
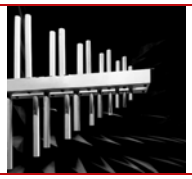
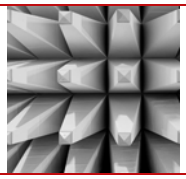

CETECOM ICT Services
consulting - testing - certification

TEST REPORT

Test report no.: 1-6277/13-01-04-B

DAkkS Deutsche Akkreditierungsstelle D-PL-12076-01-01

Testing laboratory

CETECOM ICT Services GmbH
Untertuerkheimer Strasse 6 – 10
66117 Saarbruecken / Germany
Phone: + 49 681 5 98 - 0
Fax: + 49 681 5 98 - 9075
Internet: http://www.cetecom.com
e-mail: ict@cetecom.com

Accredited Testing Laboratory:
The testing laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025 (2005) by the Deutsche Akkreditierungsstelle GmbH (DAkkS)
The accreditation is valid for the scope of testing procedures as stated in the accreditation certificate with the registration number: D-PL-12076-01-01
Area of Testing:
Radio Communications & Compatibility Testing (RCT)

Applicant

Philips Electronics Nederland B.V.
High Tech Campus 5
5656 AE Eindhoven / NETHERLANDS
Phone: -/-
Fax: -/-
Contact: Karel Rysman
e-mail: karel.rysman@philips.com
Phone: -/-

Manufacturer

Philips Electronics Nederland B.V.
High Tech Campus 5
5656 AE Eindhoven / NETHERLANDS

Test standard/s

47 CFR Part 15	Title 47 of the Code of Federal Regulations; Chapter I; Part 15 - Radio frequency devices

For further applied test standards please refer to section 3 of this test report.

Test Item

Kind of test item:	**Wrist Watch**
Model name:	**DTI-2**
FCC ID:	**2AALC-DTI2 (BT module ENW89818C2JF PAN1325)**
IC:	**216Q-1315 (BT module ENW89818C2JF PAN1325)**
Frequency:	DTS band 2400 MHz to 2483.8 MHz (Lowest channel 00 – 2402 MHz; highest channel 78 – 2480 MHz)
Technology tested:	Bluetooth® + EDR
Antenna:	Integrated antenna
Power supply:	5.0 V DC

This test report is electronically signed and valid without handwriting signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

Test report authorised:

cn=Tobias Wittenmeier, o=CETECOM ICT Services GmbH, ou=WIT-111222, email=tobias.wittenmeier@cetecom.com, c=DE
2014.02.28 11:44:14 +01'00'

Tobias Wittenmeier
Expert

Test performed:

p.o.

cn=Stefan Boes, o=CETECOM ICT Services GmbH, ou=BOE-111011, email=Stefan.Boes@cetecom.com, c=DE
2014.02.28 13:14:02 +01'00'

Christoph Schneider
Expert

1 Table of contents

2 General information

2.1 Notes and disclaimer

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This test report is electronically signed and valid without handwritten signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

2.2 Application details

Date of receipt of order:	2013-07-01
Date of receipt of test item:	2013-11-11
Start of test:	2013-11-11
End of test:	2013-11-12
Person(s) present during the test:	-/-

3 Test standard/s

Test standard	Date	Test standard description
47 CFR Part 15	01.10.2012	Title 47 of the Code of Federal Regulations; Chapter I; Part 15 - Radio frequency devices

4 Test environment

Temperature:	T_{nom}	+22	°C during room temperature tests
	T_{max}	-/-	°C during high temperature tests
	T_{min}	-/-	°C during low temperature tests
Relative humidity content:		52 %	
Barometric pressure:		not relevant for this kind of testing	
Power supply:	V_{nom}	5.0 V	DC
	V_{max}	-/- V	
	V_{min}	-/- V	

5 Test item

Kind of test item	**:**	**Wrist Watch**
Type identification	**:**	**DTI-2**
S/N serial number	**:**	**-/-**
HW hardware status	**:**	**No information available!**
SW software status	**:**	**No information available!**
Frequency band [MHz]	**:**	**DTS band 2400 MHz to 2483.8 MHz (lowest channel 00 – 2402 MHz; highest channel 78 – 2480 MHz)**
Type of radio transmission **Use of frequency spectrum**	**:** **:**	**FHSS**
Type of modulation	**:**	**No information available!**
Number of channels	**:**	**79**
Antenna	**:**	**Integrated antenna**
Power supply	**:**	**5.0 V DC**
Temperature range	**:**	**-/-°C to -/- °C**

5.1 Additional information

Test setup- and EUT-photos are included in test reports 1-6277_13-01-01_AnnexA
1-6277_13-01-01_AnnexB
1-6277_13-01-01_AnnexD

6 Test laboratories sub-contracted

None

7 Summary of measurement results

☒ **No deviations from the technical specifications were ascertained**

☐ There were deviations from the technical specifications ascertained

TC Identifier	Description	Verdict	Date	Remark
RF-Testing	CFR Part 15 RSS 210, Issue 8, Annex 8	Passed	2014-02-28	Only delta tests performed, see also G0M21008-3623-P-15

Test specification clause	Test case	Temperature conditions	Power source voltages	Mode	Pass	Fail	NA	NP	Remark
§15.247(b)(4) RSS 210 / A8.4(2)	Antenna gain	Nominal	Nominal	GFSK	☒	☐	☐	☐	complies
§15.247(e) RSS 210 / A8.2(b)	Power spectral density	Nominal	Nominal	GFSK Pi/4 DQPSK 8 DPSK	☐	☐	☒	☐	Not applicable for FHSS!
§15.247(a)(1) RSS 210 / A8.1(b)	Carrier frequency separation	Nominal	Nominal	GFSK	☐	☐	☐	☒	See G0M21008-3623-P-15
§15.247(a)(1) RSS 210 / A8.1(d)	Number of hopping channels	Nominal	Nominal	GFSK	☐	☐	☐	☒	See G0M21008-3623-P-15
§15.247(a)(1)(iii) RSS 210 / A8.3(1)	Time of occupancy (dwell time)	Nominal	Nominal	GFSK Pi/4 DQPSK 8 DPSK	☐	☐	☐	☒	See G0M21008-3623-P-15
§15.247(a)(1) RSS 210 / A8.2(a)	Spectrum bandwidth of a FHSS system 20dB bandwidth	Nominal	Nominal	GFSK Pi/4 DQPSK 8 DPSK	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	☒ ☒ ☒	See G0M21008-3623-P-15
§15.247(b)(1) RSS-210 / A8.4(2)	Maximum output power	Nominal	Nominal	GFSK Pi/4 DQPSK 8 DPSK	☒ ☒ ☒	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	Only radiated measurements performed
§15.247(d) RSS-210 / A8.5	Band edge compliance conducted	Nominal	Nominal	GFSK Pi/4 DQPSK 8 DPSK	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	☒ ☒ ☒	See G0M21008-3623-P-15
§15.205 RSS-210 / A8.5	Band edge compliance radiated	Nominal	Nominal	GFSK Pi/4 DQPSK 8 DPSK	☒ ☒ ☒	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	complies
§15.247(d) RSS-210 / A8.5	TX spurious emissions conducted	Nominal	Nominal	GFSK Pi/4 DQPSK 8 DPSK	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	☒ ☒ ☒	See G0M21008-3623-P-15
§15.247(d) RSS-210 / A8.5	TX spurious emissions radiated	Nominal	Nominal	GFSK	☒	☐	☐	☐	complies
§15.109 RSS-Gen	RX spurious emissions radiated	Nominal	Nominal	-/-	☐	☐	☐	☒	See G0M21008-3623-P-15
§15.209(a) RSS-Gen	TX spurious emissions radiated < 30 MHz	Nominal	Nominal	GFSK	☒	☐	☐	☐	complies
§15.107(a)	Conducted emissions < 30 MHz	Nominal	Nominal	GFSK	☐	☐	☐	☒	See G0M21008-3623-P-15

Note: NA = Not Applicable; NP = Not Performed

8 Additional comments

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Reference documents:	**G0M21008-3623-P-15** (Panasonic BT-Module tested by Eurofins Product Service GmbH)
Special test descriptions:	Only delta test performed, EUT contains BT-Module **ENW89818C2JF PAN1325 (Panasonic)**
Configuration descriptions:	TX tests: were performed with basic rate GFSK modulation only. RX/Standby tests: not performed
Test mode:	☐ Bluetooth Test mode loop back enabled (EUT is controlled over CBT/CMU)
	☒ Special software is used. EUT is transmitting pseudo random data by itself

9 Measurement results

9.1 Antenna gain

Measurement:

The antenna gain of the complete system is calculated by the difference of radiated power in EIRP and the conducted power of the module. For normal Bluetooth® devices, the GFSK modulation is used.

Measurement parameters:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Video bandwidth:	3 MHz
Resolution bandwidth:	3 MHz
Span:	5 MHz
Trace-Mode:	Max hold

Limits:

FCC	IC
Antenna Gain	
6 dBi	

Results:

T_{nom}	V_{nom}	lowest channel 2402 MHz	middle channel 2441 MHz	highest channel 2480 MHz
Conducted power [dBm][1] Measured with unknown modulation		10.20	9.70	9.20
Radiated power [dBm] Measured with unknown modulation		4.39	3.58	2.46
Gain [dBi] Calculated		-5.81	-6.12	-6.74

1) Values from G0M21008-3623-P-15

Result: **Passed**

9.2 Power spectral density

Not required for hopping systems!

9.3 Carrier frequency separation

Not performed!

9.4 Number of hopping channels

Not performed!

9.5 Time of occupancy (dwell time)

Not performed!

9.6 Spectrum bandwidth of a FHSS system – 20 dB bandwidth

Not performed!

9.7 Maximum output power

Description:

Measurement of the maximum output power conducted and radiated. EUT in single channel mode.

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Video bandwidth:	3 MHz
Resolution bandwidth:	3 MHz
Span:	5 MHz
Trace-Mode:	Max Hold

Limits:

FCC	IC
Maximum output power	
[Conducted: 0.125 W – antenna gain max. 6 dBi] Systems using more than 75 hopping channels: Conducted: 1.0 W – antenna gain max. 6 dBi	

Results:

Modulation	Maximum output power radiated - EIRP [dBm]		
Frequency	2402 MHz	2441 MHz	2480 MHz
GFSK	4.39	3.58	2.46
Pi/4 DQPSK	4.68	3.16	3.14
8 DPSK	4.59	3.45	3.00
Measurement uncertainty	± 3 dB		

*) - Values calculated with antenna gain

Result: **Passed**

9.8 Band edge compliance conducted

Not performed!

9.9 Band edge compliance radiated

Description:

Measurement of the radiated band edge compliance. The EUT is turned in the position that results in the maximum level at the band edge. Then a sweep over the corresponding restricted band is performed. The EUT is set to single channel mode and the transmit channel is channel 00 for the lower restricted band and channel 78 for the upper restricted band. The measurement is repeated for all modulations. Measurement distance is 3m.

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Video bandwidth:	1 MHz Peak / 10 Hz AVG
Resolution bandwidth:	1 MHz
Span:	Lower Band: 2370 – 2400 MHz higher Band: 2480 – 2500 MHz
Trace-Mode:	Max Hold

Limits:

FCC	IC
Band edge compliance radiated	
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. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 5.205(c)).	
54 dBµV/m AVG 74 dBµV/m Peak	

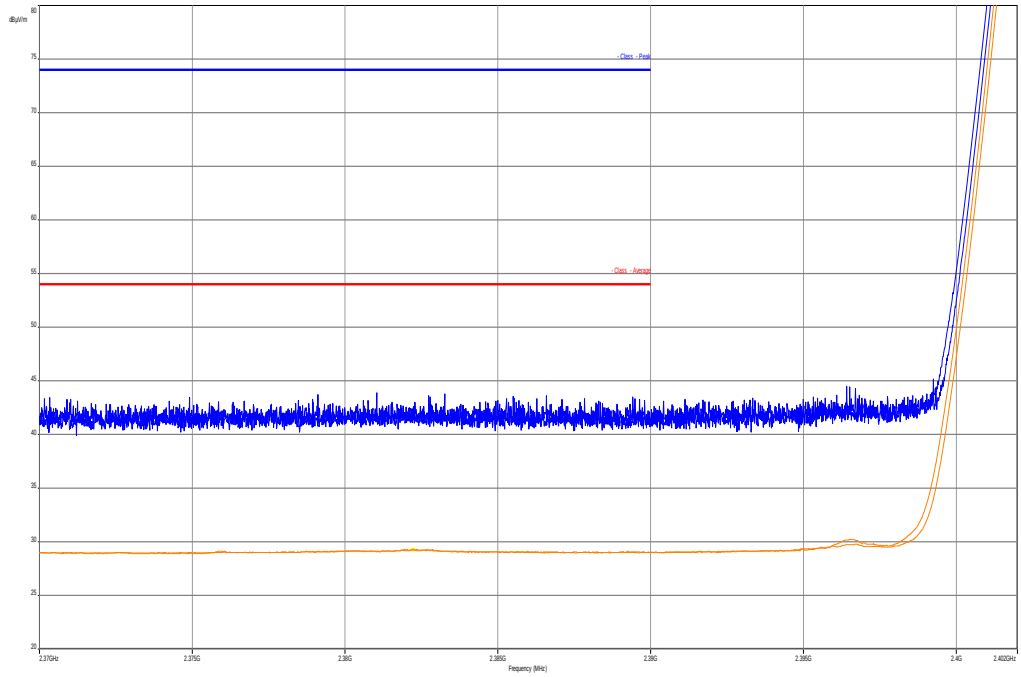
Results:

Scenario	Band edge compliance radiated [dBµV/m]		
Modulation	GFSK	Pi/4 DQPSK	8 DPSK
Lower restricted band	< 54 AVG / < 74 PP	< 54 AVG / < 74 PP	< 54 AVG / < 74 PP
Upper restricted band	< 54 AVG / < 74 PP	< 54 AVG / < 74 PP	< 54 AVG / < 74 PP
Measurement uncertainty	± 3 dB		

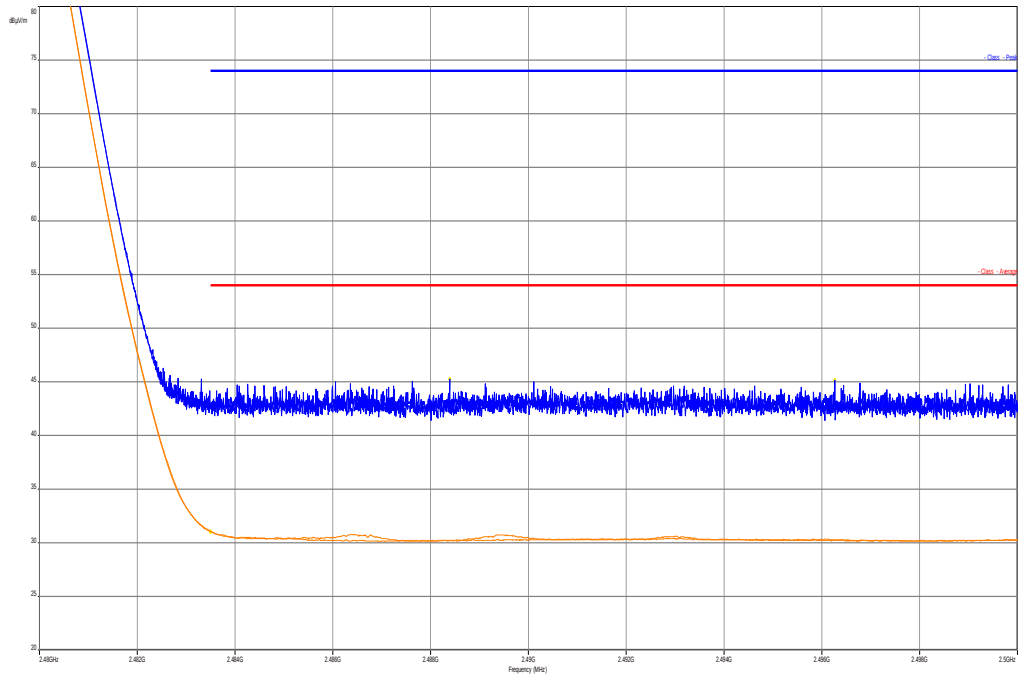
Result: Passed

Plots:

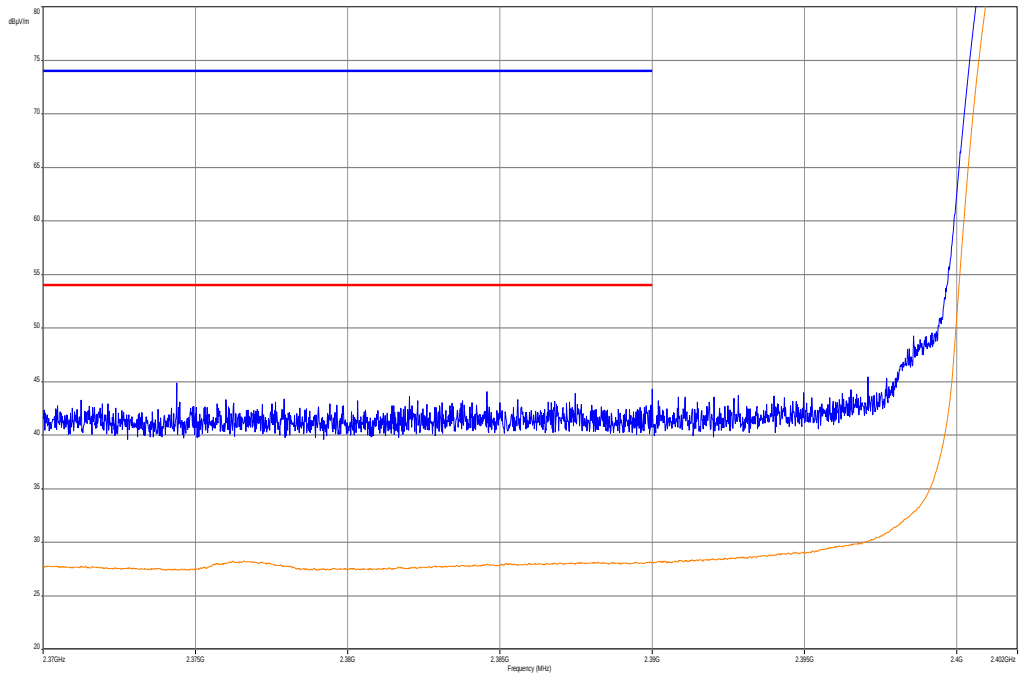
Plot 1: Lower band edge, GFSK modulation, vertical & horizontal polarization



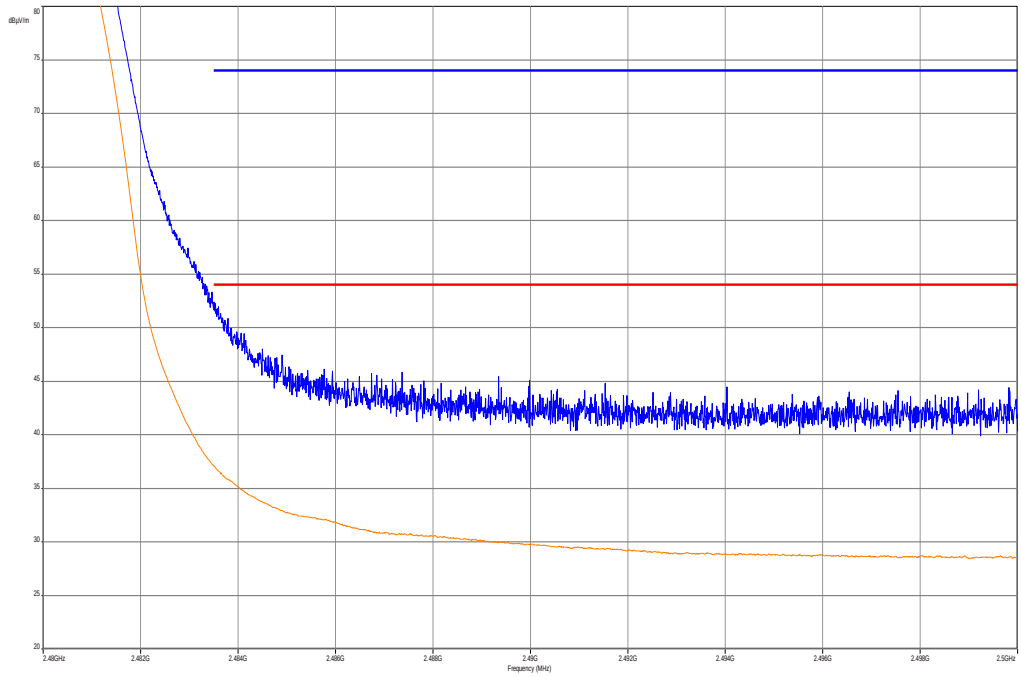
Plot 2: Upper band edge, GFSK modulation, vertical & horizontal polarization



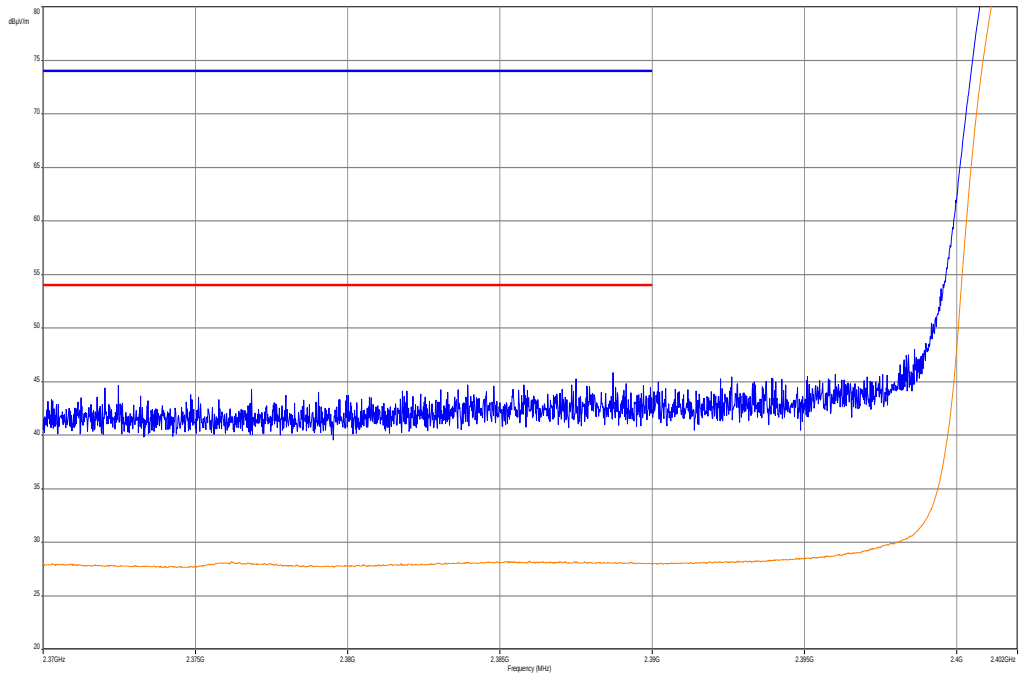
Plot 3: Lower band edge, Pi/4 DQPSK modulation, vertical & horizontal polarization



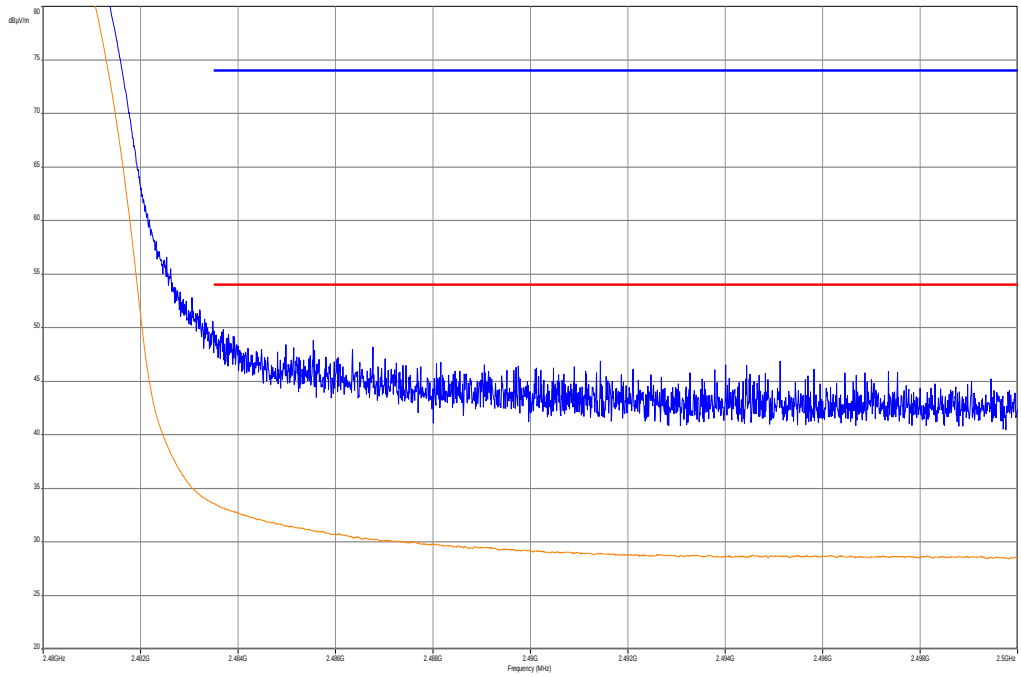
Plot 4: Upper band edge, Pi/4 DQPSK modulation, vertical & horizontal polarization



Plot 5: Lower band edge, 8 DPSK modulation, vertical & horizontal polarization



Plot 6: Upper band edge, 8 DPSK modulation, vertical & horizontal polarization



9.10 TX spurious emissions conducted

Not performed!

9.11 TX spurious emissions radiated

Description:

Measurement of the radiated spurious emissions in transmit mode. The EUT is set to single channel mode and the transmit channel is channel 00, channel 39 and channel 78. The measurement is performed in the mode with the highest output power.

Measurement:

Measurement parameter	
Detector:	Peak / Quasi Peak
Sweep time:	Auto
Video bandwidth:	Sweep: 100 kHz Remeasurement: 10 Hz
Resolution bandwidth:	F < 1 GHz: 100 kHz F > 1 GHz: 1 MHz
Span:	30 MHz to 25 GHz
Trace-Mode:	Max Hold
Measured Modulation:	☒ GFSK ☒ Pi/4 DQPSK ☐ 8DPSK

Limits:

FCC	IC
TX spurious emissions radiated	
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. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).	

§15.209		
Frequency (MHz)	Field strength (dBµV/m)	Measurement distance
30 - 88	30.0	10
88 – 216	33.5	10
216 – 960	36.0	10
Above 960	54.0	3

Results:

TX spurious emissions radiated [dBµV/m]								
2402 MHz			2441 MHz			2480 MHz		
F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]
For emissions below 1 GHz, please take a look at the table below the 1 GHz plot.			For emissions below 1 GHz, please take a look at the table below the 1 GHz plot.			For emissions below 1 GHz, please take a look at the table below the 1 GHz plot.		
All detected peak emissions are below the average limit.			All detected peak emissions are below the average limit.			All detected peak emissions are below the average limit.		
Measurement uncertainty			± 3 dB					

Result: **Passed**

Plots:

Plot 1: 30 MHz to 1 GHz, GFSK, channel 00, vertical & horizontal polarization

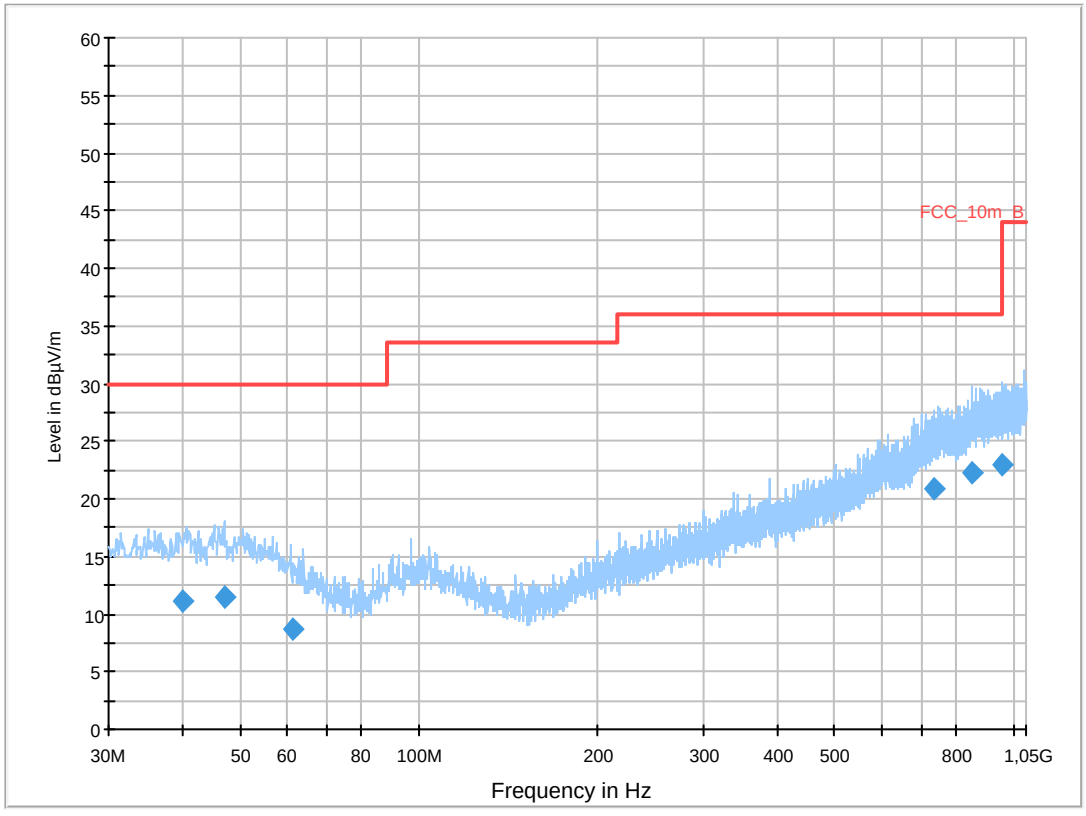
Common Information

EUT:	DTI-2
Serial Number:	81
Test Description:	FCC part 15 class B
Operating Conditions:	BT cont. TX 2402 MHz
Operator Name:	Hennemann
Comment:	battery powered

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup:	Electric Field (NOS)
Receiver:	[ESCI 3]
Level Unit:	dBµV/m

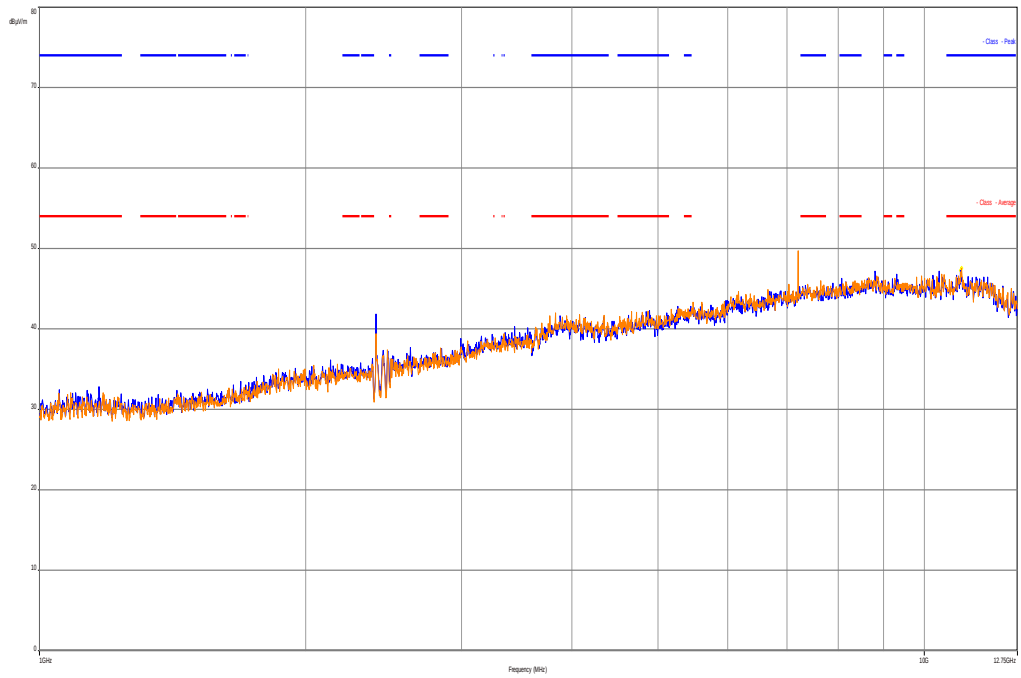
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



Final Result 1

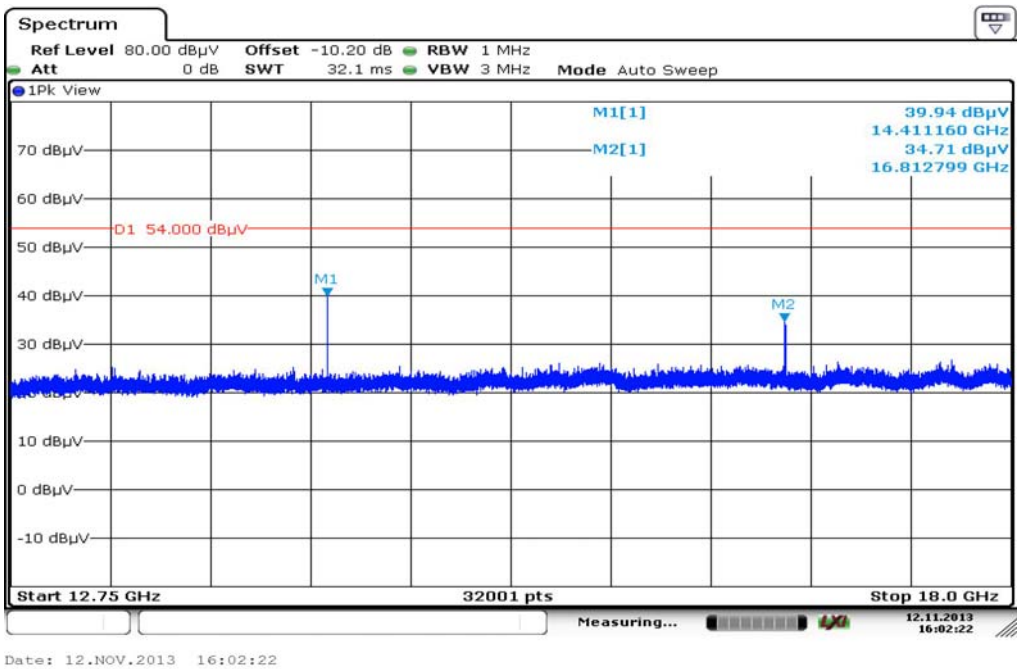
Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
39.979950	11.1	1000.0	120.000	122.0	V	10.0	13.4	18.9	30.0	
47.060850	11.4	1000.0	120.000	112.0	V	265.0	13.3	18.6	30.0	
61.272000	8.6	1000.0	120.000	170.0	H	267.0	11.3	21.4	30.0	
735.711450	20.9	1000.0	120.000	135.0	V	100.0	23.3	15.1	36.0	
849.305550	22.2	1000.0	120.000	154.0	H	10.0	24.5	13.8	36.0	
959.466450	23.0	1000.0	120.000	170.0	V	10.0	25.4	13.0	36.0	

Plot 2: 1 GHz to 12.75 GHz, GFSK, channel 00, vertical & horizontal polarization

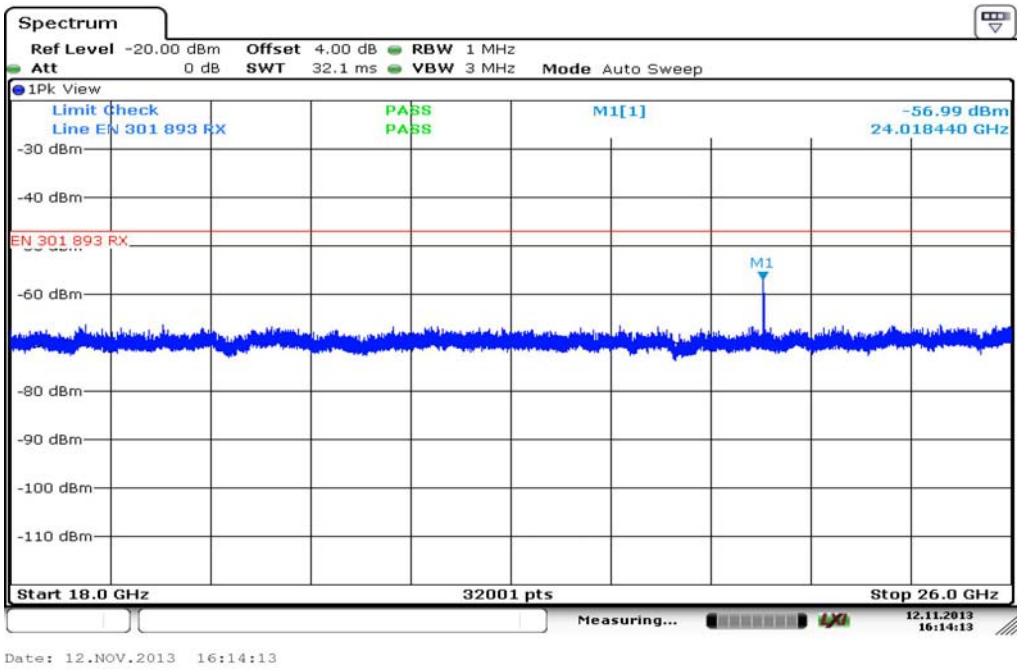


The carrier signal is notched with a 2.4 GHz band rejection filter.

Plot 3: 12.75 GHz to 18 GHz, GFSK, channel 00, vertical & horizontal polarization



Plot 4: 18 GHz to 26 GHz, GFSK, channel 00, vertical & horizontal polarization



Plot 5: 30 MHz to 1 GHz, GFSK, channel 39, vertical & horizontal polarization

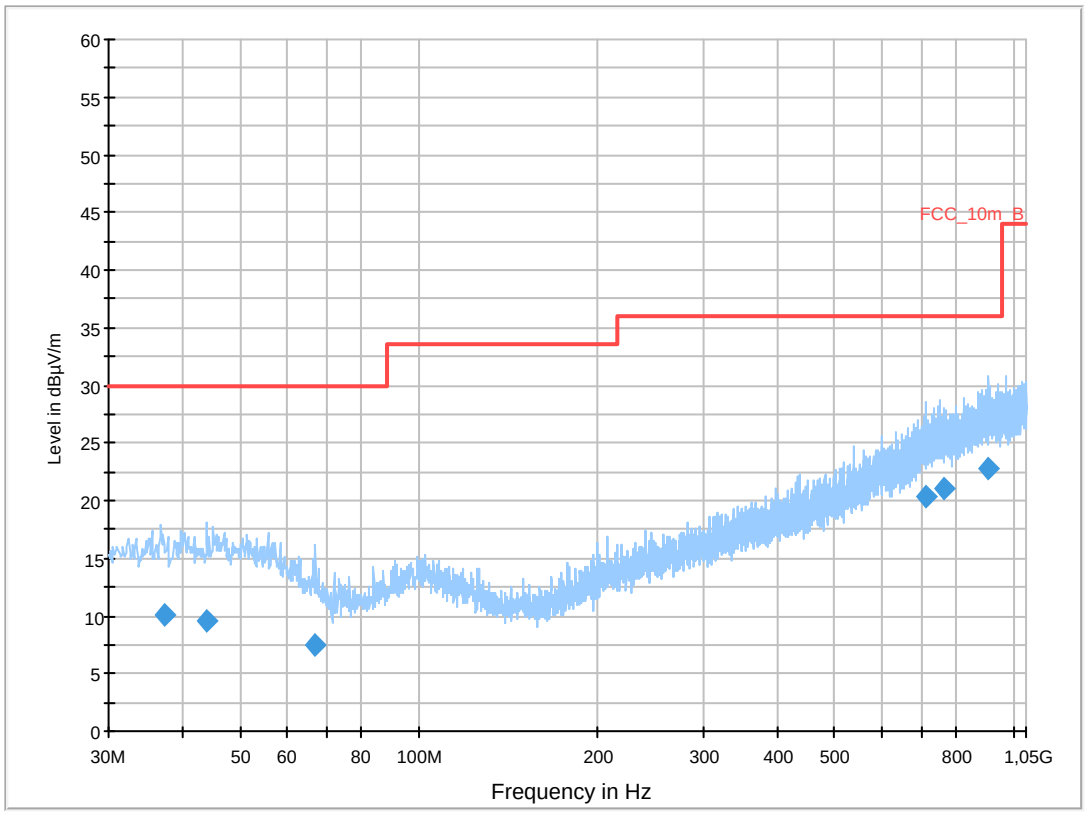
Common Information

EUT:	DTI-2
Serial Number:	82
Test Description:	FCC part 15 class B
Operating Conditions:	BT cont. TX 2441 MHz
Operator Name:	Hennemann
Comment:	battery powered

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup:	Electric Field (NOS)
Receiver:	[ESCI 3]
Level Unit:	dBµV/m

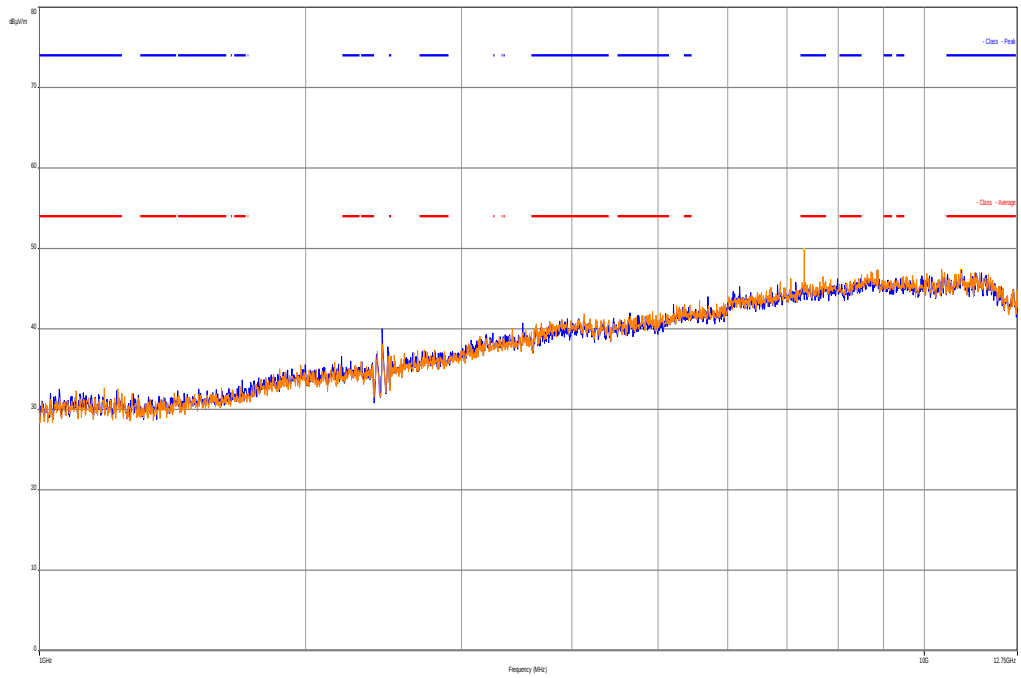
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



Final Result 1

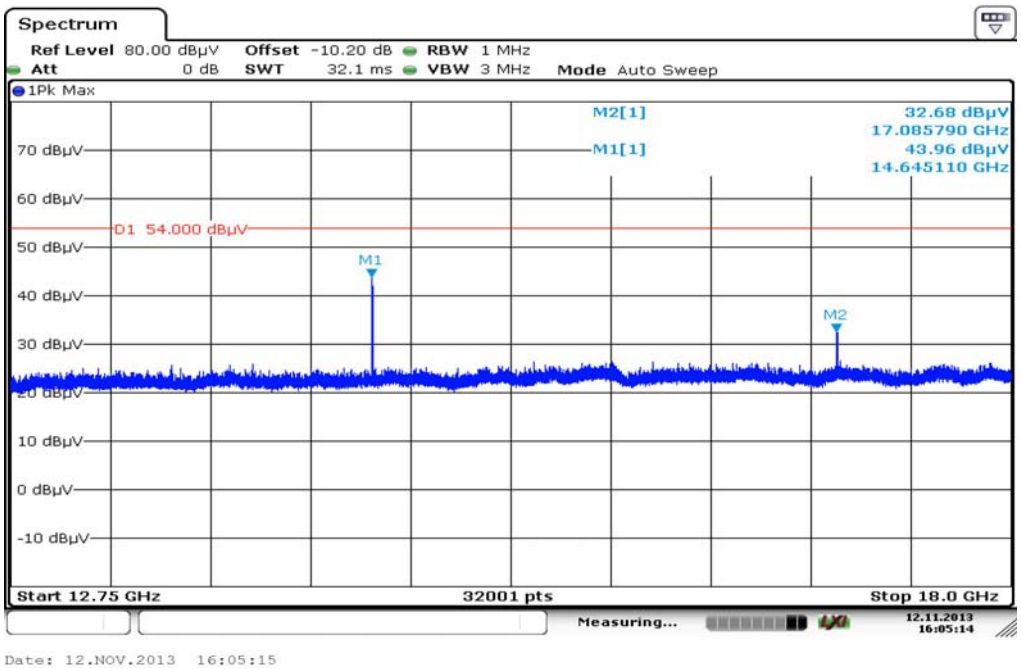
Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
37.140000	10.0	1000.0	120.000	112.0	V	-2.0	13.2	20.0	30.0	
43.896600	9.5	1000.0	120.000	121.0	H	171.0	13.3	20.5	30.0	
66.501900	7.6	1000.0	120.000	133.0	V	280.0	10.1	22.4	30.0	
710.038350	20.4	1000.0	120.000	98.0	V	261.0	22.7	15.6	36.0	
764.422650	21.1	1000.0	120.000	170.0	H	-10.0	23.7	14.9	36.0	
903.105750	22.7	1000.0	120.000	170.0	V	171.0	25.2	13.3	36.0	

Plot 6: 1 GHz to 12.75 GHz, GFSK, channel 39, vertical & horizontal polarization

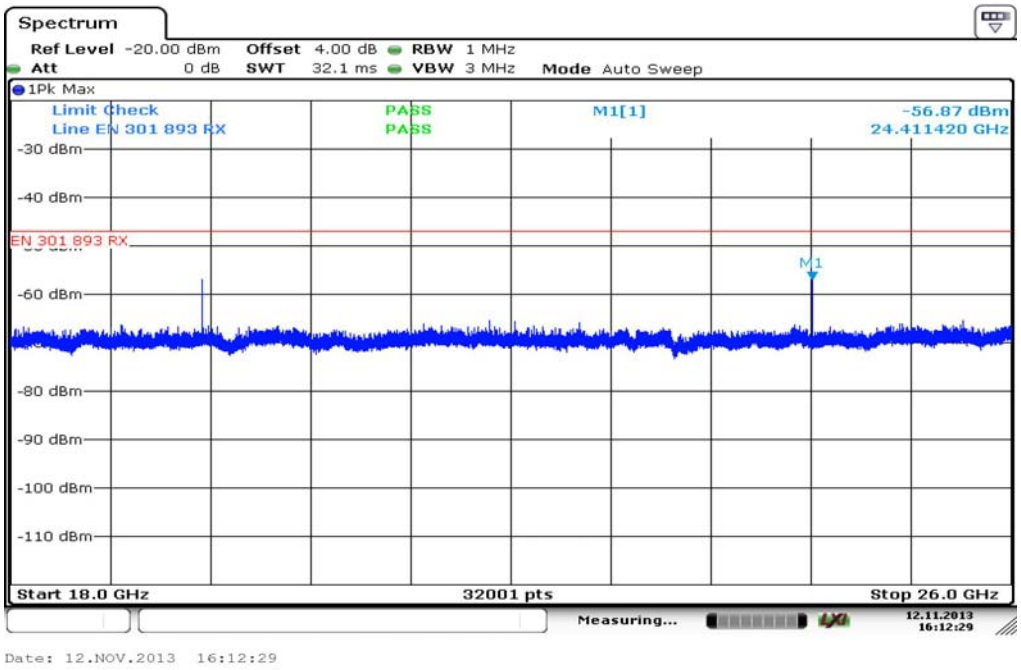


The carrier signal is notched with a 2.4 GHz band rejection filter.

Plot 7: 12.75 GHz to 18 GHz, GFSK, channel 39, vertical & horizontal polarization



Plot 8: 18 GHz to 26 GHz, GFSK, channel 39, vertical & horizontal polarization



Plot 9: 30 MHz to 1 GHz, GFSK, channel 78, vertical & horizontal polarization

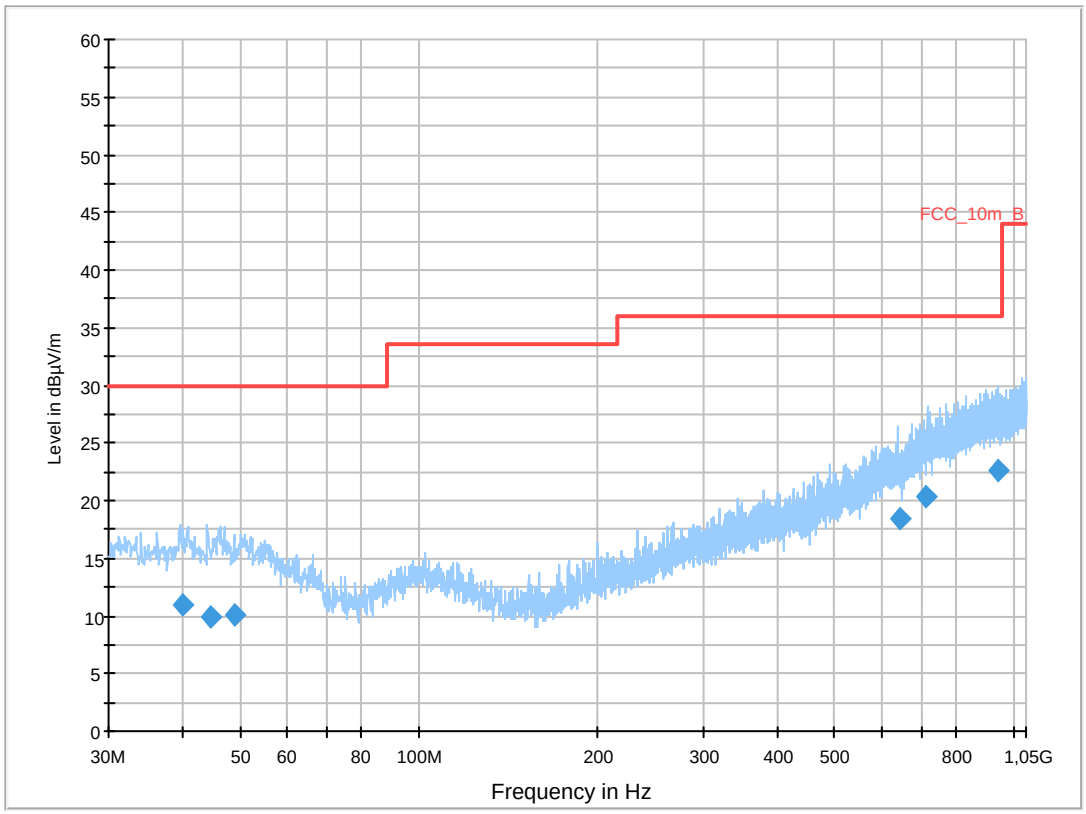
Common Information

EUT:	DTI-2
Serial Number:	91
Test Description:	FCC part 15 class B
Operating Conditions:	BT cont. TX 2480 MHz
Operator Name:	Hennemann
Comment:	battery powered

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup:	Electric Field (NOS)
Receiver:	[ESCI 3]
Level Unit:	dBµV/m

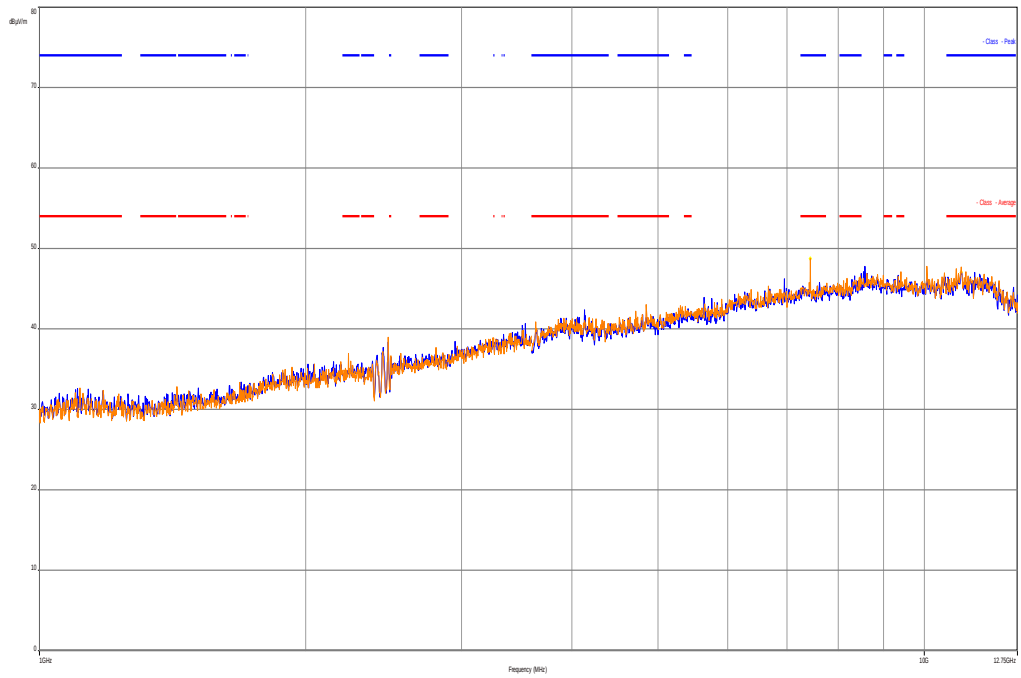
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



Final Result 1

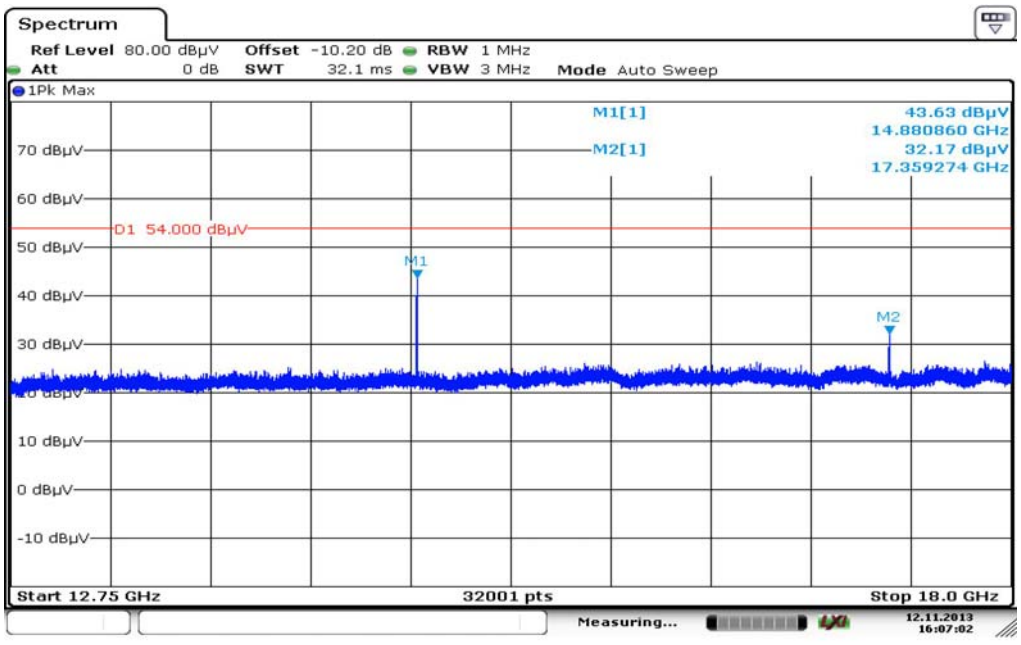
Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
40.082850	11.0	1000.0	120.000	104.0	V	190.0	13.4	19.0	30.0	
44.414850	9.9	1000.0	120.000	170.0	H	171.0	13.3	20.1	30.0	
48.989250	10.1	1000.0	120.000	105.0	V	100.0	13.4	19.9	30.0	
641.422350	18.5	1000.0	120.000	170.0	V	10.0	21.1	17.5	36.0	
714.820950	20.3	1000.0	120.000	98.0	V	280.0	22.8	15.7	36.0	
940.139250	22.7	1000.0	120.000	111.0	V	92.0	25.3	13.3	36.0	

Plot 10: 1 GHz to 12.75 GHz, GFSK, channel 78, vertical & horizontal polarization

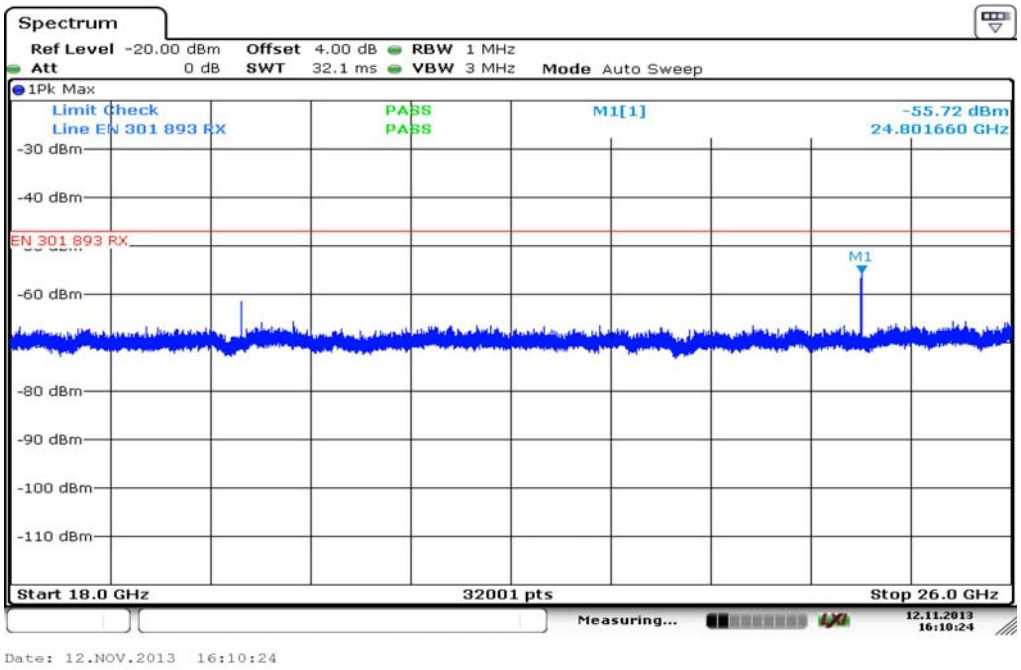


The carrier signal is notched with a 2.4 GHz band rejection filter.

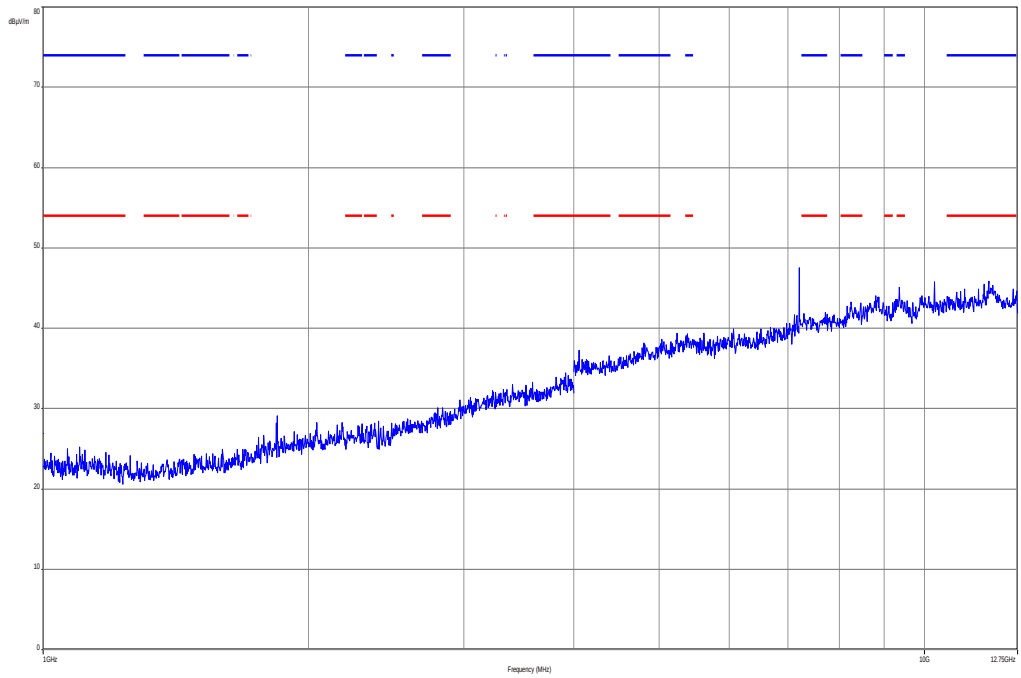
Plot 11: 12.75 GHz to 18 GHz, GFSK, channel 78, vertical & horizontal polarization



Plot 12: 18 GHz to 26 GHz, GFSK, channel 78, vertical & horizontal polarization

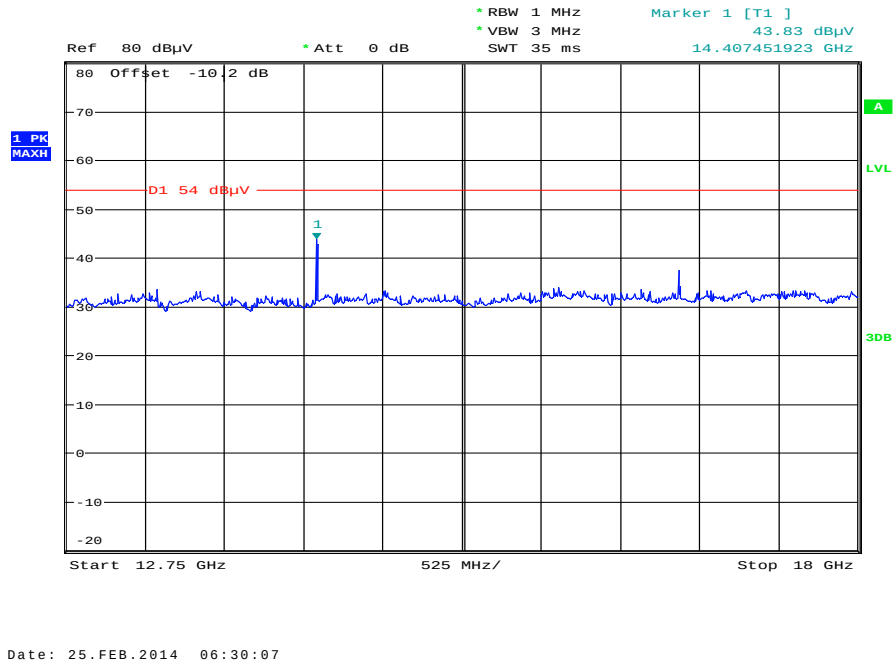


Plot 13: 1 GHz to 12.75 GHz, Pi/4 DQPSK, channel 00, vertical & horizontal polarization



The carrier signal is notched with a 2.4 GHz band rejection filter.

Plot 14: 12.75 GHz to 18 GHz, Pi/4 DQPSK, channel 00, vertical & horizontal polarization



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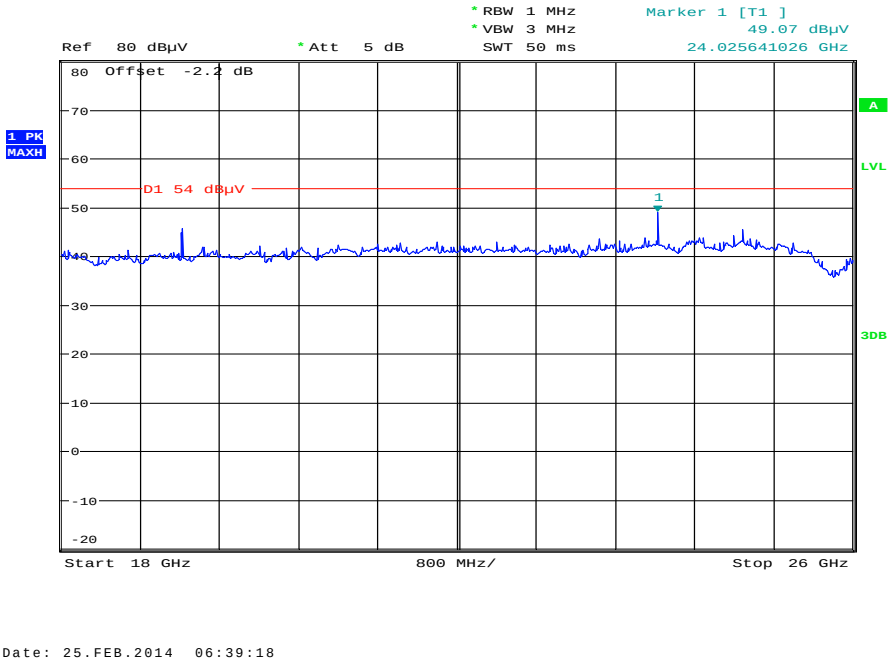
Plot 15: 18 GHz to 26 GHz, Pi/4 DQPSK, channel 00, vertical & horizontal polarization



Plot 16: 30 MHz to 1 GHz, Pi/4 DQPSK, channel 39, vertical & horizontal polarization

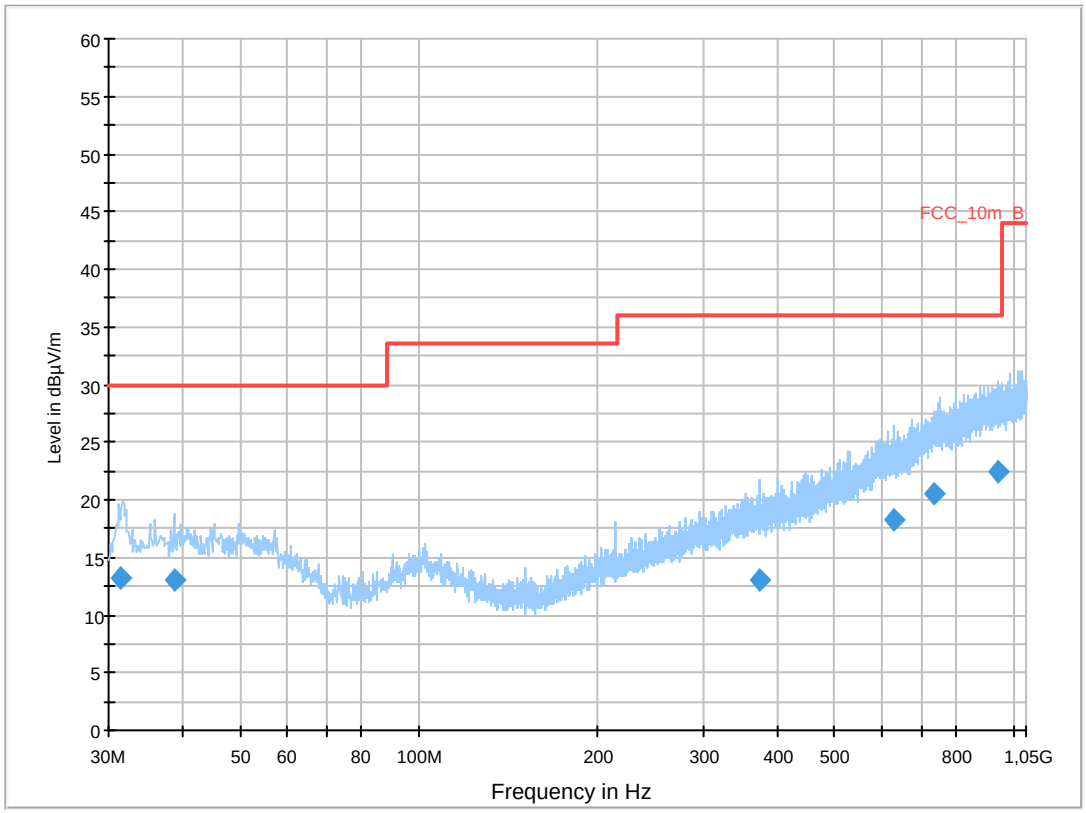
Common Information

EUT:	DTI 2
Serial Number:	
Test Description:	FCC part 15 class B
Operating Conditions:	EDR2 tx @2441 MHz
Operator Name:	Wolsdorfer
Comment:	battery powered

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup:	Electric Field (NOS)
Receiver:	[ESCI 3]
Level Unit:	dBµV/m

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
31.493550	13.2	1000.0	120.000	200.0	V	316.0	12.7	16.8	30.0	
38.701350	13.1	1000.0	120.000	134.0	V	290.0	13.3	16.9	30.0	
374.720400	13.0	1000.0	120.000	380.0	H	46.0	16.5	23.0	36.0	
630.813150	18.2	1000.0	120.000	176.0	H	206.0	21.0	17.8	36.0	
733.973400	20.6	1000.0	120.000	335.0	V	180.0	23.3	15.4	36.0	
940.653450	22.4	1000.0	120.000	400.0	V	161.0	25.3	13.6	36.0	

Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

Subrange 1

Frequency Range:	30 MHz - 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.42
Signal Path:	without Notch FW 1.0
Antenna:	VULB 9163 SN 9163-295, FW --- Correction Table (vertical): VULP6113 Correction Table (horizontal): VULP6113 Correction Table (vertical): Cable_EN_1GHz (1005) Correction Table (horizontal): Cable_EN_1GHz (1005)
Antenna Tower:	Tower [EMCO 2090 Antenna Tower] @ GPIB0 (ADR 8), FW REV 3.12
Turntable:	Turntable [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.12

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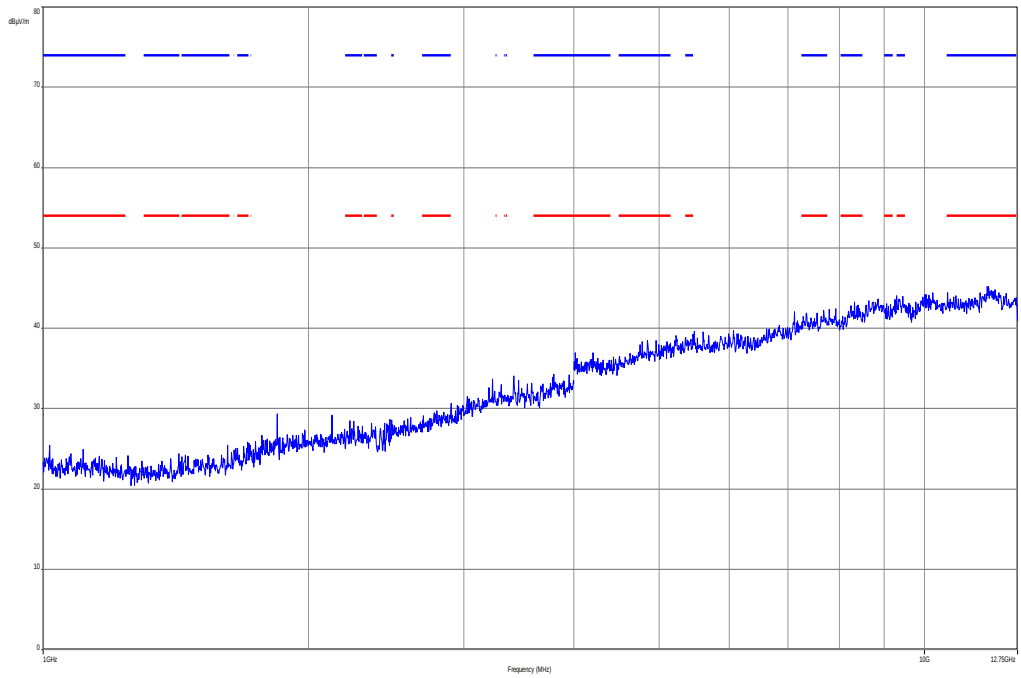
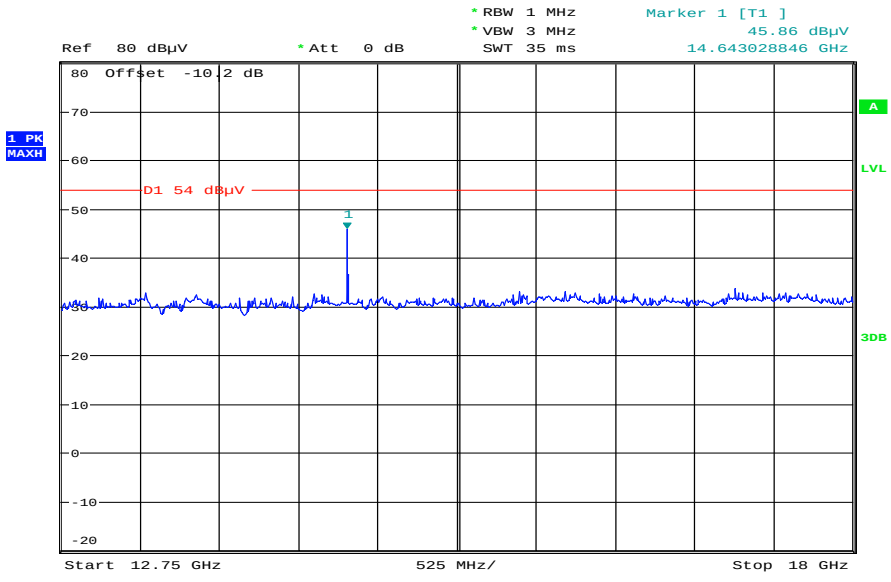
Plot 17: 1 GHz to 12.75 GHz, Pi/4 DQPSK, channel 39, vertical & horizontal polarization



The carrier signal is notched with a 2.4 GHz band rejection filter.

Plot 18: 12.75 GHz to 18 GHz, Pi/4 DQPSK, channel 39, vertical & horizontal polarization



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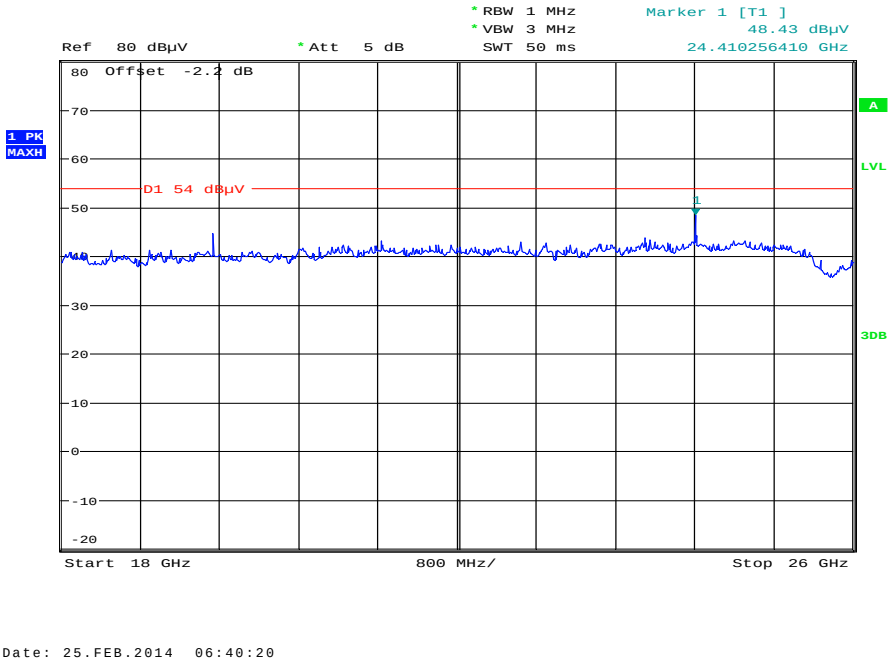
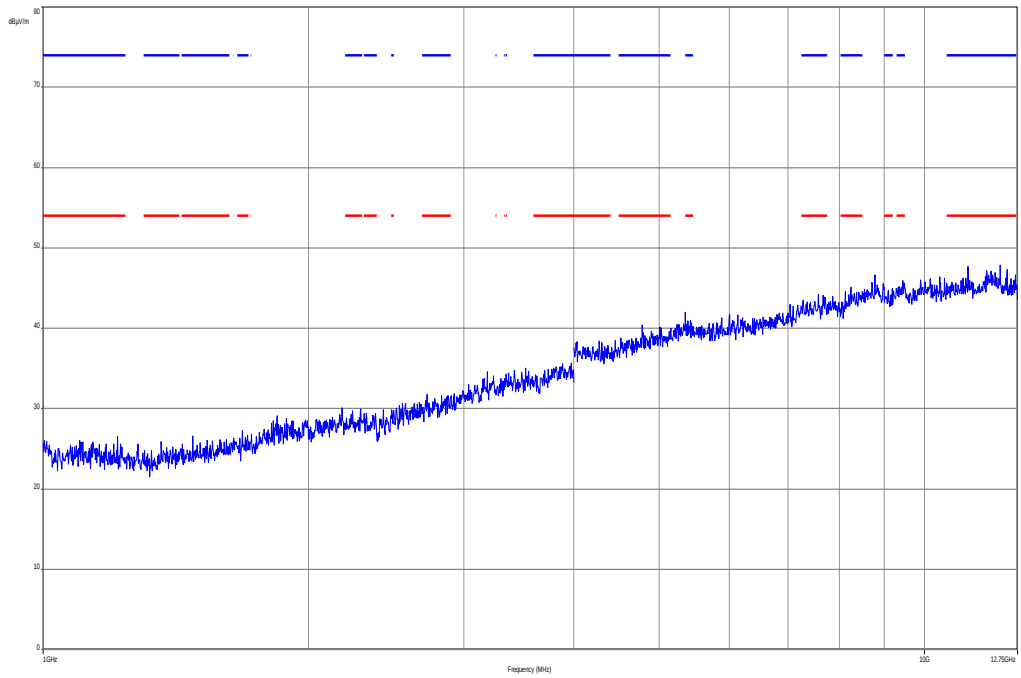
Plot 19: 18 GHz to 26 GHz, Pi/4 DQPSK, channel 39, vertical & horizontal polarization

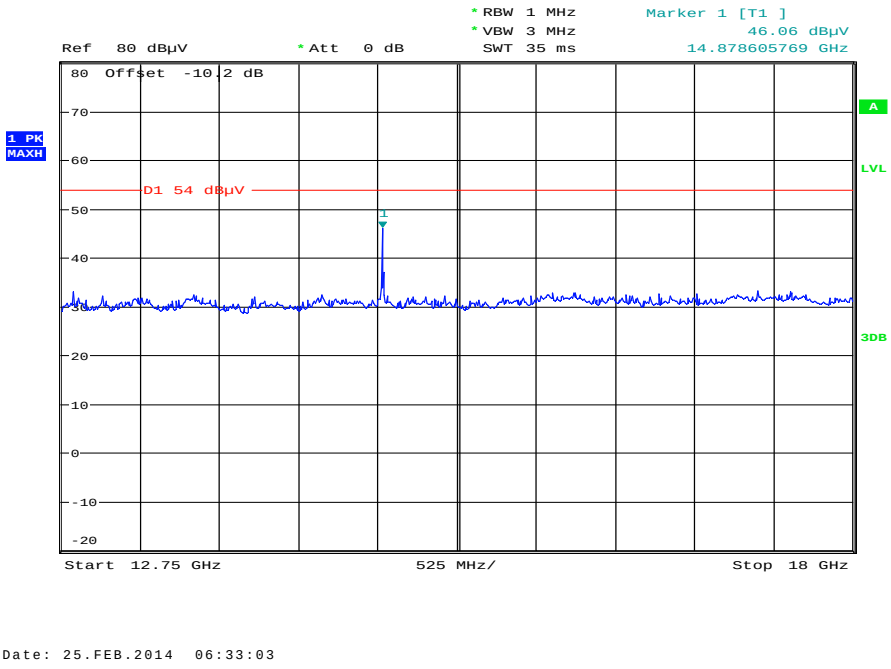


Plot 20: 1 GHz to 12.75 GHz, Pi/4 DQPSK, channel 78, vertical & horizontal polarization



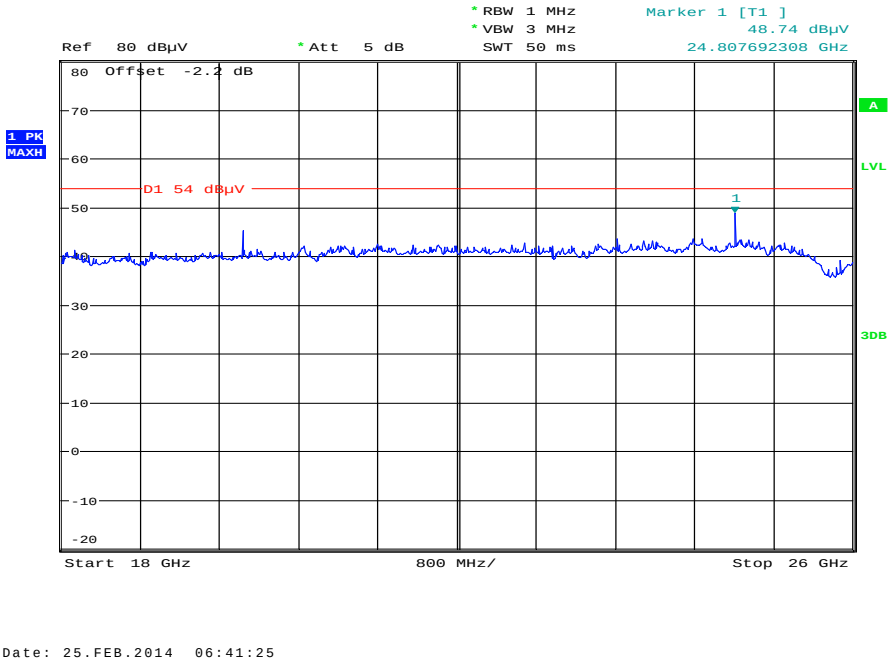
The carrier signal is notched with a 2.4 GHz band rejection filter.

Plot 21: 12.75 GHz to 18 GHz, Pi/4 DQPSK, channel 78, vertical & horizontal polarization

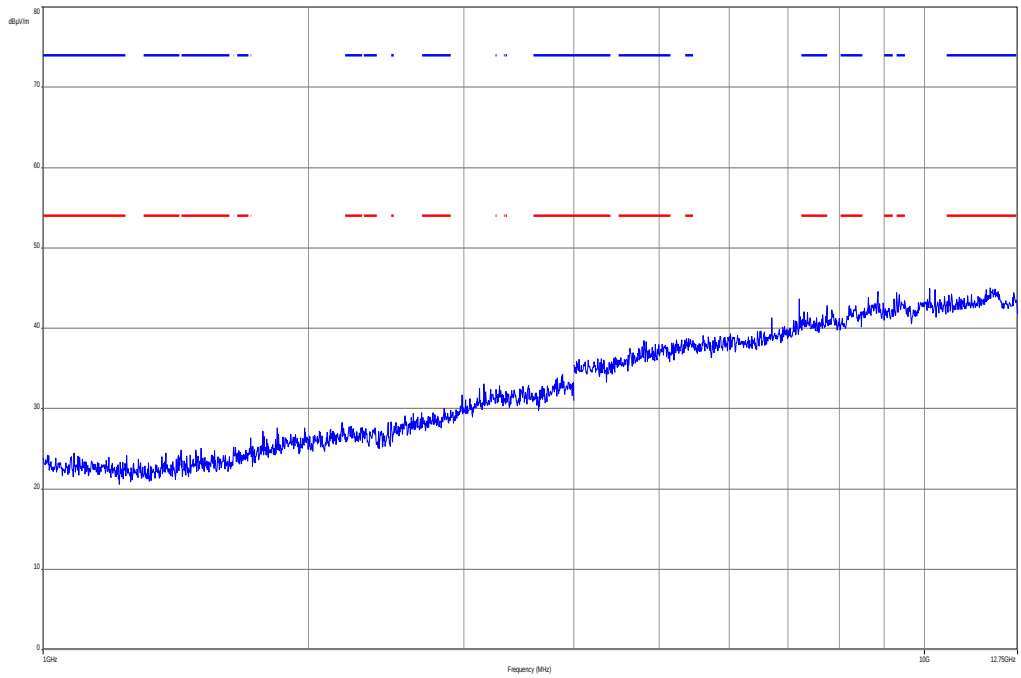


Date: 25.FEB.2014 06:33:03

Plot 22: 18 GHz to 26 GHz, Pi/4 DQPSK, channel 78, vertical & horizontal polarization

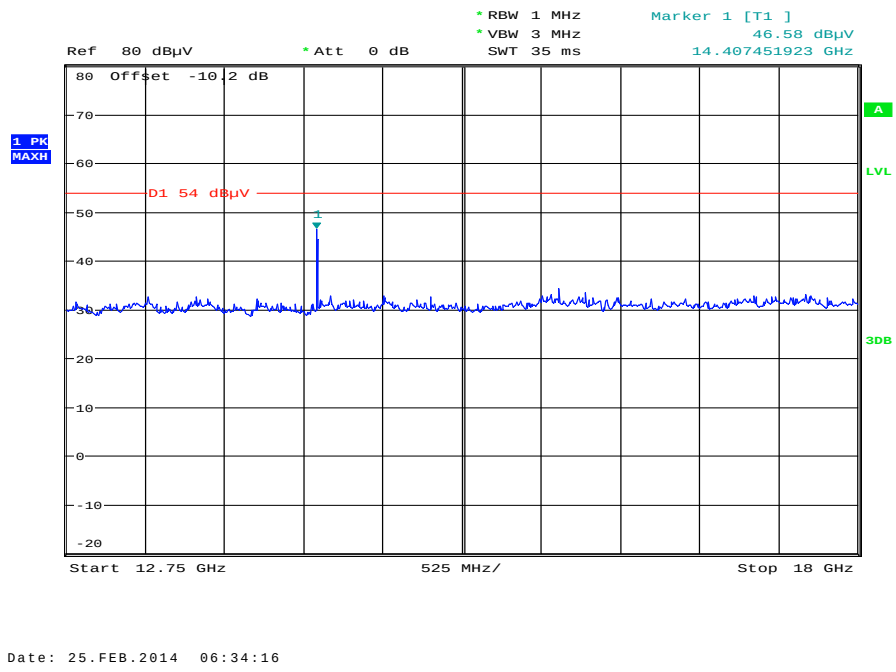


Plot 23: 1 GHz to 12.75 GHz, 8 DPSK, channel 00, vertical & horizontal polarization

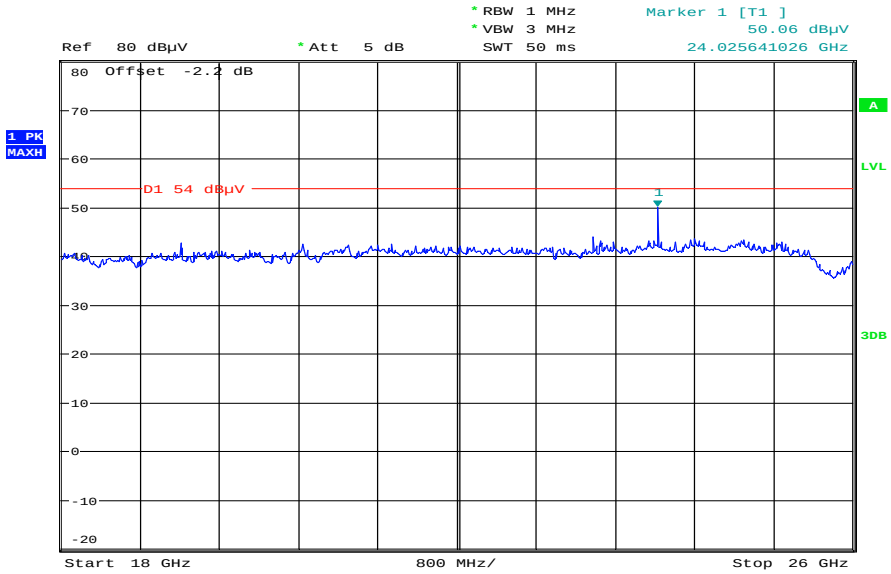


The carrier signal is notched with a 2.4 GHz band rejection filter.

Plot 24: 12.75 GHz to 18 GHz, 8 DPSK, channel 00, vertical & horizontal polarization



Plot 25: 18 GHz to 26 GHz, 8 DPSK, channel 00, vertical & horizontal polarization



Plot 26: 30 MHz to 1 GHz, 8 DPSK, channel 39, vertical & horizontal polarization

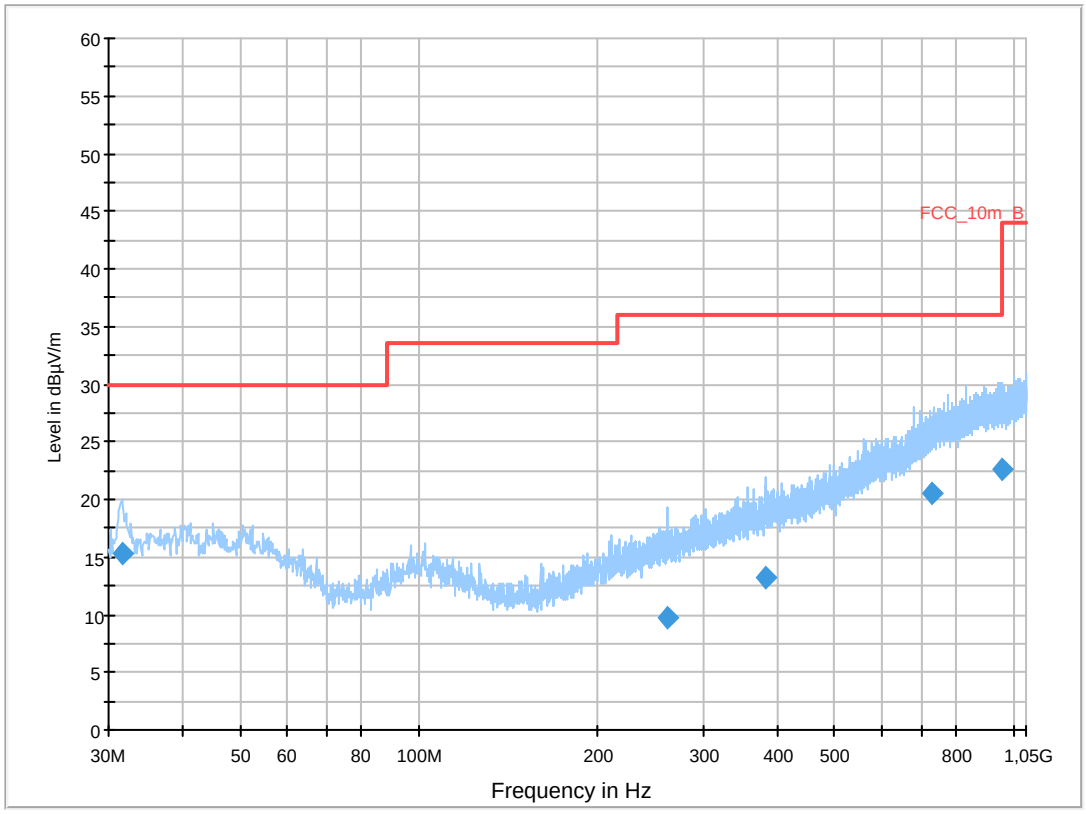
Common Information

EUT:	DTI 2
Serial Number:	812235724302
Test Description:	FCC part 15 class B
Operating Conditions:	EDR3 tx @2441 MHz
Operator Name:	Wolsdorfer
Comment:	battery powered

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup:	Electric Field (NOS)
Receiver:	[ESCI 3]
Level Unit:	dBµV/m

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
31.637100	15.3	1000.0	120.000	362.0	V	257.0	12.7	14.7	30.0	
260.660250	9.7	1000.0	120.000	200.0	V	342.0	13.6	26.3	36.0	
382.783050	13.2	1000.0	120.000	200.0	V	130.0	16.6	22.8	36.0	
731.398500	20.5	1000.0	120.000	123.0	H	38.0	23.2	15.5	36.0	
959.597400	22.5	1000.0	120.000	200.0	H	214.0	25.4	13.5	36.0	

Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

Subrange 1

Frequency Range:	30 MHz - 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.42
Signal Path:	without Notch FW 1.0
Antenna:	VULB 9163 SN 9163-295, FW --- Correction Table (vertical): VULP6113 Correction Table (horizontal): VULP6113 Correction Table (vertical): Cable_EN_1GHz (1005) Correction Table (horizontal): Cable_EN_1GHz (1005)
Antenna Tower:	Tower [EMCO 2090 Antenna Tower] @ GPIB0 (ADR 8), FW REV 3.12
Turntable:	Turntable [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.12

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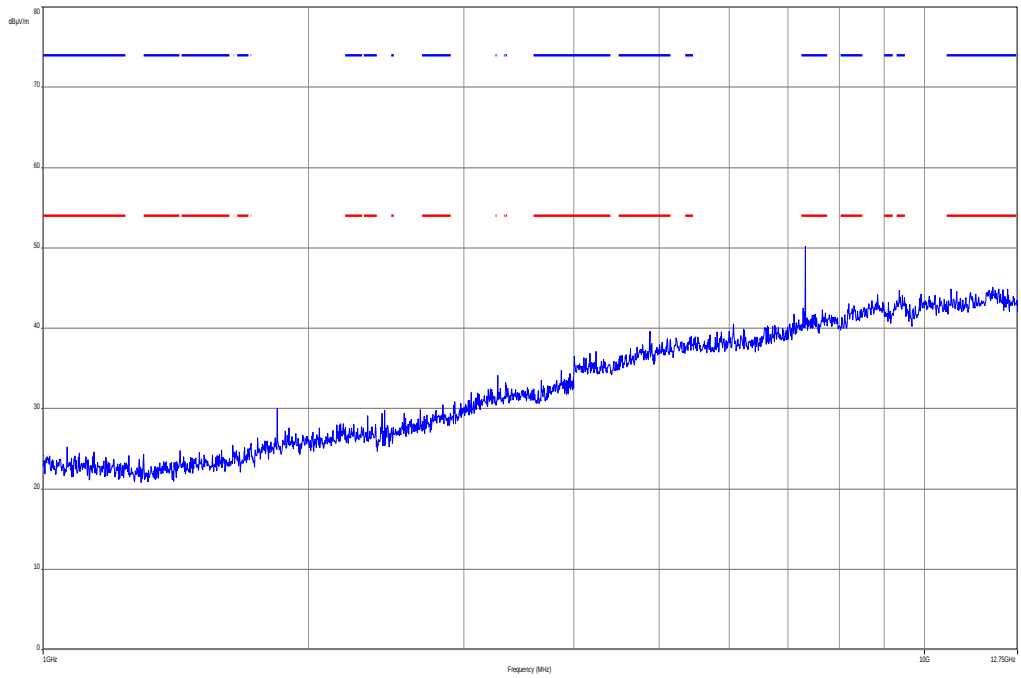
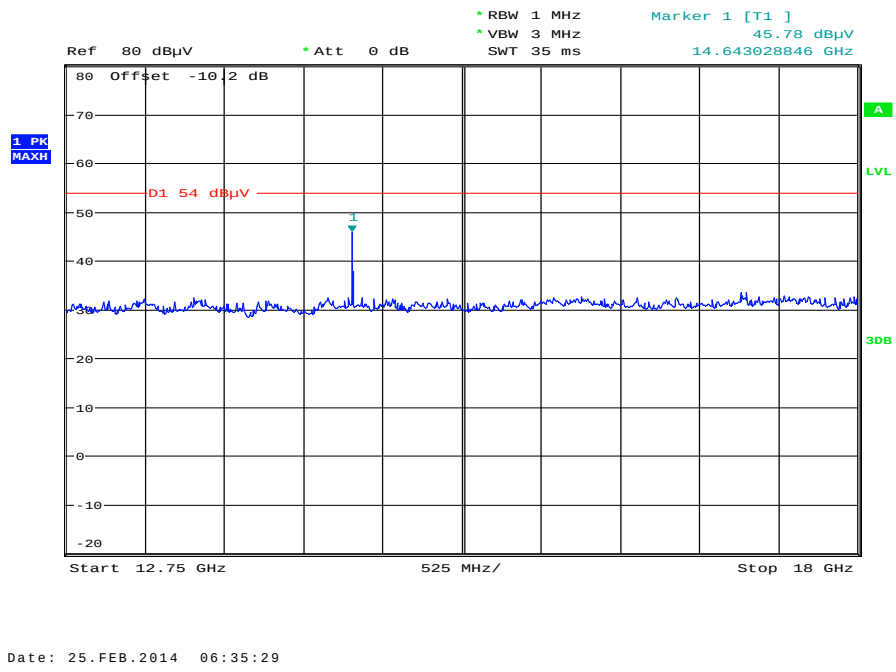
Plot 27: 1 GHz to 12.75 GHz, 8 DPSK, channel 39, vertical & horizontal polarization

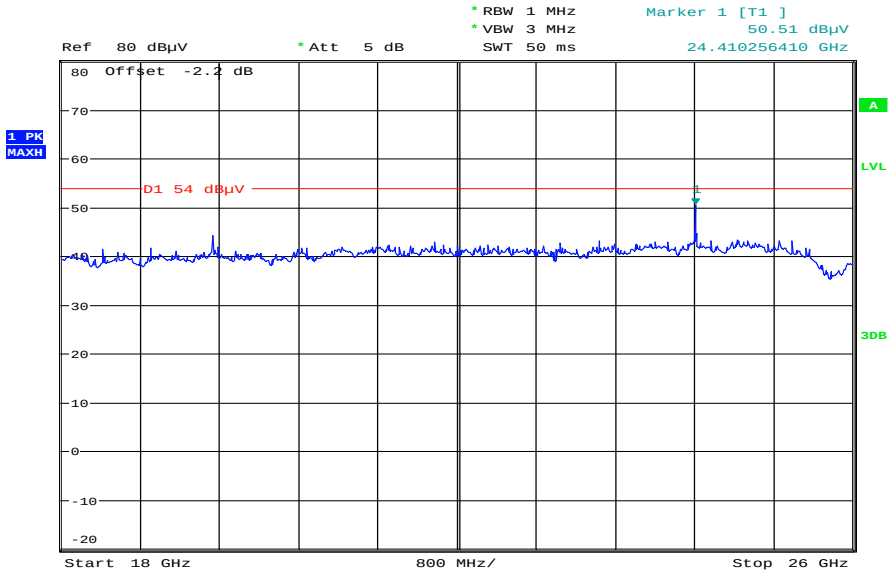


The carrier signal is notched with a 2.4 GHz band rejection filter.

Plot 28: 12.75 GHz to 18 GHz, 8 DPSK, channel 39, vertical & horizontal polarization



Plot 29: 18 GHz to 26 GHz, 8 DPSK, channel 39, vertical & horizontal polarization



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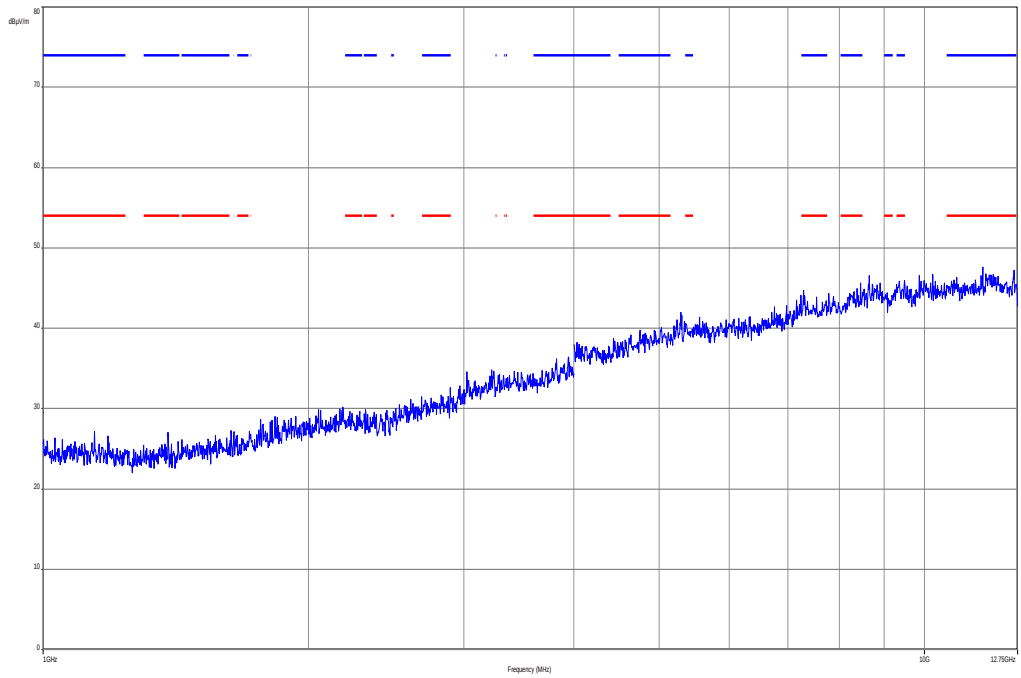
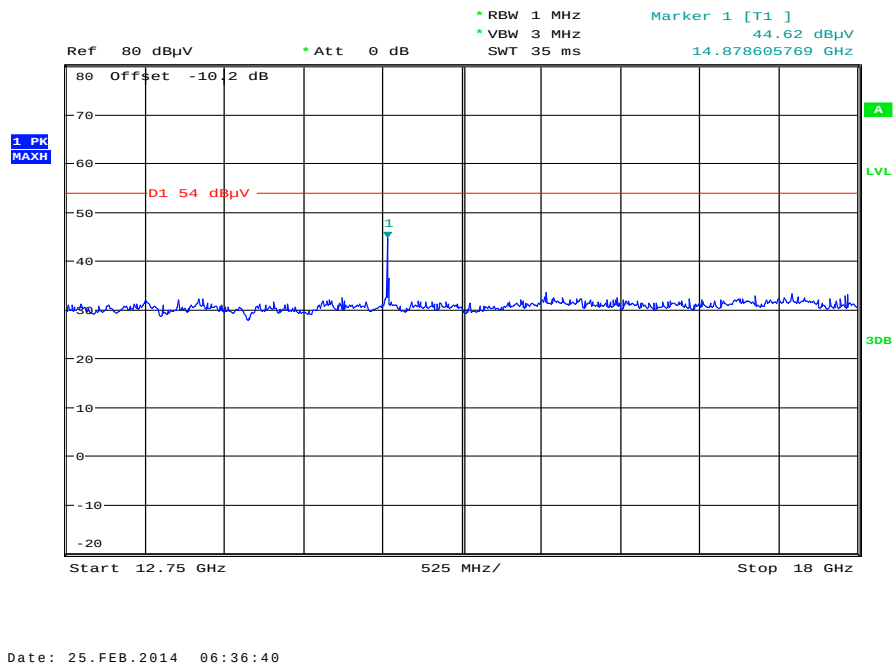
Plot 30: 1 GHz to 12.75 GHz, 8 DPSK, channel 78, vertical & horizontal polarization



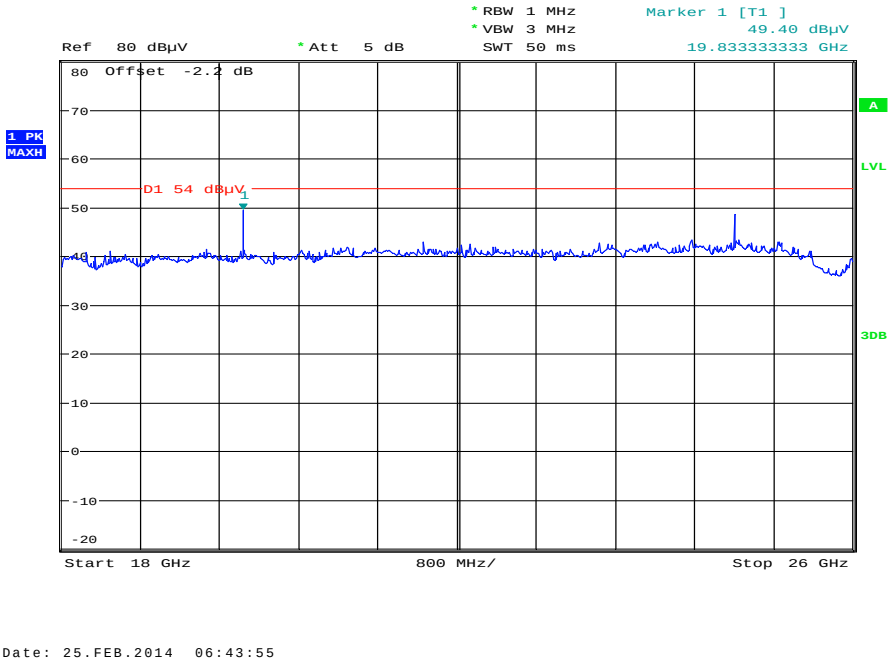
The carrier signal is notched with a 2.4 GHz band rejection filter.

Plot 31: 12.75 GHz to 18 GHz, 8 DPSK, channel 78, vertical & horizontal polarization



Date: 25.FEB.2014 06:36:40

Plot 32: 18 GHz to 26 GHz, 8 DPSK, channel 78, vertical & horizontal polarization



9.12 RX spurious emissions radiated

Not performed!

9.13 Spurious emissions radiated < 30 MHz

Description:

Measurement of the radiated spurious emissions in transmit mode below 30 MHz. The EUT is set to single channel mode and the transmit channel is channel 39. This measurement is representative for all channels and modes. If critical peaks are found channel 00 and channel 78 will be measured too. The measurement is performed in the mode with the highest output power. The limits are recalculated to a measurement distance of 3 m with 40 dB/decade according CFR Part 2.

Measurement:

Measurement parameter	
Detector:	Peak / Quasi peak
Sweep time:	Auto
Video bandwidth:	F < 150 kHz: 200 Hz F > 150 kHz: 9 kHz
Resolution bandwidth:	F < 150 kHz: 1 kHz F > 150 kHz: 100 kHz
Span:	9 kHz to 30 MHz
Trace-Mode:	Max Hold

Limits:

FCC		IC
TX spurious emissions radiated < 30 MHz		
Frequency (MHz)	Field strength (dBµV/m)	Measurement distance
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30

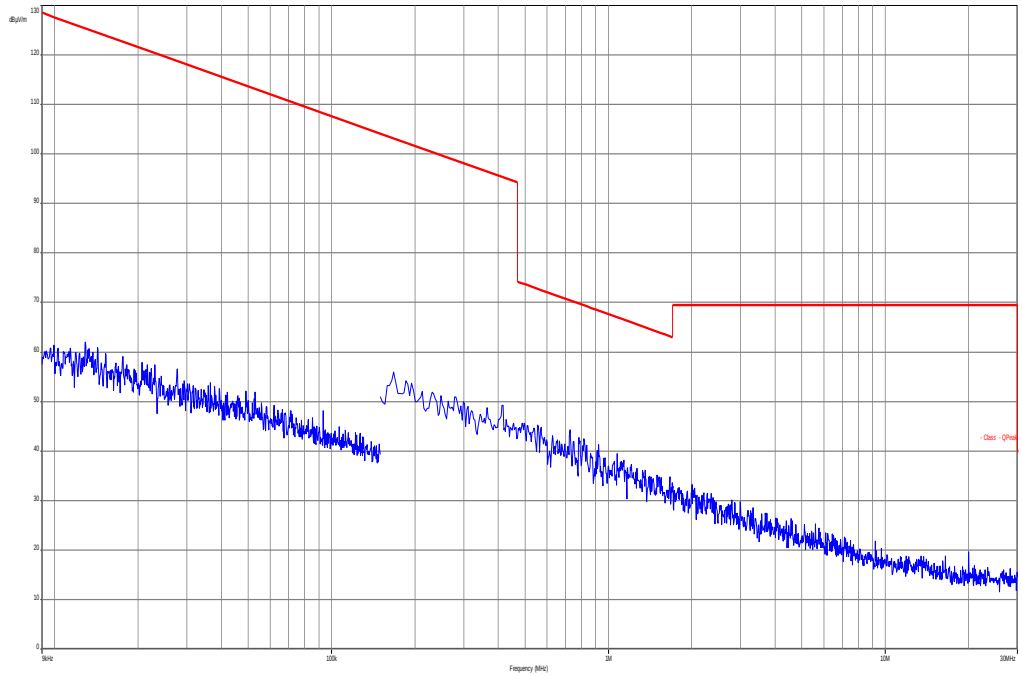
Results:

TX spurious emissions radiated < 30 MHz [dBµV/m]		
F [MHz]	Detector	Level [dBµV/m]
No critical peaks detected		
Measurement uncertainty	± 3 dB	

Result: Passed

Plots:

Plot 1: 9 kHz to 30 MHz, TX mode



9.14 Spurious emissions conducted < 30 MHz

Not performed!

10 Test equipment and ancillaries used for tests

Typically, the calibrations of the test apparatus are commissioned to and performed by an accredited calibration laboratory. The calibration intervals are determined in accordance with the DIN EN ISO/IEC 17025. In addition to the external calibrations, the laboratory executes comparison measurements with other calibrated test systems or effective verifications. Weekly chamber inspections and range calibrations are performed. Where possible, rf-generating and signalling equipment as well as measuring receivers and analyzers are connected to an external high-precision 10 MHz reference (GPS-based or rubidium frequency standard).

In order to simplify the identification of the equipment used at some special tests, some items of test equipment and ancillaries can be provided with an identifier or number in the equipment list below (Labor/Item).

No.	Lab / Item	Equipment	Type	Manufact.	Serial No.	INV. No Cetecom	Kind of Calibration	Last Calibration	Next Calibration
1	n. a.	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032	vlKI!	08.05.2013	08.05.2015
2	n. a.	Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996	ev		
3	n. a.	Switch / Control Unit	3488A	HP Meßtechnik	*	300000199	ne		
4	n. a.	Switch / Control Unit	3488A	HP Meßtechnik	2719A15013	300001156	ne		
5	n. a.	Three-Way Power Splitter, 50 Ohm	11850C	HP Meßtechnik		300000997	ne		
6	90	Active Loop Antenna 10 kHz to 30 MHz	6502	Kontron Psychotech	8905-2342	300000256	k	13.06.2013	13.06.2015
7	n. a.	Amplifier	js42-00502650-28-5a	Parzich GMBH	928979	300003143	ne		
8	n. a.	Band Reject filter	WRCG2400/2483-2375/2505-50/10SS	Wainwright	11	300003351	ev		
9	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	371	300003854	vlKI!	14.10.2011	14.10.2014
10	n. a.	MXE EMI Receiver 20 Hz bis 26,5 GHz	N9038A	Agilent Technologies	MY51210197	300004405	k	21.02.2013	21.02.2014
11	11b	Microwave System Amplifier, 0.5-26.5 GHz	83017A	HP Meßtechnik	00419	300002268	ev		
12	A026	Std. Gain Horn Antenna 12.4 to 18.0 GHz	639	Narda	8402	300000787	k	22.07.2013	22.07.2015
13	A029	Std. Gain Horn Antenna 18.0 to 26.5 GHz	638	Narda		300002442	k	19.07.2013	19.07.2015
14	n. a.	Signal Analyzer 40 GHz	FSV40	R&S	101042	300004517	k	22.10.2012	22.01.2014
15	n. a.	Temperature Test Chamber	VT 4002	Heraeus Voetsch	521/83761	300002326	Ve	26.09.2013	26.09.2015
16	n. a.	PC-WLAN Tester	Intel Core i3 3220/3,3 GHz, Prozessor		2V2403033A4523	300004589	ne		
17	n. a.	Teststand	Teststand Custom Sequence Editor	National Instruments GmbH		300004590	ne		
18	n. a.	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	9005-3440	300002190			
19	n. a.	Netztgerät 0-20V	6632A	HP Meßtechnik	2851A01814	300000924	k	09.11.2005	
20	n. a.	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO Elektronik	9709-5290	300000212	k	23.07.2013	23.07.2015

21	n. a.	Universal Communication Tester	CMU200	R&S	106826	300003346	k	16.01.2013	16.01.2014
22	n. a.	Software Option für CMU 200	CMU-Kxx	R&S		300003345	ne		
23	n. a.	Ultra Stable Notch Filter	WRCD1887.82/1889.55-5EE	Wainwright	1	300000115	ne		
24	n. a.	Funkstörmessempfänger 20Hz-26,5GHz	ESU26	R&S	100037	300003555	k	10.01.2013	10.01.2014
25	n. a.	HF-Schaltmatrixgrundgerät	TS-RSP 1144.1500 K03	R&S	100300	300003556	ev		
26	n. a.	Spiral Antenne	3102L	EMCO	51924	300003385	ne	21.11.2005	
27	n. a.	Signalgenerator 1-20 GHz	SMR20	R&S	101697/020	300003593	k	03.01.2012	03.01.2014
28	n. a.	Turnable Band Reject	WRCT1850/2170-5/40-10EEK	Wainwright	7	300003386	ev		
29	n. a.	Software Option für CMU 200	CMU-K62	R&S	103288	300003600	ne	12.01.2011	
30	n. a.	Software Option für CMU 200	CMU-K61	R&S	103354	300003612			
31	n. a.	Software Option für CMU 200	CMU-K64	R&S	102017	300003613			
32	n. a.	Software Option für CMU 200	CMU-K56	R&S	100251	300003614			
33	n. a.	Tunable Band Reject	WRCT1850/2170-5/40-10EEK	Wainwright	40	300003872	ev		
34	n. a.	Tunable Band Reject	WRCT824/894-5/40-8EEK	Wainwright	27	300003873	ev		

Agenda: Kind of Calibration

k	calibration / calibrated	EK	limited calibration
ne	not required (k, ev, izw, zw not required)	zw	cyclical maintenance (external cyclical maintenance)
ev	periodic self verification	izw	internal cyclical maintenance
Ve	long-term stability recognized	g	blocked for accredited testing
vlkI!	Attention: extended calibration interval		
NK!	Attention: not calibrated	*)	next calibration ordered / currently in progress

11 Observations

No observations exceeding those reported with the single test cases have been made.

Annex A Document history

Version	Applied changes	Date of release
1.0	Initial release	2013-11-18
-A	Changed FCC ID	2014-01-22
-B	Spurious emissions; BEC and EIRP remeasurements with EDR	2014-02-24

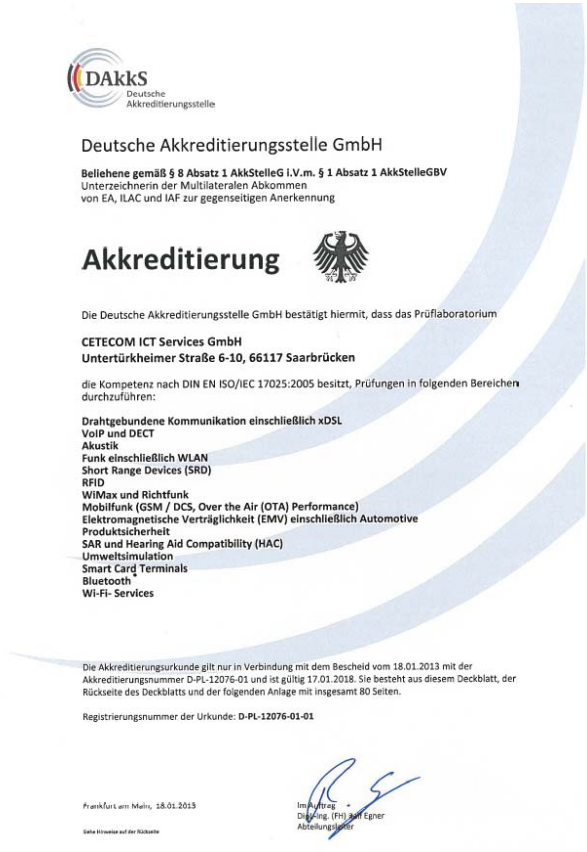
Annex B Further information

Glossary

AVG - Average
DUT - Device under test
EMC - Electromagnetic Compatibility
EN - European Standard
EUT - Equipment under test
ETSI - European Telecommunications Standard Institute
FCC - Federal Communication Commission
FCC ID - Company Identifier at FCC
HW - Hardware
IC - Industry Canada
Inv. No. - Inventory number
N/A - Not applicable
PP - Positive peak
QP - Quasi peak
S/N - Serial number
SW - Software

Annex C Accreditation Certificate

Front side of certificate



DAkkS Deutsche Akkreditierungsstelle

Deutsche Akkreditierungsstelle GmbH

Beliehene gemäß § 8 Absatz 1 AkkStelleG i.V.m. § 1 Absatz 1 AkkStelleGBV
Unterzeichnerin der Multilateralen Abkommen
von EA, ILAC und IAF zur gegenseitigen Anerkennung

Akkreditierung

Die Deutsche Akkreditierungsstelle GmbH bestätigt hiermit, dass das Prüflaboratorium

CETECOM ICT Services GmbH
Untertürkheimer Straße 6-10, 66117 Saarbrücken

die Kompetenz nach DIN EN ISO/IEC 17025:2005 besitzt, Prüfungen in folgenden Bereichen durchzuführen:

Drahtgebundene Kommunikation einschließlich xDSL
VoIP und DECT
Akustik
Funk einschließlich WLAN
Short Range Devices (SRD)
RFID
WiMax und Richtfunk
Mobilfunk (GSM / DCS, Over the Air (OTA) Performance)
Elektromagnetische Verträglichkeit (EMV) einschließlich Automotive
Produktsicherheit
SAR und Hearing Aid Compatibility (HAC)
Umweltsimulation
Smart Card Terminals
Bluetooth
Wi-Fi- Services

Die Akkreditierungsurkunde gilt nur in Verbindung mit dem Bescheid vom 18.01.2013 mit der Akkreditierungsnummer D-PL-12076-01 und ist gültig 17.01.2018. Sie besteht aus diesem Deckblatt, der Rückseite des Deckblatts und der folgenden Anlage mit insgesamt 80 Seiten.

Registrierungsnummer der Urkunde: **D-PL-12076-01-01**

Frankfurt am Main, 18.01.2013

Im Auftrag
Dipl.-Ing. (FH) Karl Egner
Abteilungsleiter

Siehe Hinweise auf der Rückseite

Back side of certificate

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Die Akkreditierung erfolgte gemäß des Gesetzes über die Akkreditierungsstelle (AkkStelleG) vom 31. Juli 2009 (BGBl. I S. 2625) sowie der Verordnung (EG) Nr. 765/2008 des Europäischen Parlaments und des Rates vom 9. Juli 2008 über die Vorschriften für die Akkreditierung und Marktüberwachung im Zusammenhang mit der Vermarktung von Produkten (Abl. L 218 vom 9. Juli 2008, S. 30).
Die DAkkS ist Unterzeichnerin der Multilateralen Abkommen zur gegenseitigen Anerkennung der European co-operation for Accreditation (EA), des International Accreditation Forum (IAF) und der International Laboratory Accreditation Cooperation (ILAC). Die Unterzeichner dieser Abkommen erkennen ihre Akkreditierungen gegenseitig an.

Der aktuelle Stand der Mitgliedschaft kann folgenden Webseiten entnommen werden:
EA: www.european-accreditation.org
ILAC: www.ilac.org
IAF: www.iaf.nu

Note:

The current certificate including annex is published on our website (see link below) or may be received from CETECOM ICT Services on request.

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