

Test Report 47 CFR FCC Part 15 subpart C Intentional Radiators	
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FCC Test Firm Registration #	804595
Tested by (name + signature)	Riccardo Pfeiffer \ Tester 
Approved by (name + signature)	Giovanni Molteni \ TM 
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Testing Laboratory	TÜV Rheinland Italia S.r.l.
Address	Via Mattei 3 - 20010 - Pogliano Milanese (MI) – Italy
Applicant's name	Custom S.p.A.
Address	Via Berettine, 2 43010 Fontevivo, Parma - Italy
Test item description	BarCode Reader
Trade Mark	
Manufacturer	Custom S.p.A.
Model/Type reference	FLEX BCR
Ratings	Battery Operated: 5V, 0,3A FCC ID OAH-3980917
Sample	
Samples received on	January 27 th 2017
TUV reference samples	170053 (EUT sampled by Applicant)
Samples tested n.	1
Testing	
Start Date:	January 30 th 2017
End Date:	February 10 th 2017
<i>The results in this Test Report are exclusively referred to the tested samples. Without the written authorization of TÜV Rheinland Italia S.r.l., this document can be reproduced only integrally</i>	

SUMMARY

1.	Reference Standards	3
2.	Summary of testing:	4
3.	General product information	6
4.	General Chipset information	7
5.	General Antennas information	9
6.	Photographic documentation	11
7.	Equipment Used During Test	13
8.	Input/Output Ports:	13
9.	Power Interface	14
10.	EUT Operation Modes	14
11.	EUT Configuration Modes:	14
12.	Test Conditions and Results – AC POWER CONDUCTED EMISSION	15
13.	Test Conditions and Results – RADIATED EMISSION	17
14.	Test Conditions and Results – 6dB BANDWIDTH	26
15.	Test Conditions and Results – OUTPUT POWER	29
16.	Test Conditions and Results – RADIATED ANTENNA PORT SPURIOUS EMISSIONS	34
17.	Test Conditions and Results – POWER SPECTRAL DENSITY	41
18.	Test Conditions and Results – RF EXPOSURE REQUIREMENTS	44

1. Reference Standards	
Standard	Description
FCC Part 15 (Subpart C)	§15.247 Operation within the bands 902-928 MHz, 2400-2483,5 MHz, and 5725-5850 MHz.
FCC Part 15 (Subpart C)	§15.207 Conducted Limits
FCC Part 15 (Subpart C)	§15.209 Radiated emission limits; general requirements
FCC Part 15 (Subpart C)	§15.203 Antenna Requirement
ANSI C63.4:2009	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
ANSI C63.10:2014	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
FCC GUIDE 15.247 (DTS): April 8,2016	Guidance for performing compliance measurements on digital transmission systems (dts) operating under §15.247

2. Summary of testing:			
FCC Rule Part	Test Item	Result	Remarks
15.207	AC POWER CONDUCTED EMISSION	N/A	Battery Operated
15.205 15.209 15.247(d)	RADIATED EMISSIONS	PASS	Meet the requirement of limit
15.247(a)(2)	6dB BANDWIDTH	PASS	Meet the requirement of limit
15.247(b)(3)(4)	OUTPUT POWER (internal antenna)	PASS	Meet the requirement of limit
15.247(d)	RADIATED SPURIOUS EMISSIONS (internal antenna)	PASS	Meet the requirement of limit
15.247(e)	POWER SPECTRAL DENSITY	PASS	Meet the requirement of limit
15.203	ANTENNA REQUIREMENT	PASS	Integral Antenna
15.247(b)	RF EXPOSURE REQUIREMENTS	PASS	Meet the requirement of limit

Possible test case verdicts:

- test case does not apply to the test object: N/A
- test object does meet the requirement: PASS
- test object does not meet the requirement: FAIL

General remarks:

The test results presented in this report relate only to the object tested.

The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.

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"(see Enclosure #)" refers to additional information appended to the report.

"(see appended table)" refers to a table appended to the report.

Throughout this report a comma (point) is used as the decimal separator.

3. General product information

BarCode reader battery operated with Wireless Charge or with micro USB.

The charging occurs when the BarCode Reader is inserted on his housing on the GPL FLEX Printer.

TX on Printer, RX on BarCode.



4. General Chipset information

PRoC™ BLE is a 32-bit, 48-MHz ARM® Cortex™-M0 BLE solution with CapSense®, 12-bit ADC, four timer, counter, pulse-width modulators (TCPWM), Direct memory access (DMA), thirty-six GPIOs, two serial communication blocks (SCBs), LCD, and I2S.

PRoC BLE includes a royalty-free BLE stack compatible with Bluetooth® 4.2 and provides a complete, programmable, and flexible solution for HID, remote controls, toys, beacons, and wireless chargers. In addition to these applications, PRoC BLE provides a simple, low-cost way to add BLE connectivity to any system.



Features

Bluetooth® Smart Connectivity

- Bluetooth 4.2 single-mode device
- 2.4-GHz BLE radio and baseband with integrated balun
- TX output power: -18 dBm to +3 dBm
- Received signal strength indicator (RSSI) with 1-dB resolution
- RX sensitivity: -92 dBm
- TX current: 15.6 mA at 0 dBm
- RX current: 16.4 mA

ARM Cortex-M0 CPU Core

- 32-bit processor (0.9 DMIPS/MHz) with single-cycle 32-bit multiply, operating at up to 48 MHz
- 256-KB flash memory
- 32-KB SRAM memory
- Emulated EEPROM using flash memory
- Watchdog timer with dedicated internal low-speed oscillator (ILO)
- Eight-channel direct memory access (DMA) controller

Ultra-Low-Power

- 1.5-µA Deep-Sleep mode with watch crystal oscillator (WCO) on
- 150-nA Hibernate mode current with SRAM retention
- 60-nA Stop mode current with GPIO wakeup

CapSense® Touch Sensing with Two-Finger Gestures

- Up to 36 capacitive sensors for buttons, sliders, and touchpads
- One-finger gestures: finger tracking, scroll, inertial scroll, edge-swipe, click, double-click
- Two-finger gestures: scroll, inertial scroll, zoom-in, zoom-out
- Cypress Capacitive Sigma-Delta (CSD) provides best-in-class SNR (> 5:1) and liquid tolerance
- Automatic hardware-tuning algorithm (SmartSense™)

Peripherals

- 12-bit, 1-Msps SAR ADC with internal reference, sample-and-hold (S/H), and channel sequencer
- Ultra-low-power LCD segment drive for 128 segments with operation in Deep-Sleep mode

- Two serial communication blocks (SCBs) supporting I²C (Master/Slave), SPI (Master/Slave), or UART
- Four dedicated 16-bit TCPWMs
 - Additional four 8-bit or two 16-bit PWMs
- Programmable LVD from 1.8 V to 4.5 V
- I²S Master interface

Clock, Reset, and Supply

- Wide supply-voltage range: 1.9 V to 5.5 V
- 3-MHz to 48-MHz internal main oscillator (IMO) with 2% accuracy
- 24-MHz external clock oscillator (ECO) without load capacitance
- 32-kHz WCO

Programmable GPIOs

- 36 GPIOs configurable as open drain high/low, pull-up/pull-down, HI-Z, or strong output
- Any GPIO pin can be CapSense, LCD, or analog, with flexible pin routing

Programming and Debug

- 2-pin SWD
- In-system flash programming support

Temperature and Packaging

- Operating temperature range: -40 °C to +105 °C
- Available in 56-pin QFN (7 mm × 7 mm) and 76-ball WLCSP (3.52 mm × 3.91 mm) packages

PSoC® Creator™ Design Environment

- Easy-to-use IDE to configure, develop, program, and test a BLE application
- Option to export the design to Keil, IAR, or Eclipse

Bluetooth Low Energy Protocol Stack

- Bluetooth Low Energy protocol stack supporting generic access profile (GAP) Central, Peripheral, Observer, or Broadcaster roles
 - Switches between Central and Peripheral roles on-the-go
- Standard Bluetooth Low Energy profiles and services for interoperability
 - Custom profile and service for specific use cases

5. General Antennas information

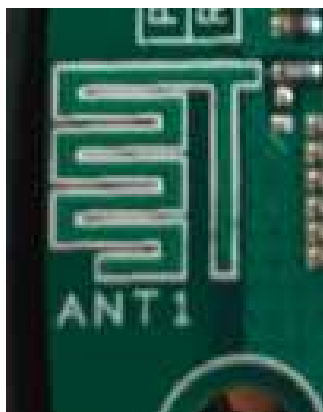
ANTENNA

Cypress-Proprietary PCB Antennas

Cypress recommends IFA and MIFA types of PCB antennas. The low data rate and typical range requirement in a BLE application make these antennas extremely useful. These antennas are inexpensive and easy to design, because they are a part of the PCB, and provide good performance in the 150-250 MHz bandwidth range.

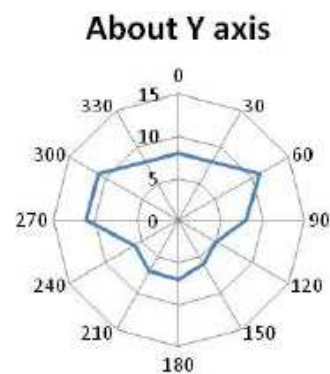
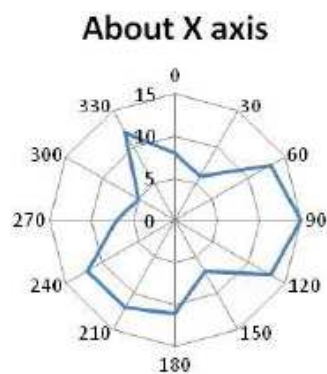
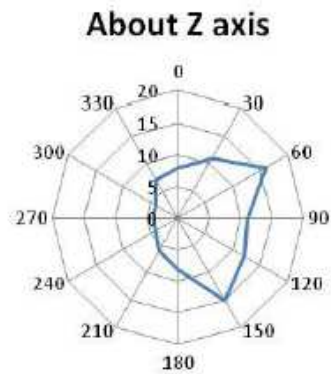
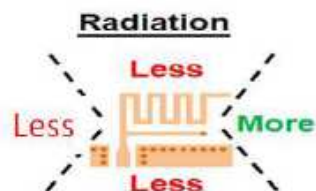
MIFA is recommended for applications that require a minimum PCB area such as a wireless mouse and presenter.

IFA is recommended for applications where one of the antenna dimensions is required to be much shorter than the other such as a heart-rate monitor. Most BLE applications are catered by MIFA antennas.

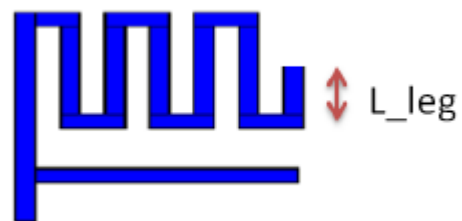
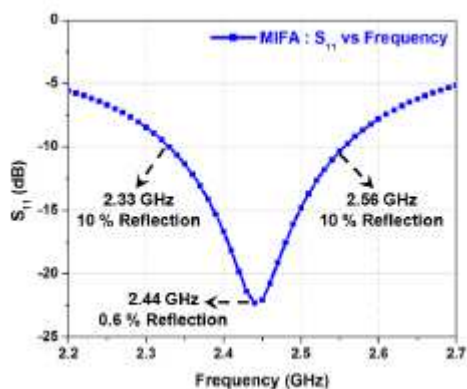


Properties at 2.44 GHz	MIFA
Appearance	
Recommended Applications	Less Area (Mouse, Keyboard, Presenter)
Dimensions (mm)	7.2 x 11.1
Dimensions (mils)	284 x 437
Gerber File	Web
Cost (US\$)	Minimal
Bandwidth (MHz) ($S_{11} \leq -10$ dB)	230
Gain (dBi)	1.6

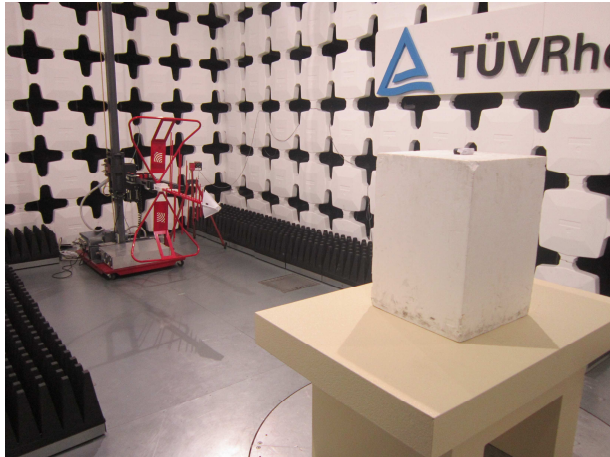
POLAR DIAGRAM



STATIONARY WAVE PATTERN (V.S.W.R.)



6. Photographic documentation



RADIATED TEST SETUP



RADIATED TEST SETUP



RADIATED TEST SETUP



RADIATED TEST SETUP



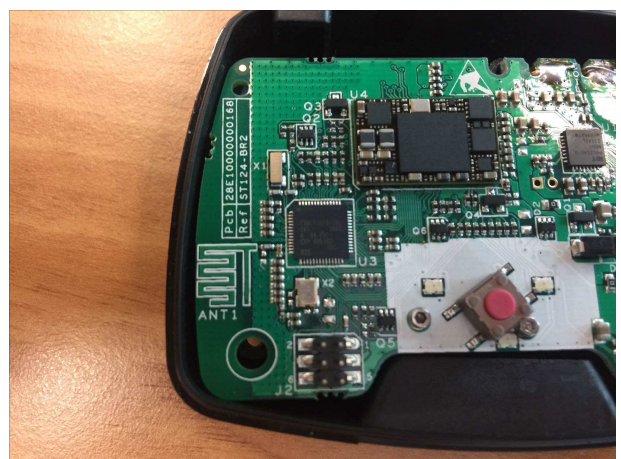
EUT INTERNAL VIEW



EUT INTERNAL VIEW



EUT LABEL



EUT INTERNAL VIEW

7. Equipment Used During Test				
Use*	Product Type	Manufacturer	Model	Comments
EUT	Bar Code Reader	Custom S.p.A.	FLEX BCR	---
AE	Printer	Custom S.p.A.	FLEX PRINTER USB BTH RCG+BCD IGT	
Note: * Use : EUT - Equipment Under Test, AE - Auxiliary/Associated Equipment, or SIM - Simulator (Not Subjected to Test) No other Auxiliary/Associated Equipment was connected/installed on the EUT				

8. Input/Output Ports:				
CONNECTIONS				
Port		Description	Connection	Cable lenght
1	Enclosure	Plastic	---	---
2	AC Power Port	AC	Not Present	---
3	DC Power Port	DC	Battery Operated – Wireless Charge	---
4	LAN	TP	Not Present	---
5	USB	I/O	Not Present	---
*Note: AC = AC Power Port DC = DC Power Port N/E = Non-Electrical I/O = Signal Input or Output Port (Not Involved in Process Control) TP = Telecommunication Ports				

9. Power Interface						
Mode #	Voltage (V)	Current (A)	Power (W)	Frequency (DC/AC-Hz)	Phases (#)	Comments
1	5	0,3	---	---	---	---

10. EUT Operation Modes	
Operation mode	Description
#1	EUT turn on with Bluetooth Module in transmission mode on Internal Antenna

11. EUT Configuration Modes:	
Mode #	Description
#1	Stand Alone

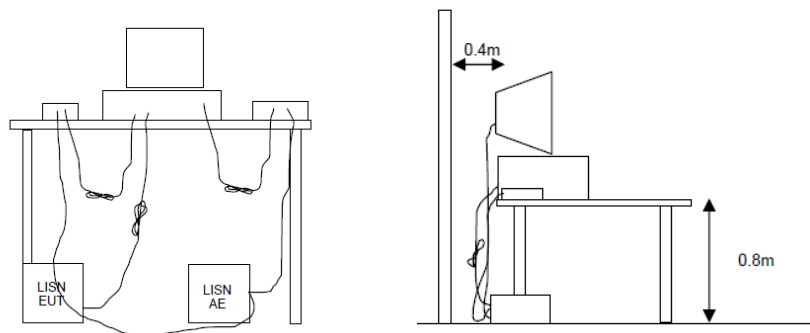
12. Test Conditions and Results – AC POWER CONDUCTED EMISSION

12	TEST: AC Power Conducted Emission			N/A
Parameters required prior to the test	Laboratory Ambient Temperature (°C)		15 to 35 °C	
	Relative Humidity (%)		30 to 60 %	
Parameters recorded during the test	Laboratory Ambient Temperature (°C)		---	
	Relative Humidity (%)		---	
	Air pressure (hPa)		---	
---	Frequency		Application Point	
Fully configured sample tested at the power line frequency	---		---	
Equipment mode:	Operation mode		---	
FCC Standard	§15.207			
Frequency (MHz)	Quasi-peak (dBuV)	Average (dBuV)	Result	
0.15-0.5	66 to 56	56 to 46	N/A	
0.5-5	56	46	N/A	
5-30	60	50	N/A	

Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 µH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of emission (MHz)	Conducted limit (dBµV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

Further information to test setup

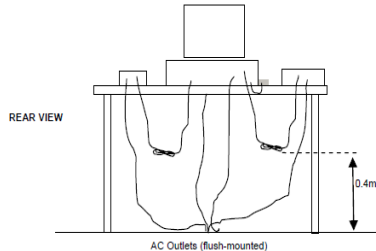
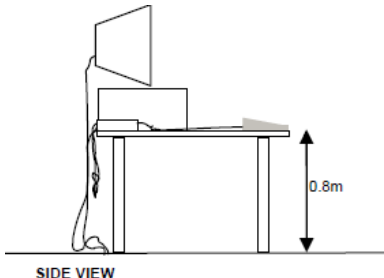


Test Equipment Used					
Description	Manufacturer	Model	Identifier	Calibration date	Calibration due
EMI Test Receiver	R&S	ESU40	87020455	04/2016	04/2017
LISN	PMM	PMM L3-64	87020466	09/2016	09/2017
20dB Attenuator	RS Components	Huber & Suhner	87020534	10/2016	10/2017
Stabilized Power Supply	Elettrotest	TPS T 30K60S	87020490	09/2015	09/2018

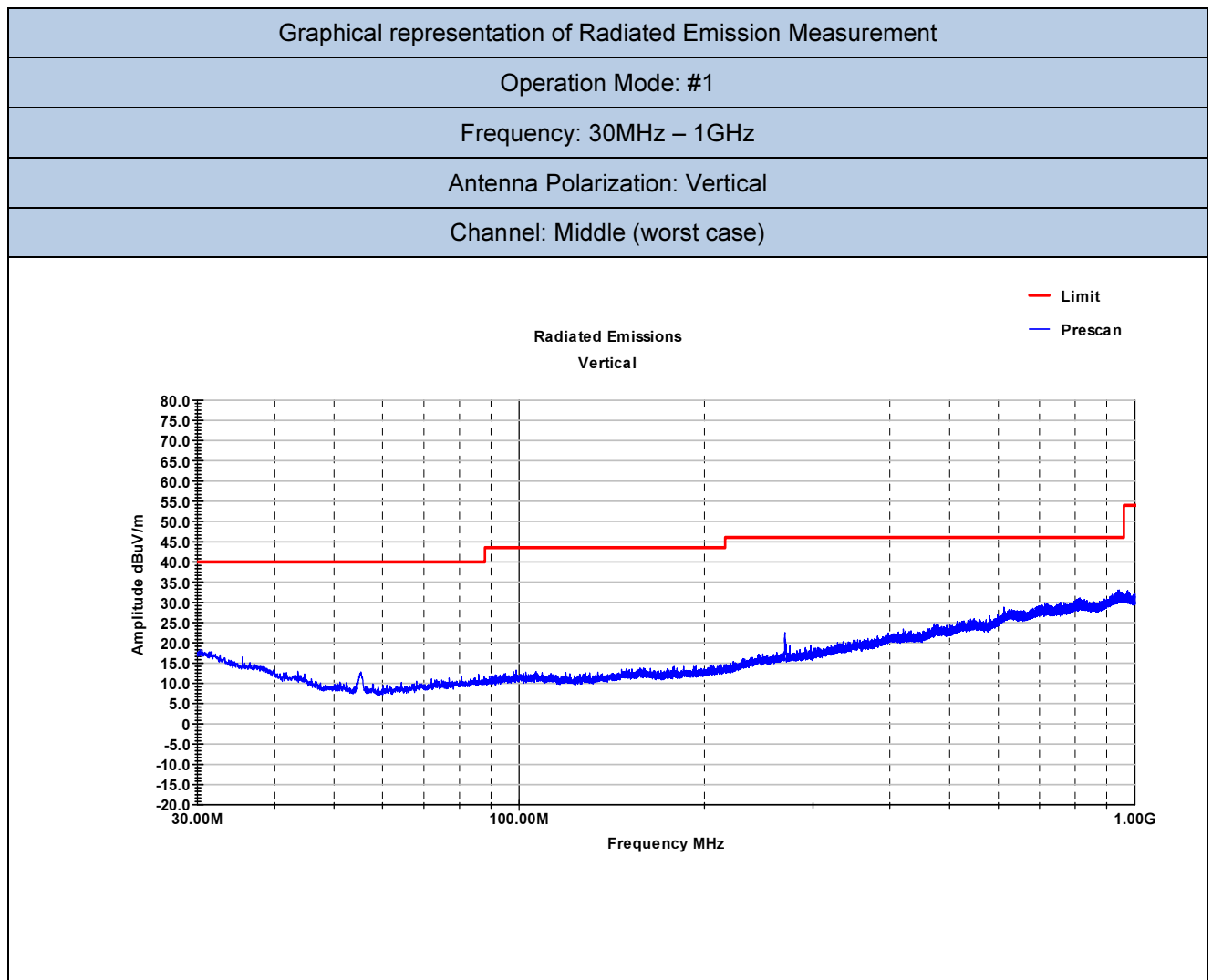
Graphical representation of Mains Terminal Disturbance Voltage Measurement
Operation Mode: ---
Line 1

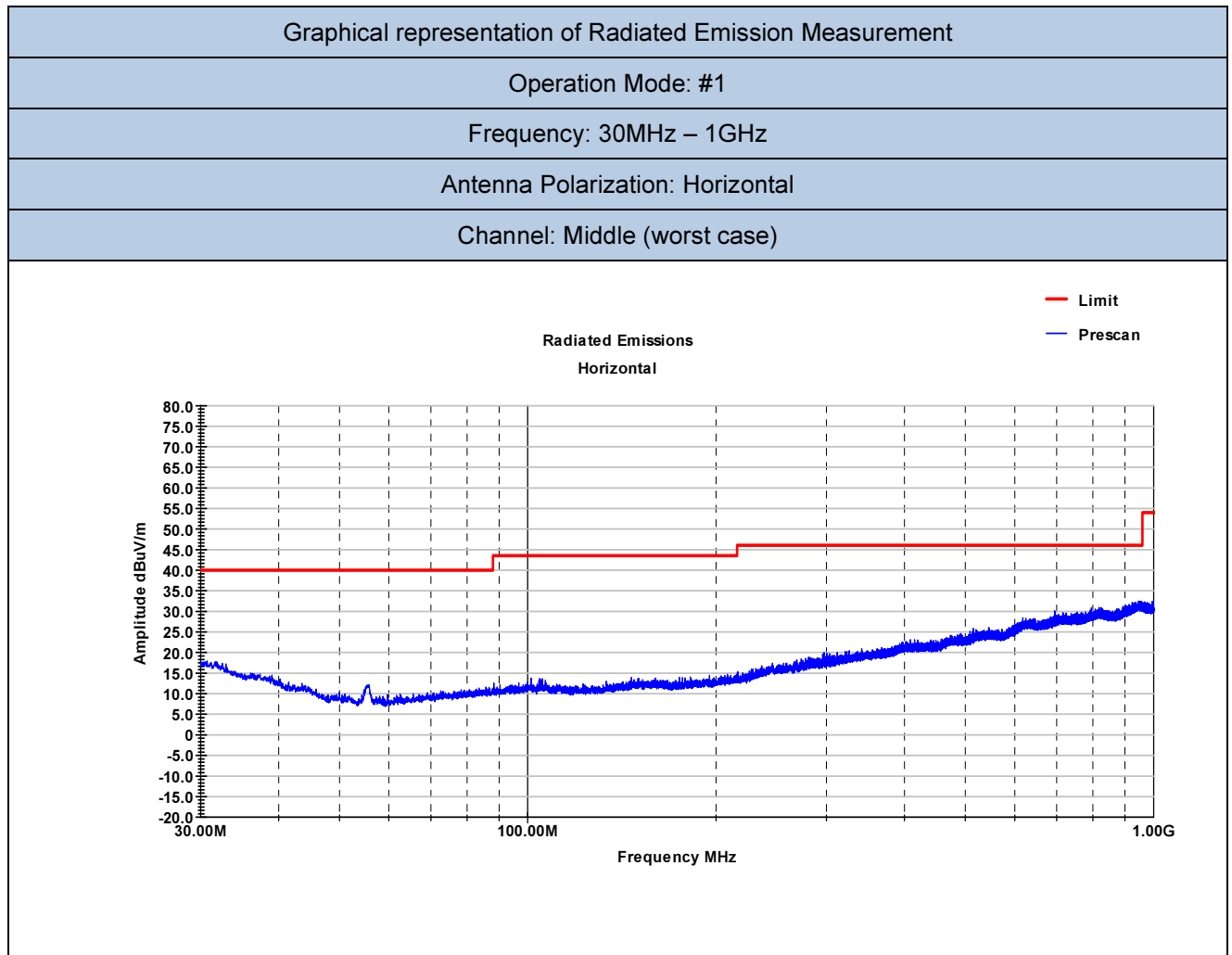
Graphical representation of Mains Terminal Disturbance Voltage Measurement
Operation Mode: ---
Line 2

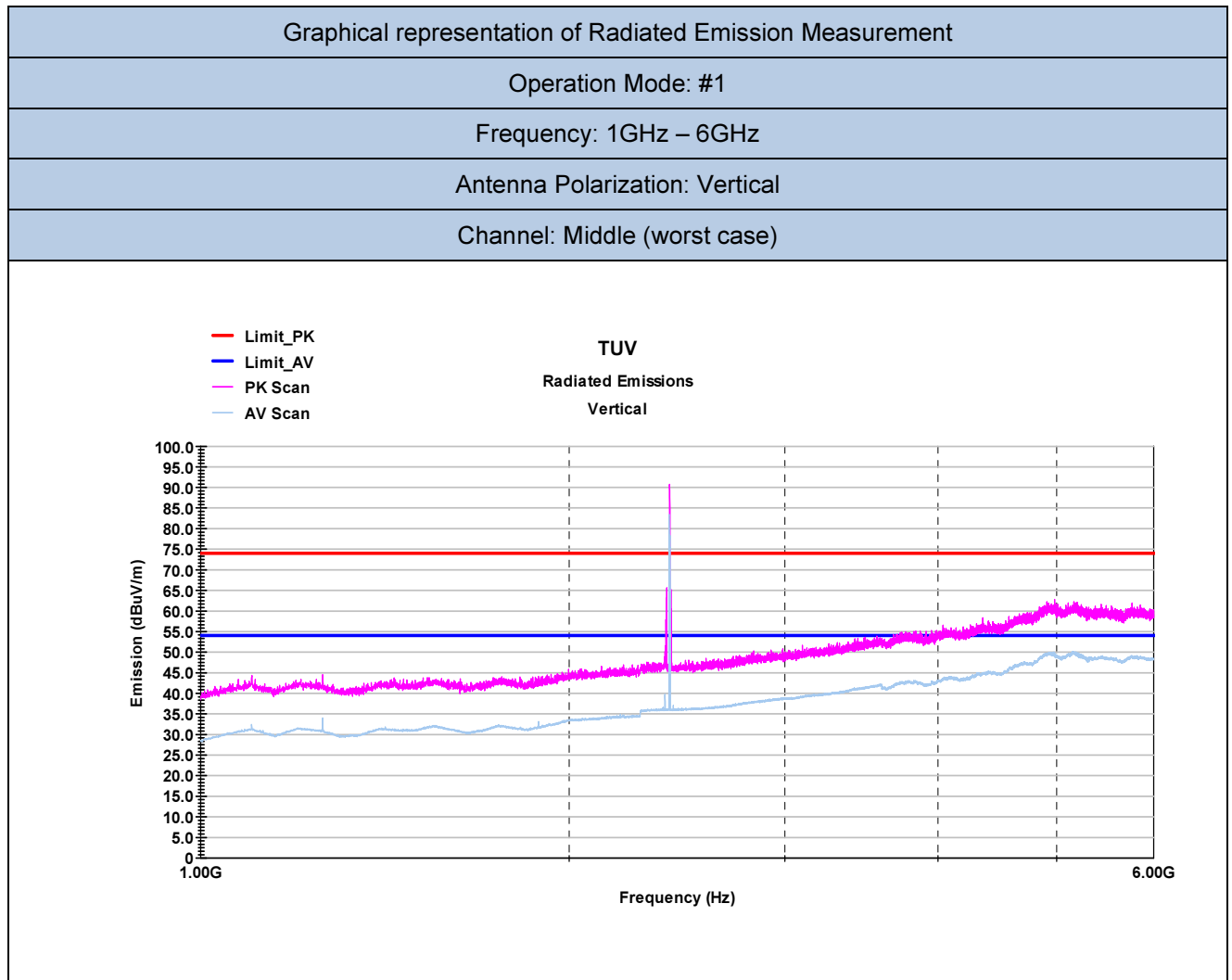
13. Test Conditions and Results – RADIATED EMISSION

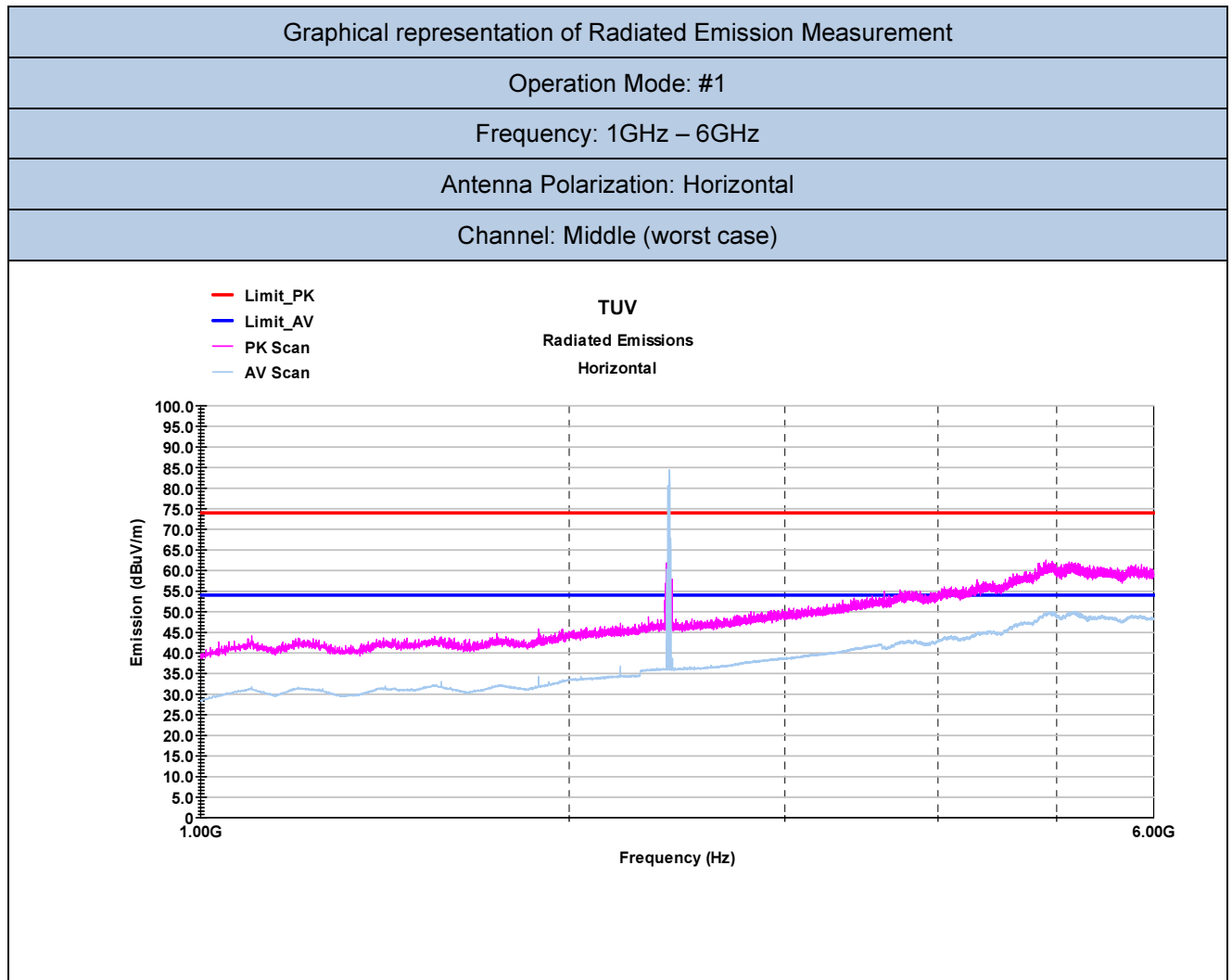
13	TEST: Radiated Emission			PASS																								
Parameters required prior to the test	Laboratory Ambient Temperature (°C)	15 to 35 °C																										
	Relative Humidity (%)	30 to 60 %																										
Parameters recorded during the test	Laboratory Ambient Temperature (°C)	18°C																										
	Relative Humidity (%)	40%																										
	Air pressure (hPa)	1020																										
—	Power Mode	Application Point																										
Fully configured sample tested at the power line frequency	Battery Operated	Enclosure																										
Equipment mode:	Operation mode	#1																										
FCC Standard	§15.205; §15.209; §15.247																											
Frequency (MHz)	Quasi-peak (dBuV)	Average (dBuV)	Result																									
0.15-0.5	66 to 56	56 to 46	PASS																									
0.5-5	56	46	PASS																									
5-30	60	50	PASS																									
Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table :																												
<table><tr><th>Frequency (MHz)</th><th>Field strength (microvolts/meter)</th><th>Measurement distance (meters)</th></tr><tr><td>0.009-0.490</td><td>2400/F(kHz)</td><td>300</td></tr><tr><td>0.490-1.705</td><td>24000/F(kHz)</td><td>30</td></tr><tr><td>1.705-30.0</td><td>30</td><td>30</td></tr><tr><td>30-88</td><td>100**</td><td>3</td></tr><tr><td>88-216</td><td>150**</td><td>3</td></tr><tr><td>216-960</td><td>200**</td><td>3</td></tr><tr><td>Above 960</td><td>500</td><td>3</td></tr></table>					Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)	0.009-0.490	2400/F(kHz)	300	0.490-1.705	24000/F(kHz)	30	1.705-30.0	30	30	30-88	100**	3	88-216	150**	3	216-960	200**	3	Above 960	500	3
Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)																										
0.009-0.490	2400/F(kHz)	300																										
0.490-1.705	24000/F(kHz)	30																										
1.705-30.0	30	30																										
30-88	100**	3																										
88-216	150**	3																										
216-960	200**	3																										
Above 960	500	3																										
**Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§15.231 and 15.241.																												
Further information to test setup	 REAR VIEW AC Outlets (flush-mounted) 0.4m  SIDE VIEW 0.8m																											

Test Equipment Used					
Description	Manufacturer	Model	Identifier	Calibration date	Calibration due
CSSA	ETS Lindgren	FACT3	87020484	10/2016	10/2017
EMI Test Receiver	R&S	ESU40	87020455	04/2016	04/2017
Antenna BiConiLog	ETS Lindgren	3124E-PA	87020457	04/2014	04/2017
Antenna Horn with Preamplifier	ETS Lindgren	3117-PA	87020458	04/2014	04/2017
2xAntenna Horn with Preamplifier	ETS Lindgren	114514 120722	87020459 87020460	04/2014	04/2017

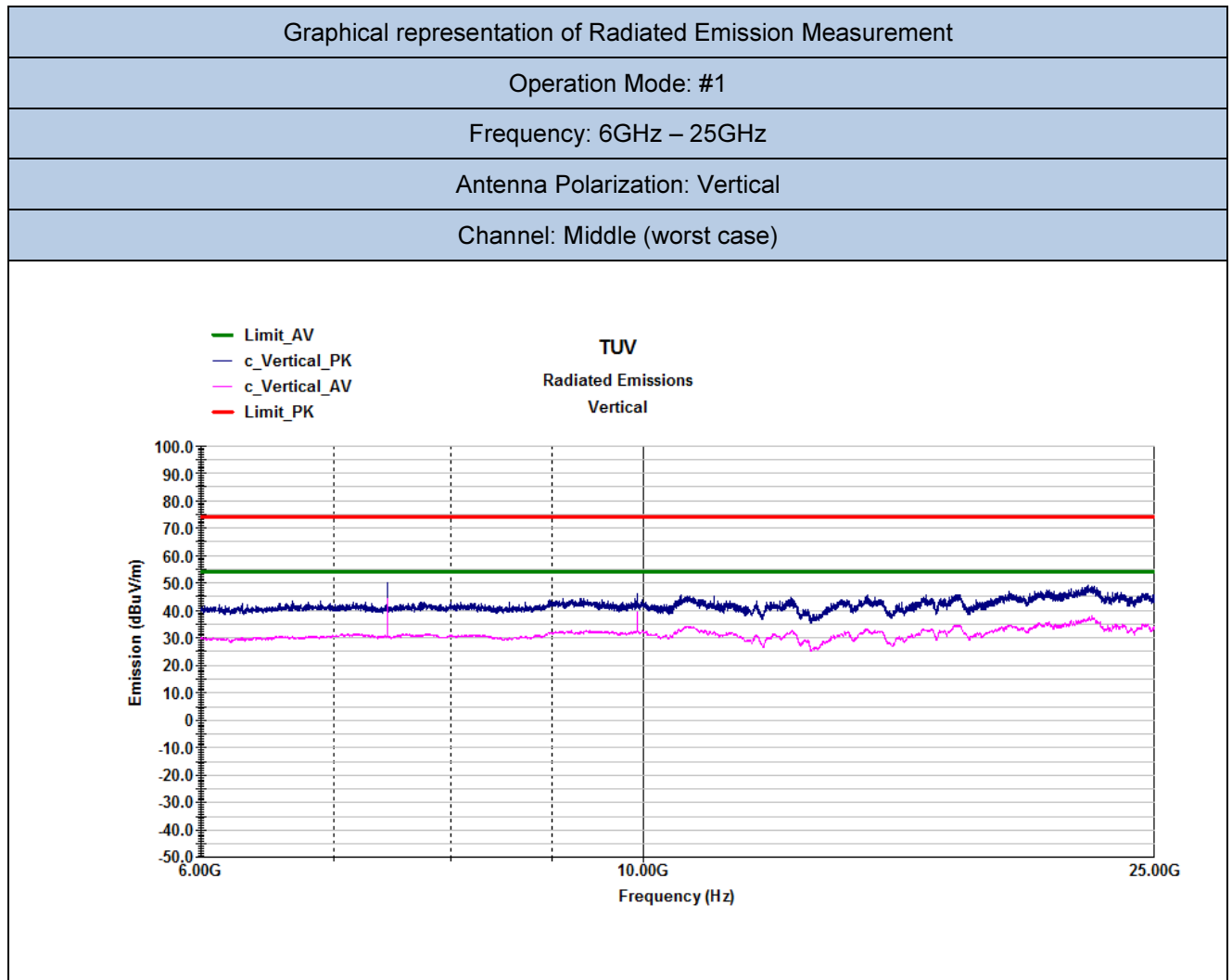


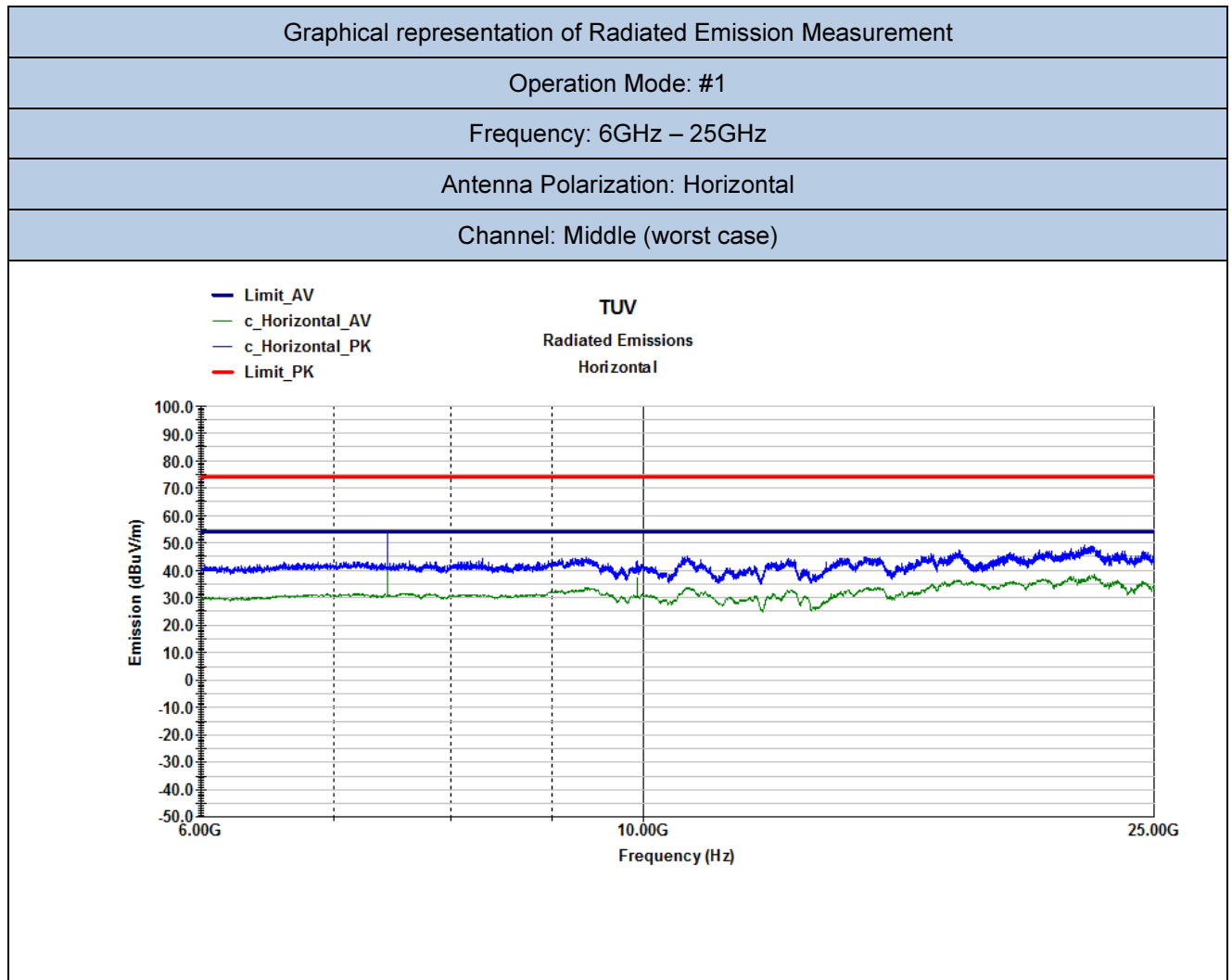






Tabulated results of Radiated Emission Measurement
Operation Mode: #1
Frequency: 1GHz - 6GHz





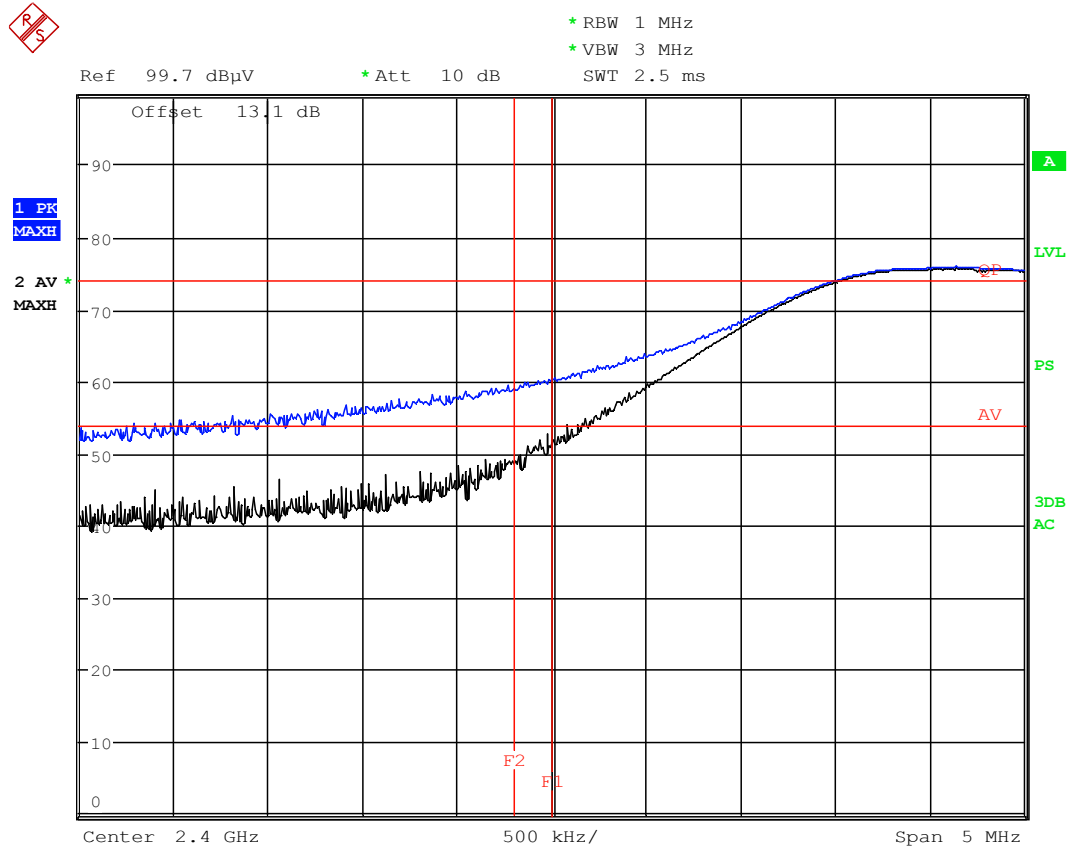
Tabulated results of Radiated Emission Measurement
Operation Mode: #1
Frequency: 6GHz - 25GHz

Graphical representation of Antenna Port Spurious Emission - Radiated

Operation Mode: #1

Channel: Low

BAND EDGE

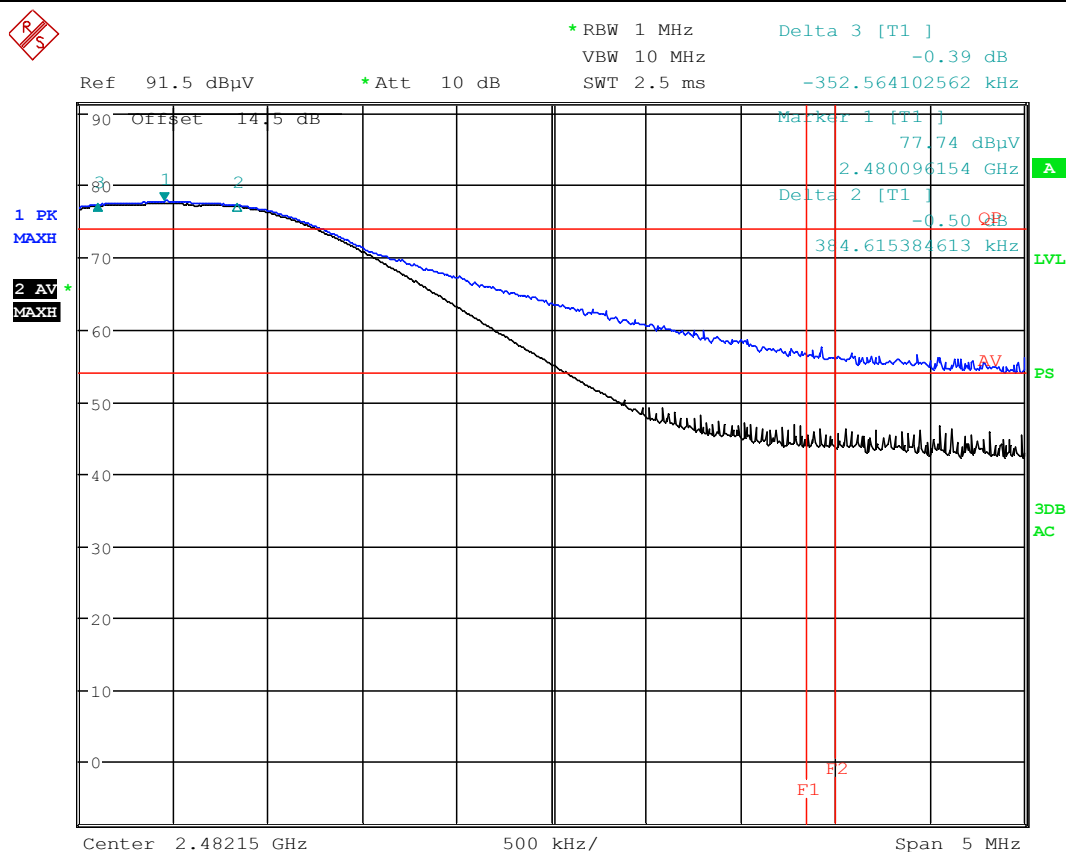


Graphical representation of Antenna Port Spurious Emission - Radiated

Operation Mode: #1

Channel: High

BAND EDGE



14. Test Conditions and Results – 6dB BANDWIDTH

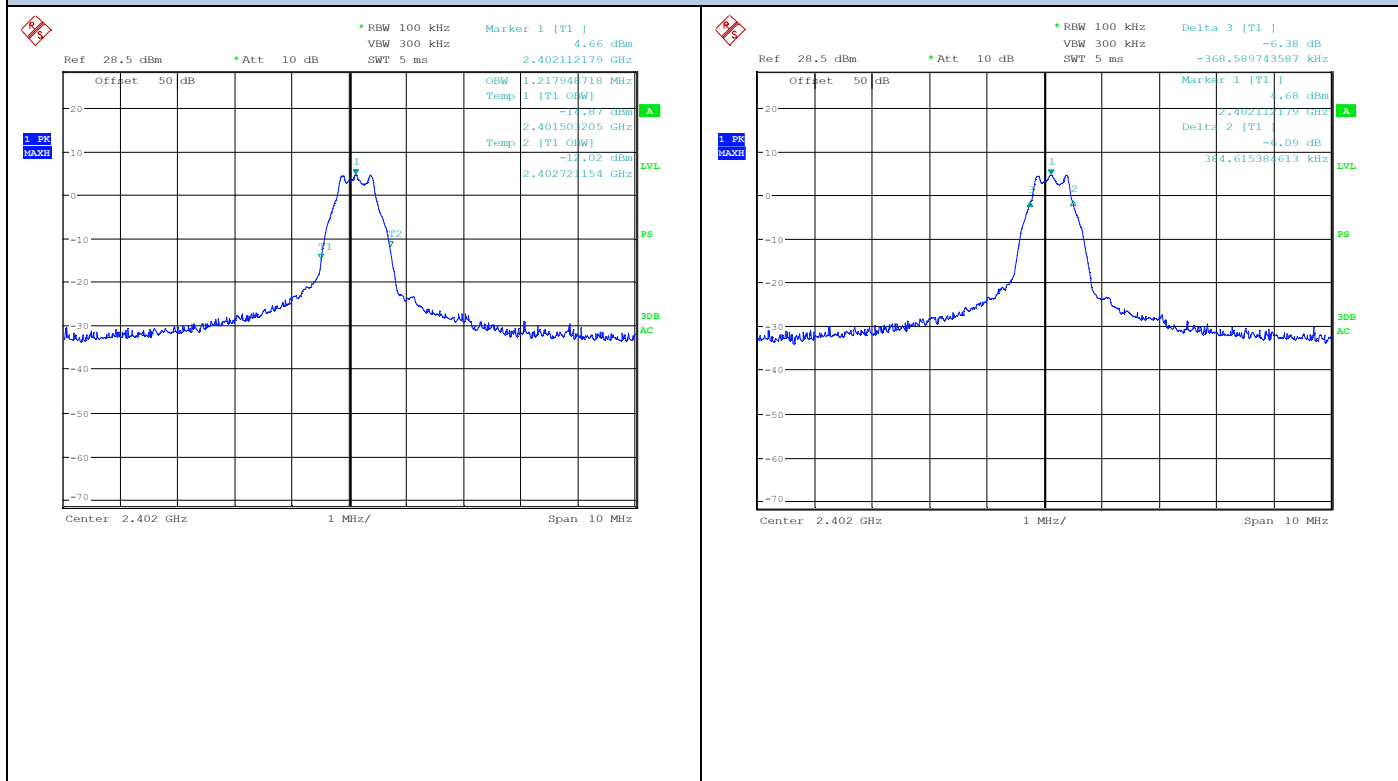
14	TEST: 6dB Bandwidth		PASS
Parameters required prior to the test	Laboratory Ambient Temperature (°C)	15 to 35 °C	
	Relative Humidity (%)	30 to 60 %	
Parameters recorded during the test	Laboratory Ambient Temperature (°C)	24°C	
	Relative Humidity (%)	48%	
	Air pressure (hPa)	1020	
—	Power Mode	Application Point	
Fully configured sample tested at the power line frequency	Battery Operated	Enclosure	
Equipment mode:	Operation mode	#1	
FCC Standard	§15.247		
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.			
Further information to test setup	EUT Attenuator (optional) Spectrum Analyzer (or Power Meter)		

Test Equipment Used					
Description	Manufacturer	Model	Identifier	Calibration date	Calibration due
EMI Test Receiver	R&S	ESU40	87020455	04/2016	04/2017
20dB Attenuator	RS Components	Huber & Suhner	87020534	10/2016	10/2017

Graphical representation of 6dB Bandwidth

Operation Mode: #1

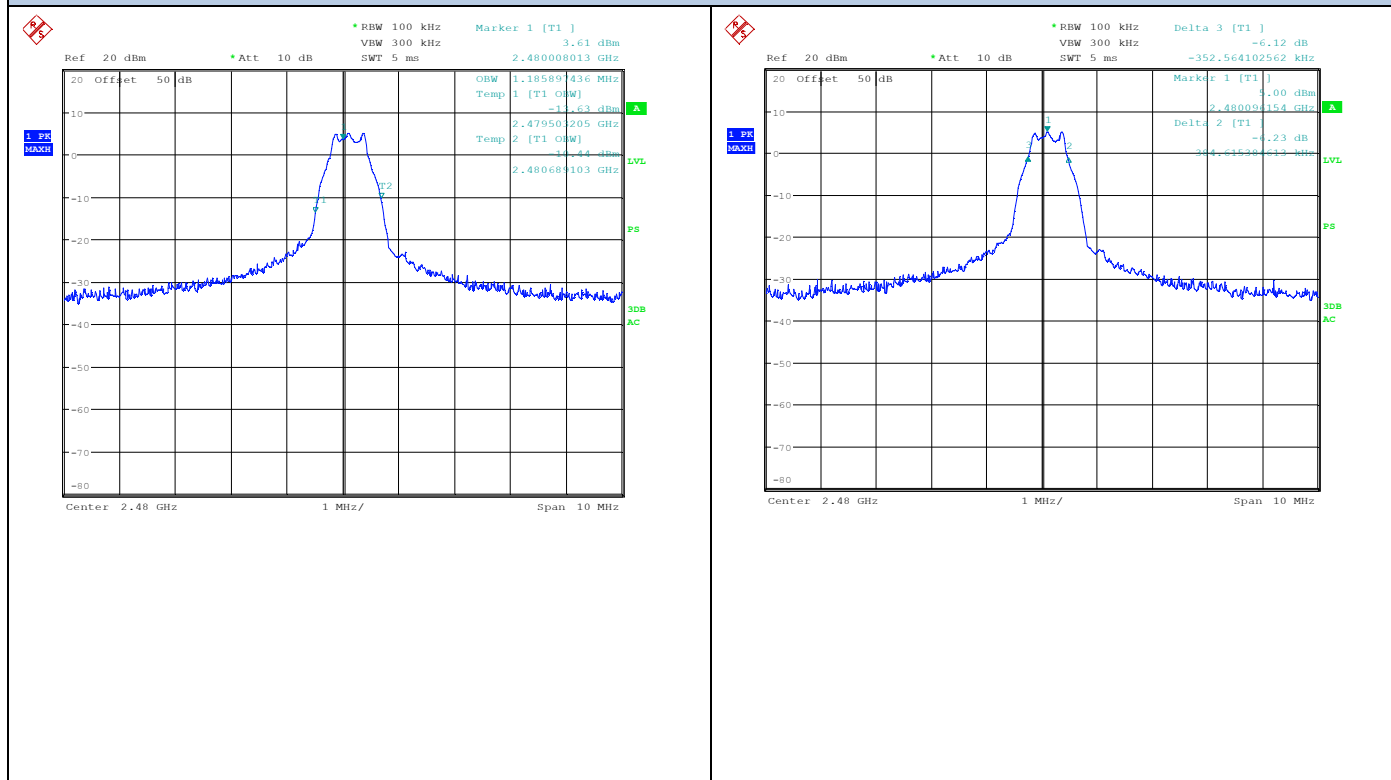
Channel: Low



Graphical representation of 6dB Bandwidth

Operation Mode: #1

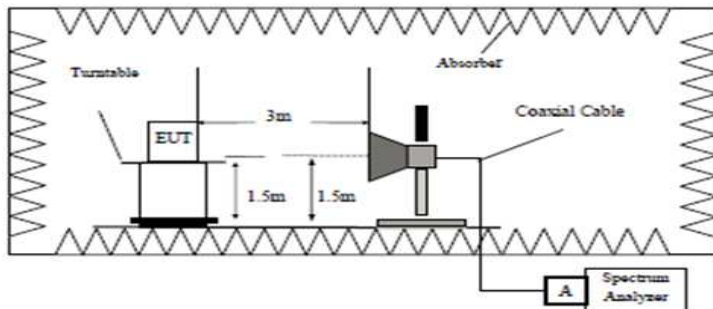
Channel: High



Test Results

Channel	Frequency (MHz)	6dB Bandwidth (Mhz)	Minimum Limit (MHz)
0	2402	0,753	0,5
39	2462	0,737	0,5

15. Test Conditions and Results – OUTPUT POWER

15	TEST: Output Power		PASS
Parameters required prior to the test	Laboratory Ambient Temperature (°C)	15 to 35 °C	
	Relative Humidity (%)	30 to 60 %	
Parameters recorded during the test	Laboratory Ambient Temperature (°C)	22,5°C	
	Relative Humidity (%)	51%	
	Air pressure (hPa)	1020	
—	Power Mode	Application Point	
Fully configured sample tested at the power line frequency	Battery Operated	Enclosure	
Equipment mode:	Operation mode	#1	
FCC Standard	§15.247 (B)(3)		
(b) The maximum peak conducted output power of the intentional radiator shall not exceed the following: (1) For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts. (2) For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section. (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. (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.			
Further information to test setup			

Test Equipment Used					
Description	Manufacturer	Model	Identifier	Calibration date	Calibration due
CSSA	ETS Lindgren	FACT3	87020484	10/2016	10/2017
EMI Test Receiver	R&S	ESU40	87020455	04/2016	04/2017
Antenna BiConiLog	ETS Lindgren	3124E-PA	87020457	04/2014	04/2017
Antenna Horn with Preamplifier	ETS Lindgren	3117-PA	87020458	04/2014	04/2017

Test result of Peak Output Power

Channel	Channel Frequency (MHz)	Output Power		Limit
		(dBm)	(mW)	(mW)
Low Channel	2402	3,51	2,24	1000
Middle Channel	2440	4,69	2,94	1000
High Channel	2480	3,63	2,30	1000

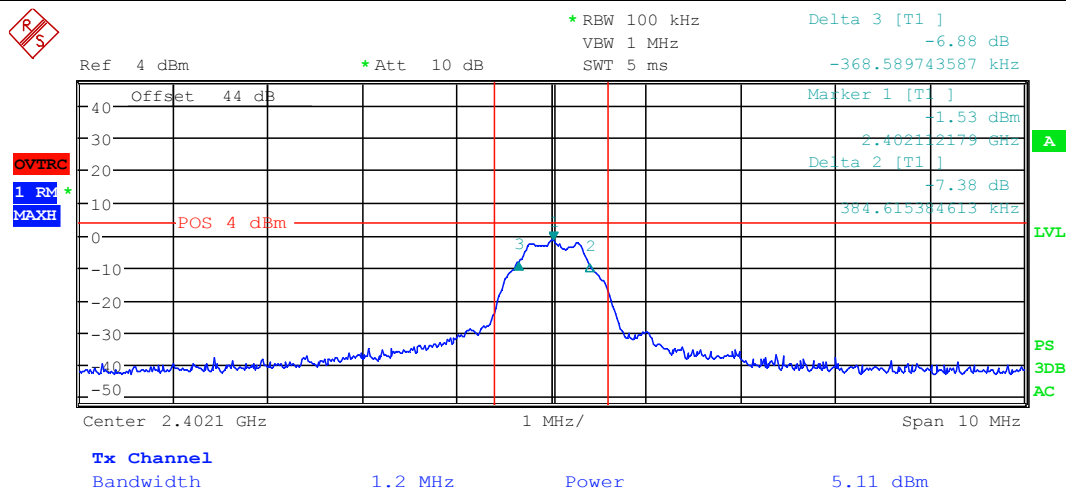
Test Executed according to FCC Meas Guidance

9.2.2.2 Method AVGSA-1 (trace averaging with the EUT transmitting at full power throughout each sweep)

Graphical representation of RF Output Power - Radiated

Operation Mode: #1

Channel: Low



Measured Band Power=5,11dBm

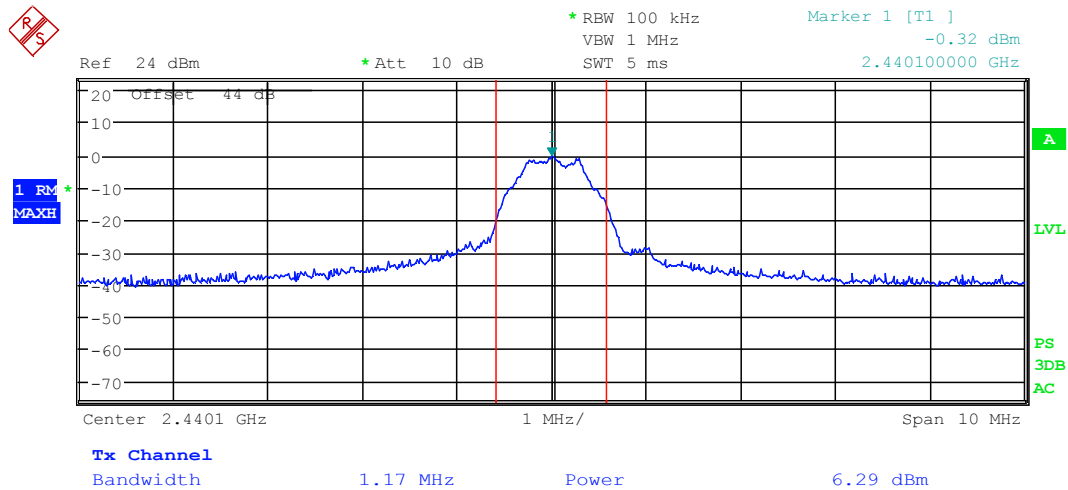
Maximum peak conducted output power = Measured Band Power – antenna gain =
 5,11dBm – 1,6dBi = 3,51dBm

3,51dBm = 2,24 mW (< 1W)

Graphical representation of RF Output Power - Radiated

Operation Mode: #1

Channel: Middle



Measured Band Power=6,29dBm

Maximum peak conducted output power = Measured Band Power – antenna gain =

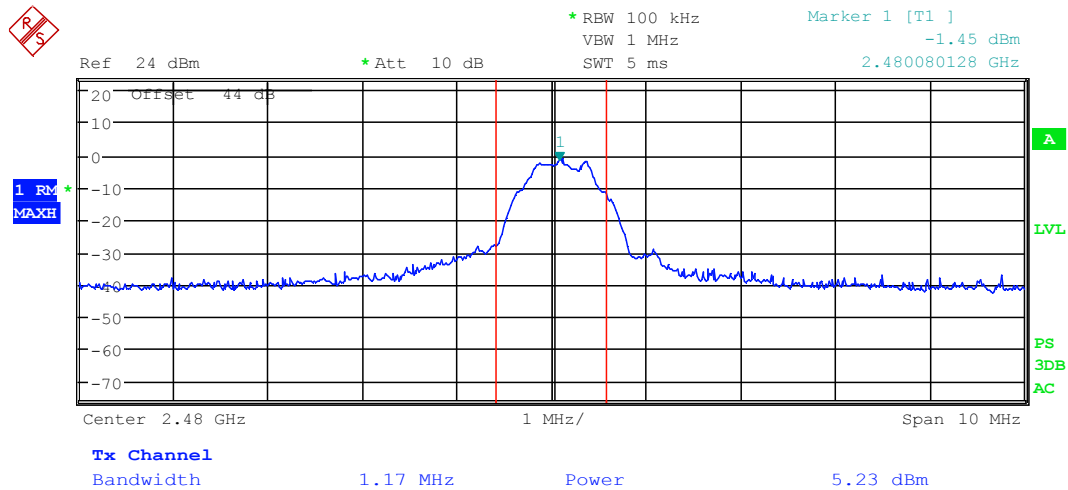
6,29 -1,6dBi= 4,69 dBm

4,69 dBm= 2,94 mW (< 1W)

Graphical representation of RF Output Power - Radiated

Operation Mode: #1

Channel: High



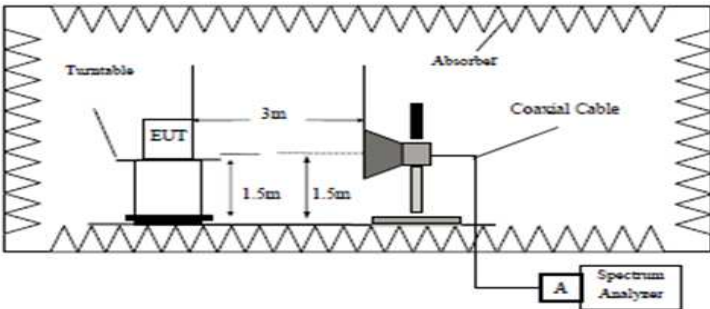
Measured Band Power=5,23dBm

Maximum peak conducted output power = Measured Band Power – antenna gain =

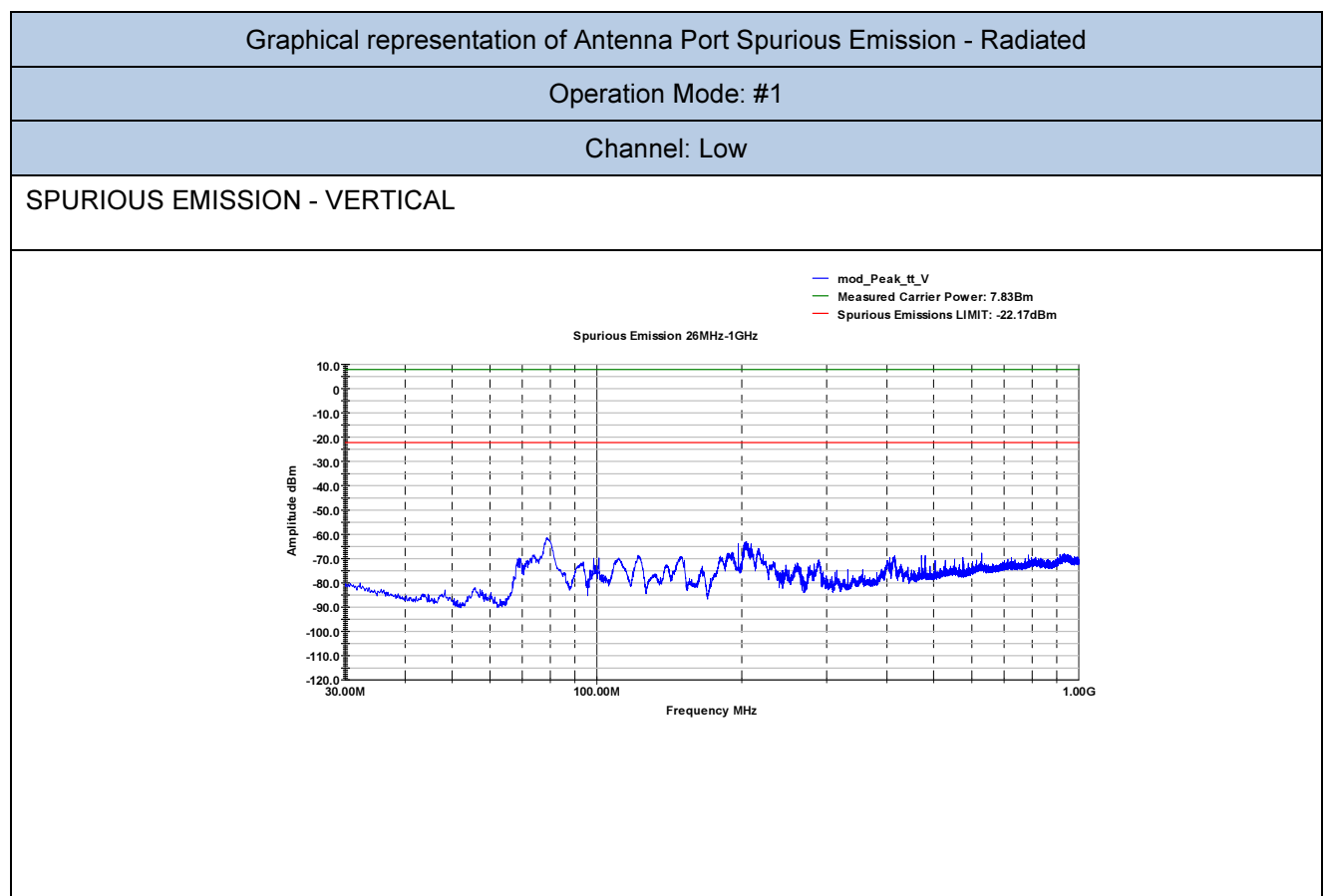
5,23dBm – 1,6dBi= 3,63dBm

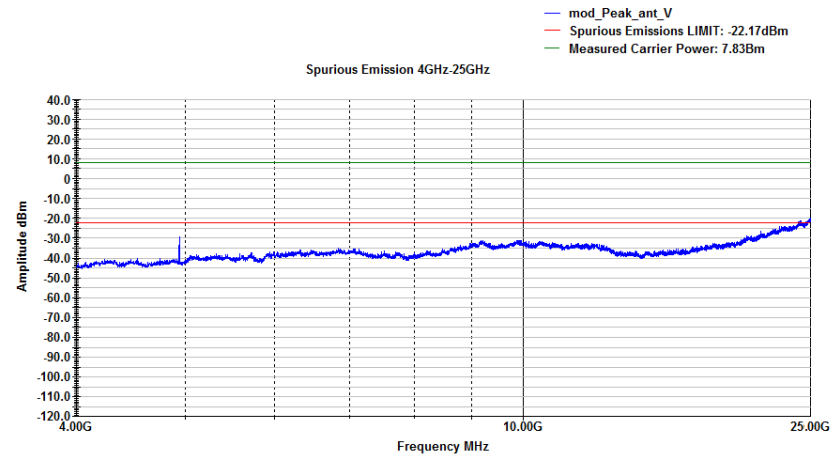
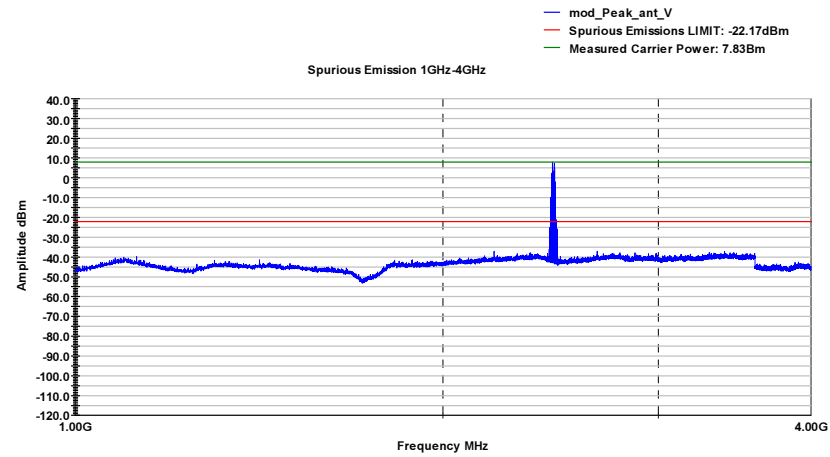
3,63 dBm= 2,30 mW (< 1W)

16. Test Conditions and Results – RADIATED ANTENNA PORT SPURIOUS EMISSIONS

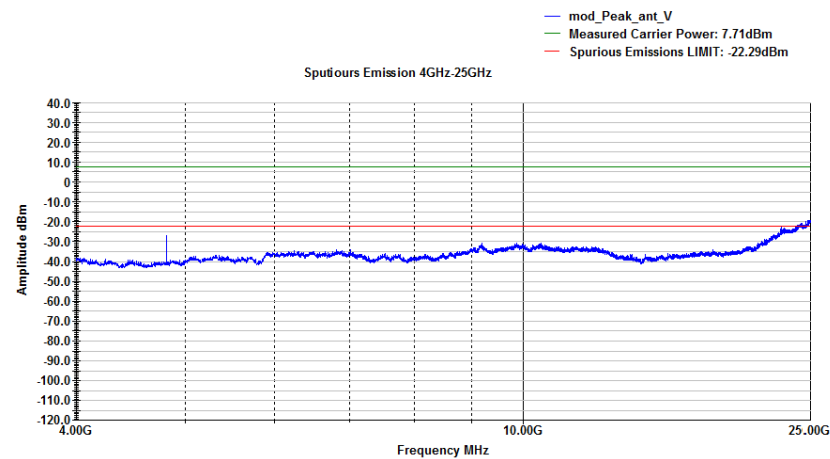
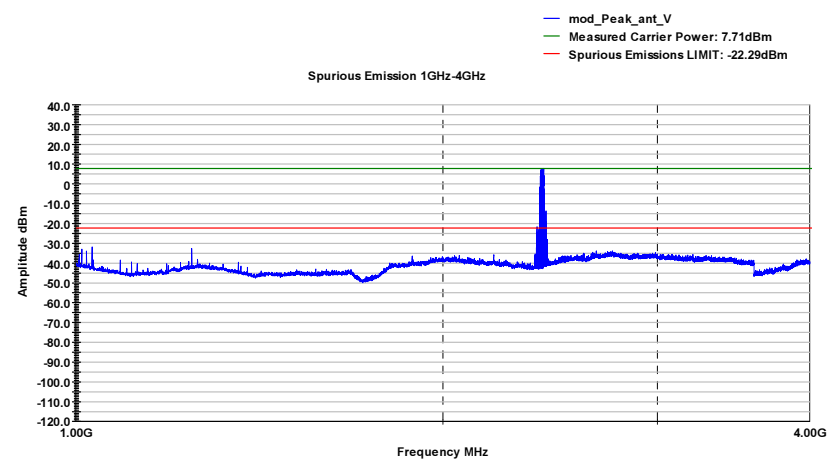
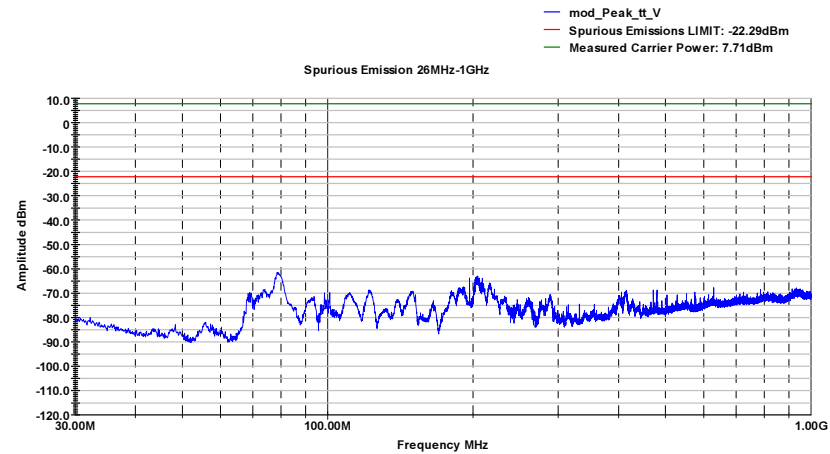
16	TEST: Radiated Antenna Port Spurious Emission		PASS
Parameters required prior to the test	Laboratory Ambient Temperature (°C)	15 to 35 °C	
	Relative Humidity (%)	30 to 60 %	
Parameters recorded during the test	Laboratory Ambient Temperature (°C)	21°C	
	Relative Humidity (%)	49%	
	Air pressure (hPa)	1020	
—	Power Mode	Application Point	
Fully configured sample tested at the power line frequency	Battery Operated	Enclosure	
Equipment mode:	Operation mode	#1	
FCC Standard	§15.247		
(d) 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 §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).			
Further information to test setup			

Test Equipment Used					
Description	Manufacturer	Model	Identifier	Calibration date	Calibration due
CSSA	ETS Lindgren	FACT3	87020484	10/2015	10/2016
EMI Test Receiver	R&S	ESU40	87020455	04/2016	04/2017
Antenna BiConiLog	ETS Lindgren	3124E-PA	87020457	04/2014	04/2017
Antenna Horn with Preamplifier	ETS Lindgren	3117-PA	87020458	04/2014	04/2017





SPURIOUS EMISSION - HORIZONTAL

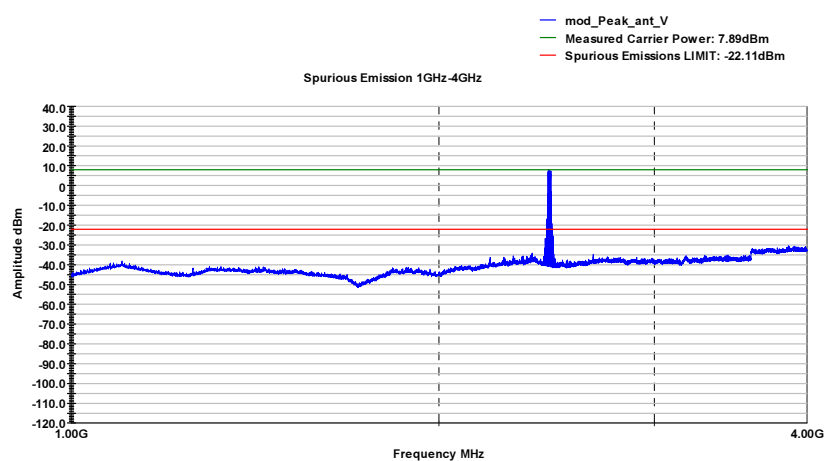
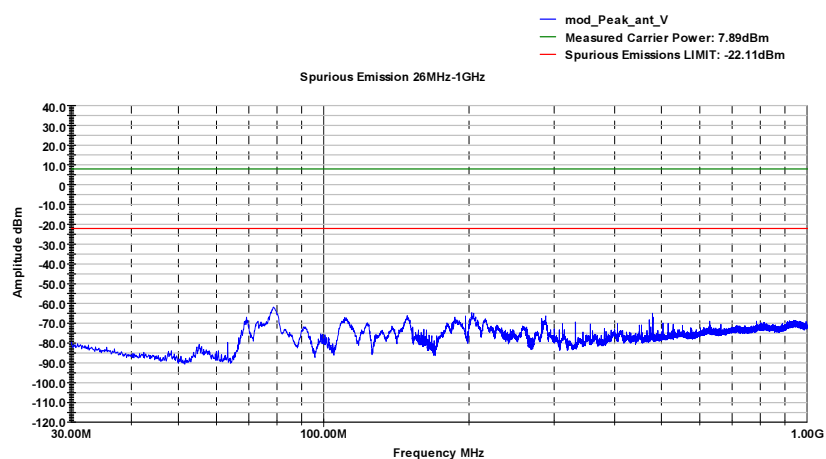


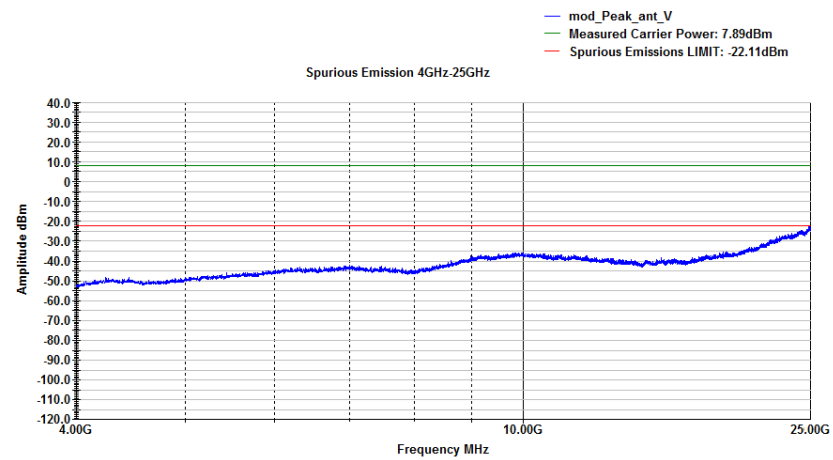
Graphical representation of Antenna Port Spurious Emission - Radiated

Operation Mode: #1

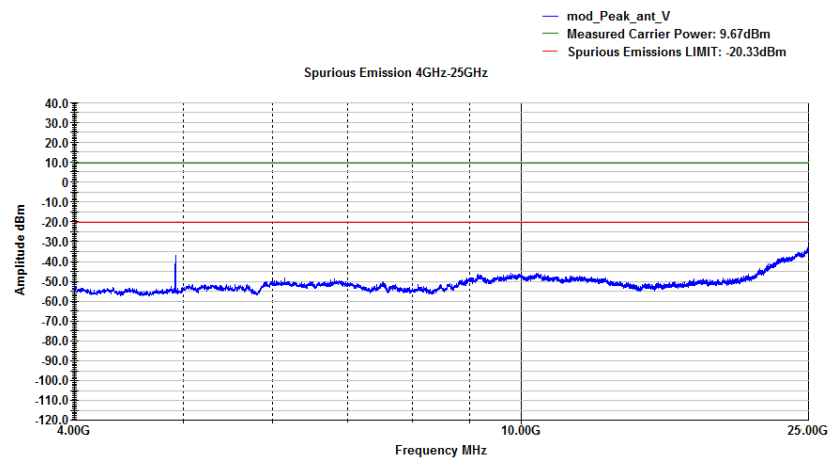
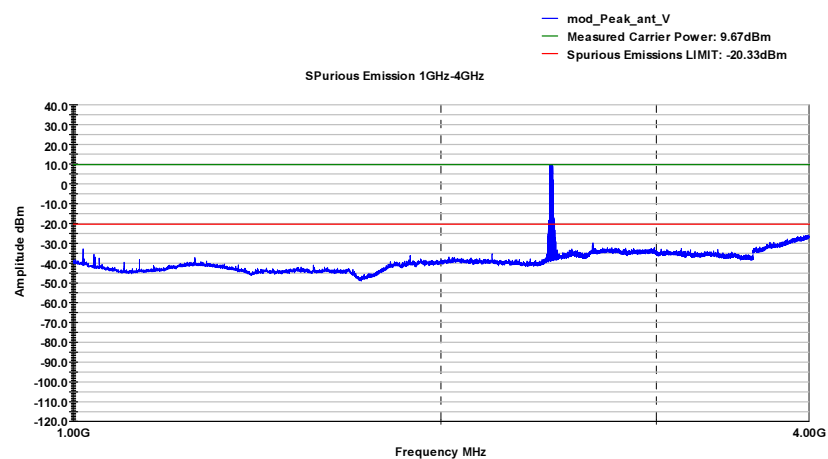
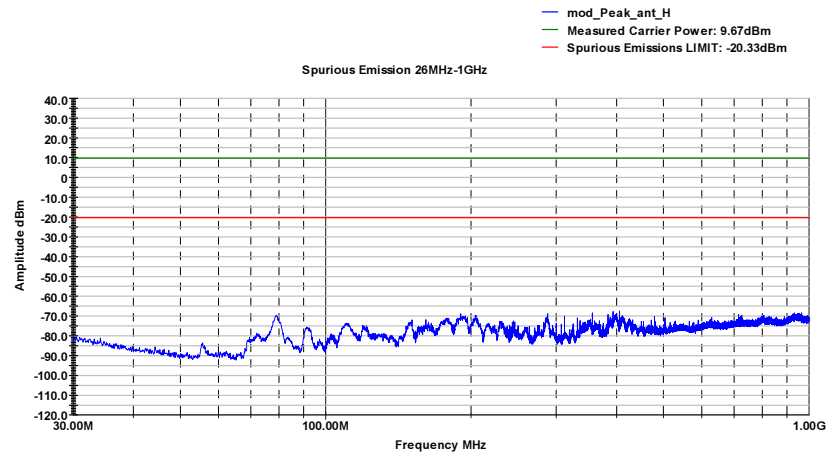
Channel: High

SPURIOUS EMISSION - VERTICAL





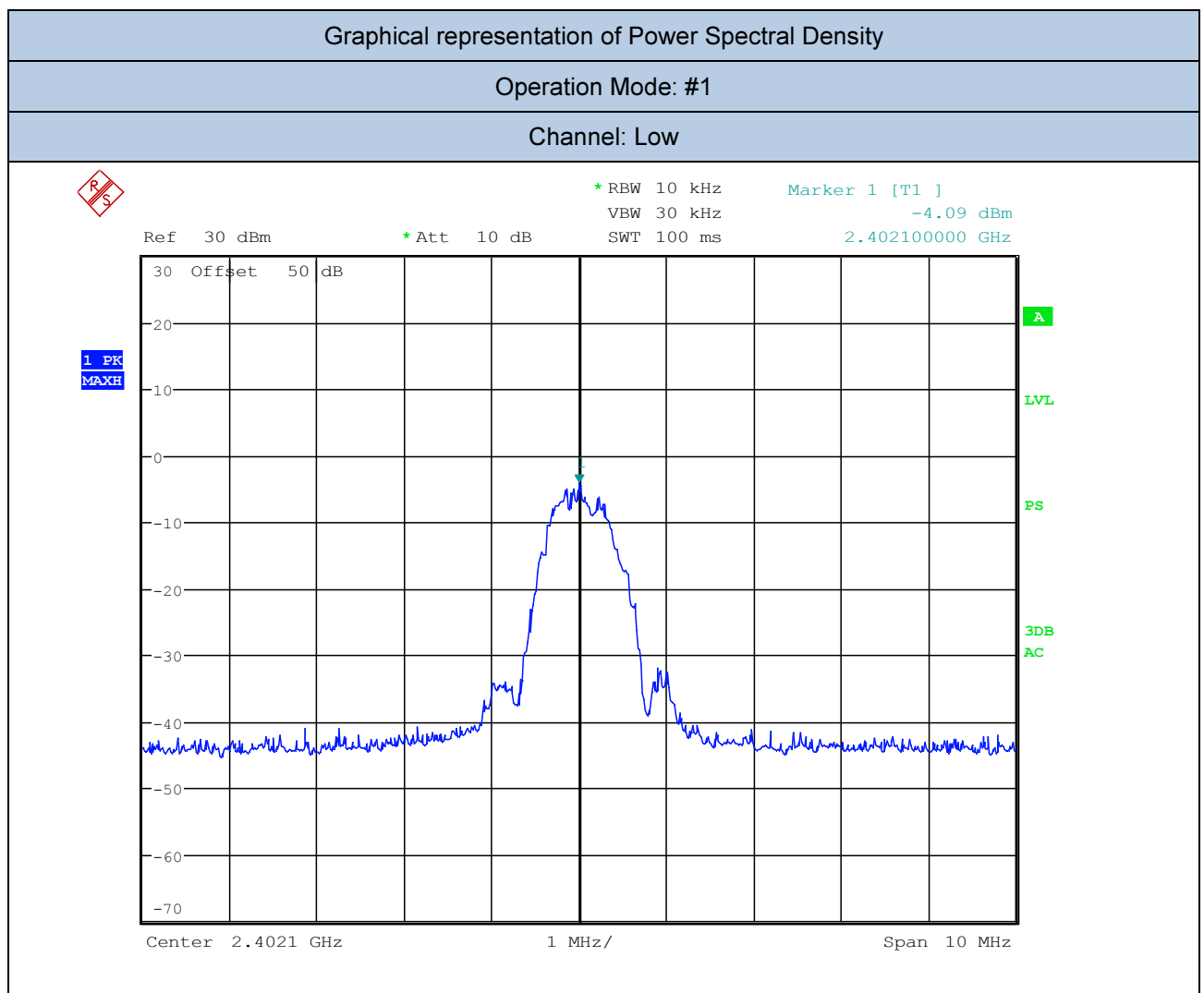
SPURIOUS EMISSION - HORIZONTAL

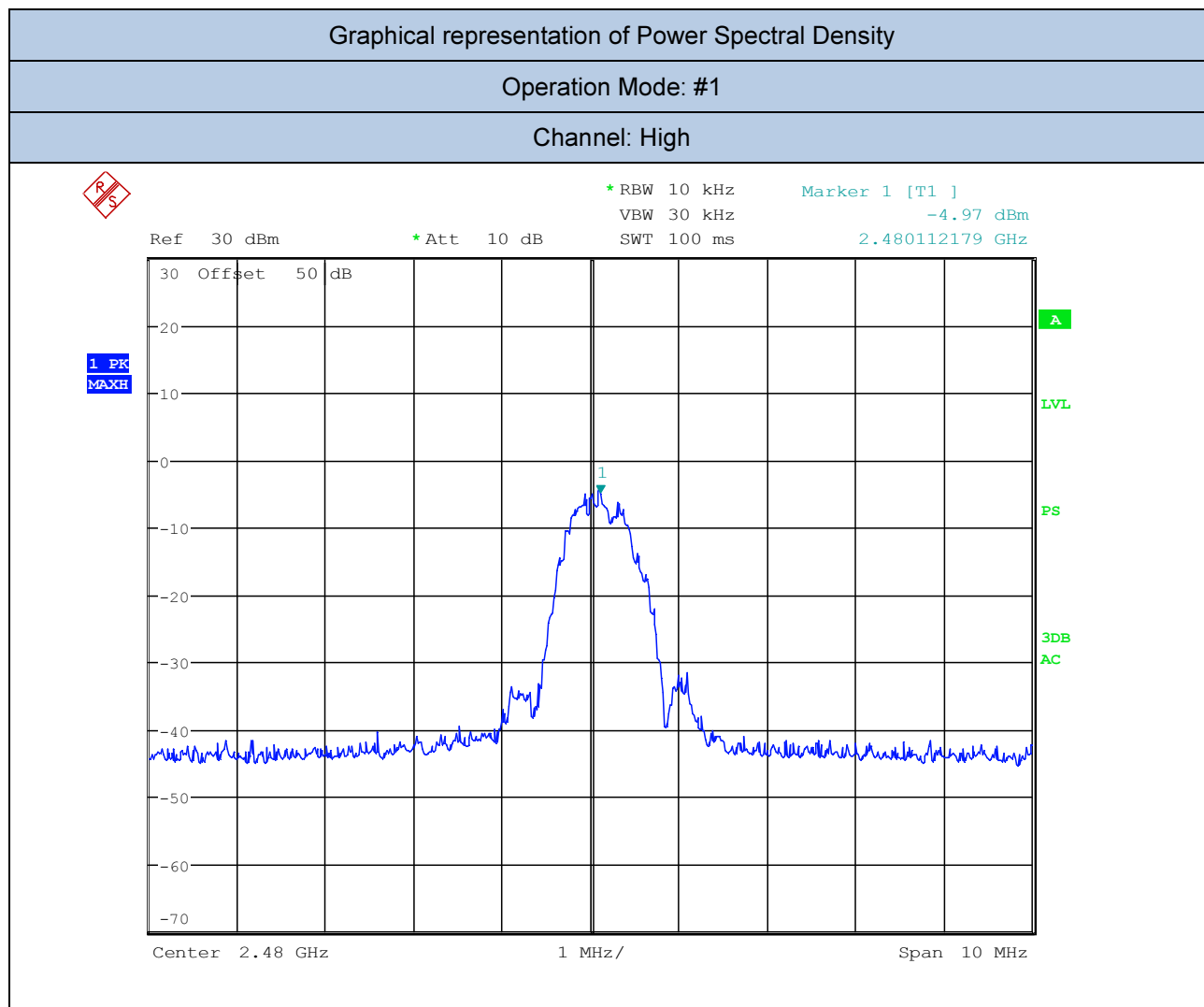


17. Test Conditions and Results – POWER SPECTRAL DENSITY

17	TEST: Power Spectral Density		PASS
Parameters required prior to the test	Laboratory Ambient Temperature (°C)	15 to 35 °C	
	Relative Humidity (%)	30 to 60 %	
Parameters recorded during the test	Laboratory Ambient Temperature (°C)	24°C	
	Relative Humidity (%)	37%	
	Air pressure (hPa)	1020	
—	Power Mode	Application Point	
Fully configured sample tested at the power line frequency	Battery Operated	Enclosure	
Equipment mode:	Operation mode	#1	
FCC Standard	§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.			
Further information to test setup	EUT Attenuator (optional) Spectrum Analyzer (or Power Meter)		

Test Equipment Used					
Description	Manufacturer	Model	Identifier	Calibration date	Calibration due
EMI Test Receiver	R&S	ESU40	87020455	04/2016	04/2017
20dB Attenuator	RS Components	Huber & Suhner	87020534	10/2016	10/2017





18. Test Conditions and Results – RF EXPOSURE REQUIREMENTS

18	TEST: RF Exposure Requirements		PASS
Parameters required prior to the test	Laboratory Ambient Temperature (°C)	15 to 35 °C	
	Relative Humidity (%)	30 to 60 %	
Parameters recorded during the test	Laboratory Ambient Temperature (°C)	---	
	Relative Humidity (%)	---	
	Air pressure (hPa)	1020	
—	Frequency	Application Point	
Fully configured sample tested at the power line frequency	115V ~ 60Hz	SMA Connector	
Equipment mode:	Operation mode	#1	
FCC Standard	§15.247		
General Test Configuration Calculation uses the free space transmission formula: $S = \frac{PG}{4\pi r^2}$ or equivalent $S = \frac{EIRP}{4\pi r^2}$ where P = input power of the antenna G = antenna gain relative to an isotropic antenna r = distance from the antenna to the point of investigation. EIRP = Effective Isotropic Radiated Power			
Summary of Results Device COMPLIES with Power Density requirements at 20cm separation			
Calculation Antenna: 5dBi (see pag.11)			

RESULTS			
CH	TX Frequency (MHz)	Measured Power at Antenna Connector (dBm)	Antenna Gain (dBi)
20	2440	4,69	1,6
MAXIMUM PERMISSIBLE EXPOSURE (MPE)			
Evaluation Distance (m)		0,2 ⁽¹⁾	
Power density at evaluation distance (W/m²)		---	
Power density Limit (W/m²)		10	
VERDICT			
The EUT Radiated Power density at evaluation distance is WHITIN THE LIMIT			
MIN Safety Distance			
0,5cm			

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