

TEST REPORT

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EUT DESCRIPTION Radio Equipment for inverter check

EUT TRADEMARK Power-One

EUT MODEL PVI-RADIOMODULE-US

REFERENCE STANDARDS : 47 CFR FCC part 15.247

TEST REPORT NUMBER FCCTR_100139_1

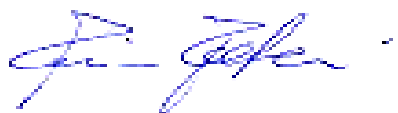
TEST REPORT ISSUE DATE 26/03/2010

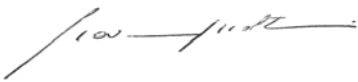
TESTING LABORATORY Prima Ricerca & Sviluppo S.r.l.
Via Campagna, 92 -22020 Faloppio (Co) –Italy

TESTING LOCATION As Above

DATE OF TEST SAMPLE RECEIPT 16/02/2010

DATE OF TEST 16/02/2010

TESTED BY Massimo Maltempi 

APPROVED BY Giovanni Molteni 

*The test results reported in this test report shall refer only to the sample actually tested and shall not refer or be deemed to refer to bulk from which such a sample may be said to have been obtained.
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1. TECHNICAL INFORMATION OF EQUIPMENT UNDER TEST (EUT)

1.1 Identification

Brand name: POWER-ONE
Manufacturer: POWER-ONE ITALY SPA
Equipment : Transceiver
Serial number : Not present
FCC ID : X6W-MOD
Country of manufacturer: ITALY

1.2 Technical data

FCC class: 47 CFR FCC Part 15 Subpart C § 15.247
Product type: Radio Equipment for inverter check
Radio type: Intentional radiators
Power type : 12 Vdc
Type Modulation: FHSS
Modulation : GFSK
Data Rate (Mbps) : 50 Kbps
Frequency range : 902 – 928 MHz
Channel number : 63
Channel Band Width (20dB) : 440 KHz
Channel space: 400KHz
Conducted/radiated Output Power : 11,2 dBm radiated
9,84 dBm conducted (EIRP = 9,84 + 2,14= 11,98 dBm)
Carrier Frequency: Channel No.1: 902,65 MHz Channel No.63: 927,45 MHz
Field Antenna : Antenna Type: Bondale Industrial Ltd.
mod. G-RA0K11165032-1460
Gain 2,14 dBi

Channel table

N°	frequencies	N°	frequencies
1	902,65	33	915,45
2	903,05	34	915,85
3	903,45	35	916,25
4	903,85	36	916,65
5	904,25	37	917,05
6	904,65	38	917,45
7	905,05	39	917,85
8	905,45	40	918,25
9	905,85	41	918,65
10	906,25	42	919,05
11	906,65	43	919,45
12	907,05	44	919,85
13	907,45	45	920,25
14	907,85	46	920,65
15	908,25	47	921,05
16	908,65	48	921,45
17	909,05	49	921,85
18	909,45	50	922,25
19	909,85	51	922,65
20	910,25	52	923,05
21	910,65	53	923,45
22	911,05	54	923,85
23	911,45	55	924,25
24	911,85	56	924,65
25	912,25	57	925,05
26	912,65	58	925,45
27	913,05	59	925,85
28	913,45	60	926,25
29	913,85	61	926,65
30	914,25	62	927,05
31	914,65	63	927,45
32	915,05		

1.3 **Modifications incorporated in E.U.T.**

The following items are the modifications introduced in the equipment under test :

- None

1.4 **Ports identification**

This section contains descriptions of all signal ports and AC/DC power input/output ports, the length and the type of the cable provided by manufacturer needed for the tests.

Moreover it is specified if the ports are ever or optionally connected.

Port	Description	Connection	
1	Enclosure	Electronic module card	By screws
2	AC power input/output ports	Port no present	
3	DC power input/output ports	12 Vdc	for radiated test powered from Inverter type PVI-4.2-OUTD-IT
4	Signals / control lines		
5	Telecommunication ports	Port no present	

Note: During the tests all cables must be what provided the manufacturer or the same that used in the real employment of the EUT.

1.5 **Auxiliary equipment**

- (Power One) Inverter type PVI-4.2-OUTD-IT

2. TEST CONDITIONS

2.1 Operating test modes and test conditions

The equipment has been tested according to the operative conditions described in the user/installation manual provided by the manufacturer and by following reference standards :

Reference Standard:

- 47 CFR FCC Part 15 Subpart C § 15.247
- RSS-210 Issue 7 June 2007 - Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment,

In the following table there are the operating conditions adopted during tests identified by an indicator (#..) at which has been referred the item “Operating condition of the equipment under test” of all technical sheets of the tests (see Section 4)

Operating condition	Description
#1	EUT in transmission mode with modulation
#2	EUT in transmission mode with only carrier frequency
#3	EUT in receiver mode

2.2 Test overview

The appliance is classified as “Intentional radiator” in conformity to FCC Part 15 Subpart C § 15.247.

The application is mainly as **monitoring of photovoltaic inverter**

3. REFERENCE STANDARD FOR PERFORMED TESTS

The measurements and test results shown in this test report were made in accordance with the procedures and found in compliance with the limit given in ANSI C63.4-2003 and 47 CFR FCC Part 15 Subpart C.

4. SUMMARY OF TEST RESULTS

4.1 Emission tests

Port		Phenomena	Basic standard	Operating condition ¹	Result
1	Antenna port	Antenna requirement	FCC Part 15 §15.203	---	Within the limit
2		Maximum Peak Output Power	FCC Part 15 §15.247 (b) (2)	#2	Within the limit
3		Carrier frequency (Hopping Channel) Separation	FCC Part 15 §15.247 (a) (1)	#1	Within the limit
4		Number of Hopping Frequency Used	FCC Part 15 §15.247 (a) (1) (i)	#1	Within the limit
5		20 dB Bandwidth	FCC Part 15 §15.247 (a) (1)	#1	Within the limit
6		Dwell Time on Each Channel	FCC Part 15 §15.247 (a) (1) (i)	#1	Within the limit
7		100 kHz Bandwidth of Band Edge	FCC Part 15 § 15.247 (c)	#1	Within the limit
8		Restricted Bands	FCC Part 15 § 15.205	#1	Within the limit
9	Enclosure	Spurious Emission at Antenna Port	FCC Part 15 §15.209, (a) (f)	#2	Within the limit
10	AC mains Input ports	Conducted Emission	FCC Part 15 § 15 207(a)	#1	Within the limit
11	Enclosure	Receiver spurious emission	RSS-210 Issue 7 § 2.2	#1	Within the limit

Note:

(a)

- (i) 902-928 MHz band
- (ii) 5725-5850 MHz band
- (iii) 2400-2483.5 MHz band

5. TEST RESULTS

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TEST 1.	ANTENNA REQUIREMENT
REFERENCE DOCUMENT	<p>According to §15.203 / 15.204</p> <p>An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sec. 15.211, Sec. 15.213, Sec. 15.217, Sec. 15.219, or Sec. 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Sec. 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.</p> <p>And according to § 15.247 (1), if transmitting antennas of directional gain greater than 6 dBi are used the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.</p>

Antenna requirement	
N° of authorized antenna type	1
Antenna type	Dedicated antenna
Total gain	2,15 dBi
External power amplifier	Not present

**TEST
2.**

MAXIMUM PEAK OUTPUT POWER

REFERENCE DOCUMENT According to §15.247(b) (2), for frequency hopping systems operating in the 902-928MHz band : 1 watt for systems employing at least 50 hopping channels; 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels.

- **TEST SETUP:** In according to manufacturer specifications
- **TEST LOCATION:** Radio test area
- TEST equipment used for conducted test:**
 - Spectrum Analyzer Rohde&Schwarz mod. FSP40
 - Test Fixture Prima Ricerca&Sviluppo
 - Climatic Chamber MAZZALI mod. Climatest
- **TEST LOCATION:** Radio test area
- TEST equipment used for radiated test**
 - EMI receiver Rohde & Schwarz Mod. ESU 40
 - Chase Antenna Mod. CBL 6111 A
 - Antenna Rohde & Schwarz mod. HL50

TEST CONDITIONS:	MEASURED
Ambient temperature : 23°C ± 5°C	24 °C
Ambient humidity : 25 - 75 %rH	45%
Pressure : 85 - 106 kPa (860 mbar - 1060 mbar)	960 mbar

modulation:	OFF
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PRIMA

RICERCA & SVILUPPO

FCCTR_100139_1

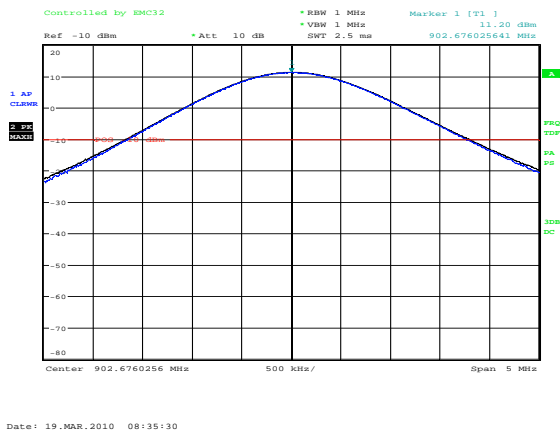
Radiated Measurement Result

frequency	Output Power in dBm	Output Power in W	Standard	Result
CH low	11,20	0.013183	< 1W	compliant
CH middle	10,19	0.010447	< 1W	compliant
CH high	9,74	0.009419	< 1W	compliant

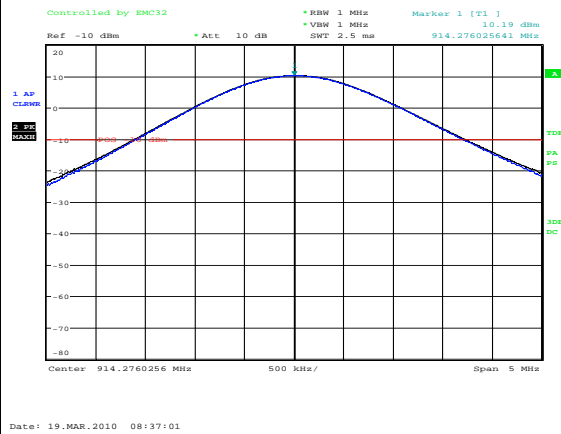
Incertezza di misura / Measurement Uncertainty : ± 3 dB

Plots of result

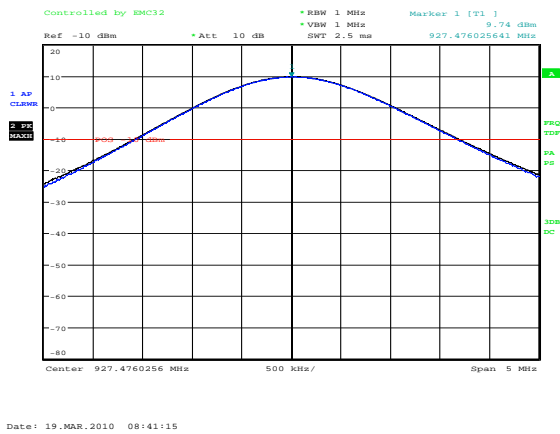
ch low



ch middle



ch High



BLANK



PRIMA

RICERCA & SVILUPPO

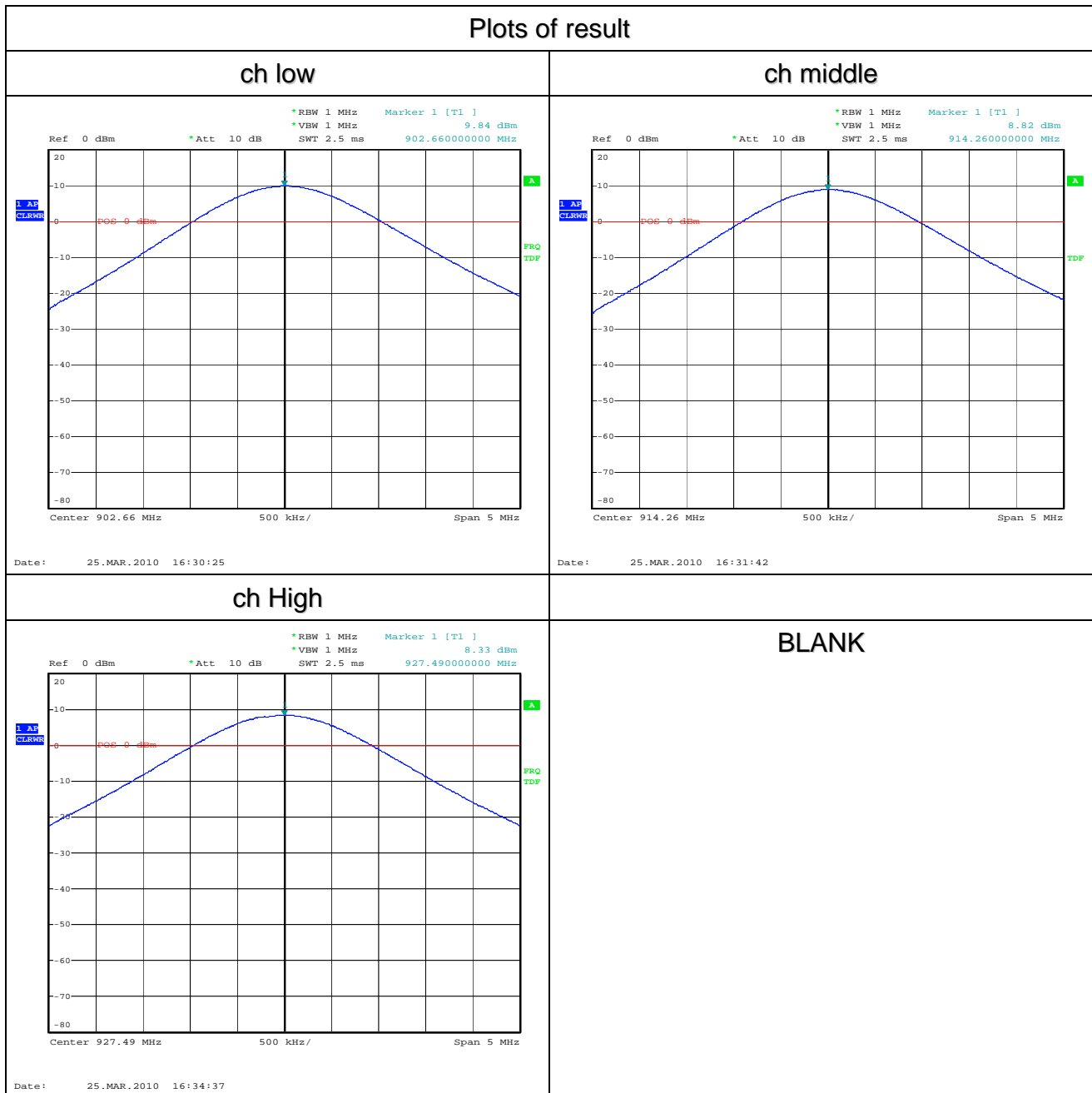
FCCTR_100139_1

Conducted Measurement Result

frequency	Output Power in dBm	Output Power in W	Standard	Result
CH low	9,84	0.009638	< 1W	compliant
CH middle	8,82	0.007621	< 1W	compliant
CH high	8,33	0.006808	< 1W	compliant

Incertezza di misura / Measurement Uncertainty : ± 3 dB

Plots of result



TEST
3. **20dB CHANNEL BANDWIDTH**

REFERENCE DOCUMENT According to §15.247(a)(l), frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

- **TEST SETUP:** In according to manufacturer specifications
- **TEST LOCATION:** Radio test area
- **TEST EQUIPMENT USED FOR TEST:**
 - Spectrum Analyzer Rohde&Schwarz mod. FSP40
 - Test Fixture Prima Ricerca&Sviluppo
 - Climatic Chamber MAZZALI mod. Climatest

TEST CONDITIONS:	MEASURED
Ambient temperature : 23°C ± 5°C	24 °C
Ambient humidity : 25 - 75 %rH	45%
Pressure : 85 - 106 kPa (860 mbar - 1060 mbar)	960 mbar

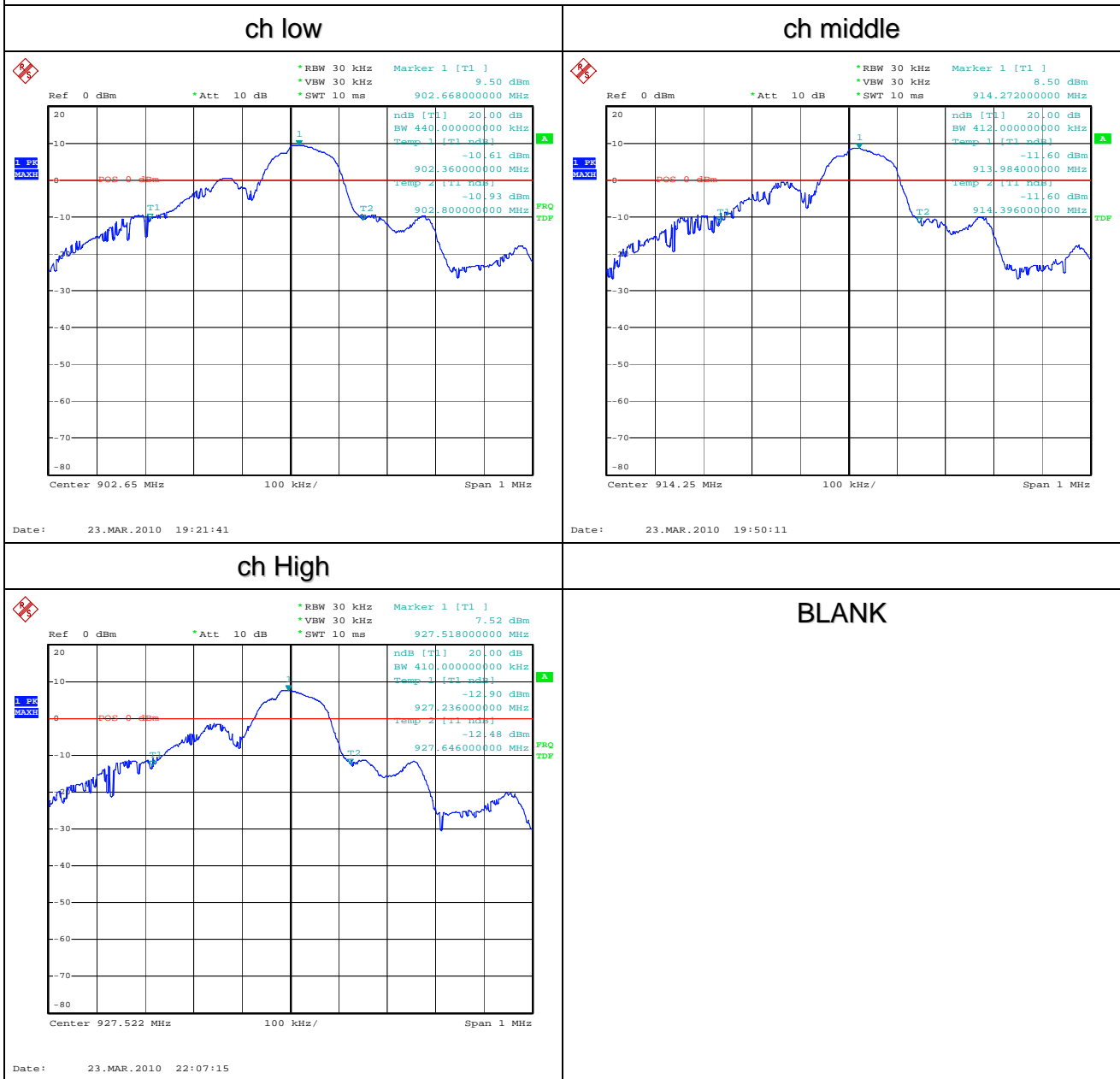
modulation:	ON
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Measurement Result

frequency	Measurement (kHz)	Standard	Result
CH low	440	≤ 500KHz	compliant
CH midle	412	≤ 500KHz	compliant
CH high	410	≤ 500KHz	compliant

Incertezza di misura / Measurement Uncertainty : ±1 KHz

Plots of result



TEST
4.

NUMBER OF HOPPING FREQUENCY USED

REFERENCE DOCUMENT According to §15.247(a)(1)(i), frequency hopping systems operating in the 902-928Mhz band: if the 20 dB bandwidth of the hopping channel is 250kHz or greater, the system shall use at least 25 hopping frequencies.

- **TEST SETUP:** In according to manufacturer specifications
- **TEST LOCATION:** Radio test area
- **TEST EQUIPMENT USED FOR TEST:**
 - Spectrum Analyzer Rohde&Schwarz mod. FSP40
 - Test Fixture Prima Ricerca&Sviluppo
 - Cristal Detector Agilent mod.8472B

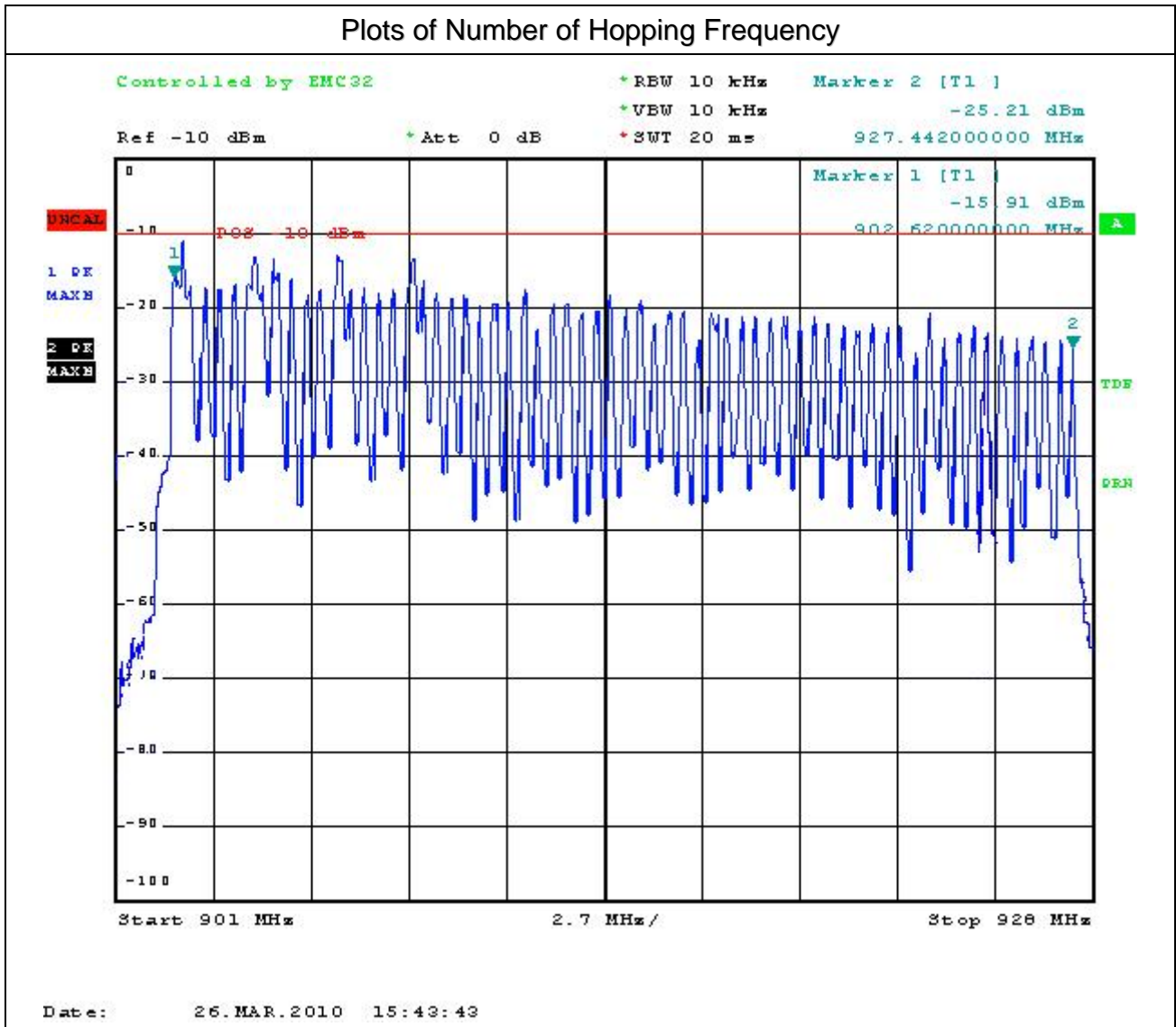
TEST CONDITIONS:	MEASURED
Ambient temperature : 23°C ± 5°C	24 °C
Ambient humidity : 25 - 75 %rH	45%
Pressure : 85 - 106 kPa (860 mbar - 1060 mbar)	960 mbar

Measurement Result

Measurement	Standard	Result
63	>25	complied



Plots of Number of Hopping Frequency



TEST
5.

HOPPING CHANNEL SEPARATION

REFERENCE DOCUMENT According to §15.247(a)(1), frequency hopping system shall have, hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudorandomly ordered list of hopping frequencies.

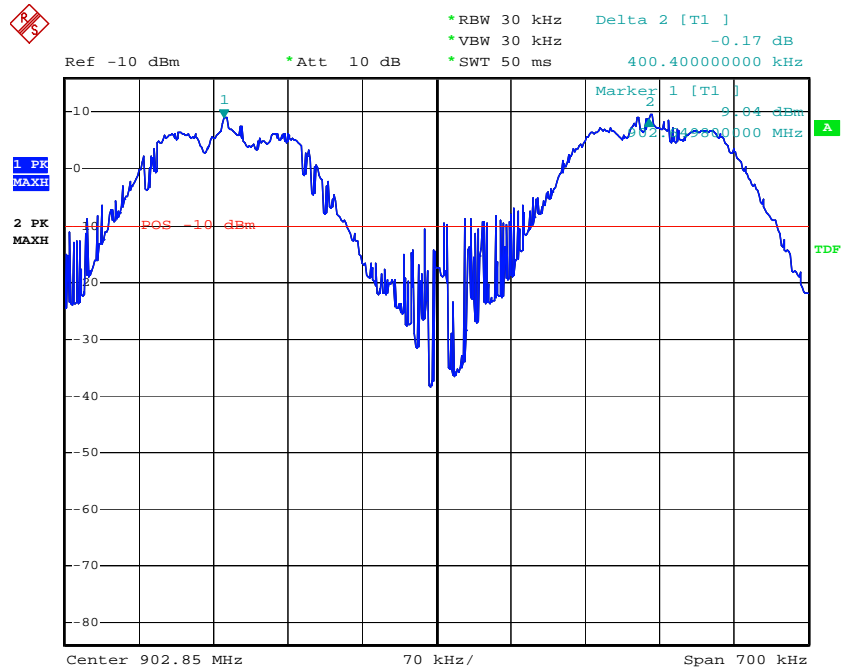
- **TEST SETUP:** In according to manufacturer specifications
- **TEST LOCATION:** Radio test area
- **TEST EQUIPMENT USED FOR TEST:**
 - Spectrum Analyzer Rohde&Schwarz mod. FSP40
 - Test Fixture Prima Ricerca&Sviluppo

TEST CONDITIONS:	MEASURED
Ambient temperature : 23°C ± 5°C	24 °C
Ambient humidity : 25 - 75 %rH	45%
Pressure : 85 - 106 kPa (860 mbar - 1060 mbar)	960 mbar

Measurement Result

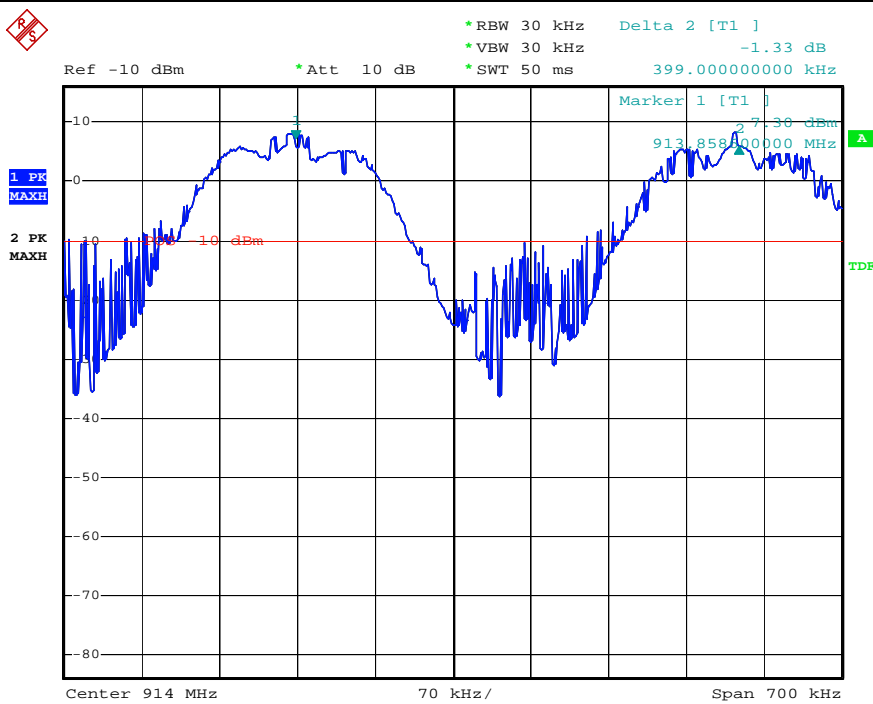
Frequency	Measurement (kHz)	Limit (kHz)	Result
Low	400,4	<500	Compliant
Middle	399	<500	Compliant
High	400,4	<500	Compliant

Ch low Plots of Hopping Channel separation



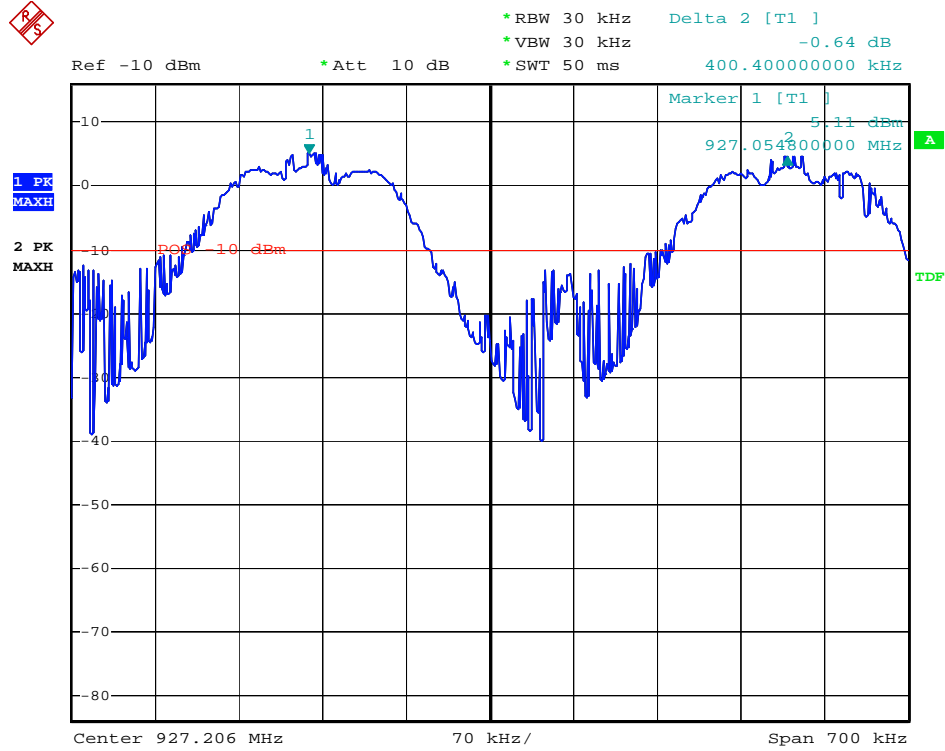
Date: 24.MAR.2010 16:38:36

Ch middle Plots of Hopping Channel separation



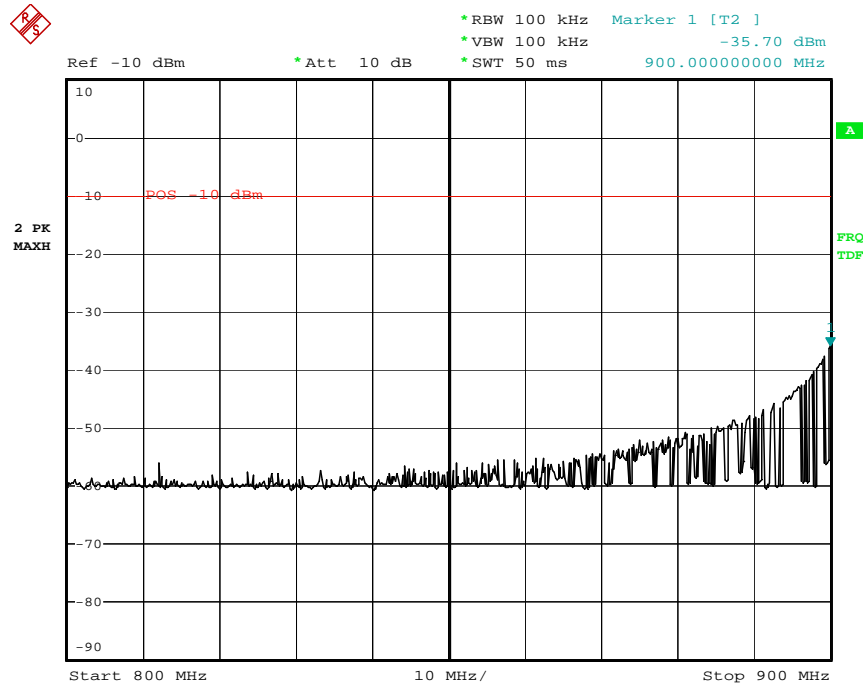
Date: 24.MAR.2010 16:52:03

Ch high Plots of Hopping Channel separation



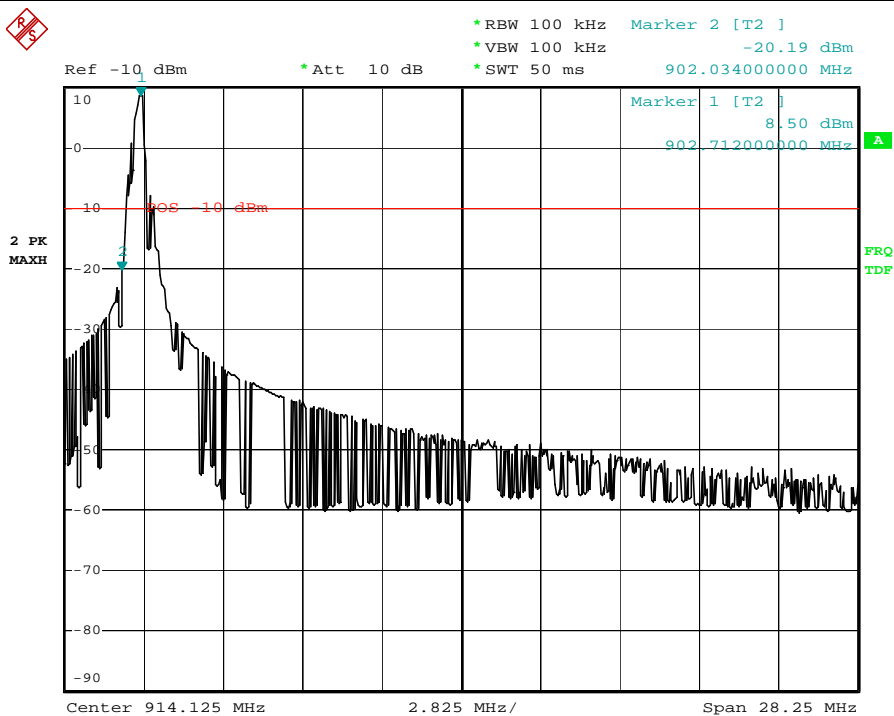
Date: 24.MAR.2010 17:02:48

Plots of 100KHz Band Edge



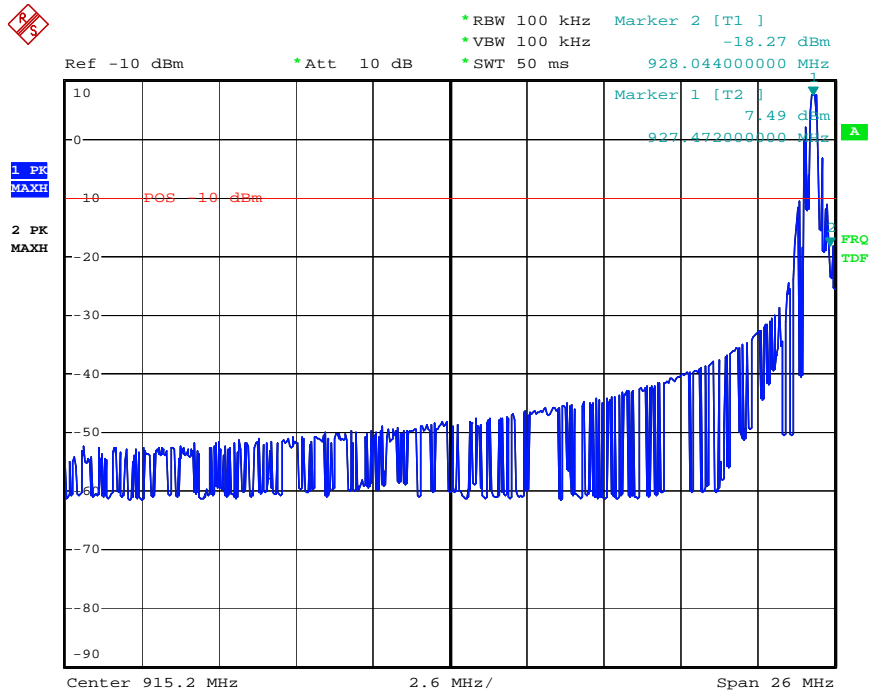
Date: 24.MAR.2010 14:40:14

Plots of 100KHz Band Edge



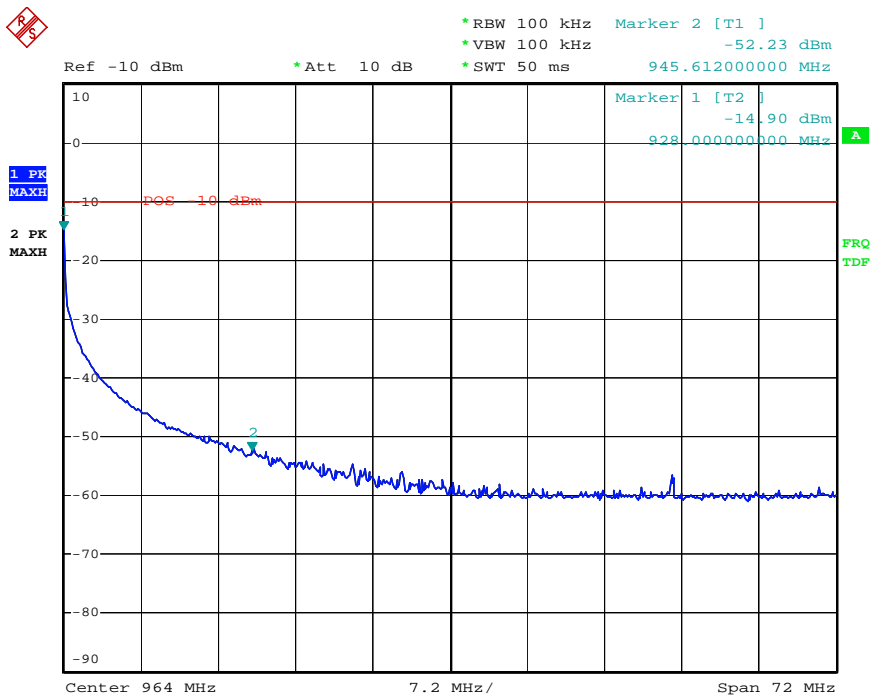
Date: 24.MAR.2010 14:31:53

Plots of 100KHz Band Edge



Date: 24.MAR.2010 15:02:57

Plots of 100KHz Band Edge



Date: 24.MAR.2010 16:18:32

TEST
7.

DWELL TIME

REFERENCE DOCUMENT According to §15.247 (a)(1)(i), if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period..

- **TEST SETUP:** In according to manufacturer specifications
- **TEST LOCATION:** Radio test area
- **TEST EQUIPMENT USED FOR TEST:**
 - Spectrum Analyzer Rohde&Schwarz mod. FSP40
 - Test Fixture Prima Ricerca&Sviluppo

TEST CONDITIONS:	MEASURED
Ambient temperature : 23°C ± 5°C	24 °C
Ambient humidity : 25 - 75 %rH	45%
Pressure : 85 - 106 kPa (860 mbar - 1060 mbar)	960 mbar

Measurement Result

9.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT was set without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Adjust the center frequency of SA on any frequency be measured and set SA to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
4. Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.

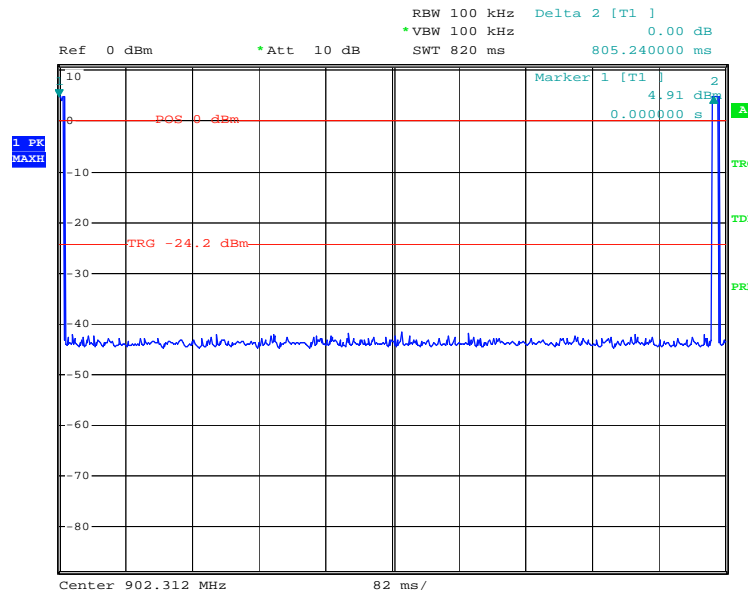
Please refer the following plots.

Dwell Timing period

EUT transmit every 805,24 msec

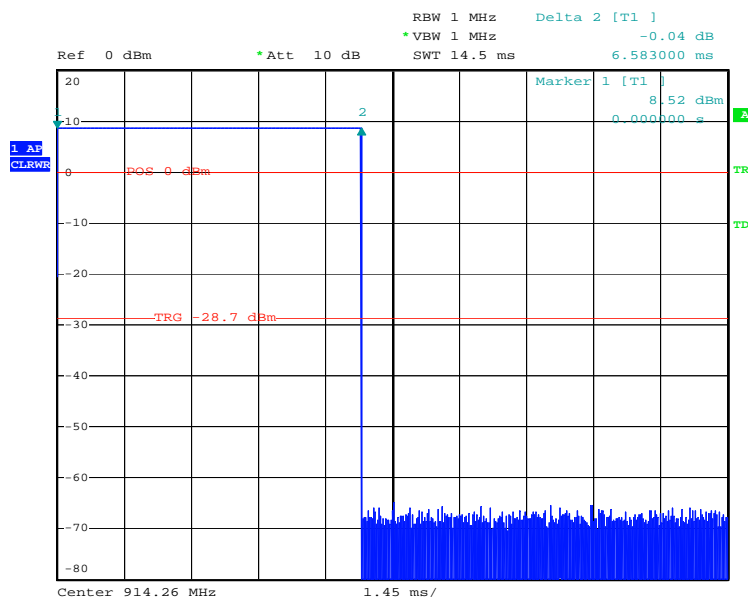
Burst ON for 6,583 msec, max transmission period on 10 sec is 0,081752 sec

period



Date: 29.MAR.2010 12:32:35

Timing on



Date: 25.MAR.2010 16:44:17

TEST 8. EMISSION OF MAINS TERMINAL DISTURBANCE VOLTAGE (CONTINUOUS DISTURBANCE)

REFERENCE DOCUMENT FCC 47CFR Part 15

- **TEST SETUP:** According to reference standard
- **TEST LOCATION:** Semianechoic chamber
- **TEST EQUIPMENT USED FOR TEST:** EMI receiver Rohde & Schwarz Mod. ESU 40
Artificial Network Rohde & Schwarz Mod. ESH3-Z5

- **TESTED PORT:** AC mains : Phase and Neutral Line
- **FREQUENCY RANGE:** 0.15 - 30 MHz
- **EMISSION LIMITS:** Section 15.207 of Standard
- **MEASUREMENT UNCERTAINTY:** Total uncertainty (k=2) \pm 2.5 dB

TEST CONDITIONS:	MEASURED
Ambient temperature : 15 - 35 °C	24 \pm 3 °C
Ambient humidity : 25 - 75 %rH	38 \pm 5 %rH
Pressure : 85 - 106 kPa (860 mbar - 1060 mbar)	975 \pm 50 mbar

Voltage:	Powered from AC/DC adapter 110Vac/12 dc	12Vdc
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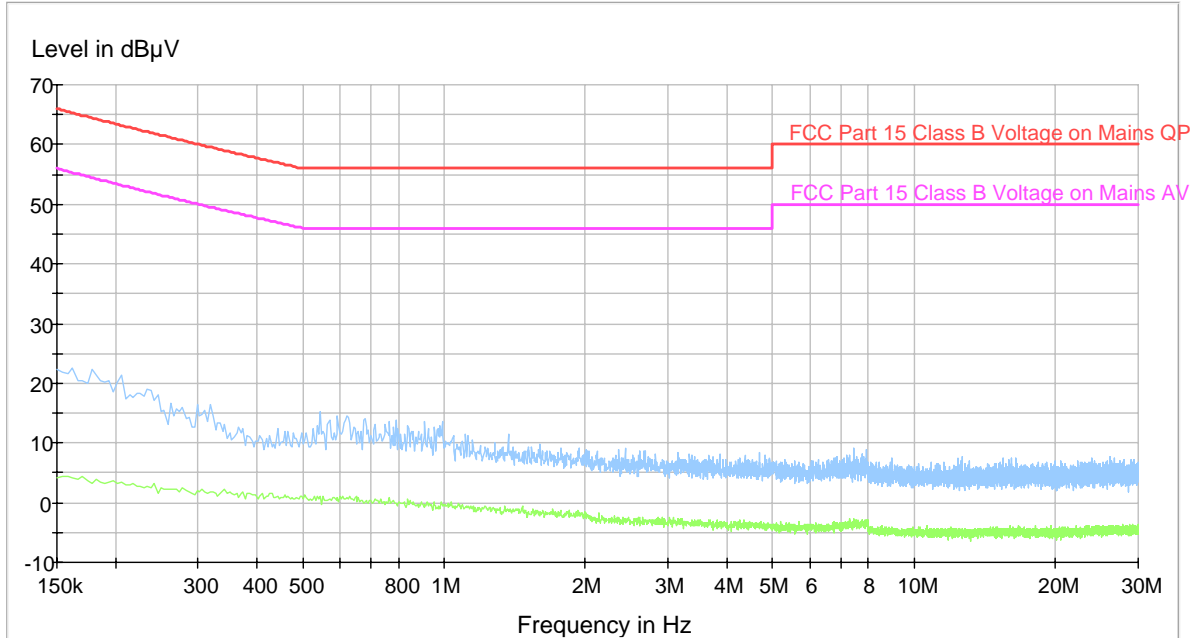
OPERATING CONDITION (Rif. Section. 2) : #1

RESULT: WITHIN THE LIMIT



Neutral

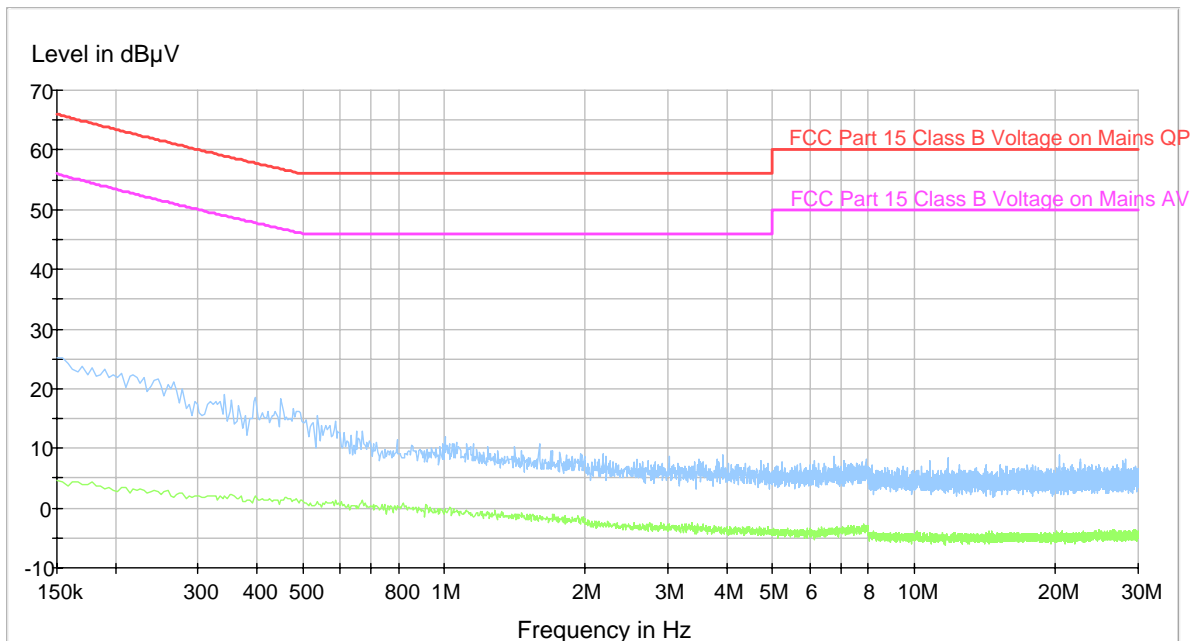
Voltage with 2-Line-LISN



— FCC Part 15 Class B Voltage on Mains QP.LimitLine — FCC Part 15 Class B Voltage on Mains AV.LimitLine
— Preview Result 1 — Preview Result 2

Phase

Voltage with 2-Line-LISN



— FCC Part 15 Class B Voltage on Mains QP.LimitLine — FCC Part 15 Class B Voltage on Mains AV.LimitLine
— Preview Result 1 — Preview Result 2

**TEST
9.**

RADIATED EMISSION 9 KHZ ÷ 10TH HARMONIC

REFERENCE DOCUMENT FCC 47CFR Part 15

- **TEST LOCATION:** Semi-anechoic chamber
- **TEST EQUIPMENT USED FOR TEST:** EMI receiver Rohde & Schwarz Mod. ESU 40
Chase Antenna Mod. CBL 6111 A
Antenna Rohde & Schwarz mod. HL50
Preamplifier BONN mod BLMA 0118 –1M
Tuneable notch filter Wainwright mod. WRCA800/960
High pass filter Wainwright mod.
- **TESTED PORT:** Enclosure
- **EMISSION LIMITS:** Acc. to Section 15.209 of reference document
- **UNCERTAINTY OF MEASURE:** Combined uncertainty = ± 1.75 dB
Total uncertainty = (k=2) ± 3.5 dB

TEST CONDITIONS:		MEASURED
Ambient temperature :	15 - 35 °C	23,5 ± 3 °C
Ambient humidity :	25 - 75 %rH	39 ± 5 %rH
Pressure :	85 - 106 kPa (860 mbar - 1060 mbar)	950 ± 50 mbar

OPERATING CONDITION (Rif. Section. 2) : #1

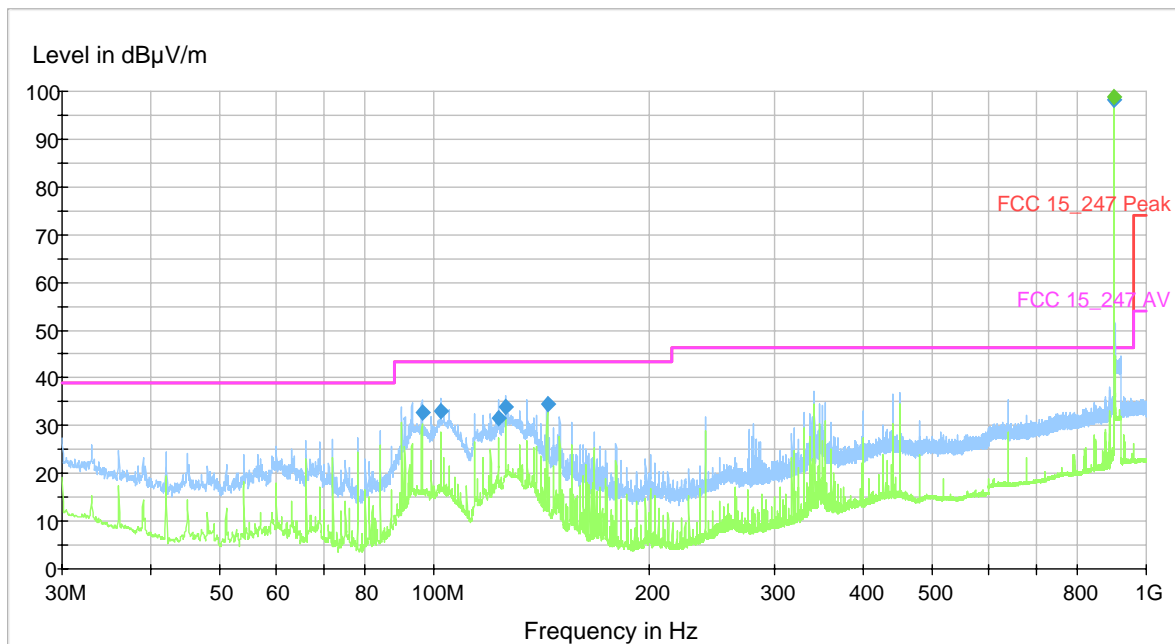
RESULT: WITHIN THE LIMIT

CH1	902,65 MHz
CH30	914,25 MHz
CH63	927,45 MHz

Vertical Polarization

CH1

Electric Field Strength FCC



— FCC 15_247 Peak.LimitLine
 — FCC 15_247 AV.LimitLine
 — Preview Result 1
— Preview Result 2
 ◆ Final Result 1
 ◆ Final Result 2

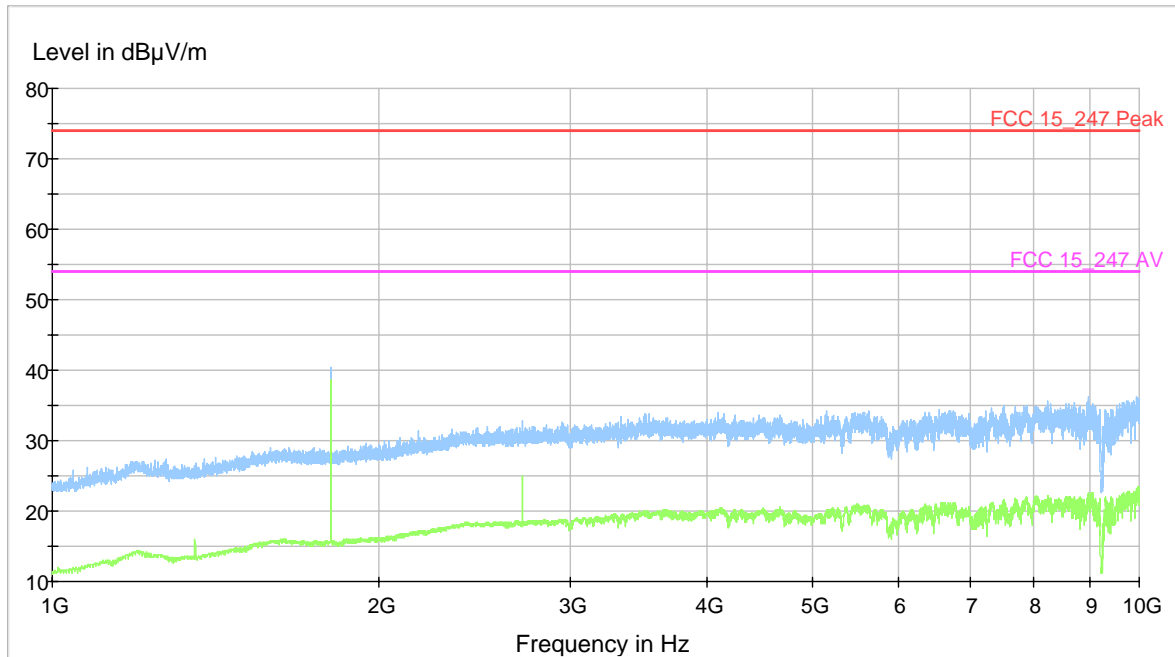
Final Result 1

Frequency (MHz)	MaxPeak-ClearWrite (dBµV/m)	Average-ClearWrite (dBµV/m)	Average-MaxHold (dBµV/m)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
371.92000	41.8	12.7	12.7	100.0	V	180.0	18.6	4.60	46.40	
378.20000	41.7	14.0	14.0	100.0	V	180.0	18.8	4.70	46.40	
384.44000	41.7	14.9	14.9	100.0	V	180.0	18.9	4.70	46.40	
390.68000	42.2	12.9	12.9	100.0	V	180.0	19.1	4.20	46.40	
396.96000	42.2	13.6	13.6	100.0	V	180.0	19.4	4.20	46.40	
902.65000	79.5	79.2	79.2	100.0	V	180.0	27.8	-33.10	46.40	

Final Result 2

Frequency (MHz)	MaxPeak-ClearWrite (dBµV/m)	Average-ClearWrite (dBµV/m)	Average-MaxHold (dBµV/m)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
431.320000	39.1	37.6	37.6	100.0	V	180.0	20.3	7.30	46.40	
443.800000	39.6	37.8	37.8	100.0	V	180.0	20.4	6.80	46.40	
456.320000	38.9	36.4	36.4	100.0	V	180.0	20.7	7.50	46.40	
902.650000	79.5	79.2	79.2	100.0	V	180.0	27.8	-33.10	46.40	

Electric Field Strength FCC



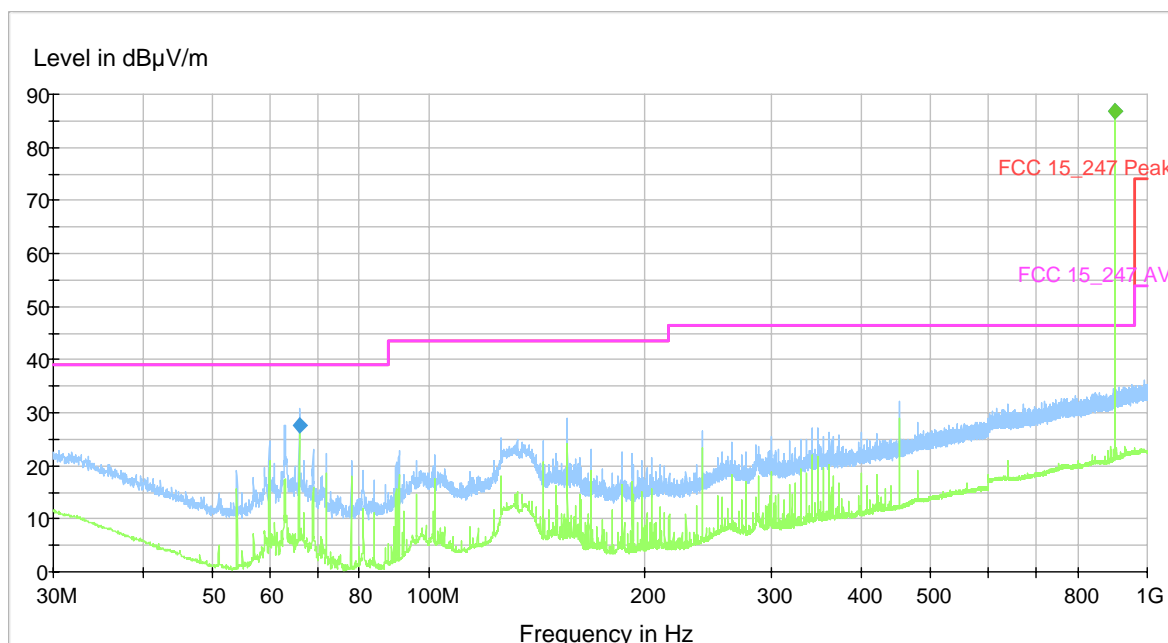
— FCC 15_247 Peak.LimitLine — FCC 15_247 AV.LimitLine — Preview Result 1 — Preview Result 2



Horizontal Polarization

CH1

Electric Field Strength FCC



— FCC 15_247 Peak.LimitLine — FCC 15_247 AV.LimitLine — Preview Result 1
— Preview Result 2 ◆ Final Result 1 ◆ Final Result 2

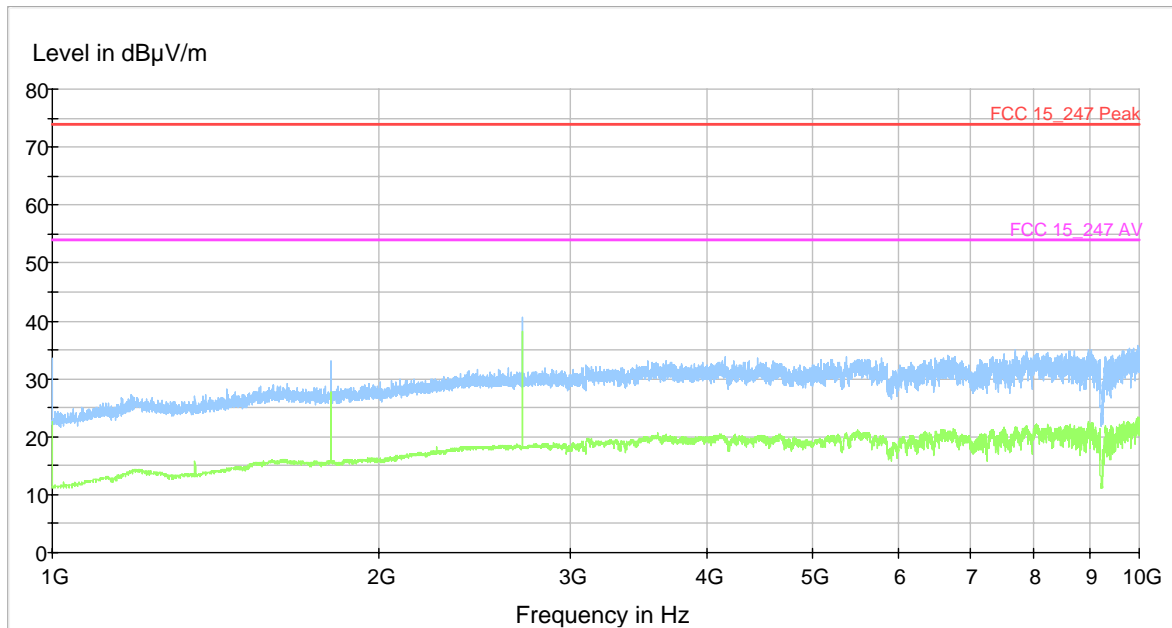
Final Result 1

Frequency (MHz)	MaxPeak-ClearWrite (dBµV/m)	Average-ClearWrite (dBµV/m)	Average-MaxHold (dBµV/m)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
66.000000	27.6	1000.000	120.000	125.0	H	111.0	7.4	11.40	39.00	
902.67000	86.8	1000.000	120.000	100.0	H	0.0	27.8	-40.40	46.40	

Final Result 2

Frequency (MHz)	MaxPeak-ClearWrite (dBµV/m)	Average-ClearWrite (dBµV/m)	Average-MaxHold (dBµV/m)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
902.670000	86.8	1000.000	120.000	100.0	H	0.0	27.8	-40.40	46.40	

Electric Field Strength FCC

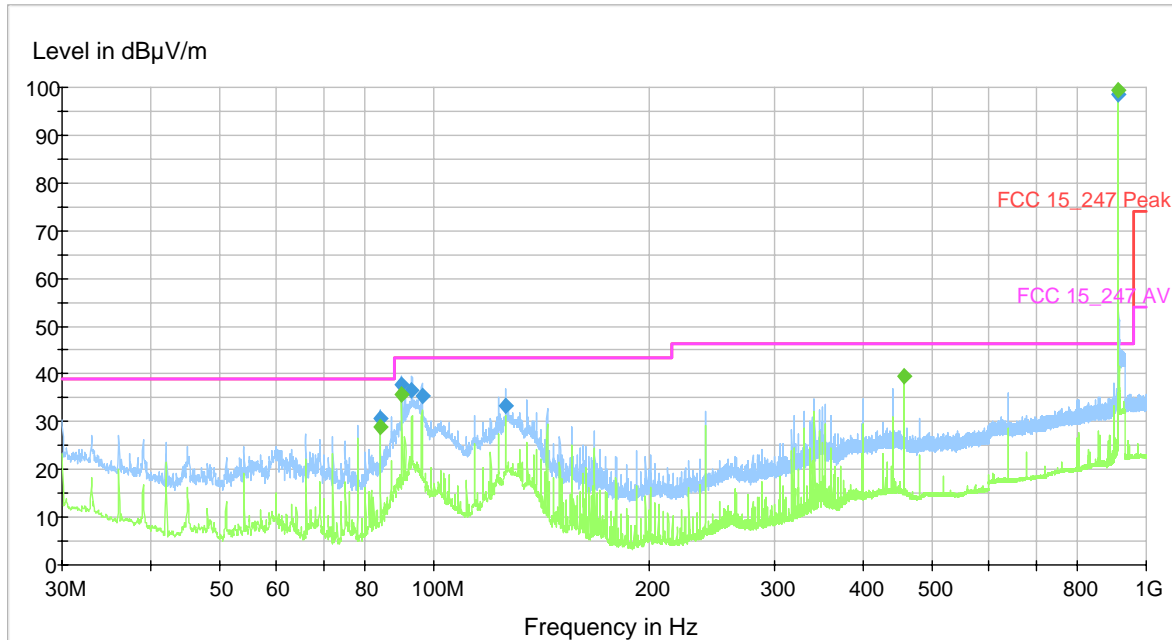


- ◆ FCC 15_247 Peak.LimitLine
◆ Final Measurement Result 1
◆ Final Result 2
- ◆ FCC 15_247 AV.LimitLine
◆ Final Measurement Result 2
◆ Final Result 2 +
- ◆ Preview Result 1
◆ Final Result 1
- ◆ Preview Result 2
◆ Final Result 1 +

Vertical Polarization

CH30

Electric Field Strength FCC



— FCC 15_247 Peak.LimitLine
 — FCC 15_247 AV.LimitLine
 — Preview Result 1
— Preview Result 2
 ◆ Final Result 1
 ◆ Final Result 2

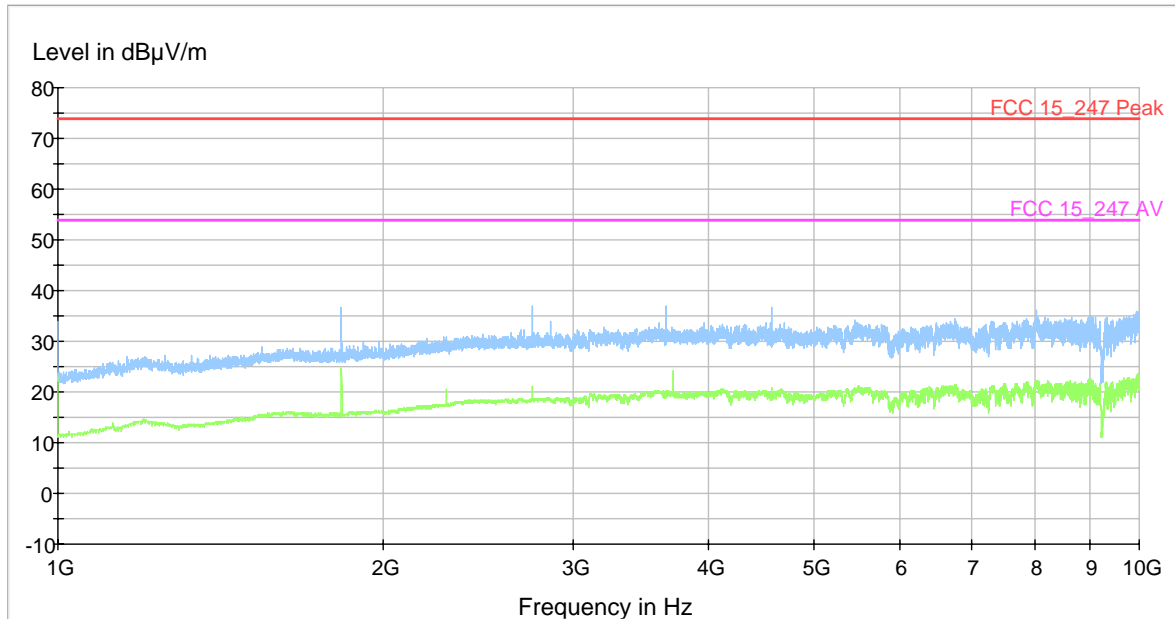
Final Result 1

Frequency (MHz)	MaxPeak-ClearWrite (dBµV/m)	Average-ClearWrite (dBµV/m)	Average-MaxHold (dBµV/m)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
84.040000	30.5	1000.000	120.000	125.0	V	90.0	9.7	8.50	39.00	
90.040000	37.6	1000.000	120.000	124.0	V	82.0	10.4	5.90	43.50	
93.000000	36.5	1000.000	120.000	100.0	V	97.0	10.8	7.00	43.50	
96.040000	35.5	1000.000	120.000	124.0	V	112.0	11.3	8.00	43.50	
126.040000	33.3	1000.000	120.000	100.0	V	97.0	13.9	10.20	43.50	
914.270000	98.5	1000.000	120.000	100.0	V	14.0	28.2	-52.10	46.40	

Final Result 2

Frequency (MHz)	MaxPeak-ClearWrite (dBµV/m)	Average-ClearWrite (dBµV/m)	Average-MaxHold (dBµV/m)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
84.040000	28.8	1000.000	120.000	124.0	V	97.0	9.7	10.20	39.00	
90.040000	35.8	1000.000	120.000	100.0	V	82.0	10.4	7.70	43.50	
457.360000	39.5	1000.000	120.000	100.0	V	23.0	20.8	6.90	46.40	
914.270000	99.4	1000.000	120.000	100.0	V	1.0	28.2	-53.00	46.40	

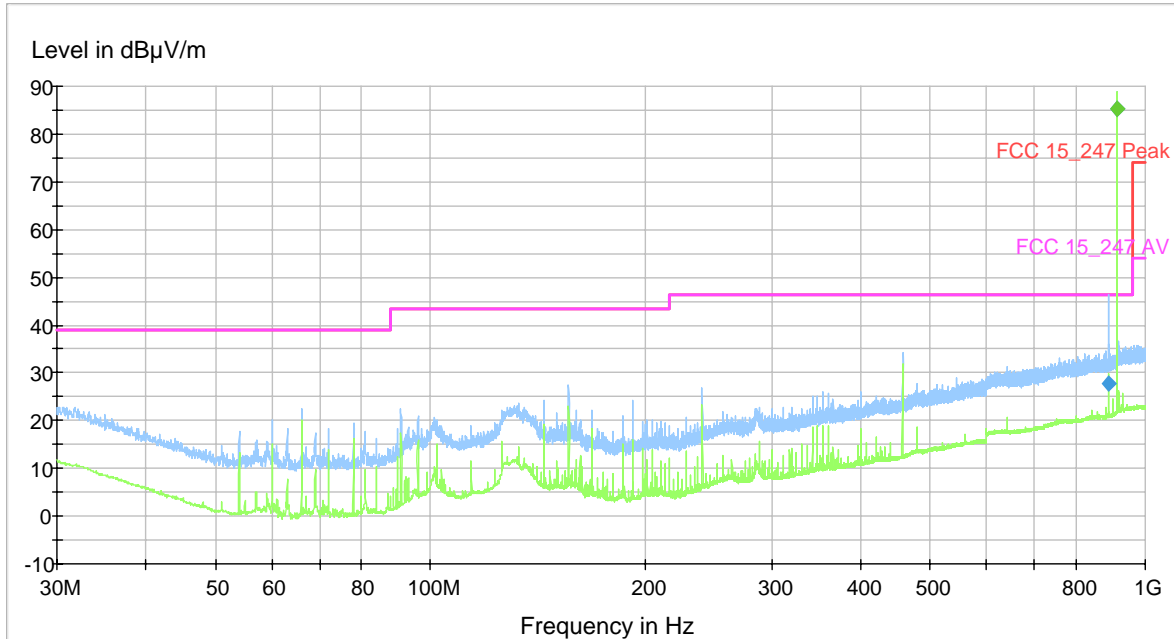
Electric Field Strength FCC



- FCC 15_247 Peak.LimitLine
- FCC 15_247 AV.LimitLine
- Preview Result 1
- Preview Result 2
- ◆ Final Measurement Result 1
- ◆ Final Measurement Result 2
- ◆ Final Result 1
- ◆ Final Result 1 +
- ◆ Final Result 2
- ◆ Final Result 2 +



Electric Field Strength FCC



— FCC 15_247 Peak.LimitLine
 — FCC 15_247 AV.LimitLine
 — Preview Result 1
— Preview Result 2
 ◆ Final Result 1
 ◆ Final Result 2

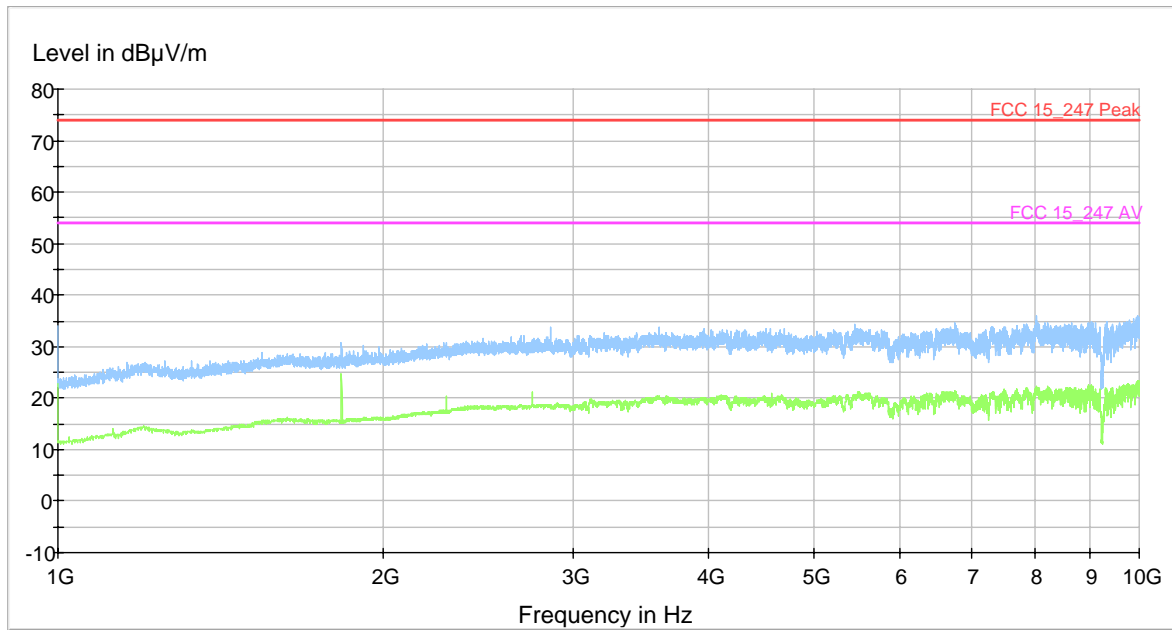
Final Result 1

Frequency (MHz)	MaxPeak-ClearWrite (dBµV/m)	Average-ClearWrite (dBµV/m)	Average-MaxHold (dBµV/m)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
887.840000	27.8	1000.000	120.000	124.0	H	23.0	27.6	18.60	46.40	
914.270000	85.3	1000.000	120.000	124.0	H	90.0	28.2	-38.90	46.40	

Final Result 2

Frequency (MHz)	MaxPeak-ClearWrite (dBµV/m)	Average-ClearWrite (dBµV/m)	Average-MaxHold (dBµV/m)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
914.270000	85.3	1000.000	120.000	124.0	H	90.0	28.2	-38.90	46.40	

Electric Field Strength FCC



- ◆ FCC 15_247 Peak.LimitLine
◆ Final Measurement Result 1
◆ Final Result 2
- ◆ FCC 15_247 AV.LimitLine
◆ Final Measurement Result 2
◆ Final Result 2 +
- ◆ Preview Result 1
◆ Final Result 1
- ◆ Preview Result 2
◆ Final Result 1 +



PRIMA

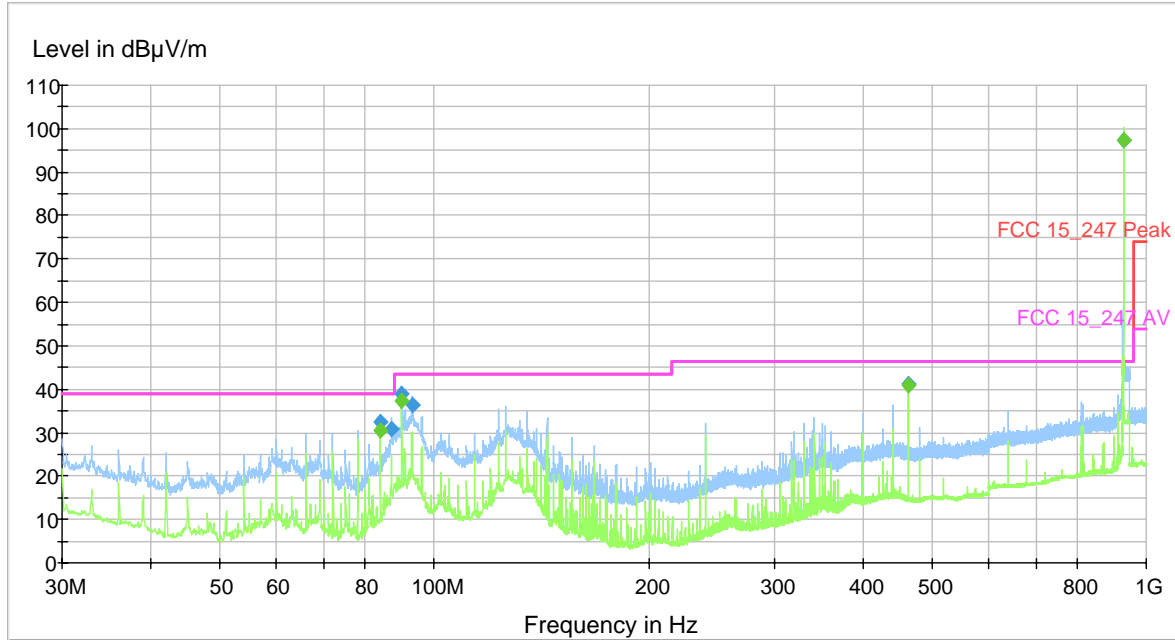
RICERCA & SVILUPPO

Vertical Polarization

CH63

FCCTR_100139_1

Electric Field Strength FCC



— FCC 15_247 Peak.LimitLine
 — FCC 15_247 AV.LimitLine
 — Preview Result 1
— Preview Result 2
 ◆ Final Result 1
 ◆ Final Result 2

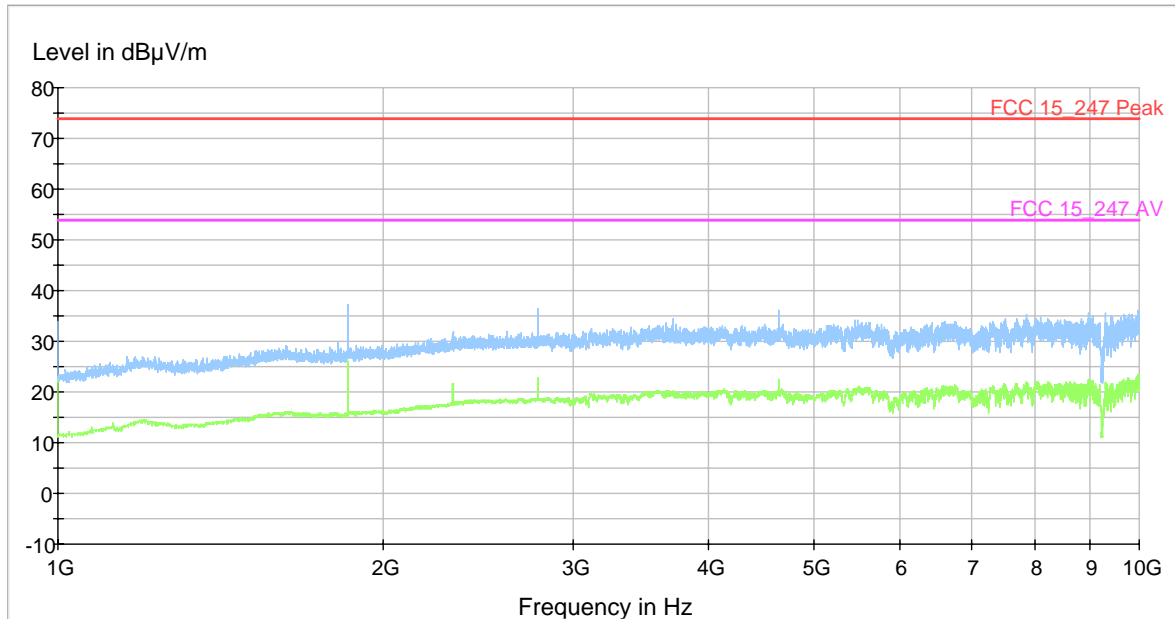
Final Result 1











Frequency (MHz)	MaxPeak-ClearWrite (dBµV/m)	Average-ClearWrite (dBµV/m)	Average-MaxHold (dBµV/m)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
84.040000	32.4	1000.000	120.000	124.0	V	97.0	9.7	6.60	39.00	
87.040000	30.8	1000.000	120.000	124.0	V	112.0	10.1	8.20	39.00	
90.040000	38.8	1000.000	120.000	125.0	V	112.0	10.4	4.70	43.50	
93.040000	36.3	1000.000	120.000	125.0	V	112.0	10.9	7.20	43.50	
463.960000	41.2	1000.000	120.000	100.0	V	23.0	21.0	5.20	46.40	
927.480000	97.5	1000.000	120.000	100.0	V	23.0	28.8	-51.10	46.40	

Final Result 2

Frequency (MHz)	MaxPeak-ClearWrite (dBµV/m)	Average-ClearWrite (dBµV/m)	Average-MaxHold (dBµV/m)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
84.040000	30.6	1000.000	120.000	124.0	V	82.0	9.7	8.40	39.00	
90.040000	37.2	1000.000	120.000	125.0	V	97.0	10.4	6.30	43.50	
463.960000	40.8	1000.000	120.000	100.0	V	23.0	21.0	5.60	46.40	
927.480000	97.5	1000.000	120.000	100.0	V	23.0	28.8	-51.10	46.40	

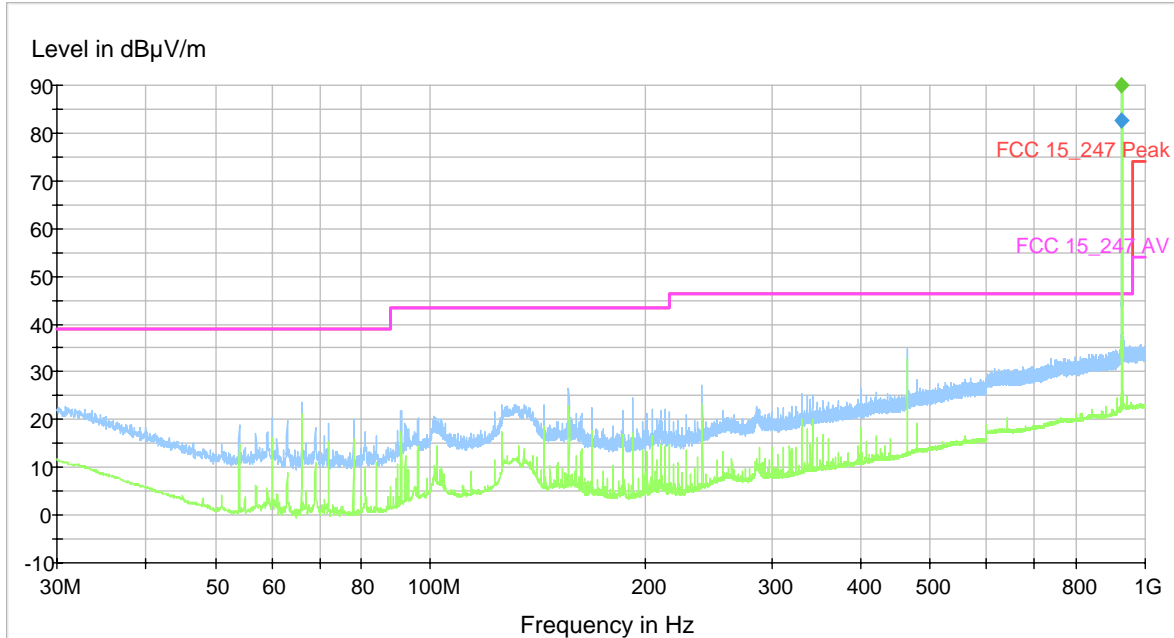
Electric Field Strength FCC



- | | | | | | | | |
|---|----------------------------|---|----------------------------|--|------------------|--|------------------|
|  | FCC 15_247 Peak.LimitLine |  | FCC 15_247 AV.LimitLine |  | Preview Result 1 |  | Preview Result 2 |
|  | Final Measurement Result 1 |  | Final Measurement Result 2 |  | Final Result 1 |  | Final Result 1 + |
|  | Final Result 2 |  | Final Result 2 + | | | | |



Electric Field Strength FCC



— FCC 15_247 Peak.LimitLine
 — FCC 15_247 AV.LimitLine
 — Preview Result 1
— Preview Result 2
 ◆ Final Result 1
 ◆ Final Result 2

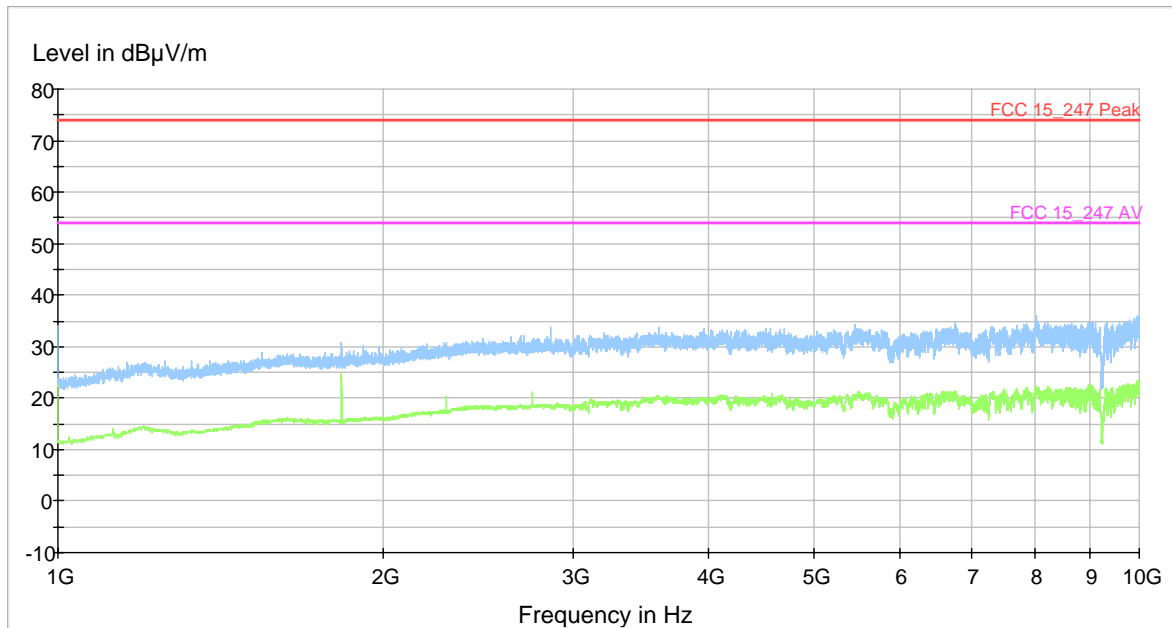
Final Result 1

Frequency (MHz)	MaxPeak-ClearWrite (dBµV/m)	Average-ClearWrite (dBµV/m)	Average-MaxHold (dBµV/m)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
927.480000	82.5	1000.000	120.000	125.0	H	84.0	28.8	-36.10	46.40	

Final Result 2

Frequency (MHz)	MaxPeak-ClearWrite (dBµV/m)	Average-ClearWrite (dBµV/m)	Average-MaxHold (dBµV/m)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
927.480000	89.9	1000.000	120.000	100.0	H	82.0	28.8	-43.50	46.40	

Electric Field Strength FCC



- FCC 15_247 Peak.LimitLine
 - ◆ Final Measurement Result 1
 - ◆ Final Result 2
- FCC 15_247 AV.LimitLine
 - ◆ Final Measurement Result 2
 - ◆ Final Result 2 +
- Preview Result 1
 - ◆ Final Result 1
- Preview Result 2
 - ◆ Final Result 1 +

**TEST
10.**

CONDUCTED EMISSION 9 KHZ ÷ 10TH HARMONIC

REFERENCE DOCUMENT FCC 47CFR Part 15

- **TEST LOCATION:** Shielded chamber
- **TEST EQUIPMENT USED FOR TEST:**
 - Spectrum Analyzer Rohde&Schwarz mod. FSP40
 - Tunable Notch Filter 900MHz WAINWRIGHT mod. WRCA800/960
 - High pass filter WAINWRIGHT mod. WHK 1.3/15G-10SS
- **TESTED PORT:** Enclosure
- **EMISSION LIMITS:** 20dB under carrier frequency or Acc. to Section 15.209 of reference document
- **UNCERTAINTY OF MEASURE:**
 - Combined uncertainty = ± 1.75 dB
 - Total uncertainty = $(k=2) \pm 3.5$ dB

TEST CONDITIONS:	MEASURED
Ambient temperature : 15 - 35 °C	23,5 \pm 3 °C
Ambient humidity : 25 - 75 %rH	39 \pm 5 %rH
Pressure : 85 - 106 kPa (860 mbar - 1060 mbar)	950 \pm 50 mbar

OPERATING CONDITION (Rif. Section. 2) : #1

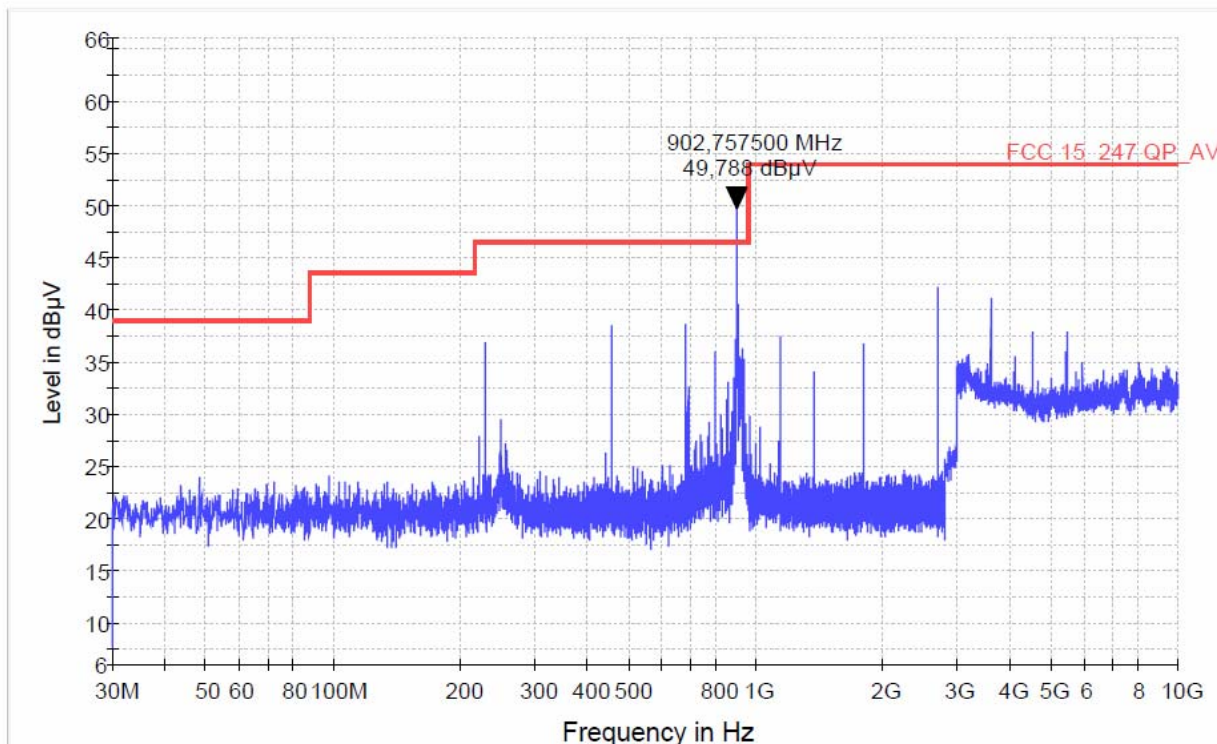
RESULT: WITHIN THE LIMIT



EUT has be connected to the Spectrum analyser via a low loss cable, carrier frequency was reduced with tunable Notch filter between 30 MHz to 1,3 Ghz and over 1,3 GHz to 10 GHz with High pass filter

Result channel low

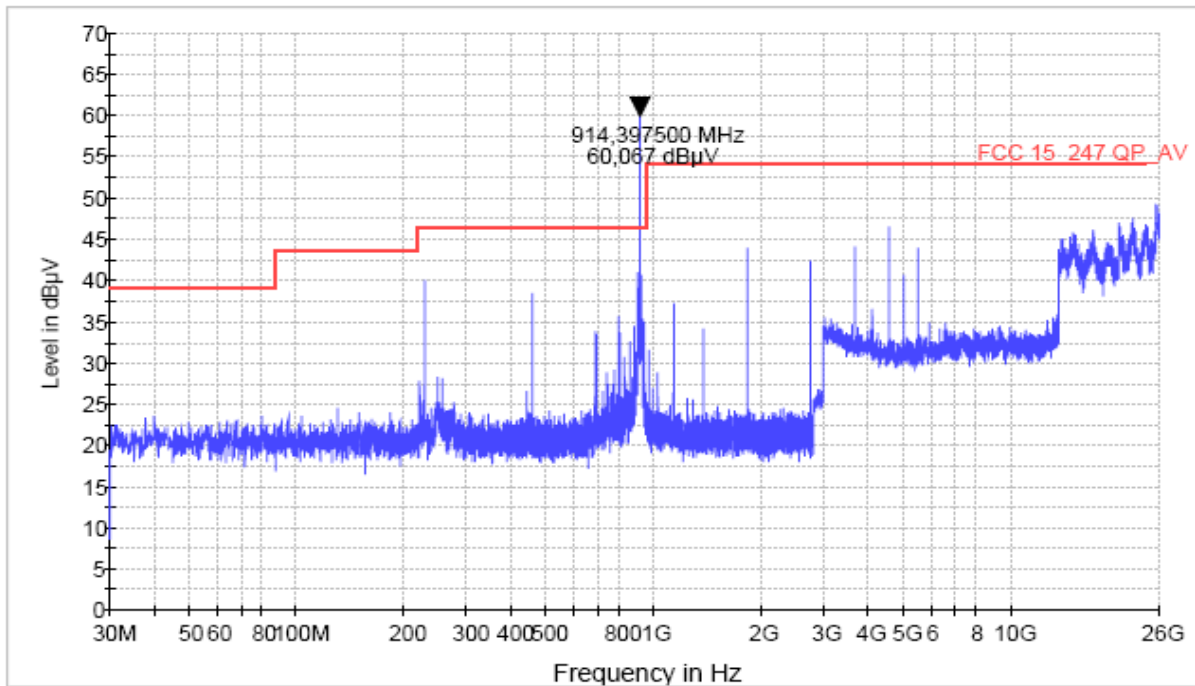
Frequency	Measured (dBuV)	Average limit(dBuV)	Margin
225,68	36,90	46	9,1
451,37	38,54	46	7,46
1805,275	36,78	54	17,22
2707,975	42,20	54	11,8
3609,100	41,2	54	12,8





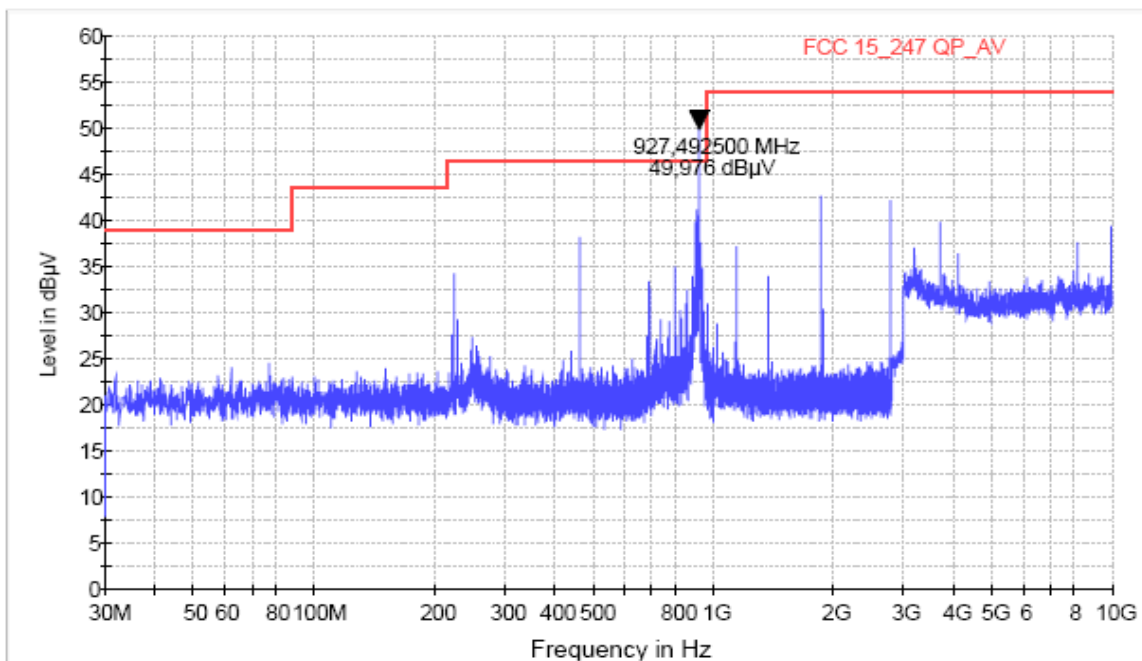
Result channel medium

Frequency	Measured (dBuV)	Average limit(dBuV)	Margin
228,607	36,98	46	9,01
457,163	38,38	46	7,62
1828,675	43,97	54	10,03
4569,000	46,53	54	7,47





Frequency	Measured (dBuV)	Average limit(dBuV)	Margin
231,872	34,22	46	11,78
463,746	38,25	46	7,75
1854,775	42,64	54	11,36
2782,45	42,20	54	11,8
3710,600	39,82	54	14,18



**TEST
1**

RECEIVER SPURIUS EMISSION 9 KHZ ÷ 10TH HARMONIC

REFERENCE RSS-GEN Issue 2 § 4.10, § 6, § 7.2.3
DOCUMENT RSS-210 Issue 7 § 2.2

- **TEST LOCATION:** Semi-anechoic chamber
- **TEST EQUIPMENT USED FOR TEST:** EMI receiver Rohde & Schwarz Mod. ESU 40
Chase Antenna Mod. CBL 6111 A
Antenna Rohde & Schwarz mod. HL50
Preamplifier BONN mod BLMA 0118 –1M
- **TESTED PORT:** Enclosure
- **EMISSION LIMITS:** Acc. to Section 15.209 of reference document
- **UNCERTAINTY OF MEASURE:** Combined uncertainty = ± 1.75 dB
Total uncertainty = (k=2) ± 3.5 dB

TEST CONDITIONS:	MEASURED
Ambient temperature : 15 - 35 °C	23,5 ± 3 °C
Ambient humidity : 25 - 75 %rH	39 ± 5 %rH
Pressure : 85 - 106 kPa (860 mbar - 1060 mbar)	950 ± 50 mbar

OPERATING CONDITION (Rif. Section. 2) : #1

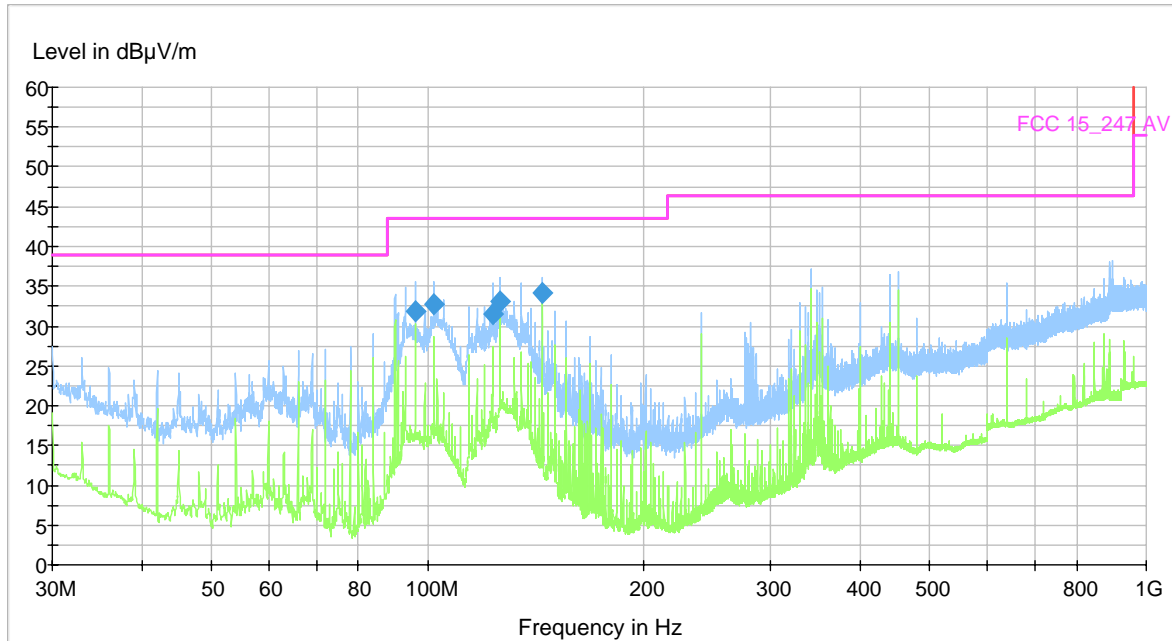
RESULT: WITHIN THE LIMIT



Worst case frequency band 902,65 MHz

Antenna polarity Vertical

Electric Field Strength FCC



— FCC 15_247 Peak.LimitLine
 — FCC 15_247 AV.LimitLine
 — Preview Result 1
— Preview Result 2
 ◆ Final Result 1
 ◆ Final Result 2

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
96.040000	31.9	1000.00	120.000	124.0	V	90.0	11.3	11.60	43.50
102.040000	32.7	1000.00	120.000	124.0	V	112.0	12.2	10.80	43.50
123.000000	31.5	1000.00	120.000	100.0	V	90.0	13.8	12.00	43.50
126.040000	33.0	1000.00	120.000	100.0	V	23.0	13.9	10.50	43.50
144.040000	34.2	1000.00	120.000	100.0	V	83.0	13.9	9.30	43.50

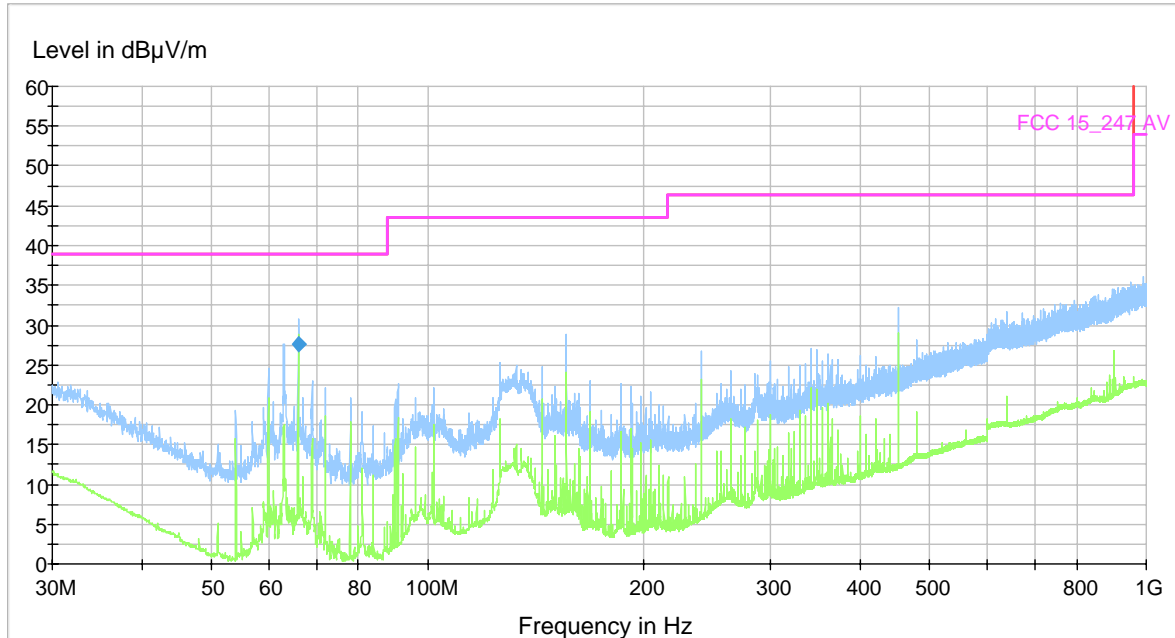
No significant spurious are detected on frequency band 1-10 GHz



Worst case frequency band 902,65 MHz

Antenna polarity Horizontal

Electric Field Strength FCC



— FCC 15_247 Peak.LimitLine
 — FCC 15_247 AV.LimitLine
 — Preview Result 1
— Preview Result 2
 ◆ Final Result 1
 ◆ Final Result 2

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
66.000000	27.6	1000.00	120.000	125.0	H	111.0	7.4	11.40	39.00

No significant spurious are detected on frequency band 1-10 GHz

6. EUT TECHNICAL DOCUMENTATION

6.1 Wiring diagrams

	<i>Document reference (n., edition, date, ...)</i>
WIRING DIAGRAM	*****
PART LIST	*****

6.2 Technical manual

	<i>Document reference (n., edition, date, ...)</i>
Operating Manual	*****

6.3 Photographic documentation

PHOTO 1 – E.U.T. IDENTIFICATION

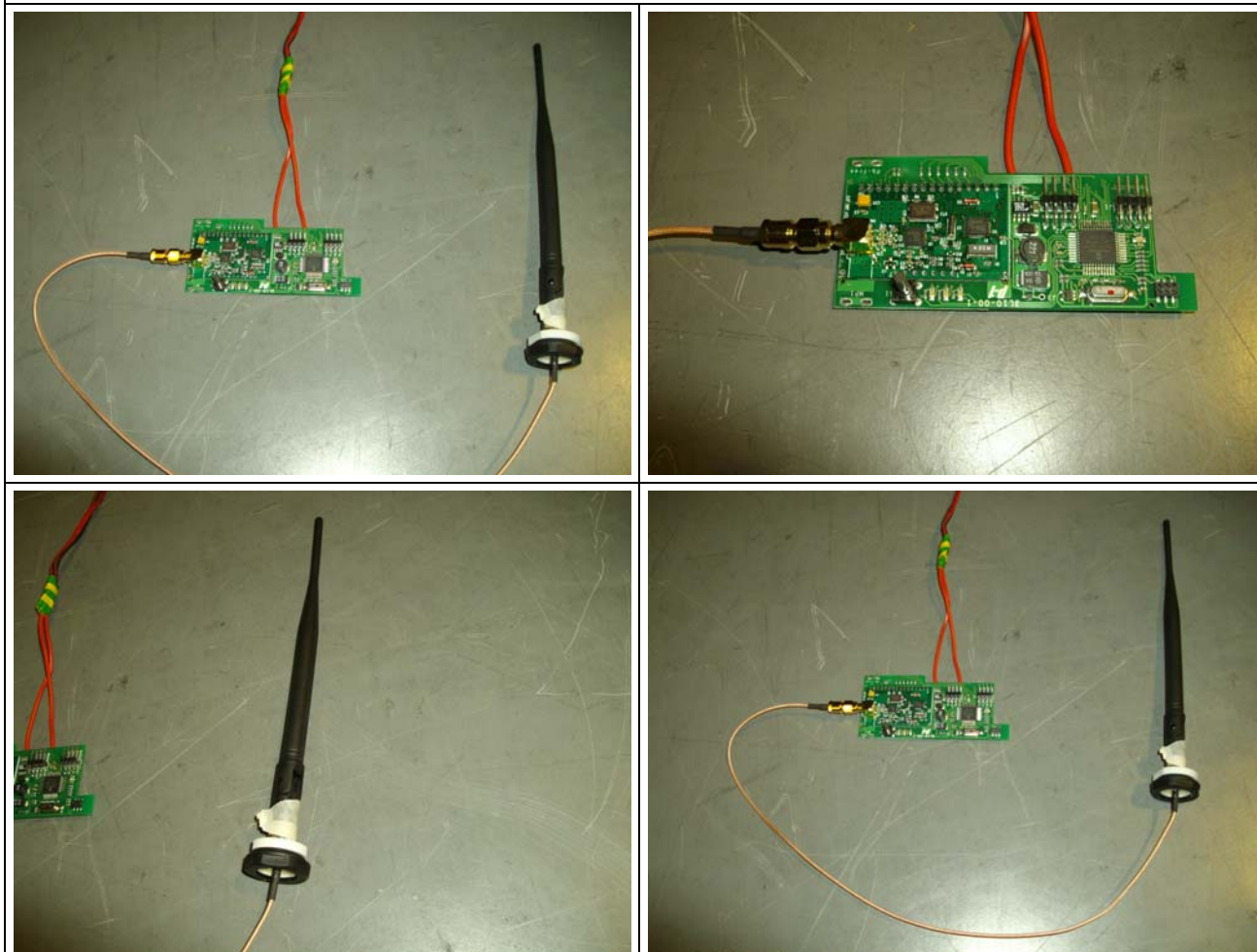




PHOTO 2 – RADIATED SETUP

