

Annex 1: Measurement diagrams to TEST REPORT No.: 6-0010-11-1-2b-C1

According to:
FCC Regulations
Part 15C, §15.231(e), §15.207
Part15B, §15.107 class B, §15.109 class B

IC-Regulations
RSS-Gen, Issue 3
RSS-210, Issue 8

for

I+ME ACTIA GmbH

Integrated Radio Access Module (IRAM) IME 4203401







Laboratory Accreditation and Listings			
 <p>DAkkS Deutsche Akkreditierungsstelle D-PL-12047-01-01</p>	 <p>Reg. No.: 736496 MRA US-EU 0003</p>	 <p>Industry Canada Reg. No.: 3462D-1 Reg. No.: 3462D-2 Reg. No.: 3462D-3</p>	 <p>Voluntary Controls for Electromagnetic Emissions Reg. No.: R-2665, R-2666 C-2914, T-1967, G-301</p>
 <p>AUTHORIZED RF LABORATORY</p>	 <p>LAB CODE 20011130-00</p>		
accredited according to DIN EN ISO/IEC 17025			
<p>CETECOM GmbH Laboratory Radio Communications & Electromagnetic Compatibility Im Teelbruch 116 • 45219 Essen • Germany Registered in Essen, Germany, Reg. No.: HRB Essen 8984 Tel.: + 49 (0) 20 54 / 95 19-954 • Fax: + 49 (0) 20 54 / 95 19-964 E-mail: info@cetecom.com • Internet: www.cetecom.com</p>			

Table of contents

1. MEASUREMENT DIAGRAMS.....	3
1.1. Conducted emissions on AC-mains (110V/60Hz).....	3
1.2. Field strength of fundamental	6
1.3. Radiated magnetic field strength measurements ($f < 30\text{MHz}$)	8
1.4. Radiated emissions in the frequency range 30 to 1000MHz.....	10
1.5. Radiated emissions in the frequency range above 1000MHz	14
1.6. 20dB Emission bandwidth	17
1.7. 99% Occupied bandwidth.....	21
1.8. Frequency error (RSS-210/RSS-Gen.).....	25

1. Measurement diagrams

1.1. Conducted emissions on AC-mains (110V/60Hz)

1.1.1. Diagram No. 1.02

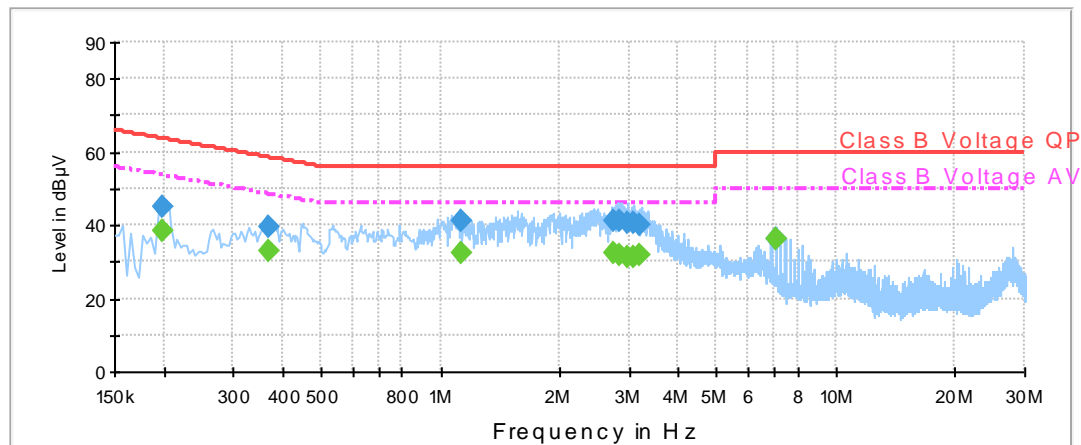
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Marg in (dB)	Limit (dBμV)
0.198281	45.1	1000.0	9.000	GN	N	0.0	18.6	63.7
0.367344	39.7	1000.0	9.000	GN	N	0.0	18.8	58.6
1.127969	41.1	1000.0	9.000	GN	N	0.1	14.9	56.0
2.745625	41.1	1000.0	9.000	GN	N	0.1	15.0	56.0
2.840000	41.1	1000.0	9.000	GN	L1	0.1	14.9	56.0
2.977813	40.6	1000.0	9.000	GN	L1	0.1	15.4	56.0
3.066094	40.4	1000.0	9.000	GN	N	0.1	15.6	56.0
3.200000	40.2	1000.0	9.000	GN	N	0.1	15.8	56.0
7.052031	36.3	1000.0	9.000	GN	N	0.1	23.7	60.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Marg in (dB)	Limit (dBμV)
0.198281	38.2	1000.0	9.000	GN	N	0.0	15.5	53.7
0.367344	32.8	1000.0	9.000	GN	N	0.0	15.8	48.6
1.127969	32.2	1000.0	9.000	GN	N	0.1	13.8	46.0
2.745625	32.2	1000.0	9.000	GN	N	0.1	13.8	46.0
2.840000	32.0	1000.0	9.000	GN	L1	0.1	14.0	46.0
2.977813	31.5	1000.0	9.000	GN	L1	0.1	14.5	46.0
3.066094	31.3	1000.0	9.000	GN	N	0.1	14.7	46.0
3.200000	31.9	1000.0	9.000	GN	N	0.1	14.1	46.0
7.052031	36.2	1000.0	9.000	GN	N	0.1	13.8	50.0

01b_FCC_Class B_Voltage_PK_QPAV_N_L1



1.1.2. Diagram No. 1.03

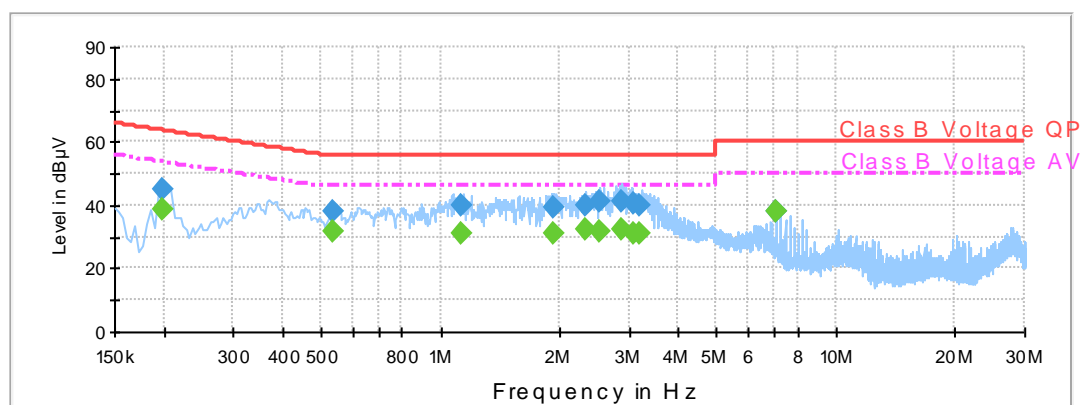
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Cor. (dB)	Marg in (dB)	Limit (dBμV)
0.199375	45.1	1000.0	9.000	GN	L1	0.0	18.5	63.6
0.537500	38.2	1000.0	9.000	GN	L1	0.0	17.8	56.0
1.128594	40.0	1000.0	9.000	GN	L1	0.1	16.0	56.0
1.941563	39.3	1000.0	9.000	GN	N	0.1	16.7	56.0
2.334375	39.7	1000.0	9.000	GN	N	0.0	16.3	56.0
2.524688	40.9	1000.0	9.000	GN	L1	0.0	15.1	56.0
2.872969	41.5	1000.0	9.000	GN	L1	0.1	14.5	56.0
3.070938	40.4	1000.0	9.000	GN	L1	0.1	15.6	56.0
3.190000	40.1	1000.0	9.000	GN	L1	0.1	15.9	56.0
7.050938	38.0	1000.0	9.000	GN	N	0.1	22.0	60.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Cor. (dB)	Marg in (dB)	Limit (dBμV)
0.199375	38.5	1000.0	9.000	GN	L1	0.0	15.1	53.6
0.537500	31.6	1000.0	9.000	GN	L1	0.0	14.4	46.0
1.128594	31.1	1000.0	9.000	GN	L1	0.1	14.9	46.0
1.941563	31.2	1000.0	9.000	GN	N	0.1	14.8	46.0
2.334375	32.2	1000.0	9.000	GN	N	0.0	13.8	46.0
2.524688	31.6	1000.0	9.000	GN	L1	0.0	14.4	46.0
2.872969	32.2	1000.0	9.000	GN	L1	0.1	13.8	46.0
3.070938	31.3	1000.0	9.000	GN	L1	0.1	14.7	46.0
3.190000	31.2	1000.0	9.000	GN	L1	0.1	14.8	46.0
7.050938	38.0	1000.0	9.000	GN	N	0.1	12.0	50.0

01b_FCC_Class B_Voltage_PK_QPAV_N_L1



1.1.3. Diagram No. 1.04

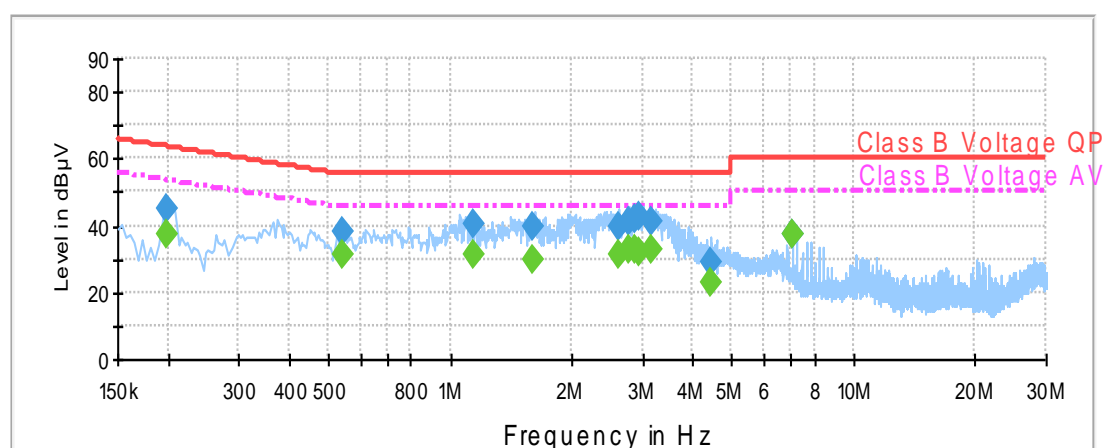
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Marg in (dB)	Limit (dBμV)
0.198281	45.1	1000.0	9.000	GN	L1	0.0	18.6	63.7
0.539219	38.0	1000.0	9.000	GN	L1	0.0	18.0	56.0
1.137344	40.2	1000.0	9.000	GN	L1	0.1	15.8	56.0
1.607344	39.9	1000.0	9.000	GN	L1	0.1	16.1	56.0
2.608438	39.7	1000.0	9.000	GN	N	0.1	16.3	56.0
2.761406	40.9	1000.0	9.000	GN	N	0.1	15.1	56.0
2.882344	42.1	1000.0	9.000	GN	L1	0.1	13.9	56.0
2.937656	42.5	1000.0	9.000	GN	L1	0.1	13.5	56.0
3.144688	41.5	1000.0	9.000	GN	N	0.1	14.5	56.0
4.428750	29.1	1000.0	9.000	GN	L1	0.1	26.9	56.0
7.049844	37.7	1000.0	9.000	GN	L1	0.1	22.4	60.0

Final Result 2

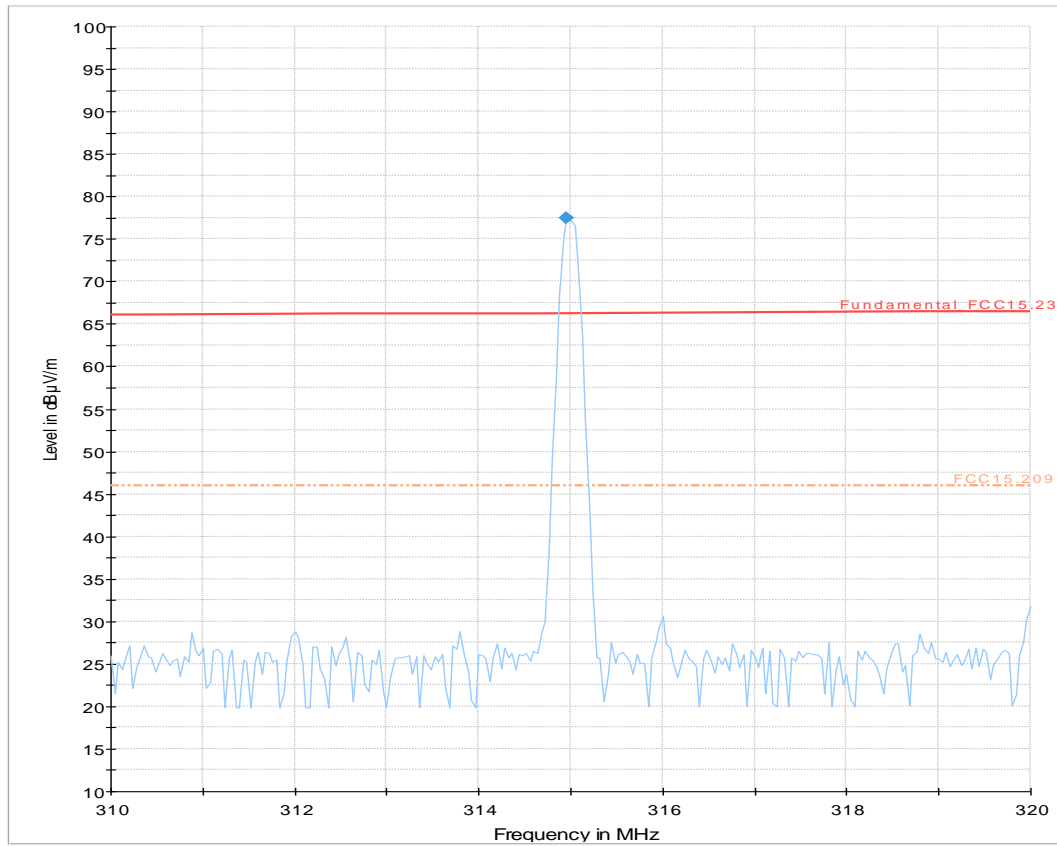
Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Marg in (dB)	Limit (dBμV)
0.198281	37.7	1000.0	9.000	GN	L1	0.0	16.0	53.7
0.539219	31.3	1000.0	9.000	GN	L1	0.0	14.8	46.0
1.137344	31.4	1000.0	9.000	GN	L1	0.1	14.6	46.0
1.607344	29.8	1000.0	9.000	GN	L1	0.1	16.2	46.0
2.608438	31.4	1000.0	9.000	GN	N	0.1	14.6	46.0
2.761406	32.9	1000.0	9.000	GN	N	0.1	13.1	46.0
2.882344	32.6	1000.0	9.000	GN	L1	0.1	13.4	46.0
2.937656	32.1	1000.0	9.000	GN	L1	0.1	13.9	46.0
3.144688	32.4	1000.0	9.000	GN	N	0.1	13.6	46.0
4.428750	23.0	1000.0	9.000	GN	L1	0.1	23.0	46.0
7.049844	37.5	1000.0	9.000	GN	L1	0.1	12.5	50.0

01b_FCC_Class B_Voltage_PK_QPAV_N_L1

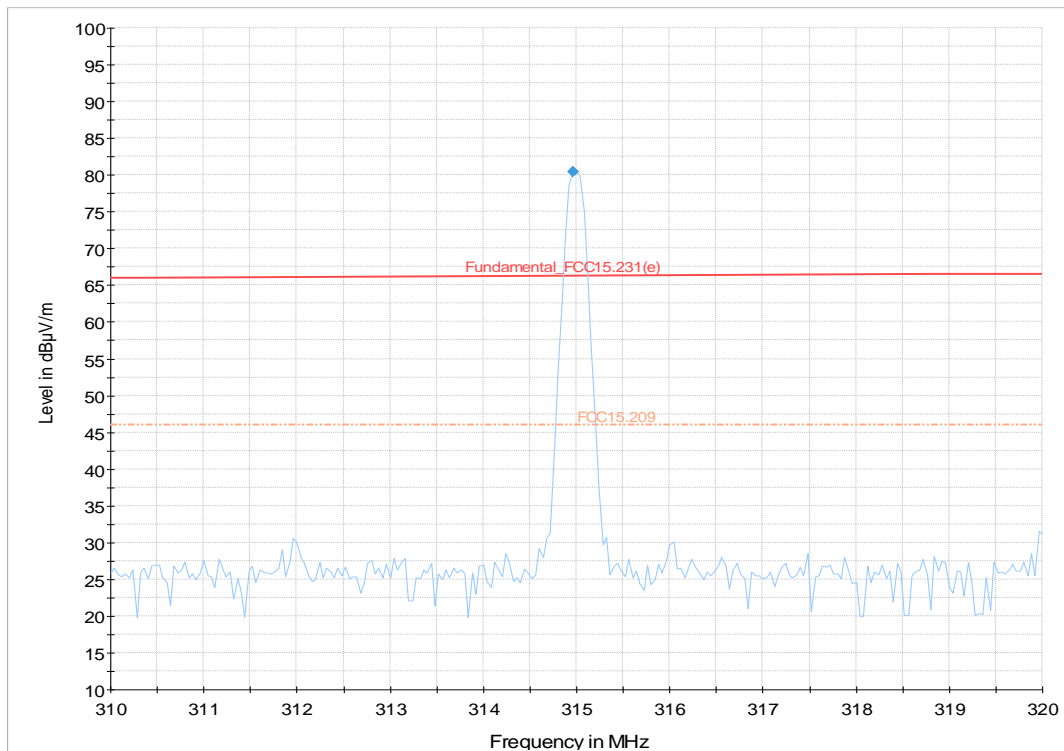


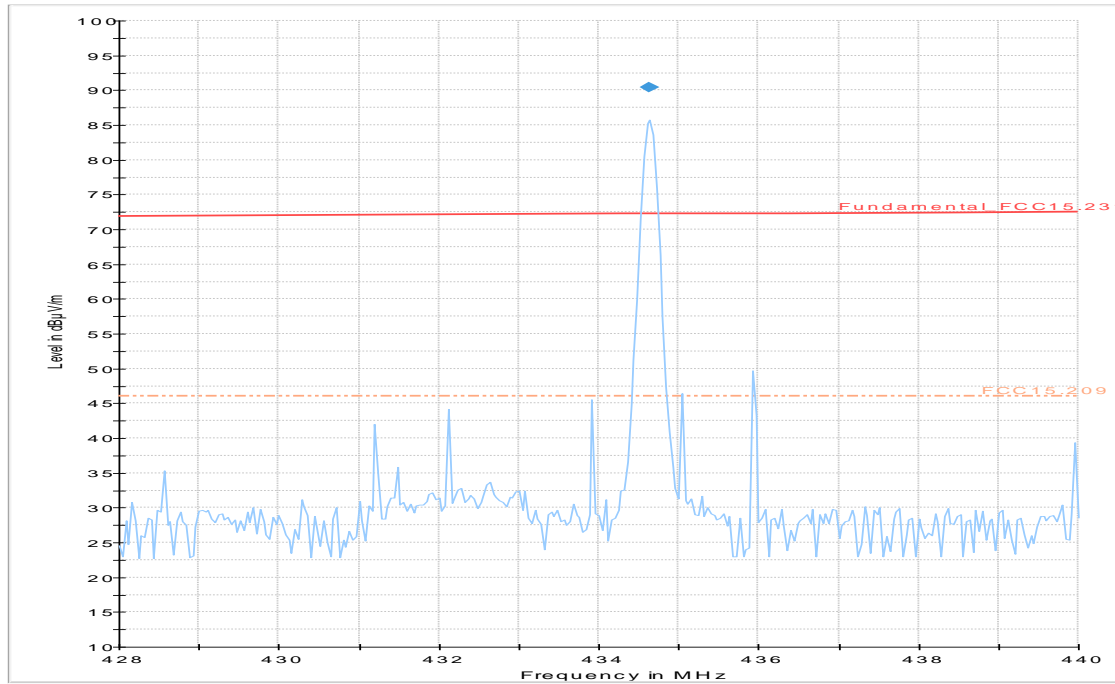
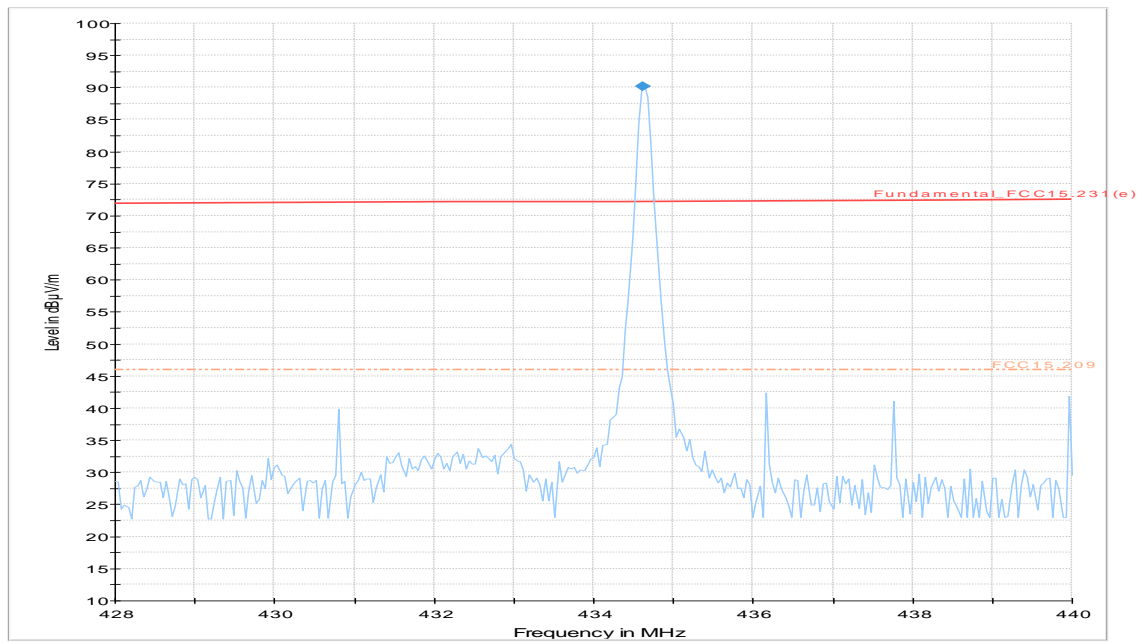
1.2. Field strength of fundamental

1.2.1. Operating-Mode: 315 MHz/ Port 1



1.2.2. Operating-Mode: 315 MHz/ Port 2



1.2.3. Operating-Mode: 434 MHz/ Port 3**1.2.4. Operating-Mode: 434 MHz/ Port 4**

1.3. Radiated magnetic field strength measurements (f<30MHz)

1.3.1. Operating-Mode: 315MHz/ Port 2

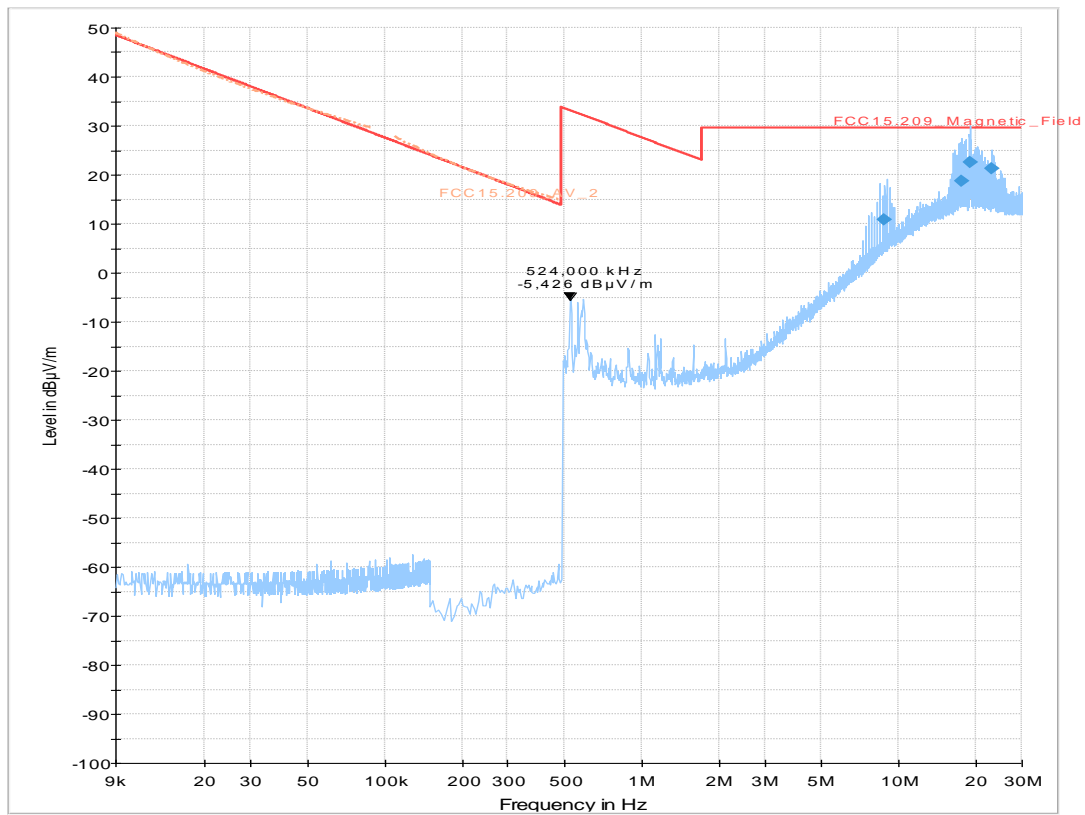


Diagram 3.04: EUT horizontal

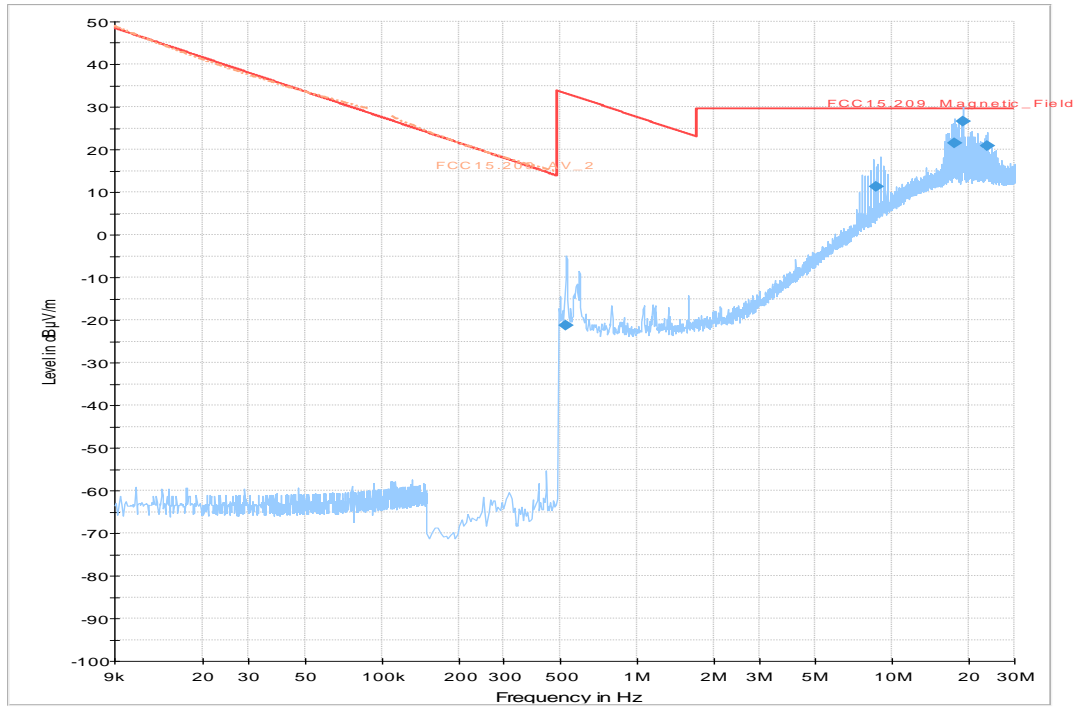
1.3.2. Operating-Mode: 434MHz/ Port 3

Diagram 3.01: EUT vertical

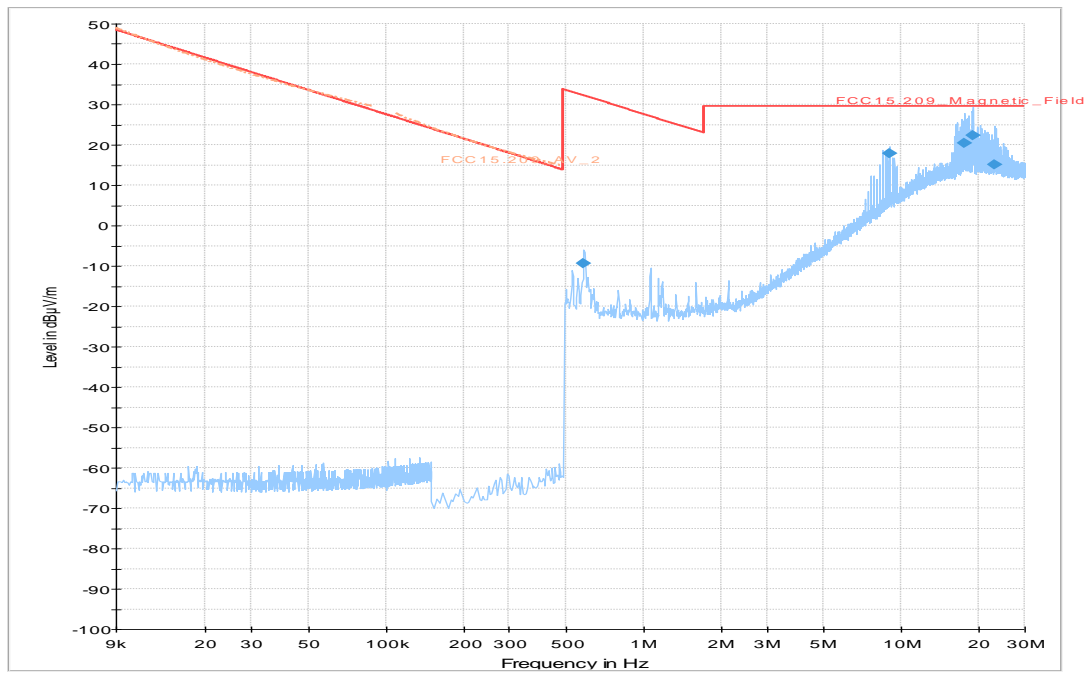


Diagram 3.02: EUT horizontal

1.4. Radiated emissions in the frequency range 30 to 1000MHz

1.4.1. TX-Mode 315 MHz

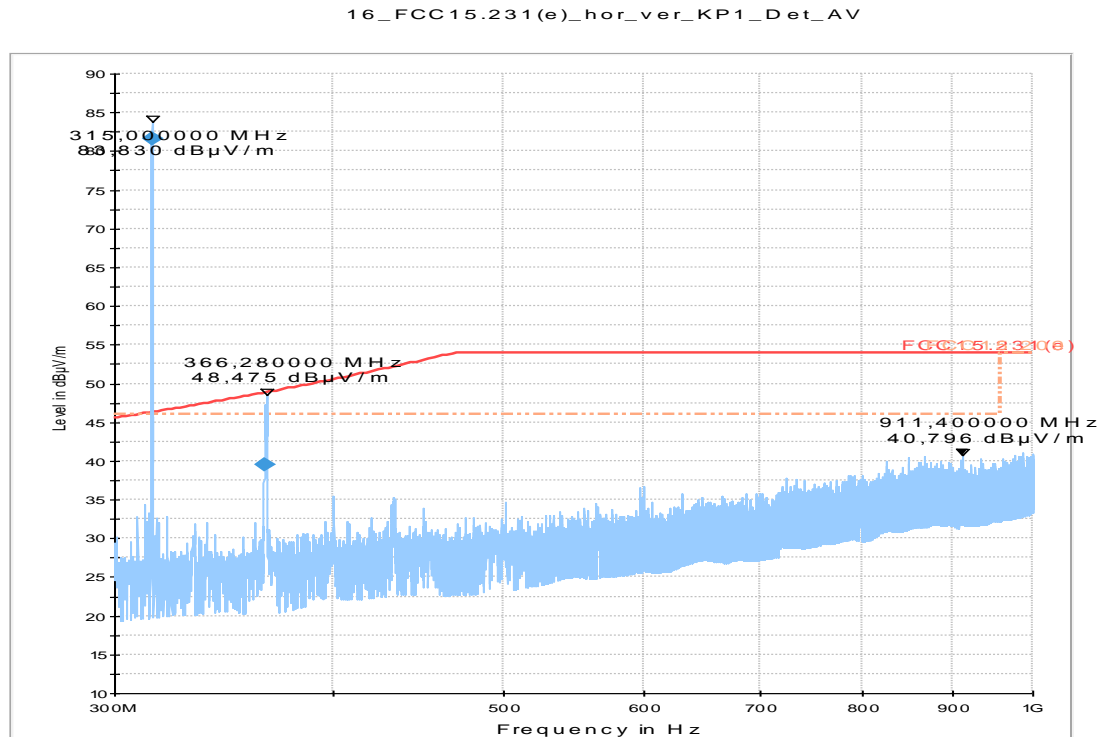


Diagram 2.17: TX-Mode 315MHz, Port 2 activated

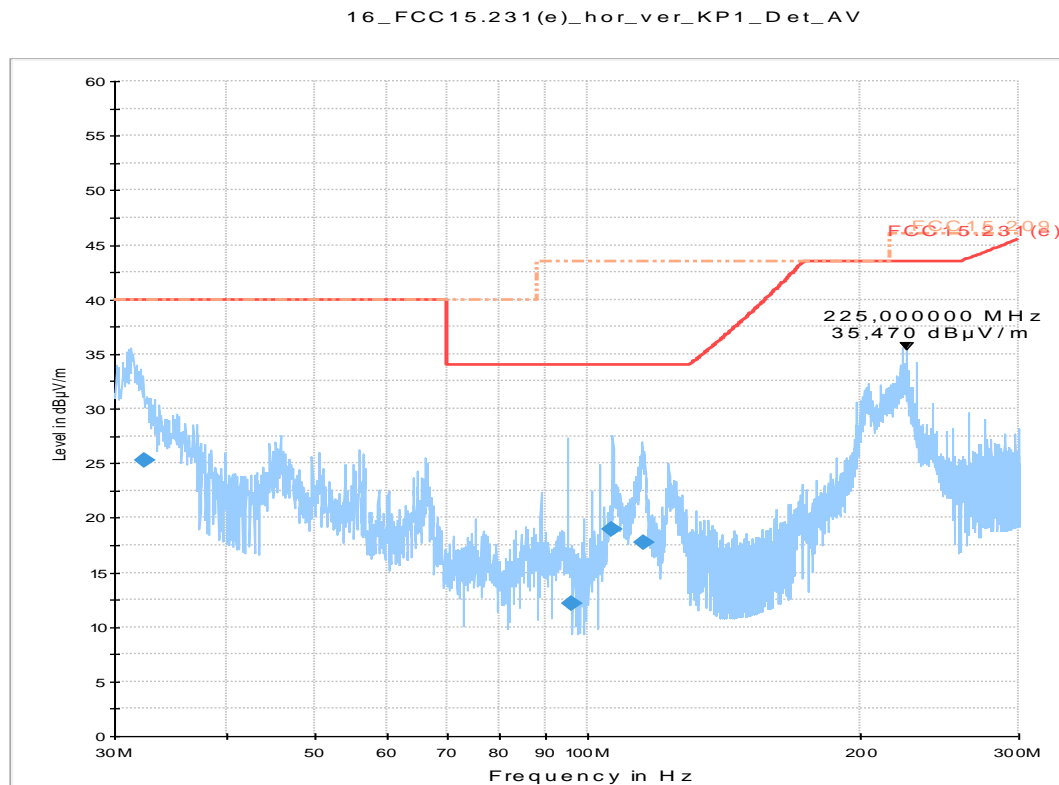


Diagram 2.17b: TX-Mode 315MHz, Port 2 activated

1.4.2. TX-Mode 434 MHz

16_FCC15.231(e)_hor_ver_KP1_Det_AV

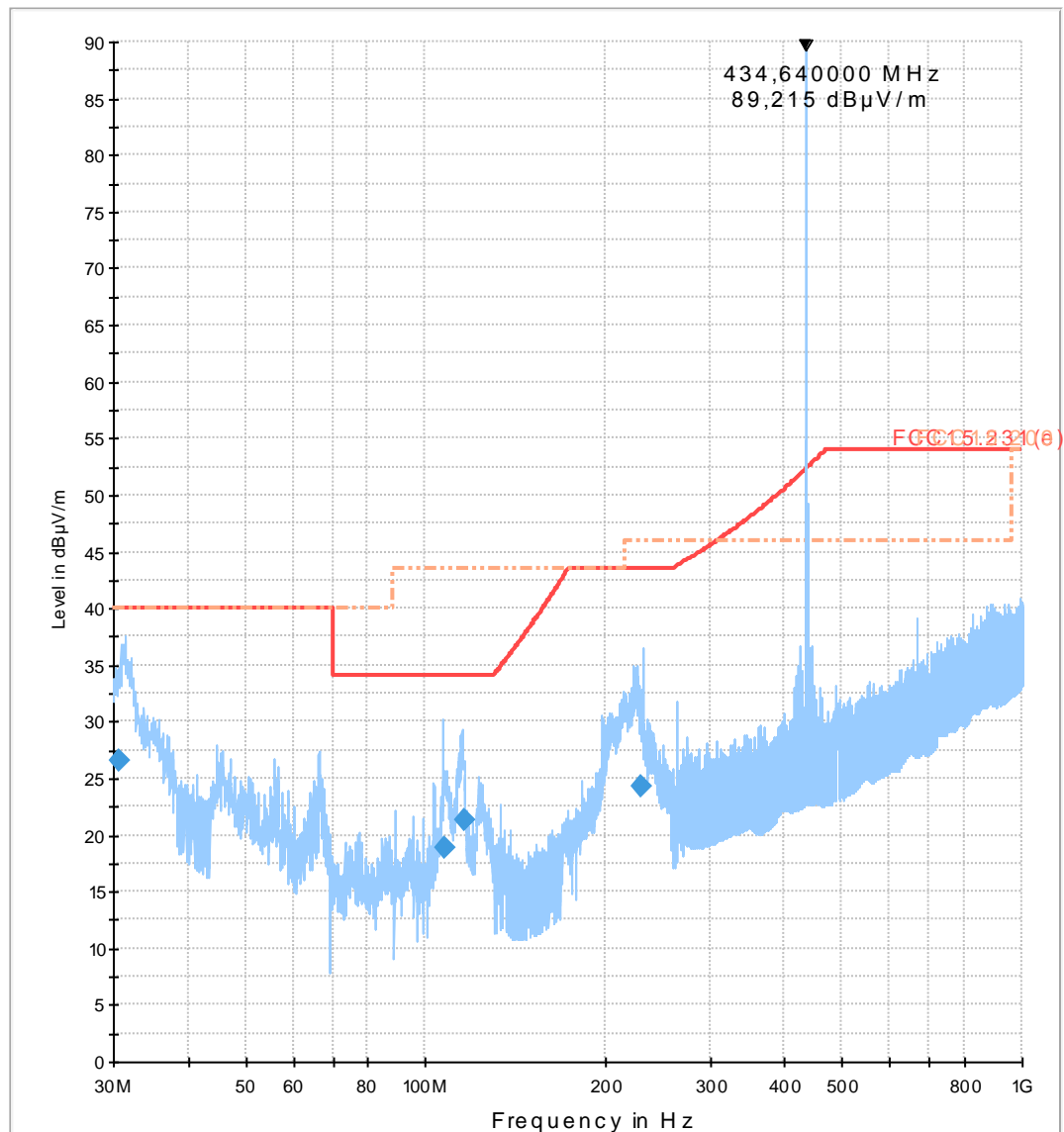


Diagram 8.214b: TX-Mode 434 MHz, Port 3 activated

1.4.3. RX-Mode 315 MHz

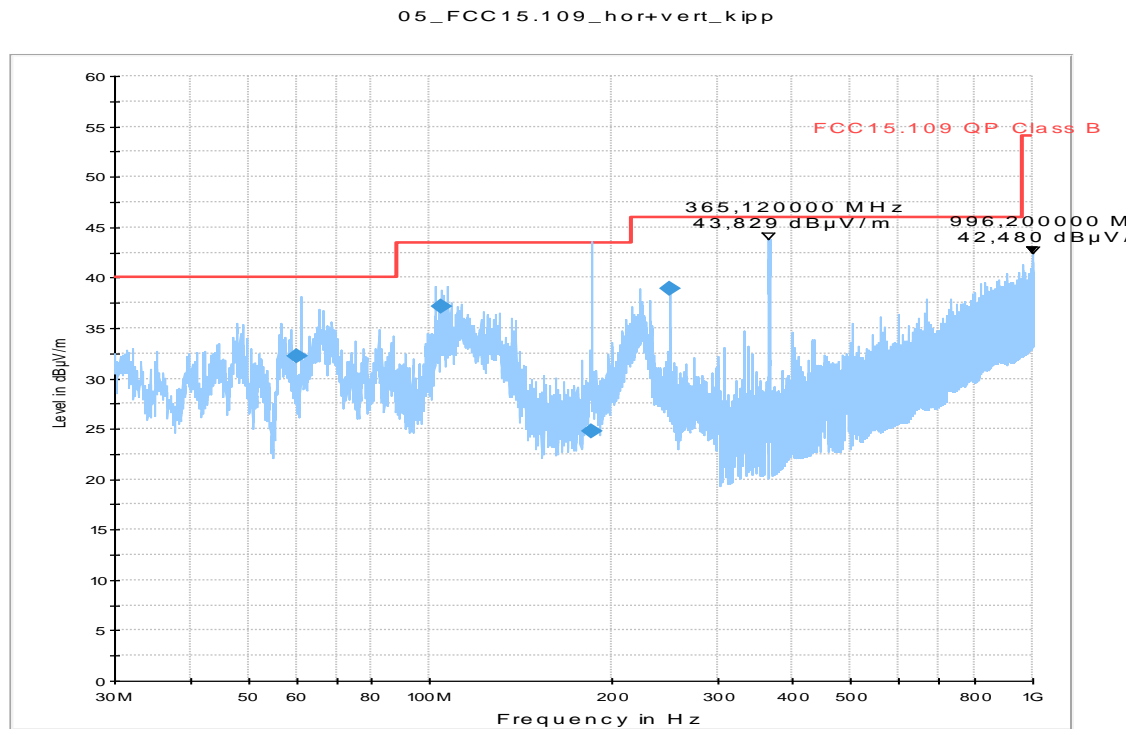


Diagram 2.19: RX-Mode (Accessories placed inside chamber)

1.4.4. RX-Mode 434 MHz, Set-up 1

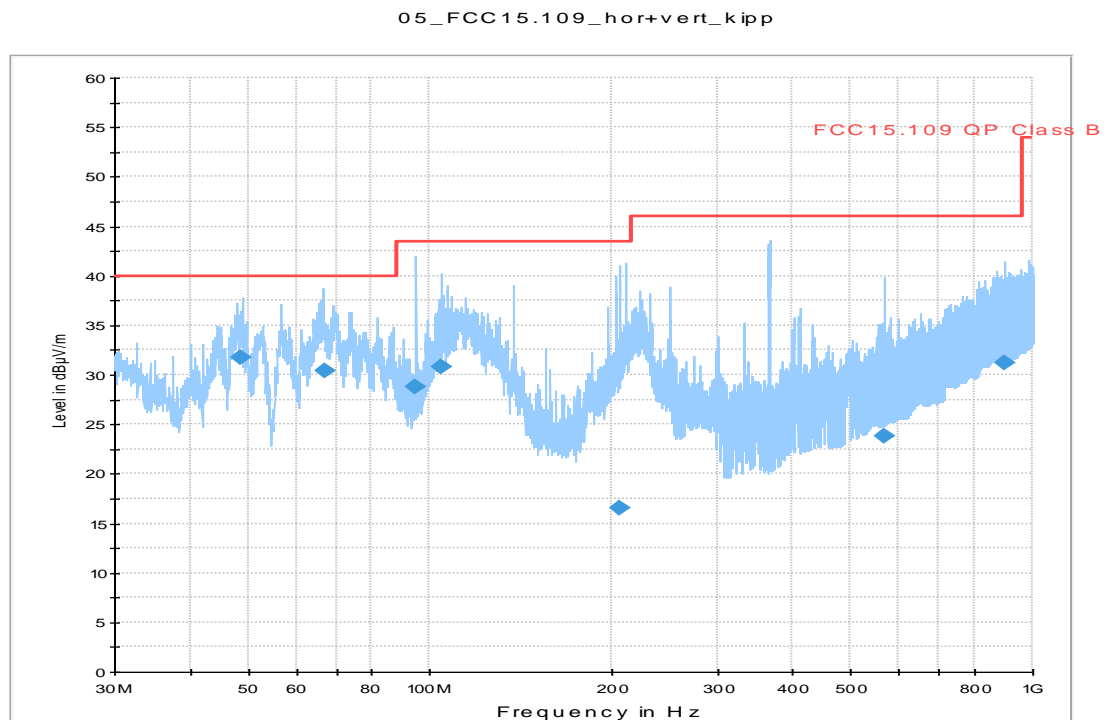


Diagram 2.215: RX-Mode (Accessories placed inside chamber)

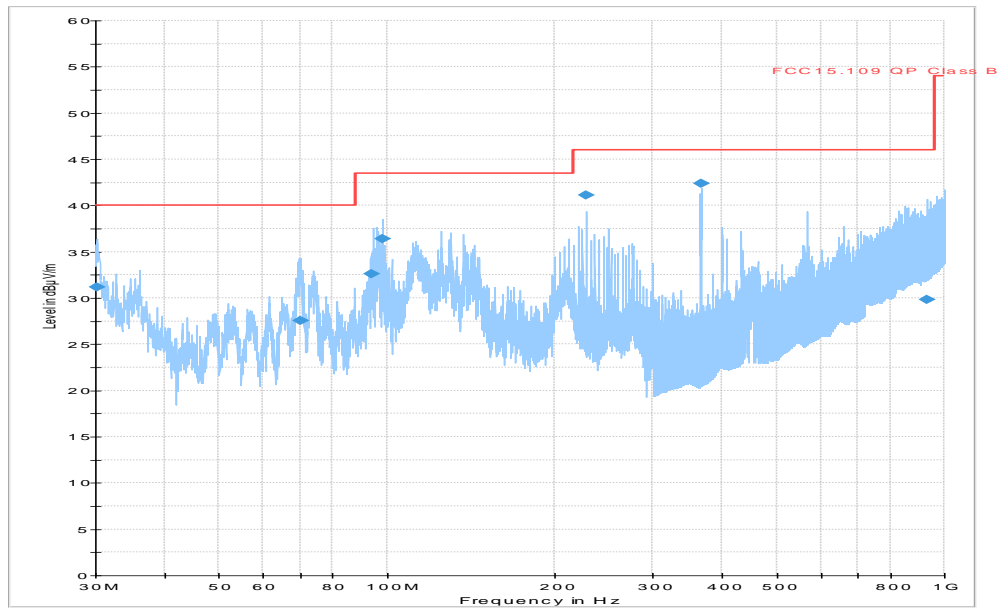
1.4.5. RX-Mode 434.64 MHz, Set-up 2

Diagram 2.04: EUT and PoE standing

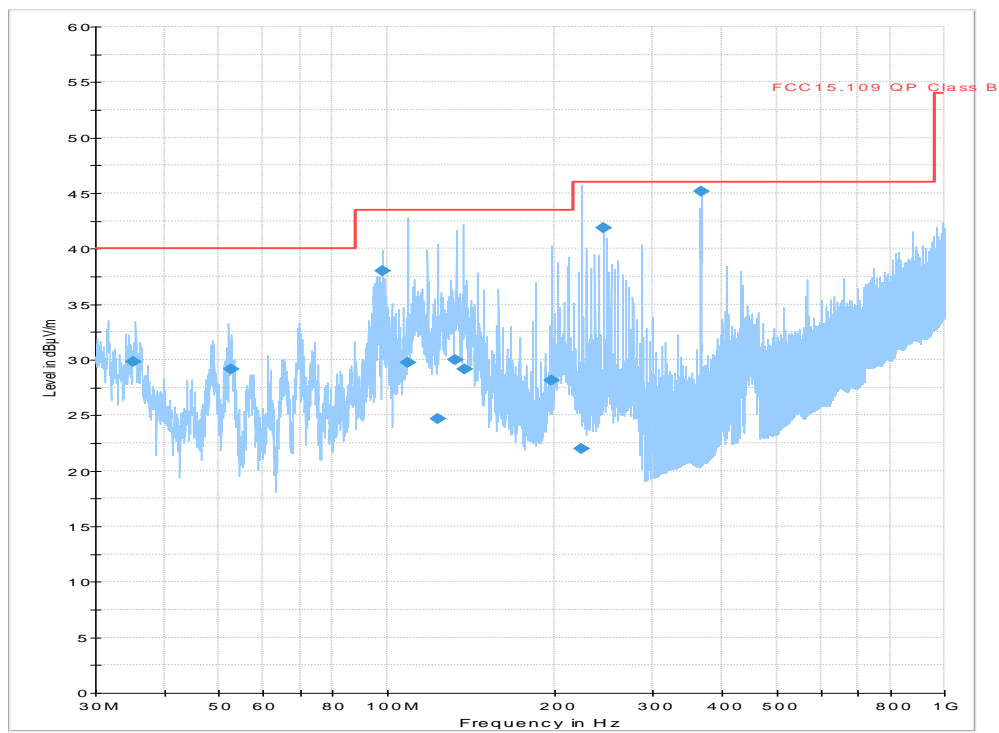


Diagram 2.05: EUT and PoE laying

1.5. Radiated emissions in the frequency range above 1000MHz

1.5.1. TX-Mode 315 MHz

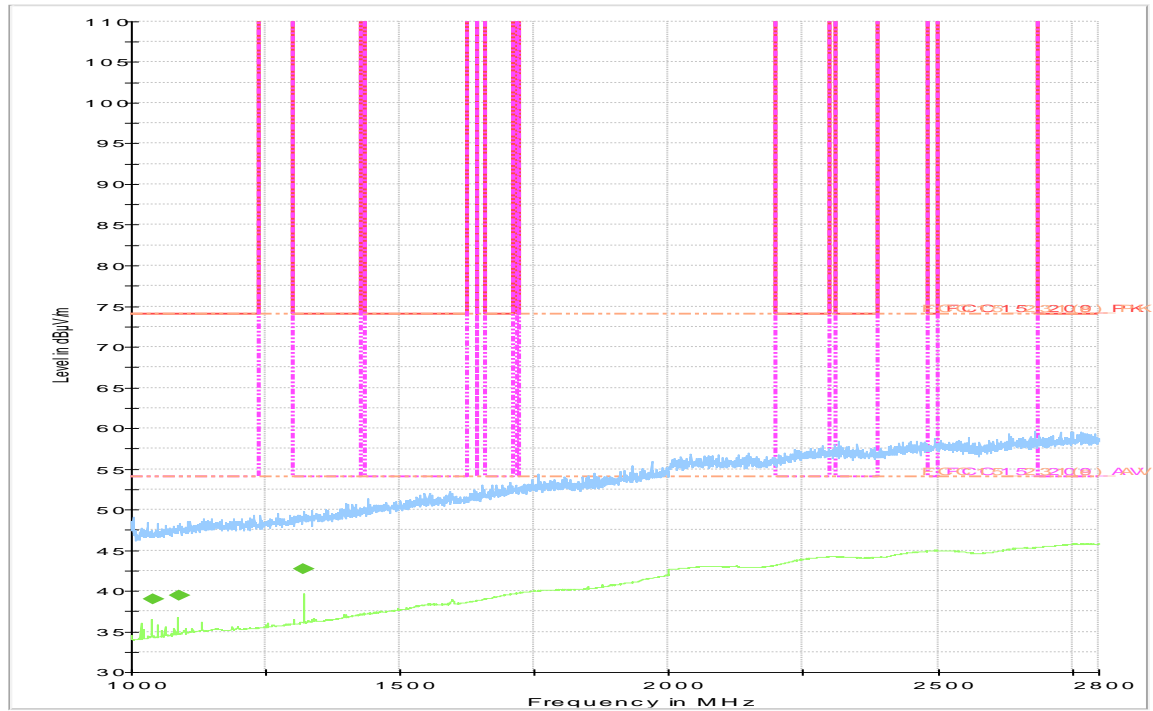


Diagram 2.21, Port 2 activated

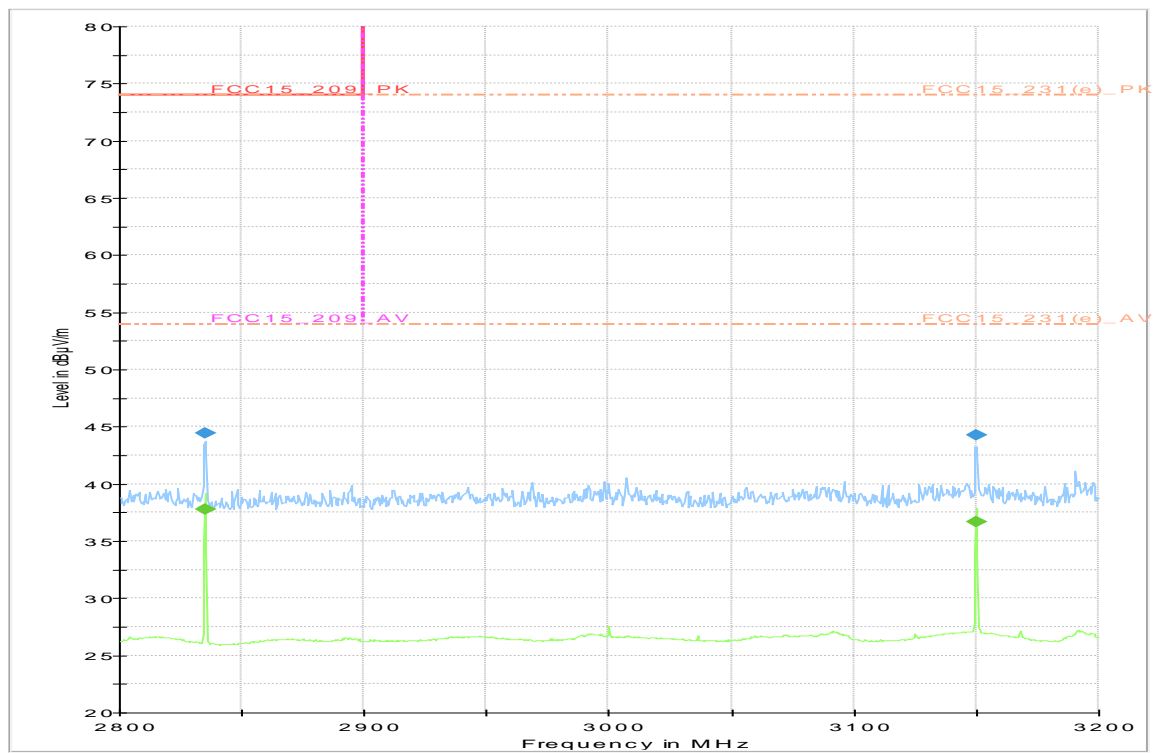


Diagram 2.22, Port 2 activated

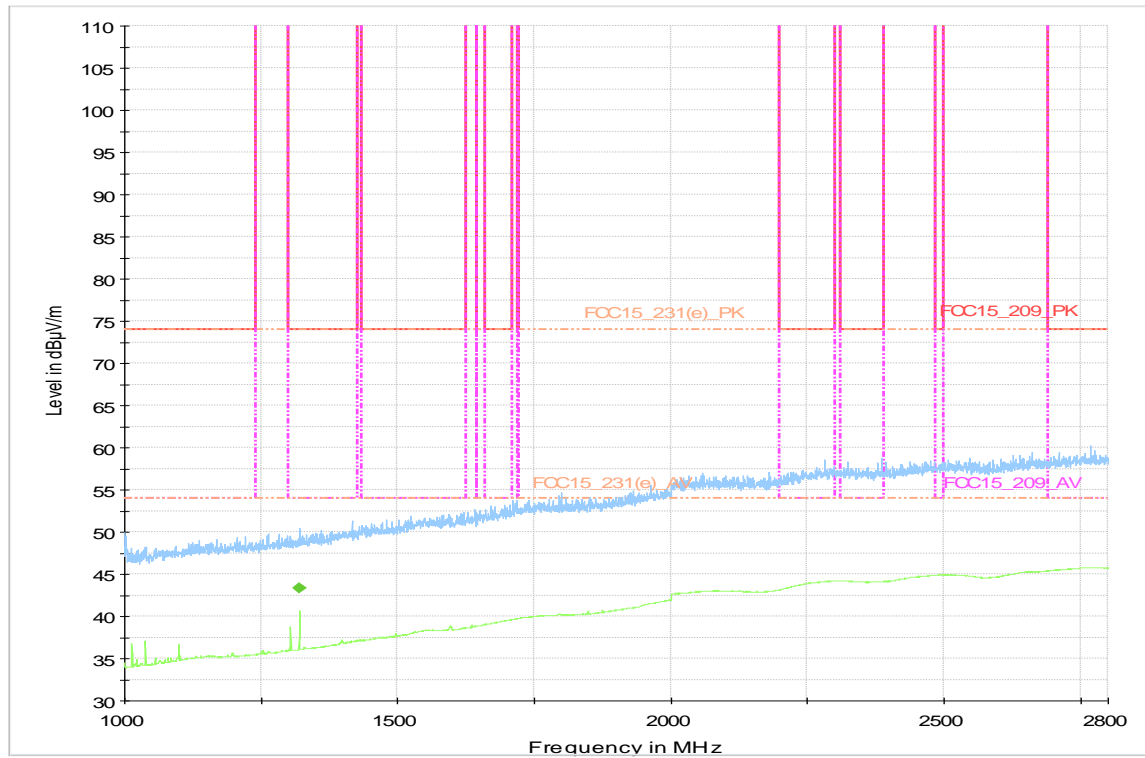
1.5.2. TX-Mode 434.64 MHz

Diagram 2.217

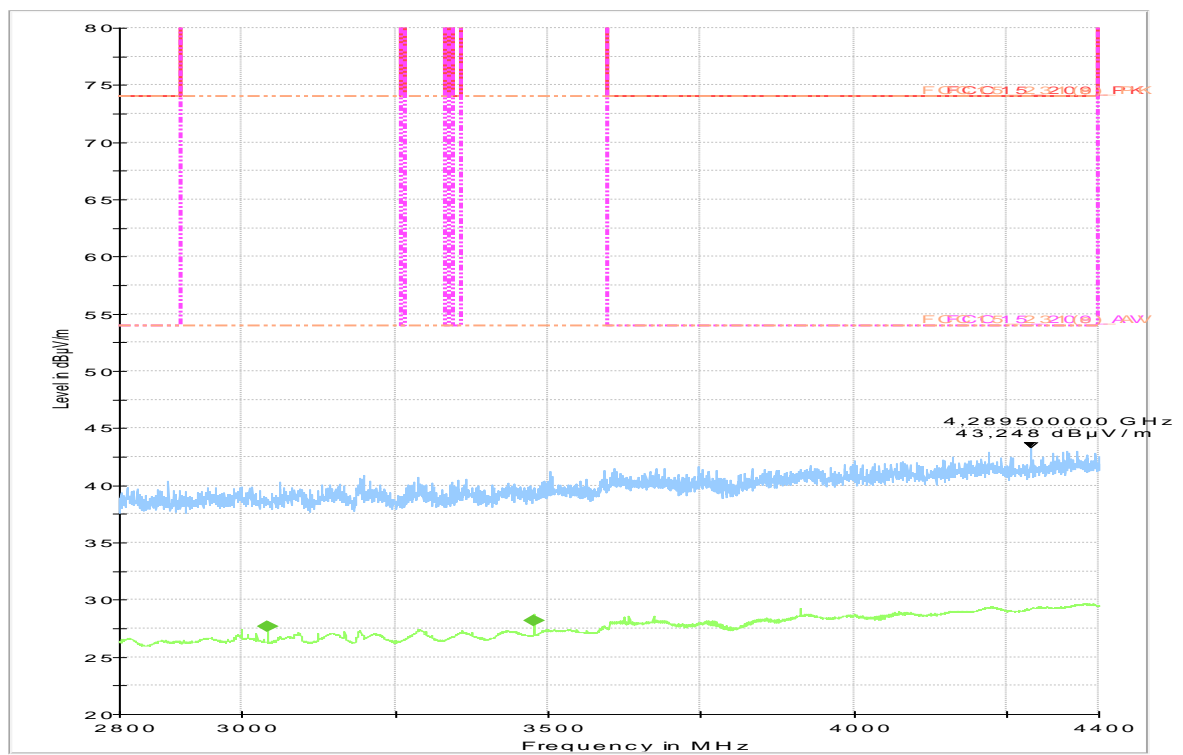


Diagram 2.218

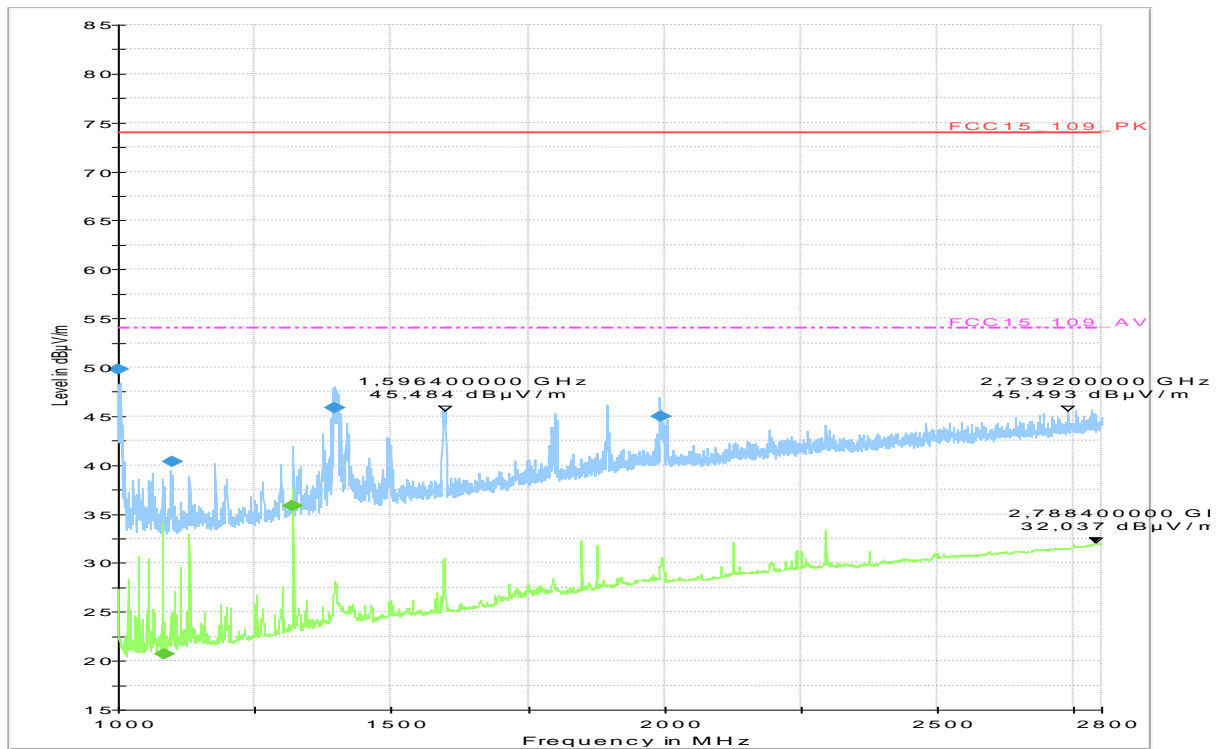
1.5.3. RX-Mode 315 MHz

Diagram 2.20

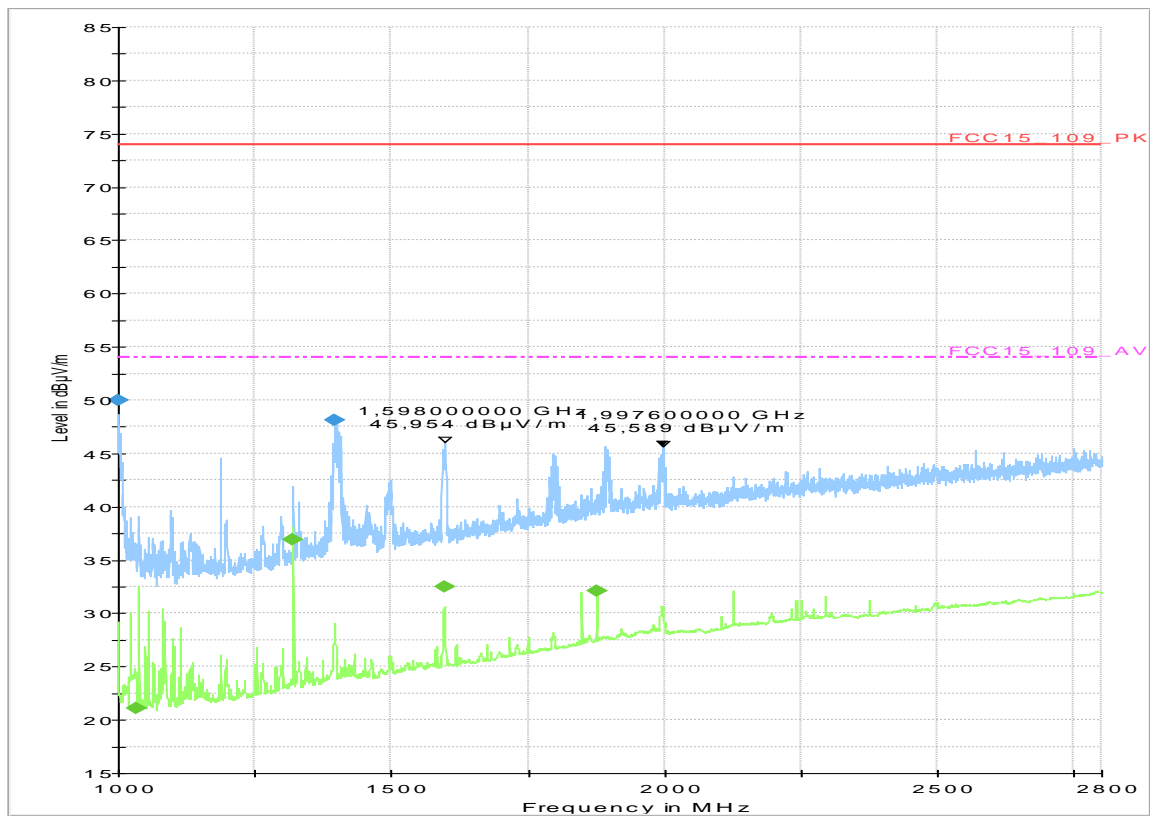
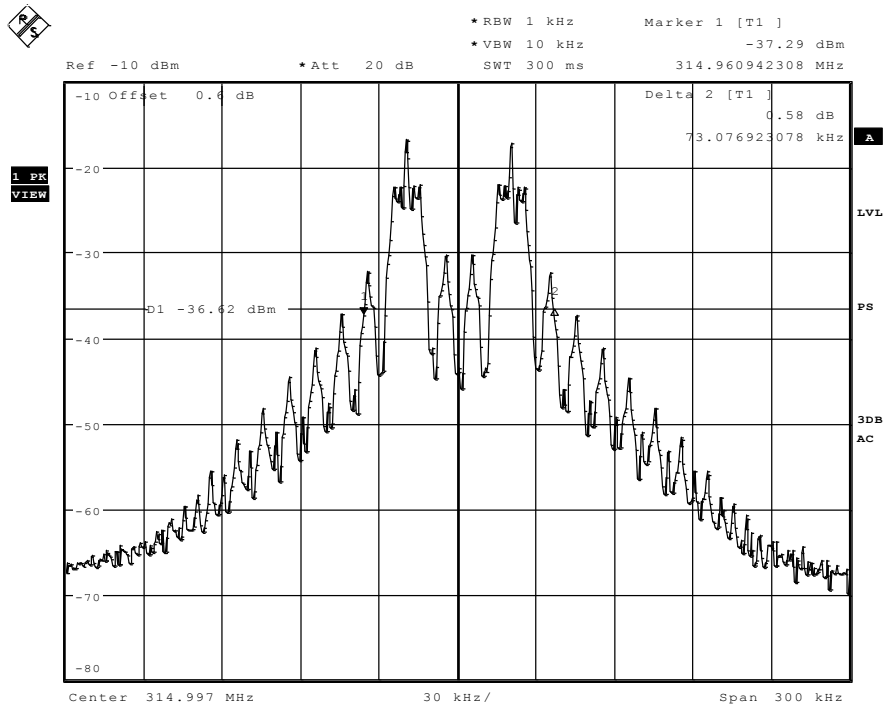
1.5.4. RX-Mode 434.64 MHz

Diagram 2.216

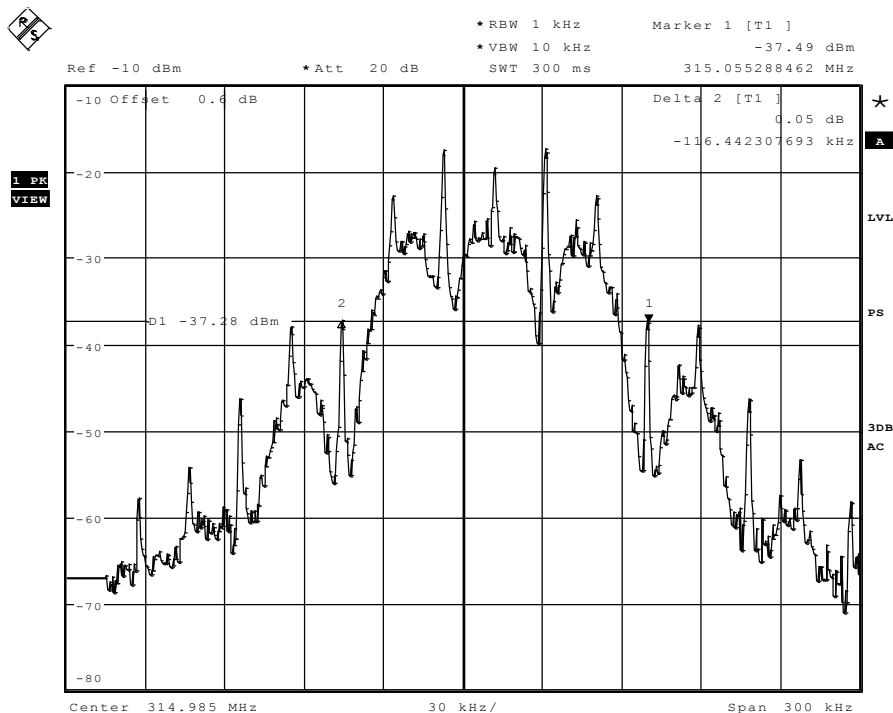
1.6. 20dB Emission bandwidth

1.6.1. Operating-Mode: 315MHz/ Port 1



Date: 10.FEB.2012 13:04:33

Data rate 5000kbit/s

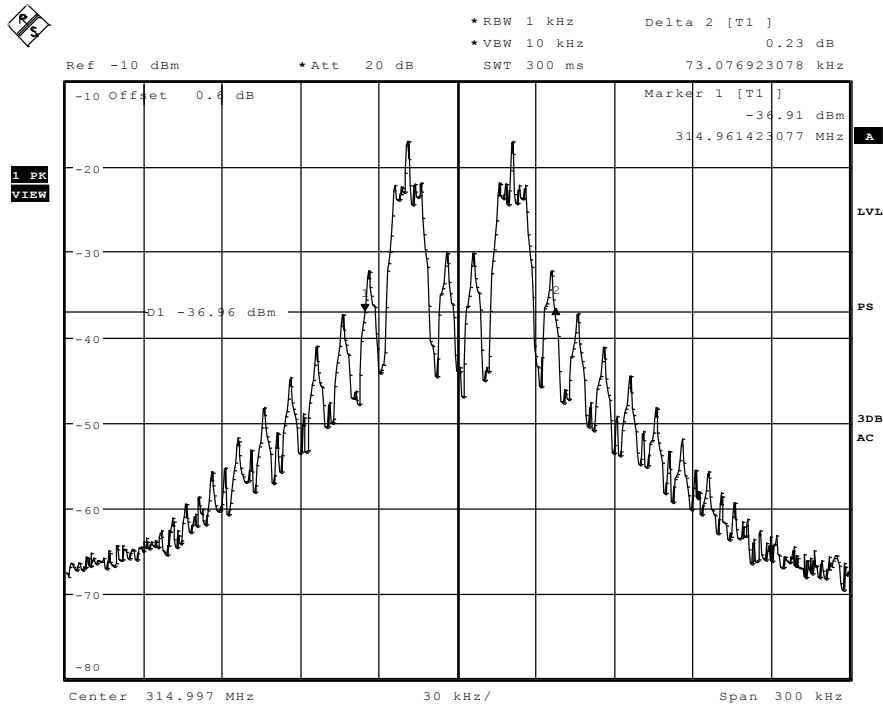


Date: 10.FEB.2012 13:01:04

Data rate 19200kbit/s

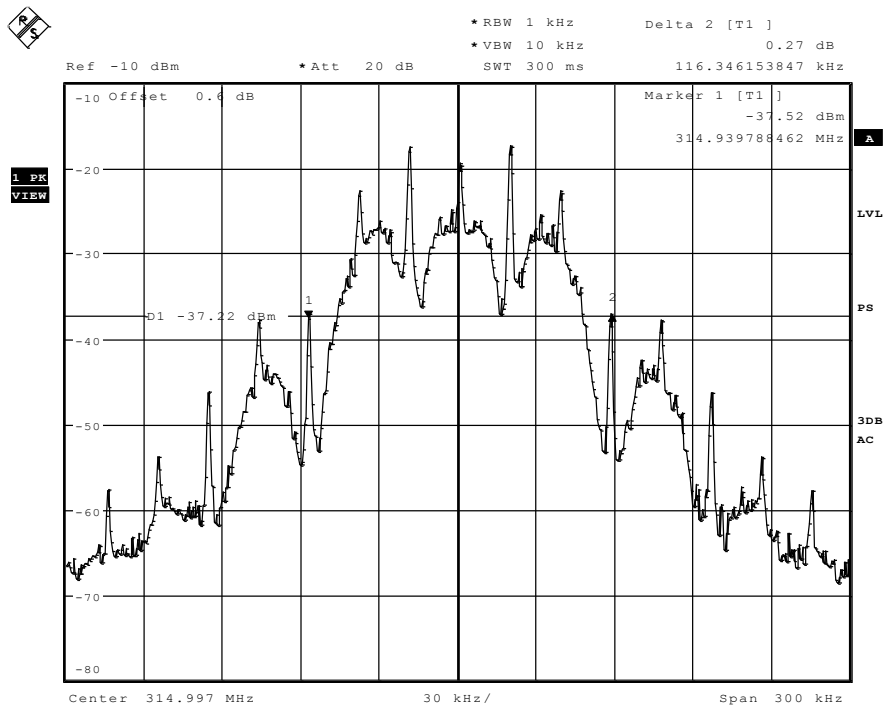
TR6-0010-11-1-2b-A1

1.6.2. Operating-Mode: 315MHz/ Port 2



Date: 10.FEB.2012 13:08:42

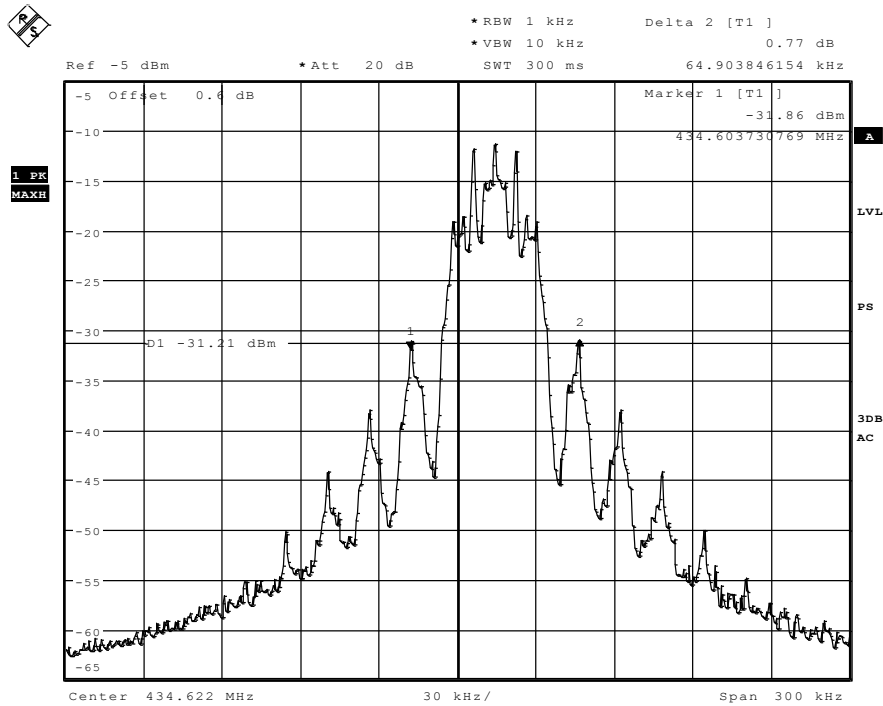
Data rate 5000kbit/s



Date: 10.FEB.2012 13:12:51

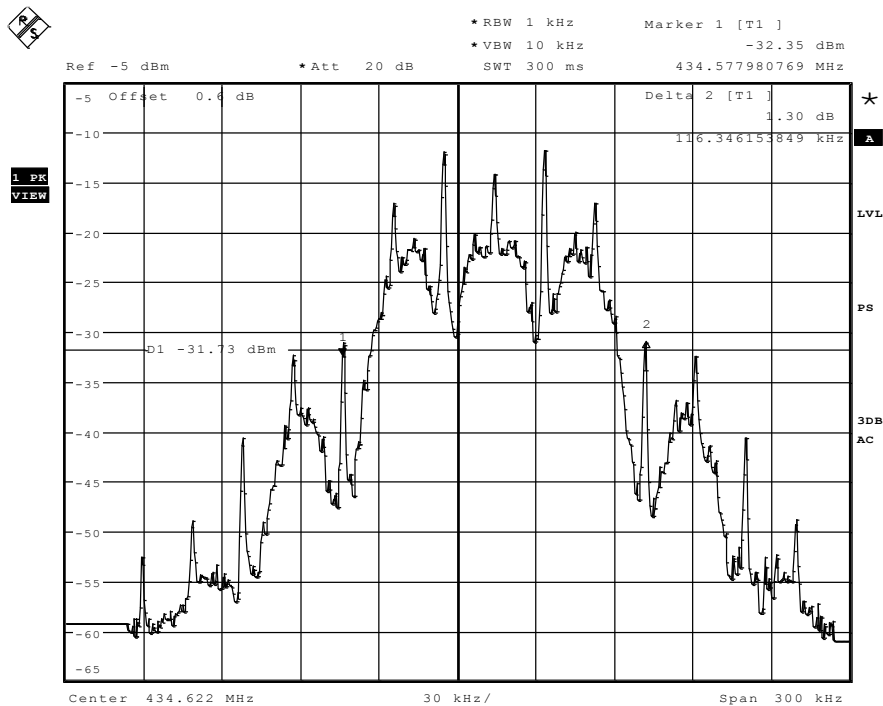
Data rate 19200kbit/s

1.6.3. Operating-Mode: 434.64MHz/ Port 3



Date: 10.FEB.2012 13:45:18

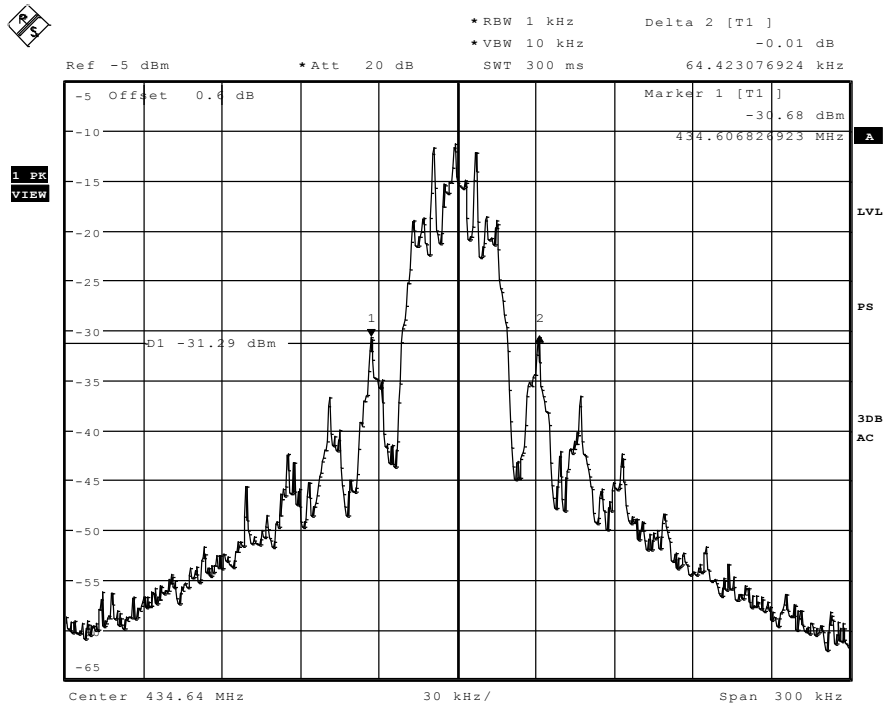
Data rate 8000kbit/s



Date: 10.FEB.2012 13:37:38

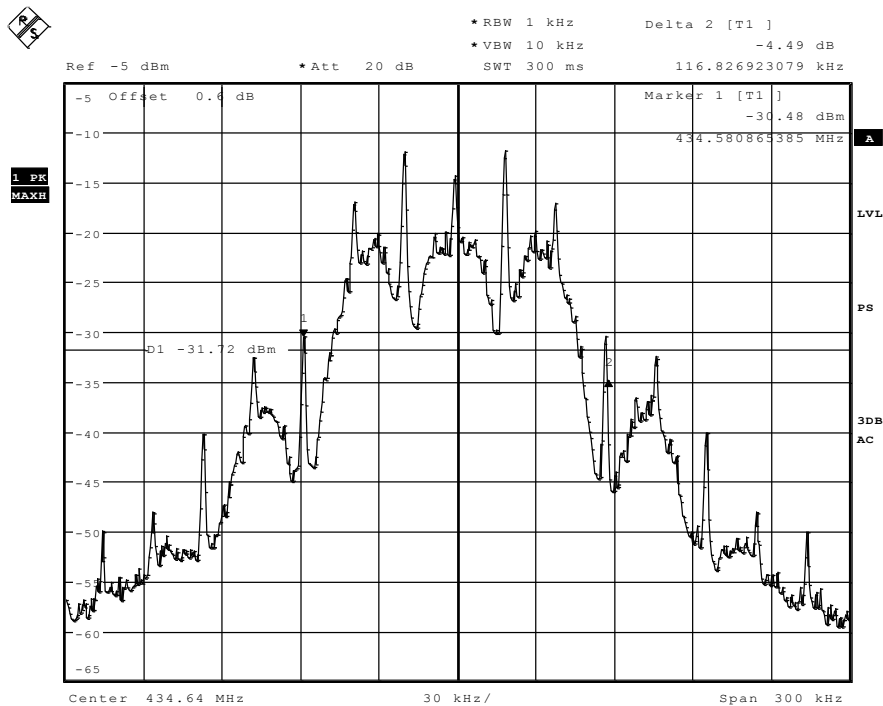
Data rate 19200kbit/s

1.6.4. Operating-Mode: 434.64MHz/ Port 4



Date: 10.FEB.2012 13:18:42

Data rate 8000kbit/s

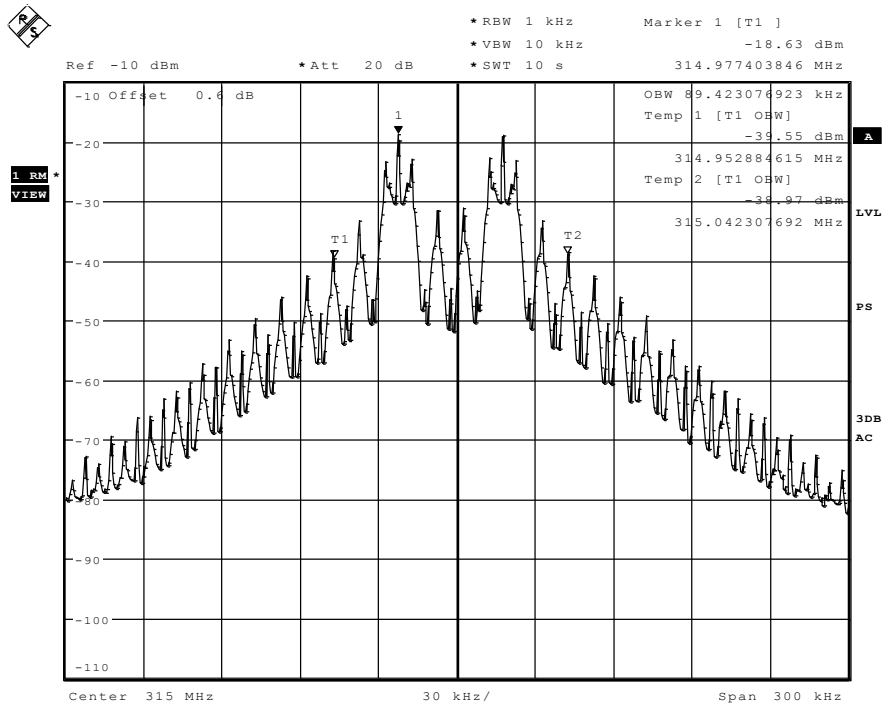


Date: 10.FEB.2012 13:32:39

Data rate 19200kbit/s

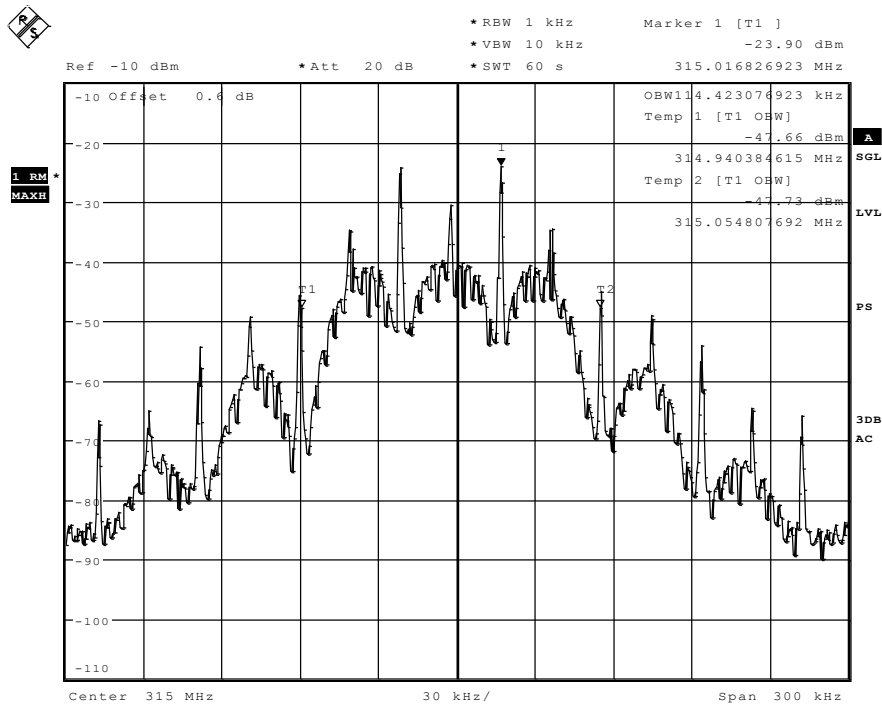
1.7. 99% Occupied bandwidth

1.7.1. Operating-Mode: 315MHz/ Port 1



Date: 10.FEB.2012 12:51:08

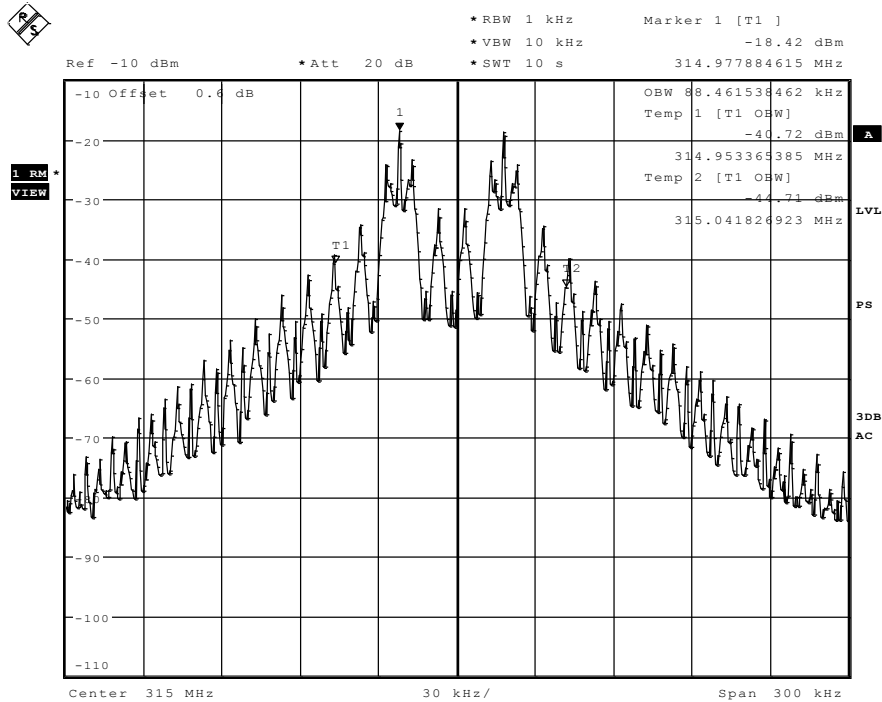
Data rate 5000kbit/s



Date: 10.FEB.2012 12:57:45

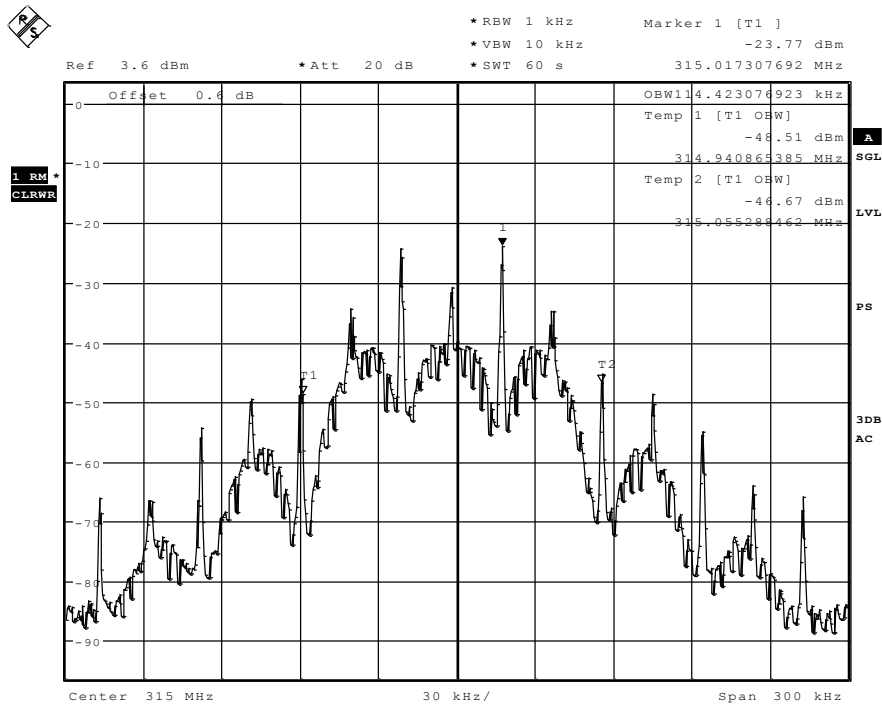
Data rate 19200kbit/s

1.7.2. Operating-Mode: 315MHz/ Port 2



Date: 10.FEB.2012 12:36:16

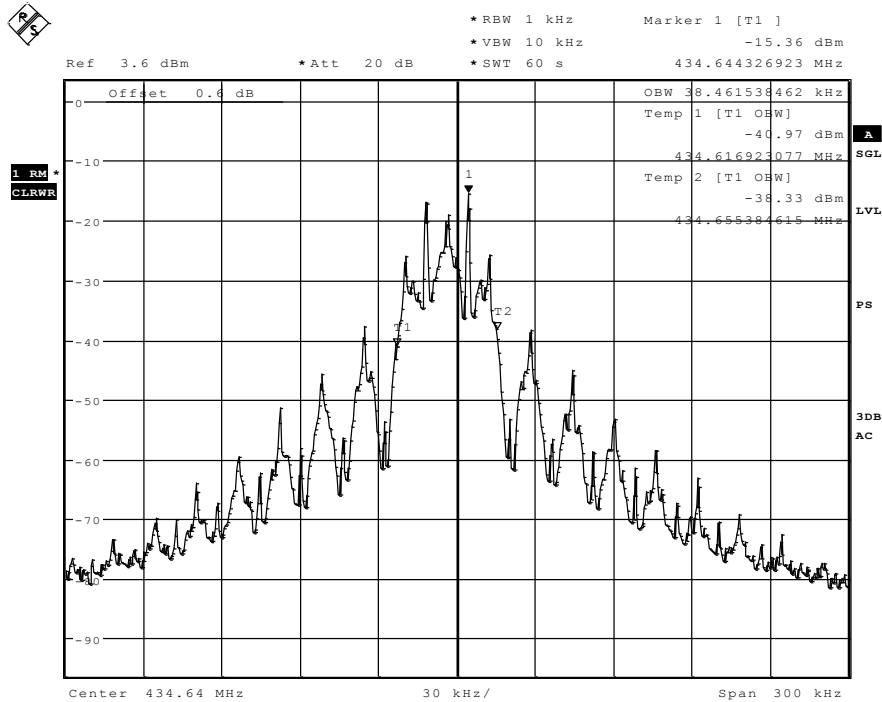
Data rate 5000kbit/s



Date: 10.FEB.2012 12:16:49

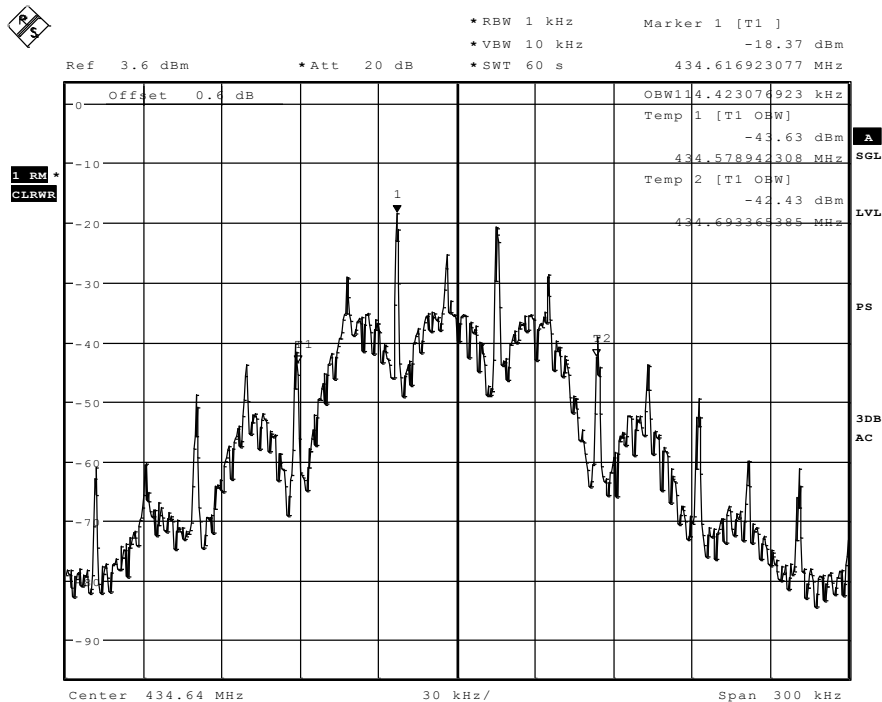
Data rate 19200kbit/s

1.7.3. Operating-Mode: 434.64MHz/ Port 3



Date: 10.FEB.2012 12:08:49

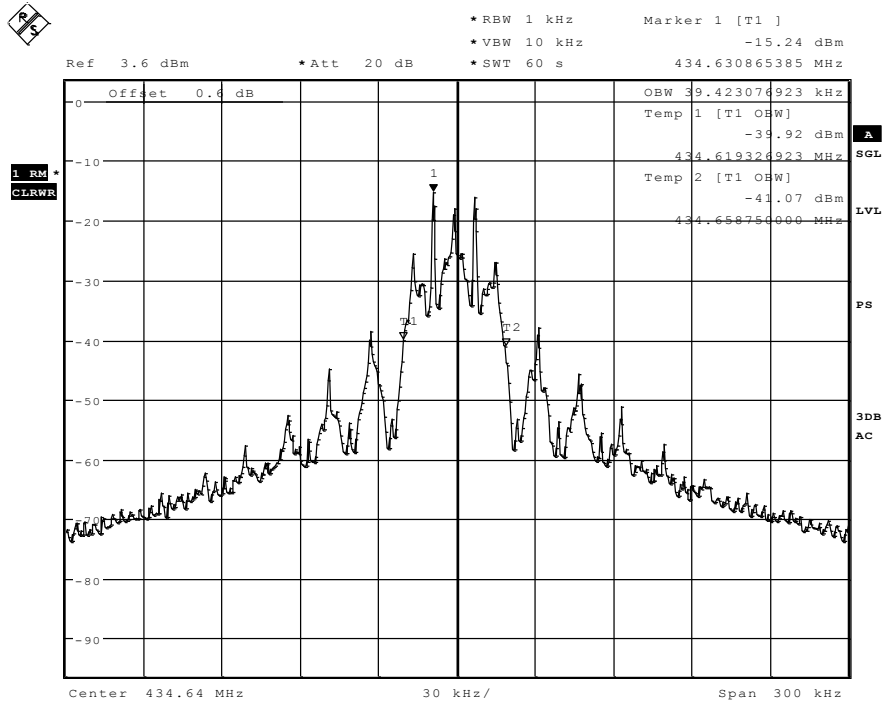
Data rate 8000kbit/s



Date: 10.FEB.2012 12:07:10

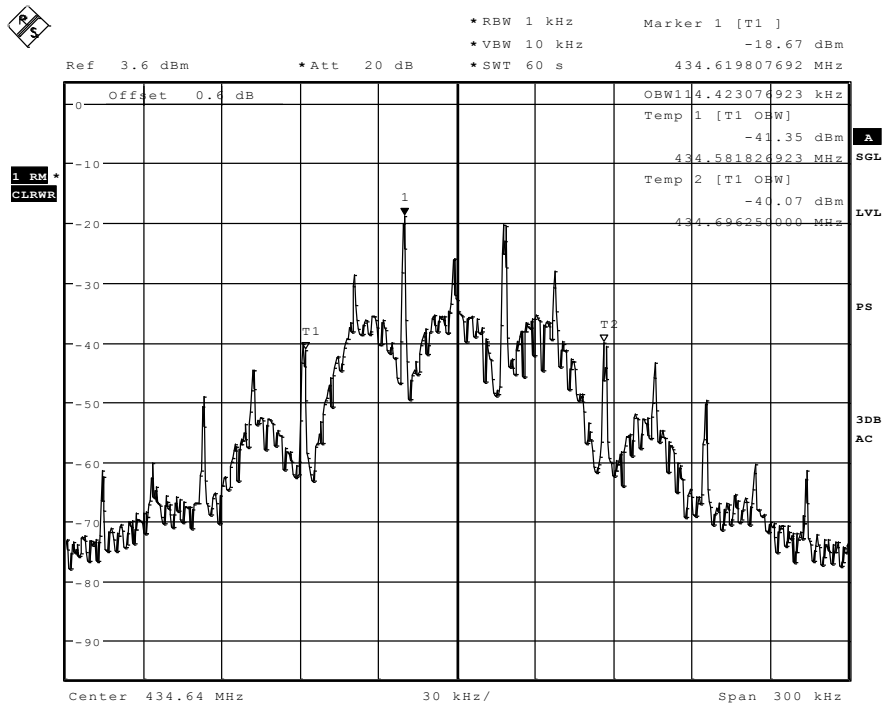
Data rate 19200kbit/s

1.7.4. Operating-Mode: 434.64MHz/ Port 4



Date: 10.FEB.2012 12:11:11

Data rate 8000kbit/s

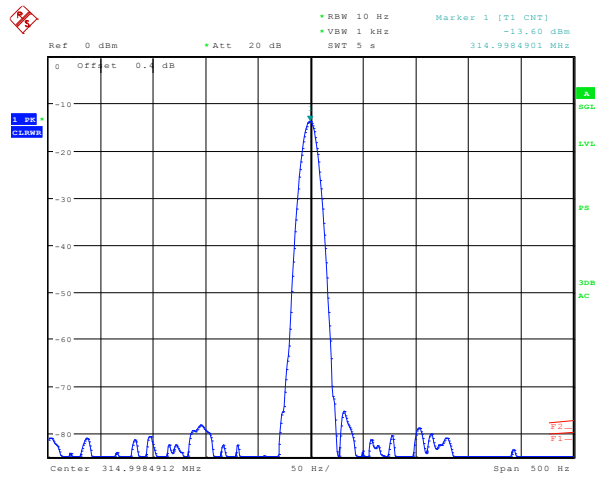


Date: 10.FEB.2012 12:12:41

Data rate 19200kbit/s

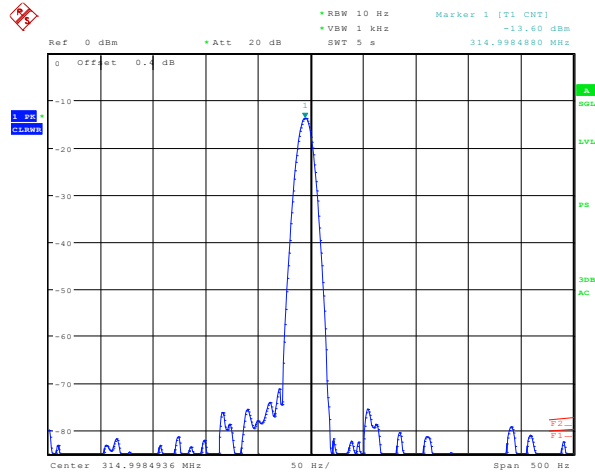
1.8. Frequency error (RSS-210/RSS-Gen.)

1.8.1. Port1: 315MHz Mode, nominal temperature



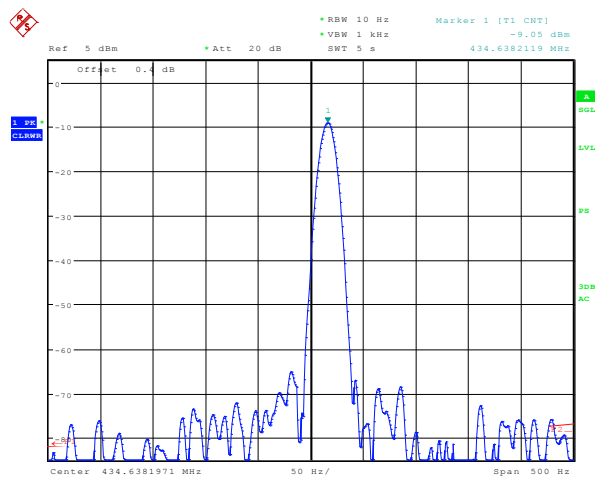
Date: 5.APR.2012 09:59:33

Tnom, Vnom



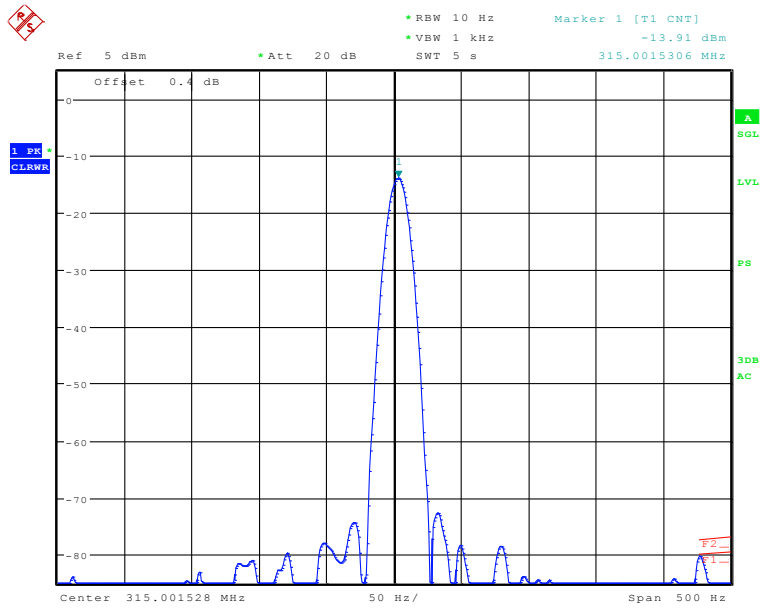
Date: 5.APR.2012 09:49:30

Tnom, Vmin

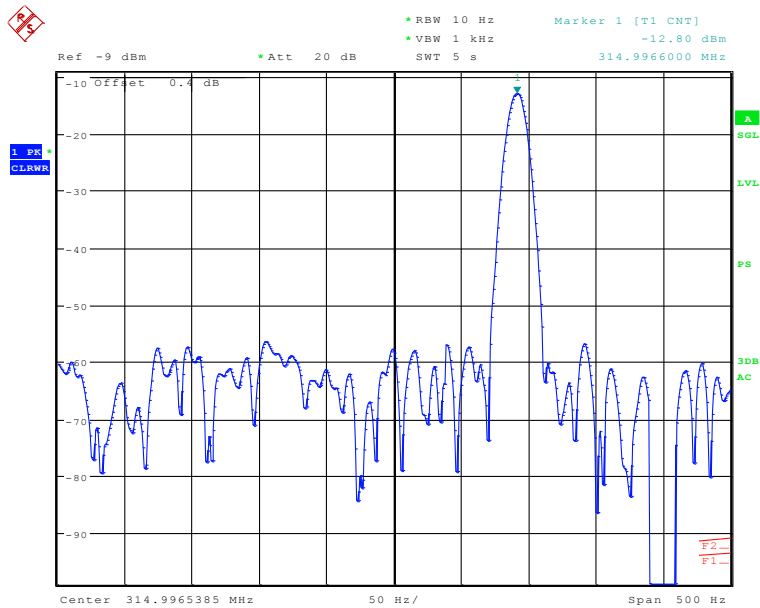


Date: 5.APR.2012 12:40:24

Tnom, Vmax

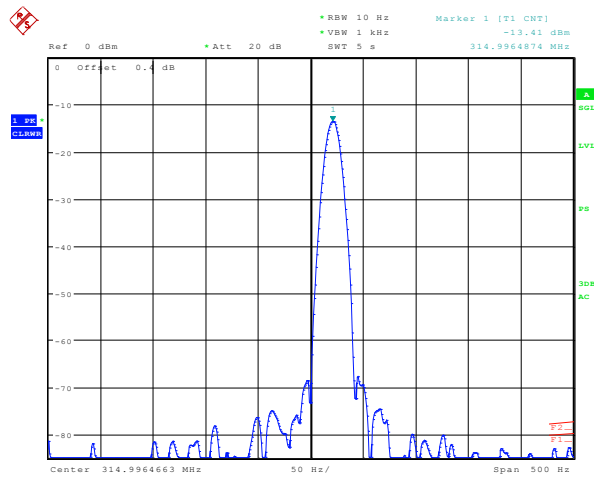
1.8.2. Port1: 315MHz Mode, nominal voltage

Date: 5.APR.2012 12:44:23

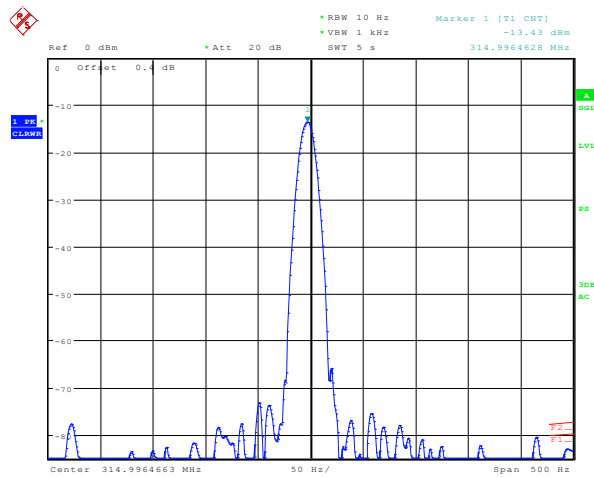
Tmax, Vnom

Date: 12.APR.2012 12:51:33

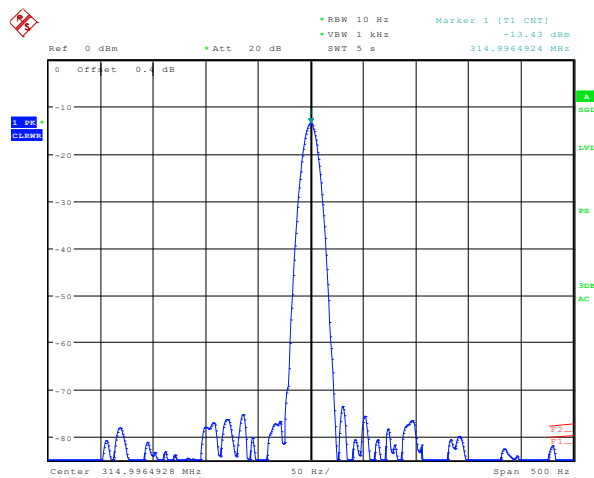
Tmin, Vnom

1.8.3. Port2: 315MHz Mode, nominal temperature

Date: 5.APR.2012 09:57:22

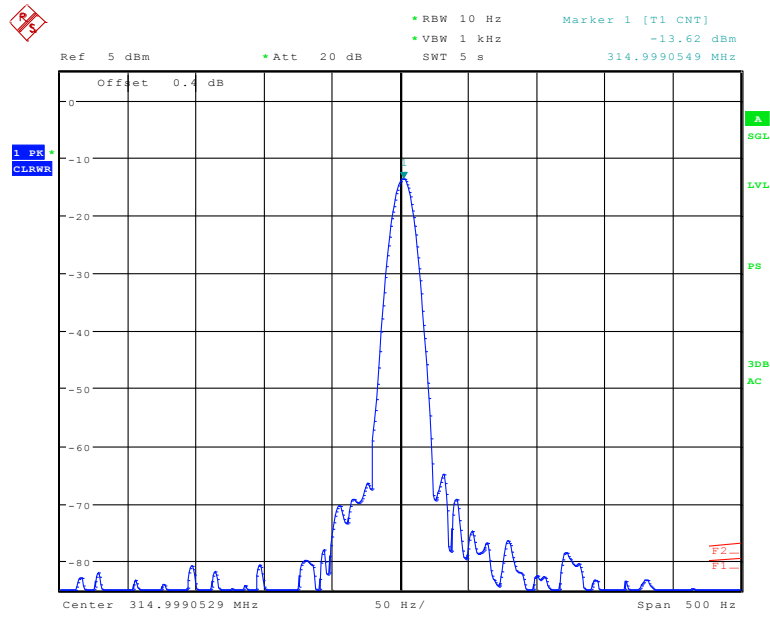
Tnom, Vnom

Date: 5.APR.2012 09:52:12

Tnom, Vmin

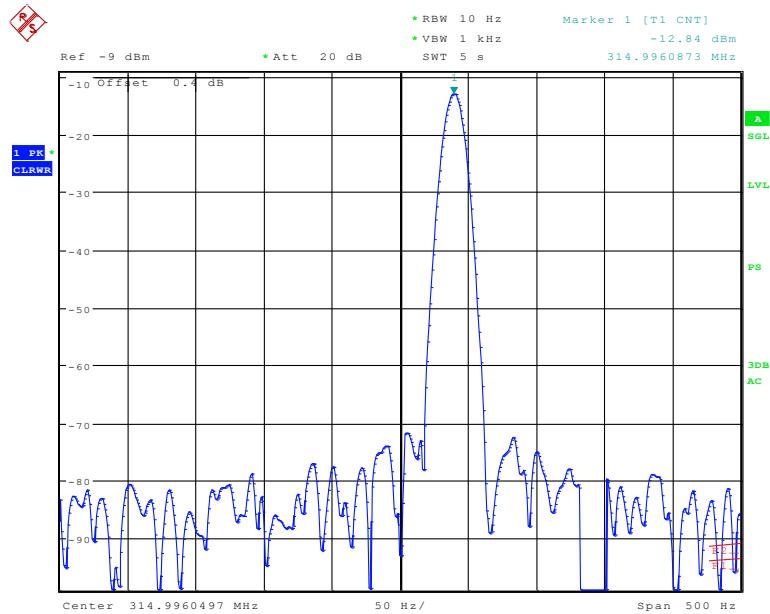
Date: 5.APR.2012 10:05:01

Tnom, Vmax

1.8.4. Port2: 315MHz Mode, nominal voltage

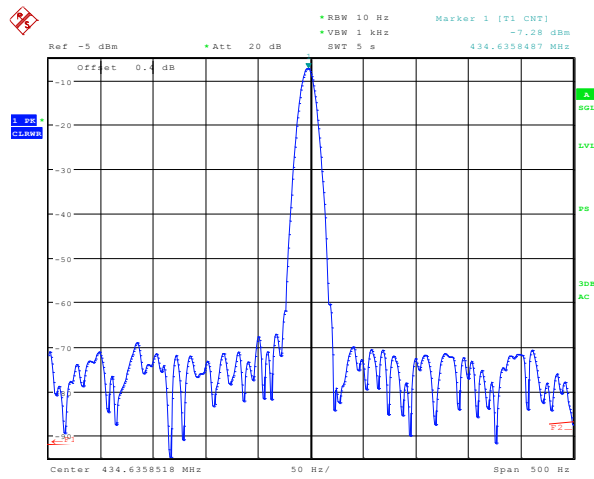
Date: 5.APR.2012 12:46:28

Tmax, Vnom

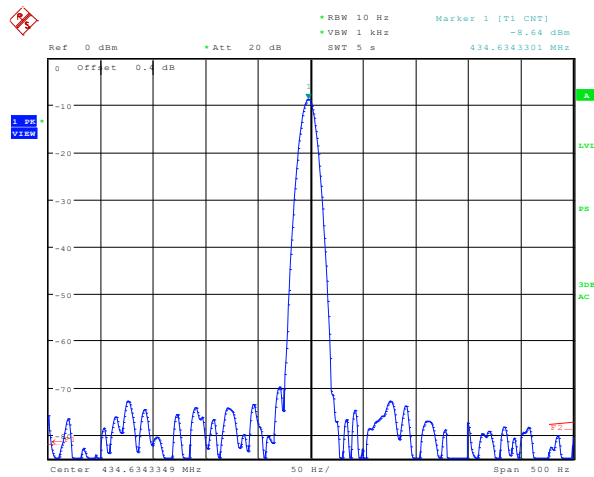


Date: 12.APR.2012 12:53:32

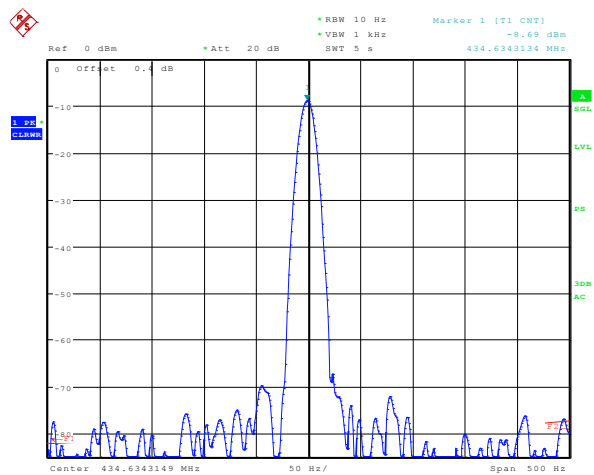
Tmin, Vnom

1.8.5. Port3: 434MHz Mode, nominal temperature

Date: 4.APR.2012 11:48:01

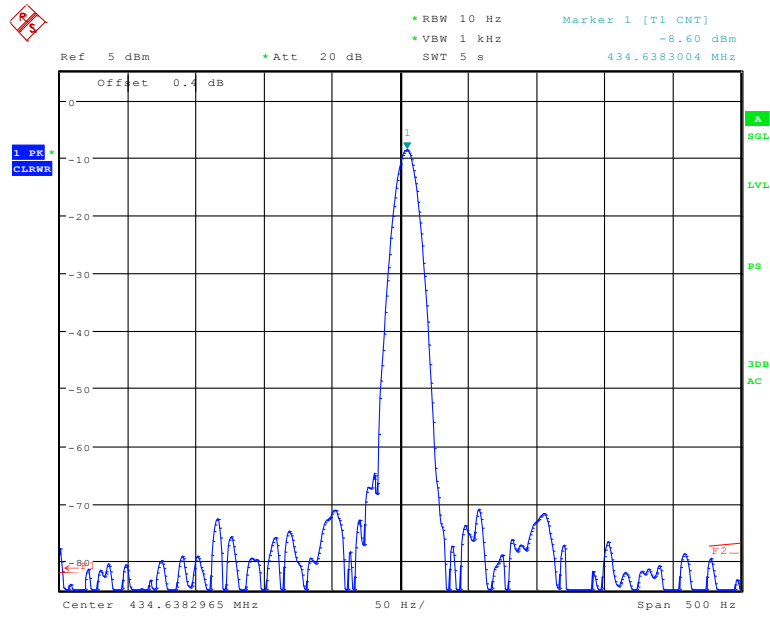
Tnom, Vnom

Date: 5.APR.2012 09:47:13

Tnom, Vmin

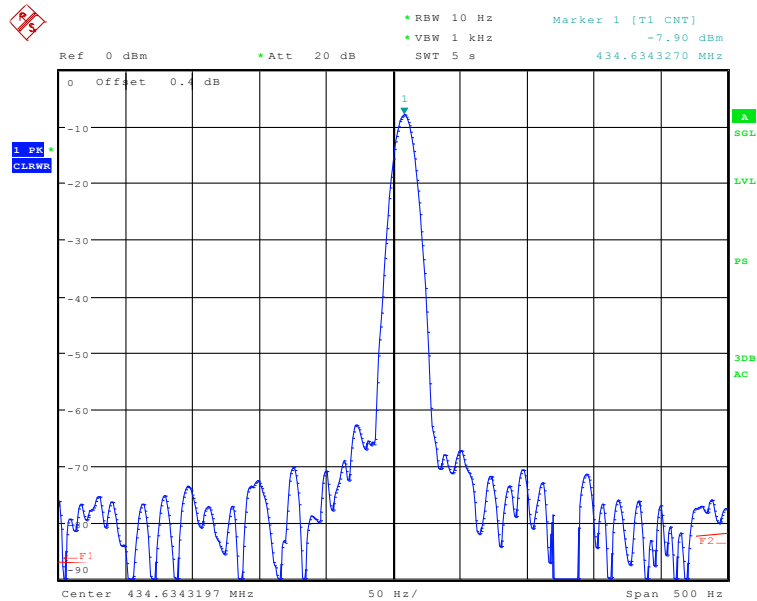
Date: 5.APR.2012 10:08:51

Tnom, Vmax

1.8.6. Port3: 434MHz Mode, nominal voltage

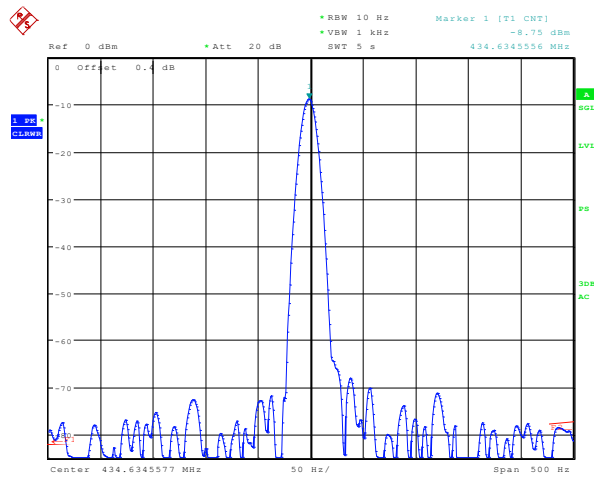
Date: 5.APR.2012 12:42:15

Tmax, Vnom

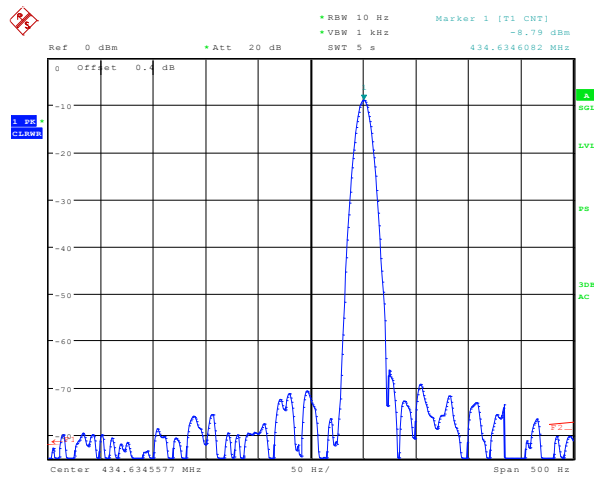


Date: 12.APR.2012 12:57:26

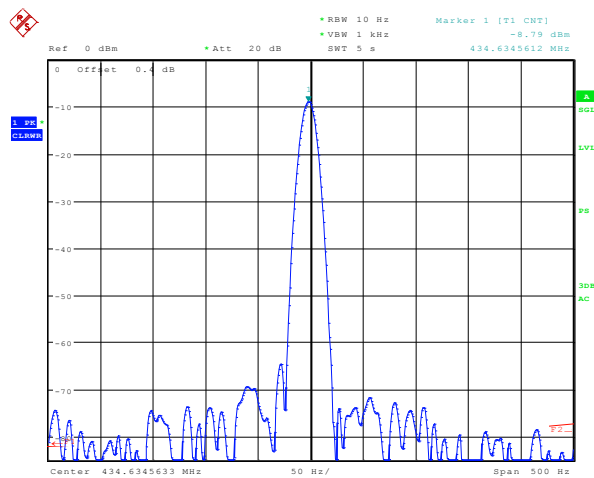
Tmin, Vnom

1.8.7. Port4: 434MHz Mode, nominal temperature

Date: 5.APR.2012 09:39:45

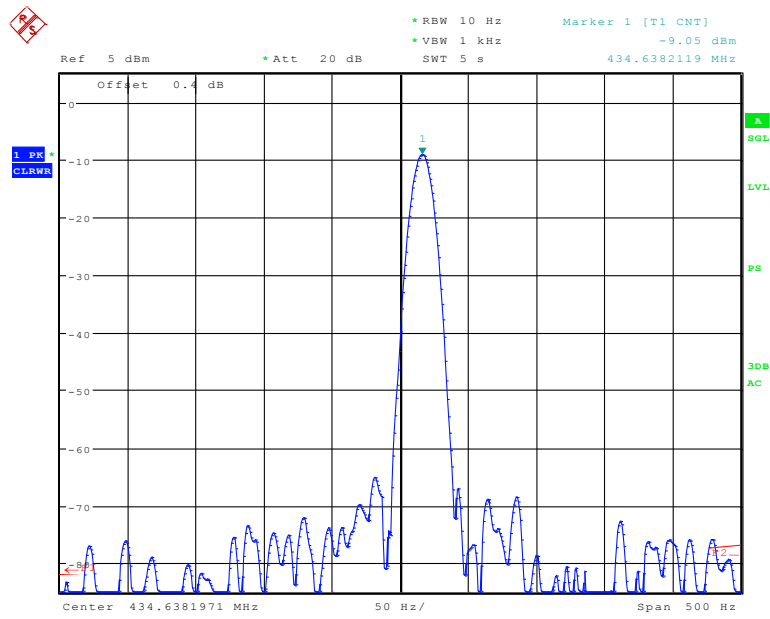
Tnom, Vnom

Date: 5.APR.2012 09:45:00

Tnom, Vmin

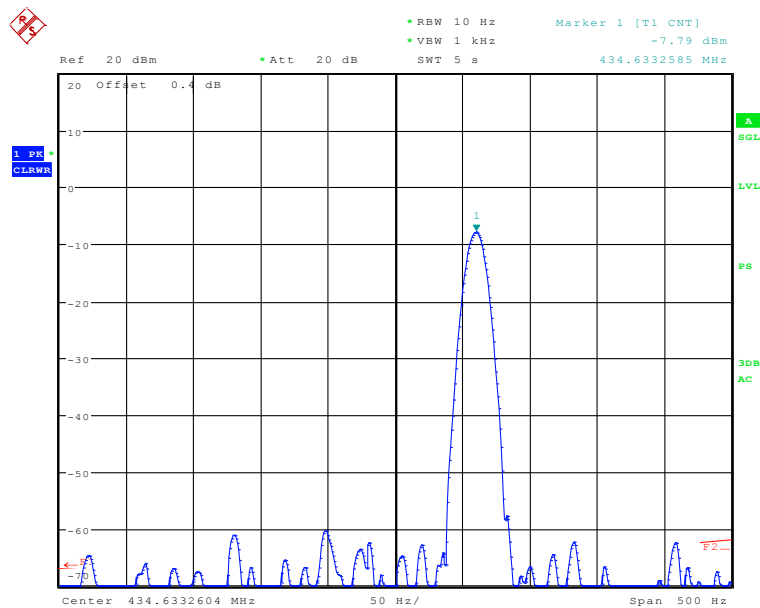
Date: 5.APR.2012 10:07:08

Tnom, Vmax

1.8.8. Port4: 434MHz Mode, nominal voltage

Date: 5.APR.2012 12:40:24

Tmax, Vnom



Date: 12.APR.2012 12:46:53

Tmin, Vnom