

TEST REPORT

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EUT DESCRIPTION Radio-Frequency Module for Inverter Data Monitoring

EUT TRADEMARK Power-One

EUT MODEL PVI-RADIOMODULE-Z

REFERENCE STANDARDS : 47 CFR FCC part 15.247

TEST REPORT NUMBER FCCTR_111161_1

TEST REPORT ISSUE DATE 29/09/2011; rev.1 17/10/2011

TESTING LABORATORY Prima Ricerca & Sviluppo S.r.l.
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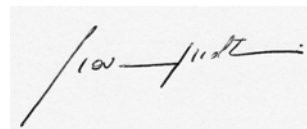
TESTING LOCATION As Above

DATE OF TEST SAMPLE RECEIPT 29/09/2011

DATE OF TEST 29/09/2011

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 : module Transceiver mod. XBee PRO S2B
 Module Manufacturer: Digi International Inc.
 Specification: Deviation from type approval for cable connection between antenna connector to antenna
 Serial number : Not present
 FCC ID : X6W-MODZ
 Country of manufacturer: ITALY

1.2 Technical data

FCC class: 47 CFR FCC Part 15 Subpart C § 15.247
 Product type: Radio-Frequency Module for Inverter Data Monitoring
 Radio type: Intentional radiators
 Power type : 12 Vdc
 Type Modulation : QPSK
 Frequency range : 2405 – 2475 MHz
 Channel number : 16

	n. channel	frequency
1	11	2405
2	12	2410
3	13	2415
4	14	2420
5	15	2425
6	16	2430
7	17	2435
8	18	2440
9	19	2445
10	20	2450
11	21	2455
12	22	2460
13	23	2465
14	24	2470
15	25	2475
16 (not used)	26	2480

Channel Bandwidth (6dB) : 1,608 MHz
 Channel spacing : 5MHz
 Conducted/radiated Output : 18,63 dBm conducted
 Power : EIRP = 18,63 + 2,14 dBi = 20,77
 Carrier Frequency: 2405, 2440, 2470, 2475 and 2480 MHz (Channels # 11, 18, 24, 25 & 26)
 Field Antenna : Antenna Type: MaxStream.
 mod. A24-HASM-450 Gain 2,14

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	Inverter type PVI-4.2-OUTD-IT
4	Signals / control lines		
5	Telecommunication ports	Port no present	
<i>Note: During the tests all cables must be what provided the manufacturer or the same that used in the real employment of the EUT.</i>			

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

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 **remote control 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) (3)	#2	Within the limit
3		6 dB Bandwidth	FCC Part 15 §15.247 (a) (1)	#1	Within the limit
4		Power Spectral Density	FCC Part 15 §15.247 (e)	#1	Within the limit
5		Band-Edge and RF conducted Spurious Emissions at the Transmitter Antenna Terminal	FCC Part 15 § 15.247 (d)	#1	Within the limit
6		Power Spectral Density	FCC Part 15 § 15.247 (e)	#1	Within the limit
7		Restricted Bands	FCC Part 15 § 15.205	#1	Within the limit
8	AC mains Input ports	Conducted Emission	FCC Part 15 § 15 207(a)	#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	According to §15.203 / 15.204 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. 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.

Antenna requirement	
N° of authorized antenna type	1
Antenna type	Dedicated antenna
Total gain	2,14 dBi
External power amplifier	Not present

**TEST
2.**

MAXIMUM PEAK OUTPUT POWER

**REFERENCE
DOCUMENT**

According to §15.247(b) (3), For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

According to §15.247(b) (4), The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

- TEST SETUP: In according to manufacturer specifications
 - TEST LOCATION: Radio test area
- TEST equipment used for conducted test:
- Spectrum Analyzer Rohde&Schwarz mod. FSP40
 - Variable Power supply
 - Attenuator 10dB mod MCL BW-N10W5+

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

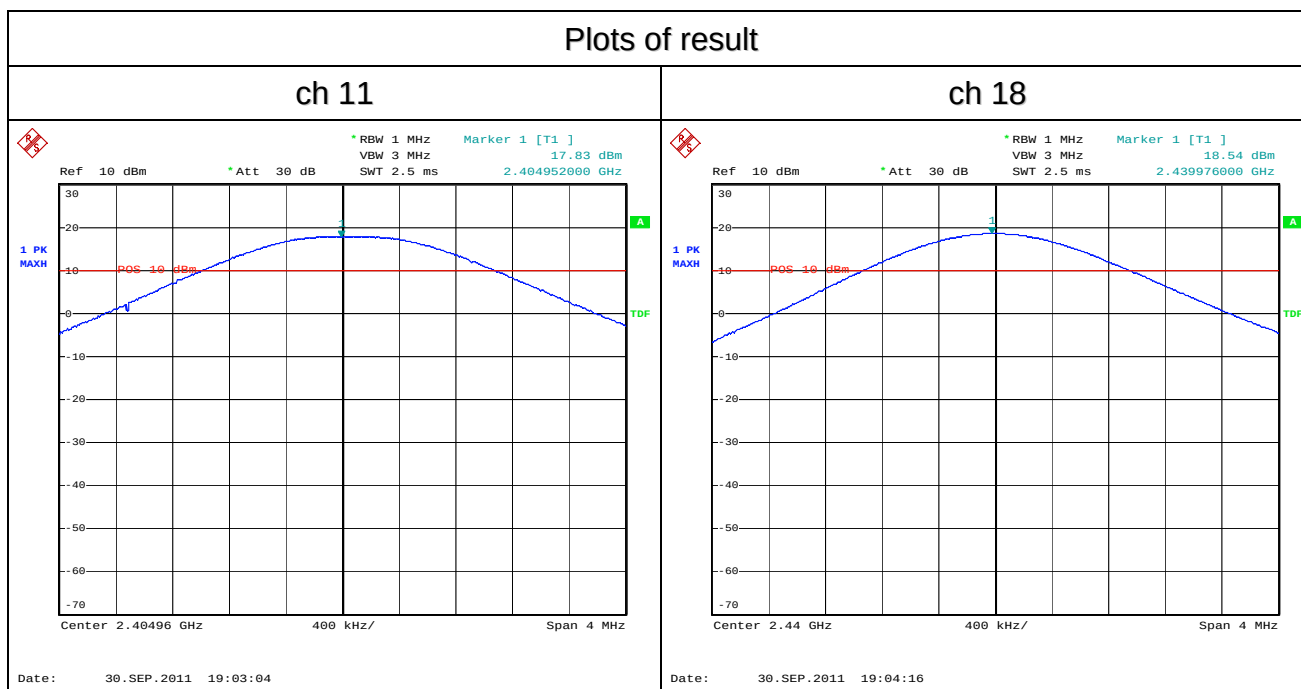
modulation:	OFF	
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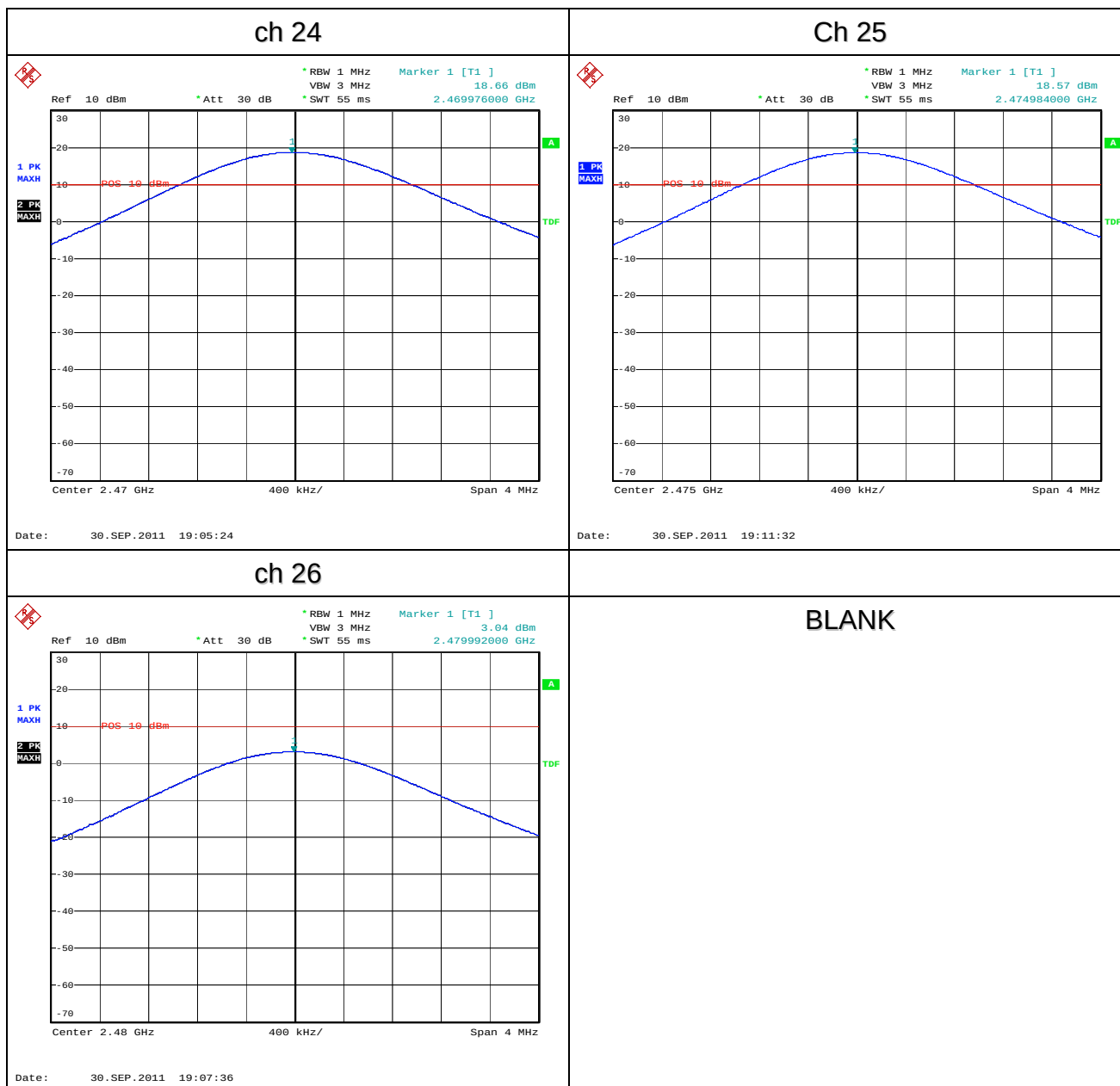
Conducted Measurement Result

channel	frequency	Output Power in dBm	Output Power in mW	Standard dBm	Result
CH 11	2405	17,83	60,67	< 30	compliant
CH 18	2440	18,54	71,45	< 30	compliant
CH 24	2470	18,63	72,94	< 30	compliant
CH 25	2475	18,57	71,94	< 30	compliant
CH 26	2480	3,04	2,01	< 30	compliant

Incertezza di misura / Measurement Uncertainty : ± 3 dB

Plots of result





MAXIMUM PEAK OUTPUT POWER

Note:- The following is type allowed antenna with gain allowed operating channels to comply with FCC 15.247 requirements

Antenna: Type- Dipole, Gain- 2.14 dBi, Operates on Channels # 11 to 26

channel	frequency	Power in dBm	Power in mW	Peak EIRP (Note1)	Power in mW	Standard limit dBm	Margin (dB)
CH 11	2405	17,83	60,67	19,97	99,31	30	-10,03
CH 18	2440	18,54	71,45	20,68	116,95	30	-9,32
CH 24	2470	18,63	72,94	20,77	119,39	30	-9,23
CH 25	2475	18,57	71,94	20,71	117,76	30	-9,29
CH 26	2480	3,04	2,01	5,18	3,296	30	-24,82
Incertezza di misura / Measurement Uncertainty : ± 3 dB							

Note 1: The Peak EIRP is calculated as the sum of Peak Conducted Power in dBm and antenna assembly gain of EUT in dBi (antenna gain – cable loss), cable loss is 0.0 dB.

TEST 3. 6dB CHANNEL BANDWIDTH

REFERENCE DOCUMENT According to §15.247(a)(2), Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

- **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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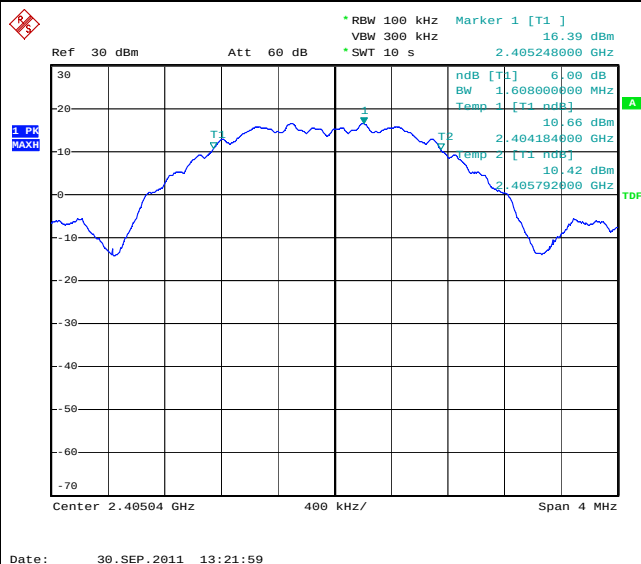
Measurement Result

frequency	Measurement (MHz) 6 dB band	Result
CH 11	1,608	compliant
CH 18	1,576	compliant
CH 24	1,584	compliant
CH 25	1,592	compliant
CH 26	1,600	compliant

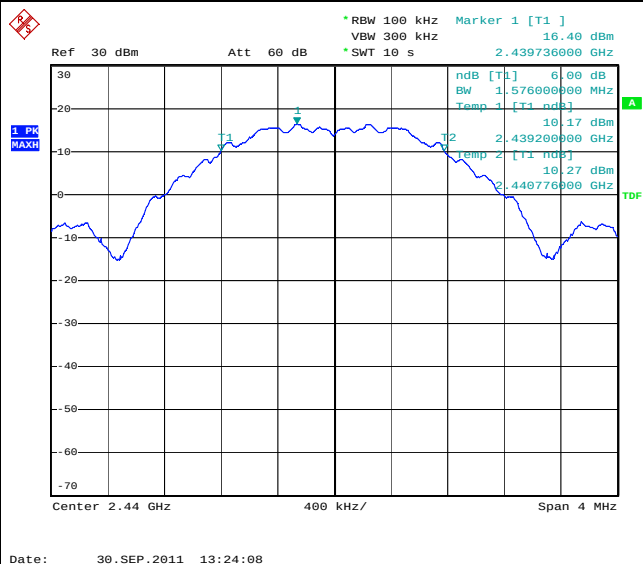
Incertezza di misura / Measurement Uncertainty : ±1 KHz

Plots of result

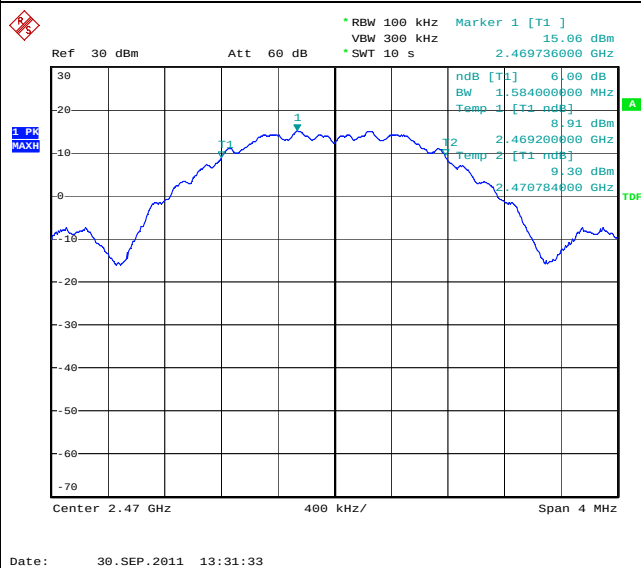
ch 11



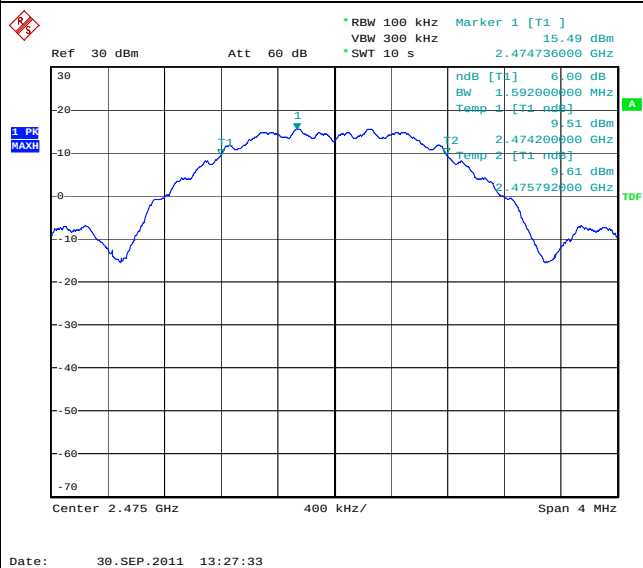
ch 18

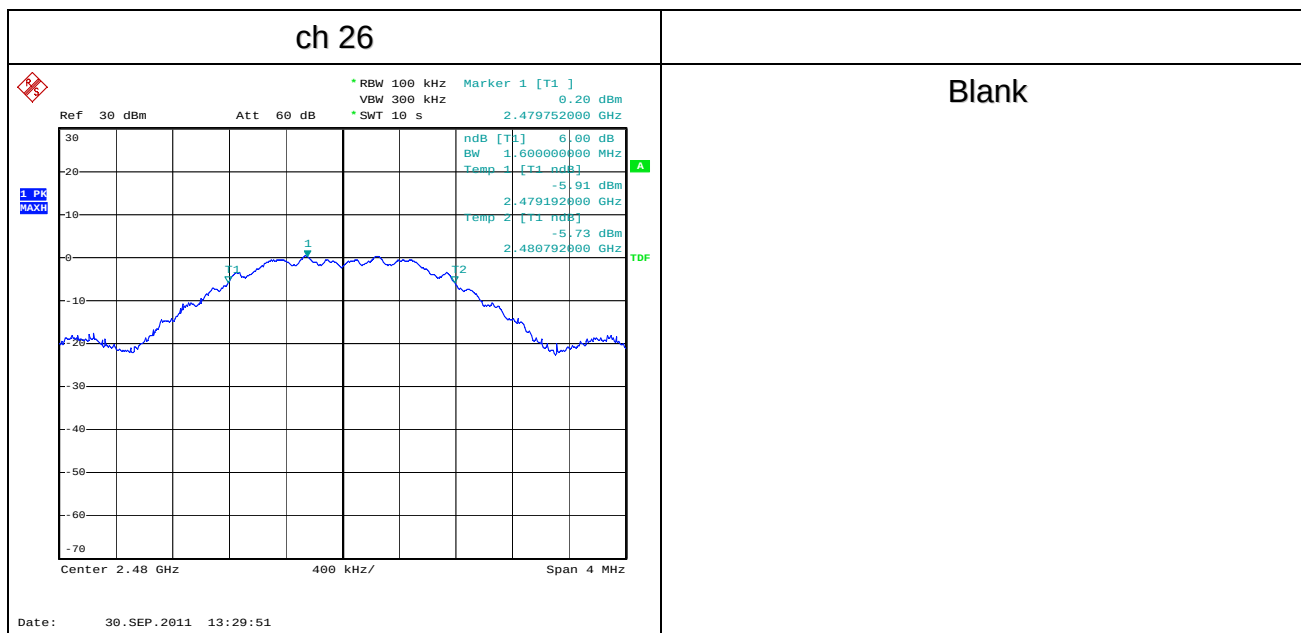


ch 24



ch 25





**TEST
4.**

Band-Edge and RF Conducted Spurious Emissions at the Transmitter Antenna Terminal

**REFERENCE
DOCUMENT**

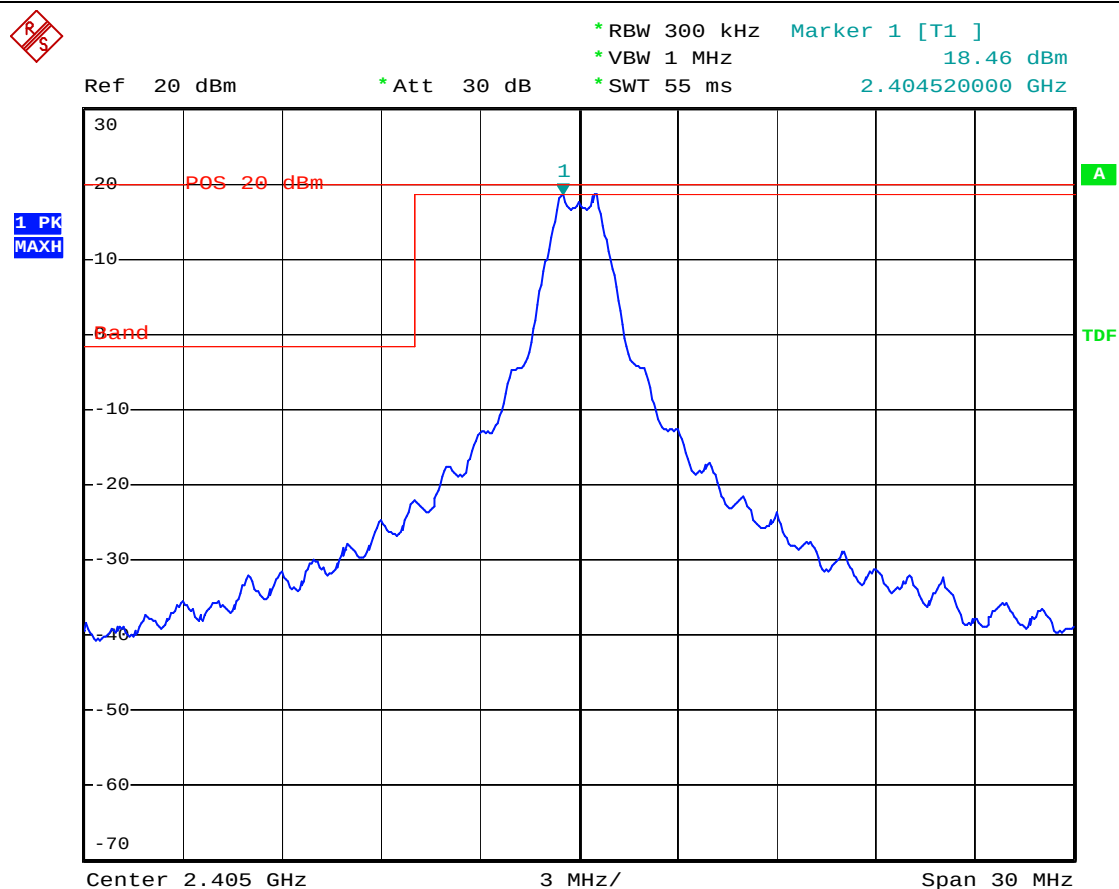
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Sec. 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Sec. 15.205(a), must also comply with the radiated emission limits specified in Sec. 15.209(a) (see Sec. 15.205(c)).

- TEST SETUP: In according to manufacturer specifications
- TEST LOCATION: Radio test area
- TEST EQUIPMENT USED FOR TEST:
 - Spectrum Analyzer Rohde&Schwarz mod. FSP40
 - Attenuator 10 dB mod. MCL BW-N10W5+
 - High pass filter Wainwright WHNX 3.5/26.5G-6SS

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:			Compliant

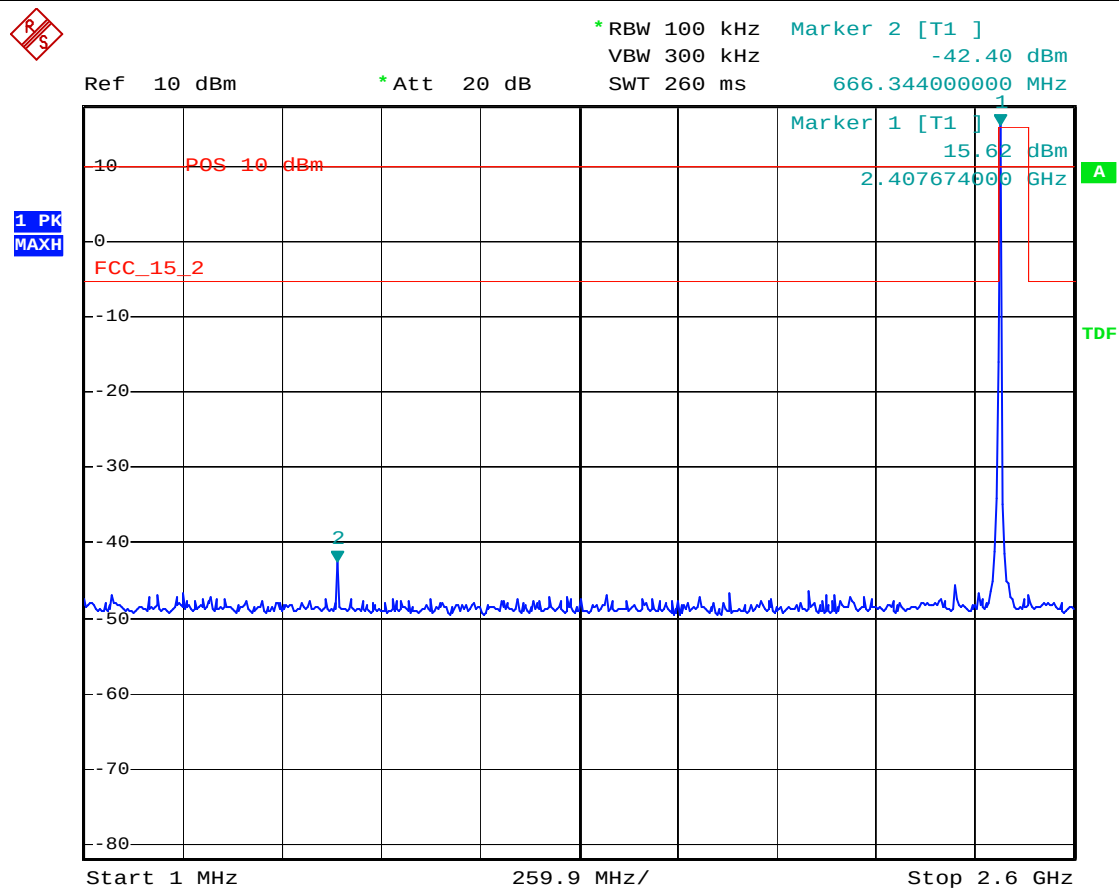
Please refer the following plots.

Plots of 100KHz Band Edge low band (2405 MHz)

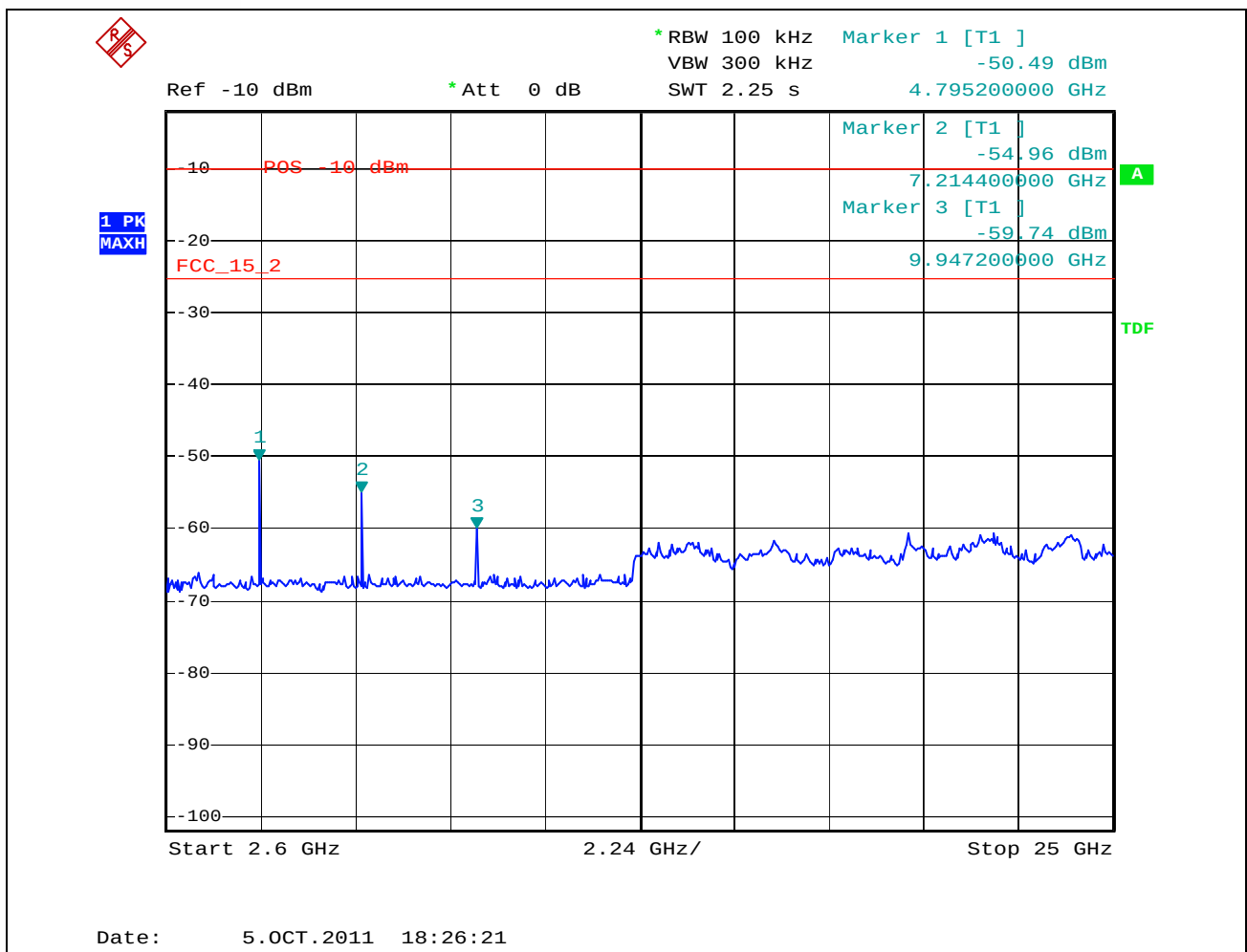


Date: 5.OCT.2011 17:19:14

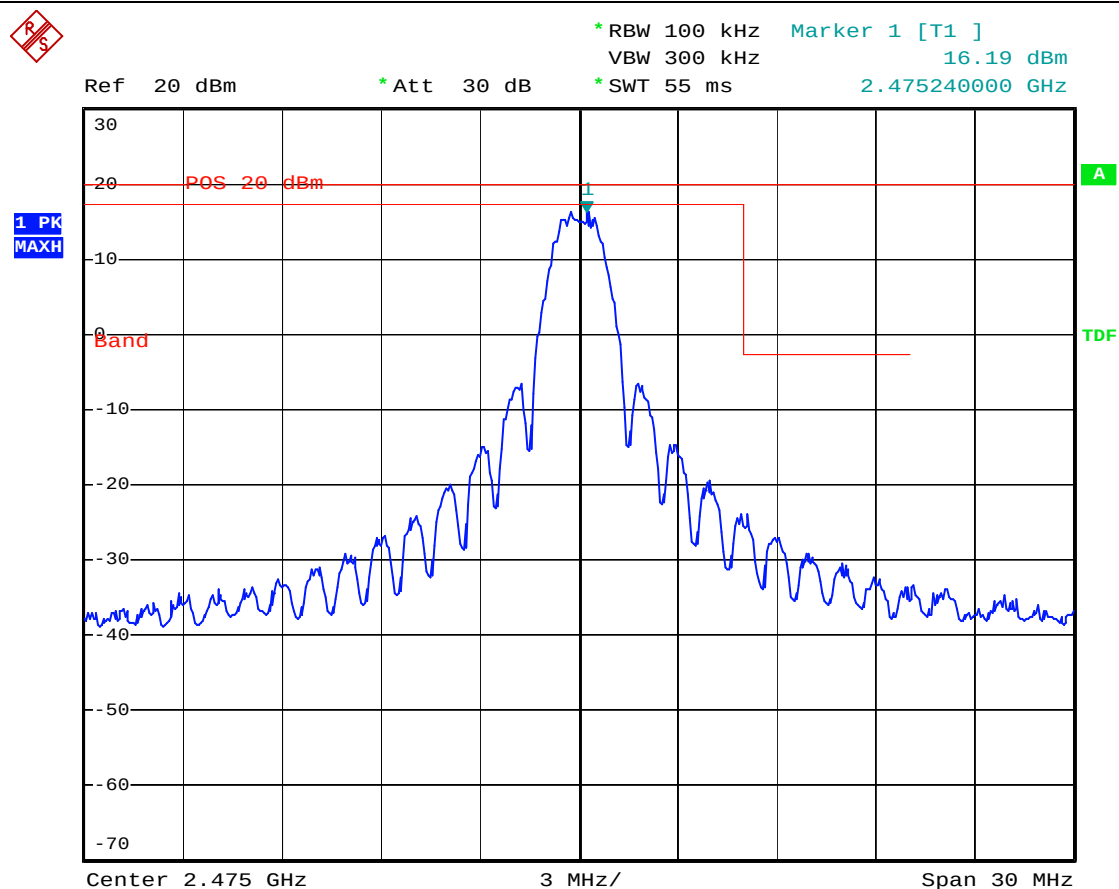
Plots of spurious conducted



Date: 5.OCT.2011 18:22:14

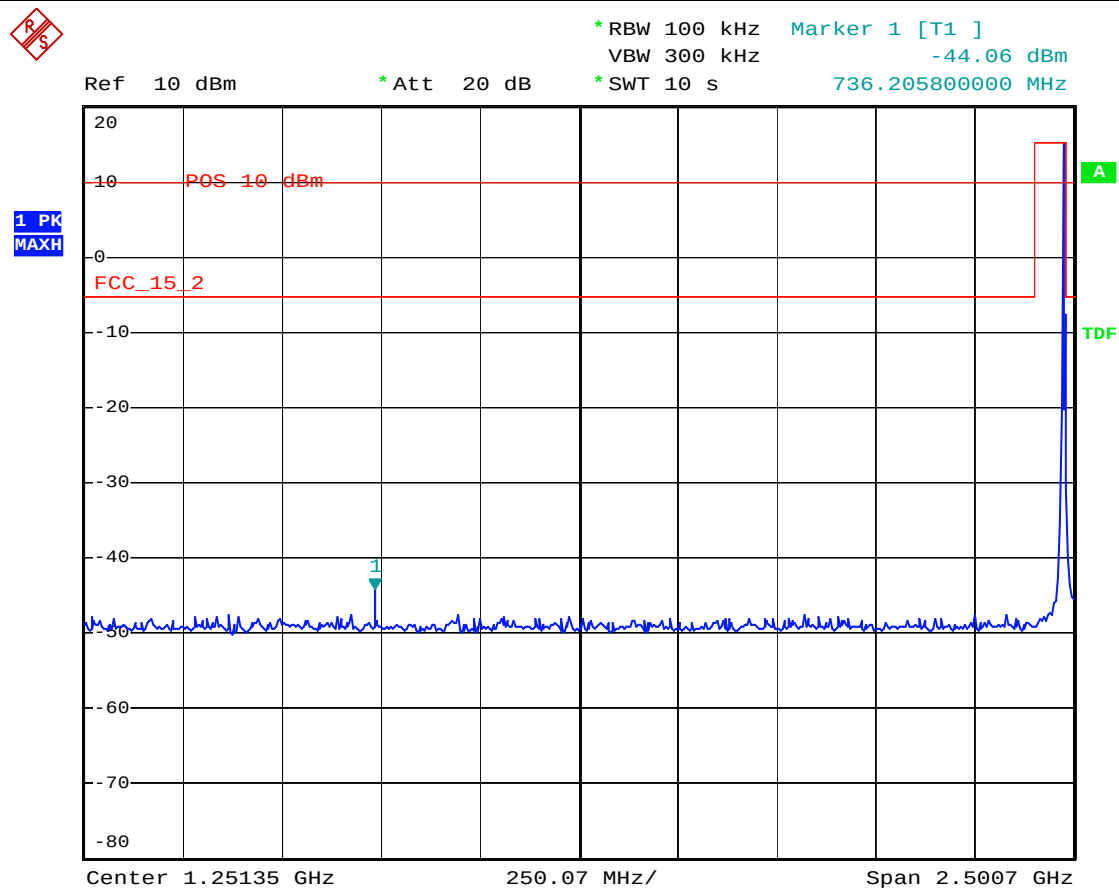


Plots of 100KHz Band Edge highest band (2475 MHz)

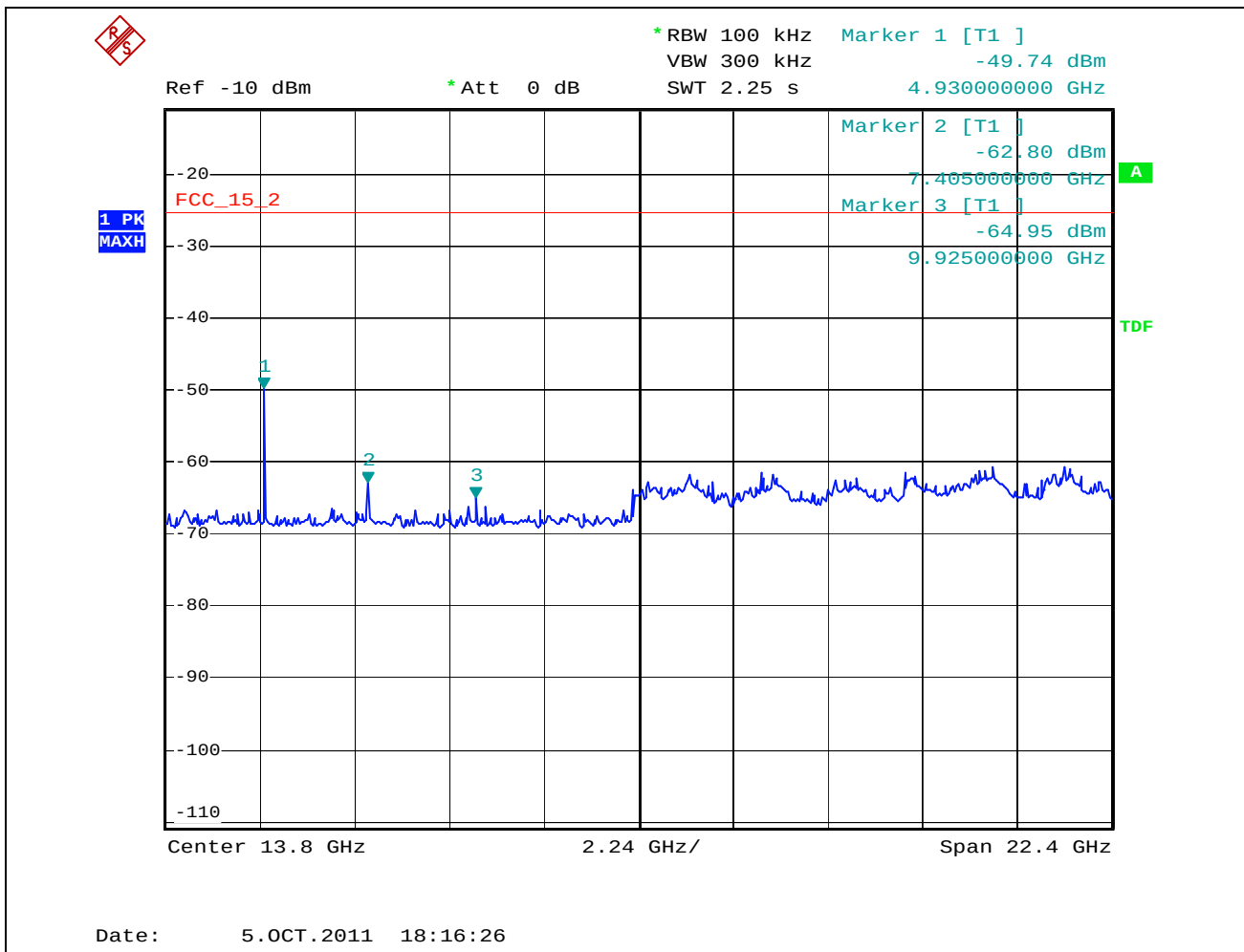


Date: 5.OCT.2011 17:32:16

Plots of conducted spurious



Date: 5.OCT.2011 18:02:30



**TEST
5.**

POWER SPECTRAL DENSITY

**REFERENCE
DOCUMENT**

According to §15.247) (e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

• **TEST SETUP:**

In according to manufacturer specifications

• **TEST LOCATION:**

Radio test area

TEST equipment used for conducted test:

- Spectrum Analyzer Rohde&Schwarz mod. FSP40
- Variable Power supply
- Attenuator 10dB mod MCL BW-N10W5+

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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PRIMA

RICERCA & SVILUPPO

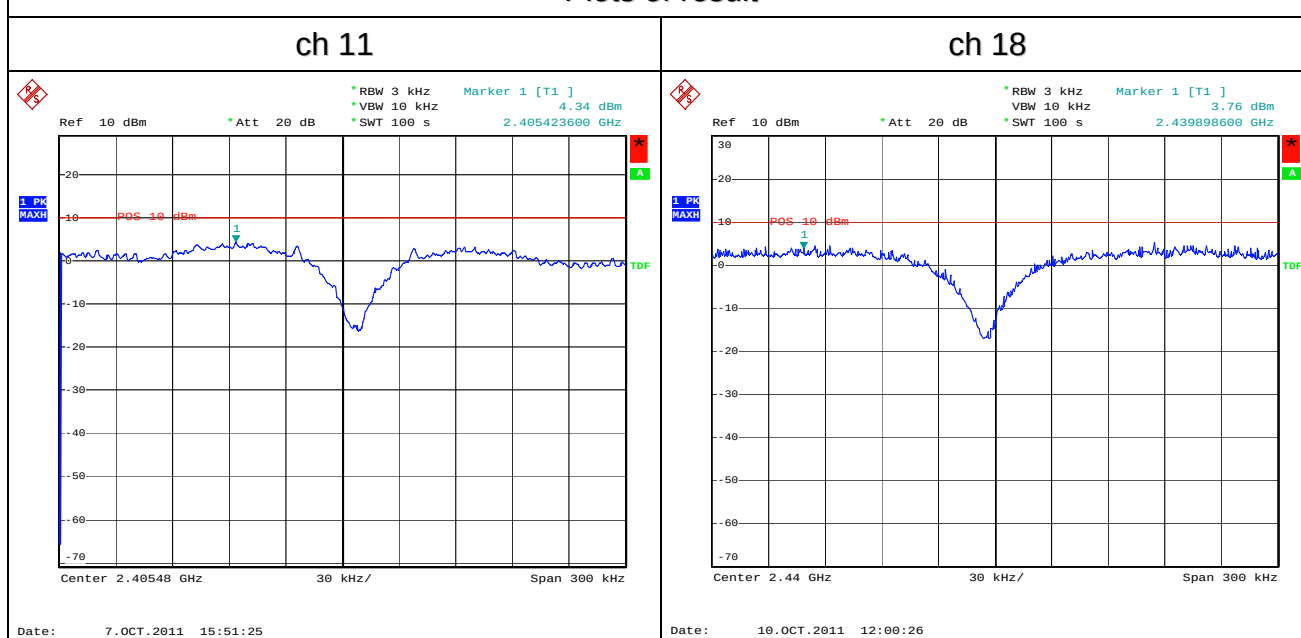
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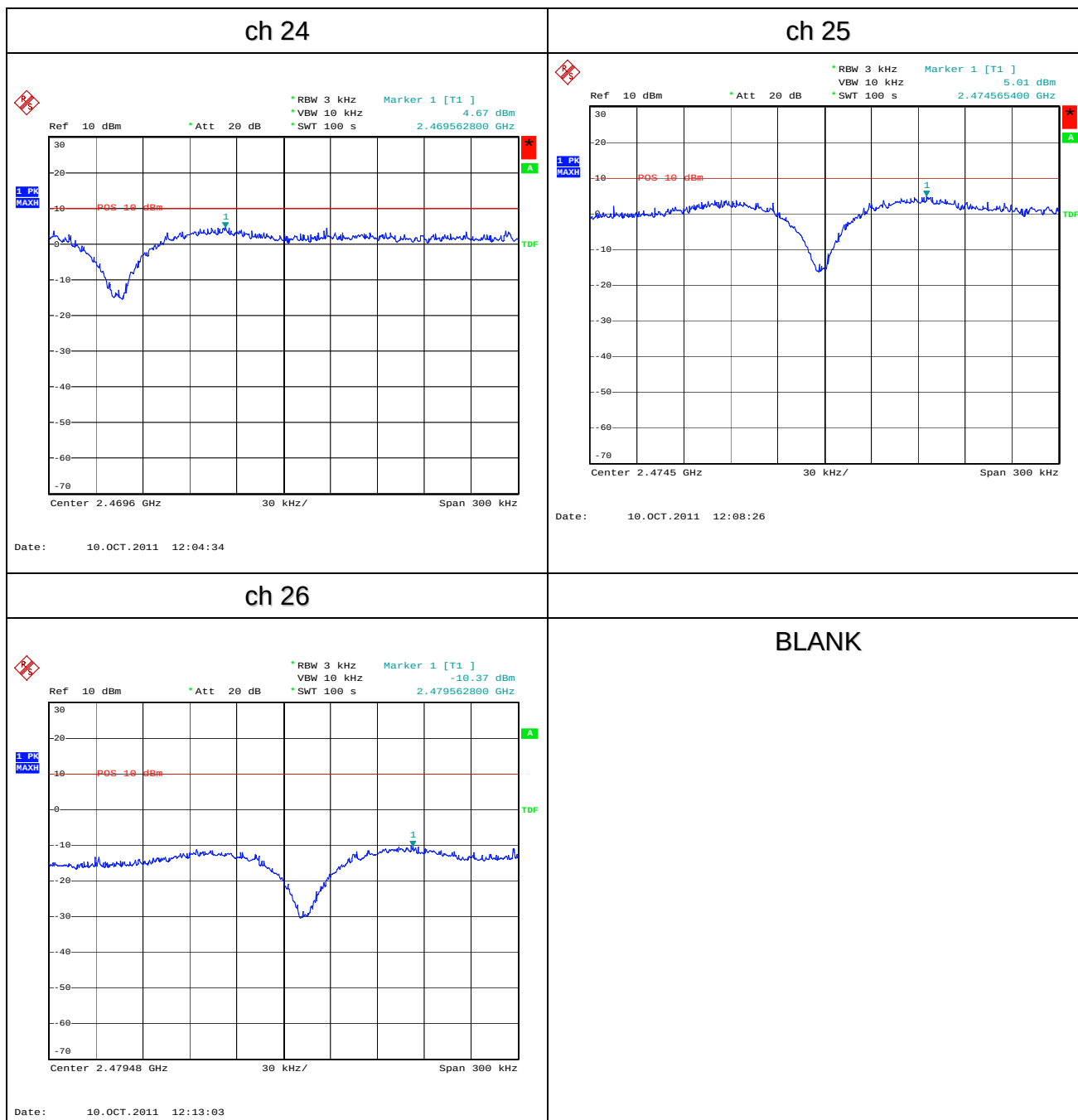
Conducted Measurement Result

channel	frequency	Power density in 3 kHz BW (dBm)	Limit (dBm)	Margin (dB)	Result
CH 11	2405	4,34	8	-3,64	compliant
CH 18	2440	3,76	8	-4,24	compliant
CH 24	2470	4,67	8	-3,33	compliant
CH 25	2475	5,01	8	-2,99	compliant
CH 26	2480	-10,37	8	-18,37	compliant

Incertezza di misura / Measurement Uncertainty : ± 1 dB

Plots of result





**TEST
6.**

RADIATED EMISSION 9 KHZ ÷ 10TH HARMONIC

REFERENCE FCC 47CFR Part 15
DOCUMENT

- **TEST LOCATION:** Semi-anechoic chamber
- **TEST EQUIPMENT USED FOR TEST:**
 - EMI receiver Rohde & Schwarz Mod. ESU 40
 - Spectrum Analyzer Rohde & Schwarz Mod. FSP 40
 - Chase Antenna Mod. CBL 6111 A
 - Antenna Rohde & Schwarz mod. HL50
 - Preamplifier BONN mod BLMA 0118 -1M
 - Preamplifier BONN mod BLMA 1840-1A
 - Tuneable notch filter Wainwright mod. WRCT2200/2500-5/40-10SK
 - High pass filter Wainwright WHNX 3.5/26.5G-6SS
- **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 $\pm$ 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

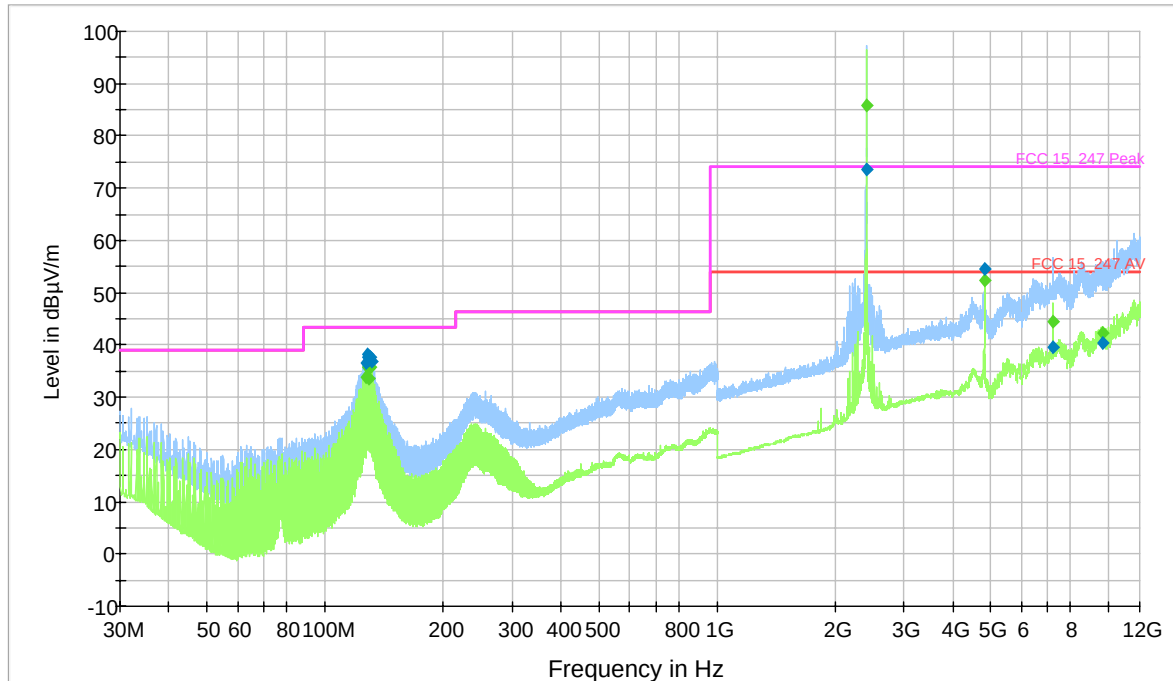
RESULT: WITHIN THE LIMIT

CH11	2405 MHz	Worst case
CH25	2475 MHz	Worst case

Vertical Polarization

CH11

Electric Field Strength FCC_OSP



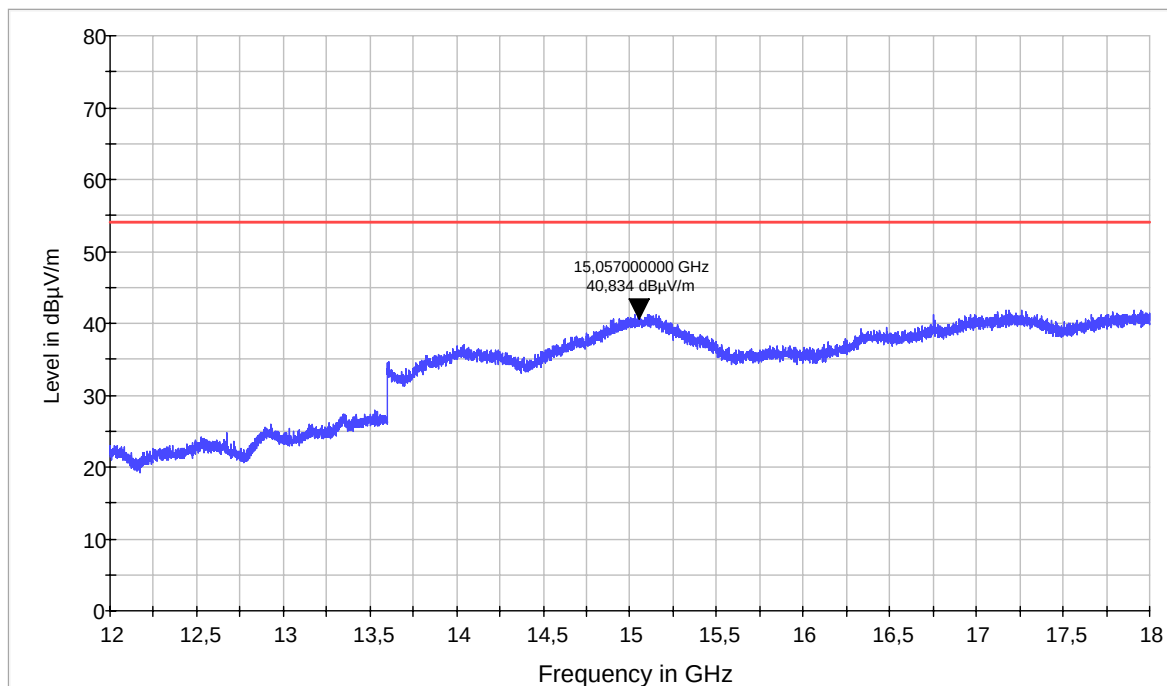
Final Result 1

Frequency (MHz)	Average (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
127.260000	34.0	1000.0	120.000	100.0	V	103.0	13.4	9.50	43.50
128.250000	35.7	1000.0	120.000	100.0	V	103.0	13.4	7.80	43.50
128.760000	36.4	1000.0	120.000	100.0	V	112.0	13.4	7.10	43.50
129.270000	33.4	1000.0	120.000	100.0	V	90.0	13.5	10.10	43.50
129.780000	35.4	1000.0	120.000	100.0	V	103.0	13.5	8.10	43.50
130.290000	35.6	1000.0	120.000	100.0	V	102.0	13.5	7.90	43.50
2405.000000	86.0	1000.0	1000.000	100.0	V	22.0	-2.3	-32.00	54.00
4810.000000	52.5	1000.0	1000.000	100.0	V	-14.0	6.6	1.50	54.00
7215.000000	44.5	1000.0	1000.000	100.0	V	-15.0	13.4	9.50	54.00
9620.500000	42.4	1000.0	1000.000	128.0	V	0.0	19.1	11.60	54.00

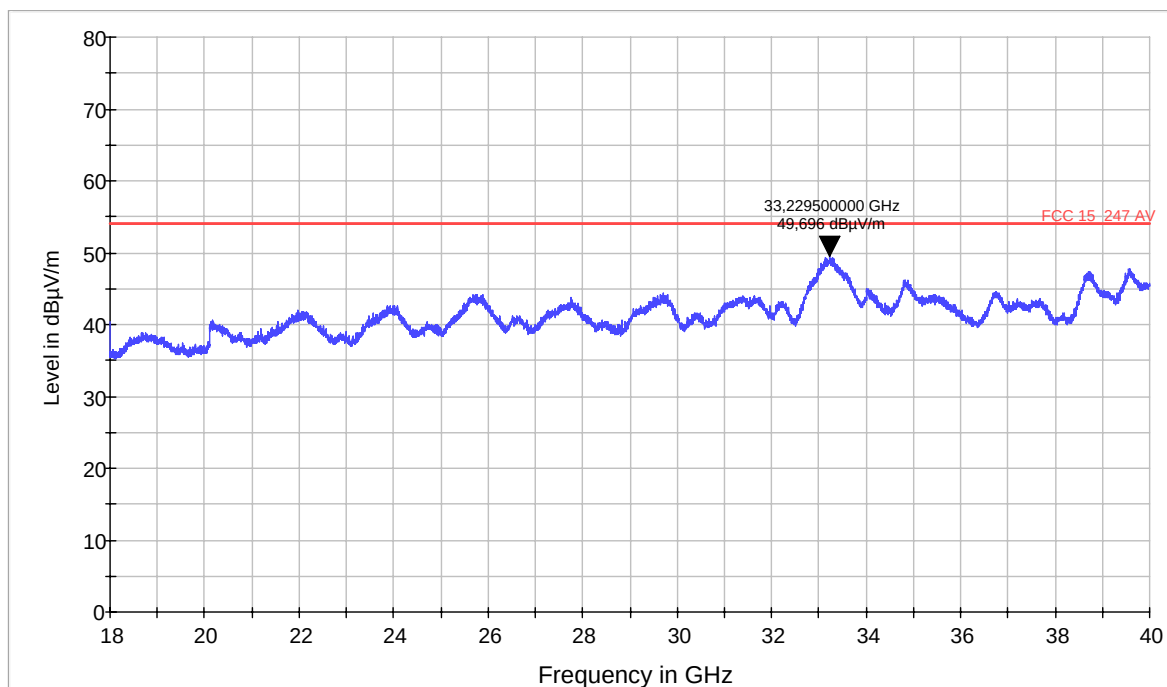
Final Result 2

Frequency (MHz)	QuasiPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)	Comment
127.230000	36.4	1000.0	120.000	100.0	V	105.0	13.4	7.10	43.50	
128.250000	37.7	1000.0	120.000	100.0	V	104.0	13.4	5.80	43.50	
128.760000	38.2	1000.0	120.000	100.0	V	104.0	13.4	5.30	43.50	
129.780000	37.1	1000.0	120.000	100.0	V	105.0	13.5	6.40	43.50	
130.290000	37.6	1000.0	120.000	100.0	V	104.0	13.5	5.90	43.50	
131.820000	36.8	1000.0	120.000	100.0	V	105.0	13.4	6.70	43.50	
2405.000000	73.6	1000.0	1000.000	150.0	V	22.0	-2.3	0.40	74.00	
4810.000000	54.6	1000.0	1000.000	100.0	V	-15.0	6.6	19.40	74.00	
7215.000000	39.5	1000.0	1000.000	150.0	V	-15.0	13.4	34.50	74.00	
9620.000000	40.3	1000.0	1000.000	123.0	V	22.0	19.1	33.70	74.00	

EMI Sweep 12_40GHz_FSP



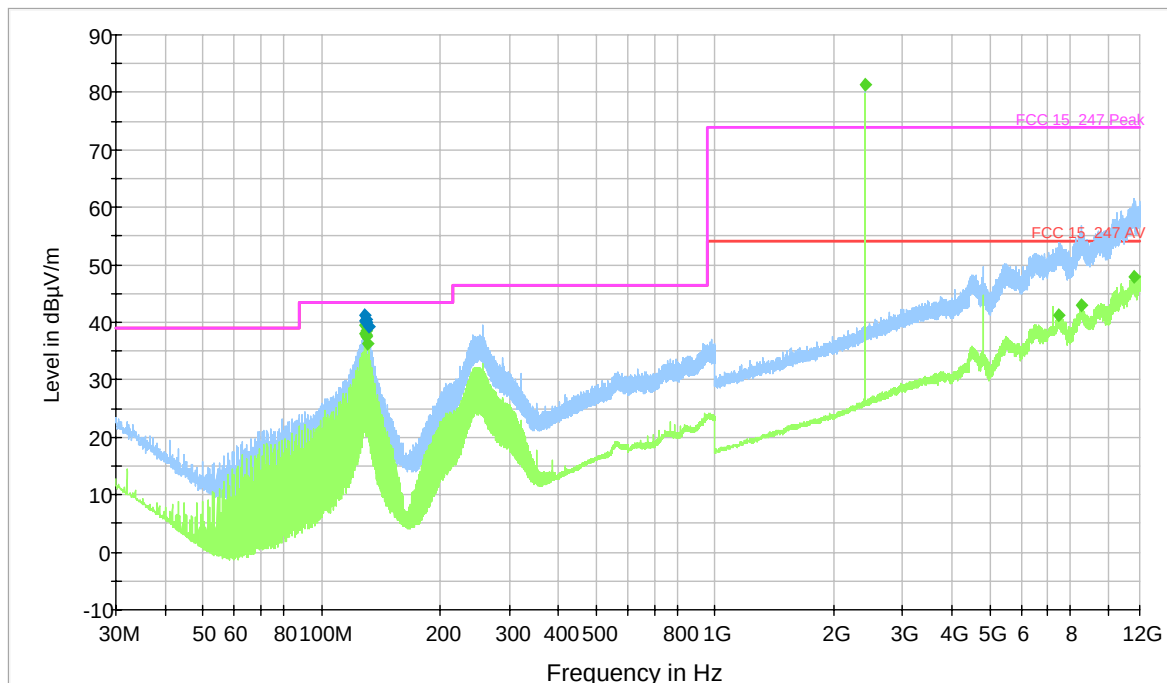
EMI Sweep 12_40GHz_FSP



Horizontal Polarization

CH11

Electric Field Strength FCC_OSP



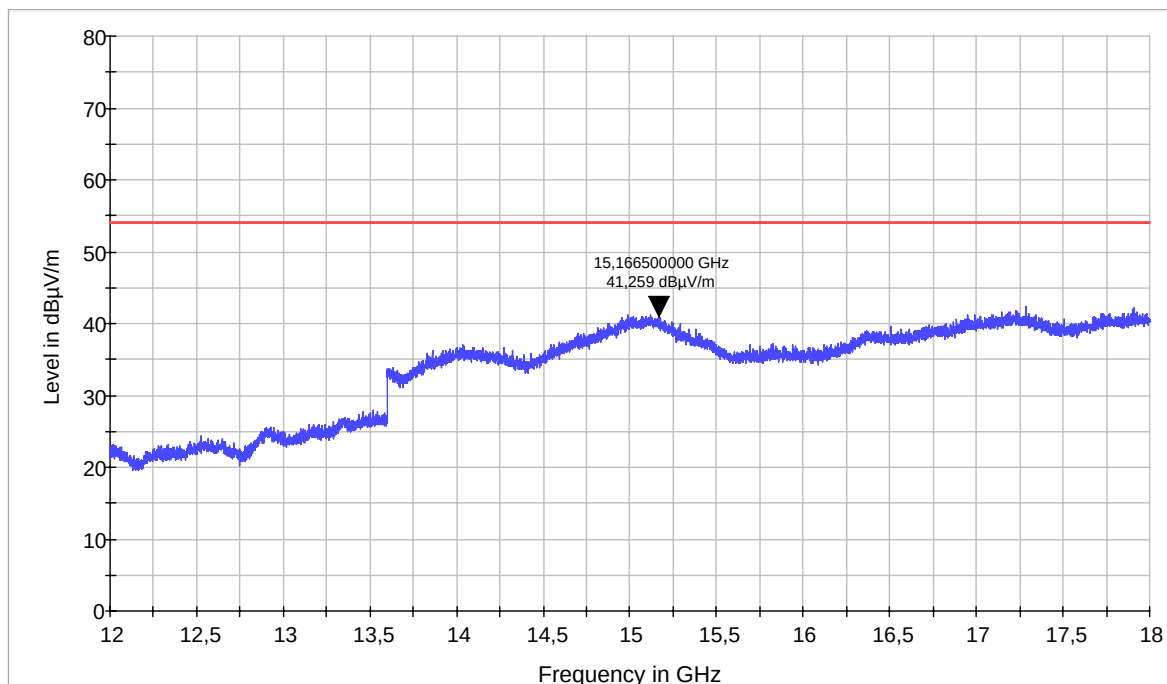
Final Result 1

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
128.220000	38.0	1000.0	120.000	194.0	H	112.0	13.4	5.50	43.50	
128.760000	39.4	1000.0	120.000	144.0	H	112.0	13.4	4.10	43.50	
129.240000	37.9	1000.0	120.000	143.0	H	112.0	13.5	5.60	43.50	
129.750000	37.6	1000.0	120.000	129.0	H	112.0	13.5	5.90	43.50	
130.260000	38.6	1000.0	120.000	150.0	H	112.0	13.5	4.90	43.50	
131.280000	36.4	1000.0	120.000	150.0	H	112.0	13.4	7.10	43.50	
2405.000000	81.4	1000.0	1000.000	244.0	H	89.0	-2.3	-27.40	54.00	
7482.000000	41.3	1000.0	1000.000	220.0	H	18.0	14.5	12.70	54.00	
8498.250000	43.1	1000.0	1000.000	150.0	H	-4.0	17.2	10.90	54.00	
11560.750000	47.9	1000.0	1000.000	150.0	H	180.0	26.8	6.10	54.00	

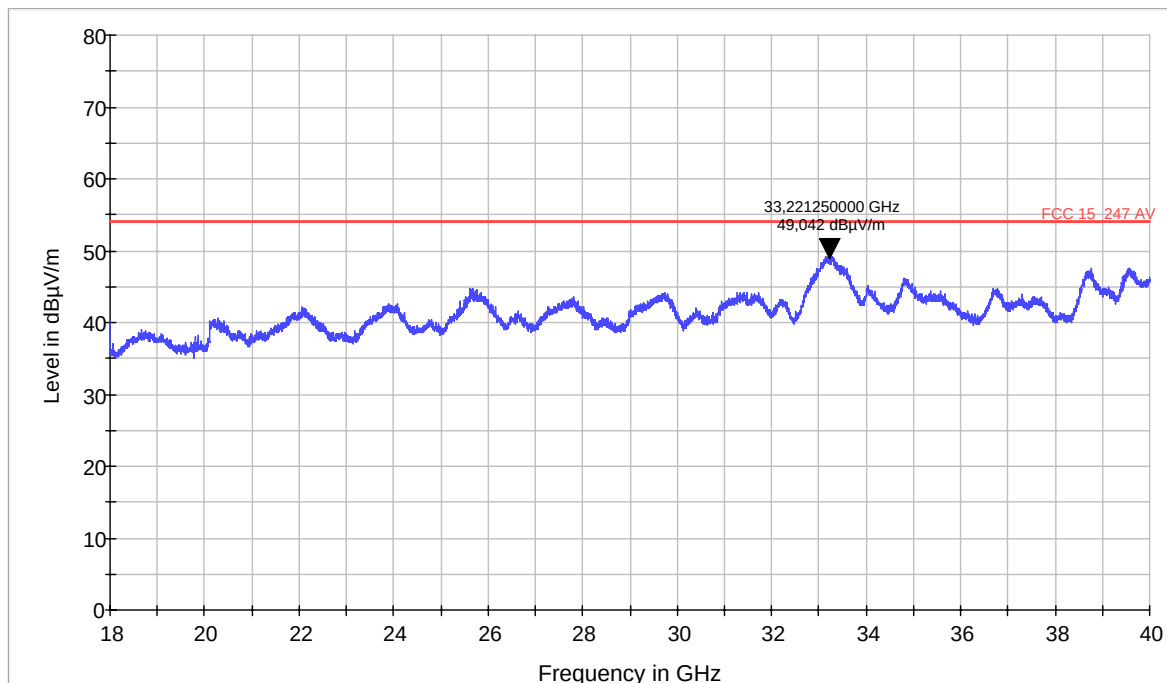
Final Result 2

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
128.220000	40.3	1000.0	120.000	150.0	H	112.0	13.4	3.20	43.50	
128.730000	41.2	1000.0	120.000	150.0	H	112.0	13.4	2.30	43.50	
129.240000	40.0	1000.0	120.000	150.0	H	112.0	13.5	3.50	43.50	
129.750000	40.0	1000.0	120.000	150.0	H	112.0	13.5	3.50	43.50	
130.260000	40.5	1000.0	120.000	150.0	H	112.0	13.5	3.00	43.50	
131.790000	39.3	1000.0	120.000	150.0	H	112.0	13.4	4.20	43.50	

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PRIMA

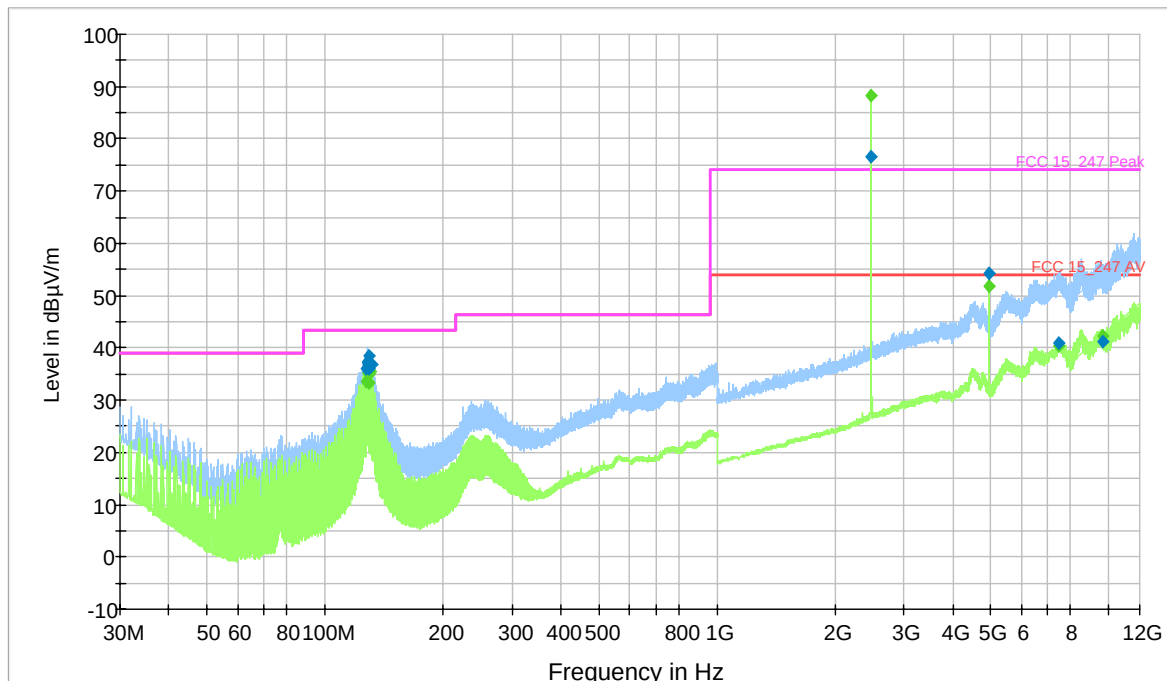
RICERCA & SVILUPPO

Vertical Polarization

CH25

FCCTR_111161_1

Electric Field Strength FCC_OSP



Final Result 1

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
127.160000	33.5	1000.0	120.000	100.0	V	103.0	13.4	10.00	43.50
128.200000	35.1	1000.0	120.000	100.0	V	103.0	13.4	8.40	43.50
128.680000	36.3	1000.0	120.000	100.0	V	112.0	13.4	7.20	43.50
129.200000	33.2	1000.0	120.000	100.0	V	90.0	13.5	10.30	43.50
129.700000	35.0	1000.0	120.000	100.0	V	103.0	13.5	8.50	43.50
130.250000	35.5	1000.0	120.000	100.0	V	102.0	13.5	8.00	43.50
2475.200000	88.3	1000.0	1000.000	100.0	V	90.0	-1.7	-34.30	54.00
4950.000000	51.9	1000.0	1000.000	100.0	V	90.0	6.1	2.10	54.00
7425.000000	40.3	1000.0	1000.000	100.0	V	90.0	14.4	13.70	54.00
9620.500000	42.4	1000.0	1000.000	128.0	V	0.0	19.1	11.60	54.00

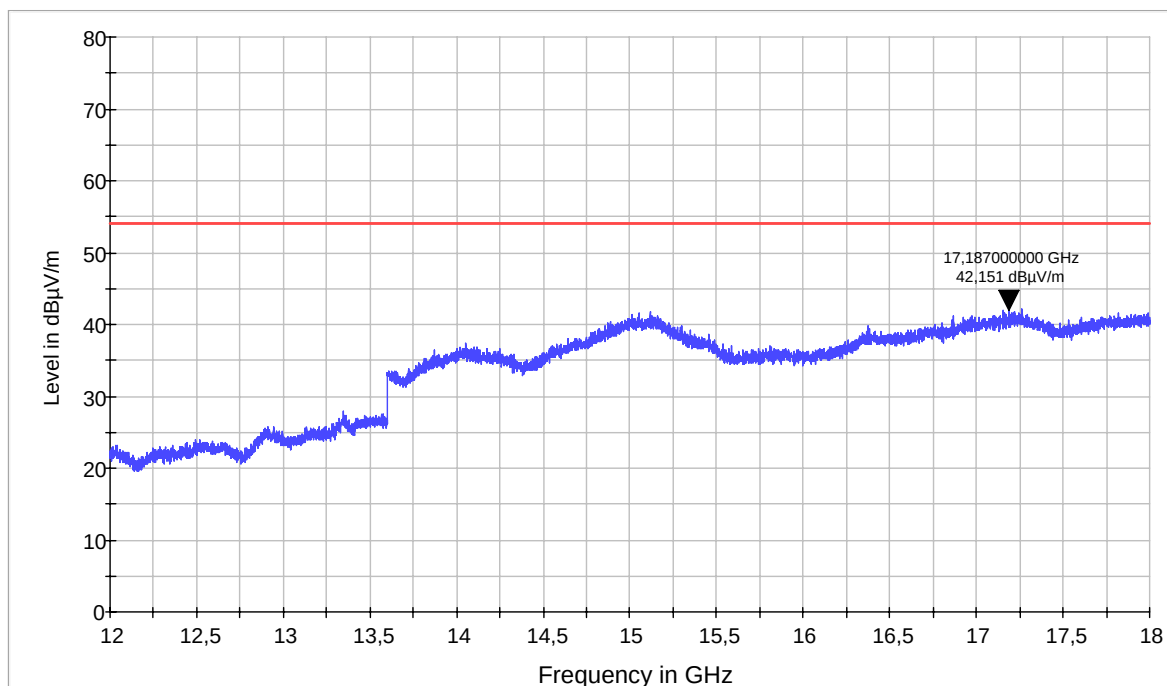
Final Result 2

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
127.160000	36.0	1000.0	120.000	100.0	V	105.0	13.4	7.50	43.50	
128.200000	37.4	1000.0	120.000	100.0	V	104.0	13.4	6.10	43.50	
128.680000	37.2	1000.0	120.000	100.0	V	104.0	13.4	6.30	43.50	
129.200000	36.1	1000.0	120.000	100.0	V	105.0	13.5	7.40	43.50	
129.700000	38.6	1000.0	120.000	100.0	V	104.0	13.5	4.90	43.50	
131.820000	36.8	1000.0	120.000	100.0	V	105.0	13.4	6.70	43.50	
2475.200000	76.6	1000.0	1000.000	150.0	V	22.0	-2.3	-1.40	74.00	
4950.000000	54.2	1000.0	1000.000	100.0	V	-15.0	6.6	19.80	74.00	
7425.000000	40.8	1000.0	1000.000	150.0	V	-15.0	13.4	33.20	74.00	
9620.500000	41.3	1000.0	1000.000	123.0	V	22.0	19.1	32.70	74.00	

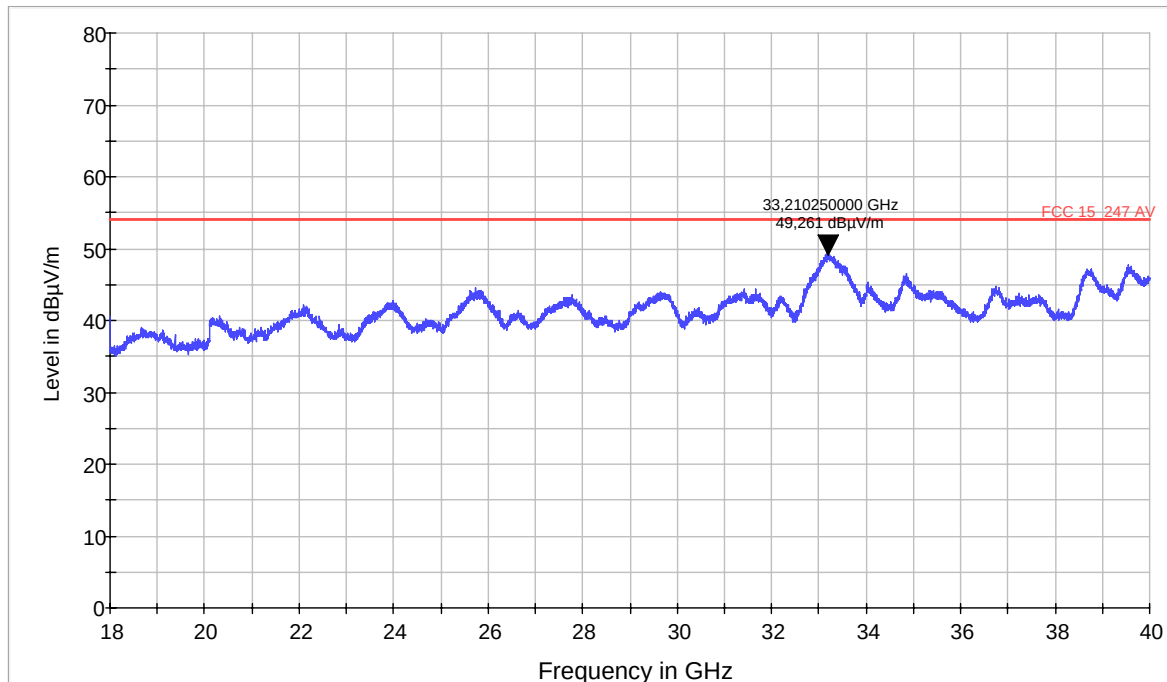
TRFCC_15.247

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EMI Sweep 12_40GHz_FSP





PRIMA

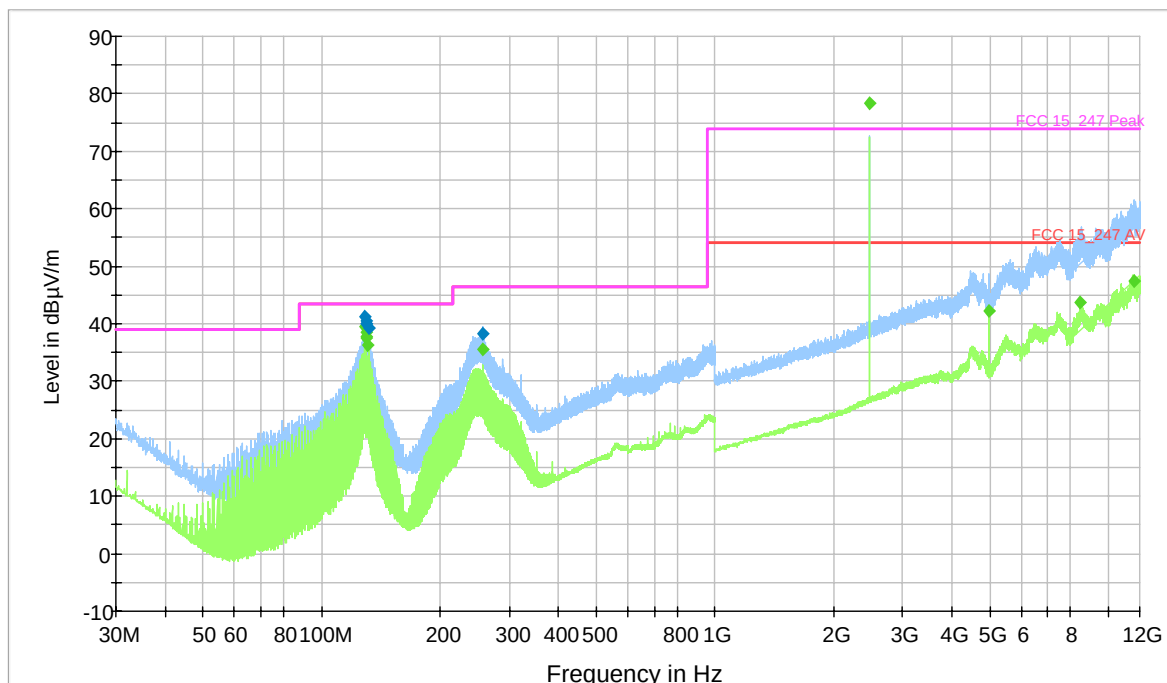
RICERCA & SVILUPPO

Horizontal polarization

CH25

FCCTR_111161_1

Electric Field Strength FCC_OSP



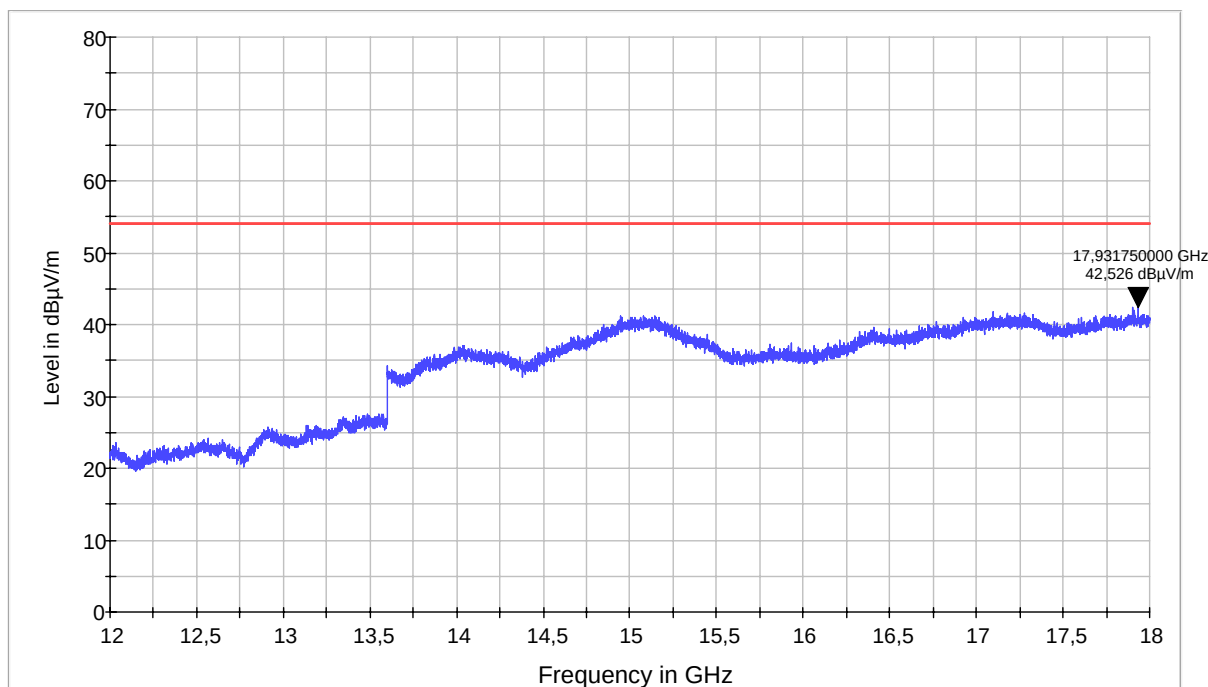
Final Result 1

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
128.760000	39.4	1000.0	120.000	144.0	H	112.0	13.4	4.10	43.50	
129.240000	37.9	1000.0	120.000	143.0	H	112.0	13.5	5.60	43.50	
129.750000	37.6	1000.0	120.000	129.0	H	112.0	13.5	5.90	43.50	
130.260000	38.6	1000.0	120.000	150.0	H	112.0	13.5	4.90	43.50	
131.280000	36.4	1000.0	120.000	150.0	H	112.0	13.4	7.10	43.50	
256.920000	35.4	1000.0	120.000	142.0	H	136.0	13.4	8.10	43.50	
2475.000000	78.4	1000.0	1000.000	244.0	H	89.0	-2.3	-24.40	54.00	
4956.400000	42.3	1000.0	1000.000	220.0	H	18.0	14.5	11.70	54.00	
8450.720000	43.7	1000.0	1000.000	160.0	H	-2.0	17.2	10.30	54.00	
11572.300000	47.5	1000.0	1000.000	1460.0	H	178.0	26.8	6.50	54.00	

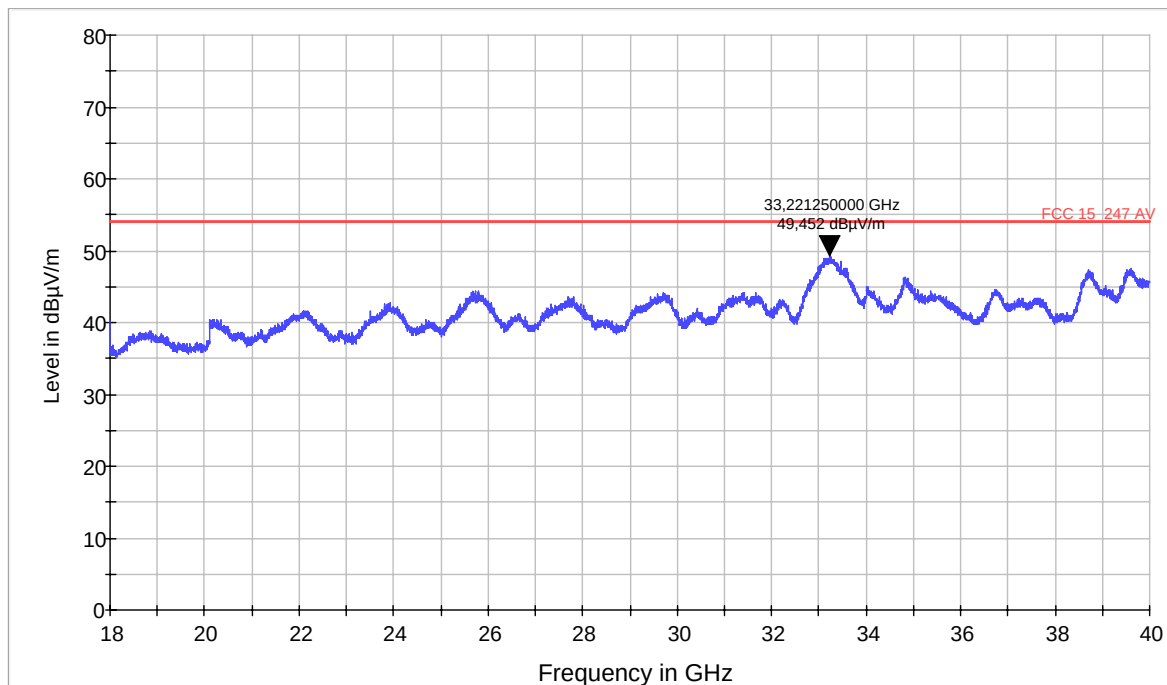
Final Result 2

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
128.730000	41.2	1000.0	120.000	150.0	H	112.0	13.4	2.30	43.50	
129.240000	40.0	1000.0	120.000	150.0	H	112.0	13.5	3.50	43.50	
129.750000	40.0	1000.0	120.000	150.0	H	112.0	13.5	3.50	43.50	
130.260000	40.5	1000.0	120.000	150.0	H	112.0	13.5	3.00	43.50	
131.790000	39.3	1000.0	120.000	150.0	H	112.0	13.4	4.20	43.50	
256.920000	38.4	1000.0	120.000	142.0	H	136.0	13.4	5.10	43.50	

EMI Sweep 12_40GHz_FSP



EMI Sweep 12_40GHz_FSP



**TEST
7.**

**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 Inverter mains output : Phase and Neutral Line
- **FREQUENCY RANGE:** 0.15 - 30 MHz
- **EMISSION LIMITS:** Section 15.207 of Standard
- **MEASUREMENT UNCERTAINTY:** Total uncertainty (k=2) ± 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

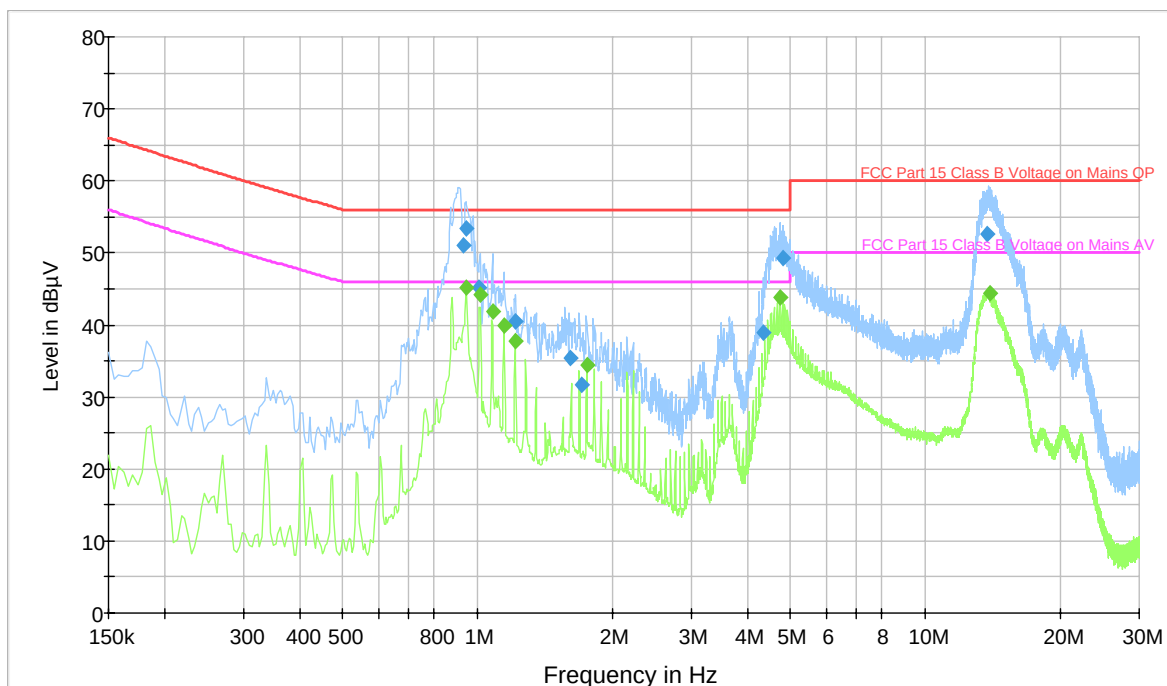
Voltage:	Tested from output Inverter type PVI-4.2-OUTD-IT	208Vac 60Hz
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OPERATING CONDITION (Rif. Section. 2) : #1

RESULT: WITHIN THE LIMIT

Neutral

Voltage_with_2_Line_lisn_OSP



Final Result 1

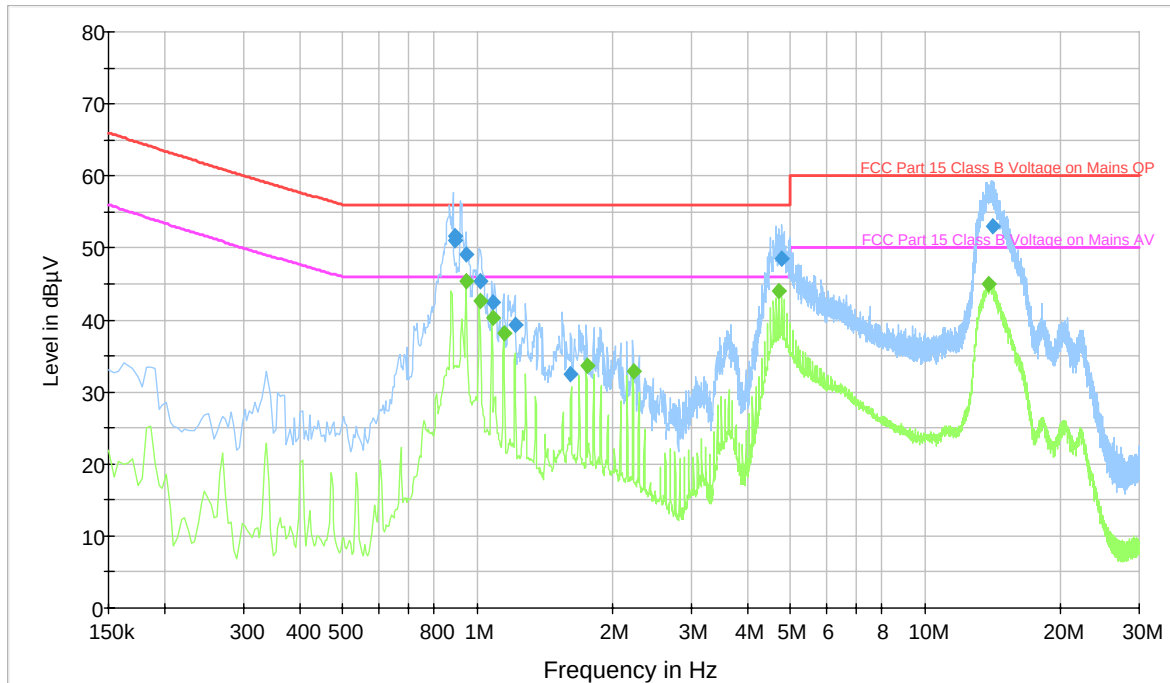
Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.932000	51.1	1000.0	9.000	GND	N	10.1	4.9	56.0	
0.944000	53.3	1000.0	9.000	GND	N	10.1	2.7	56.0	
1.008000	45.2	1000.0	9.000	GND	N	10.1	10.8	56.0	
1.216000	40.4	1000.0	9.000	GND	N	10.1	15.6	56.0	
1.616000	35.4	1000.0	9.000	GND	N	10.1	20.6	56.0	
1.704000	31.7	1000.0	9.000	GND	N	10.2	24.3	56.0	
4.336000	39.0	1000.0	9.000	GND	N	10.3	17.0	56.0	
4.792000	49.3	1000.0	9.000	GND	N	10.3	6.7	56.0	
13.716000	52.7	1000.0	9.000	GND	N	10.9	7.3	60.0	

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.944000	45.2	1000.0	9.000	GND	N	10.1	0.8	46.0	
1.012000	44.1	1000.0	9.000	GND	N	10.1	1.9	46.0	
1.080000	41.9	1000.0	9.000	GND	N	10.1	4.1	46.0	
1.148000	40.0	1000.0	9.000	GND	N	10.1	6.0	46.0	
1.216000	37.8	1000.0	9.000	GND	N	10.1	8.2	46.0	
1.756000	34.5	1000.0	9.000	GND	N	10.2	11.5	46.0	
4.724000	43.8	1000.0	9.000	GND	N	10.3	2.2	46.0	
13.900000	44.3	1000.0	9.000	GND	N	10.9	5.7	50.0	

Phase

Voltage_with_2_Line_lisn_OSP



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.888000	51.7	1000.0	9.000	GND	L1	10.1	4.3	56.0	
0.892000	51.0	1000.0	9.000	GND	L1	10.1	5.0	56.0	
0.944000	49.1	1000.0	9.000	GND	L1	10.1	6.9	56.0	
1.012000	45.5	1000.0	9.000	GND	L1	10.1	10.5	56.0	
1.080000	42.5	1000.0	9.000	GND	L1	10.1	13.5	56.0	
1.212000	39.2	1000.0	9.000	GND	L1	10.1	16.8	56.0	
1.612000	32.4	1000.0	9.000	GND	L1	10.2	23.6	56.0	

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.944000	45.3	1000.0	9.000	GND	L1	10.1	0.7	46.0	
1.012000	42.7	1000.0	9.000	GND	L1	10.1	3.3	46.0	
1.080000	40.4	1000.0	9.000	GND	L1	10.1	5.6	46.0	
1.148000	38.1	1000.0	9.000	GND	L1	10.1	7.9	46.0	
1.752000	33.6	1000.0	9.000	GND	L1	10.2	12.4	46.0	
2.224000	32.9	1000.0	9.000	GND	L1	10.2	13.1	46.0	
4.720000	44.0	1000.0	9.000	GND	L1	10.3	2.0	46.0	

6. EUT TECHNICAL DOCUMENTATION

6.1 Wiring diagrams

	Document reference (n., edition, date, ...)
WIRING DIAGRAM	*****
PART LIST	*****

6.2 Technical manual

	Document reference (n., edition, date, ...)
Operating Manual	*****

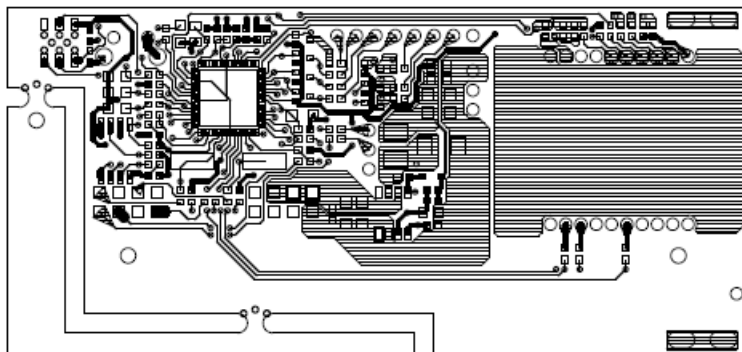
6.3 Variants

The product PVI-RADIOMODULE-Z will be manufactured using as an alternative the PCB identified as **3L10-04/1** submitted to the tests recorded in this test report or the PCB identified as **3L10-08/0**.

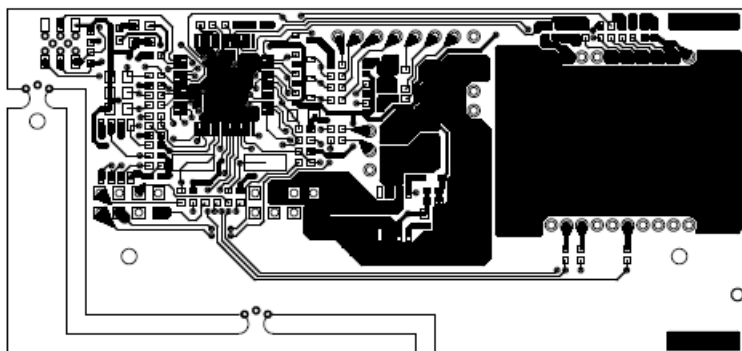
The differences between two versions do not affect the characteristics to be reported to the Commission (47 CFR 2.1043)

In details they concern :

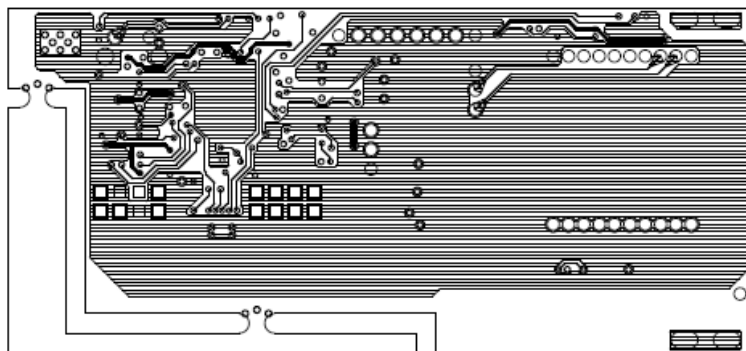
- Due to a change of the package of the microprocessor chip, the related PCB **3L10-08/0** has been consequently adapted.
- The new version of microprocessor chip is fully pin-to-pin compatible. Here following are reproduced the top view and the bottom view of the PCB layout of both versions where it is evident how little are the changes introduced.



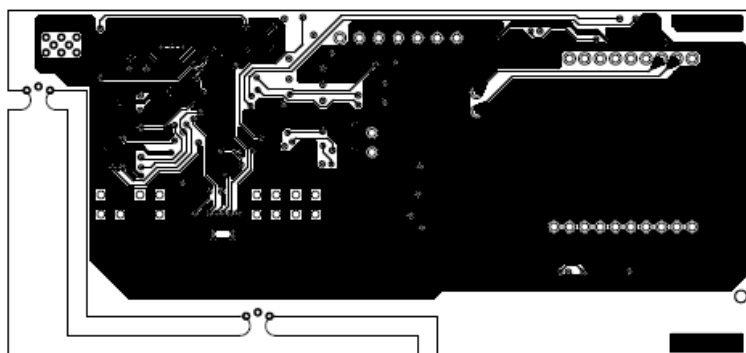
TOP VIEW
3L10-04/1



TOP VIEW
3L10-08/0



BOT VIEW
3L10-04/1



BOT VIEW
3L10-08/0



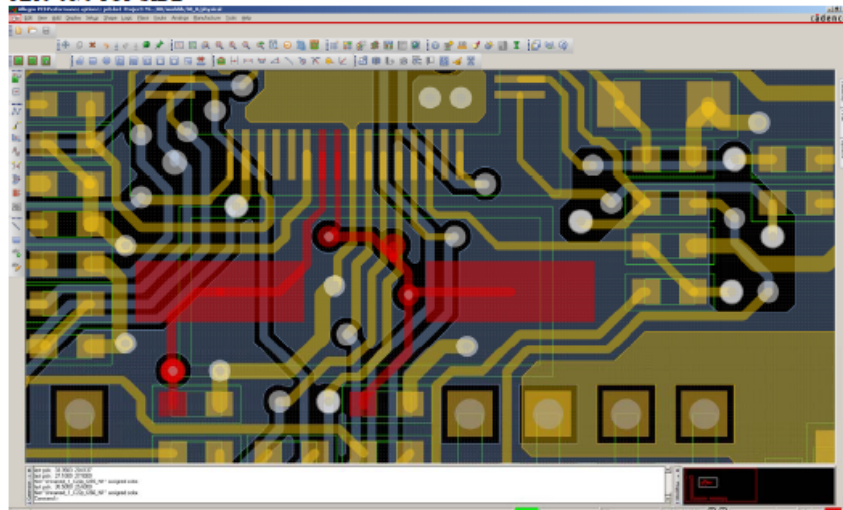
PRIMA

RICERCA & SVILUPPO

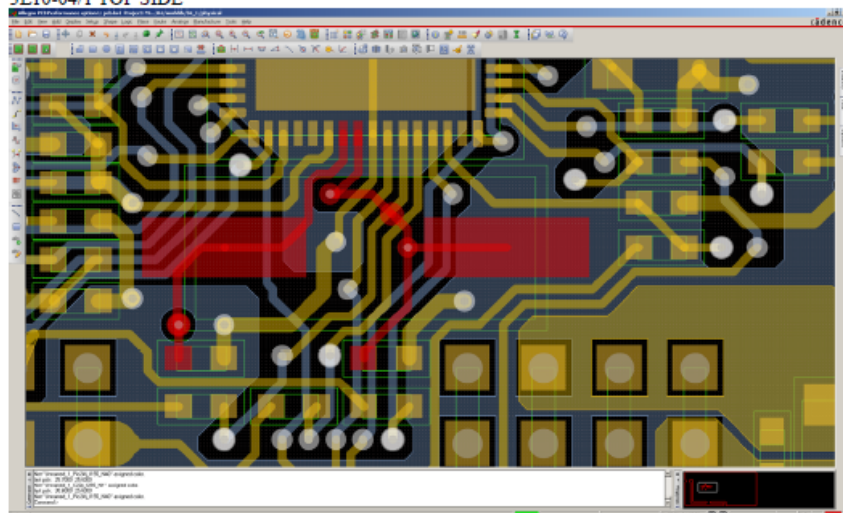
FCCTR_111161_1

- c) Furthermore, in order to show the difference does not concern sensitive area as the 8 MHz quartz oscillator, here following are reproduced (in red highlight) the relevant zones for both PCB

3L10-08/0 TOP SIDE



3L10-04/1 TOP SIDE



6.4 Photographic documentation

PHOTO 1 – E.U.T. IDENTIFICATION

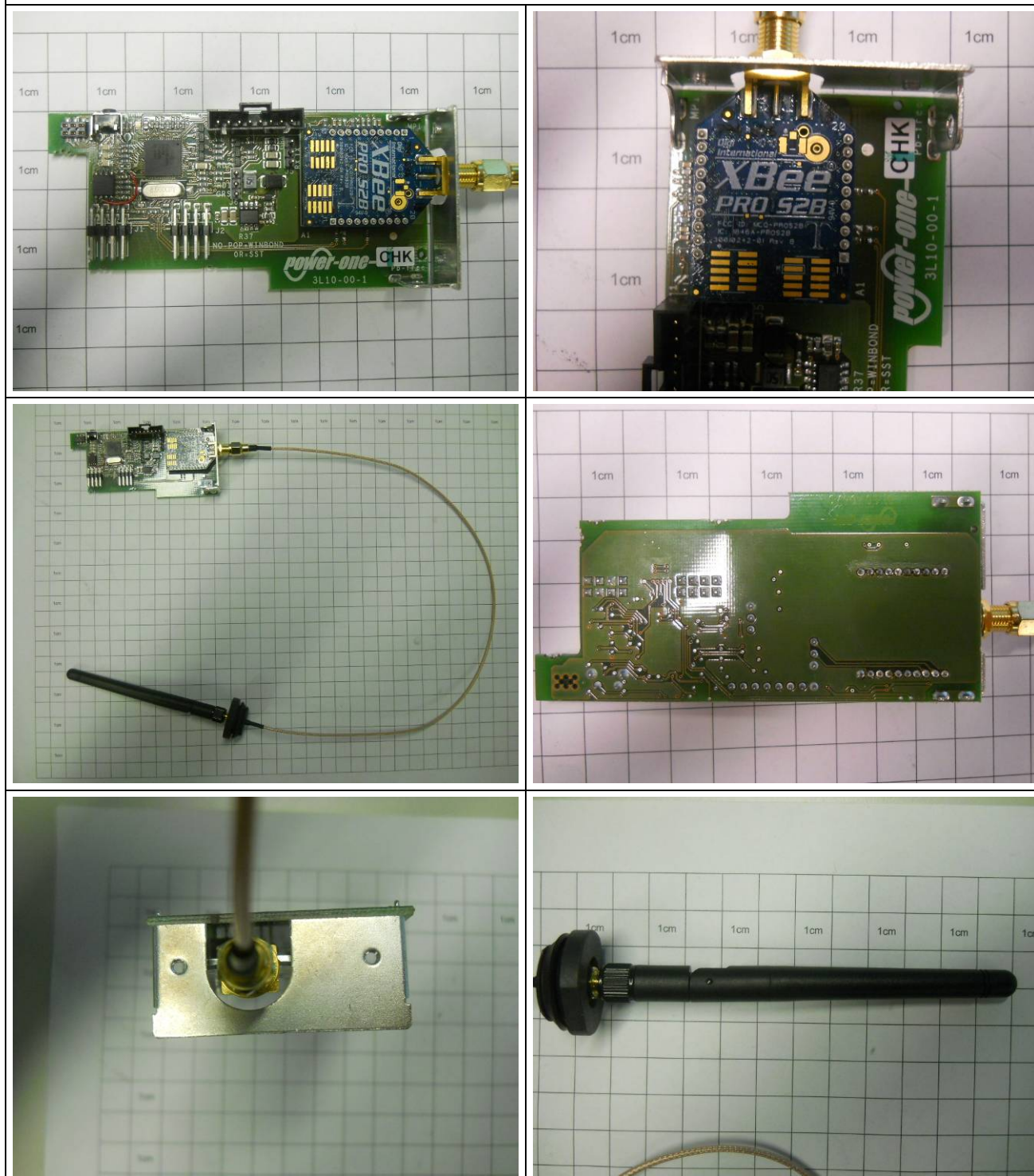


PHOTO 2 – RADIATED SETUP

