

# Test Report

<b>Product</b>	Sonitor Sense Tags
<b>Name and address of the applicant</b>	Sonitor Technologies AS Drammensveien 288, 0283 Oslo, Norway
<b>Name and address of the manufacturer</b>	Sonitor Technologies AS Drammensveien 288, 0283 Oslo, Norway
<b>Model</b>	Tag-J131
<b>Rating</b>	Primary Li-MnO <sub>2</sub> , 3V thin cell battery
<b>Trademark</b>	Sonitor Technologies
<b>Serial number</b>	Tag-J131:00096206d099
<b>Additional information</b>	This test report covers only wi-fi spurious emissions with PCB antenna. All tags contain's 125 kHz low frequency class 3 receiver and module approved 2.4GHz wifi. The tags do not have 125 kHz transmitter.
<b>Tested according to</b>	<b>FCC Part 15.247</b> Frequency Hopping Transmitters / Digital Transmission Systems <b>Industry Canada RSS-247, Issue 1</b> Low Power Licence-Exempt Radiocommunications Devices
<b>Order number</b>	303241
<b>Tested in period</b>	2016.02.04 - 2016.02.10
<b>Issue date</b>	2016.03.02
<b>Name and address of the testing laboratory</b>	 <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div> FCC No: 994405 IC OATS: 2040D-1   Instituttveien 6 Kjeller, Norway </div> <div> TEL: (+47) 22 96 03 30 FAX: (+47) 22 96 05 50 </div> </div>
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Template version: B

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# 1 INFORMATION

## 1.1 Test Item

<b>Name :</b>	Sonitor Sense tags
<b>FCC ID :</b>	2AD7T11115110401
<b>Industry Canada ID :</b>	20330-11115110401
<b>Model/version :</b>	Tag-J131
<b>Serial number :</b>	00096206d099
<b>Hardware identity and/or version:</b>	V0.5.0
<b>Software identity and/or version :</b>	-
<b>Frequency Range :</b>	2412 - 2462 MHz
<b>Number of Channels :</b>	11
<b>Operating Modes :</b>	IEEE 802.11g
<b>Type of Modulation :</b>	OFDM
<b>User Frequency Adjustment :</b>	None
<b>Output Power :</b>	0.0074W (Conducted)
<b>Type of Power Supply :</b>	3.0Vdc , Battery
<b>Number of Antennas :</b>	1
<b>Antenna Type :</b>	Johanson Technology, Part number 2450AT42A100
<b>Antenna Gain (Peak) :</b>	0 dBi

### Description of Test Item

Sonitor Sense tags are used in the Sonitor's real time locating system to track persons or objects carrying the tag. All models in Tag-J family are mainly used as patient tags. The basic variant Tag-J120 is attached to the standard hospital ID wristband and the tamper model Tag-J131 comes with its own electrically conductive wristband. If the conductive wristband is forcefully removed, it will be detected by the infrastructure. The tamper wristband used in EMC testing is not the final version, but the electrical properties of it are the same as they will be in the final version.

### Theory of Operation

The tags listen to ultrasound transmissions from the infrastructure units called Location Transmitter. The tag decodes the ultrasound location information sent by the Location Transmitter and sends the information about its location to the infrastructure using wifi multicast messages on channels 1, 6 and 11. The wifi radio can be also used to send information from the infrastructure to the tags, for example firmware updates.

The tags have 125 kHz wake-up receiver and two transponder inductors for the reception of the 125 kHz low frequency signal transmitted by the Location Transmitter. When tag detects low frequency, it sends wifi multicast messages on channels 1, 6 and 11 to the infrastructure. Based on the use case, different things can happen when the infrastructure receives this information. Typically, low frequency functionality is used to create choke points or monitor doors.

## **1.2 Test Environment**

### **1.2.1 Normal test condition**

Temperature: 20 - 23 °C

Relative humidity: 20 - 47 %

Normal test voltage: 3.0Vdc

The values are the limit registered during the test period.

## **1.3 Test Engineer(s)**

G.Suwanthakumar

## **1.4 Test Equipment**

See list of test equipment in clause 5.

## 2 TEST REPORT SUMMARY

### 2.1 General

All measurements are traceable to national standards.

The tests were conducted for the purpose of demonstrating compliance with FCC CFR 47 Part 15, paragraph 15.247 and Industry Canada RSS-247 Issue 1.

Tests were performed in accordance with ANSI C63.4-2014 and ANSI C63.10-2013.

Radiated tests were made in a semi-anechoic chamber at measuring distances of 1m, 3m and 10m.

A description of the test facility is on file with the FCC and Industry Canada.

☒ New Submission

☒ Production Unit

☐ Class II Permissive Change

☐ Pre-production Unit

**DTS** Equipment Code

☐ Family Listing



#### THIS TEST REPORT APPLIES ONLY TO THE ITEM(S) AND CONFIGURATIONS TESTED.

Deviations from, additions to, or exclusions from the test specifications are described in "Summary of Test Data".

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## 2.2 Test Summary

Name of test	FCC Part 15 reference	RSS-247 Issue 1, RSS-GEN Issue 4 reference	Result
Supply Voltage Variations	15.31(e)	6.11 (RSS-GEN)	N/A <sup>1</sup>
Antenna Requirement	15.203	8.3 (RSS-GEN)	N/A <sup>2</sup>
Power Line Conducted Emission	15.107(a) 15.207(a)	8.8 (RSS-GEN)	N/A <sup>1</sup>
20 dB Bandwidth	N/A	6.6 (RSS-GEN)	
Peak Power Output	15.247(b)	5.4 (RSS-247)	Complies
Spurious Emissions (Antenna Conducted)	15.247(c)	5.5 (RSS-247)	Complies
Spurious Emissions (Radiated)	15.247(c) 15.109(a) 15.209(a)	5.5 (RSS-247) 6.13 (RSS-GEN) 8.9 (RSS-GEN)	Complies

<sup>1</sup> Fully charged battery is used

<sup>2</sup> Integral antenna

## 2.3 Description of modification for Modification Filing

Not applicable.

## 2.4 Comments

Fully charged battery is used.

## 2.5 Family List Rational

The following model variations are considered covered by this report

VA no.	Variant	Comment	Investigated
1	Tag-J131	See explanation below	Yes
2	Tag-J120	See explanation below	no

Note: Items that are shaded have been subject to testing documented in this report. Opinions expressed regarding application of test results to variant models are not part of our current accreditation.

Firmware version: v0.5.0

S/N: 0009269a43c

## 2.6 EUT description, Tag-J131 with tamper band

Since Tag-J120 and Tag-J131 are identical excluding the tamper function that is only enabled in model Tag-J131.

Name	Ultrasound receiver	125kHz low frequency receiver	WiFi	Tamper detection wrist band
Tag-J131	X	X	X	X
Tag-J120	X	X	X	

### 3 TEST RESULTS

#### 3.1 Power Line Conducted Emissions

Para. No.: 15.207 (a)

Test Performed By: -	Date of Test: -
----------------------	-----------------

Measurement procedure: ANSI C63.4-2014 using 50  $\mu$ H/50 ohms LISN.

Test Results: N/A

Measurement Data:



### 3.2 Minimum 20 dB Bandwidth

Para. No.: 15.247 (a)(2)

Test Performed By: G.Suwanthakumar

Date of Test: 2016.02.10

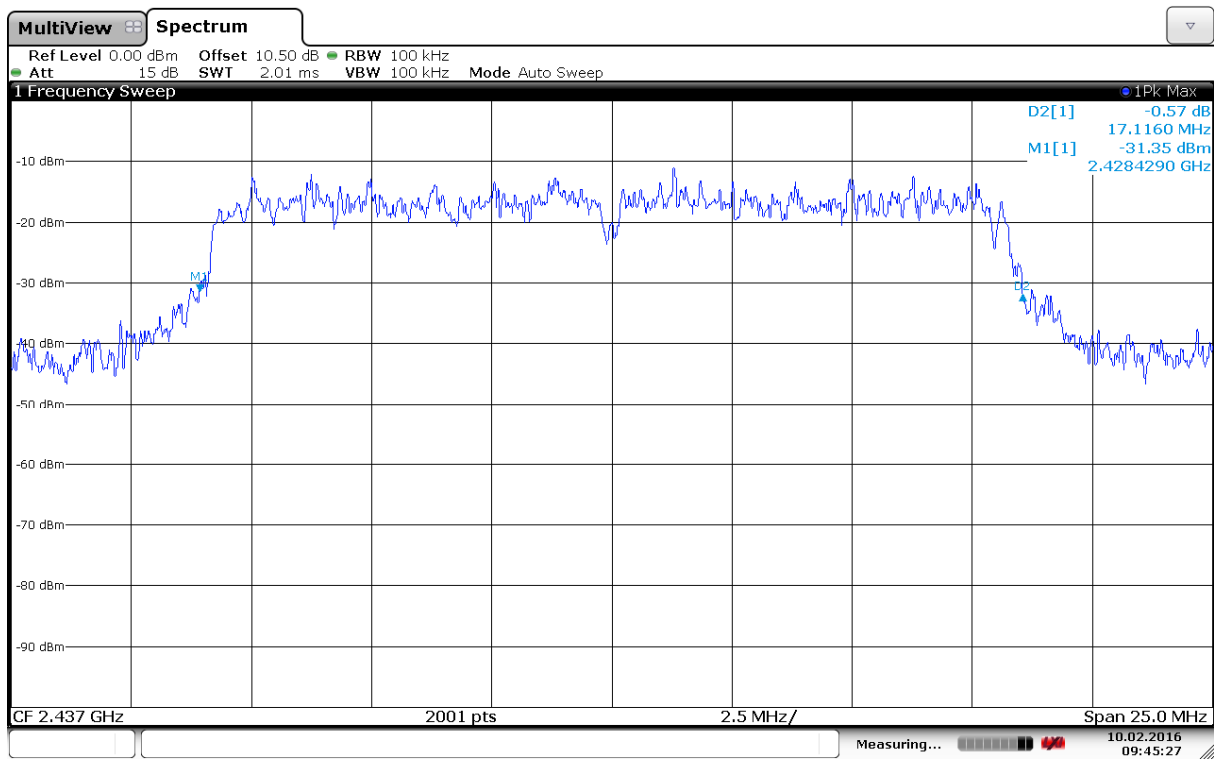
Test Results: Complies

Measurement Data:

Measured 20 dB Bandwidth (MHz)		
-	2427 MHz, Ch 6	-
-	17.1	-

**Requirements:**

No requirements, just for information.



Date: 10.FEB.2016 09:45:27

**20 dB BW, 2437MHz**

### 3.3 Peak Power Output

Para. No.: 15.247 (b)

Test Results: Complies

#### Measurement Data:

	2412 MHz	2437 MHz	2462 MHz
Conducted Power (dBm)	8.10	7.57	8.89
Conducted Power (Watts)	0.0065	0.0057	0.0074

#### See attached graph.

Detachable antenna?

☐ Yes ☒ No

If detachable, is the antenna connector non-standard?

☐ Yes ☐ No

Type of antenna connector: N/A

#### Requirements:

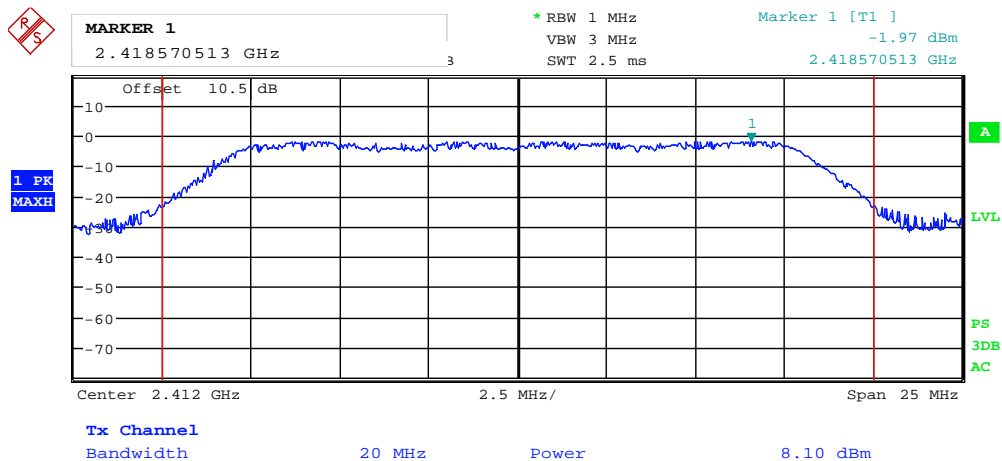
The maximum peak output power shall not exceed the following limits:

For frequency hopping systems employing at least 75 hopping channels: 1 Watt

For all other frequency hopping systems in the 2400 - 2483.5 MHz band: 0.125 Watts

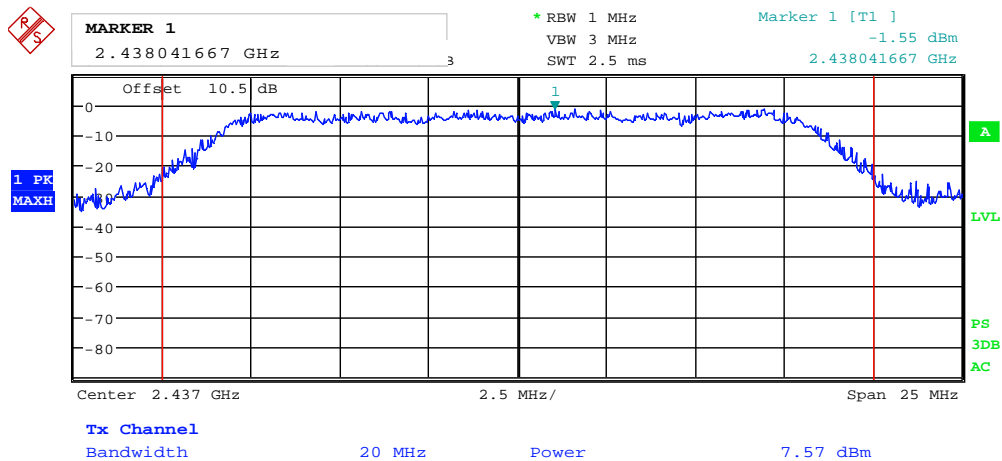
For Digital Transmission Systems in the 2400 - 2483.5 MHz band: 1 Watt

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power from the intentional radiator shall be reduced below the stated value above by the amount in dB that the directional gain of the antenna exceeds 6 dBi.



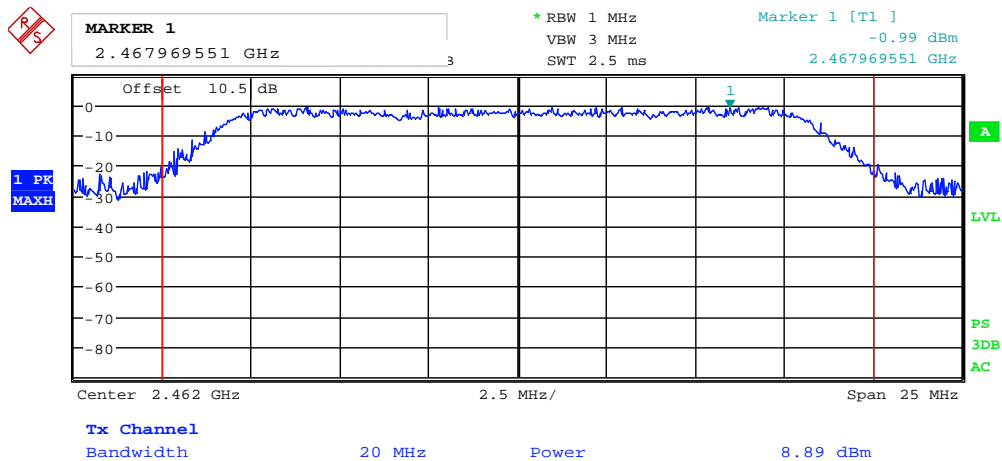
Date: 4.FEB.2016 08:49:27

**Conducted Power, 2412MHz , ch01**



Date: 4.FEB.2016 09:16:57

### Conducted Power, 2437MHz, ch06



Date: 4.FEB.2016 09:22:14

**Conducted Power, 2462MHz, ch11**

### 3.4 Spurious Emissions (Radiated)

Para. No.: 15.247 (c)

Test Results: Complies

#### Measurement Data:

##### Band-edge conducted power

	Measured field strength (dBμV/m)		Limit	Margin	
	2390 MHz	2483.5 MHz	dBμV/m	dB	
Peak Detector	60.88	63.69	74	13.12	10.31
Average Detector	-	43.69	54	-	10.31

Average Detector values are measured with Peak Detector and corrected for Duty Cycle.

See attached plots.

#### Measured :

##### Duty Cycle Correction Factor Calculation:

Duty Cycle =  $123.19\mu\text{s} / (123.19\mu\text{s} + 5.076\text{ms})$

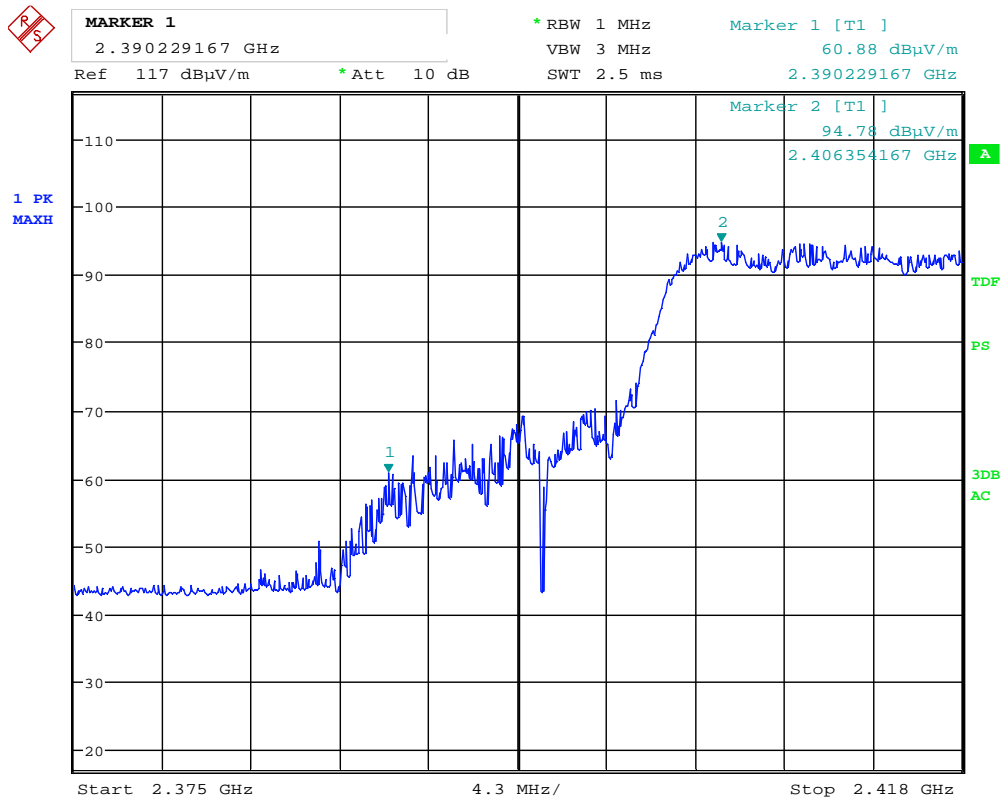
Duty Cycle Correction factor =  $-20 \times \log(0.0237) = 32.5 \text{ dB}$

Declared duty cycle by the manufacturer:

0.14% in normal use

Duty Cycle Correction factor =  $-20 \times \log(0.014) = 37.1 \text{ dB}$

**Maximum Duty Cycle Correction Factor according to Para 15.35 (b): 20 dB**



Date: 4.FEB.2016 13:28:26

**Lower Band Edge, Ch01, 2412MHz, PK**



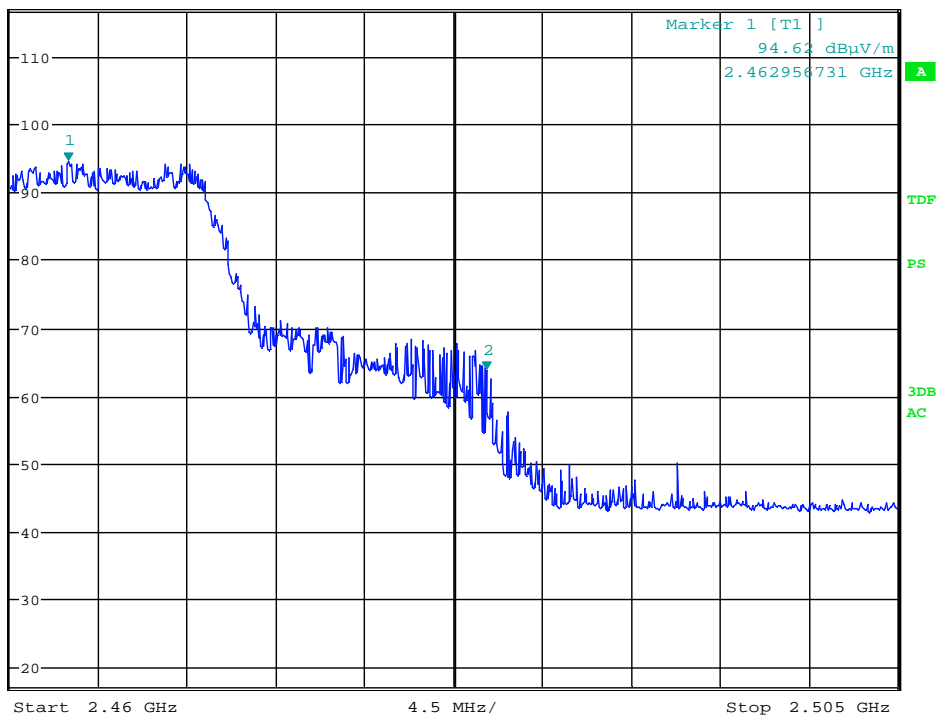


**MARKER 2**  
2.484149038 GHz  
Ref 117 dBμV/m \*Att 10 dB

\*RBW 1 MHz  
VBW 3 MHz  
SWT 2.5 ms

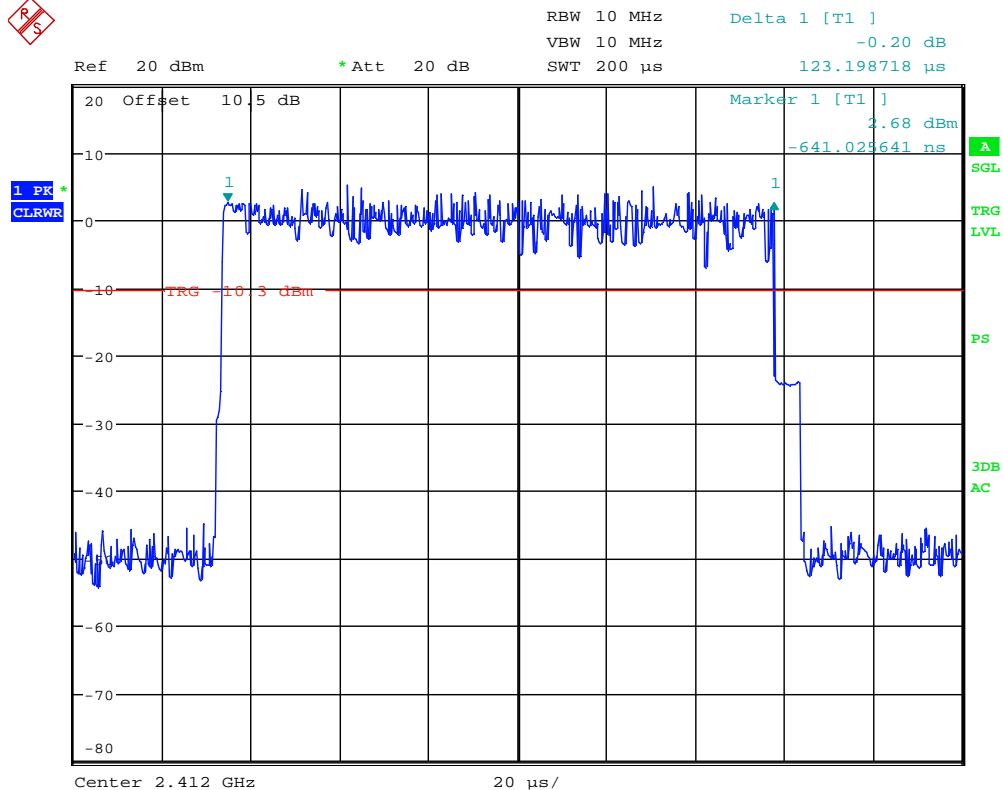
Marker 2 [T1 ]  
63.69 dBμV/m  
2.484149038 GHz

1 PK  
MAXH



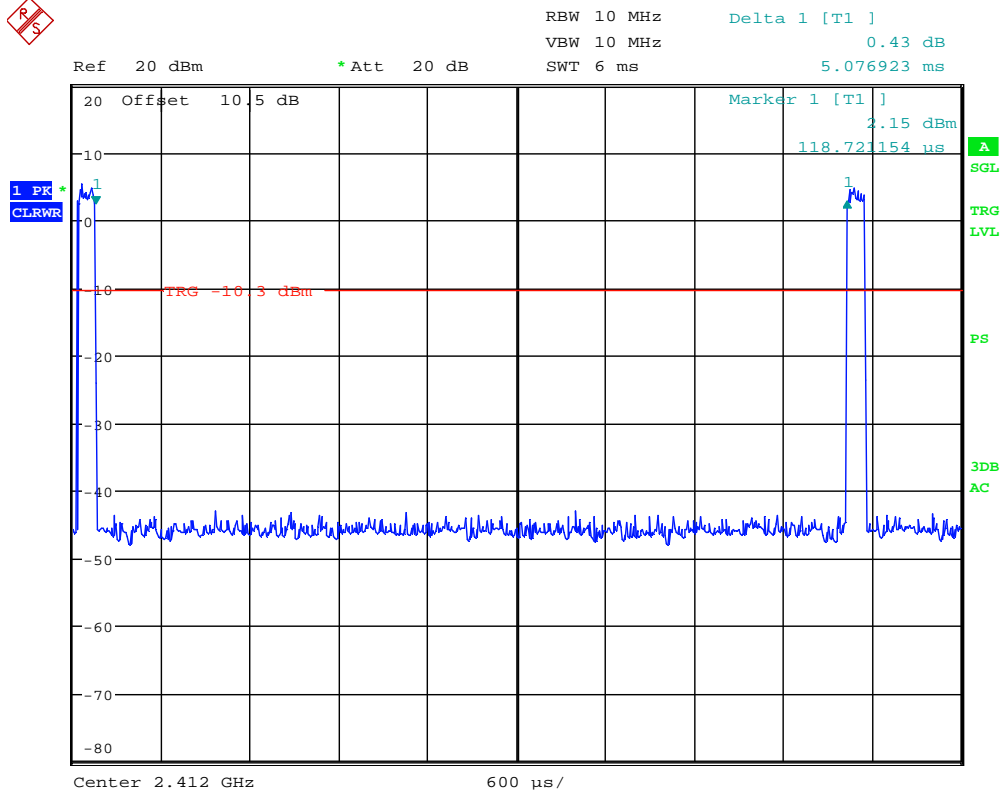
Date: 4.FEB.2016 13:49:27

Upper Band Edge ch11, 2462MHz, PK



Date: 4.FEB.2016 08:37:35

### Burst ON-time



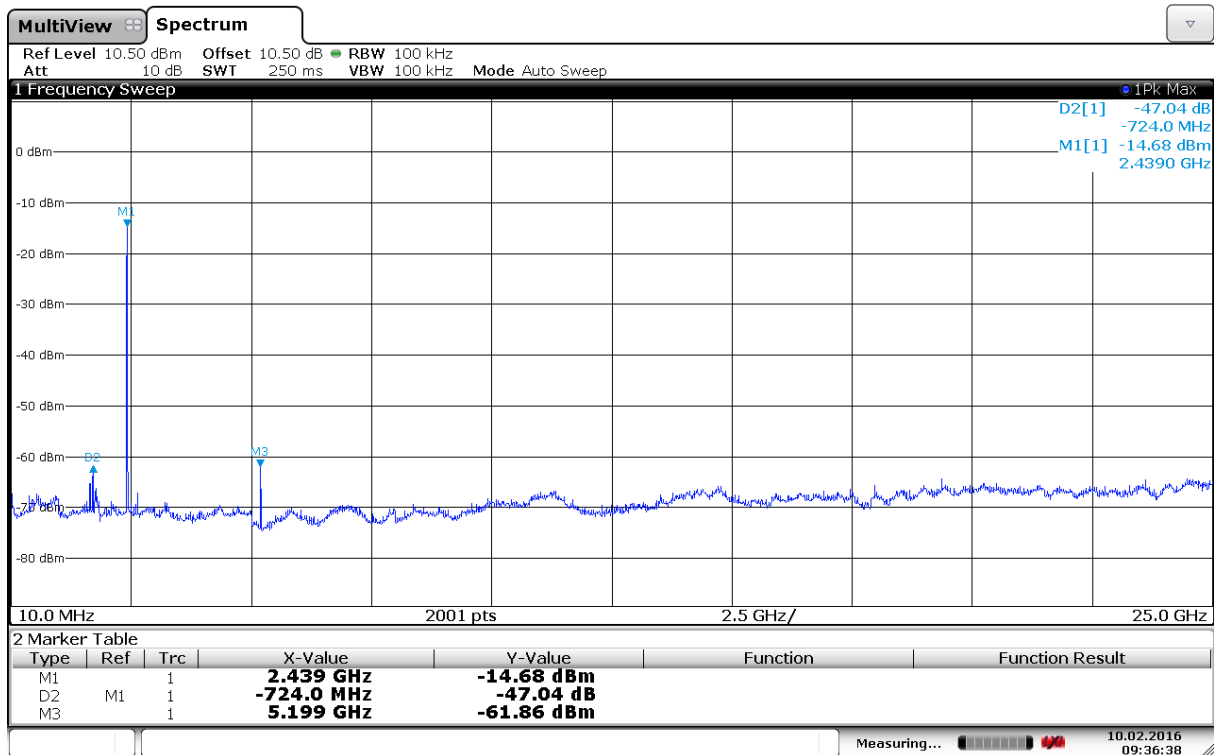
Date: 4.FEB.2016 08:39:16

### Burst OFF-time

RF conducted power to 25 GHz see attached graph.

Maximum RF level outside operating band:

RF ch ch01, ch06 & ch11: 47 dB/C, margin >20 dB



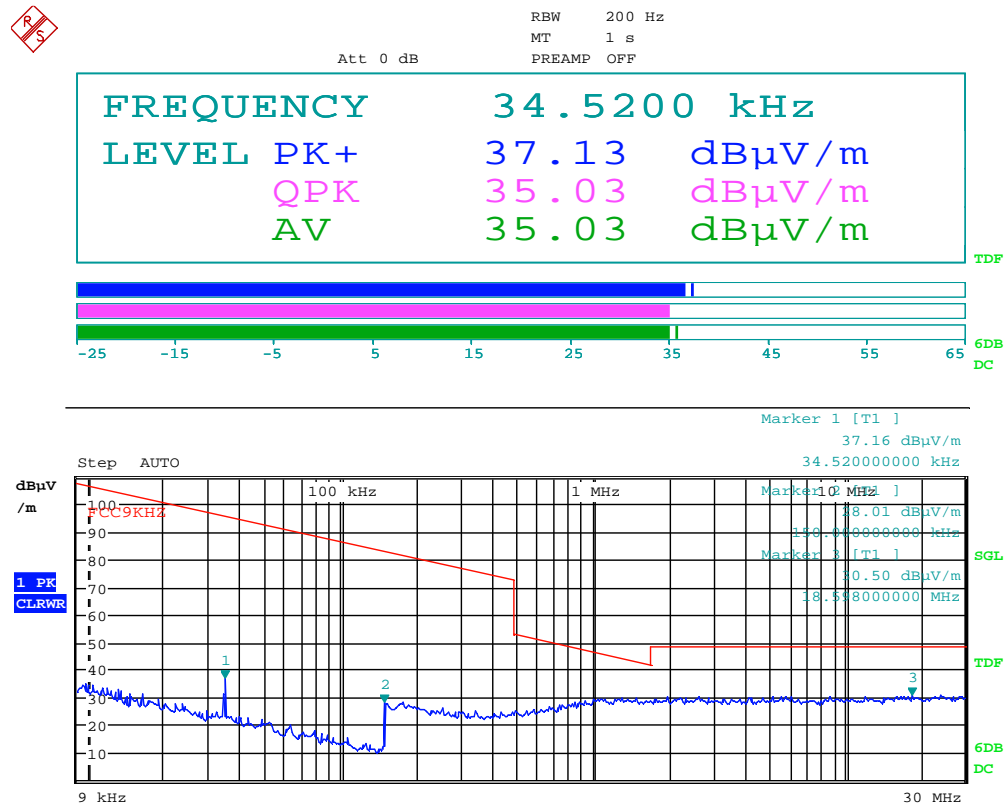
Conducted spurious emissions, 10MHz – 25GHz

# Radiated emissions 10 kHz -30 MHz.

Measuring distance 10 m, measured with Peak detector.

No component detected, see attached graph.

Limit is converted to 10 m using 40 dB/decade according to 15.31 (f) (2).



Date: 10.JUN.2015 08:40:49

**Radiated emission 30 – 1000 MHz.**

Detector: Quasi-Peak

Measuring distance 3 m according to ANSI.

All values are below the limit even when measured with Peak Detector.

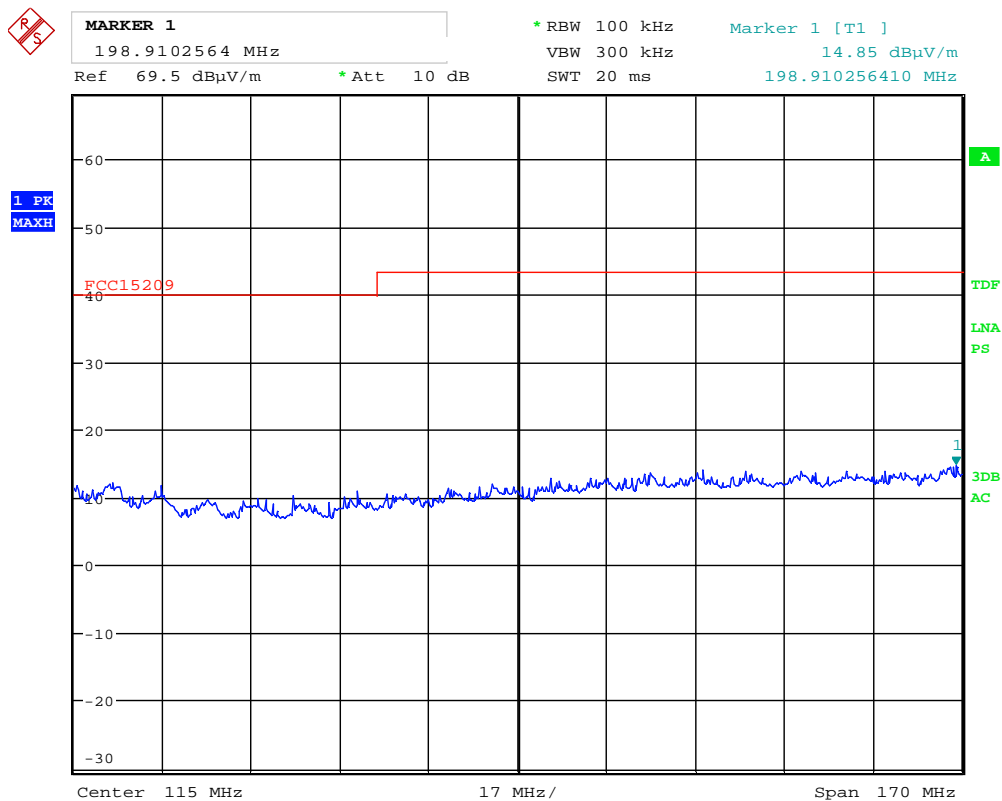
Frequency	Operational condition	Field strength	Measuring distance	Limit FCC15.209	Margin
MHz		dB $\mu$ V/m	metres	dB $\mu$ V/m	dB
All freqs	TX on	/	3	/	>10

Tested only with Peak Detector.

See attached graphs.

Antenna factor, amplifier gain and cable loss are included in Spectrum Analyzer "Transducer factor".

See attached graphs.



Date: 4.FEB.2016 16:29:48

VP: 30 - 200MHz, Tag-J



MARKER 1

197.5480769 MHz

Ref 69.5 dBµV/m

\* Att 10 dB

\* RBW 100 kHz

VBW 300 kHz

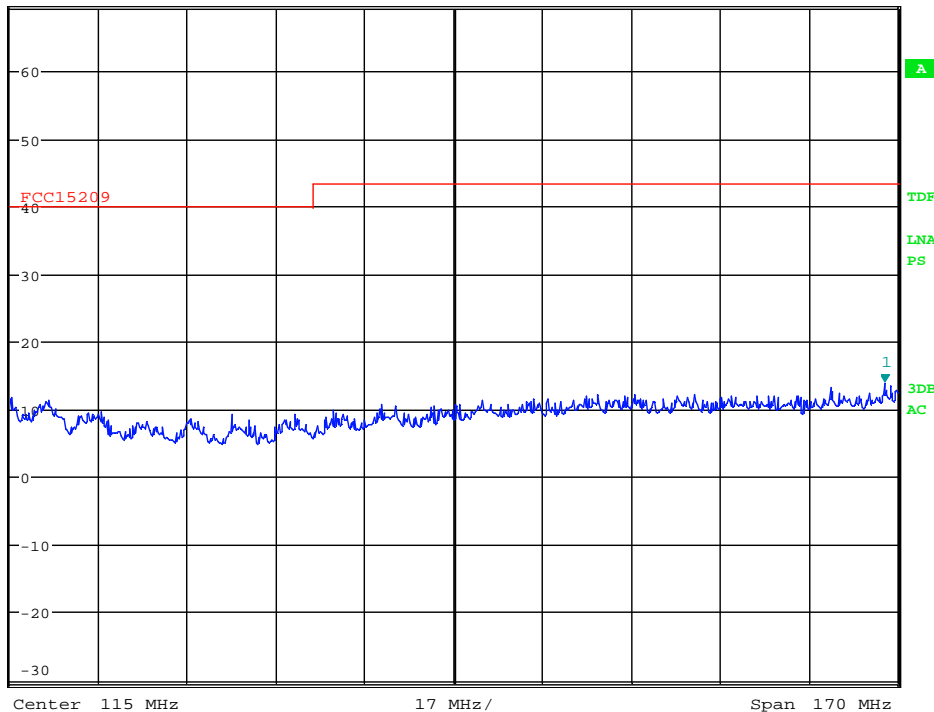
SWT 20 ms

Marker 1 [T1 ]

13.86 dBµV/m

197.548076923 MHz

1 PK  
MAXH



Date: 4.FEB.2016 16:30:28

HP: 30 - 200MHz , Tag-J





MARKER 1

892.3076923 MHz

\* RBW 100 kHz

Marker 1 [T1]

VBW 300 kHz

28.15 dBμV/m

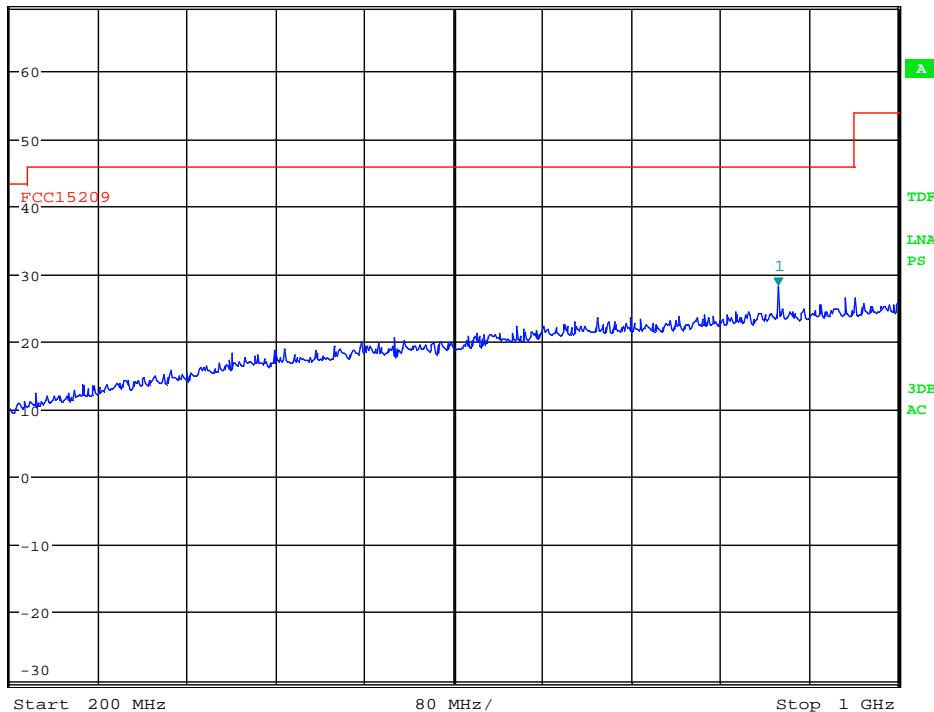
Ref 69.5 dBμV/m

\* Att 10 dB

SWT 80 ms

892.307692308 MHz

1 PK  
MAXH



Date: 4.FEB.2016 16:39:29

VP: 200 - 1000MHz, Tag-J



MARKER 1

197.5480769 MHz

Ref 69.5 dBμV/m

\* Att 10 dB

\* RBW 100 kHz

VBW 300 kHz

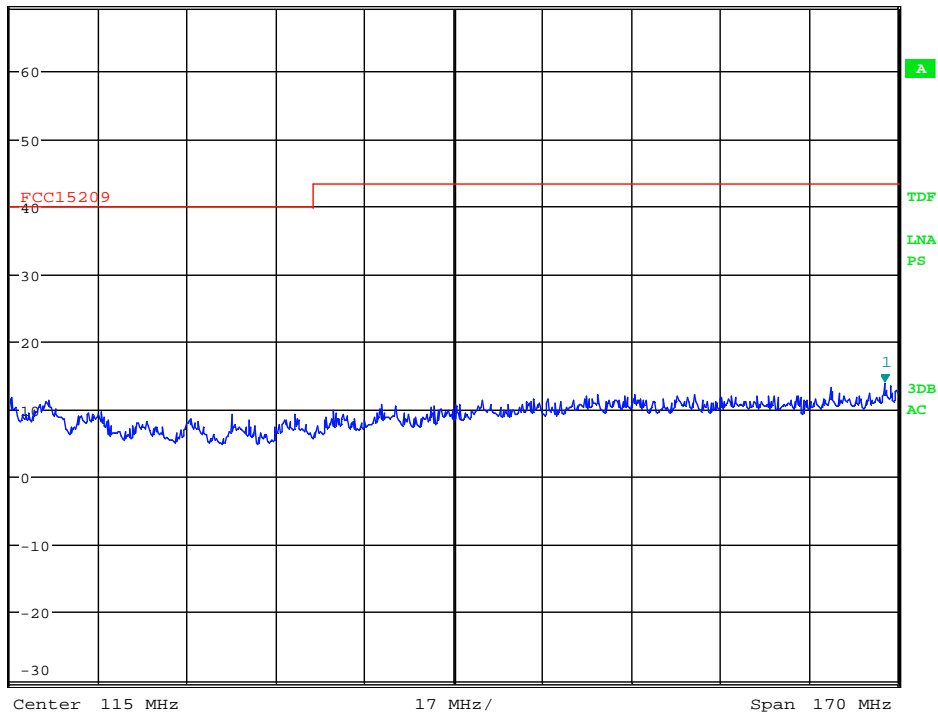
SWT 20 ms

Marker 1 [T1]

13.86 dBμV/m

197.548076923 MHz

1 PK  
MAXH



Date: 4.FEB.2016 16:30:28

HP: 200 - 1000MHz, Tag-J

## Radiated Emissions, 1-25 GHz

Measuring distance: 3m (1 – 3 GHz)  
1m (3 – 18 GHz)

A pre-scan was performed above 18 GHz no spurious emissions were detected.

### Peak Detector:

Frequency	RF channel	Dist. corr. factor	Field strength, Peak Detector, 1m	Duty cycle corr. factor	Limit	Margin
GHz	L,M,H	dB	dBμV/m	dB	dBμV/m	dB
4.824	L	-9.5*	37.62	0	74	>20
4.874	M	-9.5*	37.86	0	74	>20
4.924	H	-9.5*	37.51	0	74	>20
7.236	L	-9.5*	50.63	0	74	>20
7.311	M	-9.5*	52.76	0	74	>20
7.386	H	-9.5*	50.00	0	74	>20
Other freqs	L,M,H	-9.5*	None detected	0	74	>20

### Average Detector:

Frequency	RF channel	Dist. corr. factor	Field strength, Peak Detector, 1m	Duty cycle corr. factor	Limit	Margin
GHz	L,M,H	dB	dBμV/m	dB	dBμV/m	dB
4.824	L	-9.5*	37.62	20	54	>30
4.874	M	-9.5*	37.86	20	54	>30
4.924	H	-9.5*	37.51	20	54	>30
7.236	L	-9.5*	50.63	20	54	>30
7.311	M	-9.5*	52.76	20	54	>30
7.386	H	-9.5*	50.00	20	54	>30
Other freqs	L,M,H	-9.5*	None detected	20	54	>30

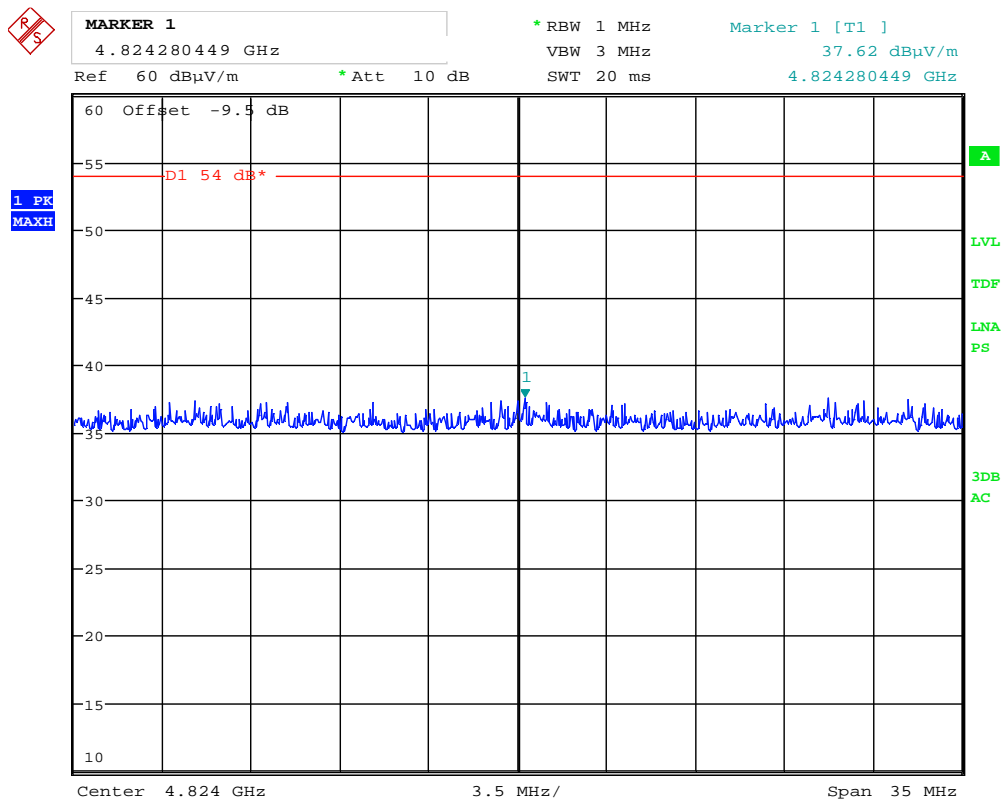
\*distance correction is included in the measured value

EUT was positioned on a 1.5m high stand for all tests above 1 GHz.

Average Detector values are calculated from Peak values by Duty Cycle Correction Factor.

Antenna factor, amplifier gain and cable loss are included in spectrum analyzer "Transducer factor".

See plots.

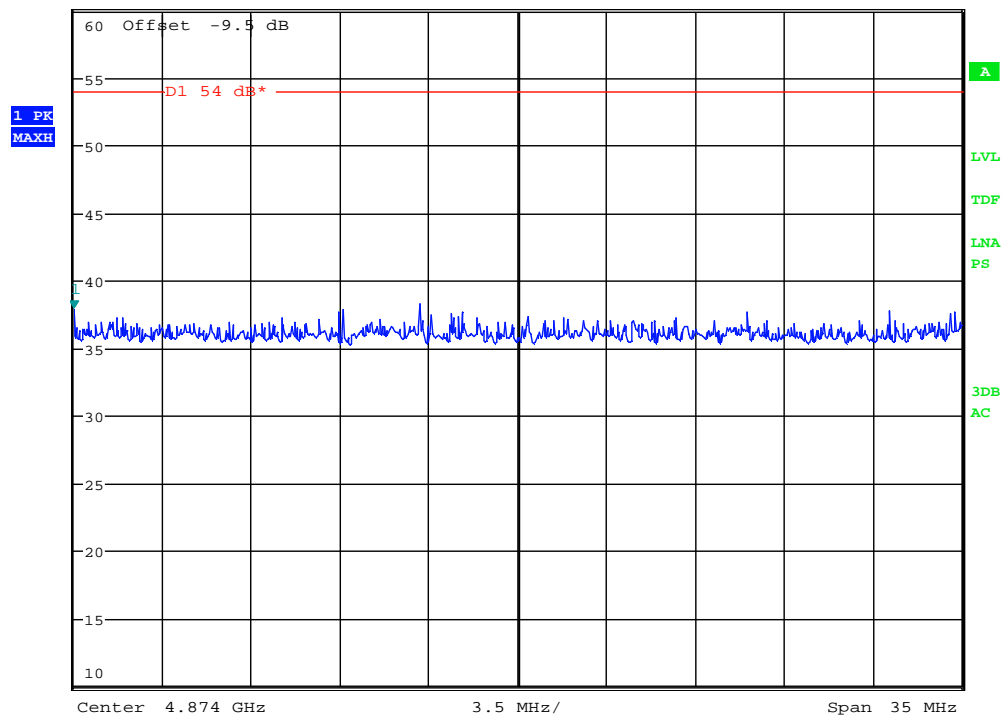


Date: 4.FEB.2016 15:39:55

VP: Ch01, 2412MHz, 2<sup>nd</sup> harmonic @1m (distance correction is given in the graph)



**MARKER 1**  
4.8565 GHz  
Ref 60 dBμV/m \*Att 10 dB \*RBW 1 MHz Marker 1 [T1]  
VBW 3 MHz 37.86 dBμV/m  
SWT 20 ms 4.856500000 GHz



Date: 4.FEB.2016 15:46:17

VP: Ch06, 2437MHz, 2<sup>nd</sup> harmonic @1m (distance correction is given in the graph)



MARKER 1

4.912782051 GHz

\* RBW 1 MHz

Marker 1 [T1]

VBW 3 MHz

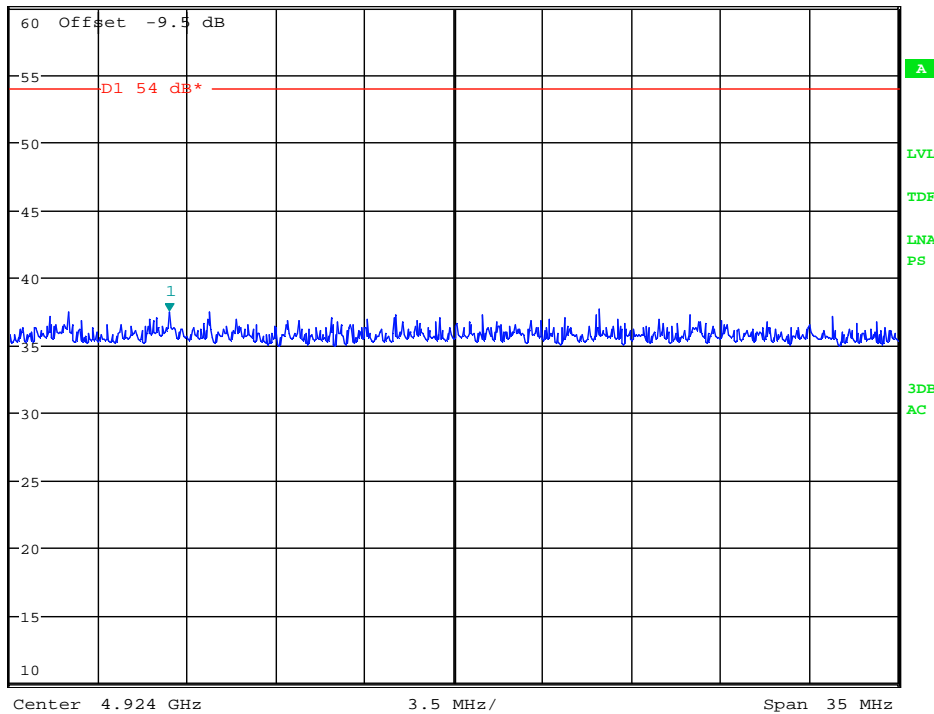
37.51 dBμV/m

SWT 20 ms

4.912782051 GHz

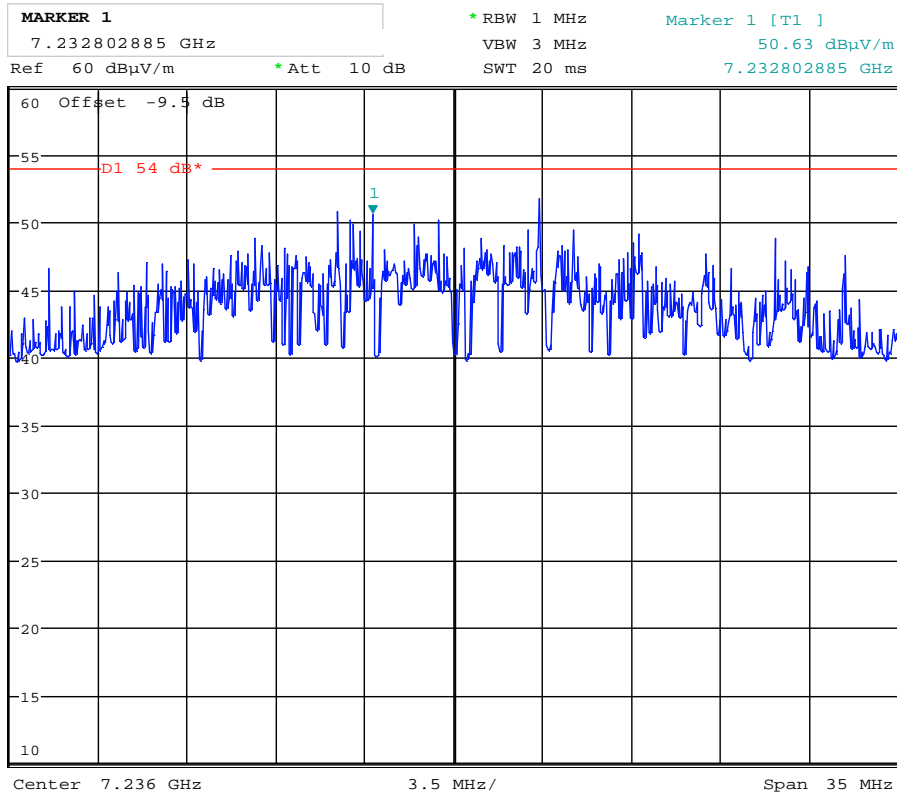
Ref 60 dBμV/m \* Att 10 dB

1 PK  
MAXH



Date: 4.FEB.2016 15:53:05

VP: Ch11, 2462MHz, 2<sup>nd</sup> harmonic @1m (distance correction is given in the graph)



Date: 4.FEB.2016 15:44:18

VP: Ch01, 2412MHz, 3<sup>rd</sup> harmonic @1m (distance correction is given in the graph)



MARKER 1

7.304549679 GHz

\* RBW 1 MHz

Marker 1 [T1]

VBW 3 MHz

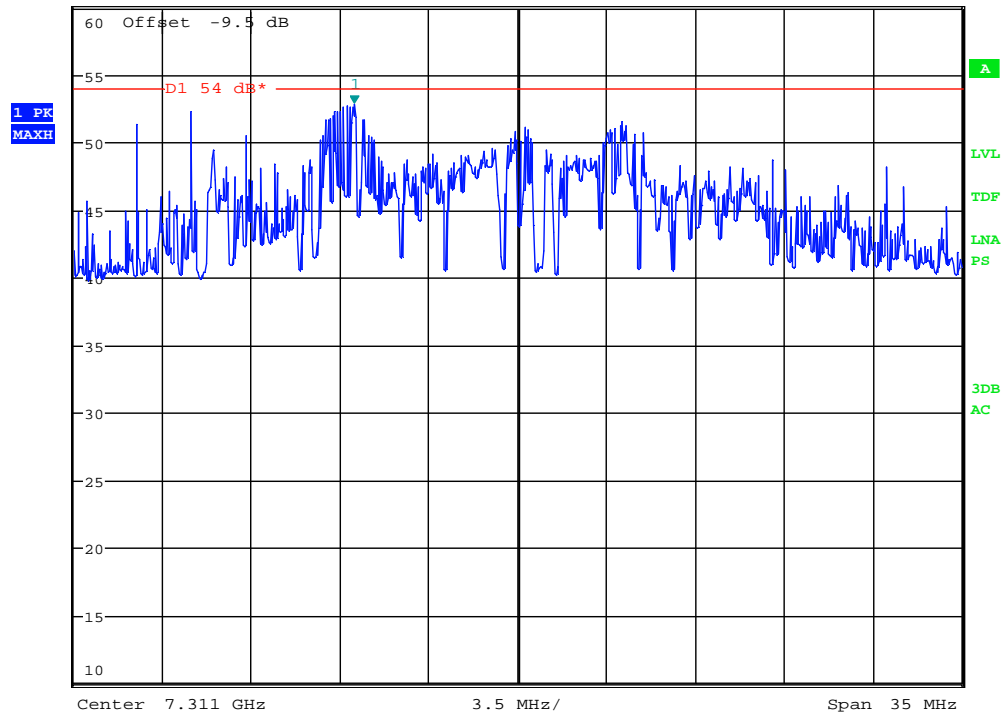
52.76 dBμV/m

Ref 60 dBμV/m

\* Att 10 dB

SWT 20 ms

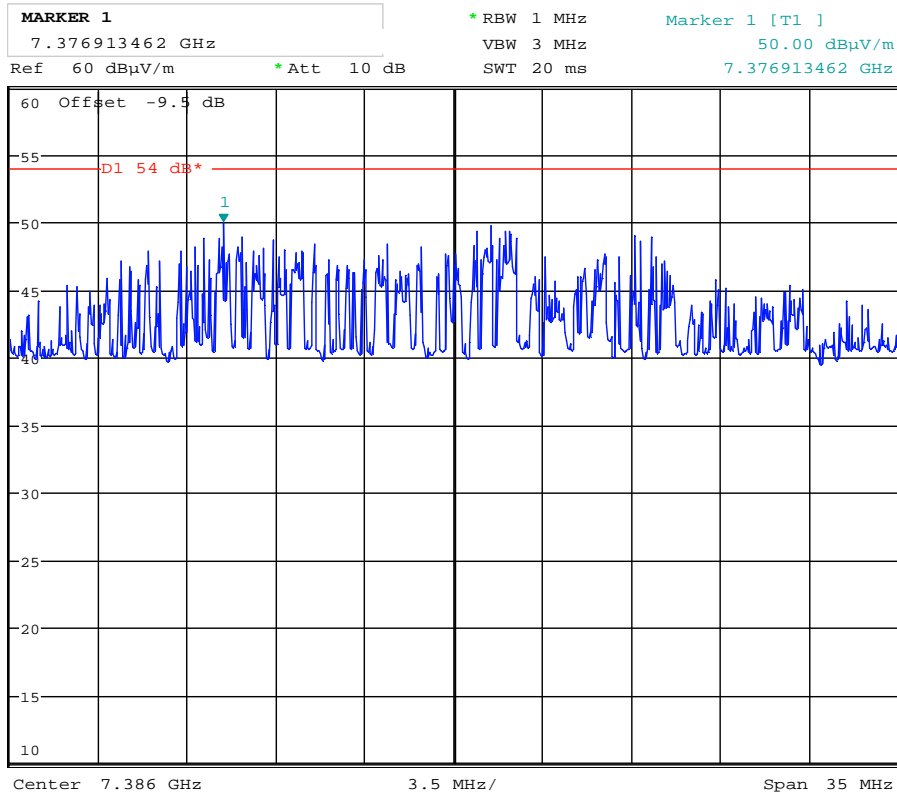
7.304549679 GHz



Date: 4.FEB.2016 15:51:57

VP: Ch06, 2437MHz, 3<sup>rd</sup> harmonic @1m (distance correction is given in the graph)





Date: 4.FEB.2016 15:55:15

VP: Ch11, 2462MHz, 3<sup>rd</sup> harmonic @1m (distance correction is given in the graph)



MARKER 2

1.980769231 GHz

Ref 117 dBµV/m

\*Att 10 dB

\*RBW 1 MHz

VBW 3 MHz

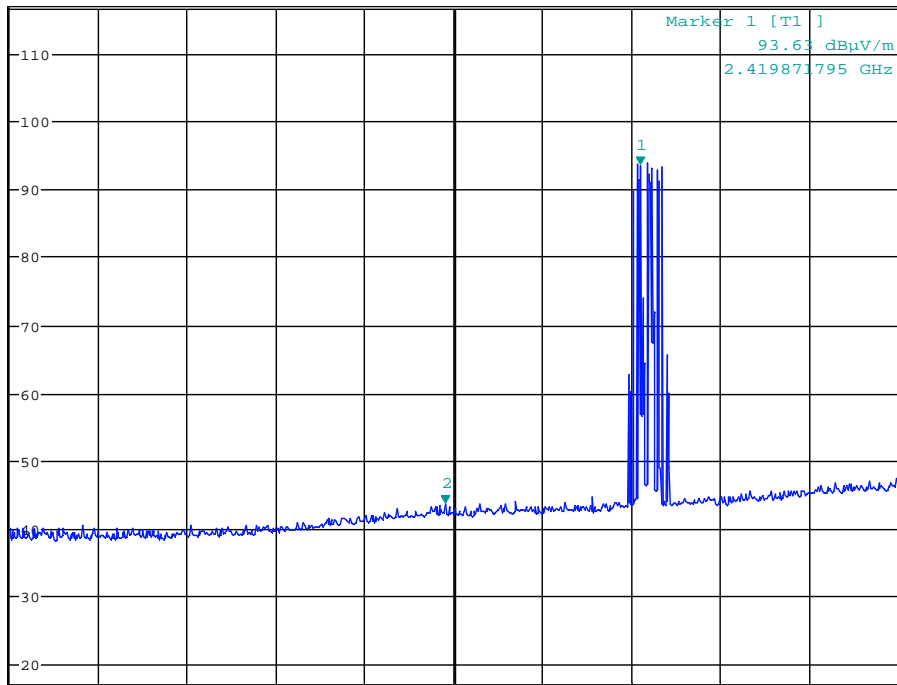
SWT 5 ms

Marker 2 [T1]

43.51 dBµV/m

1.980769231 GHz

1 PK  
MAXH



Start 1 GHz 200 MHz/ Stop 3 GHz

Date: 4.FEB.2016 13:53:02

VP: Ch01, Ch06 & Ch11, 1 - 3GHz, Pk scan, @3m



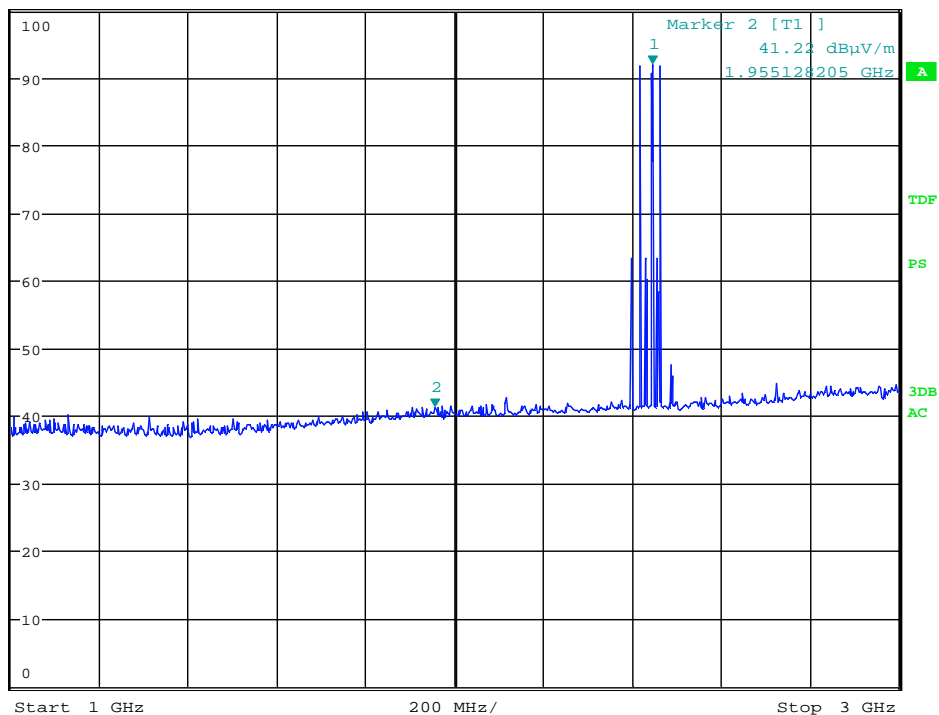
**MARKER 1**  
2.445512821 GHz

\* RBW 1 MHz  
VBW 3 MHz  
SWT 5 ms

Marker 1 [T1]  
91.82 dBμV/m  
2.445512821 GHz

Ref 100 dBμV/m \* Att 10 dB

1 PK  
MAXH



Date: 4.FEB.2016 14:03:28

HP: Ch01, Ch06 & Ch11, 1 - 3GHz, Pk scan, @3m



MARKER 1

7.6875 GHz

\* RBW 1 MHz

Marker 1 [T1]

VBW 3 MHz

41.97 dBμV/m

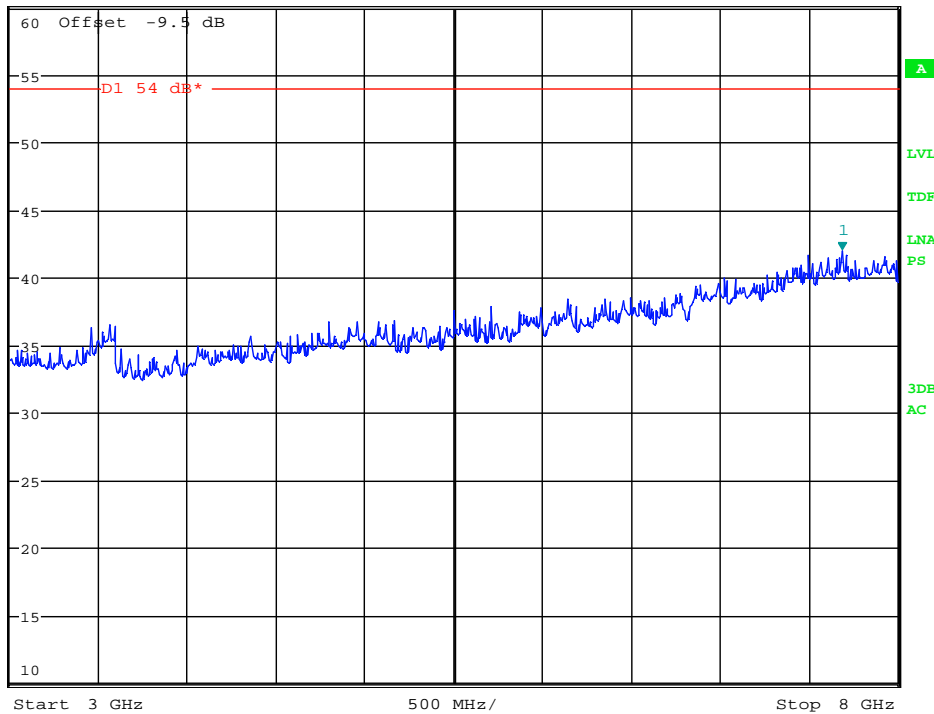
Ref 60 dBμV/m

\* Att 10 dB

SWT 30 ms

7.687500000 GHz

1 PK  
MAXH



Date: 4.FEB.2016 15:31:57

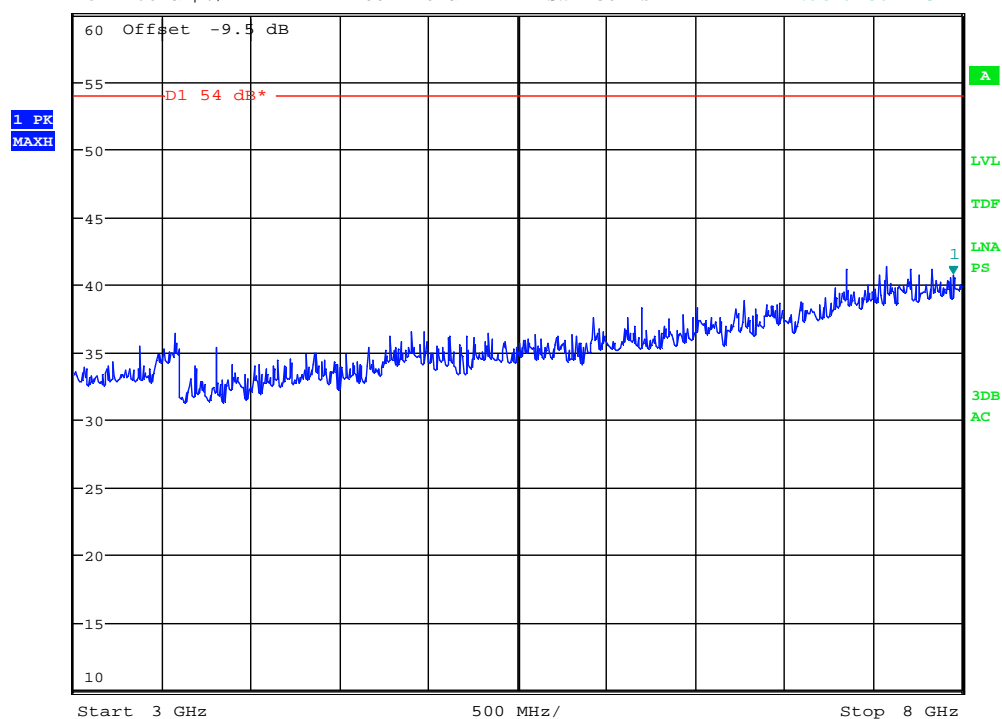
VP: Ch01, Ch06 & Ch11, 3 - 8GHz, Pk scan, @1m (distance correction is given in the graph)



**MARKER 1**  
7.951923077 GHz  
Ref 60 dBμV/m

\*RBW 1 MHz  
VBW 3 MHz  
SWT 30 ms

Marker 1 [T1]  
40.77 dBμV/m  
7.951923077 GHz



Date: 4.FEB.2016 15:37:42

HP: Ch01, Ch06 & Ch11, 3 - 8GHz, Pk scan, @1m (distance correction is given in the graph)



MARKER 1

7.607371795 GHz

\* RBW 1 MHz

Marker 1 [T1]

VBW 3 MHz

42.09 dBμV/m

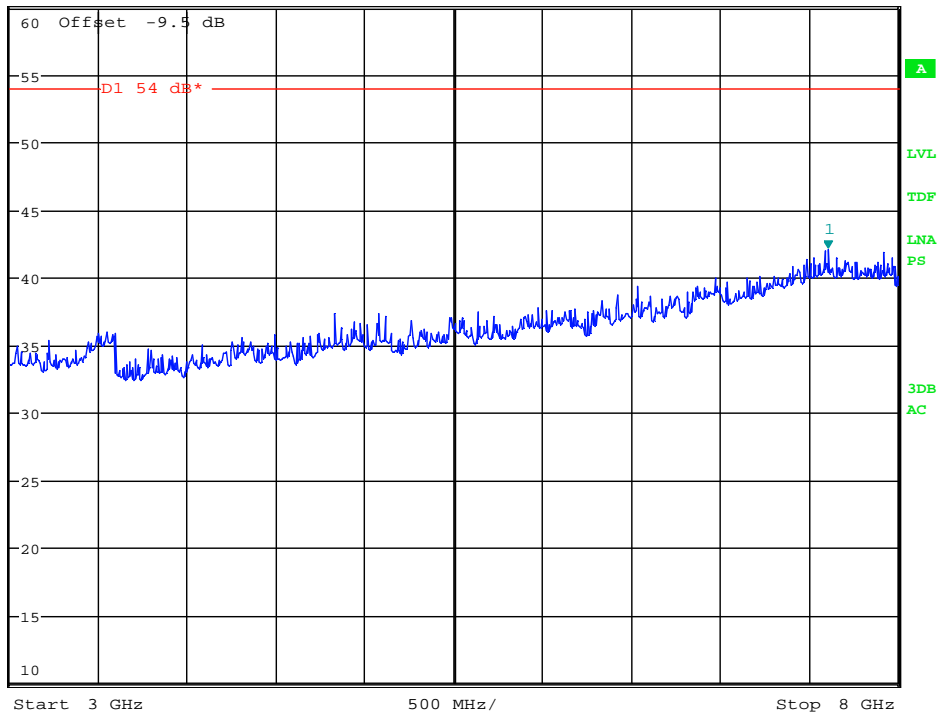
Ref 60 dBμV/m

\* Att 10 dB

SWT 30 ms

7.607371795 GHz

1 PK  
MAXH



Date: 4.FEB.2016 15:37:02

VP: Ch01, Ch06 & Ch11, 3 - 8.5GHz, Pk scan, @1m (distance correction is given in the graph)



MARKER 1

8.361378205 GHz

\* RBW 1 MHz

Marker 1 [T1]

VBW 3 MHz

42.86 dBμV/m

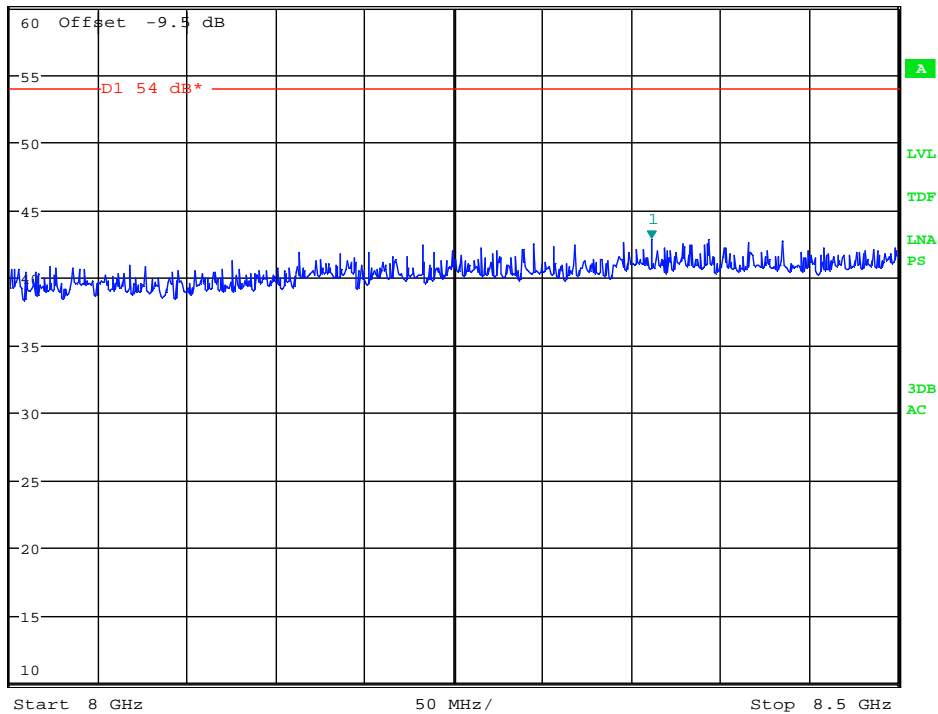
Ref 60 dBμV/m

\* Att 10 dB

SWT 20 ms

8.361378205 GHz

1 PK  
MAXH



Date: 4.FEB.2016 16:18:12

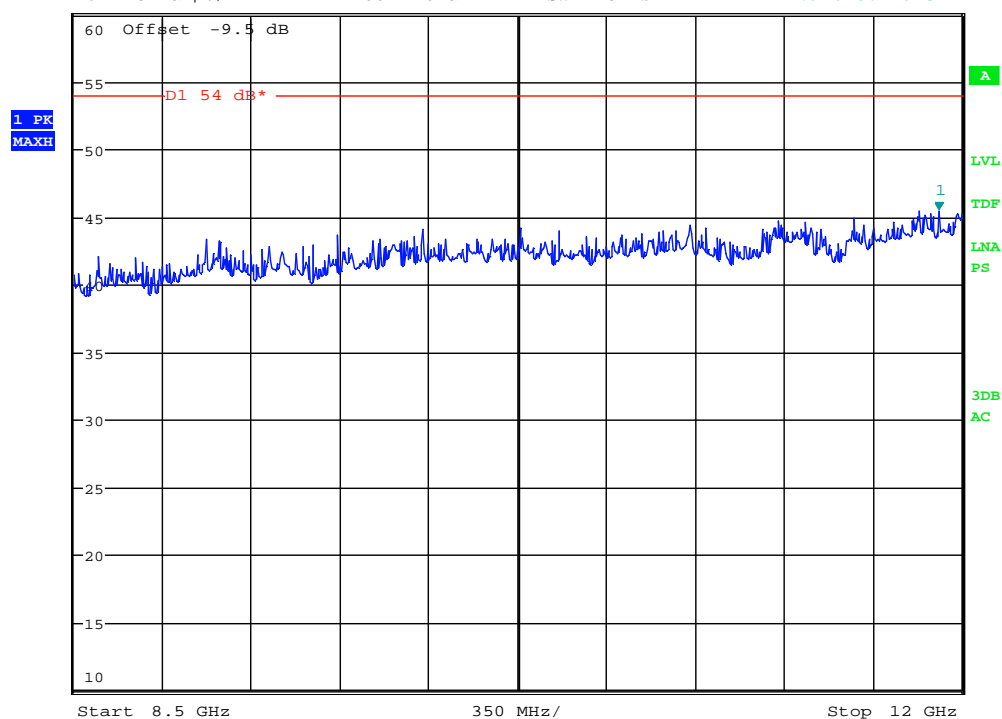
HP: Ch01, Ch06 & Ch11, 8 - 8.5GHz, Pk scan, @1m (distance correction is given in the graph)



**MARKER 1**  
11.91025641 GHz  
Ref 87 dBµV/m

\* RBW 1 MHz  
VBW 3 MHz  
SWT 25 ms

Marker 1 [T1]  
45.44 dBµV/m  
11.910256410 GHz



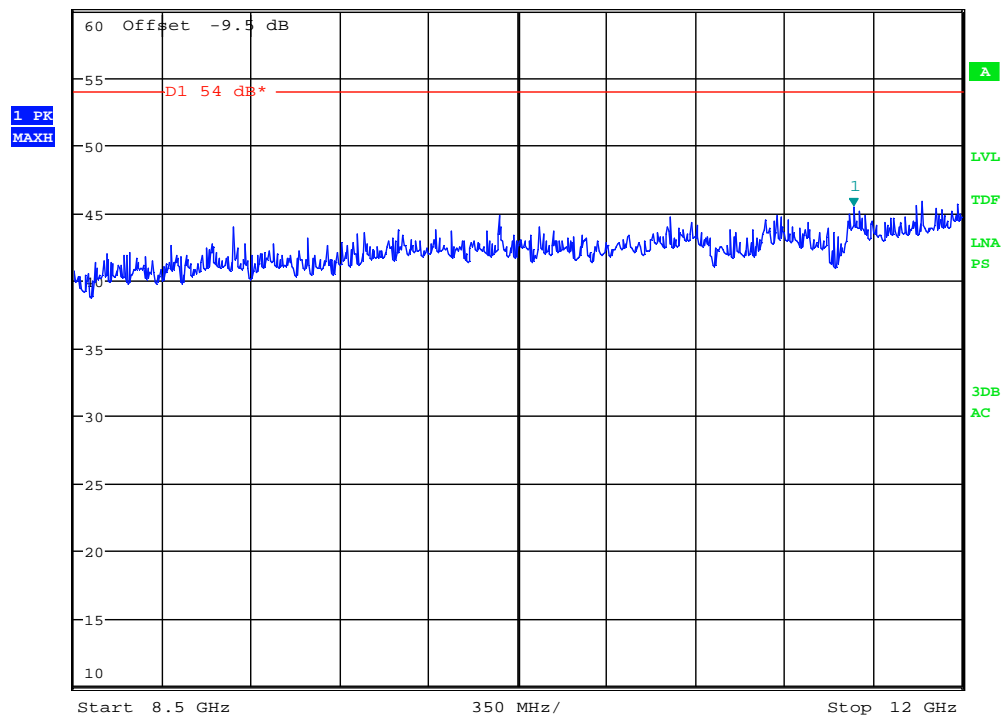
Date: 4.FEB.2016 16:01:20

VP: Ch01, Ch06 & Ch11, 8.5 - 12GHz, Pk scan, @1m (distance correction is given in the graph)



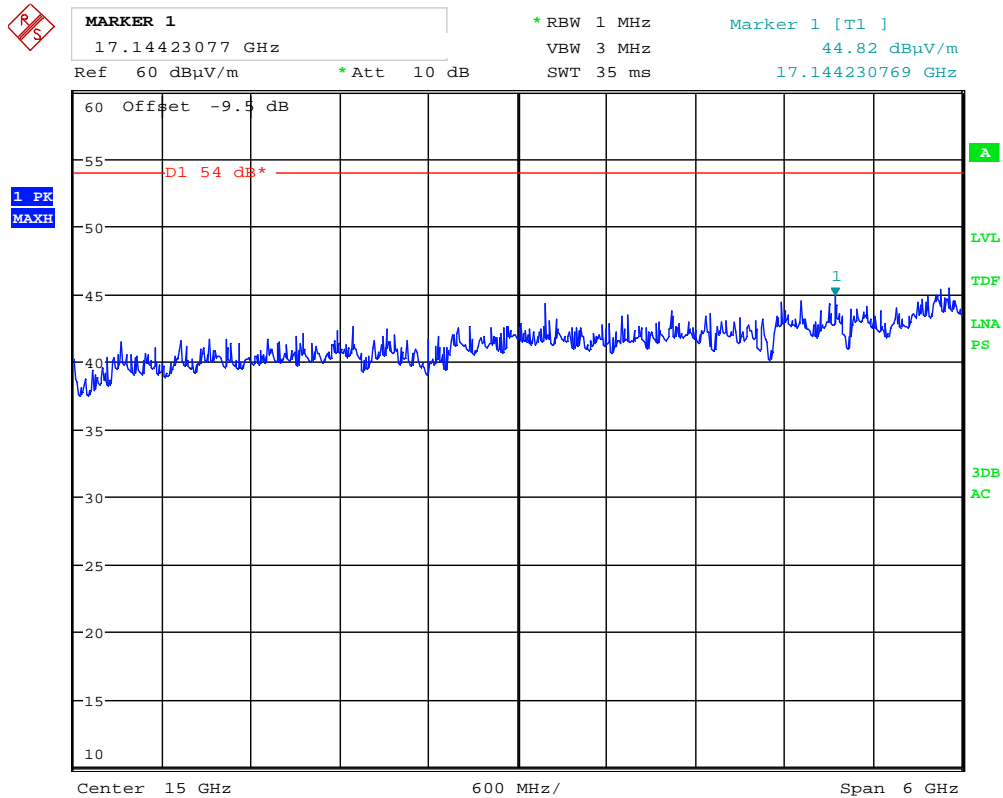


**MARKER 1**  
11.57371795 GHz  
Ref 87 dBµV/m \*Att 10 dB \*RBW 1 MHz Marker 1 [T1 ]  
VBW 3 MHz 45.48 dBµV/m  
SWT 25 ms 11.573717949 GHz



Date: 4.FEB.2016 16:02:13

HP: Ch01, Ch06 & Ch11, 8.5 - 12GHz, Pk scan, @1m (distance correction is given in the graph)



Date: 4.FEB.2016 16:04:10

VP: Ch01, Ch06 & Ch11, 12 - 18GHz, Pk scan, @1m (distance correction is given in the graph)



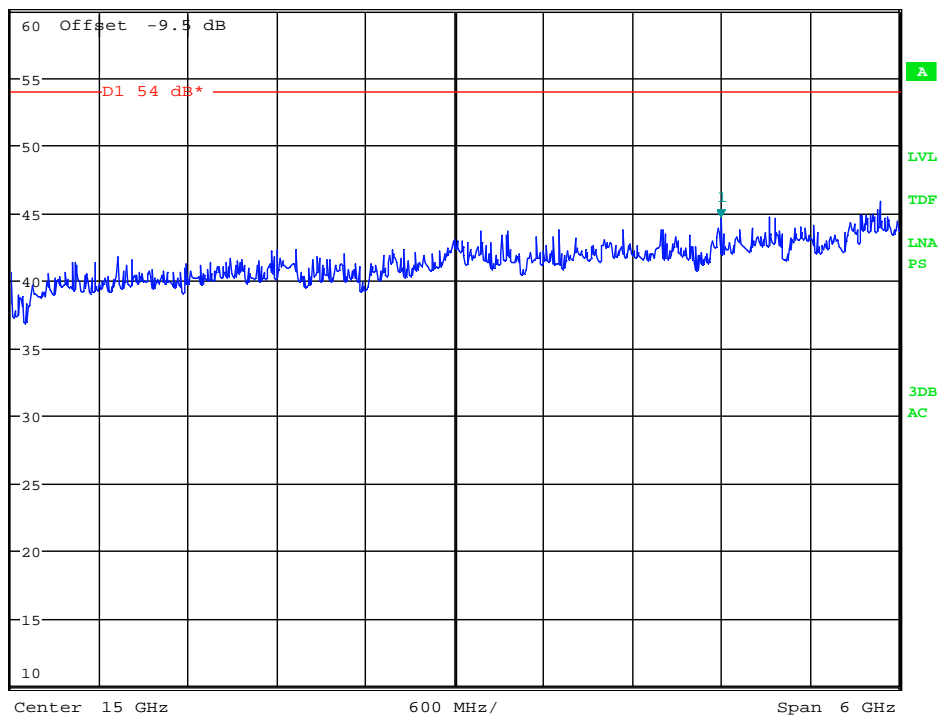
**MARKER 1**  
16.79807692 GHz  
Ref 60 dBμV/m

\*Att 10 dB

\*RBW 1 MHz  
VBW 3 MHz  
SWT 35 ms

Marker 1 [T1]  
44.56 dBμV/m  
16.798076923 GHz

1 PK  
MAXH



Date: 4.FEB.2016 16:04:45

VP: Ch01, Ch06 & Ch11, 12 - 18GHz, Pk scan, @1m (distance correction is given in the graph)



MARKER 1  
20.10897436 GHz

\* RBW 1 MHz

Marker 1 [T1]

VBW 3 MHz

33.44 dBμV/m

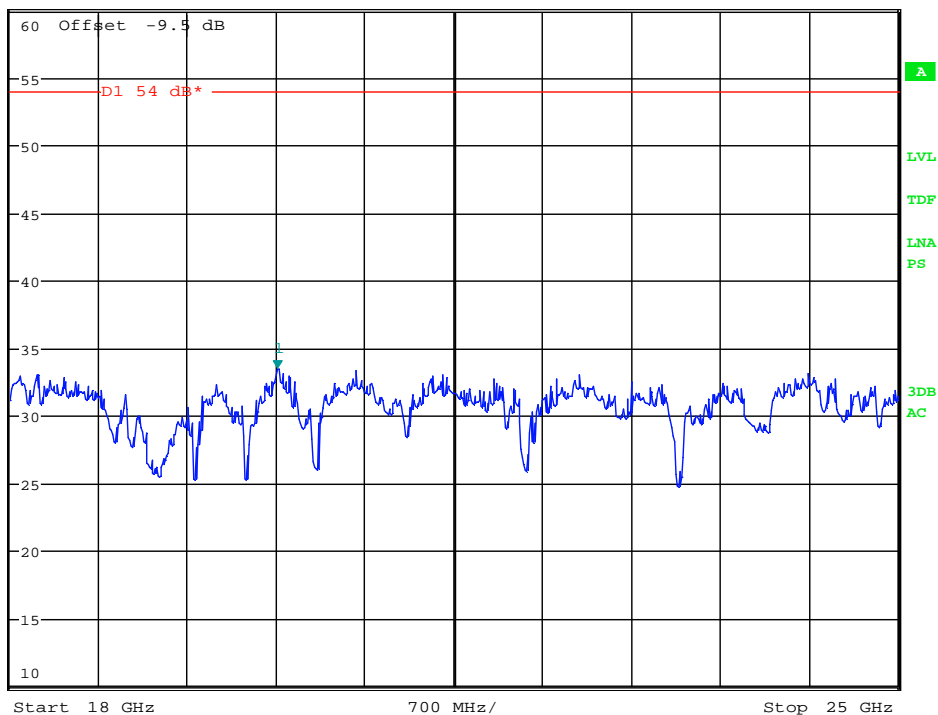
Ref 60 dBμV/m

\* Att 10 dB

SWT 45 ms

20.108974359 GHz

1 PK  
MAXH



Date: 4.FEB.2016 16:13:11

VP/HP: Ch01, Ch06 & Ch11, 18 - 25GHz, Pre-Scan, @1m (distance correction is given in the graph)

## 4 Measurement Uncertainty

Measurement Uncertainty Values		
Test Item		Uncertainty
Output Power		±0.5 dB
Power Spectral Density		±0.5 dB
Out of Band Emissions, Conducted	< 3.6 GHz	±0.6 dB
	> 3.6 GHz	±0.9 dB
Spurious Emissions, Radiated	< 1 GHz	±2.5 dB
	> 1 GHz	±2.2 dB
Emission Bandwidth		±4 %
Power Line Conducted Emissions		+2.9 / -4.1 dB
Spectrum Mask Measurements	Frequency	±5 %
	Amplitude	±1.0 dB
Frequency Error		±0.6 ppm
Temperature Uncertainty		±1 °C

All uncertainty values are expanded standard uncertainty to give a confidence level of 95%, based on coverage factor k=2

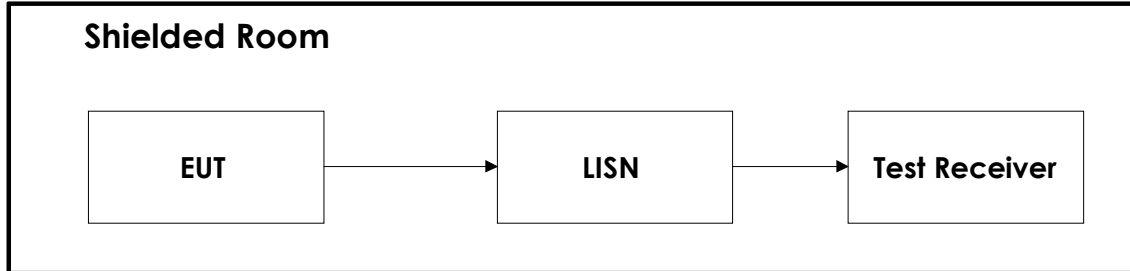
## 5 LIST OF TEST EQUIPMENT

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment and ancillaries are identified (numbered) by the Test Laboratory.

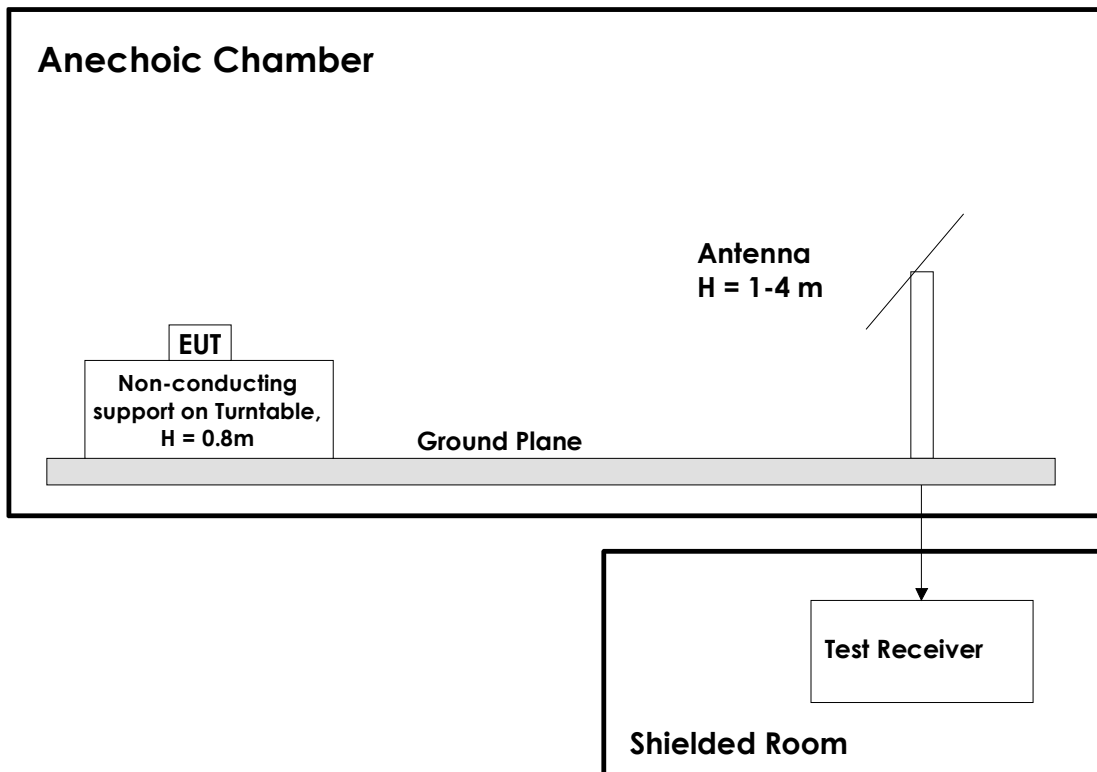
No.	Instrument/ ancillary	Type of instrument/ ancillary	Manufacturer	Ref. no.	Cal. Date	Cal. Due
1.	ESU40	EMI Receiver	Rohde & Schwarz	LR1639	2015.11	2016.11
2.	FSW26	Spectrum Analyzer	Rohde & Schwarz	LR 1640	2015.11	2017.11
3.	HFH2-Z2	Loop antenna	Rohde & Schwarz	LR1660	2014.10	2017.10
4.	3115	Antenna horn	EMCO	LR 1330	2010.08	2017.08
5.	HK116	Biconical Antenna	Rohde & Schwarz	LR 1260	2013.12	2016.12
6.	HL223	Log Periodic antenna	Rohde & Schwarz	LR 1261	2013.12	2016.12
7.	643	Antenna Horn	Narda	LR 093	2009.01	2017.01
8.	PM7320X	Antenna Horn	Sivers Lab	LR 102	2009.01	2017.01
9.	DBF-520-20	Antenna Horn	Systron Donner	LR 100	2009.01	2017.01
10.	638	Antenna Horn	Narda	LR 1480	2009.01	2017.01
11.	4768-10	Attenuator	Narda	LR 1773	Cal b4 use	
12.	6HC3000/18000	Highpass Filter	Trilithic	LR 1614	Cal b4 use	
13.	8449B	Pre-amplifier	Hewlett Packard	LR 1322	2015.09	2016.09
14.	HP 10855A	Pre-amplifier	Hewlett Packard	LR 1445	2015.10	2016.10
15.	Model 87 V	Multimeter	Fluke	LR 1597	2015.10	2016.10

## 6 BLOCK DIAGRAM

### 6.1 Power Line Conducted Emission



### 6.2 Test Site Radiated Emission



## Revision history

Version	Date	Comment	Sign
1	2016.02.10	Test report	GNS
2	2016.03.02	Editorial corrections	FS