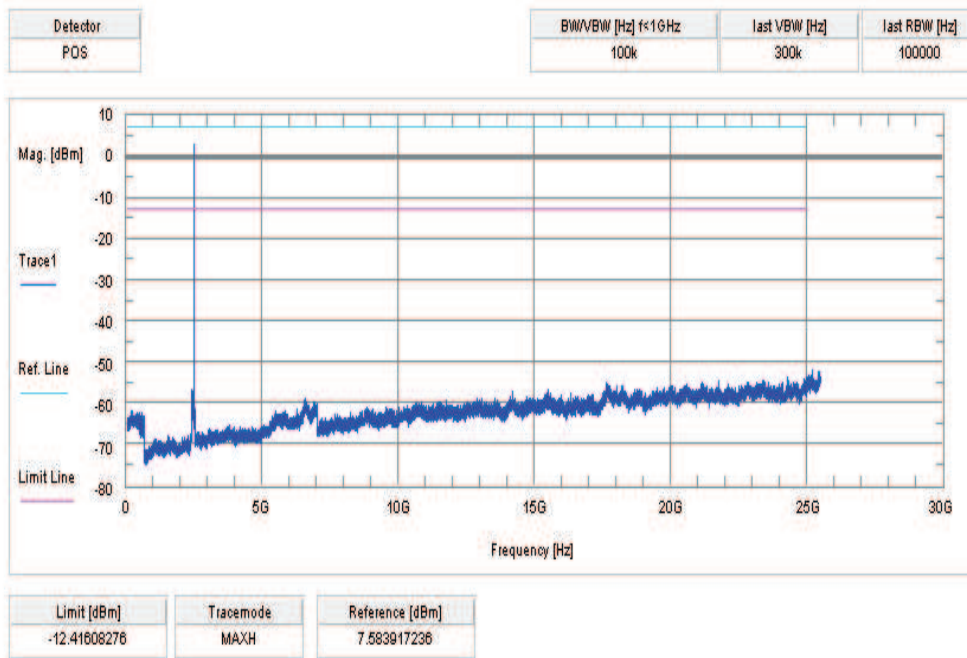
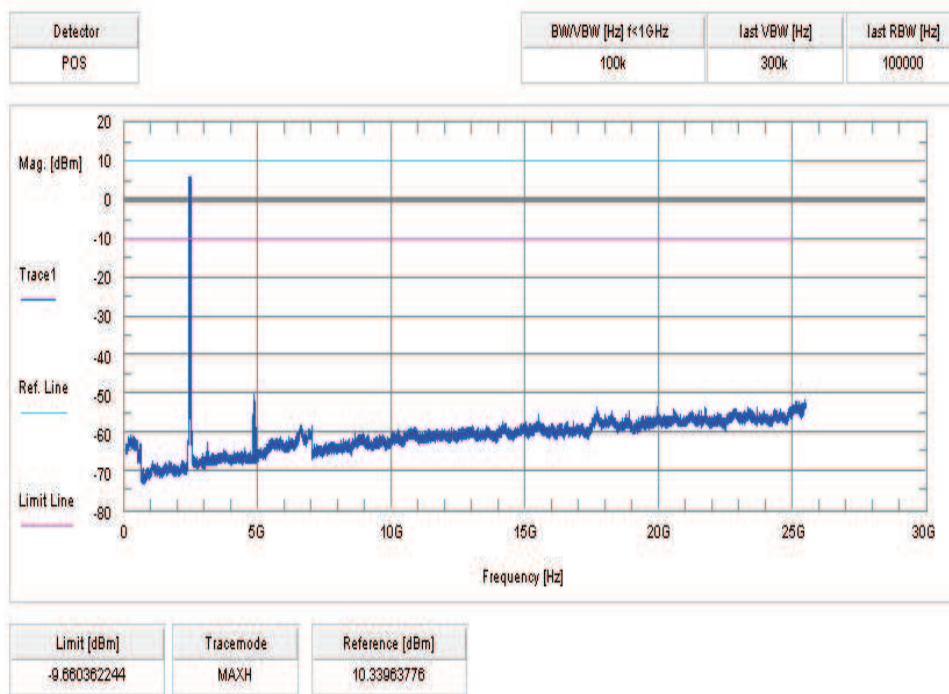


**Plot 9:** highest channel – 2480 MHz, 8 DPSK modulation

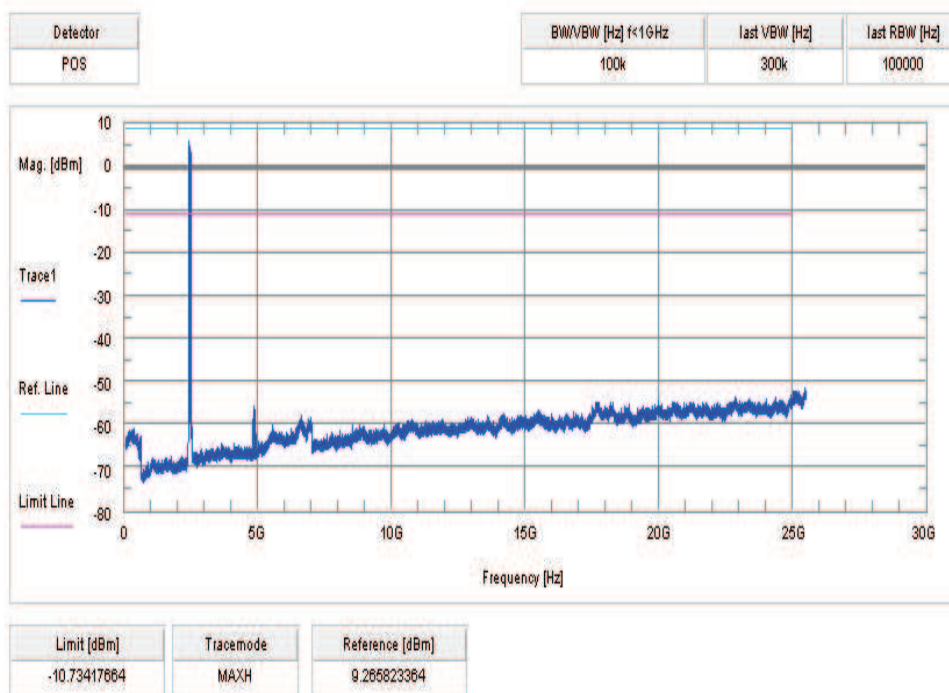


Additional measurements according to manufacturers test plan:

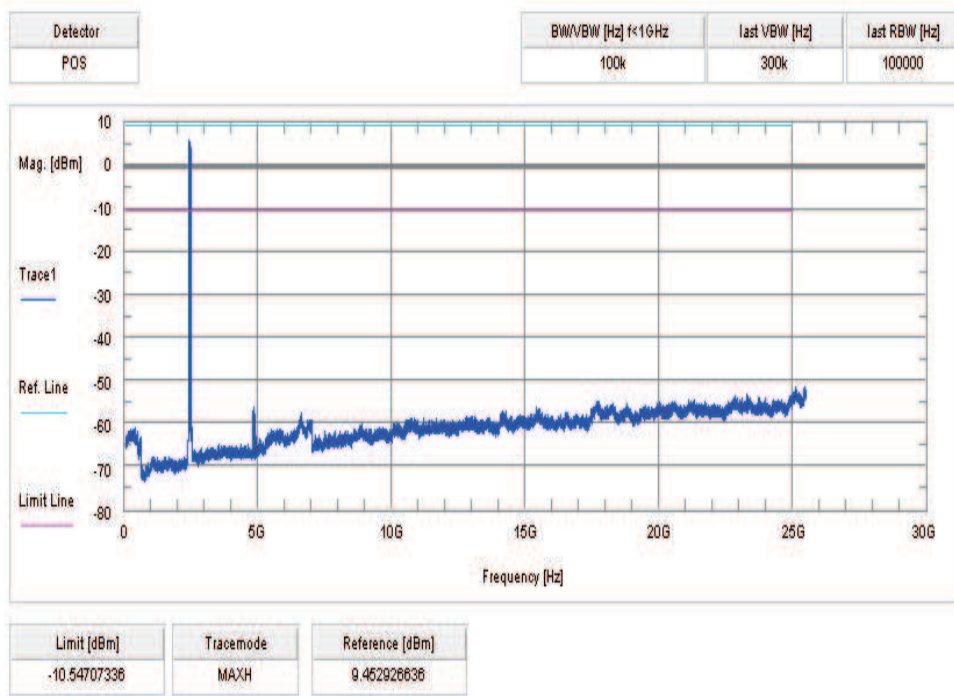
Plot 9: Hopping mode GFSK modulation



Plot 9: Hopping mode Pi/4 DQPSK modulation



Plot 9: Hopping mode 8 DPSK modulation



## 9.12 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:	<input checked="" type="checkbox"/> GFSK <input checked="" type="checkbox"/> Pi/4 DQPSK <input checked="" type="checkbox"/> 8DPSK

The modulation with the highest output power was used to perform the transmitter spurious emissions. If spurious were detected a re-measurement was performed on the detected frequency with each modulation.

### Limits:

FCC		IC	
TX spurious emissions radiated			
<p>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)).</p>			
§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]
No critical peaks detected			No critical peaks detected			No critical peaks detected		
Measurement uncertainty			± 3 dB					

**Result:** Passed

**Plots GFSK**

**Plot 1:** 30 MHz to 1 GHz, TX mode, channel 00, vertical & horizontal polarization

**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: 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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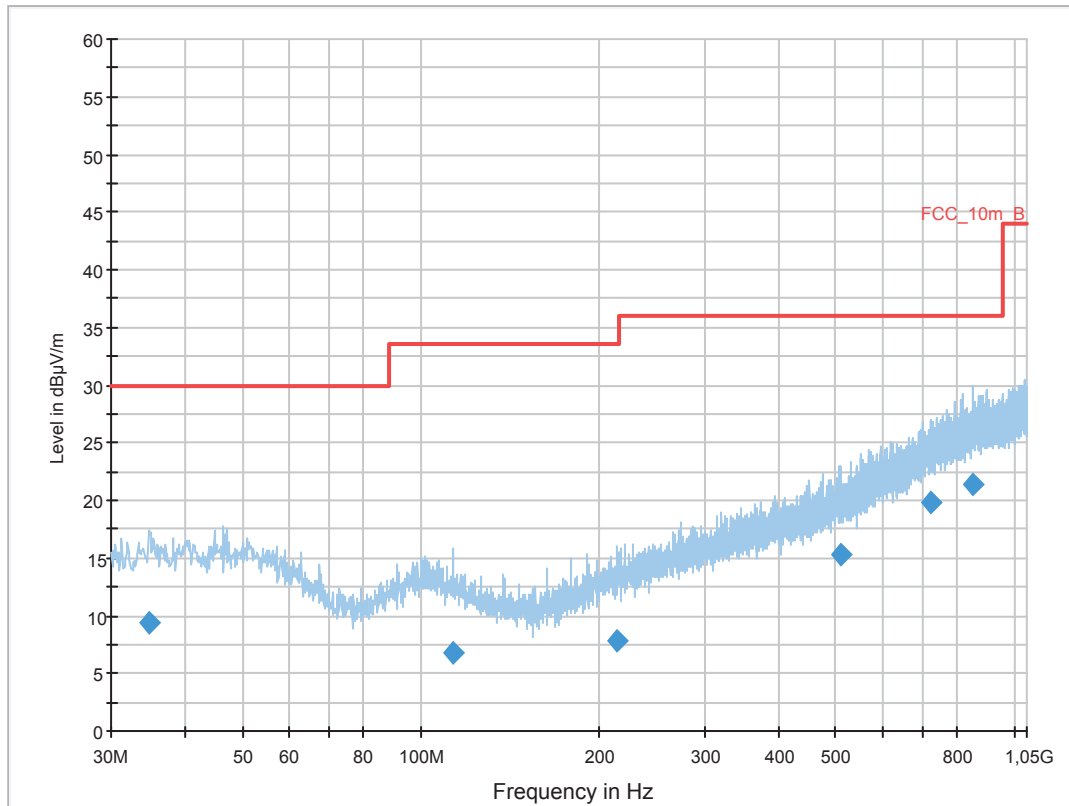
**Common Information**

EUT: RFM121LW  
 Serial Number: IMEI:990002430024636  
 Test Description: FCC part 15 C class B @ 10 m  
 Operating Conditions: BT DH5 TX CH0  
 Operator Name: Wolsdorfer  
 Comment: battery powered

**Scan Setup: STAN\_Fin [EMI radiated]**

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

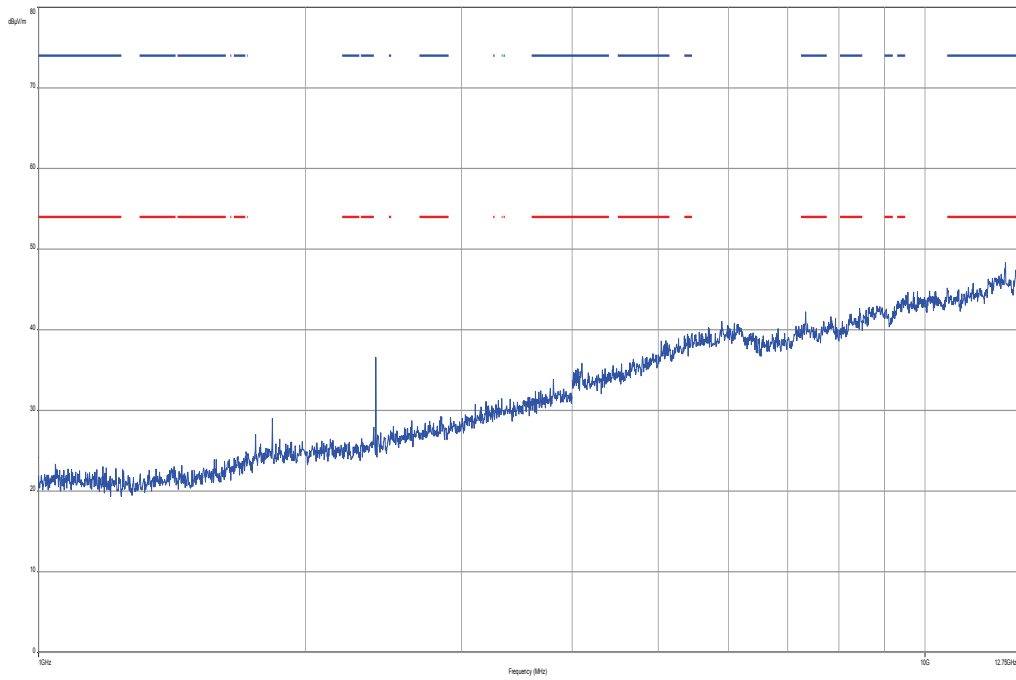
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



### 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
34.834350	9.5	1000.0	120.000	156.0	V	182.0	13.0	20.5	30.0	
113.118750	6.7	1000.0	120.000	170.0	V	190.0	10.8	26.8	33.5	
213.874050	7.8	1000.0	120.000	170.0	V	-2.0	12.2	25.7	33.5	
508.406700	15.2	1000.0	120.000	170.0	H	171.0	18.8	20.8	36.0	
723.818700	19.9	1000.0	120.000	105.0	V	280.0	23.1	16.1	36.0	
850.216050	21.4	1000.0	120.000	120.0	V	273.0	24.6	14.6	36.0	

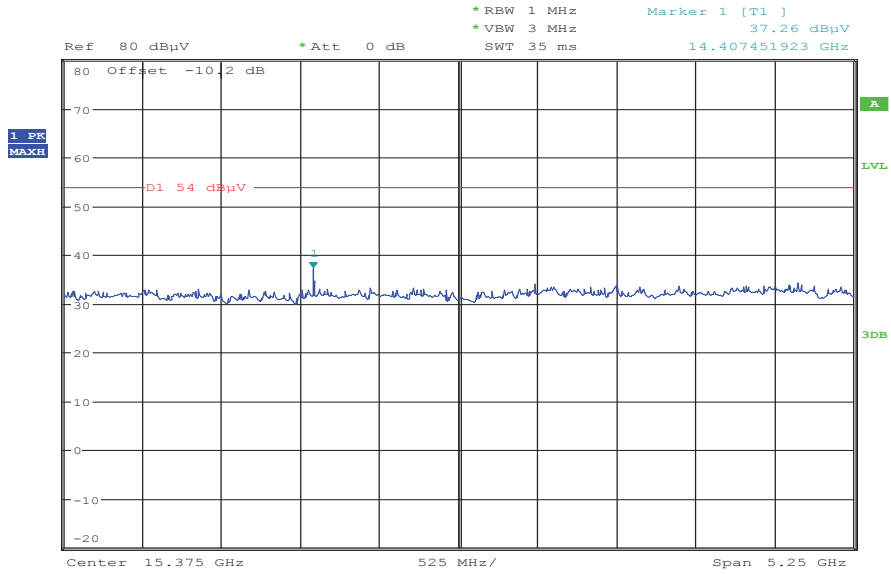
**Plot 2:** 1 GHz to 12.75 GHz, TX mode, channel 00, vertical & horizontal polarization



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

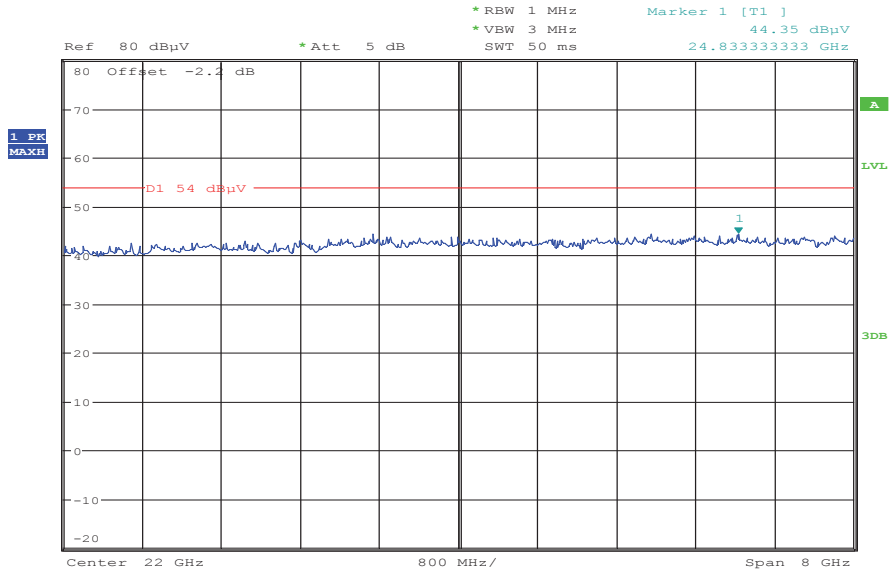


Plot 3: 12.75 GHz to 18 GHz, TX mode, channel 00, vertical & horizontal polarization



Date: 25.MAR.2013 08:14:40

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



Date: 25.MAR.2013 08:28:46

**Plot 5:** 30 MHz to 1 GHz, TX mode, channel 39, vertical & horizontal polarization

**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: 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

EMC 32 Version 8.52

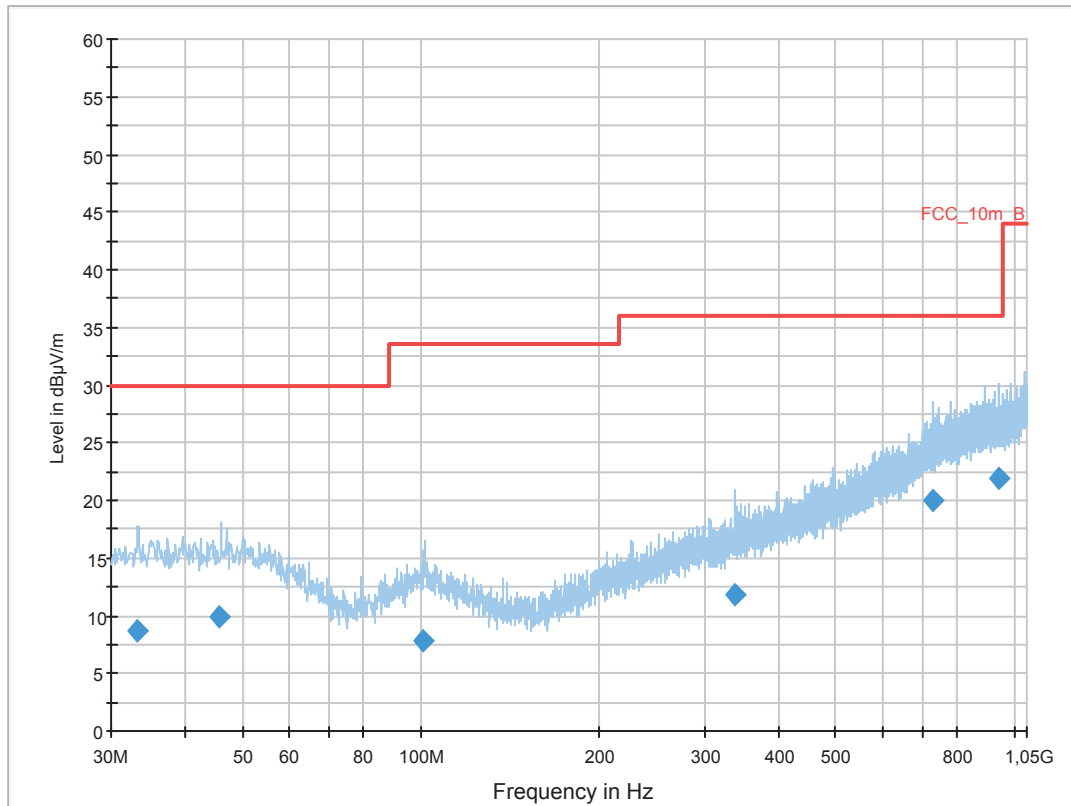
**Common Information**

EUT: RFM121LW  
 Serial Number: IMEI:990002430024636  
 Test Description: FCC part 15 C class B @ 10 m  
 Operating Conditions: BT DH5 TX CH39  
 Operator Name: Wolsdorfer  
 Comment: battery powered

**Scan Setup: STAN\_Fin [EMI radiated]**

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

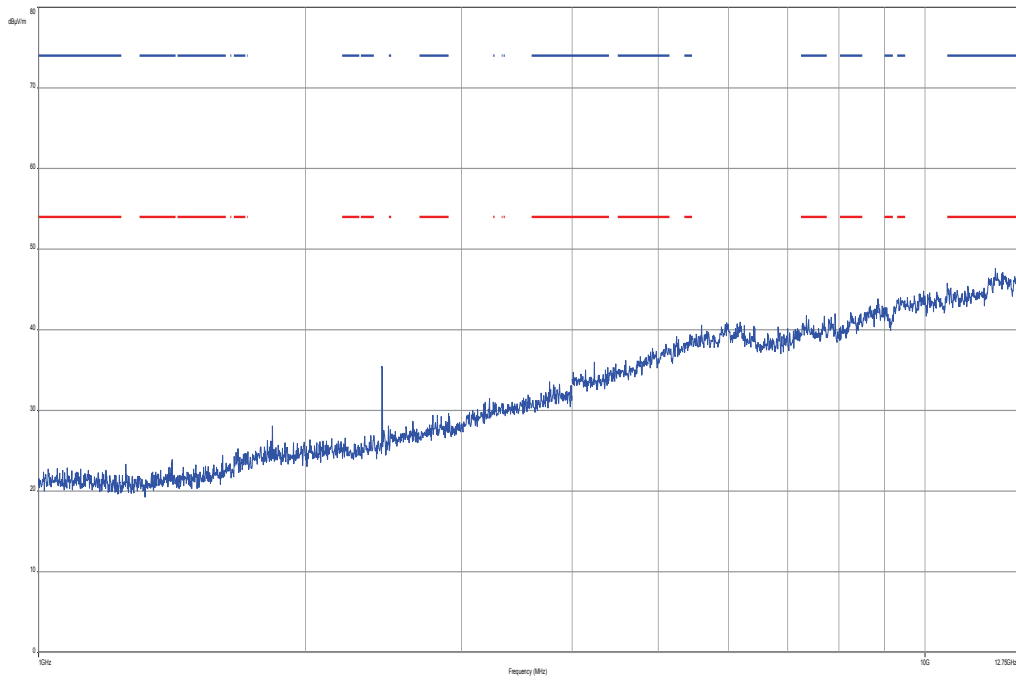
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



### Final Result 1

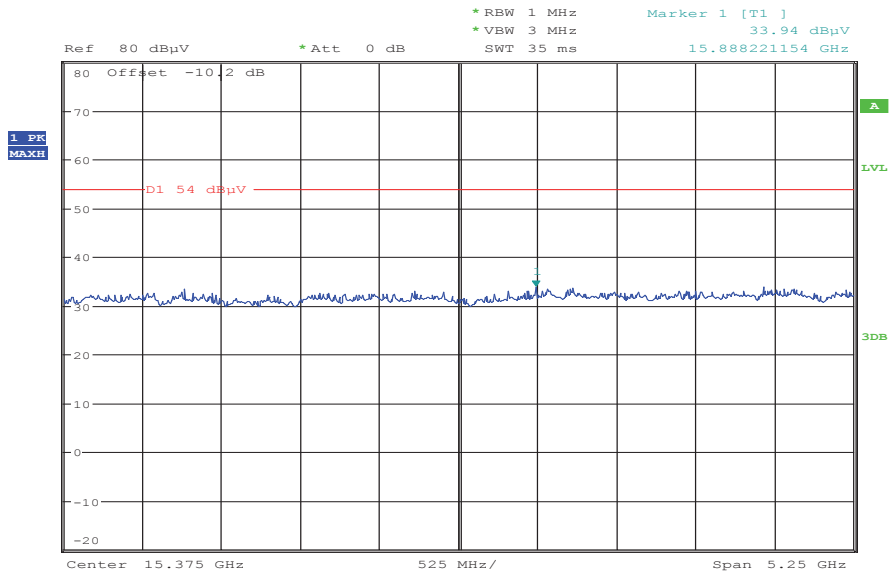
Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
33.075450	8.7	1000.0	120.000	170.0	H	190.0	12.8	21.3	30.0	
45.469950	9.8	1000.0	120.000	170.0	H	80.0	13.3	20.2	30.0	
100.736850	7.8	1000.0	120.000	170.0	V	100.0	11.8	25.7	33.5	
337.809600	11.8	1000.0	120.000	170.0	H	190.0	15.7	24.2	36.0	
730.808100	20.1	1000.0	120.000	98.0	H	100.0	23.2	15.9	36.0	
938.794050	21.9	1000.0	120.000	170.0	V	268.0	25.3	14.1	36.0	

**Plot 6:** 1 GHz to 12.75 GHz, TX mode, channel 39, vertical & horizontal polarization



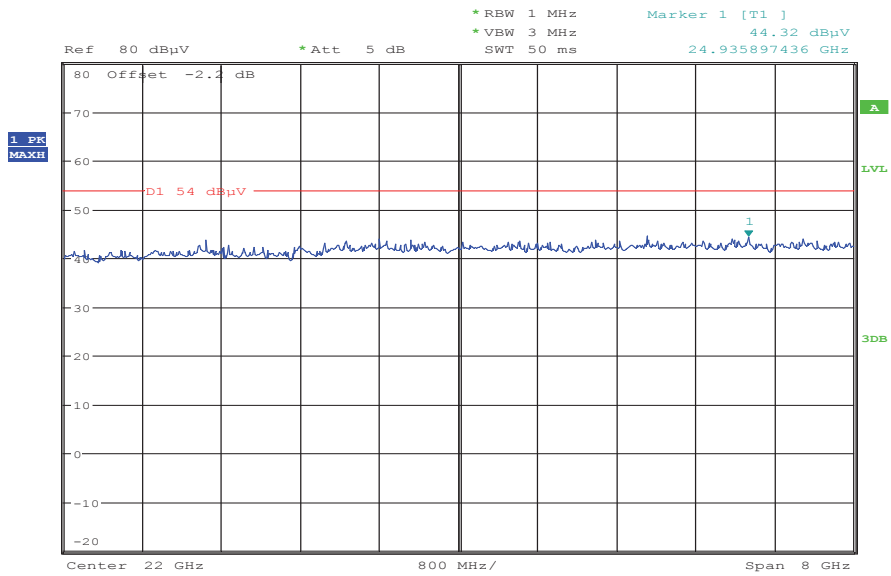
The carrier signal is notched with a 2.4 GHz band rejection filter.

**Plot 7: 12.75 GHz to 18 GHz, TX mode, channel 39, vertical & horizontal polarization**



Date: 25.MAR.2013 08:16:08

**Plot 8: 18 GHz to 26 GHz, TX mode, channel 39, vertical & horizontal polarization**



Date: 25.MAR.2013 08:29:46

**Plot 9:** 30 MHz to 1 GHz, TX mode, channel 78, vertical & horizontal polarization

**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: 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

EMC 32 Version 8.52

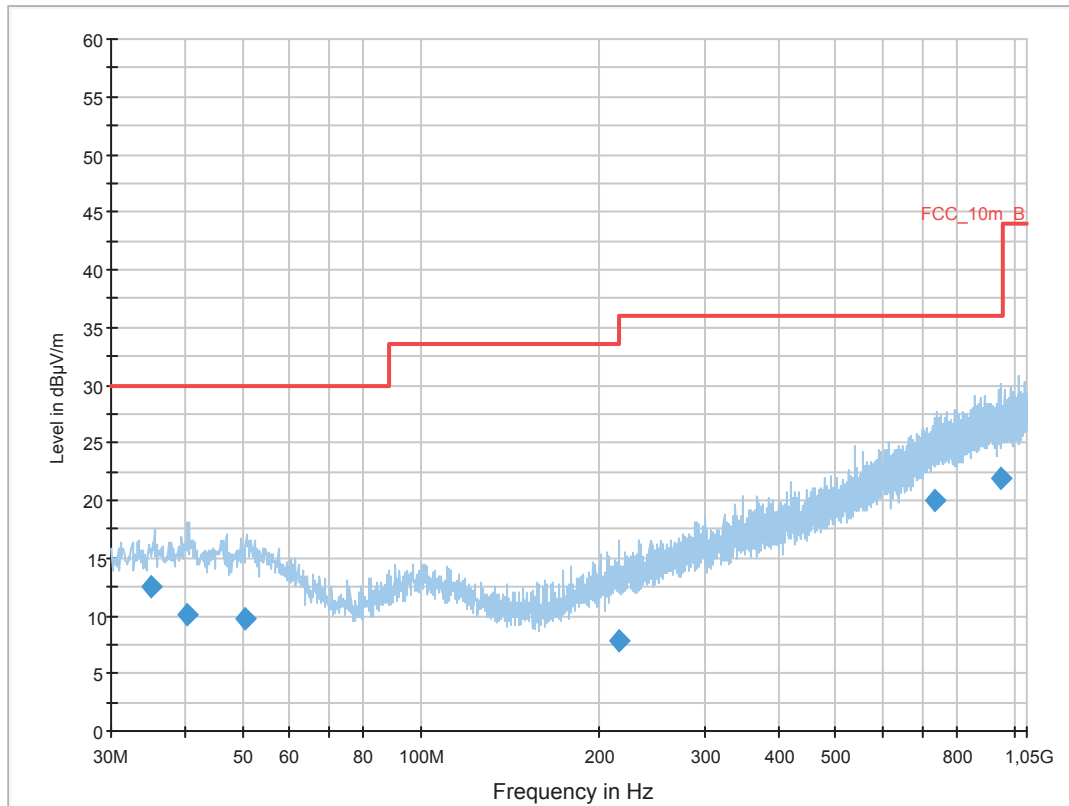
**Common Information**

EUT: RFM121LW  
 Serial Number: IMEI:990002430024636  
 Test Description: FCC part 15 C class B @ 10 m  
 Operating Conditions: BT DH5 TX CH78  
 Operator Name: Wolsdorfer  
 Comment: battery powered

**Scan Setup: STAN\_Fin [EMI radiated]**

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

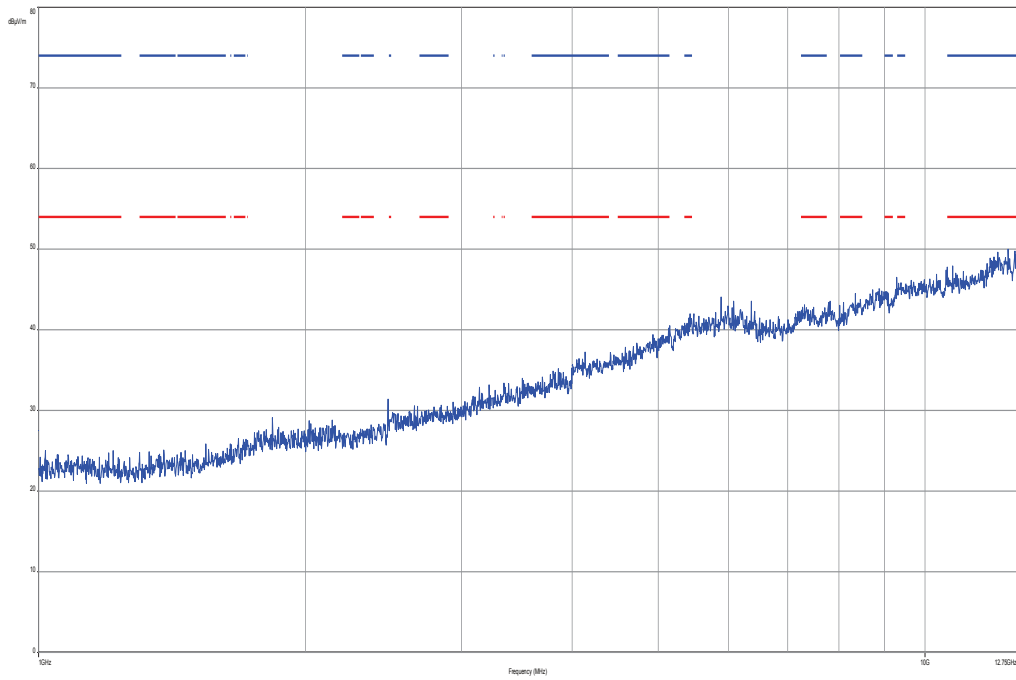
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



### 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
35.014350	12.5	1000.0	120.000	98.0	V	280.0	13.0	17.5	30.0	
40.287450	10.1	1000.0	120.000	170.0	H	10.0	13.4	19.9	30.0	
50.476350	9.8	1000.0	120.000	170.0	V	90.0	13.3	20.2	30.0	
215.458800	7.8	1000.0	120.000	143.0	H	190.0	12.2	25.7	33.5	
734.020950	20.1	1000.0	120.000	170.0	V	100.0	23.3	15.9	36.0	
946.550850	22.0	1000.0	120.000	170.0	V	81.0	25.3	14.0	36.0	

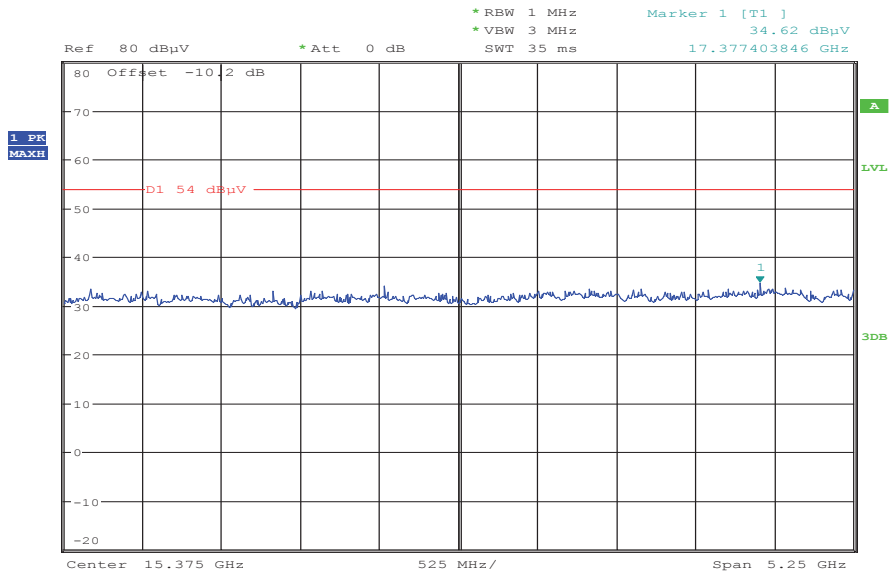
**Plot 10:** 1 GHz to 12.75 GHz, TX mode, channel 78, vertical & horizontal polarization



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

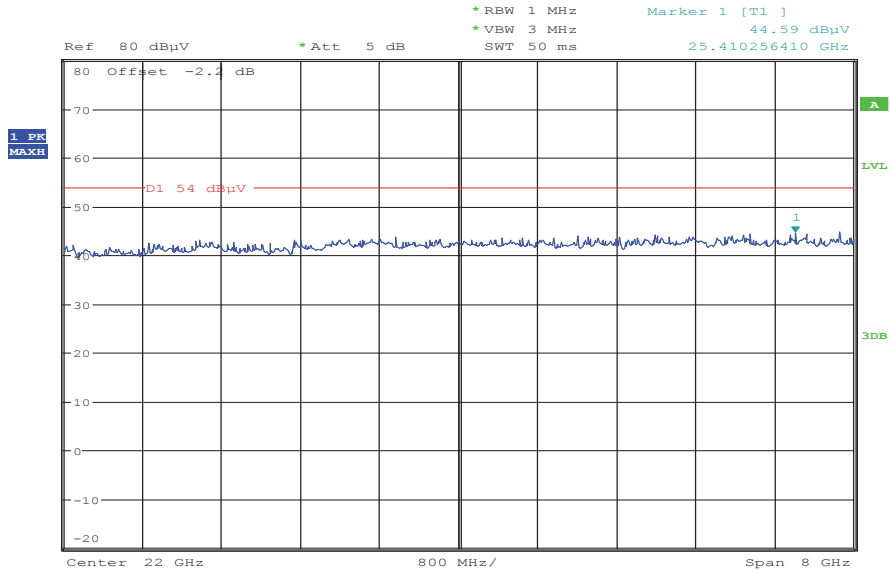


**Plot 11: 12.75 GHz to 18 GHz, TX mode, channel 78, vertical & horizontal polarization**



Date: 25.MAR.2013 08:17:26

**Plot 12: 18 GHz to 26 GHz, TX mode, channel 78, vertical & horizontal polarization**



Date: 25.MAR.2013 08:31:30

**Plots Pi/4 DQPSK**

**Plot 1:** 30 MHz to 1 GHz, TX mode, channel 00, vertical & horizontal polarization

**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
Antenna Tower:	Correction Table: Cable_EN_1GHz (1005) Tower [EMCO 2090 Antenna Tower] @ GPIB0 (ADR 8), FW REV 3.12
Turntable:	Turntable [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.12

EMC 32 Version 8.10.00

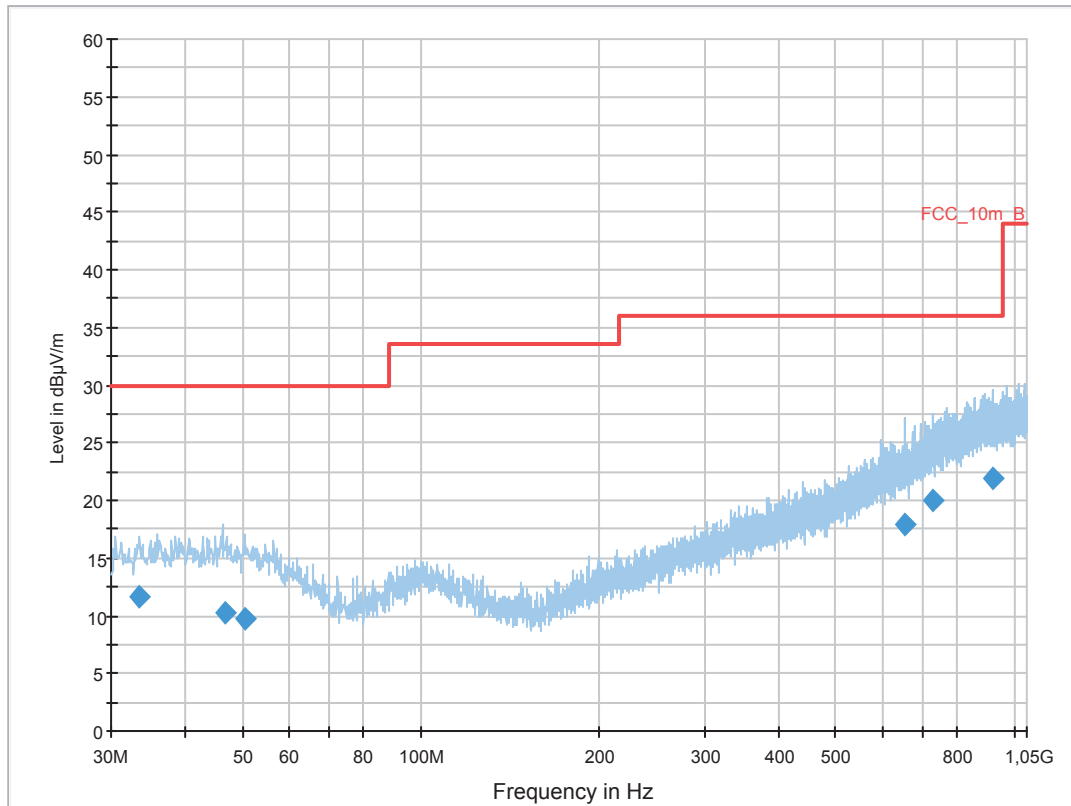
**Common Information**

EUT: RFM121LW  
 Serial Number: IMEI:990002430024636  
 Test Description: FCC part 15 C class B @ 10 m  
 Operating Conditions: BT 2DH5 TX CH0  
 Operator Name: Wolsdorfer  
 Comment: battery powered

**Scan Setup: STAN\_Fin [EMI radiated]**

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

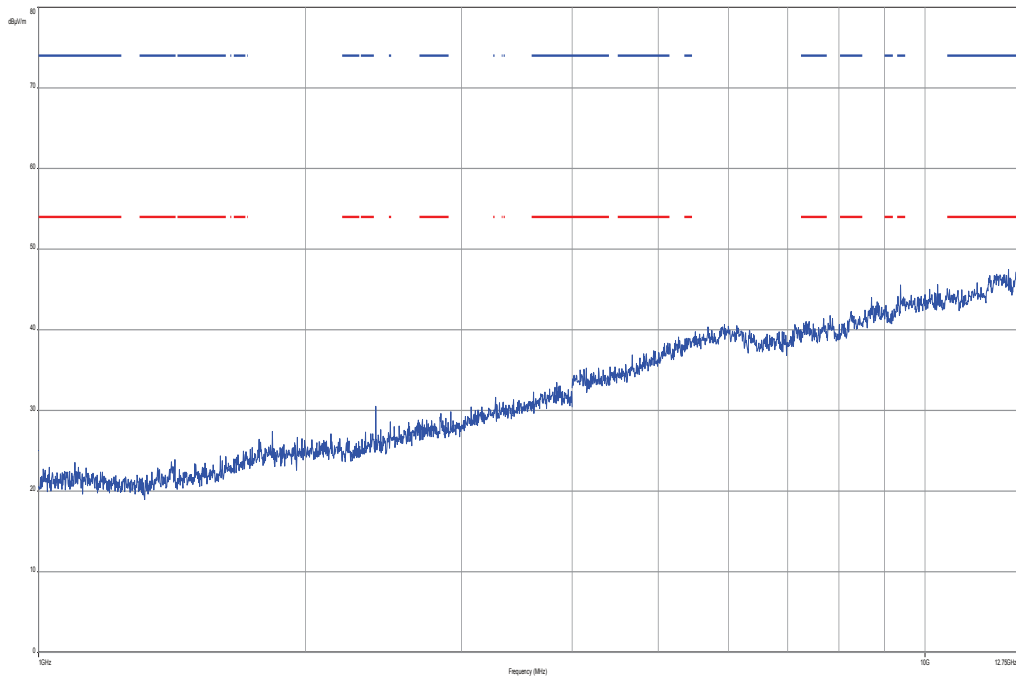
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



### Final Result 1

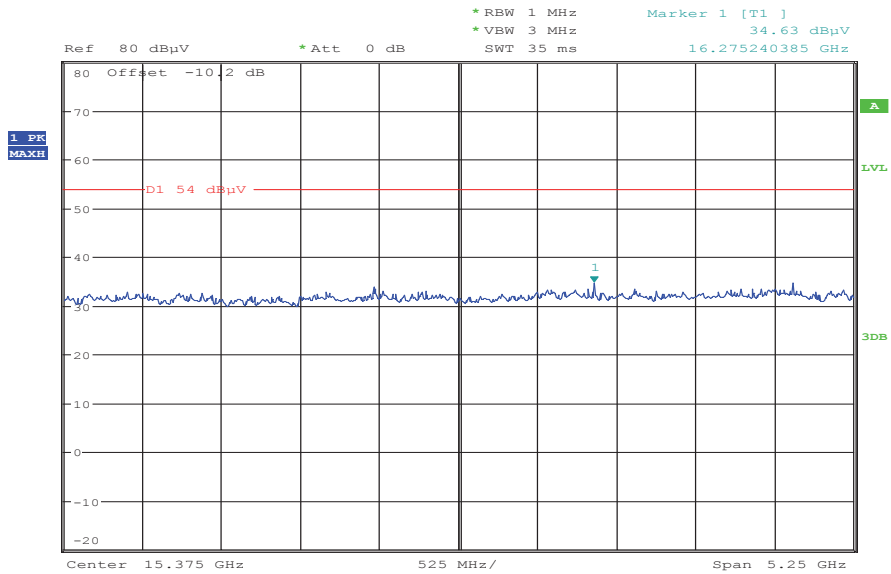
Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
33.369000	11.7	1000.0	120.000	170.0	V	183.0	12.9	18.3	30.0	
46.765050	10.2	1000.0	120.000	98.0	V	100.0	13.3	19.8	30.0	
50.343750	9.7	1000.0	120.000	170.0	H	280.0	13.3	20.3	30.0	
653.493750	17.9	1000.0	120.000	170.0	H	274.0	21.2	18.1	36.0	
727.525500	20.0	1000.0	120.000	153.0	V	190.0	23.1	16.0	36.0	
917.605200	22.0	1000.0	120.000	146.0	H	184.0	25.3	14.0	36.0	

**Plot 2:** 1 GHz to 12.75 GHz, TX mode, channel 00, vertical & horizontal polarization



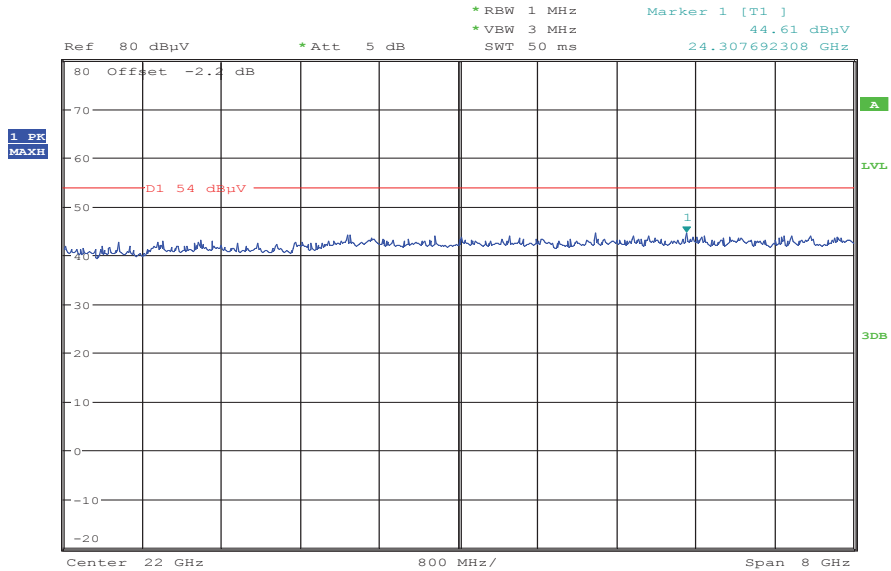
The carrier signal is notched with a 2.4 GHz band rejection filter.

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



Date: 25.MAR.2013 08:19:00

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



Date: 25.MAR.2013 08:33:19

**Plot 5:** 30 MHz to 1 GHz, TX mode, channel 39, vertical & horizontal polarization

**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: 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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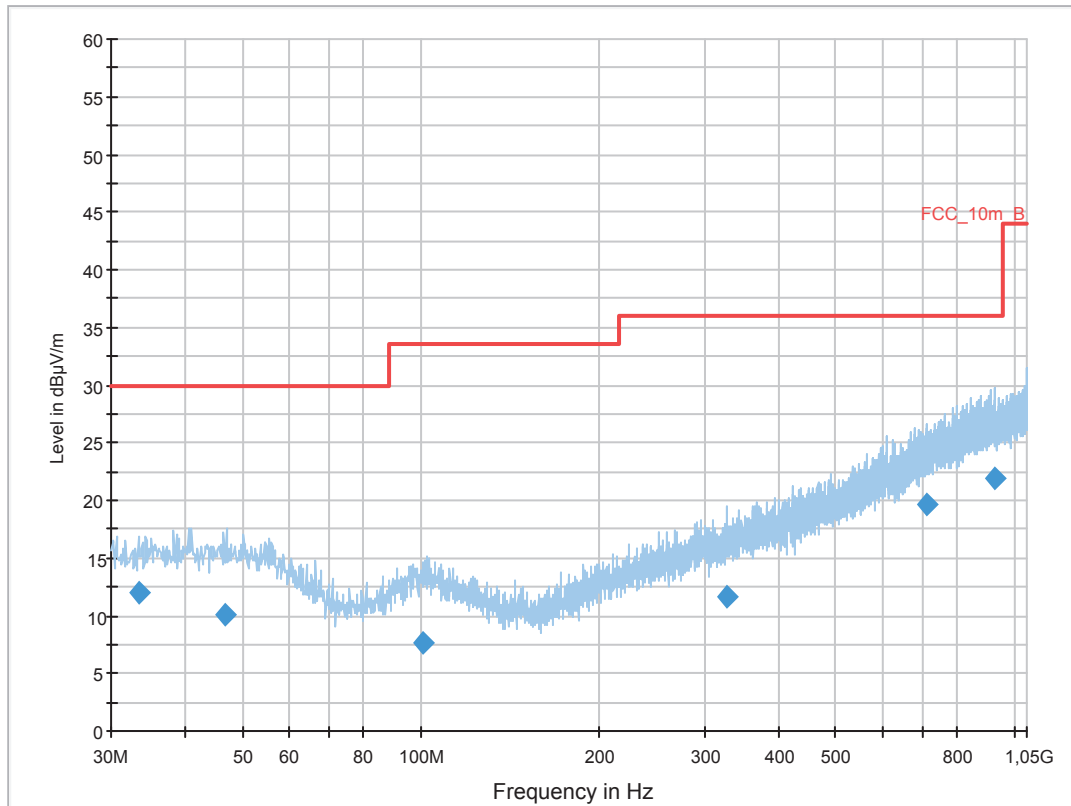
**Common Information**

EUT: RFM121LW  
 Serial Number: IMEI:990002430024636  
 Test Description: FCC part 15 C class B @ 10 m  
 Operating Conditions: BT 2DH5 TX CH39  
 Operator Name: Wolsdorfer  
 Comment: battery powered

**Scan Setup: STAN\_Fin [EMI radiated]**

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

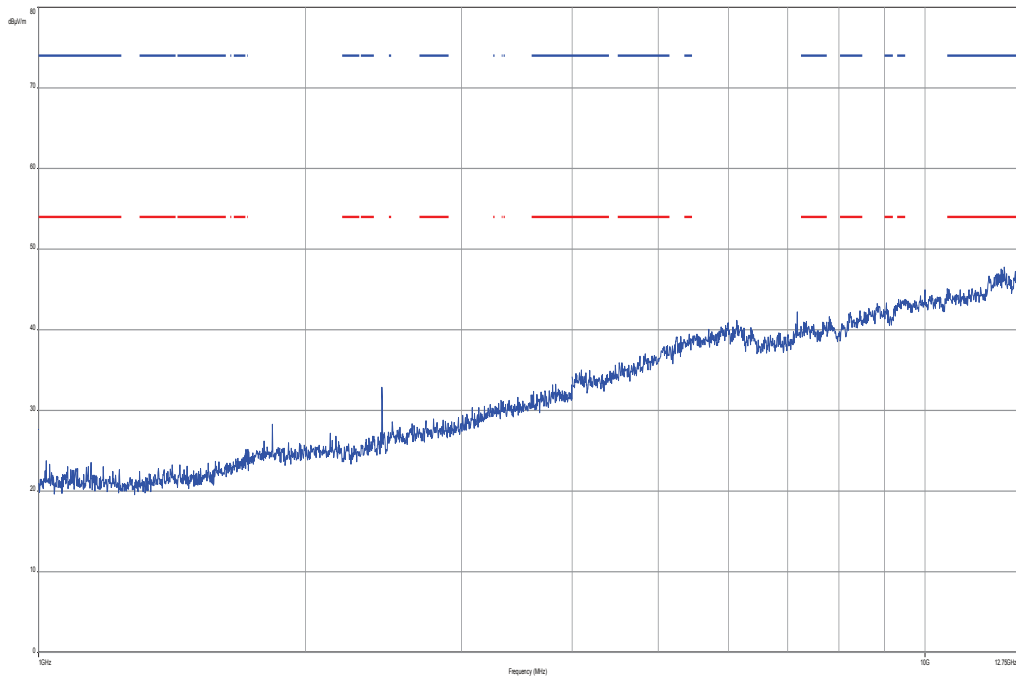
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



### 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
33.355950	12.0	1000.0	120.000	120.0	V	190.0	12.9	18.0	30.0	
46.604550	10.1	1000.0	120.000	98.0	V	261.0	13.3	19.9	30.0	
100.792950	7.7	1000.0	120.000	170.0	H	171.0	11.8	25.8	33.5	
328.855650	11.6	1000.0	120.000	170.0	H	260.0	15.4	24.4	36.0	
714.098400	19.7	1000.0	120.000	170.0	H	280.0	22.8	16.3	36.0	
928.568700	22.0	1000.0	120.000	170.0	H	268.0	25.3	14.0	36.0	

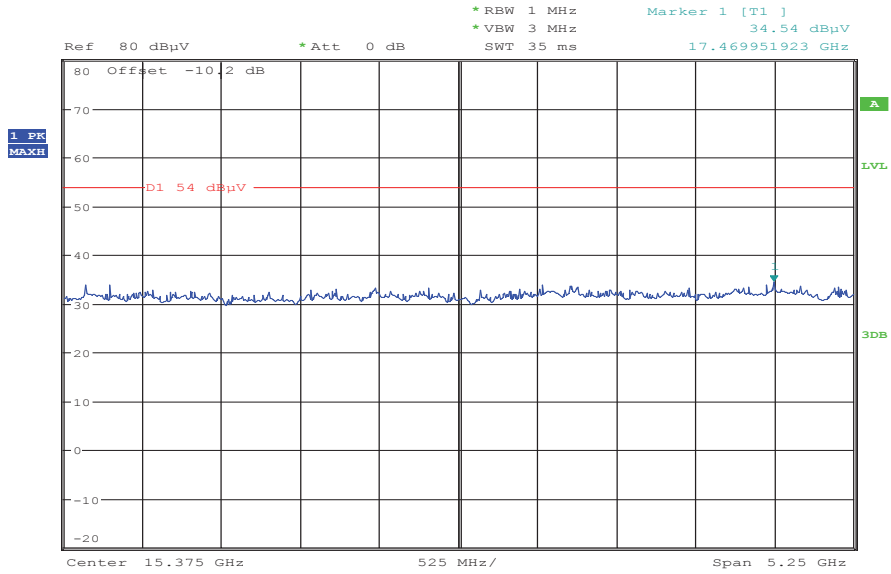
**Plot 6:** 1 GHz to 12.75 GHz, TX mode, channel 39, vertical & horizontal polarization



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

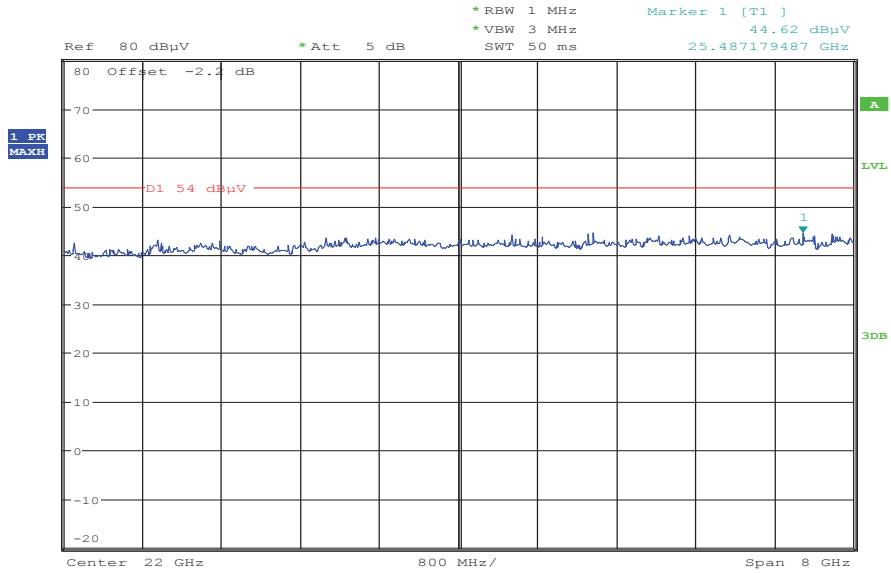


Plot 7: 12.75 GHz to 18 GHz, TX mode, channel 39, vertical & horizontal polarization



Date: 25.MAR.2013 08:20:13

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



Date: 25.MAR.2013 08:34:40

**Plot 9:** 30 MHz to 1 GHz, TX mode, channel 78, vertical & horizontal polarization

**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: 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

EMC 32 Version 8.52

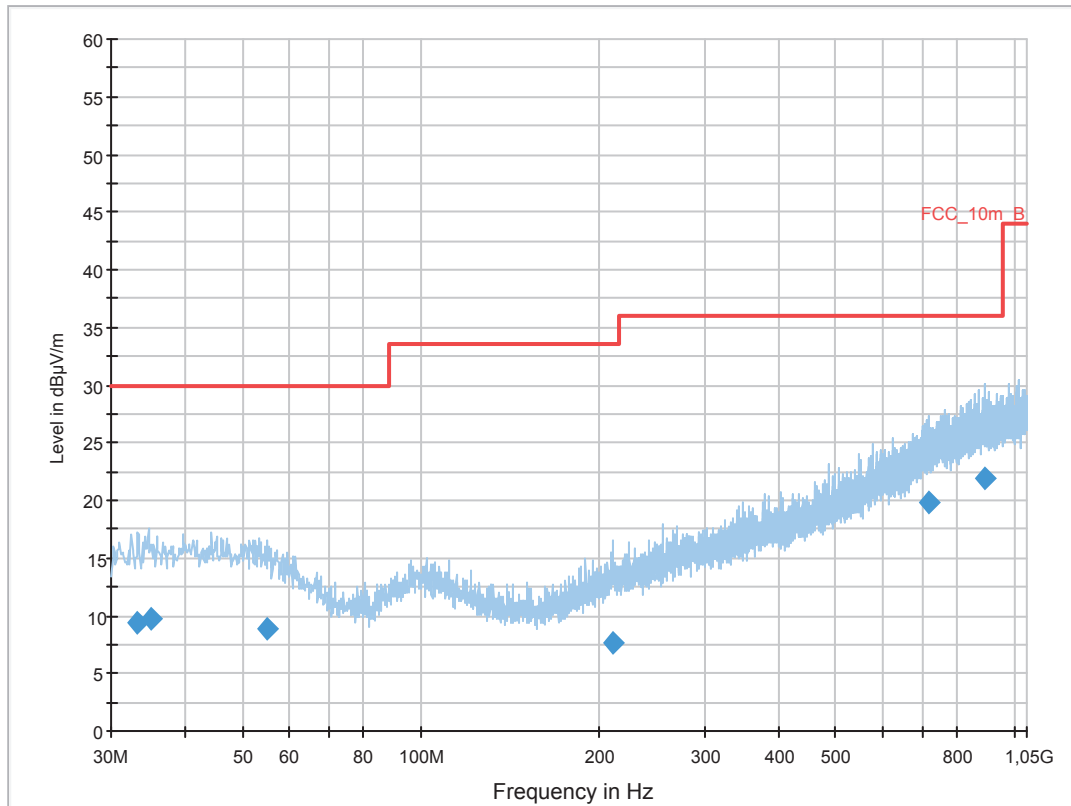
**Common Information**

EUT: RFM121LW  
 Serial Number: IMEI:990002430024636  
 Test Description: FCC part 15 C class B @ 10 m  
 Operating Conditions: BT 2DH5 TX CH78  
 Operator Name: Wolsdorfer  
 Comment: battery powered

**Scan Setup: STAN\_Fin [EMI radiated]**

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

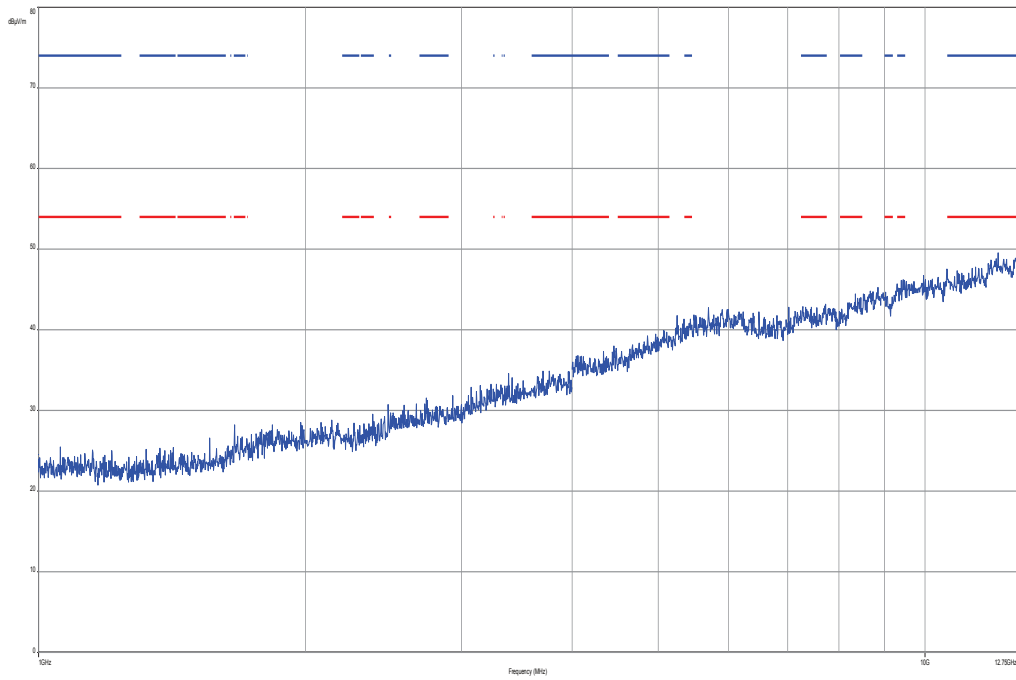
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



### Final Result 1

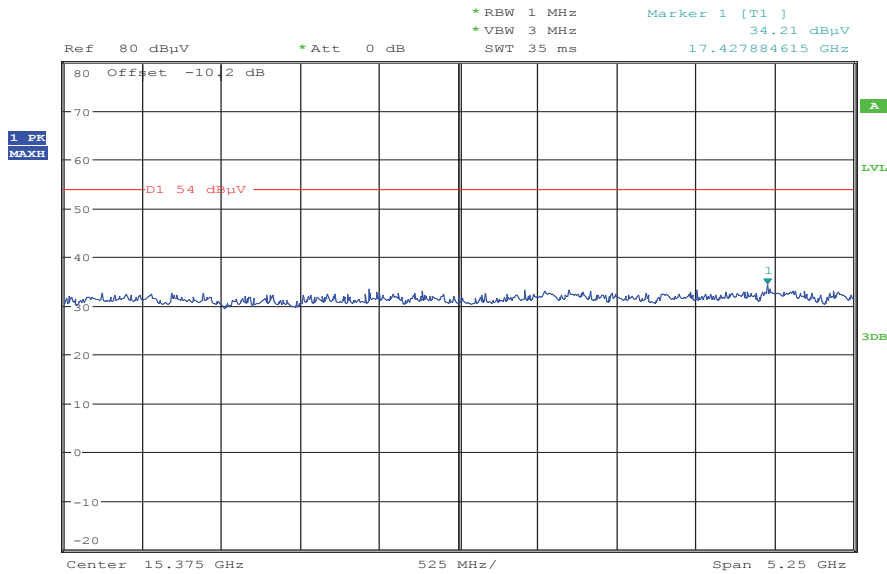
Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
33.190050	9.3	1000.0	120.000	161.0	V	80.0	12.8	20.7	30.0	
34.939200	9.7	1000.0	120.000	170.0	V	178.0	13.0	20.3	30.0	
54.795450	8.9	1000.0	120.000	170.0	H	100.0	12.9	21.1	30.0	
210.776100	7.7	1000.0	120.000	170.0	H	2.0	12.1	25.8	33.5	
719.487600	19.8	1000.0	120.000	104.0	V	190.0	23.0	16.2	36.0	
889.960950	21.9	1000.0	120.000	170.0	H	86.0	25.1	14.1	36.0	

**Plot 10:** 1 GHz to 12.75 GHz, TX mode, channel 78, vertical & horizontal polarization



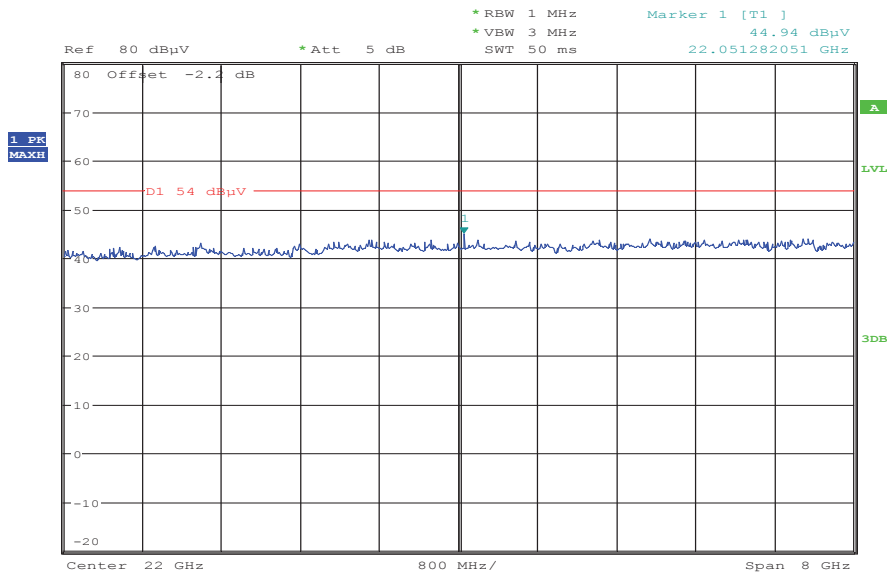
The carrier signal is notched with a 2.4 GHz band rejection filter.

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



Date: 25.MAR.2013 08:21:49

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



Date: 25.MAR.2013 08:36:13

**Plots 8DPSK**

**Plot 1:** 30 MHz to 1 GHz, TX mode, channel 00, vertical & horizontal polarization

**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: 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

EMC 32 Version 8.10.00

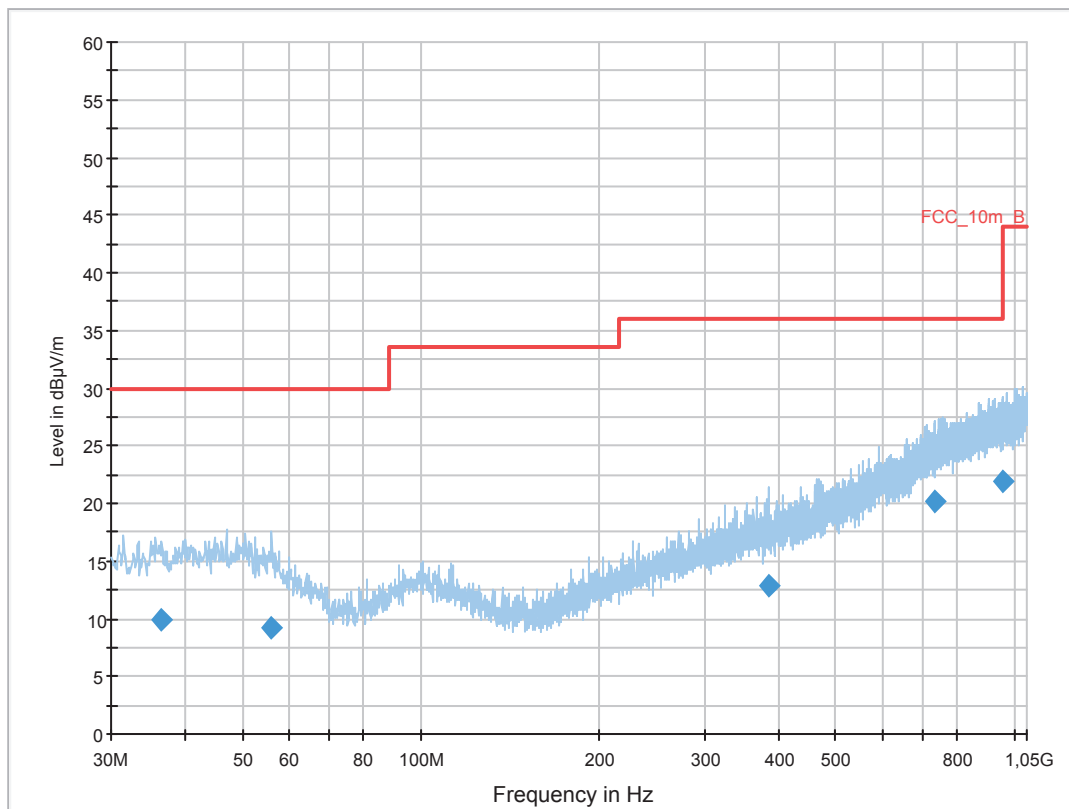
**Common Information**

EUT: RFM121LW  
 Serial Number: IMEI:990002430024636  
 Test Description: FCC part 15 C class B @ 10 m  
 Operating Conditions: BT 3DH5 TX CH0  
 Operator Name: Wolsdorfer  
 Comment: battery powered

**Scan Setup: STAN\_Fin [EMI radiated]**

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

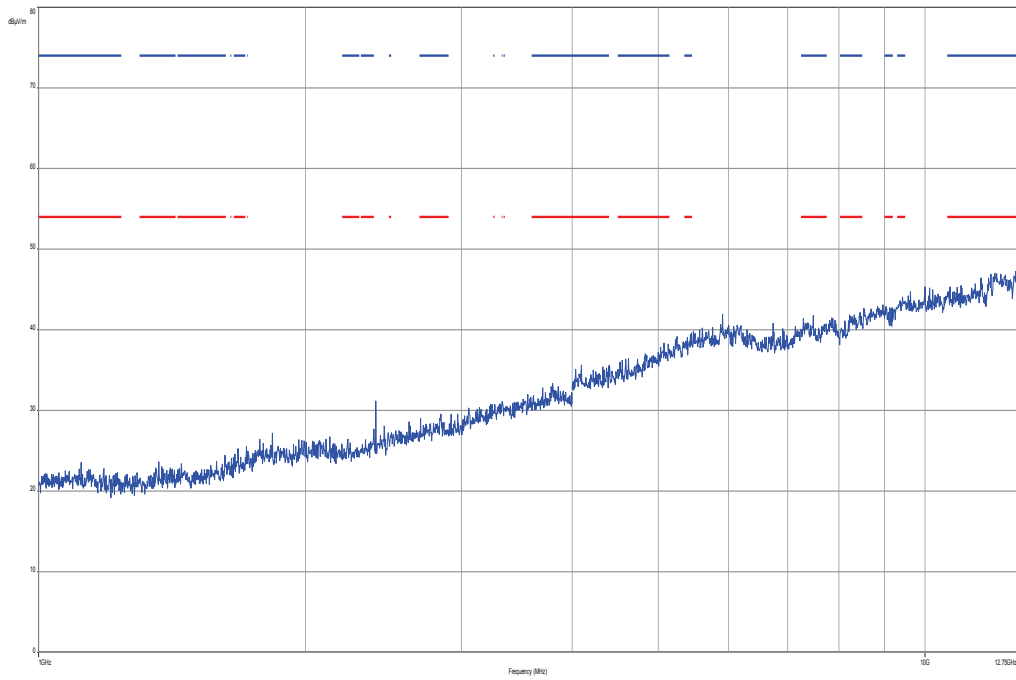
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



### 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
36.520650	9.9	1000.0	120.000	170.0	V	178.0	13.2	20.1	30.0	
55.672650	9.1	1000.0	120.000	170.0	V	280.0	12.7	20.9	30.0	
386.859300	12.8	1000.0	120.000	170.0	H	178.0	16.7	23.2	36.0	
733.834500	20.1	1000.0	120.000	146.0	V	100.0	23.3	15.9	36.0	
953.849700	22.0	1000.0	120.000	170.0	V	190.0	25.4	14.0	36.0	

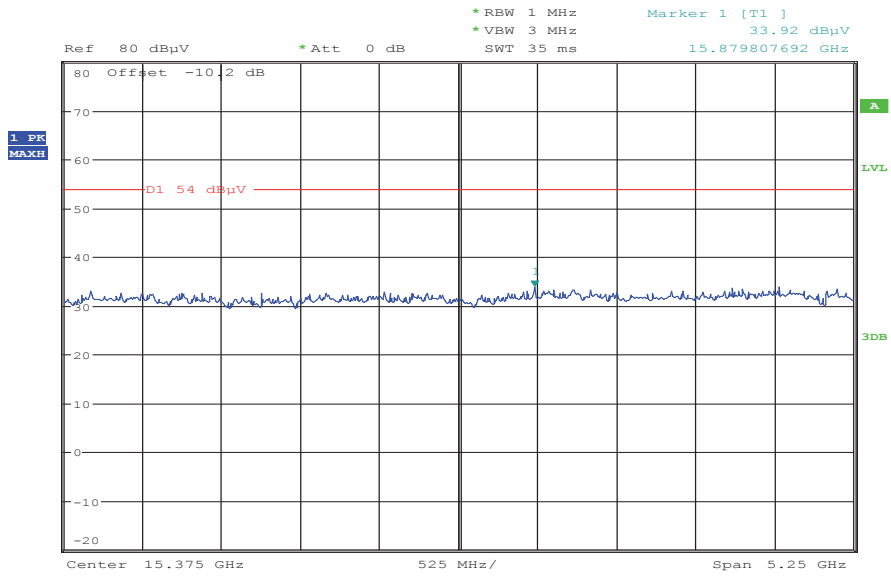
**Plot 2:** 1 GHz to 12.75 GHz, TX mode, channel 00, vertical & horizontal polarization



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

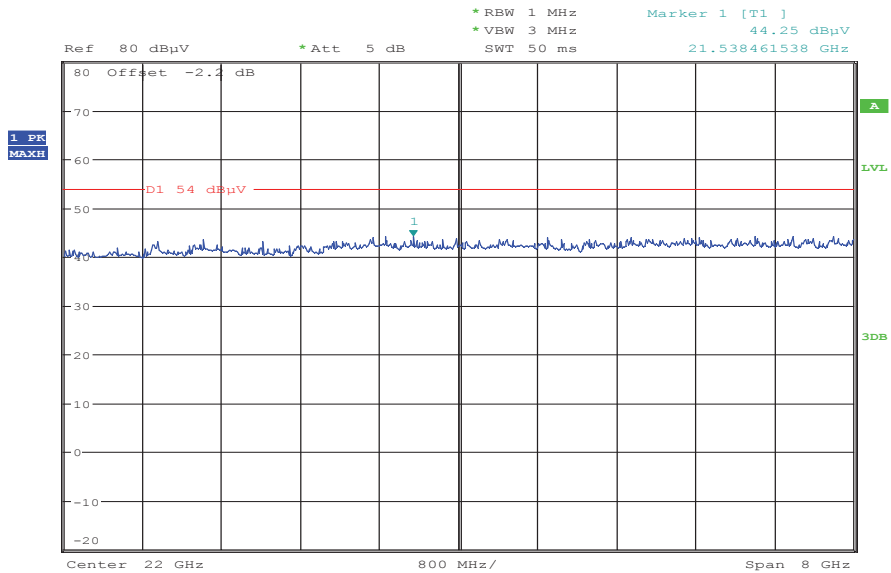


Plot 3: 12.75 GHz to 18 GHz, TX mode, channel 00, vertical & horizontal polarization



Date: 25.MAR.2013 08:23:04

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



Date: 25.MAR.2013 08:37:28

**Plot 5:** 30 MHz to 1 GHz, TX mode, channel 39, vertical & horizontal polarization

**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: 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

EMC 32 Version 8.52

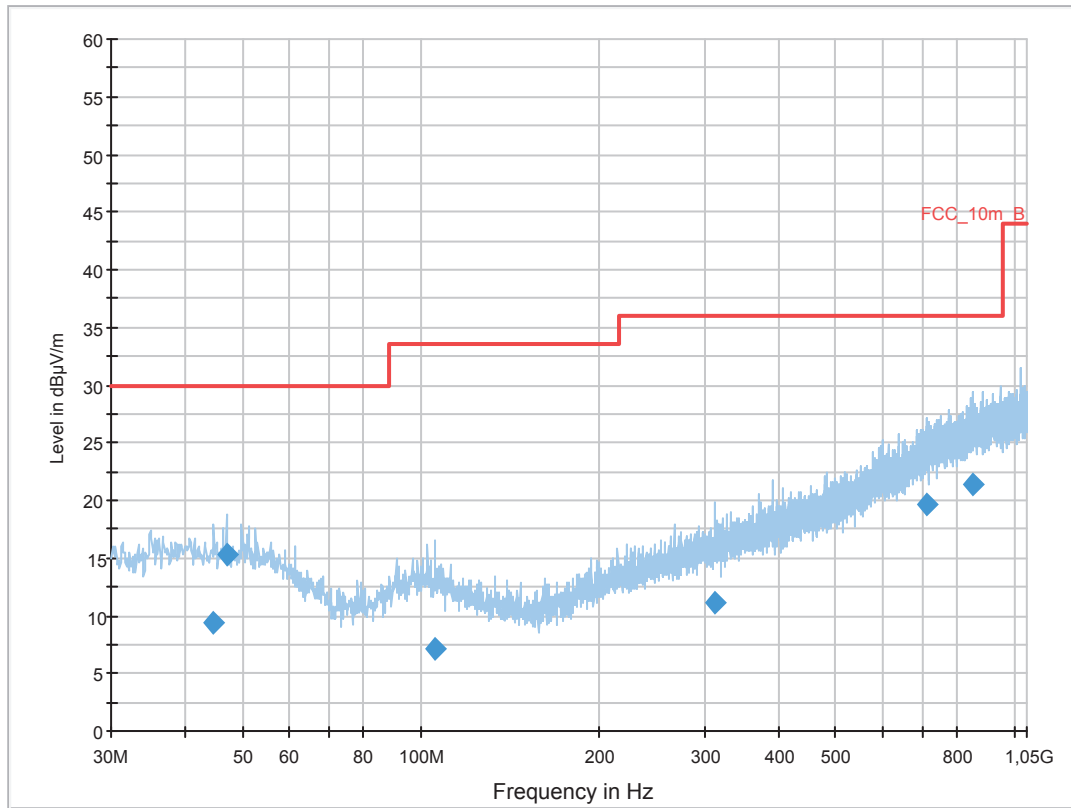
**Common Information**

EUT: RFM121LW  
 Serial Number: IMEI:990002430024636  
 Test Description: FCC part 15 C class B @ 10 m  
 Operating Conditions: BT 3DH5 TX CH39  
 Operator Name: Wolsdorfer  
 Comment: battery powered

**Scan Setup: STAN\_Fin [EMI radiated]**

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

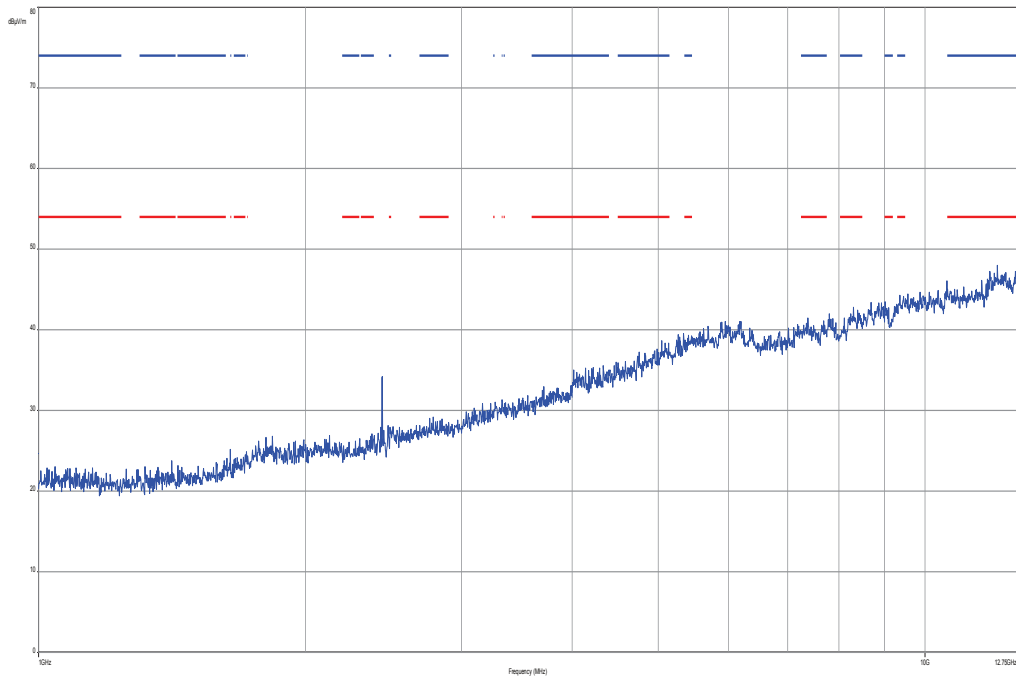
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



### Final Result 1

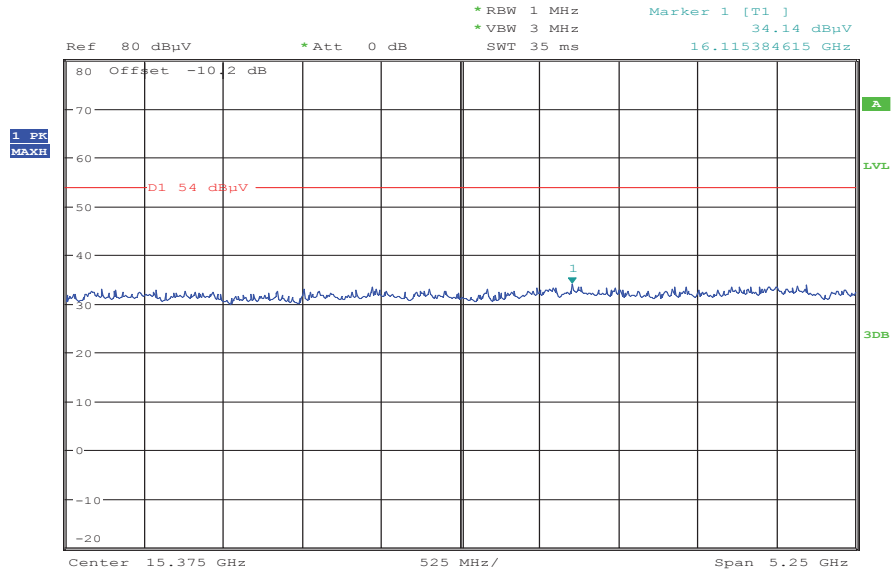
Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
44.490450	9.4	1000.0	120.000	105.0	V	190.0	13.3	20.6	30.0	
47.001000	15.3	1000.0	120.000	98.0	V	190.0	13.3	14.7	30.0	
105.807750	7.2	1000.0	120.000	143.0	H	10.0	11.4	26.3	33.5	
312.905850	11.1	1000.0	120.000	170.0	V	100.0	14.9	24.9	36.0	
710.451600	19.6	1000.0	120.000	170.0	V	280.0	22.7	16.4	36.0	

**Plot 6:** 1 GHz to 12.75 GHz, TX mode, channel 39, vertical & horizontal polarization



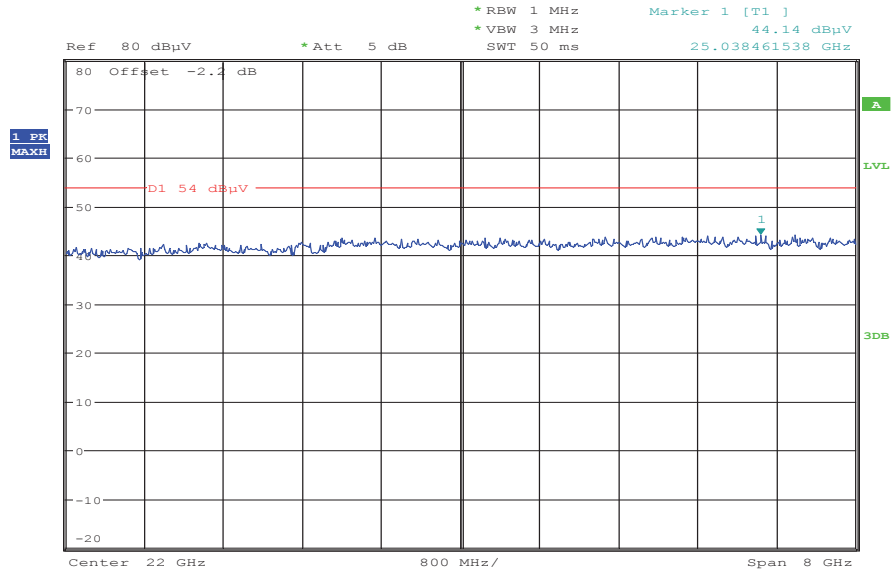
The carrier signal is notched with a 2.4 GHz band rejection filter.

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



Date: 25.MAR.2013 08:24:39

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



Date: 25.MAR.2013 08:38:42

**Plot 9:** 30 MHz to 1 GHz, TX mode, channel 78, vertical & horizontal polarization

**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: 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

EMC 32 Version 8.52

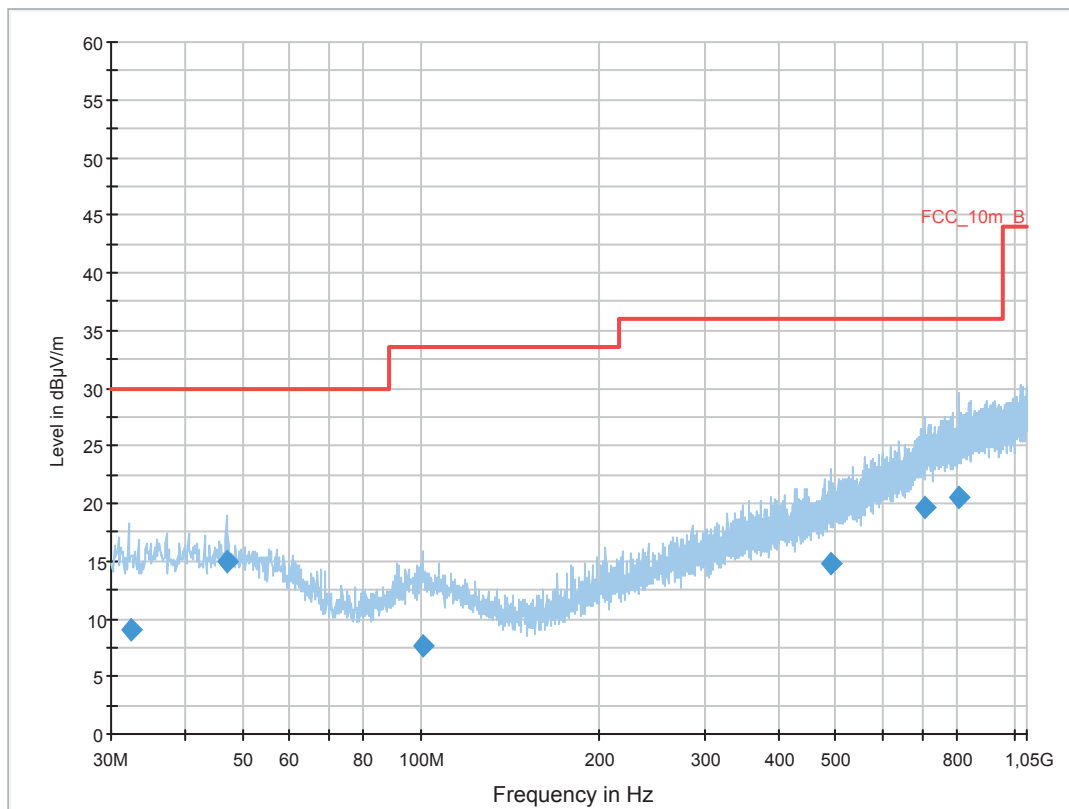
**Common Information**

EUT: RFM121LW  
 Serial Number: IMEI:990002430024636  
 Test Description: FCC part 15 C class B @ 10 m  
 Operating Conditions: BT 3DH5 TX CH78  
 Operator Name: Wolsdorfer  
 Comment: battery powered

**Scan Setup: STAN\_Fin [EMI radiated]**

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

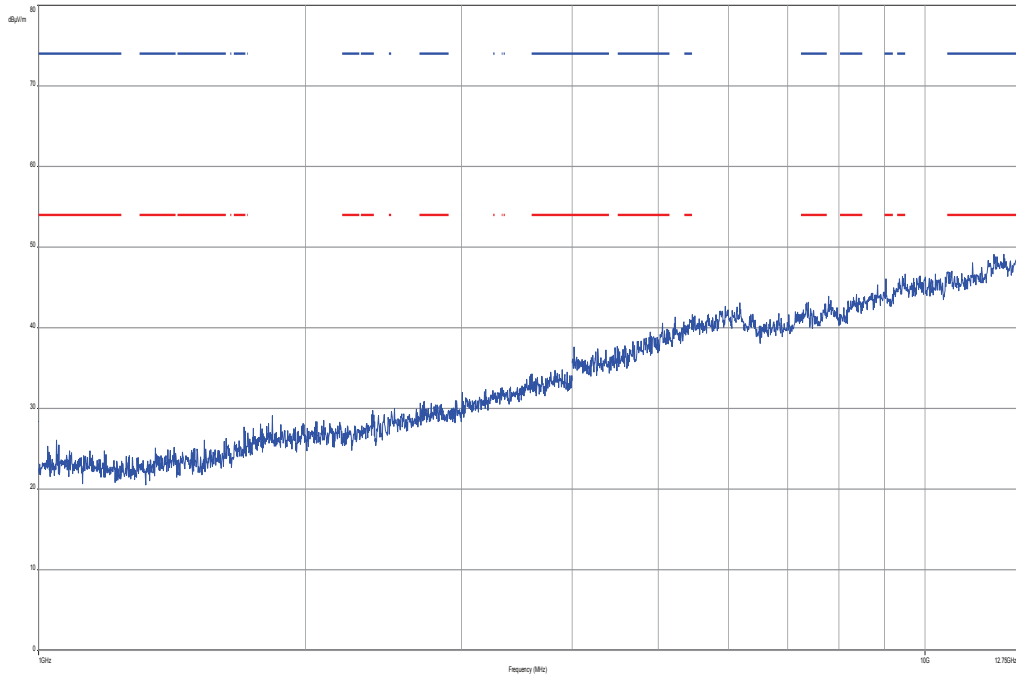
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



### 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
32.379750	9.1	1000.0	120.000	170.0	H	268.0	12.8	20.9	30.0	
46.993500	15.0	1000.0	120.000	98.0	V	100.0	13.3	15.0	30.0	
100.627650	7.7	1000.0	120.000	134.0	V	176.0	11.8	25.8	33.5	
492.155100	14.8	1000.0	120.000	170.0	V	266.0	18.5	21.2	36.0	
708.676350	19.6	1000.0	120.000	170.0	H	2.0	22.7	16.4	36.0	

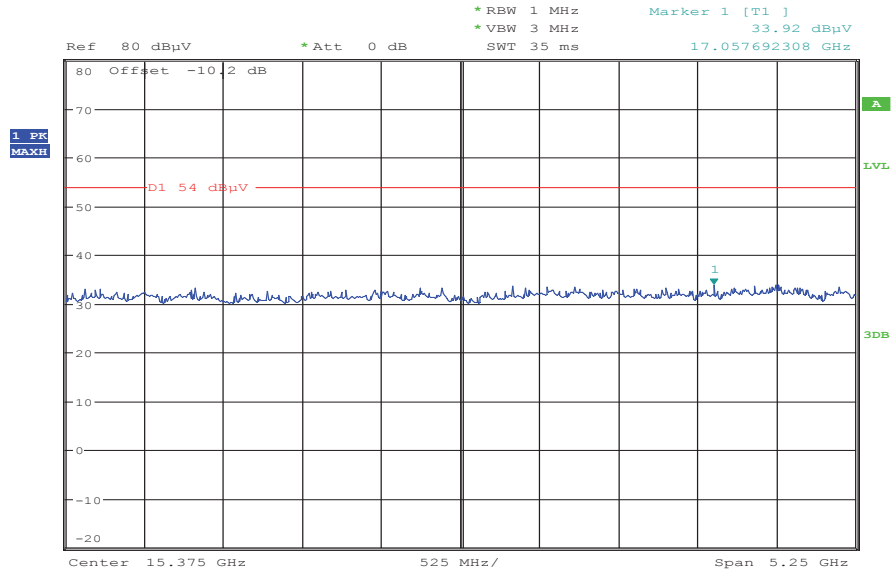
**Plot 10:** 1 GHz to 12.75 GHz, TX mode, channel 78, vertical & horizontal polarization



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

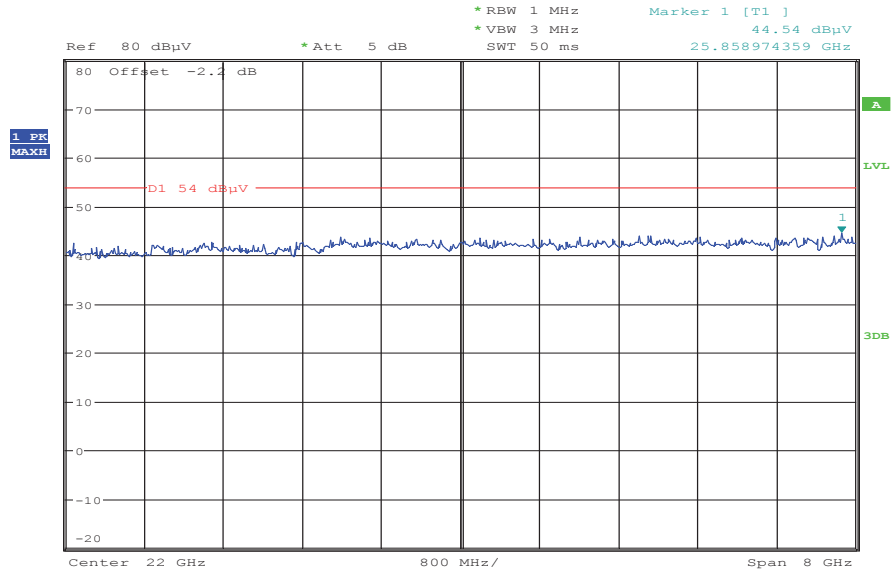


Plot 11: 12.75 GHz to 18 GHz, TX mode, channel 78, vertical & horizontal polarization



Date: 25.MAR.2013 08:25:46

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



Date: 25.MAR.2013 08:39:48

### 9.13 RX spurious emissions radiated

**Description:**

Measurement of the radiated spurious emissions in idle/receive mode. The EUT is detached so all oscillators are active.

**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

**Limits:**

FCC		IC
RX Spurious Emissions Radiated		
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:**

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

**Result: Passed**

**Plots:**

**Plot 1:** 30 MHz to 1 GHz, RX mode, vertical & horizontal polarization

**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: 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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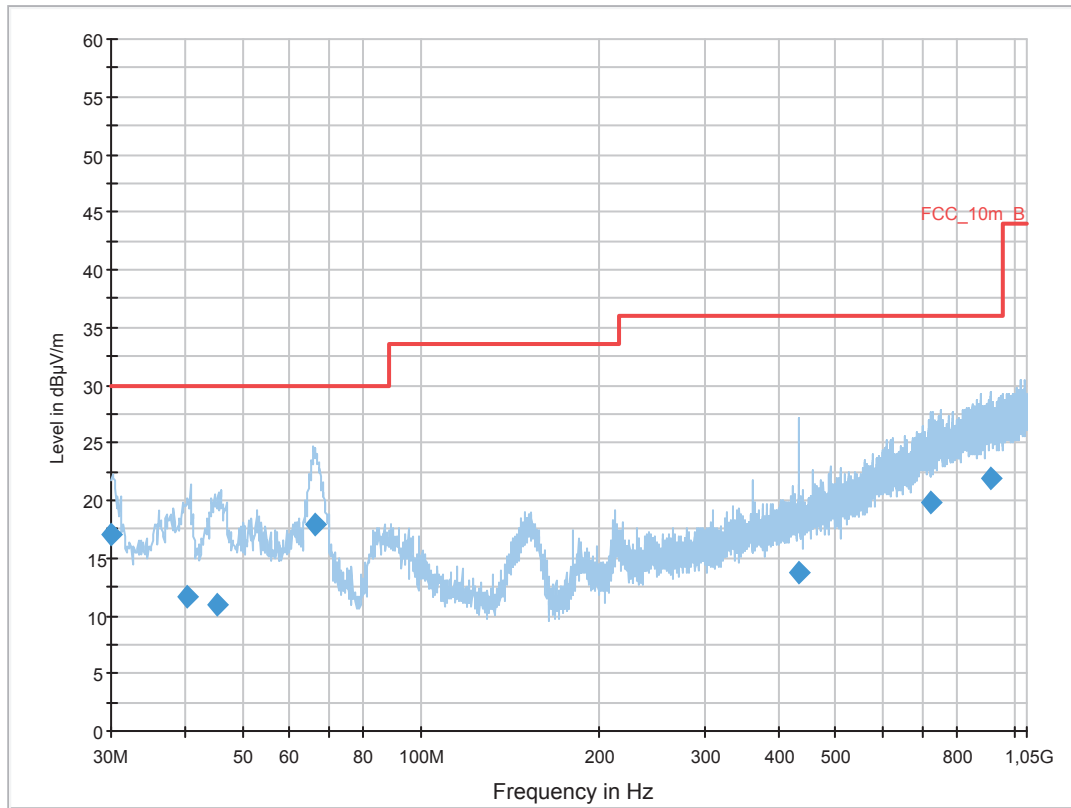
**Common Information**

EUT: RFM121LW  
 Serial Number: IMEI:990002430024636  
 Test Description: FCC part 15 B class B @ 5 m  
 Operating Conditions: BT RX + charging  
 Operator Name: Wolsdorfer  
 Comment: AC: 115 V / 60 Hz

**Scan Setup: STAN\_Fin [EMI radiated]**

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

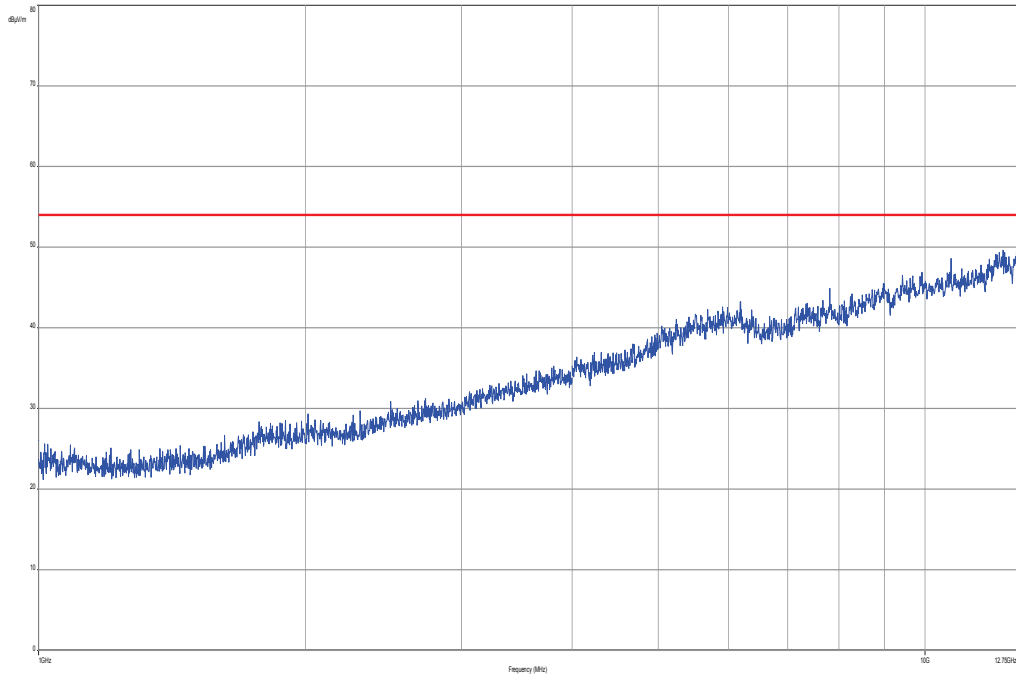
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



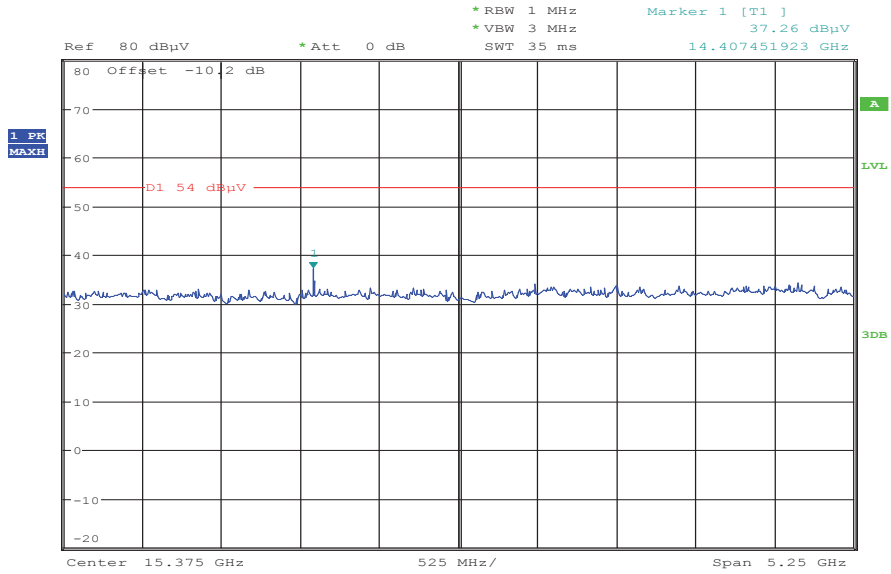
### Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
30.009185	17.0	1000.0	120.000	98.0	V	190.0	12.5	13.0	30.0	
40.314600	11.7	1000.0	120.000	112.0	V	190.0	13.4	18.3	30.0	
45.338250	11.0	1000.0	120.000	170.0	V	265.0	13.3	19.0	30.0	
66.138000	17.8	1000.0	120.000	170.0	V	-3.0	10.1	12.2	30.0	
432.708600	13.7	1000.0	120.000	170.0	V	-10.0	17.4	22.3	36.0	
723.556500	19.8	1000.0	120.000	143.0	V	266.0	23.1	16.2	36.0	
911.778600	22.0	1000.0	120.000	170.0	V	85.0	25.2	14.0	36.0	

**Plot 2:** 1 GHz to 12.75 GHz, RX mode, vertical & horizontal polarization

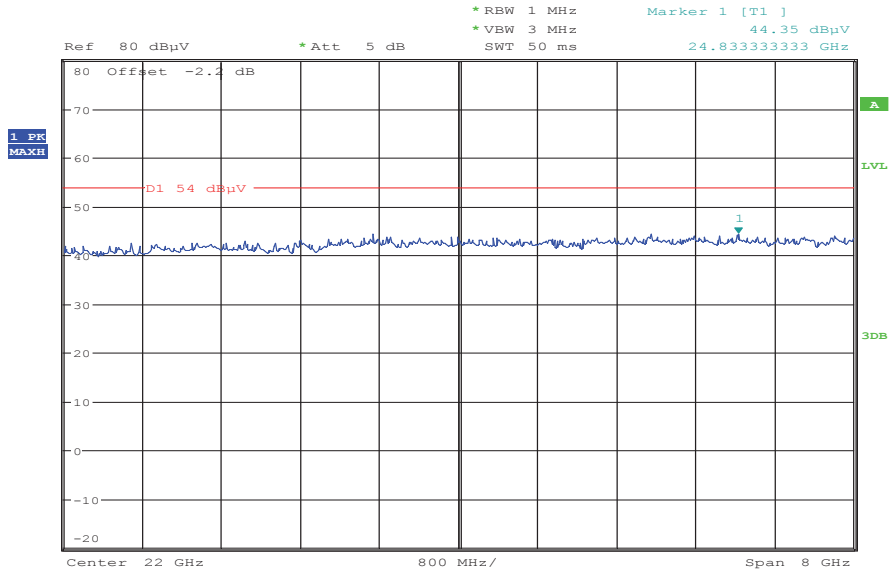


**Plot 3: 12.75 GHz to 18 GHz, RX mode, vertical & horizontal polarization**



Date: 25.MAR.2013 08:14:40

**Plot 4: 18 GHz to 26 GHz, RX mode, vertical & horizontal polarization**



Date: 25.MAR.2013 08:28:46

### 9.14 Spurious emissions radiated < 30 MHz

Not performed!

### 9.15 Spurious emissions conducted < 30 MHz

**Description:**

Measurement of the conducted 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. Both power lines, phase and neutral line, are measured. Found peaks are remeasured with average and quasi peak detection to show compliance to the limits.

**Measurement:**

Measurement parameter	
Detector:	Peak - Quasi peak / average
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 conducted < 30 MHz		
Frequency (MHz)	Quasi-peak (dBµV/m)	Average (dBµV/m)
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30.0	60	50

\*Decreases with the logarithm of the frequency

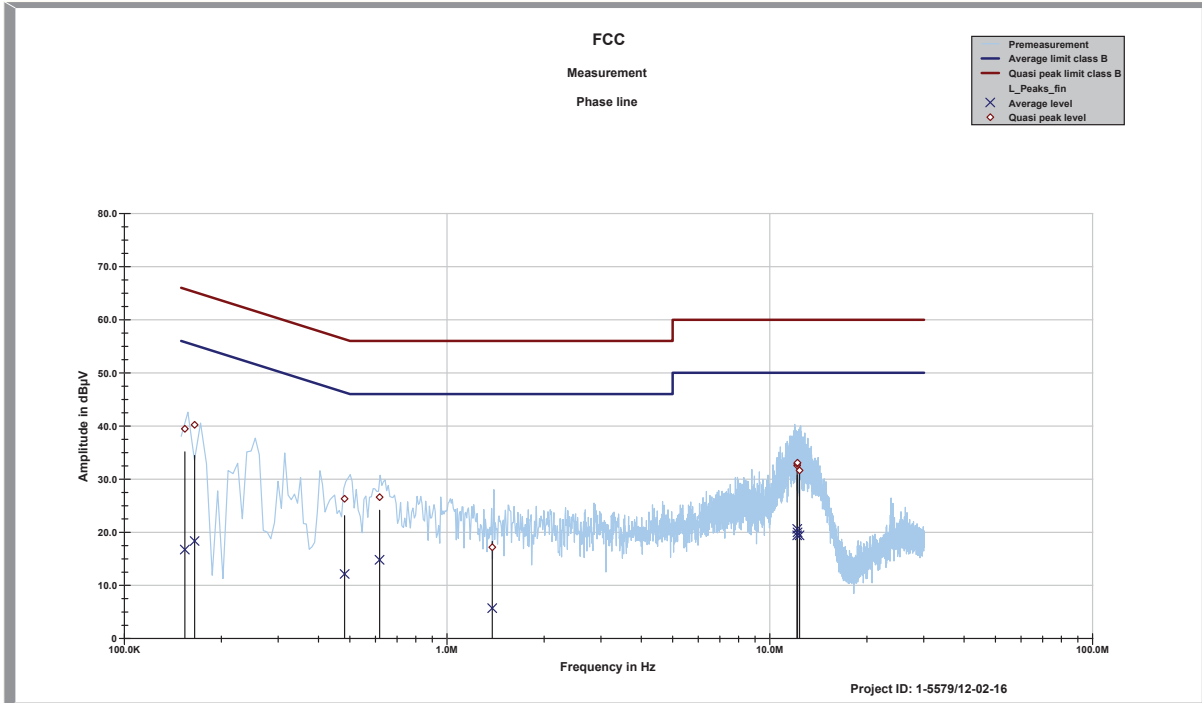
**Results:**

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

**Result: Passed**

**Plots:**

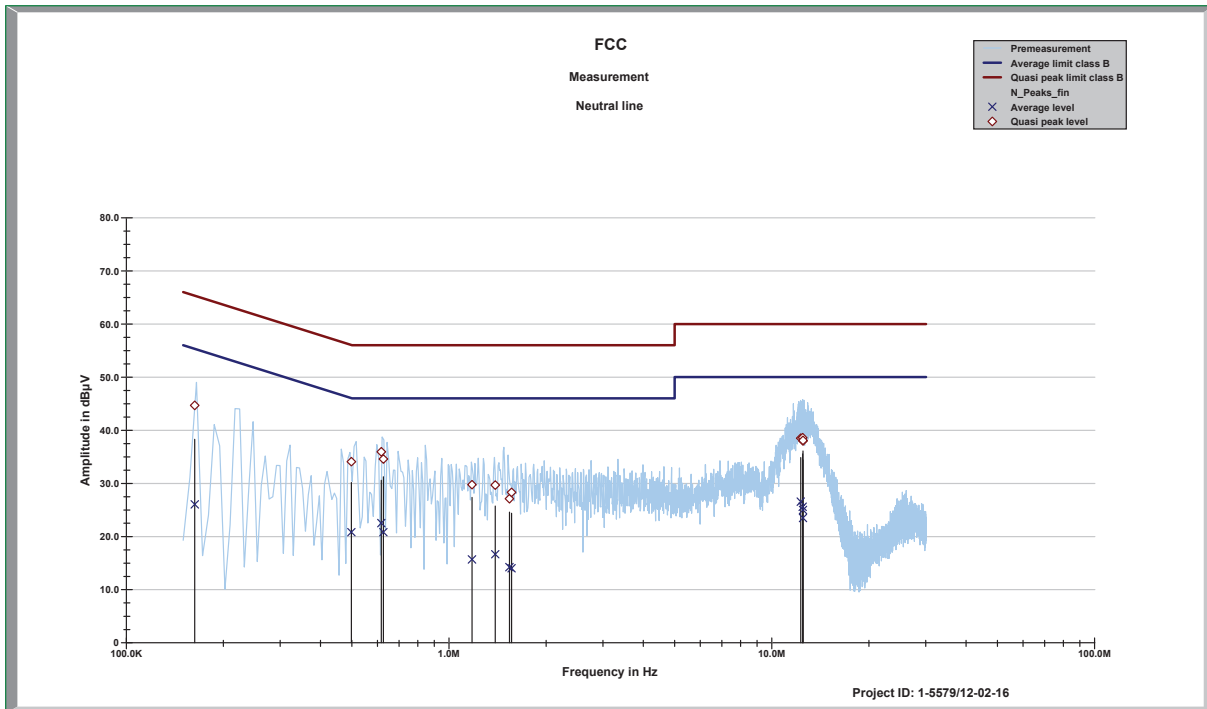
**Plot 1:** 150 kHz to 30 MHz, TX mode, phase line



Frequency	Quasi peak level	Margin quasi peak	Average level	Margin average
MHz	dBµV	dBµV	dBµV	dBµV
0.15404	39.46	26.32	16.73	39.15
0.16522	40.21	24.99	18.35	37.22
0.48151	26.29	30.03	12.13	34.39
0.61787	26.60	29.40	14.80	31.20
1.38	17.18	38.82	5.70	40.30
12.144	32.57	27.43	19.40	30.60
12.1532	32.89	27.11	20.64	29.36
12.177	33.06	26.94	19.98	30.02
12.3493	31.63	28.37	19.41	30.59



Plot 2: 150 kHz to 30 MHz, TX mode, neutral line



Frequency	Quasi peak level	Margin quasi peak	Average level	Margin average
MHz	dBµV	dBµV	dBµV	dBµV
0.16302	44.67	20.64	26.05	29.58
0.498	34.08	21.95	20.81	25.25
0.61661	35.93	20.07	22.53	23.47
0.62621	34.58	21.42	20.80	25.20
1.17758	29.76	26.24	15.69	30.31
1.3902	29.68	26.32	16.66	29.34
1.5379	27.12	28.88	14.23	31.77
1.5614	28.30	27.70	14.02	31.98
12.283	38.51	21.49	26.56	23.44
12.4493	38.60	21.40	25.58	24.42
12.4801	37.99	22.01	25.00	25.00
12.4803	38.09	21.91	23.50	26.50

## 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.	Switch / Control Unit	3488A	HP Meßtechnik		300001691	ne		
2	n. a.	Power Supply DC	NGPE 40/40	R&S	388	400000078	viKI!	21.08.2012	21.08.2014
3	n. a.	Power Sensor 50 Ohms, 10 MHz - 18 GHz, 1 nW - 20 mW	NRV-Z1	R&S	833894/011	300002681-0010	k	22.08.2012	22.08.2014
4	n. a.	Hygro-Thermometer	-/, 5-45°C, 20-100%rF	Thies Clima	-/	400000080	k	24.09.2012	24.09.2013
5	n. a.	Vector Signal Generator, 300 kHz to 2.2 GHz	SMIQ03B	R&S	835541/055	300002681-0001	k	18.08.2011	18.08.2014
6	n. a.	Signal Generator 0.01/2 - 20 GHz, Frequ. Resol. 0.1Hz	SMP02	R&S	835133/011	300002681-0003	k	12.08.2011	12.08.2014
7	n. a.	Dual Channel Power Meter	NRVD	R&S	835430/044	300002681-0004	k	22.08.2012	22.08.2014
8	n. a.	Signal Analyzer 20Hz-26,5GHz-150 to + 30 DBM	FSIQ26	R&S	835540/018	300002681-0005	k	01.02.2012	01.02.2014
9	n. a.	Frequency Standard (Rubidium Frequency Standard)	MFS (Rubidium)	R&S (Datum)	002	300002681-0009	Ve	21.08.2012	21.08.2014
10	n. a.	Directional Coupler	101020010	Krytar	70215	300002840	ev		
11	n. a.	DC-Blocker	8143	Inmet Corp.	none	300002842	ne		
12	n. a.	Powersplitter	6005-3	Inmet Corp.		300002841	ev		
13	n. a.	Temperature Test Chamber	VT 4002	Heraeus Voetsch	58566046820 010	300003019	Ve	20.09.2011	20.09.2013
14	n. a.	CBT (Bluetooth Tester + EDR Signalling)	CBT 1153.9000 K35	R&S	100185	300003416	viKI!	21.08.2012	21.08.2014
15	n. a.	Spectrum Analyzer 9kHz to 30GHz - 140..+30dBm	FSP30	R&S	100886	300003575	k	22.08.2012	22.08.2014
16	n. a.	CBT-K57 Software-Option for CBT/CBT32	CBT-K57	R&S	101051	300003910	ne		
17	n. a.	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2818A03450	300001040	Ve	12.01.2012	12.01.2015
18	n. a.	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032	viKI!	11.05.2011	11.05.2013
19	n. a.	Active Loop Antenna	6502	EMCO	2210	300001015	ne		
20	n. a.	Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996	ev		
21	n. a.	Switch / Control Unit	3488A	HP Meßtechnik	*	300000199	ne		
22	n. a.	Switch / Control Unit	3488A	HP Meßtechnik	2719A15013	300001156	ne		
23	9	Isolating Transformer	MPL IEC625 Bus	Erfi	91350	300001155	ne		

			Regeltrennt ravo						
24	n. a.	Three-Way Power Splitter, 50 Ohm	11850C	HP Meßtechnik		300000997	ne		
25	n. a.	Amplifier	js42- 00502650- 28-5a	Parzich GMBH	928979	300003143	ne		
26	n. a.	Band Reject filter	WRCG185 5/1910- 1835/1925- 40/8SS	Wainwright	7	300003350	ev		
27	n. a.	Band Reject filter	WRCG240 0/2483- 2375/2505- 50/10SS	Wainwright	11	300003351	ev		
28	n. a.	Highpass Filter	WHKX7.0/1 8G-8SS	Wainwright	18	300003789	ne		
29	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbe ck	371	300003854	vkI!	14.10.2011	14.10.2014
30	n. a.	MXE EMI Receiver 20 Hz bis 26,5 GHz	N9038A	Agilent Technologi es	MY51210197	300004405	k	21.02.2013	21.02.2014
31	45	Switch-Unit	3488A	HP Meßtechnik	2719A14505	300000368	g		
32	50	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2920A04466	300000580	ne		
33	n. a.	software	SPS_PHE 1.4f	Spitzberger & Spieß	B5981; 5D1081;B597 9	300000210	ne		
34	n. a.	EMI Test Receiver	ESCI 3	R&S	100083	300003312	k	09.01.2013	09.01.2014
35	n. a.	Analyzer- Reference- System (Harmonics and Flicker)	ARS 16/1	SPS	A3509 07/0 0205	300003314	k	14.07.2011	14.07.2013
36	n. a.	Amplifier	JS42- 00502650- 28-5A	MITEQ	1084532	300003379	ev		
37	n. a.	Antenna Tower	Model 2175	ETS- LINDGREN	64762	300003745	izw		
38	n. a.	Positioning Controller	Model 2090	ETS- LINDGREN	64672	300003746	izw		
39	n. a.	Turntable Interface-Box	Model 105637	ETS- LINDGREN	44583	300003747	izw		
40	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbe ck	295	300003787	k	12.04.2012	12.04.2014
41	n. a.	Spectrum- Analyzer	FSU26	R&S	200809	300003874	k	16.01.2013	16.01.2014

**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
vkI!	Attention: extended calibration interval	*	next calibration ordered / currently in progress
NK!	Attention: not calibrated		

**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	2013-03-27
-A	Correction of SW status and PIN	2013-04-02
-B	Changed standard version / changed HW status	2013-04-04

**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



Deutsche Akkreditierungsstelle GmbH

Befehlens 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
- SARS und Hearing Aid Compatibility (HAC)
- Umweltsimulation
- Smart Card Terminals
- Bluetooth
- Wi-Fi Services

Die Akkreditierungskunde 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  
 Internetauftrag

Christine Pflüger  
 Abteilungsleiterin

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. 2525) 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](http://www.european-accreditation.org)  
 ILAC: [www.ilac.org](http://www.ilac.org)  
 IAF: [www.iaf.ru](http://www.iaf.ru)

**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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