(part B) unintentional rad. and FCC 15.209(Part C) intentional rad. Both Rx

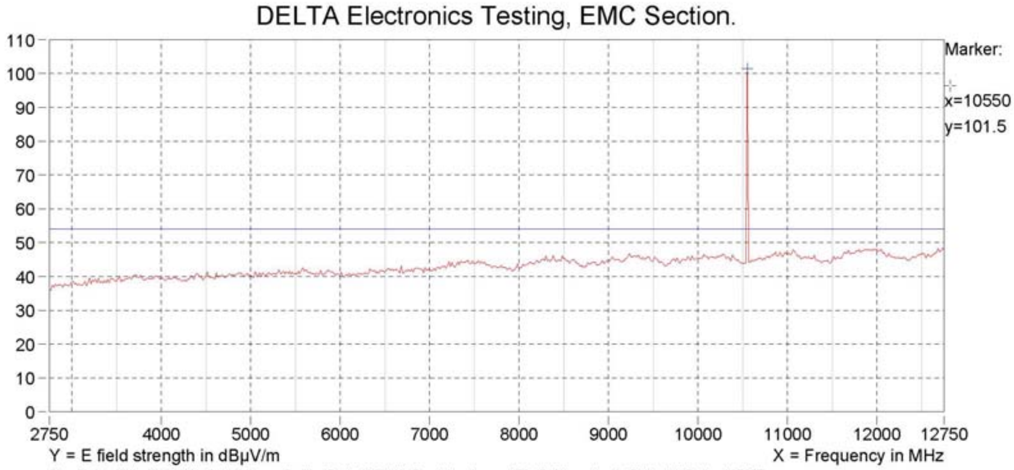
ISG
TMan II. 10.525 GHz

ant 1-3 meter horizontal and vertical. T.T. 0-360 deg.

FCC part 15 sub C

Project no: A503808 - HEN

Sheet 16



Step: Y=0.1 dB lin, X=0.1 MHz lin, t=Auto ms, Positive Peak, 1000 kHz Resol, Level range 100 dB, Attenuation 0 dB, Hewlett Packard 8565E

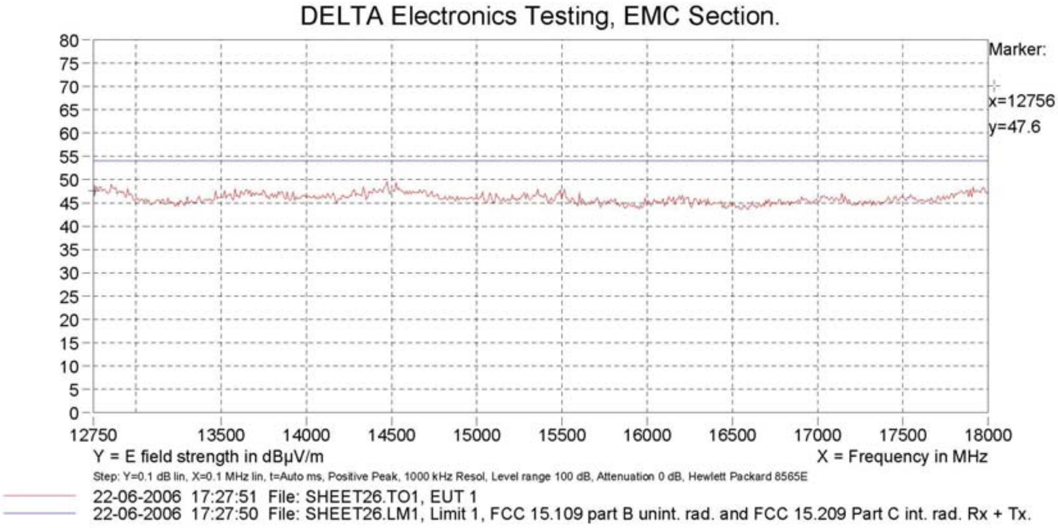
22-06-2006 17:23:15 File: SHEET20.TO1, EUT 1
22-06-2006 17:23:14 File: SHEET20.LM1, Limit 1, FCC15.109(part B) unintentional rad. and FCC 15.209(Part C) intentional rad. Both Rx

ISG
TMan II. 10.5495 GHz

ant 1-3 meter horizontal and vertical. T.T. 0-360 deg.

FCC part 15 sub C

Project no: A503808 - HEN Sheet 20

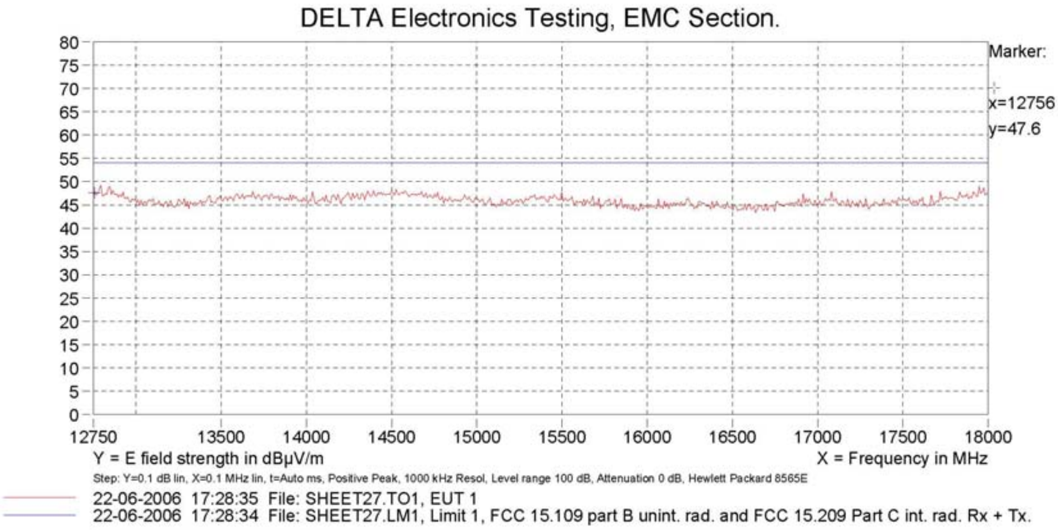


ISG
TMan II. 10.5005 GHz

ant 1 meter vertical. T.T. 0-360 deg.

FCC part 15 sub C

Project no: A503808 - HEN | Sheet 26

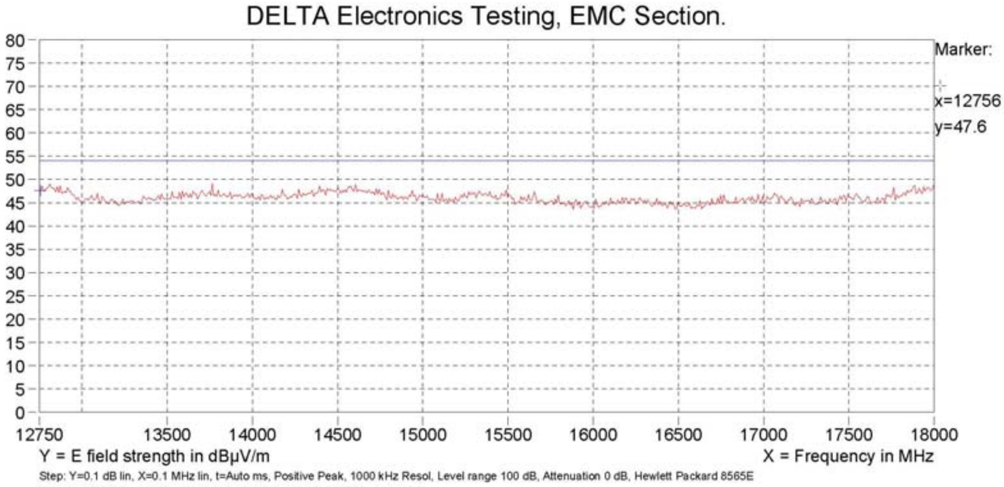


ISG
TMan II. 10.5005 GHz

ant 1 meter horizontal. T.T. 0-360 deg.

FCC part 15 sub C

Project no: A503808 - HEN | Sheet 27



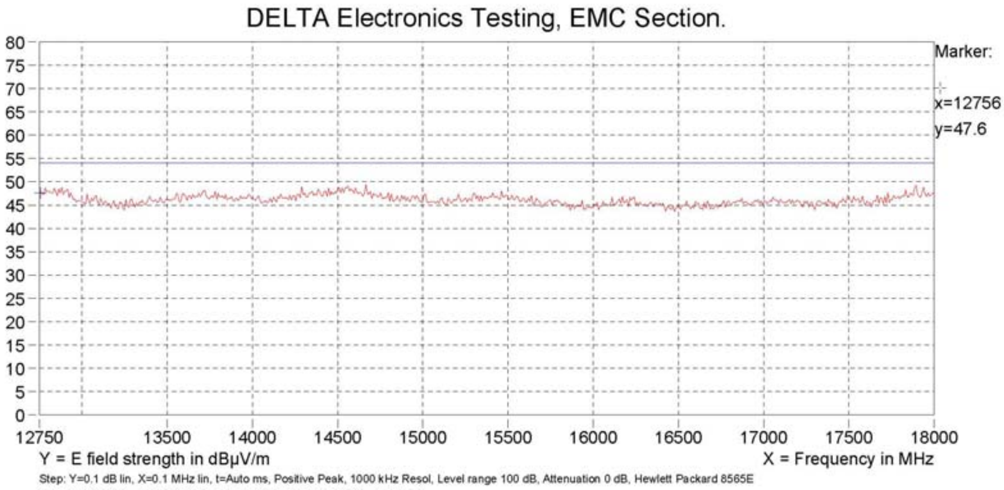
22-06-2006 17:27:12 File: SHEET25.TO1, EUT 1
22-06-2006 17:27:11 File: SHEET25.LM1, Limit 1, FCC 15.109 part B unint. rad. and FCC 15.209 Part C int. rad. Rx + Tx.

ISG
TMan II. 10.525 GHz

ant 1 meter vertical. T.T. 0-360 deg.

FCC part 15 sub C

Project no: A503808 - HEN Sheet 25



22-06-2006 17:26:04 File: SHEET24.TO1, EUT 1
22-06-2006 17:26:03 File: SHEET24.LM1, Limit 1, FCC 15.109 part B unint. rad. and FCC 15.209 Part C int. rad. Rx + Tx.

ISG
TMan II. 10.525 GHz

ant 1 meter horizontal. T.T. 0-360 deg.

FCC part 15 sub C

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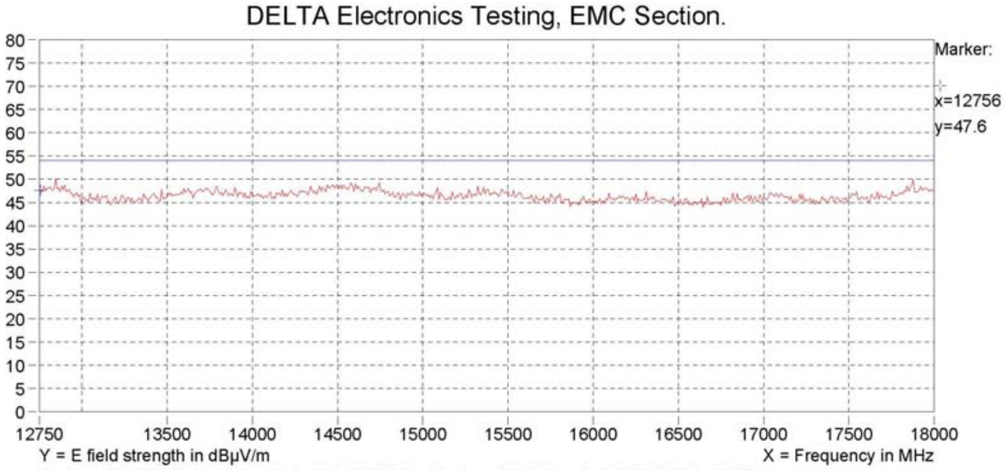


Step: Y=0.1 dB lin, X=0.1 MHz lin, t=Auto ms, Positive Peak, 1000 kHz Resol, Level range 100 dB, Attenuation 0 dB, Hewlett Packard 8565E

22-06-2006 17:24:24 File: SHEET22.TO1, EUT 1
22-06-2006 17:24:23 File: SHEET22.LM1, Limit 1, FCC 15.109 part B unint. rad. and FCC 15.209 Part C int. rad. Rx + Tx.

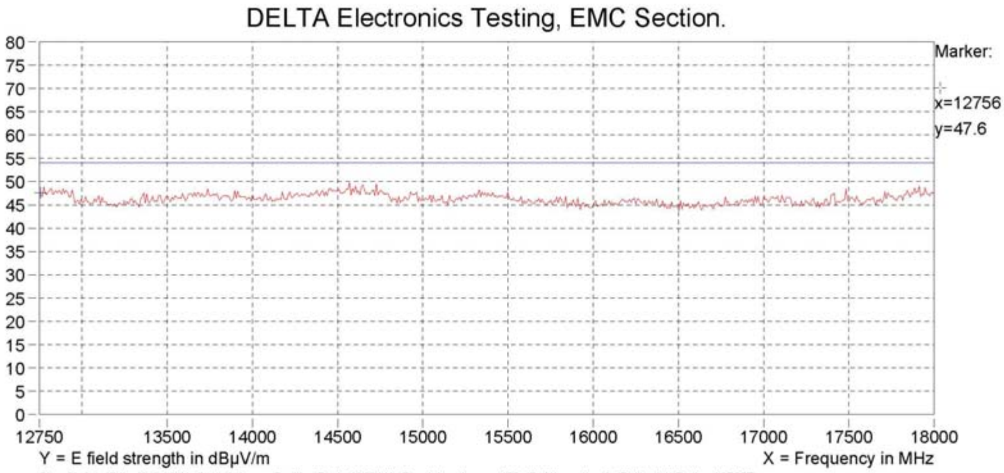
ISG
TMan II. 10.5495 GHz

ant 1 meter vertical. T.T. 0-360 deg.

FCC part 15 sub C

Project no: A503808 - HEN

Sheet 22



Step: Y=0.1 dB lin, X=0.1 MHz lin, t=Auto ms, Positive Peak, 1000 kHz Resol, Level range 100 dB, Attenuation 0 dB, Hewlett Packard 8565E

22-06-2006 17:25:00 File: SHEET23.TO1, EUT 1
22-06-2006 17:25:00 File: SHEET23.LM1, Limit 1, FCC 15.109 part B unint. rad. and FCC 15.209 Part C int. rad. Rx + Tx.

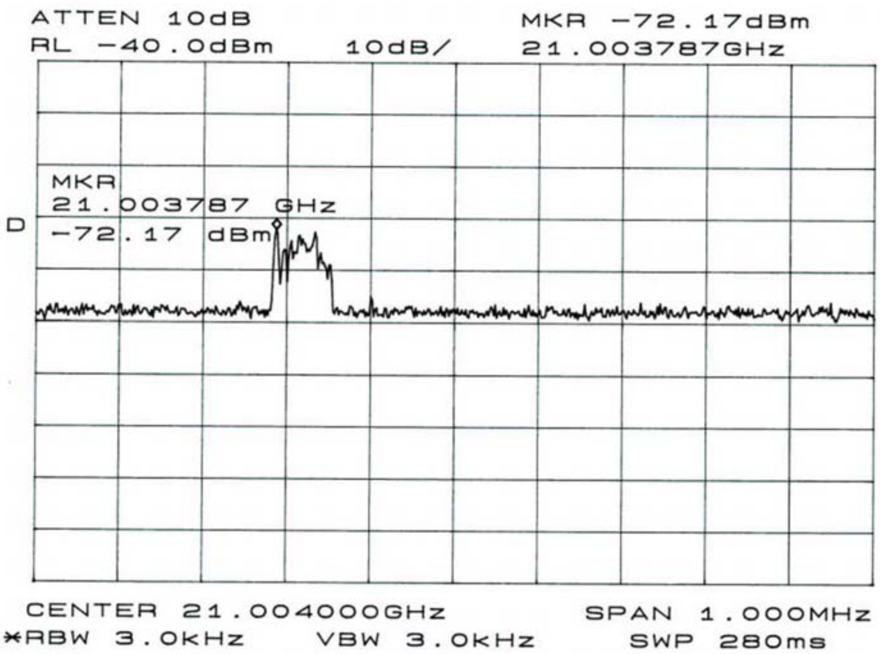
ISG
TMan II. 10.5495 GHz

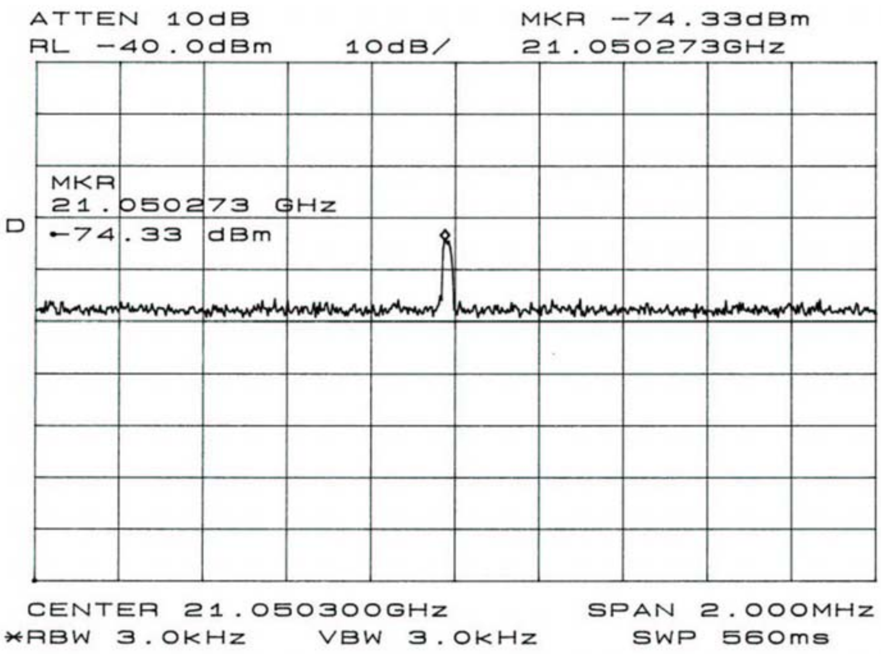
ant 1 meter horizontal. T.T. 0-360 deg.

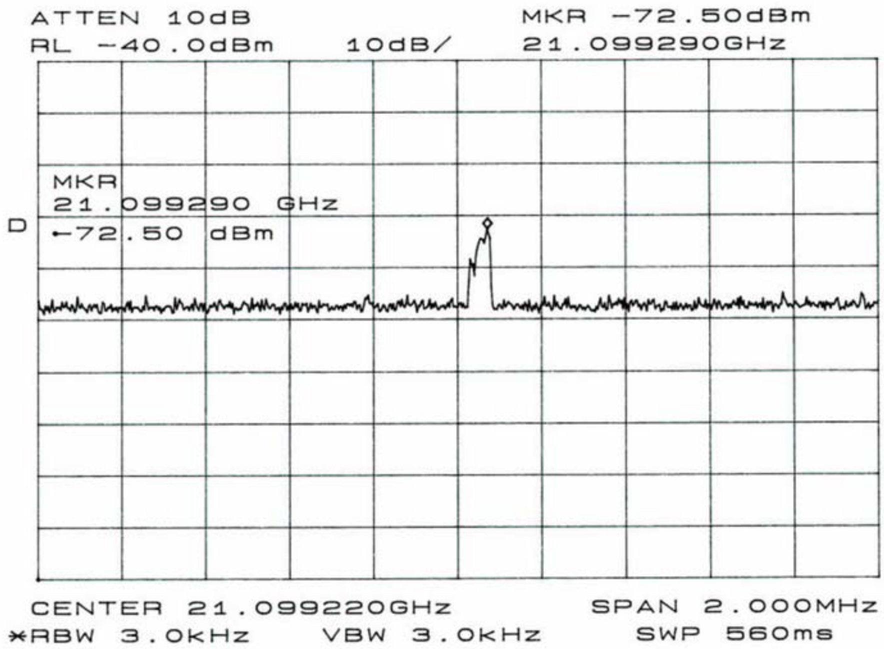
FCC part 15 sub C

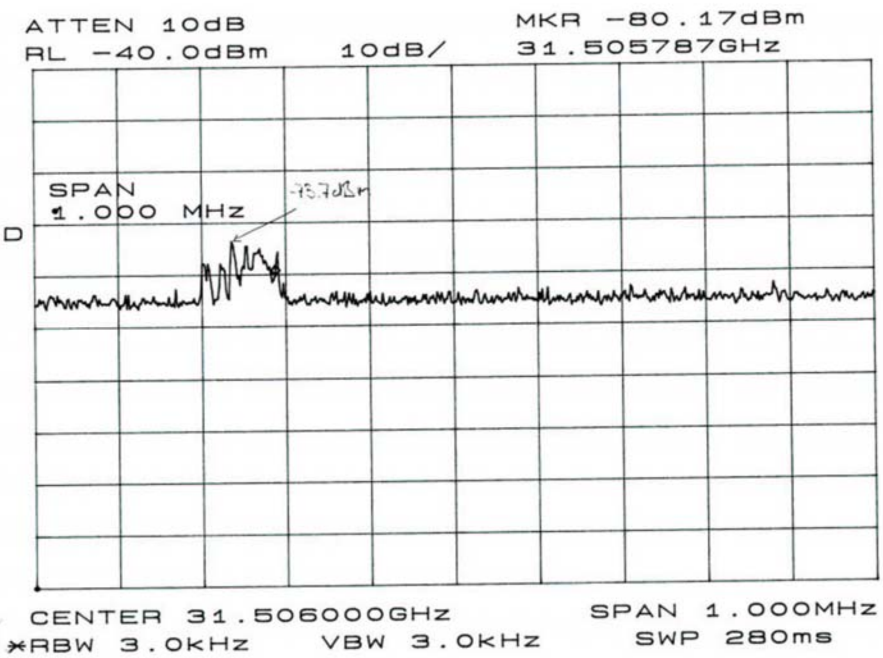
Project no: A503808 - HEN

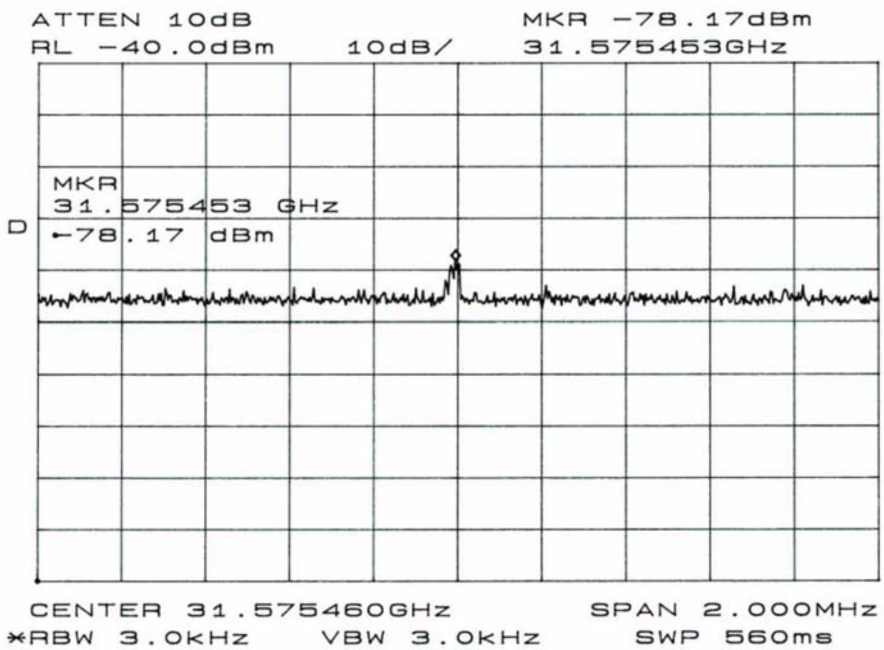
Sheet 23

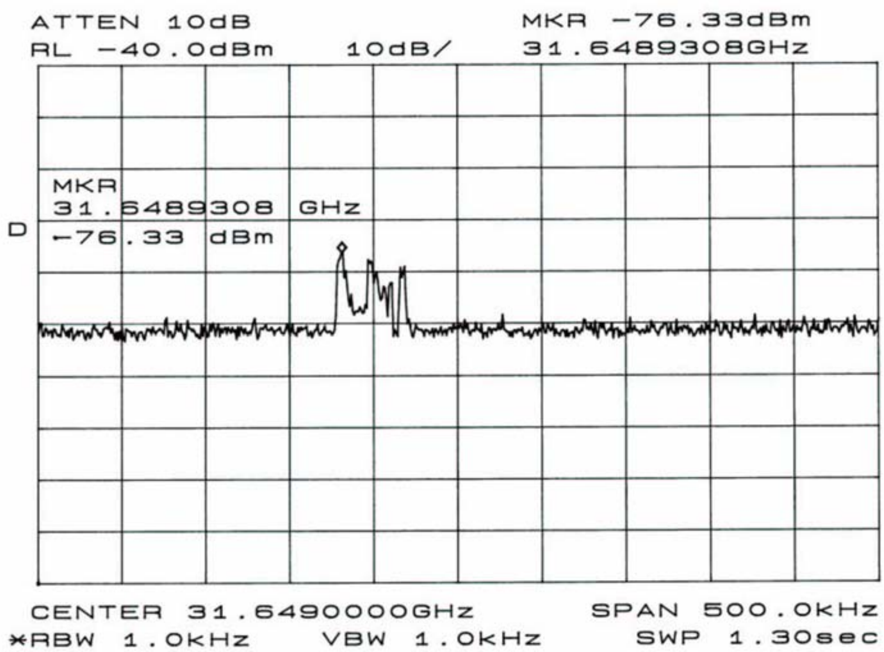

ATTEN 10dB
RL -40.0dBm
10dB/
MKR -72.17dBm
21.003787GHz
MKR
21.003787 GHz
-72.17 dBm
D
CENTER 21.004000GHz
SPAN 1.000MHz
*RBW 3.0kHz
VBW 3.0kHz
SWP 280ms


ATTEN 10dB
RL -40.0dBm
10dB/
MKR -74.33dBm
21.050273GHz
MKR
21.050273 GHz
-74.33 dBm
D
CENTER 21.050300GHz
SPAN 2.000MHz
*RBW 3.0kHz
VBW 3.0kHz
SWP 560ms


ATTEN 10dB
RL -40.0dBm
10dB/
MKR -72.50dBm
21.099290GHz
MKR
21.099290 GHz
-72.50 dBm
D
CENTER 21.099220GHz
SPAN 2.000MHz
*RBW 3.0kHz
VBW 3.0kHz
SWP 560ms

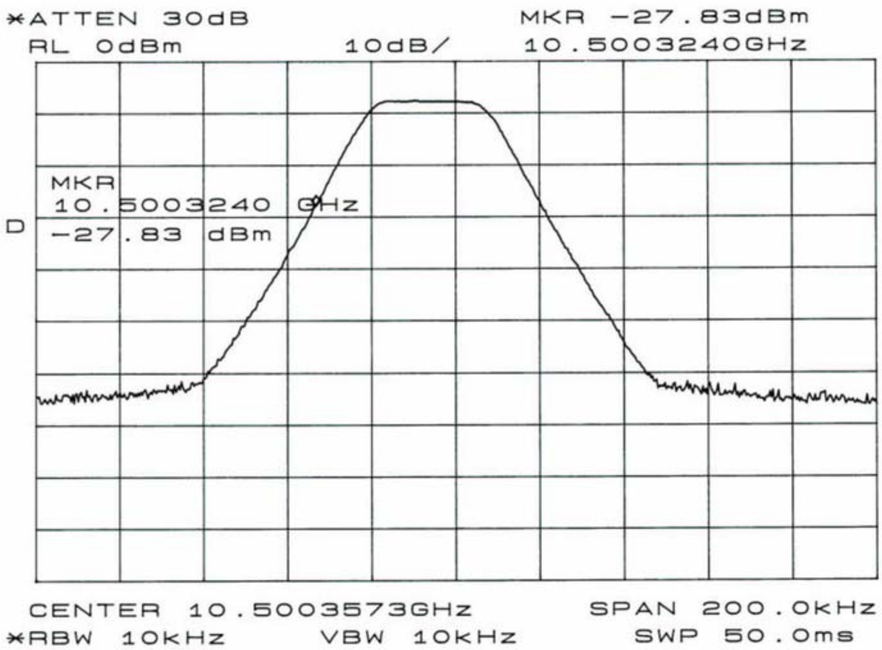

ATTEN 10dB
RL -40.0dBm
10dB/
MKR -80.17dBm
31.505787GHz
SPAN
1.000 MHz
-75.7dBm
D
CENTER 31.506000GHz
SPAN 1.000MHz
*RBW 3.0kHz
VBW 3.0kHz
SWP 280ms

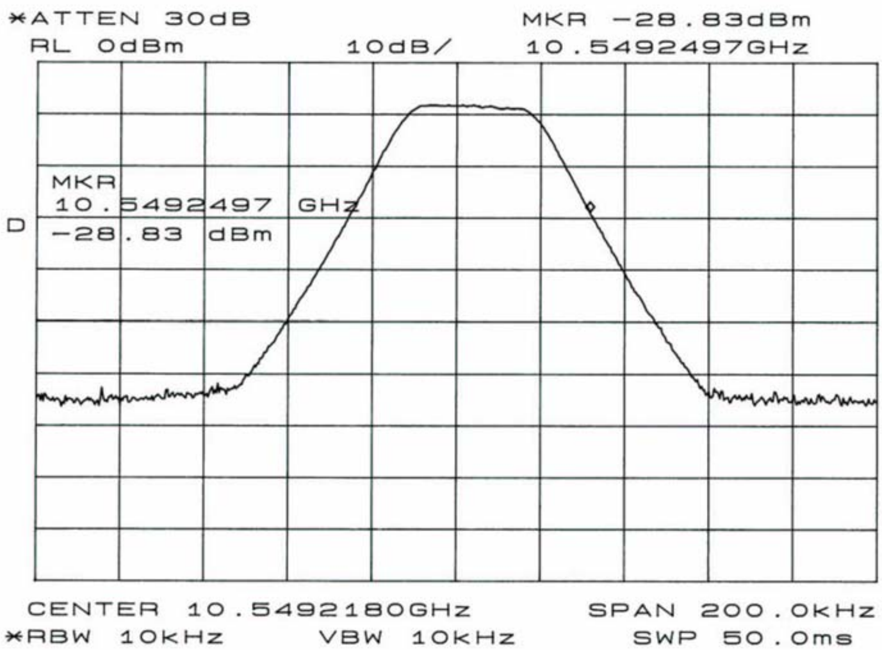

ATTEN 10dB
RL -40.0dBm
10dB/
MKR -78.17dBm
31.575453GHz
MKR
31.575453 GHz
-78.17 dBm
D
CENTER 31.575460GHz
SPAN 2.000MHz
*RBW 3.0kHz
VBW 3.0kHz
SWP 560ms


ATTEN 10dB
RL -40.0dBm
10dB/
MKR -76.33dBm
31.6489308GHz
MKR
31.6489308 GHz
-76.33 dBm
D
CENTER 31.6490000GHz
SPAN 500.0kHz
*RBW 1.0kHz
VBW 1.0kHz
SWP 1.30sec

Annex 5

Test record sheet regarding occupied bandwidth

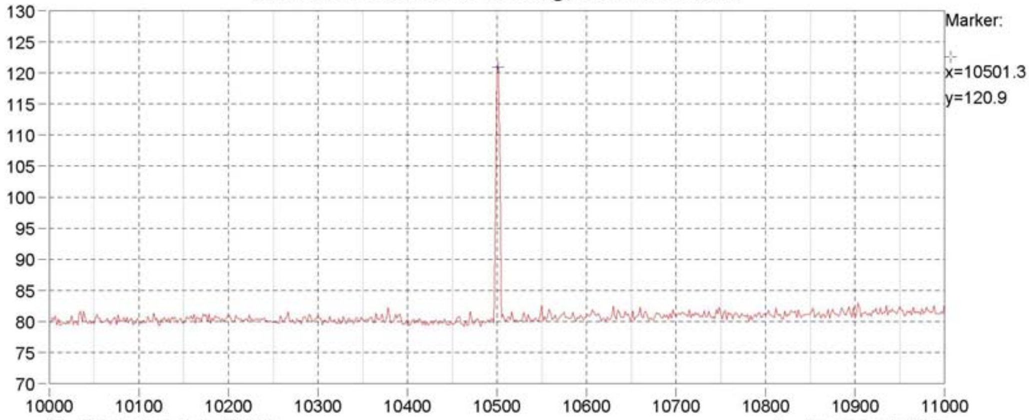

*ATTEN 30dB
RL 0dBm
10dB/
MKR -27.83dBm
10.5003240GHz
MKR
10.5003240 GHz
-27.83 dBm
D
CENTER 10.5003573GHz
SPAN 200.0kHz
*RBW 10kHz
VBW 10kHz
SWP 50.0ms


*ATTEN 30dB
RL 0dBm
10dB/
MKR -28.83dBm
10.5492497GHz
MKR
10.5492497 GHz
-28.83 dBm
D
CENTER 10.5492180GHz
SPAN 200.0kHz
*RBW 10kHz
VBW 10kHz
SWP 50.0ms

Annex 6

Test record sheets regarding peak output field strength

DELTA Electronics Testing, EMC Section.



Y = E field strength in dBµV/m X = Frequency in MHz

Step: Y=0.1 dB lin, X=0.1 MHz lin, t=Auto ms, Positive Peak, 1000 kHz Resol, Level range 100 dB, Attenuation 0 dB, Hewlett Packard 8565E

22-06-2006 17:21:50 File: SHEET18.TO1, EUT 1
22-06-2006 17:21:49 File: SHEET18.LM1, Limit 1, FCC15.109(part B) unintentional rad. and FCC 15.209(Part C) intentional rad. Both Rx

ISG
TMan II. 10.5005 GHz

ant 1-3 meter horizontal and vertical. T.T. 0-360 deg.

FCC part 15 sub C

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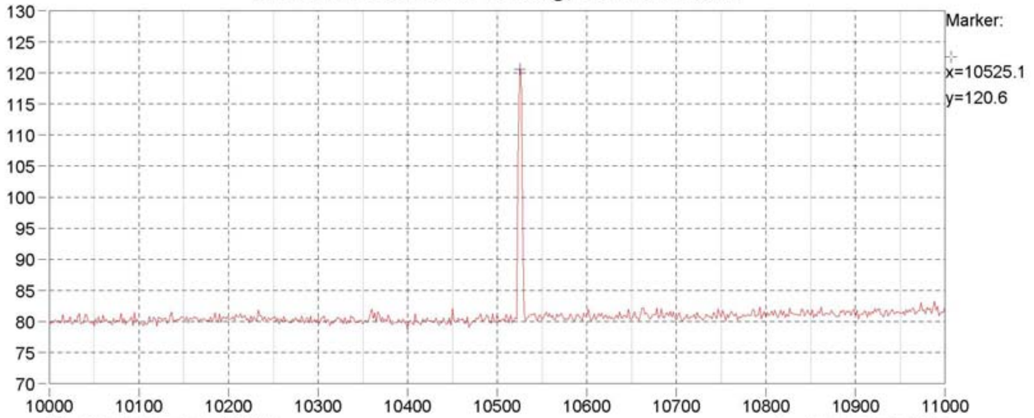
DELTA Electronics Testing, EMC Section.



Y = E field strength in dBµV/m
X = Frequency in MHz

Step: Y=0.1 dB lin, X=0.1 MHz lin, t=Auto ms, Positive Peak, 1000 kHz Resol, Level range 100 dB, Attenuation 0 dB, Hewlett Packard 8565E

22-06-2006 17:21:04 File: SHEET17.TO1, EUT 1
22-06-2006 17:21:03 File: SHEET17.LM1, Limit 1, FCC15.109(part B) unintentional rad. and FCC 15.209(Part C) intentional rad. Both Rx

ISG
TMan II. 10.525 GHz

ant 1-3 meter horizontal and vertical. T.T. 0-360 deg.

FCC part 15 sub C

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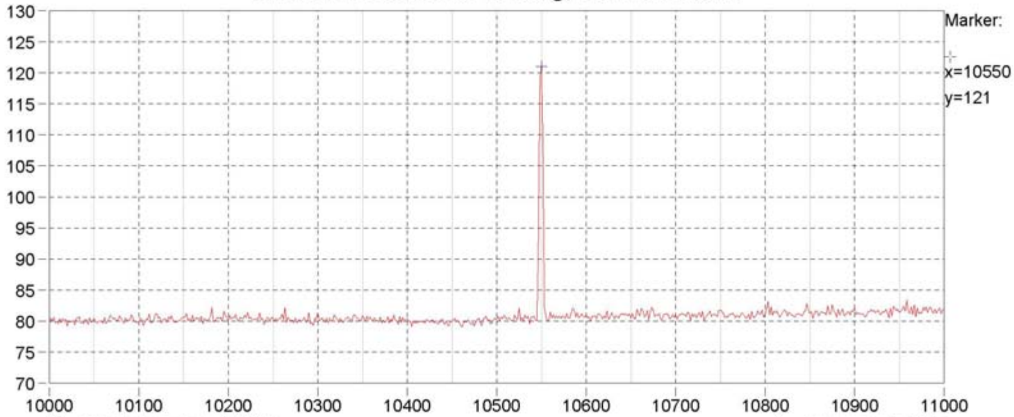
DELTA Electronics Testing, EMC Section.



Y = E field strength in dBµV/m
X = Frequency in MHz

Step: Y=0.1 dB lin, X=0.1 MHz lin, t=Auto ms, Positive Peak, 1000 kHz Resol, Level range 100 dB, Attenuation 0 dB, Hewlett Packard 8565E

22-06-2006 17:23:49 File: SHEET21.TO1, EUT 1
22-06-2006 17:23:46 File: SHEET21.LM1, Limit 1, FCC15.109(part B) unintentional rad. and FCC 15.209(Part C) intentional rad. Both Rx

ISG
TMan II. 10.5495 GHz

ant 1-3 meter horizontal and vertical. T.T. 0-360 deg.

FCC part 15 sub C

Project no: A503808 - HEN Sheet 21