InterLab®

FCC Measurement/Technical Report on

Mobile Computer
JLT 8404

Report Reference: MDE_SVEP_0801_FCCa

Test Laboratory:

DAT-P-192/99-01

7 layers AG
Borsigstrasse 11
40880 Ratingen
Germany
email: info@7Layers.de

Note:
The following test results relate only to the devices specified in this document. This report shall not be reproduced in parts without the written approval of the testing laboratory.

Table of Contents

0 Summary

0.1 Technical Report Summary

Type of Authorization
Certification for an Intentional Radiator (Frequency Hopping Spread Spectrum and Digital Device / Spread Spectrum).

Applicable FCC Rules

Prepared in accordance with the requirements of FCC Rules and Regulations as listed in 47 CFR Ch.1 (10-1-07 Edition).

The following parts and subparts are applicable to the results in this test report.

- Part 2, Subpart J - Equipment Authorization Procedures, Certification

- Part 15, Subpart C – Intentional Radiators

Note:
-

Summary Test Results:

The EUT complied with all performed tests as listed in chapter 0.2 Measurement Summary.

0.2 Measurement Summary

FCC Part 15, Subpart C		**§15.35, §15.205, §15.209**	
Spurious radiated emissions			
The measurement was performed according to ANSI C63.4			2003
OP-Mode	**Setup**	**Port**	**Final Result**
op-mode 1	Setup_01	Enclosure	Passed
op-mode 2	Setup_01	Enclosure	Passed
op-mode 4	Setup_01	Enclosure	Passed
op-mode 5	Setup_01	Enclosure	Passed
op-mode 7	Setup_01	Enclosure	Passed
op-mode 8	Setup_01	Enclosure	Passed
op-mode 10	Setup_01	Enclosure	Passed
op-mode 11	Setup_01	Enclosure	Passed
op-mode 13	Setup_01	Enclosure	Passed
op-mode 14	Setup_01	Enclosure	Passed
op-mode 16	Setup_01	Enclosure	Passed
op-mode 17	Setup_01	Enclosure	Passed
op-mode 20	Setup_01	Enclosure	Passed
op-mode 21	Setup_01	Enclosure	Passed
op-mode 22	Setup_01	Enclosure	Passed
op-mode 23	Setup_01	Enclosure	Passed

FCC Part 15, Subpart C		**§15.35, §15.205, §15.209**	
Band edge compliance			
The measurement was performed according to ANSI C63.4			2003
OP-Mode	**Setup**	**Port**	**Final Result**
op-mode 1	Setup_01	Enclosure	Passed
op-mode 2	Setup_01	Enclosure	Passed
op-mode 4	Setup_01	Enclosure	Passed
op-mode 5	Setup_01	Enclosure	Passed
op-mode 7	Setup_01	Enclosure	Passed
op-mode 8	Setup_01	Enclosure	Passed
op-mode 11	Setup_01	Enclosure	Passed
op-mode 13	Setup_01	Enclosure	Passed
op-mode 14	Setup_01	Enclosure	Passed
op-mode 16	Setup_01	Enclosure	Passed
op-mode 17	Setup_01	Enclosure	Passed

The purpose of the test case and operating mode selection is the evaluation of co-location effects and
to demonstrate the conformance of the W-LAN component to §15.205, §15.209

Responsible for Accreditation Scope: _____ Responsible for Test Report: _____

1 Administrative Data

1.1 Testing Laboratory

Company Name:	7 Layers AG
Address	Borsigstr. 11 40880 Ratingen Germany

This facility has been fully described in a report submitted to the FCC and accepted under the registration number 96716 .

The test facility is also accredited by the following accreditation organisation:

- Deutscher Akkreditierungs Rat	DAR-Registration no. DAT-P-192/99-01
Responsible for Accreditation Scope:	Dipl.-Ing. Bernhard Retka Dipl.-Ing. Robert Machulec Dipl.-Ing. Thomas Hoell
Report Template Version:	2007-12-03

1.2 Project Data

Responsible for testing and report:	Dipl.-Ing. Arndt Stöcker
Date of Test(s):	2008-02-14 to 2008-02-15
Date of Report:	2008-02-29

1.3 Applicant Data

Company Name:	Svep Design Center AB
Address:	S:t Lars väg 42A SE-222 70 Lund Sweden
Contact Person:	Mikael Bergqvist

1.4 Manufacturer Data

Company Name:	JLT Mobile Computers AB
Address:	Isbjörnsvägen 3 SE-352 45 Växjö Sweden
Contact Person:	Jan Olofsson

2 Product labelling

2.1 FCC ID label

At the time of the report there was no FCC label available.

2.2 Location of the label on the EUT

see above

3 Test object Data

3.1 General EUT Description

Equipment under Test	Mobile Computer
Type Designation:	JLT 8404
Kind of Device:	Tablet PC; Bluetooth WLAN transceiver
(optional)	
Voltage Type:	DC
Low voltage level:	9.0 V
Normal voltage level	19.0 V
High voltage level	21.0 V

General product description:

Bluetooth is a short-range radio link intended to be a cable replacement between portable and/or fixed electronic devices.

Bluetooth operates in the unlicensed ISM Band at 2.4 GHz. In the US a band of 83.5 MHz width is available. In this band, the Bluetooth technology defines 79 RF channels spaced 1 MHz (2402 - 2480 MHz). The actual RF channel is chosen from a pseudo-random hopping sequence through the 79 channels. A channel is occupied for a defined amount of time slots, with a nominal slot length of 625 µs. The maximum dwell time on one channel is defined by the packet type and is 0.625 ms for DH1 packets, 1.875 ms for DH3 and 3.125 ms for DH5. The nominal hop rate is 1600 hops/s for DH1, 1600/3 for DH3 and 1600/5 for DH5. All frequencies are equally used. The maximum nominal average time of occupancy is 0.4 s within a period of 79*0.4 seconds.

WLAN Transceiver operating in the 2.4 GHz ISM band using Direct Sequence Spread Spectrum (DSSS) Modulation. The EUT supports the modes 802.11b (maximum data rate 11 Mbps), 802.11g (maximum data rate 54 Mbps) and 802.11g Turbo (maximum data rate = two times 54 Mbps = 108 Mbps distributed) This mode is avalible at channel 6 (2437 MHz) only.

The EUT provides the following ports:

Ports
Enclosure
AC Port (power line)

The main components of the EUT are listed and described in Chapter 3.2

3.2 EUT Main components

Type, S/N, Short Descriptions etc. used in this Test Report

Short Description	Equipment under Test	Type Designation	Serial No.	HW Status	SW Status	Date of Receipt
EUT A (Code: 3D000A02)	Mobile Computer	JLT 8404	84040080	2.0	1.0	2008-02-13

Remark: EUT A is equipped with integral antennas for Bluetooth and W-LAN with a gain of 2.0 dBi each.

NOTE: The short description is used to simplify the identification of the EUT in this test report.

3.3 Ancillary Equipment

For the purposes of this test report, ancillary equipment is defined as equipment which is used in conjunction with the EUT to provide operational and control features to the EUT. It is necessary to configure the system in a typical fashion, as a customer would normally use it. But nevertheless Ancillary Equipment can influence the test results.

Short Description	Equipment under Test	Type Designation	HW Status	SW Status	Serial no.	FCC ID
AE 1	AC Charger; Nordic Power	SA60-19	1.0	-	0206	-

3.4 EUT Setups

This chapter describes the combination of EUTs and ancillary equipment used for testing.

Setup No.	Combination of EUTs	Description
Setup_01	EUT A + AE 1	setup for radiated measurements

3.5 Operating Modes

This chapter describes the operating modes of the EUTs used for testing.

Op. Mode	Description of Operating Modes	Remarks
op-mode 1	EUT transmits on 2402 MHz (Bluetooth) and on 2412 MHz (WLAN, 802.11b)	Bluetooth: Loopback mode, max output power WLAN: local TX mode, max output power
op-mode 2	EUT transmits on 2402 MHz (Bluetooth) and on 2412 MHz (WLAN, 802.11g)	Bluetooth: Loopback mode, max output power WLAN: local TX mode, max output power
op-mode 4	EUT transmits on 2402 MHz (Bluetooth) and on 2462 MHz (WLAN, 802.11b)	Bluetooth: Loopback mode, max output power WLAN: local TX mode, max output power
op-mode 5	EUT transmits on 2402 MHz (Bluetooth) and on 2462 MHz (WLAN, 802.11g)	Bluetooth: Loopback mode, max output power WLAN: local TX mode, max output power
op-mode 7	EUT transmits on 2412 MHz (Bluetooth) and on 2412 MHz (WLAN, 802.11b)	Bluetooth: Loopback mode, max output power WLAN: local TX mode, max output power
op-mode 8	EUT transmits on 2412 MHz (Bluetooth) and on 2412 MHz (WLAN, 802.11g)	Bluetooth: Loopback mode, max output power WLAN: local TX mode, max output power
op-mode 10	EUT transmits on 2462 MHz (Bluetooth) and on 2462 MHz (WLAN, 802.11b)	Bluetooth: Loopback mode, max output power WLAN: local TX mode, max output power
op-mode 11	EUT transmits on 2462 MHz (Bluetooth) and on 2462 MHz (WLAN, 802.11g)	Bluetooth: Loopback mode, max output power WLAN: local TX mode, max output power
op-mode 13	EUT transmits on 2480 MHz (Bluetooth) and on 2412 MHz (WLAN, 802.11b)	Bluetooth: Loopback mode, max output power WLAN: local TX mode, max output power
op-mode 14	EUT transmits on 2480 MHz (Bluetooth) and on 2412 MHz (WLAN, 802.11g)	Bluetooth: Loopback mode, max output power WLAN: local TX mode, max output power
op-mode 16	EUT transmits on 2480 MHz (Bluetooth) and on 2462 MHz (WLAN, 802.11b)	Bluetooth: Loopback mode, max output power WLAN: local TX mode, max output power
op-mode 17	EUT transmits on 2480 MHz (Bluetooth) and on 2462 MHz (WLAN, 802.11g)	Bluetooth: Loopback mode, max output power WLAN: local TX mode, max output power
op-mode 20	EUT transmits on 2402 MHz (Bluetooth) and on 2437 MHz (WLAN, 802.11g Turbo)	Bluetooth: Loopback mode, max output power WLAN: local TX mode, max output power
op-mode 21	EUT transmits on 2441 MHz (Bluetooth) EUT transmits on 2437 MHz (WLAN, 802.11g Turbo)	Bluetooth: Loopback mode, max output power WLAN: local TX mode, max output power
op-mode 22	EUT transmits on 2480 MHz (Bluetooth) EUT transmits on 2437 MHz (WLAN, 802.11g Turbo)	Bluetooth: Loopback mode, max output power WLAN: local TX mode, max output power
op-mode 23	EUT transmits on 2437 MHz (WLAN, 802.11g Turbo)	Bluetooth: OFF W-LAN: local TX mode, max output power
op-mode 24	EUT transmits on 2462 MHz (WLAN, 802.11g)	Bluetooth: OFF WLAN: local TX mode, max output power

4 Test Results

4.1 Spurious radiated emissions

Standard FCC Part 15, 10-1-07
Subpart C

The test was performed according to: ANSI C 63.4, 2003

4.1.1 Test Description

The test set-up was made in accordance to the general provisions of ANSI C 63.4-2003. The Equipment Under Test (EUT) was set up on a non-conductive table 1.0 x 2.0 m in the semi-anechoic chamber. The test was performed at the distance of 3 m between the EUT and the receiving antenna.
The radiated emissions measurements were made in a typical installation configuration.
The measurement procedure is implemented into the EMI test software ES-K1 from R&S.
1. Measurement up to 30 MHz
The test set-up was made in accordance to the general provisions of ANSI C 63.4-2003. The Equipment Under Test (EUT) was set up on a non-conductive table in the anechoic chamber.
The radiated emissions measurements were made in a typical installation configuration.
The measurement procedure is implemented into the EMI test software ES-K1 from R&S.
The Loop antenna HFH2-Z2 is used.
Step 1: pre measurement
- Anechoic chamber
- Antenna distance: 10m
- Detector: Peak-Maxhold
- Frequency range: 0.009 - 0.15 and 0.15 – 30 MHz
- Frequency steps: 0.1 kHz and 5 kHz
- IF–Bandwidth: 0.2 kHz and 10 kHz
- Measuring time / Frequency step: 100 ms

Intention of this step is, to determine the radiated EMI-profile of the EUT. Afterwards the relevant emissions for the final measurement are identified.
Step 2: final measurement
For the relevant emissions determined in step 1, an additional measurement with the following settings will be performed. Intention of this step is to find the maximum emission level.
- Open area test side
- Antenna distance: according to the Standard
- Detector: Quasi-Peak
- Frequency range: 0.009 – 30 MHz
- Frequency steps: measurement at frequencies detected in step 1
- IF–Bandwidth: 200 Hz - 10 kHz
- Measuring time / Frequency step: 100 ms

2. Measurement above 30 MHz and up to 1 GHz
Step 1: Preliminary scan
Preliminary test to identify the highest amplitudes relative to the limit.
Settings for step 1:
- Detector: Peak-Maxhold
- Frequency range: 30 – 1000 MHz
- Frequency steps: 60 kHz
- IF–Bandwidth: 120 kHz
- Measuring time / Frequency step: 100 µs
- Turntable angle range: –180 to 180 °

- Turntable step size: 90 °
- Height variation range: 1 – 3 m
- Height variation step size: 2 m
- Polarisation: Horizontal + Vertical

Intention of this step is, to determine the radiated EMI-profile of the EUT. Afterwards the relevant emissions for the final measurement are identified.

Step 2: second measurement

For the relevant emissions determined in step 1, an additional measurement with the following settings will be performed. Intention of this step is, to find out the approximate turntable angle and antenna height for each frequency.

- Detector: Peak – Maxhold
- Measured frequencies: in step 1 determined frequencies
- IF – Bandwidth: 120 kHz
- Measuring time: 100 ms
- Turntable angle range: –180 to 180 °
- Turntable step size: 45 °
- Height variation range: 1 – 4 m
- Height variation step size: 0.5 m
- Polarisation: horizontal + vertical

After this step the EMI test system has determined the following values for each frequency (of step 1):

- Frequency
- Azimuth value (of turntable)
- Antenna height

The last two values have now the following accuracy:

- Azimuth value (of turntable): 45 °
- Antenna height: 0.5 m

Step 3: final measurement

In this step the accuracy of the turntable azimuth and antenna height will be improved. This is necessary to find out the maximum value of every frequency.

For each frequency, which was determined the turntable azimuth and antenna height will be adjusted. The turntable azimuth will be slowly varied by +/- 22.5 ° around this value. During this action the value of emission is continuously measured. The turntable azimuth at the highest emission will be recorded and adjusted. In this position the antenna height is also slowly varied by +/– 25 cm around the antenna height determined. During this action the value of emission is also continuously measured. The antenna height of the highest emission will also be recorded and adjusted.

- Detector: Peak – Maxhold
- Measured frequencies: in step 1 determined frequencies
- IF – Bandwidth: 120 kHz
- Measuring time: 100 ms
- Turntable angle range: –22.5 ° to +22.5 ° around the determined value
- Height variation range: –0.25 m to +0.25 m around the determined value

Step 4: final measurement with QP detector

With the settings determined in step 3, the final measurement will be performed:
EMI receiver settings for step 4:

- Detector: Quasi-Peak(< 1 GHz)
- Measured frequencies: in step 1 determined frequencies
- IF – Bandwidth: 120 kHz
- Measuring time: 1 s

After the measurement a plot will be generated which contains a diagram with the results of the preliminary scan and a chart with the frequencies and values of the results of the final measurement.

4.1.2 Measurement above 1 GHz

The following modifications apply to the measurement procedure for the frequency range above 1 GHz:
The measurement distance was reduced to 1 m. The results were extrapolated by the extrapolation factor of 20 dB/decade (inverse linear distance for field strength measurements, inverse linear-distance squared for the power reference level measurements). Due to the fact that in this frequency range a double ridged wave guided horn antenna (up to 18 GHz) and a horn antenna (18–25 GHz, 25–40 GHz) are used, the steps 2–4 are omitted. Step 1 was performed only at one height of the receiving antenna.
EMI receiver settings:
- Detector: Peak, Average
- RBW = VBW = 100 kHz

4.1.3 Test Requirements / Limits

FCC §15.205 (b)
"Except as provided in paragraphs (d) and (e) of this section, the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in § 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in § 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in § 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in § 15.35 apply to these measurements."

FCC §15.209 (a)
"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:"

FCC §15.209, Radiated Emission Limits

Frequency in MHz	Limit (µV/m)	Measurement distance (m)	Limit(dBµV/m @10m)
0.009 – 0.49	2400/F(kHz)	300	Limit (dBµV/m)+30dB
0.49 – 1.705	24000/F(kHz)	30	Limit (dBµV/m)+10dB
1.705 - 30	30	30	Limit (dBµV/m)+10dB

Frequency in MHz	Limit (µV/m)	Measurement distance (m)	Limit (dBµV/m)
30 - 88	100	3	40.0
88 - 216	150	3	43.5
216 - 960	200	3	46.0
above 960	500	3	54.0

FCC §15.35(b)
"..., there is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit. ..."

Used conversion factor: Limit (dBµV/m) = 20 log (Limit (µV/m)/1µV/m)

4.1.4 Test Protocol

Temperature: 24 °C
Air Pressure: 1036 hPa
Humidity: 31 %

4.1.4.1 Measurement up to 30 MHz

Op. Mode	Setup	Port
op-mode 1	Setup_01	Enclosure

Polari-sation	Frequency MHz	Corrected value dBµV/m			Limit dBµV/m	Limit dBµV/m	Limit dBµV/m	Delta to limit dB	Delta to limit dB
		QP	Peak	AV	QP	Peak	AV	QP/Peak	AV
0°									
90°									

Remark: No (further) spurious emissions in the range 20 dB below the limit found therefore step 2 was not performed.
The found peak at 99.5kHz is emission from loop antenna power supply.

4.1.4.2 Measurement above 30 MHz

Op. Mode	Setup	Port
op-mode 1	Setup_01	Enclosure

Polari-sation	Frequency MHz	Corrected value dBµV/m			Limit dBµV/m	Limit dBµV/m	Limit dBµV/m	Delta to limit dB	Delta to limit dB
		QP	Peak	AV	QP	Peak	AV	QP/Peak	AV
Vertical + horizontal	1120	-	44.31	34.70	-	74.00	54.00	29.69	19.30
Vertical + horizontal	1200	-	45.09	35.63	-	74.00	54.00	28.91	18.37
Vertical + horizontal	1333	-	45.71	35.64	-	74.00	54.00	28.29	18.36
Vertical + horizontal	1608	-	46.54	36.20	-	74.00	54.00	27.46	17.80
Vertical + horizontal	1667	-	46.92	34.65	-	74.00	54.00	27.08	19.35
Vertical + horizontal	2240	-	48.98	40.02	-	74.00	54.00	25.02	13.98
Vertical + horizontal	2320	-	50.52	41.81	-	74.00	54.00	23.48	12.19
Vertical + horizontal	2387	-	51.43	41.65	-	74.00	54.00	22.57	12.35

Remark: No (further) spurious emissions in the range 20 dB below the limit found.
Tested from 30 MHz to 3 GHz.

Op. Mode	Setup	Port
op-mode 7	Setup_01	Enclosure

Polari-sation	Frequency MHz	Corrected value dBµV/m			Limit dBµV/m	Limit dBµV/m	Limit dBµV/m	Delta to limit dB	Delta to limit dB
		QP	Peak	AV	QP	Peak	AV	QP/Peak	AV
Vertical + horizontal	1120	-	43.78	34.12	-	74.00	54.00	30.22	19.88
Vertical + horizontal	1200	-	44.84	35.16	-	74.00	54.00	29.16	18.84
Vertical + horizontal	1333	-	44.78	36.05	-	74.00	54.00	29.22	17.95
Vertical + horizontal	1597	-	46.06	38.54	-	74.00	54.00	27.94	15.46
Vertical + horizontal	2136	-	49.21	38.67	-	74.00	54.00	24.79	15.33
Vertical + horizontal	4824	-	65.00	49.44	-	74.00	54.00	9.00	4.56

Remark: No (further) spurious emissions in the range 20 dB below the limit found.
Tested from 1 to 25 GHz.

Op. Mode	Setup	Port
op-mode 13	Setup_01	Enclosure

Polari-sation	Frequency MHz	Corrected value dBµV/m			Limit dBµV/m	Limit dBµV/m	Limit dBµV/m	Delta to limit dB	Delta to limit dB
		QP	Peak	AV	QP	Peak	AV	QP/Peak	AV
Vertical + horizontal	1120	-	44.31	34.63	-	74.00	54.00	29.69	19.37
Vertical + horizontal	1200	-	44.29	35.96	-	74.00	54.00	29.71	18.04
Vertical + horizontal	1333	-	44.78	35.64	-	74.00	54.00	29.22	18.36
Vertical + horizontal	1608	-	46.14	36.28	-	74.00	54.00	27.86	17.72
Vertical + horizontal	2240	-	49.23	40.09	-	74.00	54.00	24.77	13.91
Vertical + horizontal	2320	-	50.93	41.99	-	74.00	54.00	23.07	12.01
Vertical + horizontal	2352	-	52.81	41.48	-	74.00	54.00	21.19	12.52
Vertical + horizontal	2384	-	52.88	42.47	-	74.00	54.00	21.12	11.53
Vertical + horizontal	2484	-	58.96	43.14	-	74.00	54.00	15.04	10.86

Remark: No (further) spurious emissions in the range 20 dB below the limit found.
Tested from 1 to 3 GHz.

Op. Mode	Setup	Port
op-mode 02	Setup_01	Enclosure

Polari-sation	Frequency MHz	Corrected value dBµV/m			Limit dBµV/m	Limit dBµV/m	Limit dBµV/m	Delta to limit dB	Delta to limit dB
		QP	Peak	AV	QP	Peak	AV	QP/Peak	AV
Vertical + horizontal	1120	-	44.70	34.63	-	74.00	54.00	29.30	19.37
Vertical + horizontal	1200	-	44.84	35.96	-	74.00	54.00	29.16	18.04
Vertical + horizontal	1333	-	46.36	35.64	-	74.00	54.00	27.64	18.36
Vertical + horizontal	1597	-	47.37	40.20	-	74.00	54.00	26.63	13.80
Vertical + horizontal	2240	-	49.50	40.64	-	74.00	54.00	24.50	13.36
Vertical + horizontal	2320	-	51.59	42.45	-	74.00	54.00	22.41	11.55
Vertical + horizontal	2390	-	71.53	52.66	-	74.00	54.00	2.47	1.34
Vertical + horizontal	2498	-	50.44	39.54	-	74.00	54.00	23.56	14.46
Vertical + horizontal	4804	-	66.03	51.47	-	74.00	54.00	7.97	2.53
Vertical + horizontal	4828	-	43.13	28.85	-	74.00	54.00	30.87	25.15

Remark: No (further) spurious emissions in the range 20 dB below the limit found.
Tested from 1 to 10 GHz.

Op. Mode	Setup	Port
op-mode 08	Setup_01	Enclosure

Polari-sation	Frequency MHz	Corrected value dBµV/m			Limit dBµV/m	Limit dBµV/m	Limit dBµV/m	Delta to limit dB	Delta to limit dB
		QP	Peak	AV	QP	Peak	AV	QP/Peak	AV
Vertical + horizontal	1200	-	44.29	35.09	-	74.00	54.00	29.71	18.91
Vertical + horizontal	1333	-	45.44	36.25	-	74.00	54.00	28.56	17.75
Vertical + horizontal	1520	-	45.62	35.63	-	74.00	54.00	28.38	18.37
Vertical + horizontal	1608	-	46.00	37.34	-	74.00	54.00	28.00	16.66
Vertical + horizontal	2240	-	48.98	40.09	-	74.00	54.00	25.02	13.91
Vertical + horizontal	2320	-	50.93	41.69	-	74.00	54.00	23.07	12.31
Vertical + horizontal	2390	-	66.71	51.86	-	74.00	54.00	7.29	2.14
Vertical + horizontal	4824	-	64.12	48.40	-	74.00	54.00	9.88	5.60

Remark: No (further) spurious emissions in the range 20 dB below the limit found.
Tested from 1 to 25 GHz.

Op. Mode	Setup	Port
op-mode 14	Setup_01	Enclosure

Polari-sation	Frequency MHz	Corrected value dBµV/m			Limit dBµV/m	Limit dBµV/m	Limit dBµV/m	Delta to limit dB	Delta to limit dB
		QP	Peak	AV	QP	Peak	AV	QP/Peak	AV
Vertical + horizontal	1120	-	43.53	34.34	-	74.00	54.00	30.47	19.66
Vertical + horizontal	1200	-	44.44	35.90	-	74.00	54.00	29.56	18.10
Vertical + horizontal	1333	-	45.84	35.78	-	74.00	54.00	28.16	18.22
Vertical + horizontal	1608	-	46.40	37.98	-	74.00	54.00	27.60	16.02
Vertical + horizontal	2240	-	50.29	40.70	-	74.00	54.00	23.71	13.30
Vertical + horizontal	2320	-	51.59	42.61	-	74.00	54.00	22.41	11.39
Vertical + horizontal	2390	-	70.82	52.76	-	74.00	54.00	3.18	1.24
Vertical + horizontal	2484	-	58.84	43.14	-	74.00	54.00	15.16	10.86

Remark: No (further) spurious emissions in the range 20 dB below the limit found.
Tested from 1 to 3 GHz.

Op. Mode	Setup	Port
op-mode 04	Setup_01	Enclosure

Polari-sation	Frequency MHz	Corrected value dBµV/m			Limit dBµV/m	Limit dBµV/m	Limit dBµV/m	Delta to limit dB	Delta to limit dB
		QP	Peak	AV	QP	Peak	AV	QP/Peak	AV
Vertical + horizontal	1120	-	44.57	34.70	-	74.00	54.00	29.43	19.30
Vertical + horizontal	1200	-	45.22	35.96	-	74.00	54.00	28.78	18.04
Vertical + horizontal	1333	-	45.57	35.57	-	74.00	54.00	28.43	18.43
Vertical + horizontal	1597	-	45.66	37.45	-	74.00	54.00	28.34	16.55
Vertical + horizontal	2258	-	51.15	43.24	-	74.00	54.00	22.85	10.76
Vertical + horizontal	2320	-	51.32	43.59	-	74.00	54.00	22.68	10.41

Remark: No (further) spurious emissions in the range 20 dB below the limit found.
Tested from 1 to 3 GHz.

Op. Mode	Setup	Port
op-mode 10	Setup_01	Enclosure

Polari-sation	Frequency MHz	Corrected value dBµV/m			Limit dBµV/m	Limit dBµV/m	Limit dBµV/m	Delta to limit dB	Delta to limit dB
		QP	Peak	AV	QP	Peak	AV	QP/Peak	AV
Vertical + horizontal	1200	-	45.63	35.23	-	74.00	54.00	28.37	18.77
Vertical + horizontal	1333	-	45.04	35.43	-	74.00	54.00	28.96	18.57
Vertical + horizontal	1520	-	44.97	34.51	-	74.00	54.00	29.03	19.49
Vertical + horizontal	2258	-	51.56	42.74	-	74.00	54.00	22.44	11.26
Vertical + horizontal	2320	-	51.32	43.69	-	74.00	54.00	22.68	10.31
Vertical + horizontal	4924	-	55.31	36.45	-	74.00	54.00	18.69	17.55

Remark: No (further) spurious emissions in the range 20 dB below the limit found.
Tested from 1 to 25 GHz.

Op. Mode	Setup	Port
op-mode 16	Setup_01	Enclosure

Polari-sation	Frequency MHz	Corrected value dBµV/m			Limit dBµV/m	Limit dBµV/m	Limit dBµV/m	Delta to limit dB	Delta to limit dB
		QP	Peak	AV	QP	Peak	AV	QP/Peak	AV
Vertical + horizontal	1120	-	44.70	34.41	-	74.00	54.00	29.30	19.59
Vertical + horizontal	1200	-	44.29	35.77	-	74.00	54.00	29.71	18.23
Vertical + horizontal	1333	-	44.78	35.50	-	74.00	54.00	29.22	18.50
Vertical + horizontal	1520	-	45.62	34.69	-	74.00	54.00	28.38	19.31
Vertical + horizontal	2258	-	50.87	41.63	-	74.00	54.00	23.13	12.37
Vertical + horizontal	2320	-	51.86	44.02	-	74.00	54.00	22.14	9.98
Vertical + horizontal	2384	-	53.14	42.64	-	74.00	54.00	20.86	11.36
Vertical + horizontal	2484	-	59.21	43.41	-	74.00	54.00	14.79	10.59

Remark: No (further) spurious emissions in the range 20 dB below the limit found.
Tested from 1 to 3 GHz.

Op. Mode	Setup	Port
op-mode 05	Setup_01	Enclosure

Polari-sation	Frequency MHz	Corrected value dBµV/m			Limit dBµV/m	Limit dBµV/m	Limit dBµV/m	Delta to limit dB	Delta to limit dB
		QP	Peak	AV	QP	Peak	AV	QP/Peak	AV
Vertical + horizontal	1120	-	44.57	34.41	-	74.00	54.00	29.43	19.59
Vertical + horizontal	1200	-	45.09	35.70	-	74.00	54.00	28.91	18.30
Vertical + horizontal	1333	-	45.97	35.85	-	74.00	54.00	28.03	18.15
Vertical + horizontal	1520	-	45.62	35.63	-	74.00	54.00	28.38	18.37
Vertical + horizontal	1597	-	45.79	36.71	-	74.00	54.00	28.21	17.29
Vertical + horizontal	1667	-	46.52	34.08	-	74.00	54.00	27.48	19.92
Vertical + horizontal	2258	-	50.87	39.57	-	74.00	54.00	23.13	14.43
Vertical + horizontal	2320	-	50.38	41.00	-	74.00	54.00	23.62	13.00
Vertical + horizontal	2484	-	68.86	48.82	-	74.00	54.00	5.14	5.18

Remark: No (further) spurious emissions in the range 20 dB below the limit found.
Tested from 1 to 3 GHz.

Op. Mode	Setup	Port
op-mode 11	Setup_01	Enclosure

Polari-sation	Frequency MHz	Corrected value dBµV/m			Limit dBµV/m	Limit dBµV/m	Limit dBµV/m	Delta to limit dB	Delta to limit dB
		QP	Peak	AV	QP	Peak	AV	QP/Peak	AV
Vertical + horizontal	1120	-	43.66	34.12	-	74.00	54.00	30.34	19.88
Vertical + horizontal	1200	-	44.17	35.23	-	74.00	54.00	29.83	18.77
Vertical + horizontal	1333	-	44.92	35.57	-	74.00	54.00	29.08	18.43
Vertical + horizontal	1520	-	46.01	34.93	-	74.00	54.00	27.99	19.07
Vertical + horizontal	1667	-	45.58	34.93	-	74.00	54.00	28.42	19.07
Vertical + horizontal	2366	-	52.76	42.63	-	74.00	54.00	21.24	11.37
Vertical + horizontal	2484	-	66.42	48.70	-	74.00	54.00	7.58	5.30
Vertical + horizontal	4924	-	55.44	33.86	-	74.00	54.00	18.56	20.14

Remark: No (further) spurious emissions in the range 20 dB below the limit found.
Tested from 30 MHz to 25 GHz.

Op. Mode	Setup	Port
op-mode 17	Setup_01	Enclosure

Polari-sation	Frequency MHz	Corrected value dBµV/m			Limit dBµV/m	Limit dBµV/m	Limit dBµV/m	Delta to limit dB	Delta to limit dB
		QP	Peak	AV	QP	Peak	AV	QP/Peak	AV
Vertical + horizontal	2258	-	50.62	40.08	-	74.00	54.00	23.38	13.92
Vertical + horizontal	2320	-	51.86	42.28	-	74.00	54.00	22.14	11.72
Vertical + horizontal	2384	-	54.26	42.86	-	74.00	54.00	19.74	11.14
Vertical + horizontal	2484	-	64.96	50.42	-	74.00	54.00	9.04	3.58
Vertical + horizontal	4925	-	38.90	25.50	-	74.00	54.00	35.10	28.50
Vertical + horizontal	4960	-	52.40	35.49	-	74.00	54.00	21.60	18.51

Remark: No (further) spurious emissions in the range 20 dB below the limit found.
Tested from 2 to 10 GHz.

Op. Mode	Setup	Port
op-mode 20	Setup_01	Enclosure

Polari-sation	Frequency MHz	Corrected value dBµV/m			Limit dBµV/m	Limit dBµV/m	Limit dBµV/m	Delta to limit dB	Delta to limit dB
		QP	Peak	AV	QP	Peak	AV	QP/Peak	AV
Vertical + horizontal	2240	-	51.99	44.79	-	74.00	54.00	22.01	9.21
Vertical + horizontal	2320	-	43.40	22.05	-	74.00	54.00	22.05	10.60
Vertical + horizontal	2390	-	48.27	10.97	-	74.00	54.00	10.97	5.73
Vertical + horizontal	2484	-	42.20	18.09	-	74.00	54.00	18.09	11.80
Vertical + horizontal	4804	-	66.52	51.84	-	74.00	54.00	7.48	2.16

Remark: No (further) spurious emissions in the range 20 dB below the limit found.
Tested from 2 to 10 GHz.

Op. Mode	Setup	Port
op-mode 21	Setup_01	Enclosure

Polari-sation	Frequency MHz	Corrected value dBµV/m			Limit dBµV/m	Limit dBµV/m	Limit dBµV/m	Delta to limit dB	Delta to limit dB
		QP	Peak	AV	QP	Peak	AV	QP/Peak	AV
Vertical + horizontal	2240	-	52.12	44.71	-	74.00	54.00	21.88	9.29
Vertical + horizontal	2320	-	52.23	43.30	-	74.00	54.00	21.77	10.70
Vertical + horizontal	2390	-	62.90	47.85	-	74.00	54.00	11.10	6.15
Vertical + horizontal	2484	-	56.90	42.08	-	74.00	54.00	17.10	11.92
Vertical + horizontal	4882	-	59.27	38.60	-	74.00	54.00	14.73	15.40

Remark: No (further) spurious emissions in the range 20 dB below the limit found.
Tested from 2 to 10 GHz.

Op. Mode	Setup	Port
op-mode 23	Setup_01	Enclosure

Polari-sation	Frequency MHz	Corrected value dBµV/m			Limit dBµV/m	Limit dBµV/m	Limit dBµV/m	Delta to limit dB	Delta to limit dB
		QP	Peak	AV	QP	Peak	AV	QP/Peak	AV
Vertical + horizontal	-	-	-	-	-	74.00	54.00	-	-

Remark: No (further) spurious emissions in the range 20 dB below the limit found.
Tested from 30 MHz to 1 GHz.

Op. Mode	Setup	Port
op-mode 2	Setup_01	Enclosure

Polari-sation	Frequency MHz	Corrected value dBµV/m			Limit dBµV/m	Limit dBµV/m	Limit dBµV/m	Delta to limit dB	Delta to limit dB
		QP	Peak	AV	QP	Peak	AV	QP/Peak	AV
Vertical + horizontal	1200	-	45.31	35.37	-	74.00	54.00	28.69	18.63
Vertical + horizontal	1333	-	45.14	35.78	-	74.00	54.00	28.86	18.22
Vertical + horizontal	1625	-	46.86	39.30	-	74.00	54.00	27.14	14.70
Vertical + horizontal	2240	-	51.99	44.95	-	74.00	54.00	22.01	9.05
Vertical + horizontal	2320	-	52.48	43.79	-	74.00	54.00	21.52	10.21
Vertical + horizontal	2390	-	64.10	48.06	-	74.00	54.00	9.90	5.94
Vertical + horizontal	2484	-	58.66	44.37	-	74.00	54.00	15.34	9.63
Vertical + horizontal	4960	-	52.17	35.26	-	74.00	54.00	21.83	18.74

Remark: No (further) spurious emissions in the range 20 dB below the limit found.
Tested from 1 to 25 GHz.

4.1.5 Test result: Spurious radiated emissions

FCC Part 15, Subpart C	Op. Mode	Result
	op-mode 1	passed
	op-mode 2	passed
	op-mode 4	passed
	op-mode 5	passed
	op-mode 7	passed
	op-mode 8	passed
	op-mode 10	passed
	op-mode 11	passed
	op-mode 13	passed
	op-mode 14	passed
	op-mode 16	passed
	op-mode 17	passed
	op-mode 20	passed
	op-mode 21	passed
	op-mode 22	passed
	op-mode 23	passed

4.2 Band edge compliance

Standard FCC Part 15, 10-1-07
Subpart C

The test was performed according to: ANSI C 63.4, 2003

4.2.1 Test Description

The test set-up was made in accordance to the general provisions of ANSI C 63.4-2003. The Equipment Under Test (EUT) was placed inside FAC (fully anechoic chamber) to perform the measurements. The radiated emissions measurements were made in a typical installation configuration.

The measurement was carried out with a spectrum analyser, cable and horn antenna in a distance of 1 m using peak and average detector.

The measurement was preformed at the lowest and highest band edges of the used ISM bands:

- 2400.0 MHz
- 2483.5 MHz

4.2.2 Test Requirements / Limits

For the measurement at the band edges the limit is specified in §15.209.

Frequency in MHz	Limit (µV/m)	Measurement distance (m)	Limit(dBµV/m @10m)
0.009 – 0.49	2400/F(kHz)	300	Limit (dBµV/m)+30dB
0.49 – 1.705	24000/F(kHz)	30	Limit (dBµV/m)+10dB
1.705 - 30	30	30	Limit (dBµV/m)+10dB

Frequency in MHz	Limit (µV/m)	Measurement distance (m)	Limit (dBµV/m)
30 - 88	100	3	40.0
88 - 216	150	3	43.5
216 - 960	200	3	46.0
above 960	500	3	54.0

"In the emission table above, the tighter limit applies at the band edges."

FCC §15.35(b)
"..., there is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit. ..."

Used conversion factor: Limit (dBµV/m) = 20 log (Limit (µV/m)/1µV/m)

4.2.3 Test Protocol

Temperature: 22°C
Air Pressure: 1039 hPa
Humidity: 33 %

4.2.3.1 Lower band edge

Op. Mode	Setup	Port
op-mode 1	Setup_01	Enclosure

Frequency MHz	Measured value dBµV/m	Reference value dBµV/m	Limit dBµV/m	Delta to limit dB
2400.00	64.6	102,7	82.7	18.1

Remark: Please see annex for the measurement plot.

Op. Mode	Setup	Port
op-mode 2	Setup_01	Enclosure

Frequency MHz	Measured value dBµV/m	Reference value dBµV/m	Limit dBµV/m	Delta to limit dB
2400.00	70	102.6	62.6	12.6

Remark: Please see annex for the measurement plot.

Op. Mode	Setup	Port
op-mode 7	Setup_01	Enclosure

Frequency MHz	Measured value dBm	Reference value dBm	Limit dBm	Delta to limit dB
2400.00	56.6	101.9	81.9	25.3

Remark: Please see annex for the measurement plot.

Op. Mode	Setup	Port
op-mode 8	Setup_01	Enclosure

Frequency MHz	Measured value dBm	Reference value dBm	Limit dBm	Delta to limit dB
2400.00	69.7	103.1	83.1	13.4

Remark: Please see annex for the measurement plot.

4.2.3.2 Higher band edge

Temperature: 22°C
Air Pressure: 1039 hPa
Humidity: 33 %

Op. Mode	Setup	Port
op-mode 4	Setup_01	Enclosure

Frequency MHz	Polarisation	Corrected value dBµV/m		Limit Peak dBµV/m	Limit AV dBµV/m	Delta to Peak limit/dB	Delta to AV limit dB
		Peak	AV				
2483.50	Vertical + horizontal	49.4	37.5	74.00	54.00	24.6	16.5

Remark: Please see annex for the measurement plot.

Op. Mode	Setup	Port
op-mode 5	Setup_01	Enclosure

Frequency MHz	Polarisation	Corrected value dBµV/m		Limit Peak dBµV/m	Limit AV dBµV/m	Delta to Peak limit/dB	Delta to AV limit dB
		Peak	AV				
2483.50	Vertical + horizontal	68.2	48.8	74.00	54.00	5.8	5.2

Remark: Please see annex for the measurement plot.

Op. Mode	Setup	Port
op-mode 13	Setup_01	Enclosure

Frequency MHz	Polarisation	Corrected value dBµV/m		Limit Peak dBµV/m	Limit AV dBµV/m	Delta to Peak limit/dB	Delta to AV limit dB
		Peak	AV				
2483.50	Vertical + horizontal	59.0	43.2	74.00	54.00	15.0	10,8

Remark: Please see annex for the measurement plot.

Op. Mode	Setup	Port
op-mode 14	Setup_01	Enclosure

Frequency MHz	Polarisation	Corrected value dBµV/m		Limit Peak dBµV/m	Limit AV dBµV/m	Delta to Peak limit/dB	Delta to AV limit dB
		Peak	AV				
2483.50	Vertical + horizontal	58.8	43.1	74.00	54.00	15.2	10.9

Remark: Please see annex for the measurement plot.

Op. Mode	Setup	Port
op-mode 11	Setup_01	Enclosure

Frequency MHz	Polarisation	Corrected value dBµV/m		Limit Peak dBµV/m	Limit AV dBµV/m	Delta to Peak limit/dB	Delta to AV limit dB
		Peak	AV				
2483.50	Vertical + horizontal	66.0	48.7	74.00	54.00	8.0	5.3

Remark: Please see annex for the measurement plot.

Op. Mode	Setup	Port
op-mode 16	Setup_01	Enclosure

Frequency MHz	Polarisation	Corrected value dBµV/m		Limit Peak dBµV/m	Limit AV dBµV/m	Delta to Peak limit/dB	Delta to AV limit dB
		Peak	AV				
2483.50	Vertical + horizontal	48.5	37.2	74.00	54.00	25.5	16.8

Remark: Please see annex for the measurement plot.

Op. Mode	Setup	Port
op-mode 17	Setup_01	Enclosure

Frequency MHz	Polarisation	Corrected value dBµV/m		Limit Peak dBµV/m	Limit AV dBµV/m	Delta to Peak limit/dB	Delta to AV limit dB
		Peak	AV				
2483.50	Vertical + horizontal	65.0	50.5	74.00	54.00	9	3.5

Remark: Please see annex for the measurement plot.

4.2.4 Test result: Band edge compliance

FCC Part 15, Subpart C	Op. Mode	Result
	op-mode 1	passed
	op-mode 2	passed
	op-mode 4	passed
	op-mode 5	passed
	op-mode 7	passed
	op-mode 8	passed
	op-mode 11	passed
	op-mode 13	passed
	op-mode 14	passed
	op-mode 16	passed
	op-mode 17	passed

5 Test Equipment

EUT Digital Signalling System

Equipment	Type	Serial No.	Manufacturer
Digital Radio Communication Tester	CMD 55	831050/020	Rohde & Schwarz
Signalling Unit for Bluetooth Spurious Emissions	PTW60	100004	Rohde & Schwarz
Universal Radio Communication Tester	CMU 200	102366	Rohde & Schwarz

EMI Test System

Equipment	Type	Serial No.	Manufacturer
Comparison Noise Emitter	CNE III	99/016	York
EMI Analyzer	ESI 26	830482/004	Rohde & Schwarz
Signal Generator	SMR 20	846834/008	Rohde & Schwarz

EMI Radiated Auxiliary Equipment

Equipment	Type	Serial No.	Manufacturer
Antenna mast 4m	MA 240	240/492	HD GmbH H. Deisel
Biconical dipole	VUBA 9117	9117108	Schwarzbeck
Broadband Amplifier 18MHz-26GHz	JS4-18002600-32	849785	Miteq
Broadband Amplifier 30MHz-18GHz	JS4-00101800-35	896037	Miteq
Broadband Amplifier 45MHz-27GHz	JS4-00102600-42	619368	Miteq
Cable "ESI to EMI Antenna"	EcoFlex10	W18.01-2 + W38.01-2	Kabel Kusch
Cable "ESI to Horn Antenna"	UFB311A + UFB293C	W18.02-2 + W38.02-2	Rosenberger-Microcoax
Double-ridged horn	HF 906	357357/002	Rohde & Schwarz
Double-ridged horn	HF 906	357357/001	Rohde & Schwarz
High Pass Filter	5HC3500/12750-1.2-KK	200035008	Trilithic
High Pass Filter	5HC2700/12750-1.5-KK	9942012	Trilithic
High Pass Filter	4HC1600/12750-1.5-KK	9942011	Trilithic
KUEP pre amplifier	Kuep 00304000	001	7layers
Log.-per. Antenna	HL 562 Ultralog	830547/003	Rohde & Schwarz
Loop Antenna	HFH2-Z2	829324/006	Rohde & Schwarz
Pyramidal Horn Antenna 26.5 GHz	Model 3160-09	9910-1184	EMCO

EMI Conducted Auxiliary Equipment

Equipment	Type	Serial No.	Manufacturer
Cable "LISN to ESI"	RG214	W18.03+W48.03	Huber+Suhner
Two-Line V-Network	ESH 3-Z5	828304/029	Rohde & Schwarz
Two-Line V-Network	ESH 3-Z5	829996/002	Rohde & Schwarz

Auxiliary Test Equipment

Equipment	Type	Serial No.	Manufacturer
Broadband Resist. Power Divider N	1506A / 93459	LM390	Weinschel
Broadband Resist. Power Divider SMA	1515 / 93459	LN673	Weinschel
Digital Multimeter 01	Voltcraft M-3860M	IJ096055	Conrad
Digital Multimeter 02	Voltcraft M-3860M	IJ095955	Conrad
Digital Oscilloscope	TDS 784C	B021311	Tektronix
Fibre optic link Satellite	FO RS232 Link	181-018	Pontis
Fibre optic link Transceiver	FO RS232 Link	182-018	Pontis
I/Q Modulation Generator	AMIQ-B1	832085/018	Rohde & Schwarz
Notch Filter ultra stable	WRCA800/960-6E	24	Wainwright
Spectrum Analyzer 9 kHz to 3 GHz	FSP3	838164/004	Rohde & Schwarz
Temperature Chamber	VT 4002	58566002150010	Vötsch
Temperature Chamber	KWP 120/70	59226012190010	Weiss
ThermoHygro Datalogger 03	Opus10 THI (8152.00)	7482	Lufft Mess- und Regeltechnik GmbH

Anechoic Chamber

Equipment	Type	Serial No.	Manufacturer
Air Compressor (pneumatic)			Atlas Copco
Controller	CO 2000	CO2000/328/12470406 /L	Innco innovative constructions GmbH
EMC Camera	CE-CAM/1		CE-SYS
EMC Camera for observation of EUT	CCD-400E	0005033	Mitsubishi
Filter ISDN	B84312-C110-E1		Siemens&Matsushita
Filter telephone systems / modem	B84312-C40-B1		Siemens&Matsushita
Filter Universal 1A	B84312-C30-H3		Siemens&Matsushita
Fully/Semi AE Chamber	10.58x6.38x6		Frankonia
Turntable	DS 420S	420/573/99	HD GmbH, H. Deisel
Valve Control Unit (pneum.)	VE 615P	615/348/99	HD GmbH, H. Deisel

Equipment	Type	Serial No.	Manufacturer
10 MHz Reference	MFS	5489/001	Efratom
Power Meter 832025/059	NRVD	832025/059	Rohde & Schwarz
Power Sensor A 832279/013	NRV-Z1	832279/013	Rohde & Schwarz
Power Sensor B 832279/015	NRV-Z1	832279/015	Rohde & Schwarz
Power Supply	E3632A	MY40003776	Agilent
Power Supply	PS-2403D	-	Conrad
RF Step Attenuator 833695/001	RSP	833695/001	Rohde & Schwarz
Rubidium Frequency Normal	MFS	002	Efratom
Signal Analyzer FSIQ26 832695/007	FSIQ26	832695/007	Rohde & Schwarz
Signal Generator 833680/003	SMP 03	833680/003	Rohde & Schwarz
Signal Generator A 834344/002	SMIQ03B	834344/002	Rohde & Schwarz
Signal Generator B 832870/017	SMIQ03B	832870/017	Rohde & Schwarz
Signal Switching and Conditioning Unit	SSCU	338826/005	Rohde & Schwarz
Signalling Unit PTW60 838312/014	PTW60 for TS8960	838312/014	Rohde & Schwarz
System Controller 829323/008	PSM12	829323/008	Rohde & Schwarz

6 Photo Report

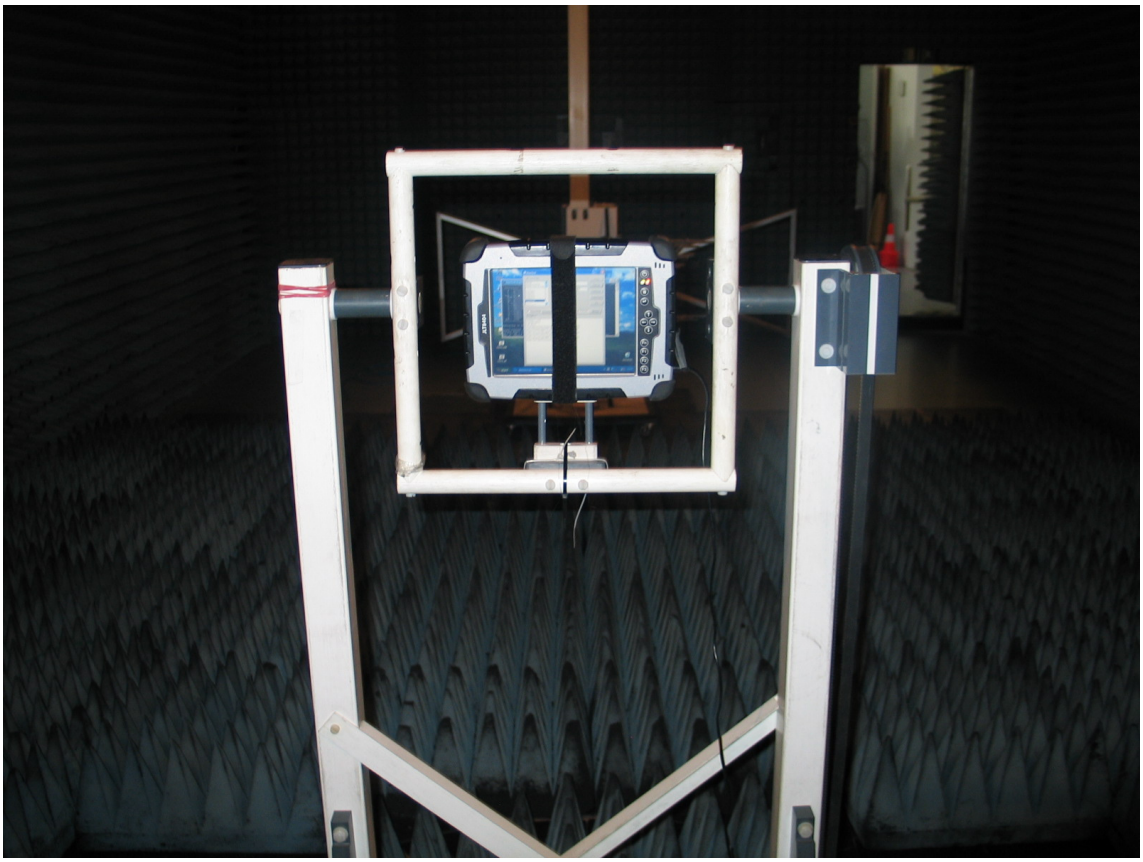


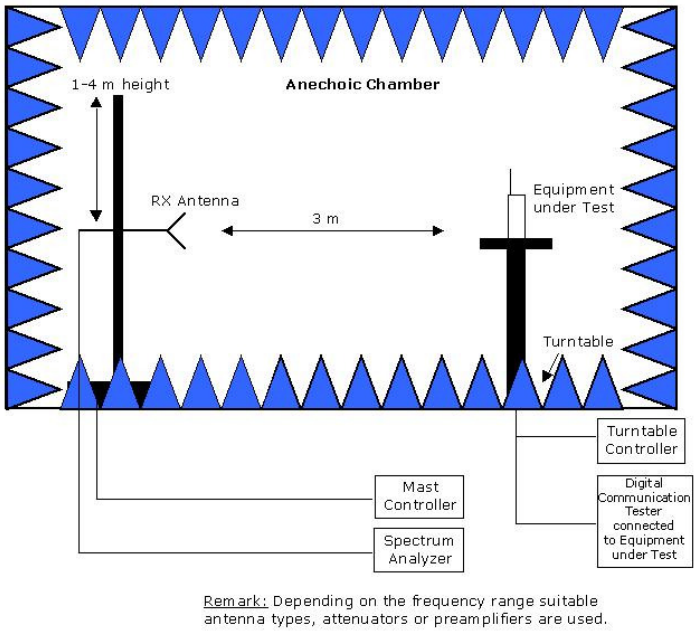
Photo 1: Test setup for radiated measurements above 1GHz

Photo 2: Test setup for radiated measurements below 1GHz

Photo 3: EUT (front side)

Photo 4: EUT (rear side)

7 Setup Drawings



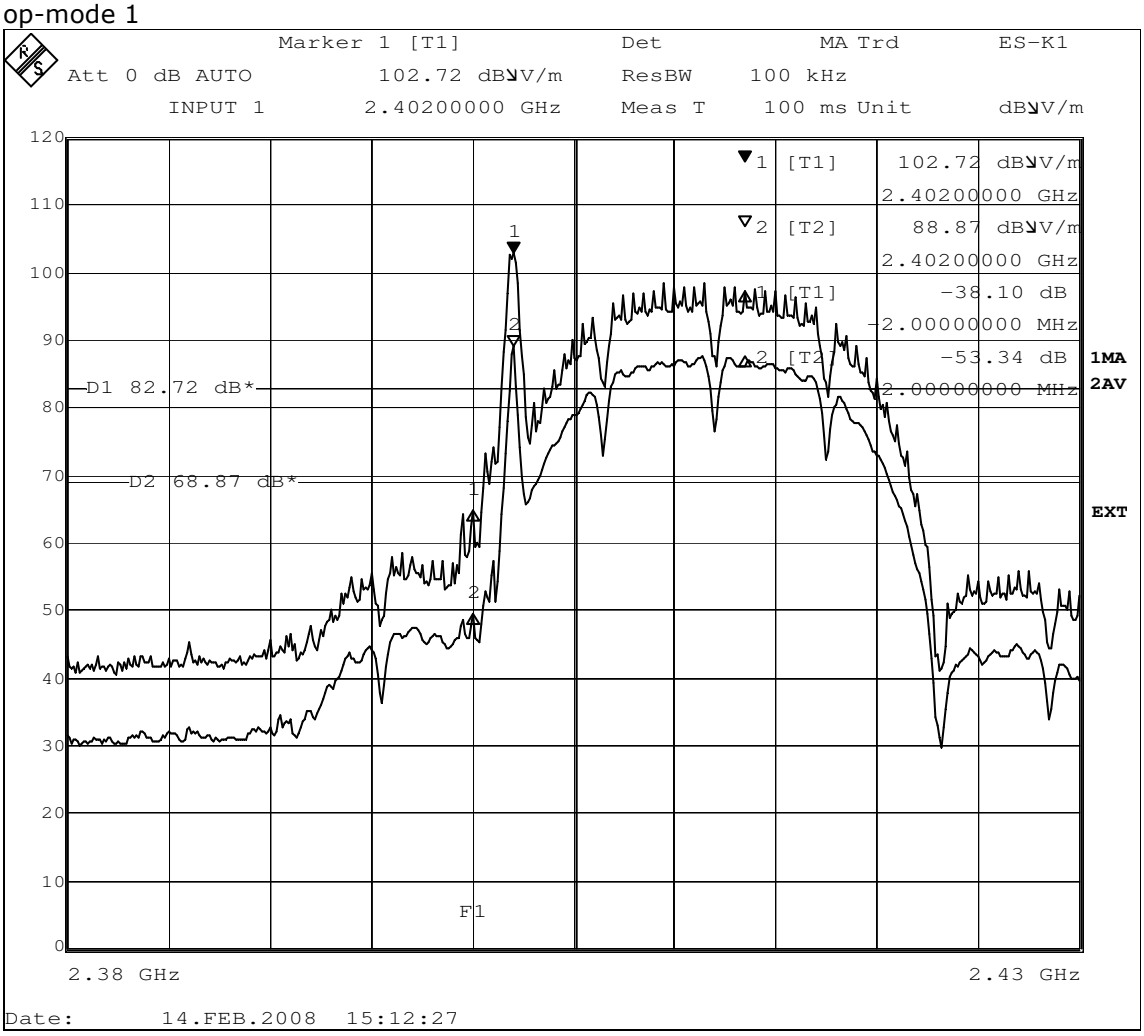
Drawing 1: Setup in the Anechoic chamber. For measurements below 1 GHz the ground was replaced by a conducting ground plane.

8 Annex measurement plots

8.1 Band edge compliance

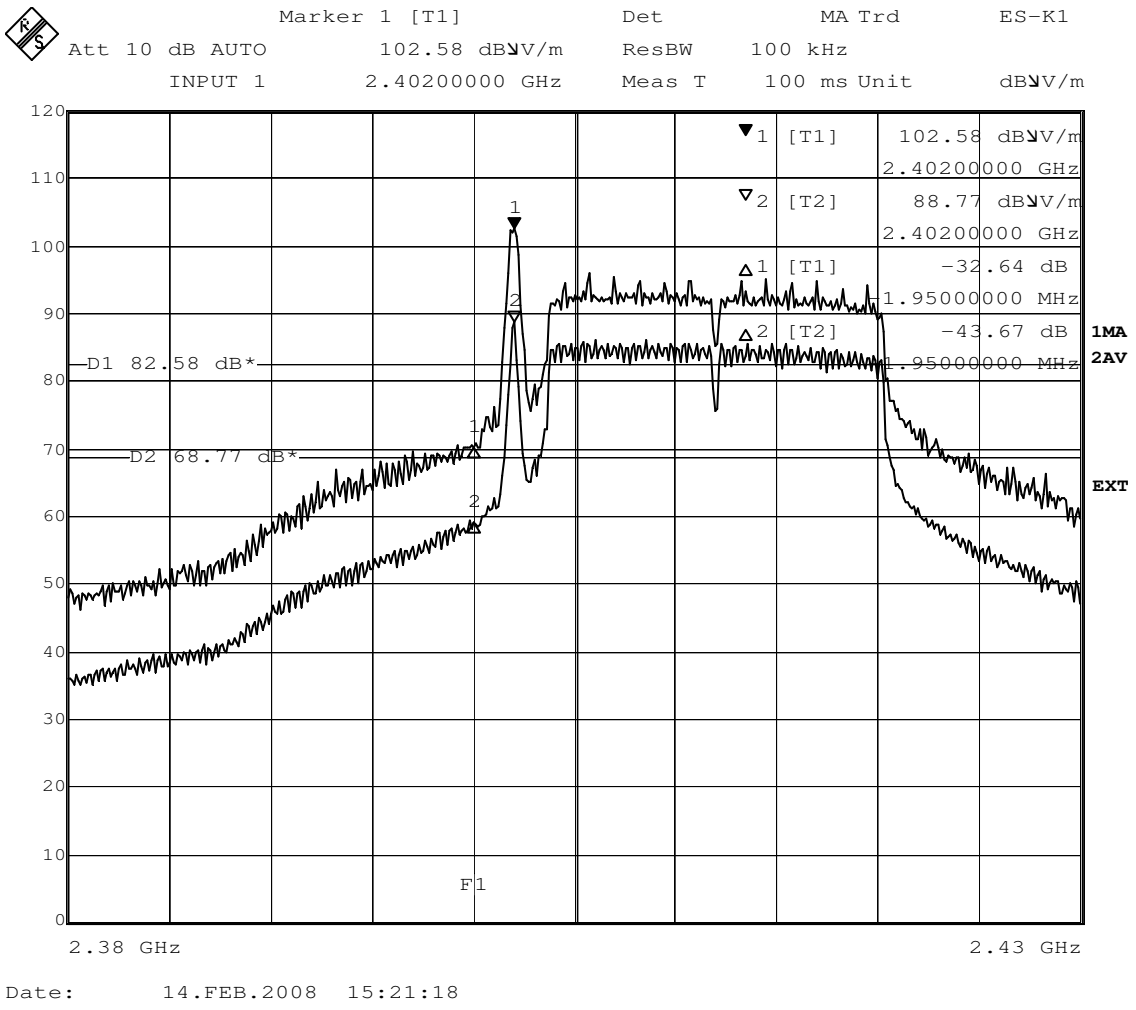
8.1.1 Lower band edge

op-mode 1



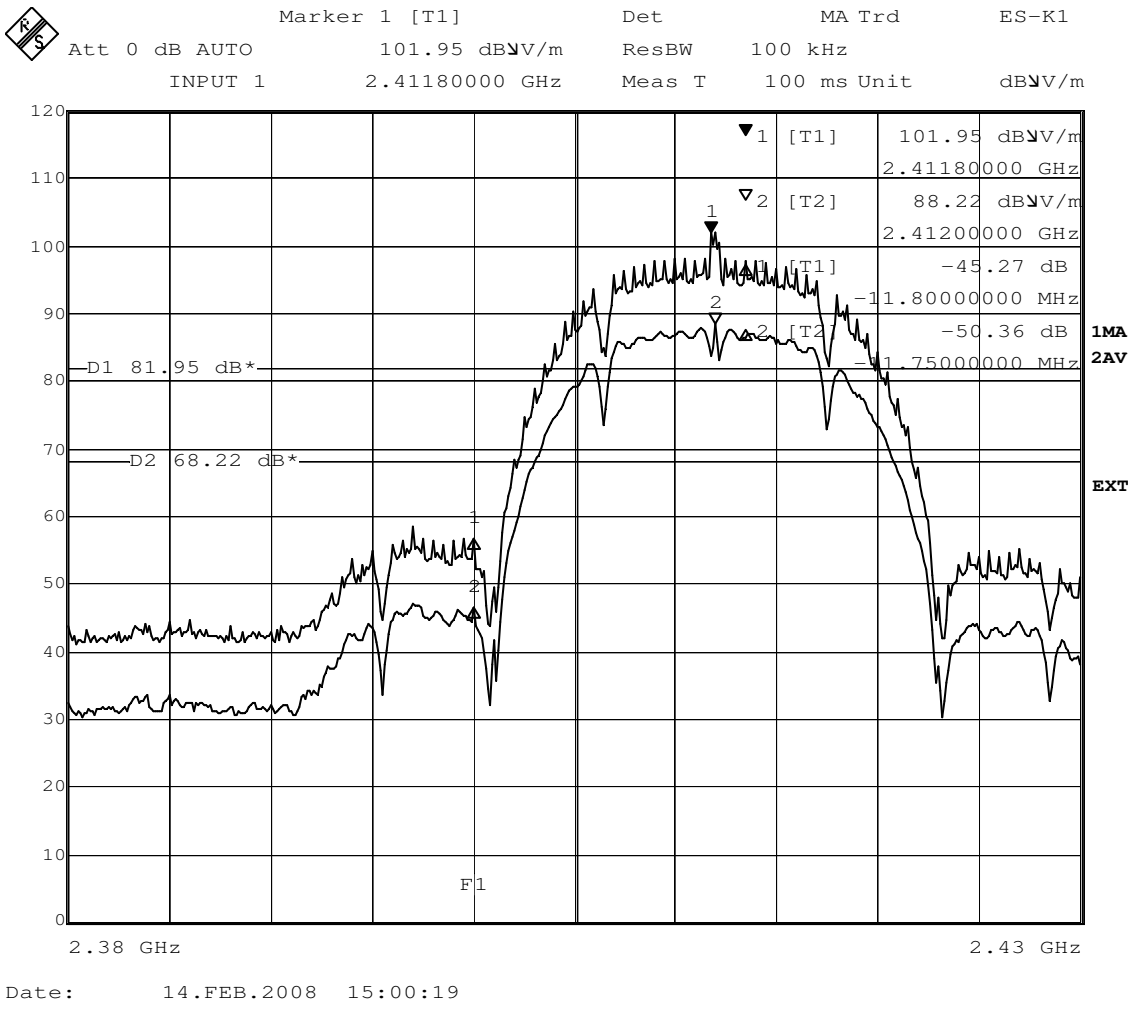
Op. Mode

op-mode 2



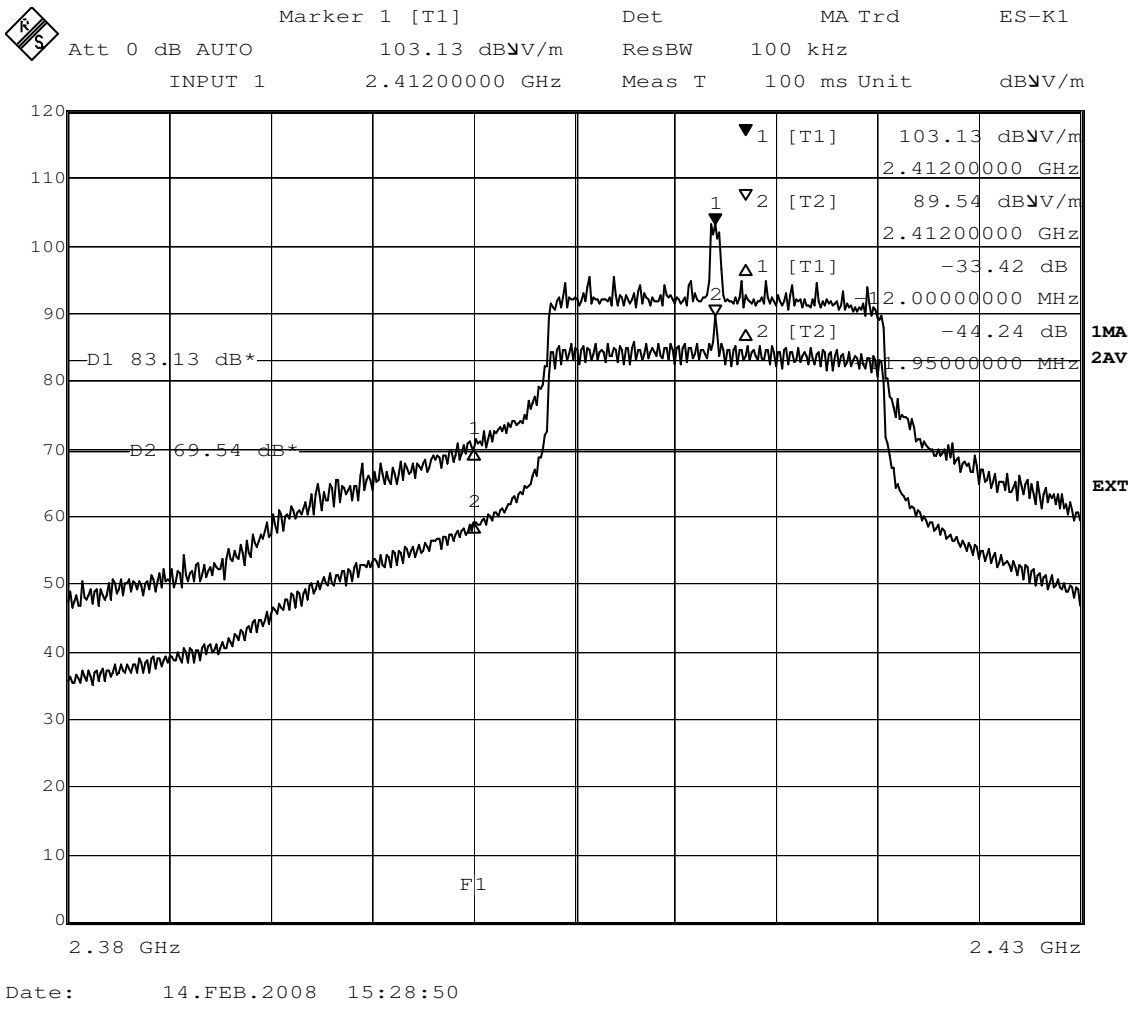
Op. Mode

op-mode 7



Op. Mode

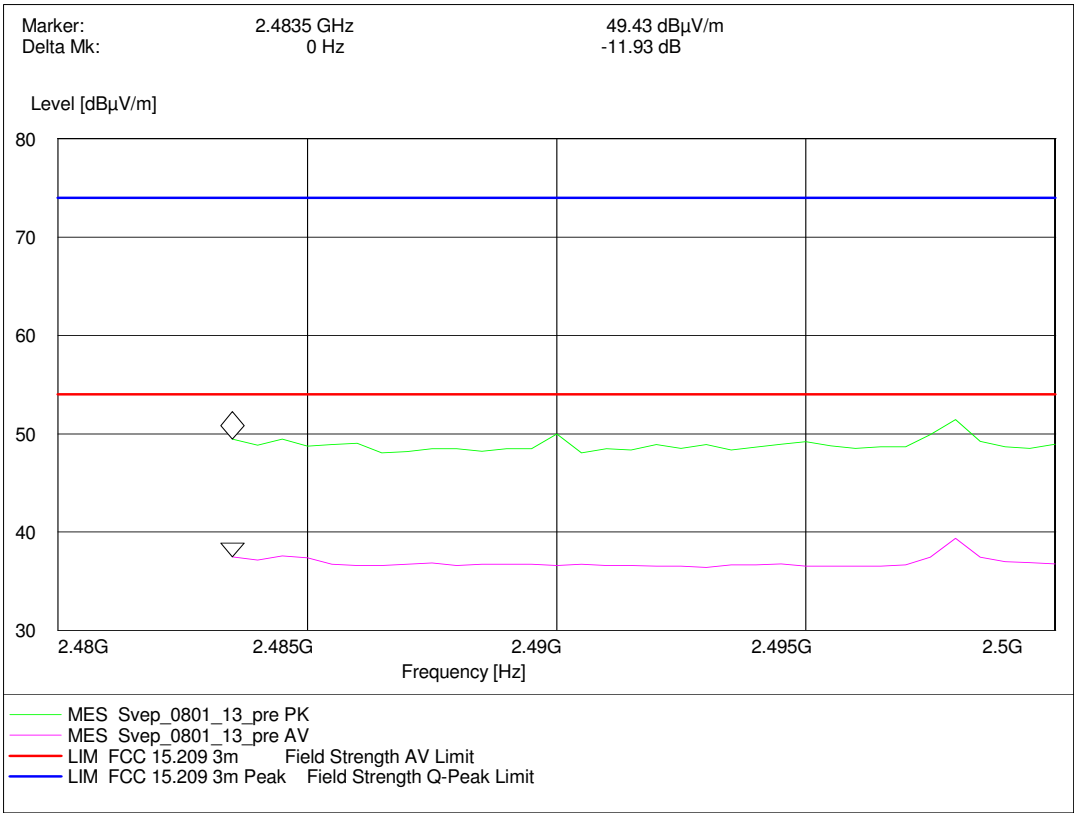
op-mode 8



8.1.2 Upper band edge

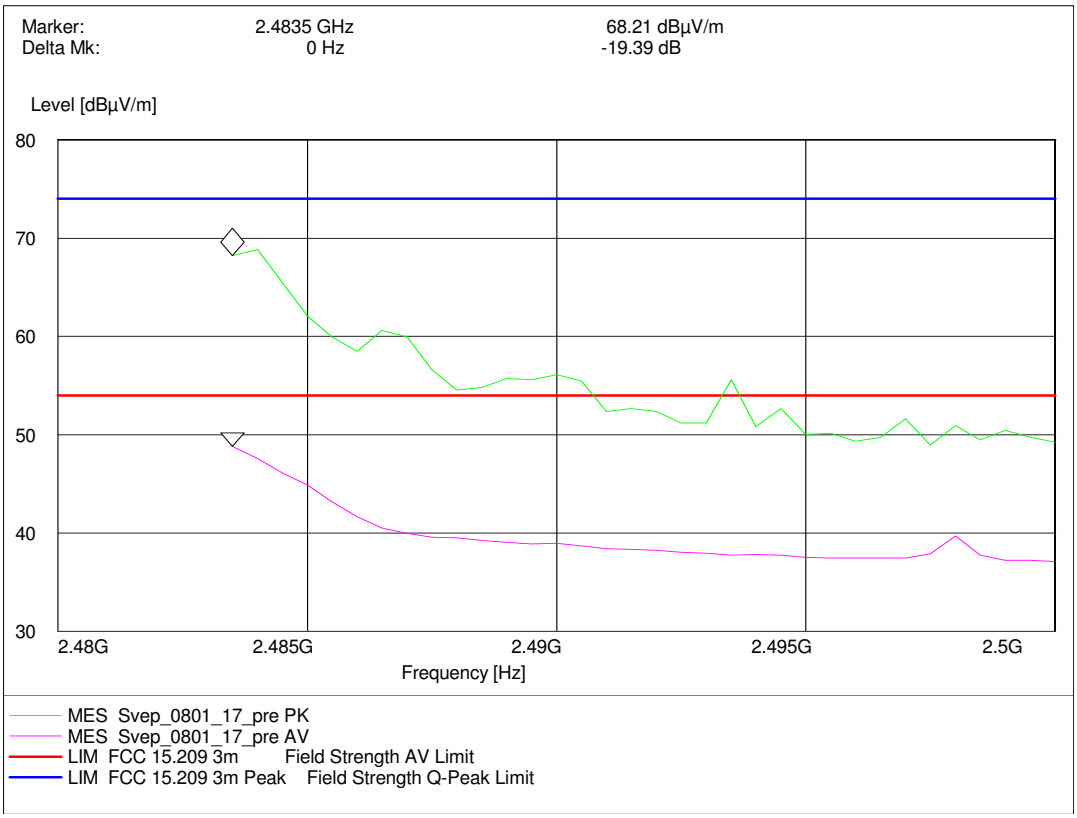
Op. Mode

op-mode 4



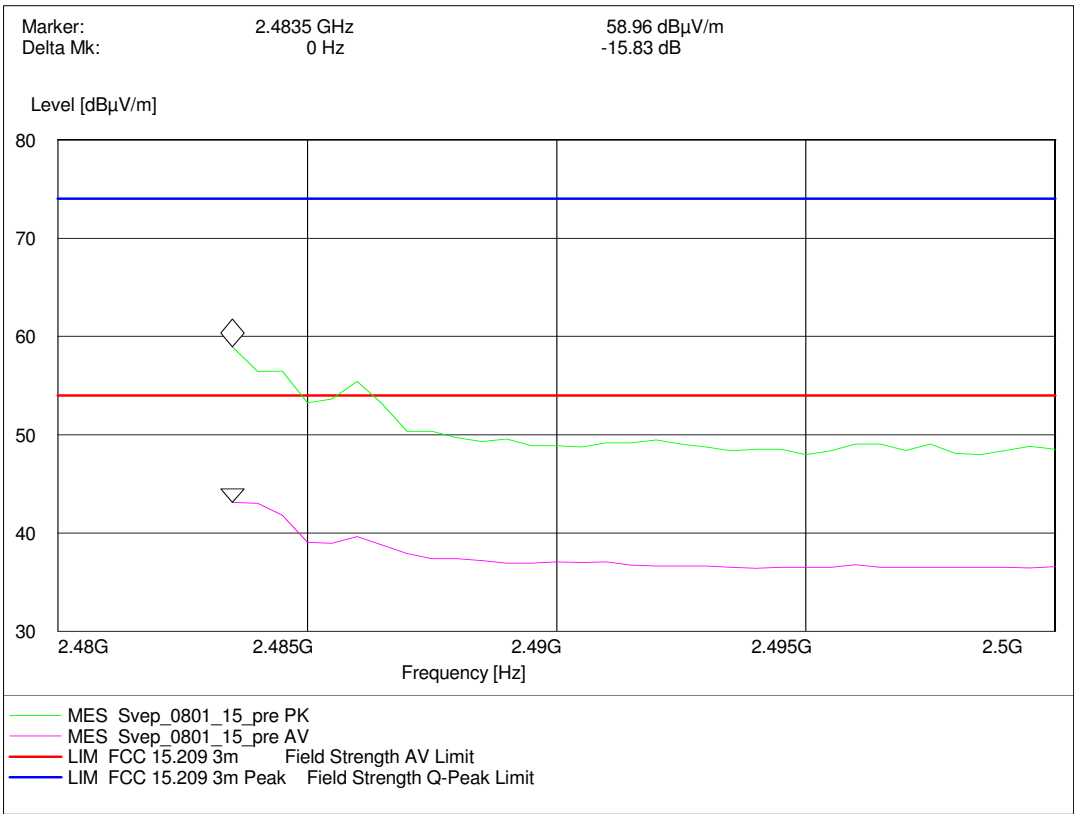
Op. Mode

op-mode 5



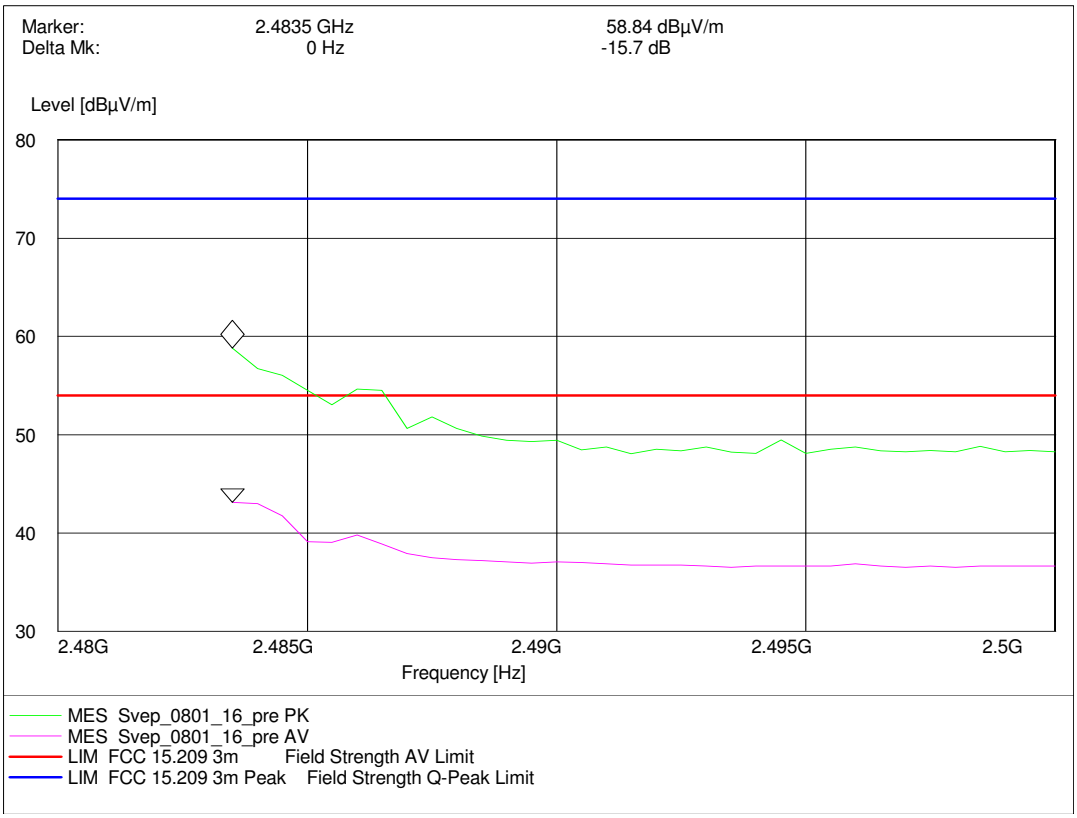
Op. Mode

op-mode 13



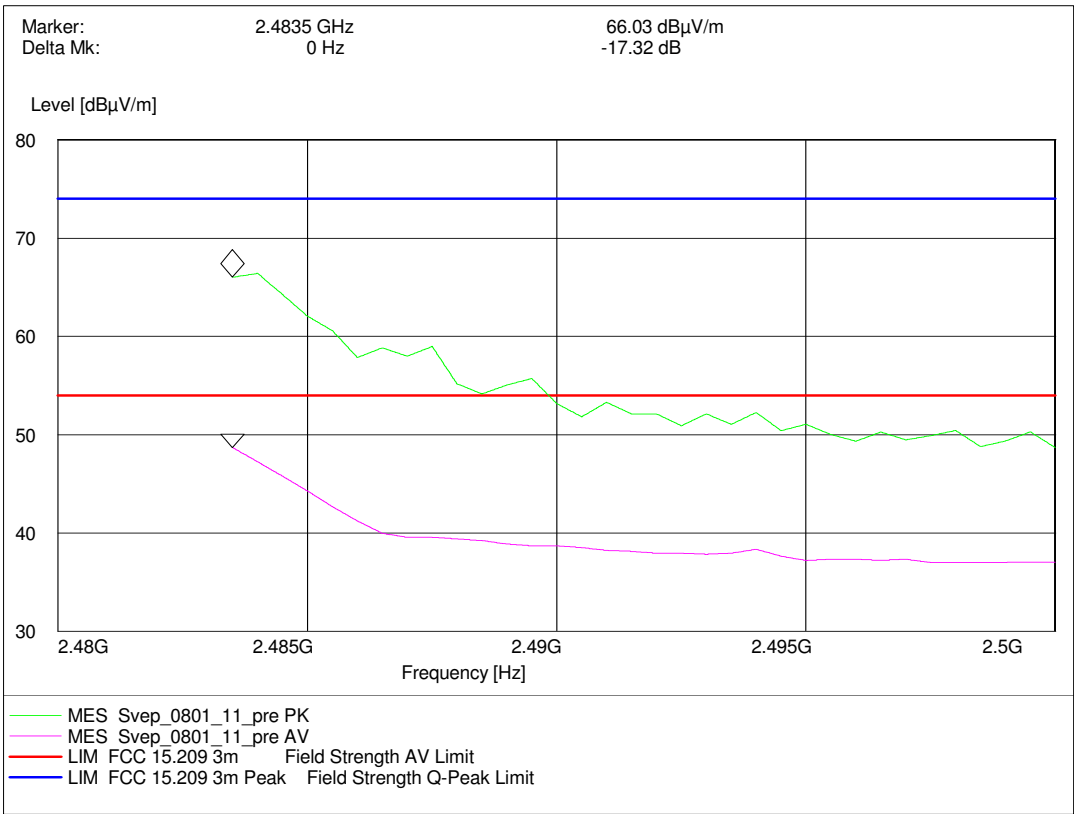
Op. Mode

op-mode 14



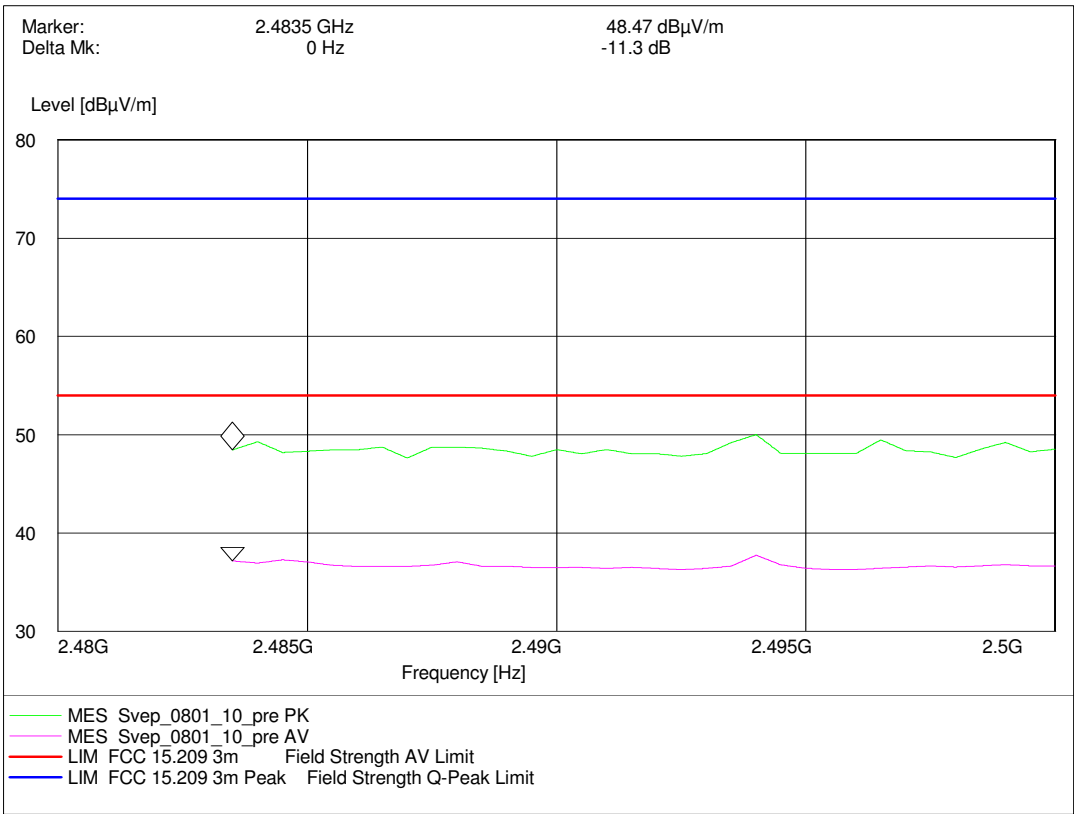
Op. Mode

op-mode 11



Op. Mode

op-mode 16



Op. Mode

op-mode 17