



Test Report

FCC Part 15.247 for DSSS systems/ CANADA RSS-210

SmartSynch, Inc.

Model #: GEI210GPRSV1.0

FCC ID: QHC-I210GPRS

IC No.: 4393B-I210GPRS

TEST REPORT #: EMC_SMAR2_016_15.247

DATE: 2009-4-16



FCC listed#
A2LA Accredited

IC recognized #
3462B

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1 Assessment

The following is in compliance with the applicable criteria specified in FCC rules Part 15.247 of the Code of Federal Regulations and in compliance with the applicable criteria specified in Industry Canada rules RSS210.

Company	Description	Model #
SmartSynch, Inc.	Wireless Utility Meter	GEI210GPRSV1.0

This report is reviewed by:

Satya Radhakrishna
(Project Engineer)

2009-4-16 EMC & Radio

Date	Section	Name	Signature
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The test results of this test report relate exclusively to the test item specified in Identification of the Equipment under Test. The CETECOM Inc. USA does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the CETECOM Inc USA.

This report is prepared by:

Marc Douat
(Test Lab Manager)

2009-4-16 EMC & Radio

Date	Section	Name	Signature
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2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the EMC Test Report

Company Name:	CETECOM Inc.
Department:	EMC
Address:	411 Dixon Landing Road Milpitas, CA 95035 U.S.A.
Telephone:	+1 (408) 586 6200
Fax:	+1 (408) 586 6299
Responsible Test Lab Manager:	Marc Douat

2.2 Identification of the Client

APPLICANT	
Applicant (Company Name)	SmartSynch, Inc.
Street Address	4400 Old Canton Road Suite 300
City/Zip Code	Jackson MS 39211
Country	USA
Contact Person	Mike Mathis
Telephone	601-362-1780
Fax	601-362-1787
e-mail	mmathis@smartsynch.com

2.3 Identification of the Manufacturer

Same as above applicant.

3 Equipment Under Test (EUT)

3.1 Specification of the Equipment under Test

EUT	
Marketing Name of EUT (if not same as Model No.)	Wireless Utility Meter
Description	SSI I210 GPRS SmartMeter
Model No.	GEI210GPRSV1.0
H/W	55M-I21002C-001 Rev2
S/W	660-040001-P00
FCC ID:	QHC-I210GPRS
IC No.:	4393B-I210GPRS

Frequency Range:	2400MHz – 2483.5MHz
Type(s) of Modulation:	OQPSK
Number of Channels:	15
Antenna Type:	Integral
Output Power:	Conducted: 15.01 dBm, 31.69mW Radiated: 13.58dBm, 22.8mW

3.2 Identification of the Equipment under Test (EUT)

EUT #	TYPE	MANF.	MODEL
1	EUT	SmartSynch	GEI210GPRSV1.0



4 Subject Of Investigation

The objective of the measurements done by Cetecom Inc. was to measure the performance of the EUT as specified by requirements listed in FCC rules Part 15.247 of Title 47 of the Code of Federal Regulations and Industry Canada rules RSS210.

All data in this report shows the worst case between horizontal and vertical polarization for above 1GHz.

5 Measurements (Radiated)**5.1 MAXIMUM PEAK OUTPUT POWER § 15.247 (RADIATED)****5.1.1 LIMIT SUB CLAUSE § 15.247 (b) (1) (2) (3) (4)**

Frequency range	RF power output
2400-2483.5 MHz	36dBm EIRP

*limit is based upon antenna gain of less than or equal to 6dBi.

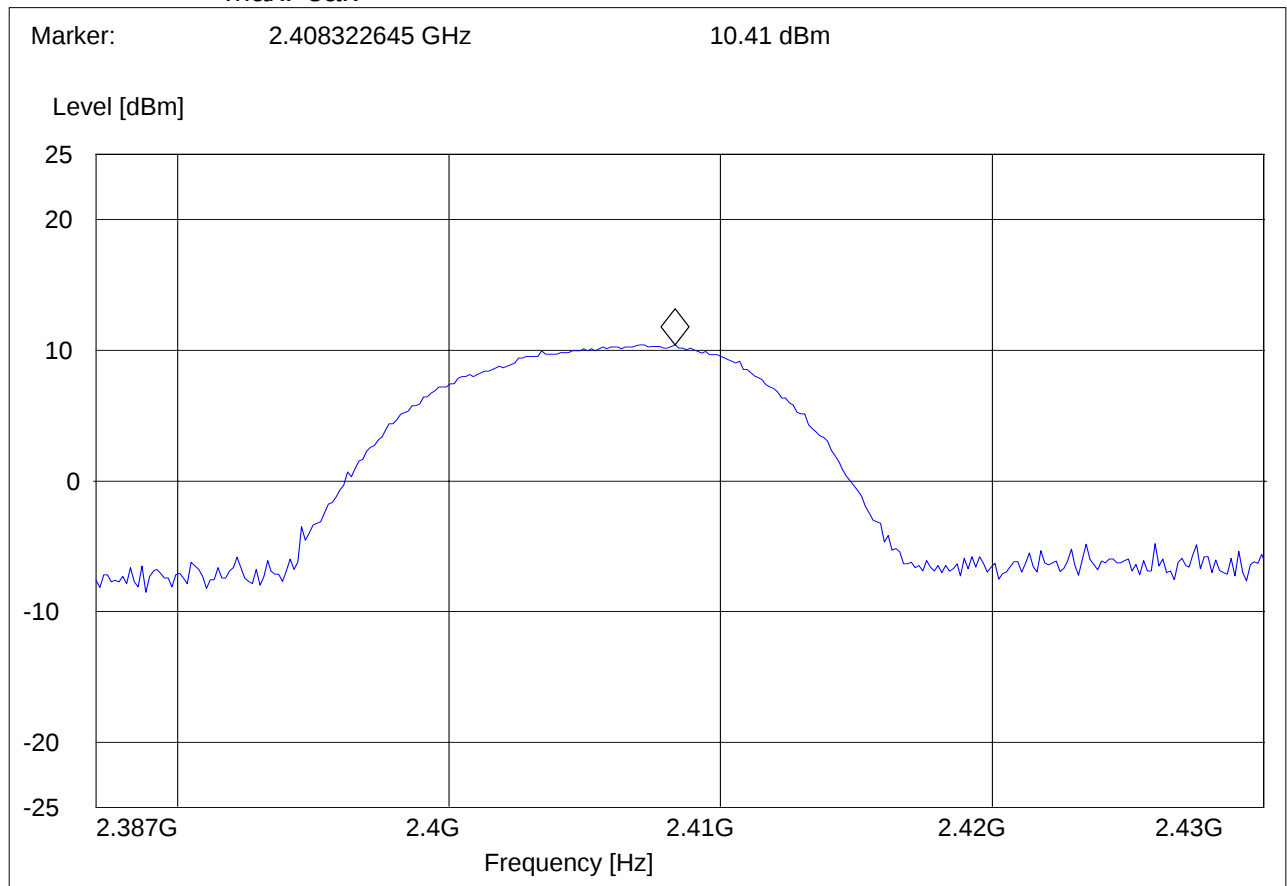
5.1.2 EIRP

TEST CONDITIONS	MAXIMUM PEAK OUTPUT POWER (dBm)		
Frequency (MHz)	2405	2430	2475
802.15.4	10.41	13.58	12.02
Measurement uncertainty	±0.5dBm		

EUT: i210
Customer:: SmartSynch
Test Mode: zigbee low ch
ANT Orientation: H
EUT Orientation: V
Test Engineer: Sam
Voltage: AC + Internal Battery
Comments:

SWEEP TABLE: "EIRP RLAN CH1"

Short Description: EIRP RLAN channel-2412 MHz
Start Stop Detector Meas. IF Transducer
Frequency Frequency Time Bandw.
2.4 GHz 2.5 GHz MaxPeak Coupled 10 MHz DUMMY-DBM
MaxPeak

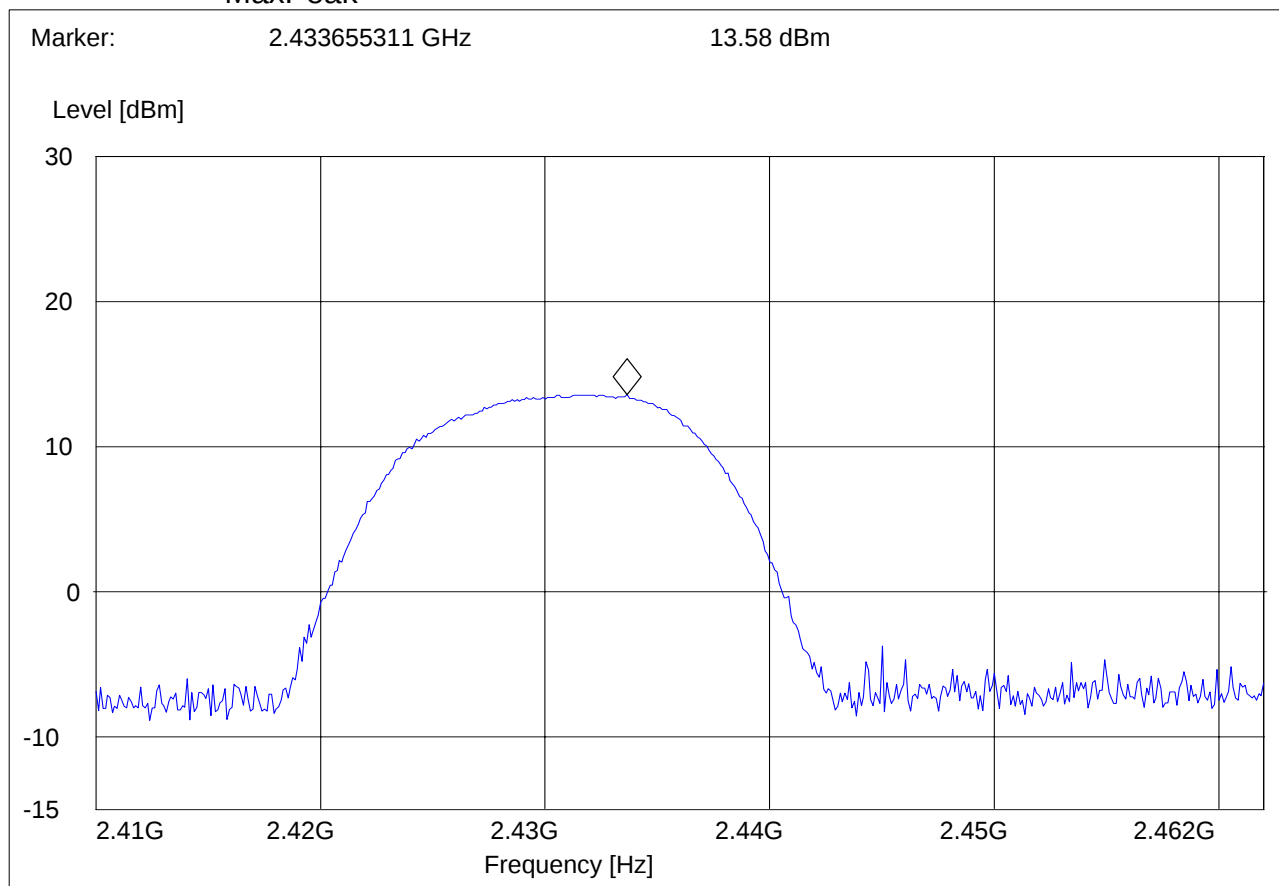




EUT: i210
Customer:: SmartSynch
Test Mode: Zigbee mid ch
ANT Orientation: H
EUT Orientation: V
Test Engineer: Marc
Voltage: AC + Internal Battery
Comments:

SWEEP TABLE: "EIRP RLAN CH6"

Short Description: EIRP RLAN channel-2437 MHz
Start Stop Detector Meas. IF Transducer
Frequency Frequency Time Bandw.
2.4 GHz 2.5 GHz MaxPeak Coupled 10 MHz DUMMY-DBM
MaxPeak

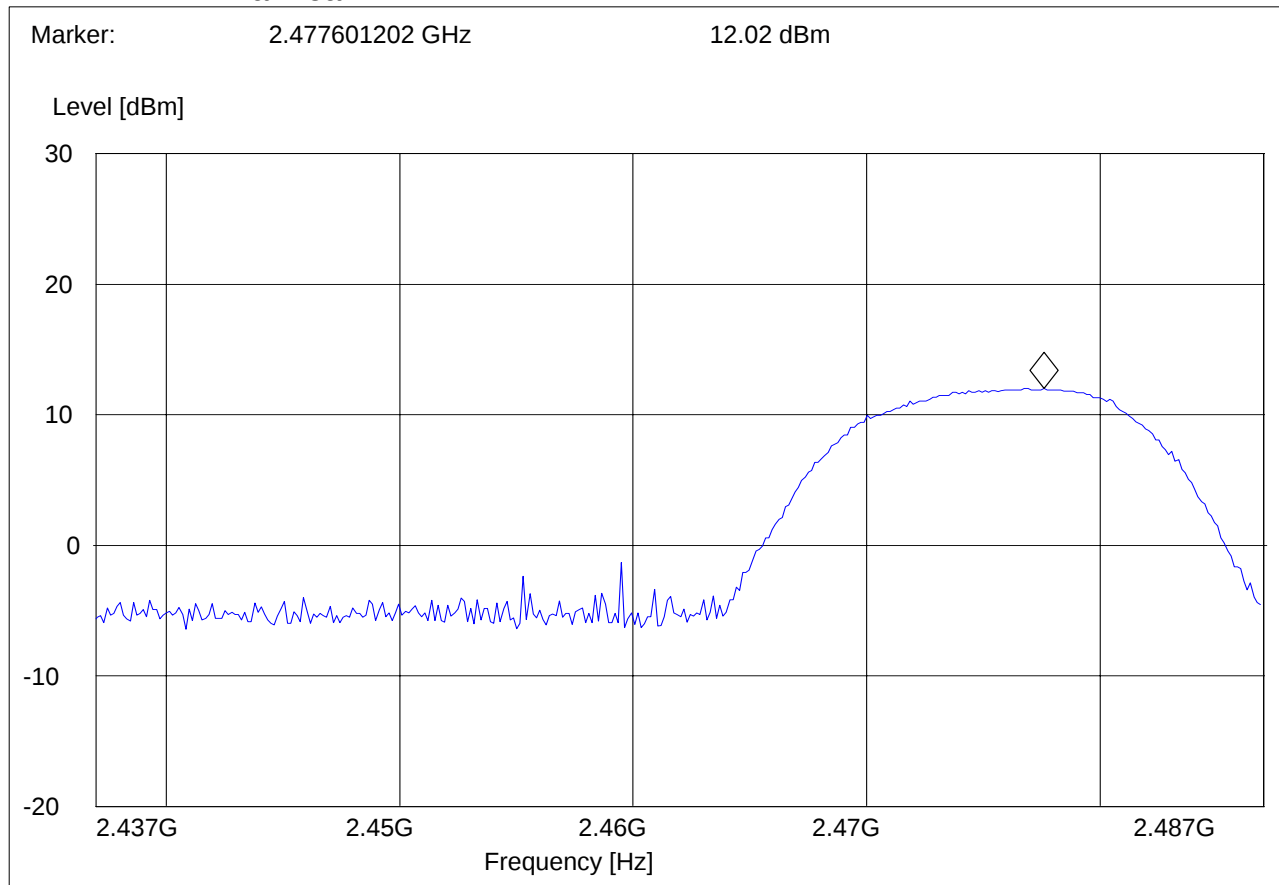




EUT: i210
Customer:: SmartSynch
Test Mode: zigbee high ch
ANT Orientation: H
EUT Orientation: V
Test Engineer: Sam
Voltage: AC + Internal Battery
Comments:

SWEEP TABLE: "EIRP RLAN CH11"

Short Description: EIRP RLAN channel-2462 MHz
Start Stop Detector Meas. IF Transducer
Frequency Frequency Time Bandw.
2.4 GHz 2.5 GHz MaxPeak Coupled 10 MHz DUMMY-DBM
MaxPeak



5.2 RESTRICTED BAND EDGE COMPLIANCE RADIATED §15.247/15.205

5.2.1 LIMITS

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)
13.36 - 13.41			

***PEAK LIMIT= 74dBuV/m**

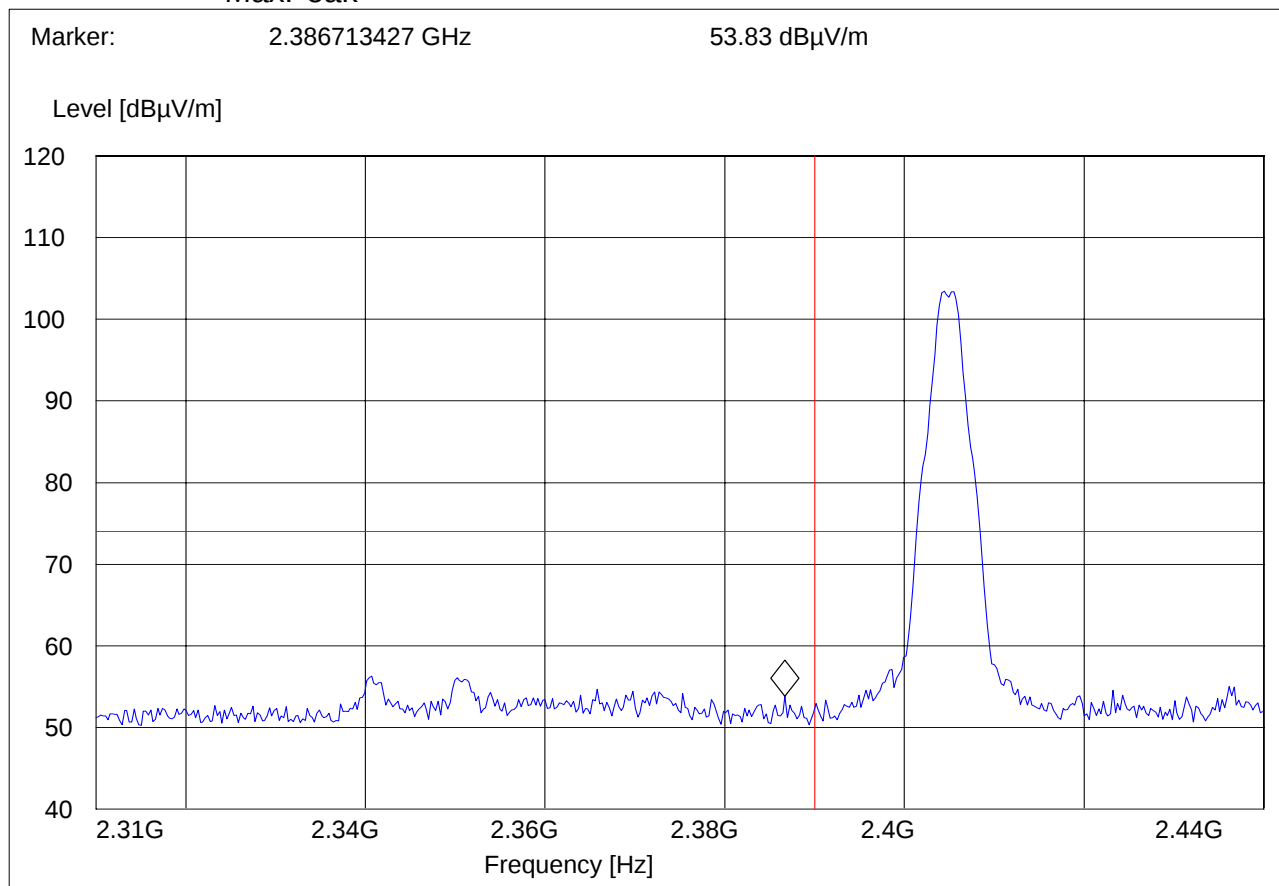
***AVG. LIMIT= 54dBuV/m**

Low Bandedge Peak

EUT: i210
Customer:: SmartSynch
Test Mode: zigbee low ch
ANT Orientation: H
EUT Orientation: V
Test Engineer: Chris
Voltage: AC + Internal Battery
Comments:

SWEEP TABLE: "FCC15.247 LBE_PK"

Start	Stop	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time	Bandw.	
2.3 GHz	2.4 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert
MaxPeak					



Low Bandedge Avg

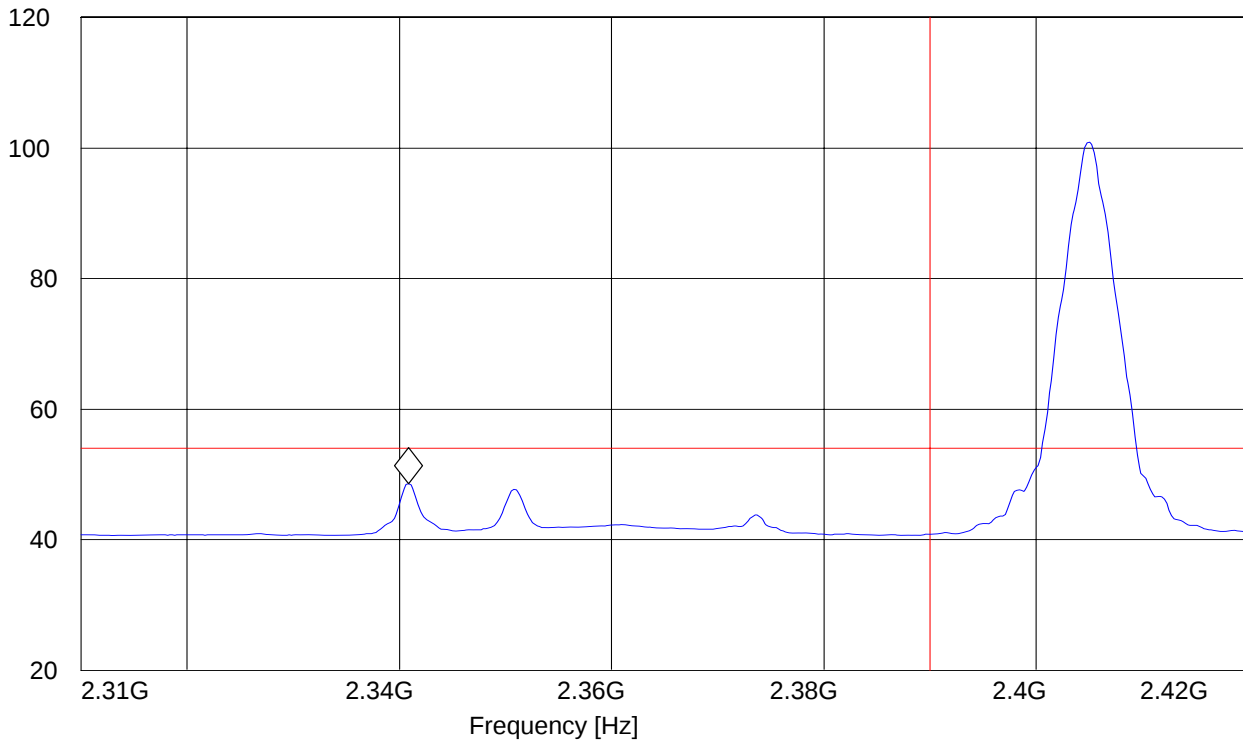
EUT: i210
Customer:: SmartSynch
Test Mode: zigbee low ch
ANT Orientation: H
EUT Orientation: V
Test Engineer: Chris
Voltage: AC + Internal Battery
Comments:

SWEEP TABLE: "FCC15.247 LBE_AVG"

Start	Stop	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time	Bandw.	
2.3 GHz	2.4 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert

Marker: 2.340861723 GHz 48.57 dB μ V/m

Level [dB μ V/m]

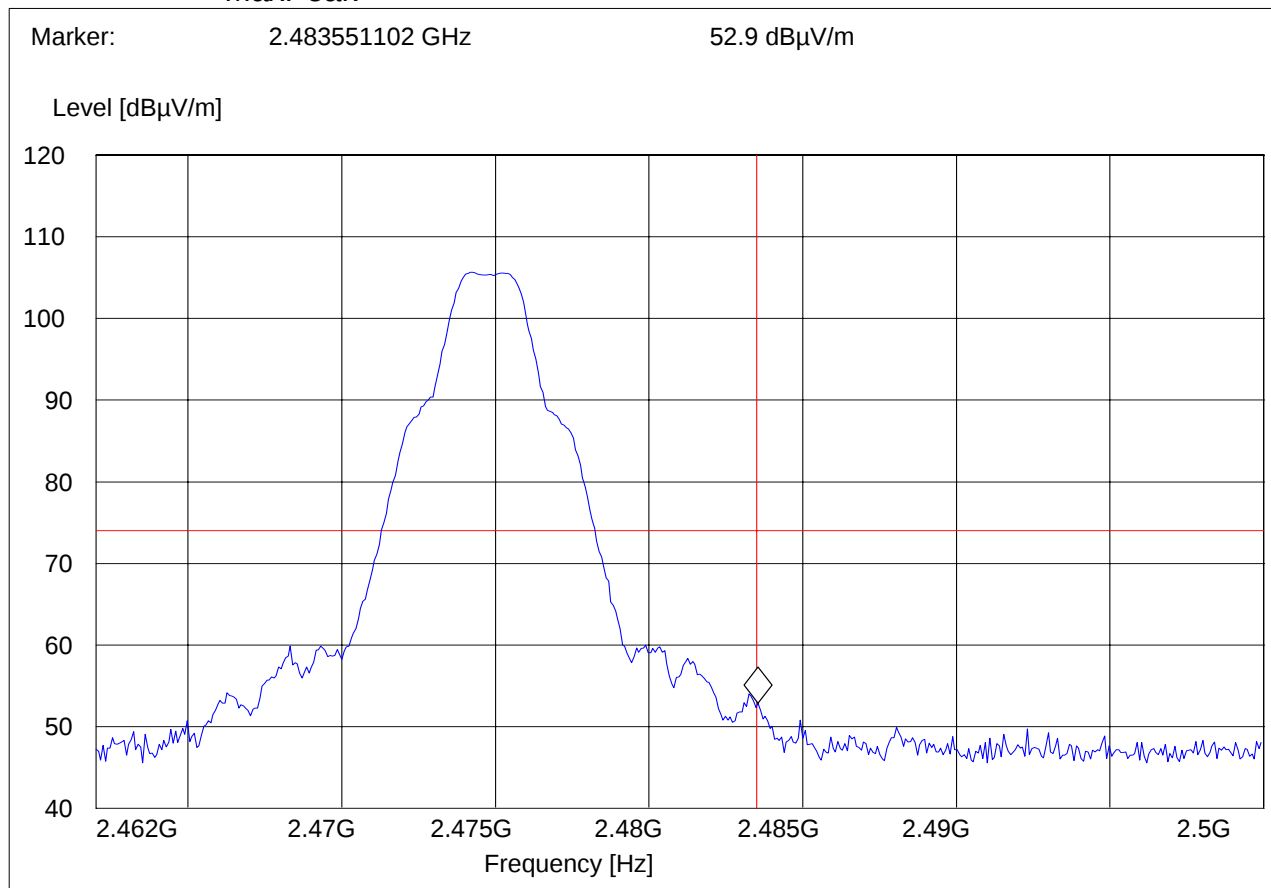


High Bandedge Peak

EUT: i210
Customer:: SmartSynch
Test Mode: zigbee high ch
ANT Orientation: H
EUT Orientation: V
Test Engineer: Chris
Voltage: AC + Internal Battery
Comments:

SWEEP TABLE: "FCC15.247 HBE_PK"

Start	Stop	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time	Bandw.	
2.5 GHz	2.5 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert
		MaxPeak			



High Bandedge Avg

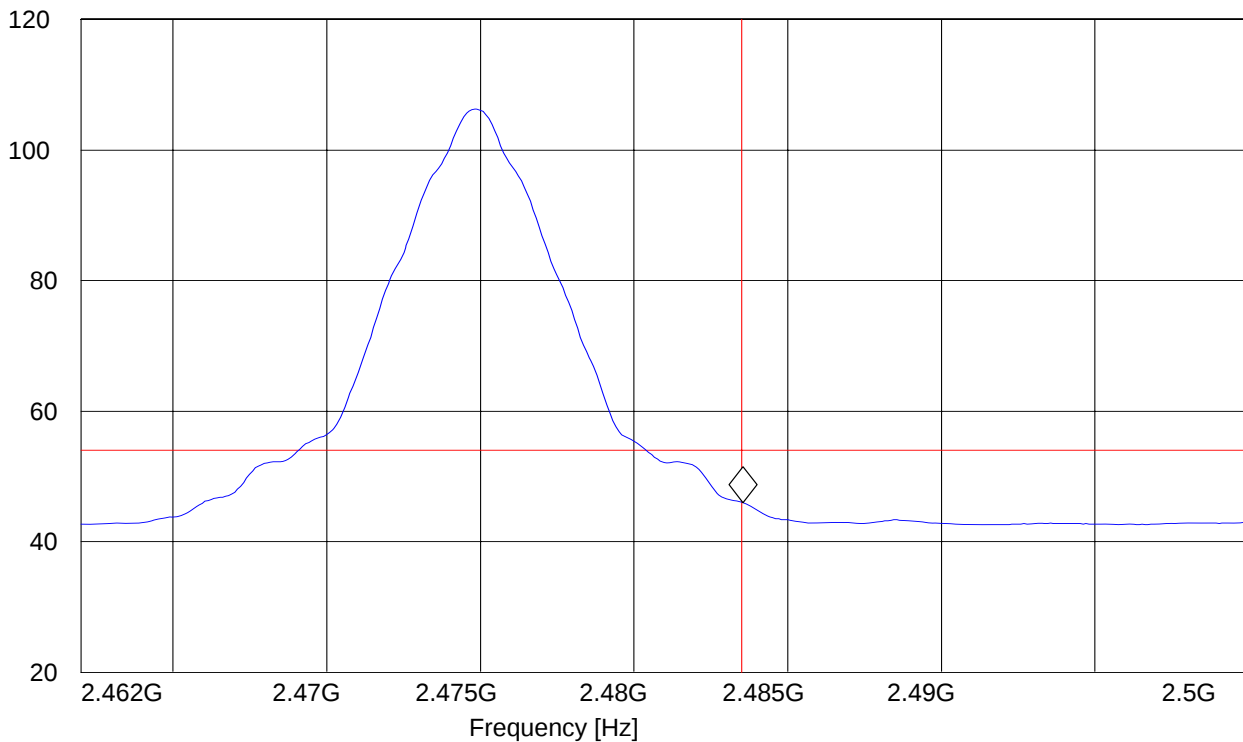
EUT: i210
Customer:: SmartSynch
Test Mode: zigbee high ch
ANT Orientation: H
EUT Orientation: V
Test Engineer: Chris
Voltage: AC + Internal Battery
Comments:

SWEEP TABLE: "FCC15.247 HBE_AVG"

Start	Stop	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time	Bandw.	
2.5 GHz	2.5 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_horz

Marker: 2.483547094 GHz 46 dB μ V/m

Level [dB μ V/m]



5.3 TRANSMITTER SPURIOUS EMISSIONS RADIATED § 15.247/15.205/15.209

5.3.1 LIMITS

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)
13.36 - 13.41			

*PEAK LIMIT= 74dBuV/m

*AVG. LIMIT= 54dBuV/m

NOTE:

1. The radiated emissions were done with different settings, using the relevant pre-amplifiers for the relevant frequency ranges. This is the reason that the graphs show different noise levels. In the range between 3 and 25 GHz very short cable connections to the antenna was used to minimize the noise level.

2. All measurements are done in peak mode using an average limit , unless specified with the plots.

Results for the radiated measurements below 30MHz according § 15.33

Frequency	Measured values	Remarks
9KHz – 30MHz	No emissions found, caused by the EUT	This is valid for all the tested channels

5.3.2 RESULTS 802.15.4 (worst case)**30MHz – 1GHz****Antenna: vertical****Note: This plot is valid for low, mid, high channels and both polarizations (worst-case plot)**

EUT: i210

Customer:: SmartSynch

Test Mode: zigbee mid ch

ANT Orientation: V

EUT Orientation: V

Test Engineer: Sam

Voltage: AC + Internal Battery

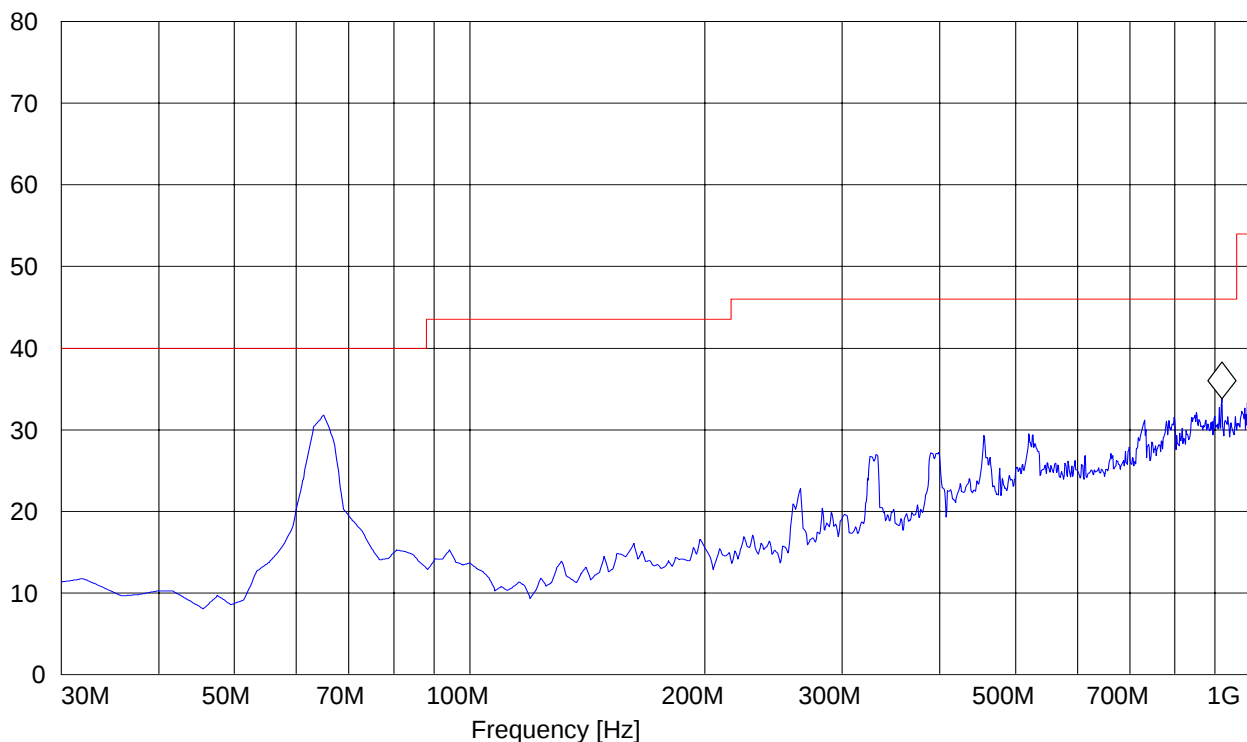
Comments:

SWEEP TABLE: "FCC15.247_30M-1G_Ver"

Start	Stop	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time	Bandw.	
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186_Vert

Marker: 918.356713 MHz 33.78 dBμV/m

Level [dBμV/m]

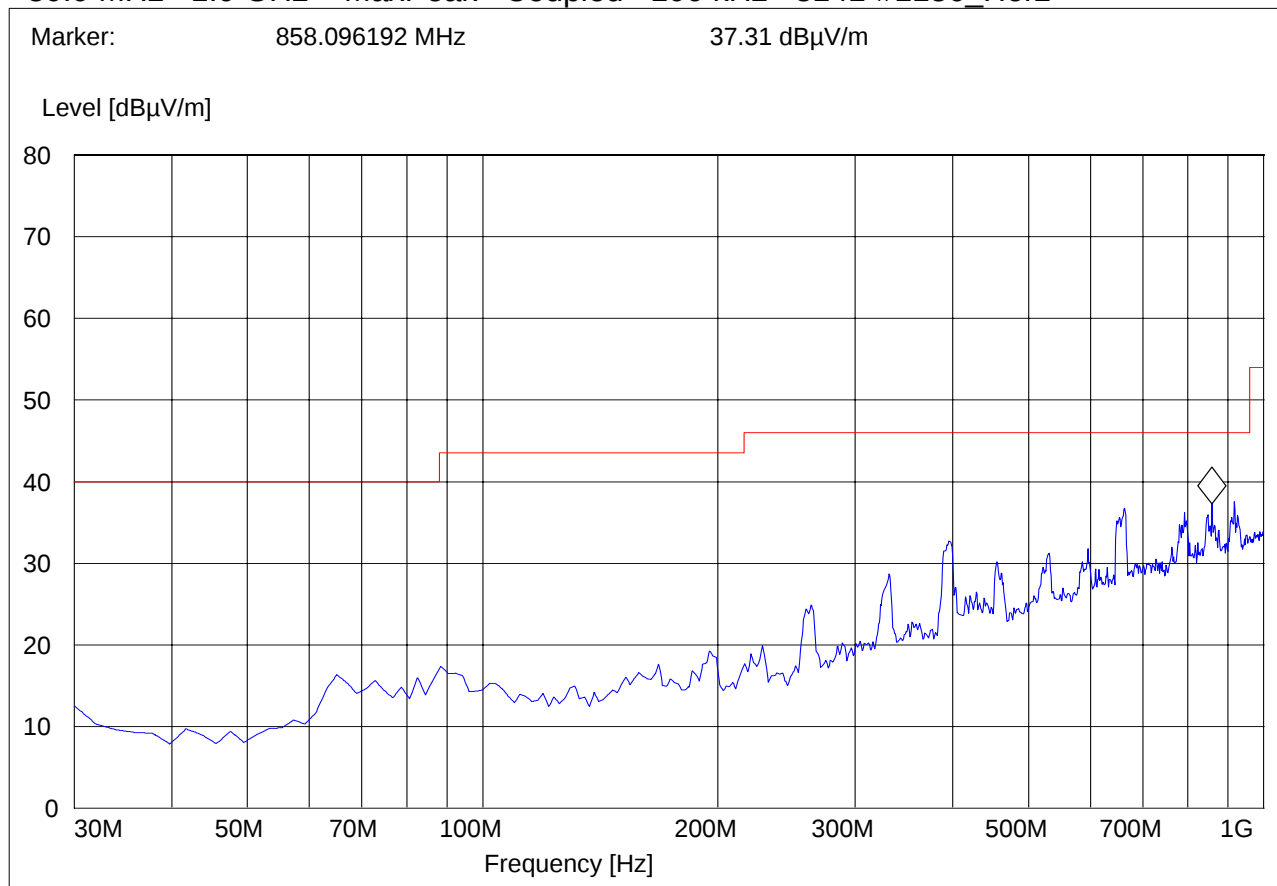


30MHz – 1GHz**Antenna: Horizontal****Note: This plot is valid for low, mid, high channels and both polarizations (worst-case plot)**

EUT: i210
Customer:: SmartSynch
Test Mode: zigbee mid ch
ANT Orientation: H
EUT Orientation: V
Test Engineer: Sam
Voltage: AC + Internal Battery
Comments:

SWEEP TABLE: "FCC15.247_30M-1G_Hor"

Start	Stop	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time	Bandw.	
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186_Horz



1-3GHz (2405MHz)**Note: The peaks above the limit line is the carrier freq.****Note: Peak Reading vs. Average limit**

EUT: i210

Customer:: SmartSynch

Test Mode: zigbee low ch

ANT Orientation: H

EUT Orientation: V

Test Engineer: Sam

Voltage: AC + Internal Battery

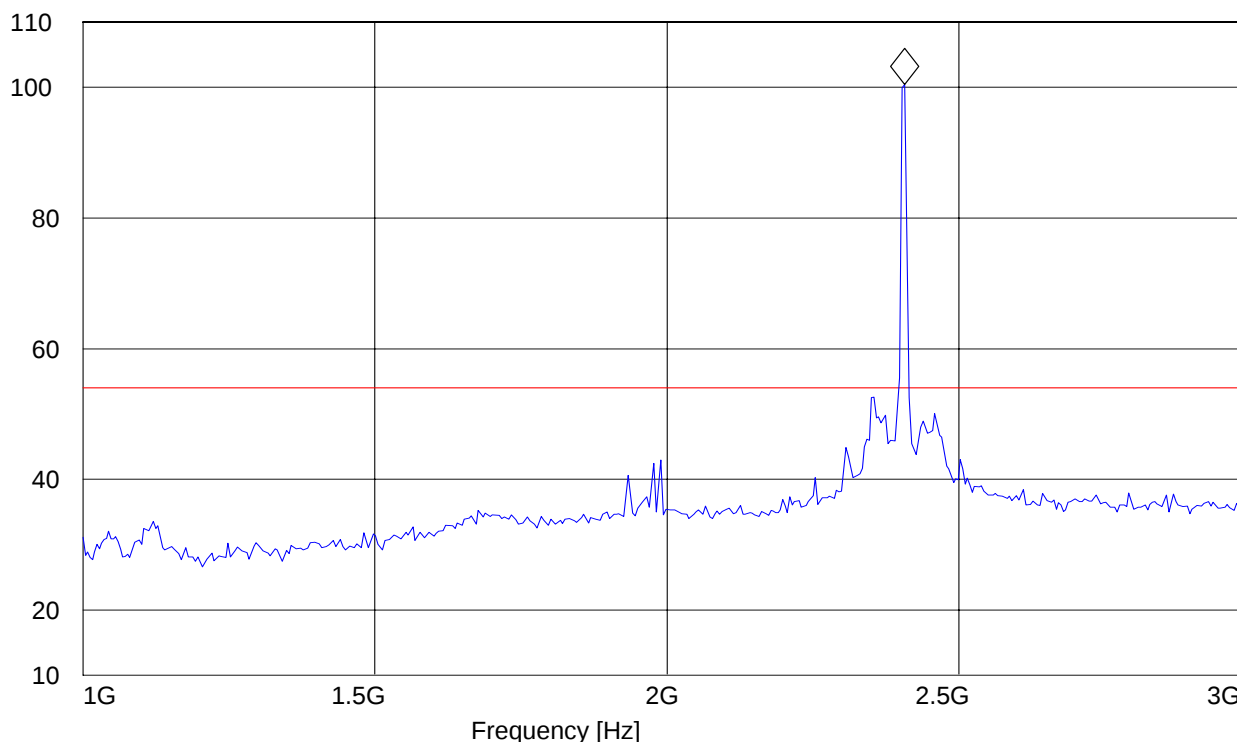
Comments:

SWEEP TABLE: "FCC15.247_1-3G"

Start	Stop	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time	Bandw.	
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert

Marker: 2.406813627 GHz 100.47 dBμV/m

Level [dBμV/m]



1-3GHz (2430MHz)**Note: The peaks above the limit line is the carrier freq.****Note: Peak Reading vs. Average limit**

EUT: i210

Customer:: SmartSynch

Test Mode: zigbee mid ch

ANT Orientation: H

EUT Orientation: V

Test Engineer: Sam

Voltage: AC + Internal Battery

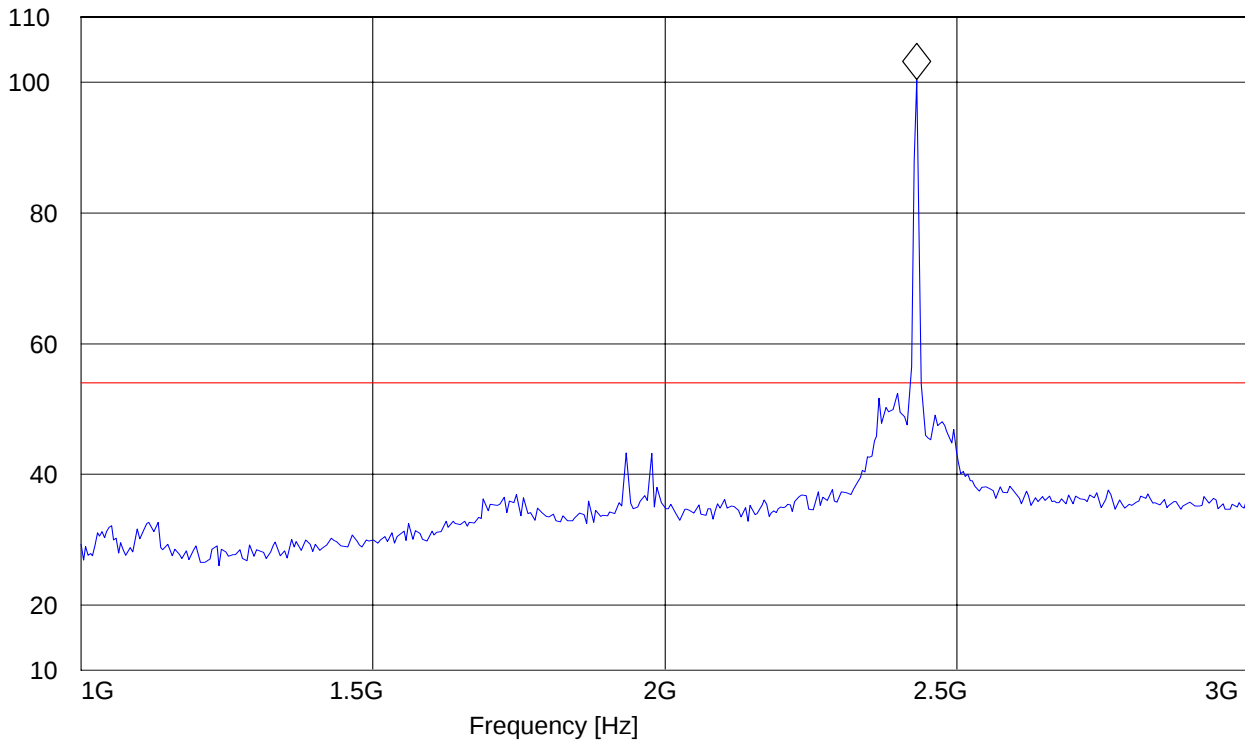
Comments:

SWEEP TABLE: "FCC15.247_1-3G"

Start	Stop	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time	Bandw.	
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert

Marker: 2.430861723 GHz 100.44 dBμV/m

Level [dBμV/m]



1-3GHz (2475MHz)**Note: The peaks above the limit line is the carrier freq.****Note: Peak Reading vs. Average limit**

EUT: i210

Customer:: SmartSynch

Test Mode: zigbee high ch

ANT Orientation: H

EUT Orientation: V

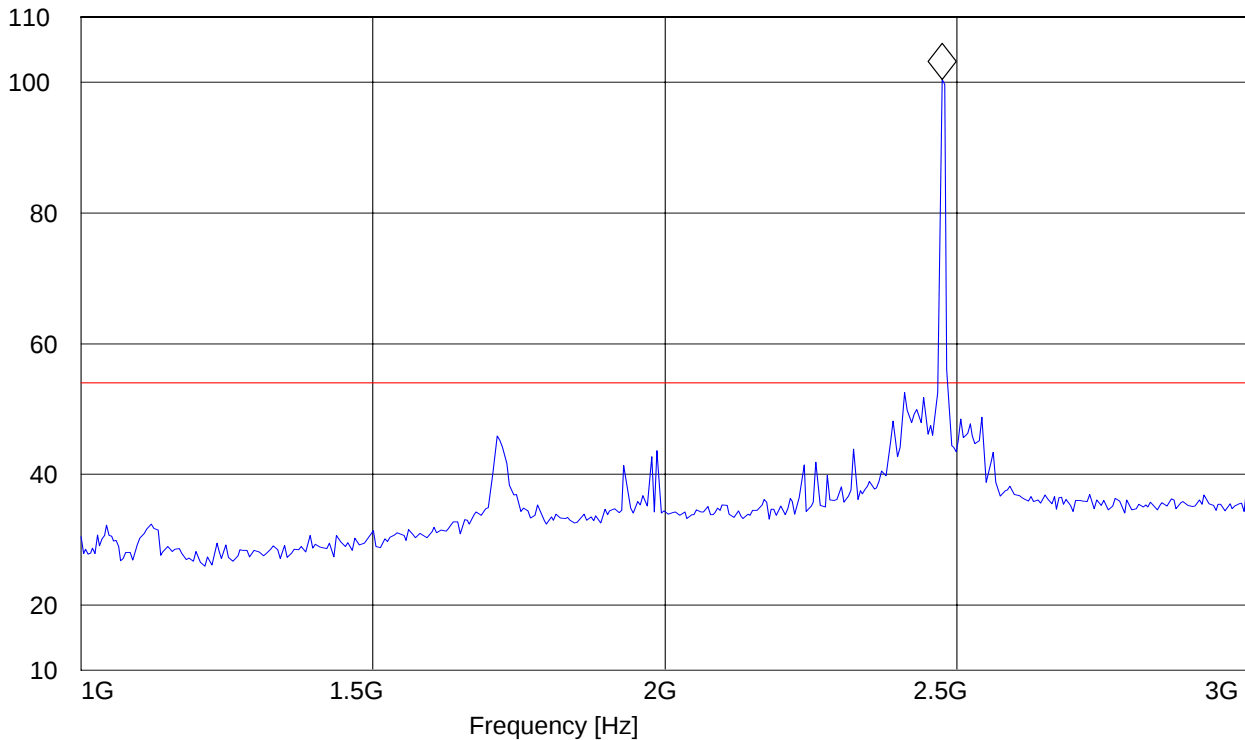
Test Engineer: Sam

Voltage: AC + Internal Battery

Comments:

SWEEP TABLE: "FCC15.247_1-3G"

Start	Stop	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time	Bandw.	
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert

Marker: 2.4749499 GHz 100.48 dB μ V/mLevel [dB μ V/m]

3-18GHz (2405MHz)**Note: Peak Reading vs. Average limit**

EUT: i210

Customer:: SmartSynch

Test Mode: zigbee low ch

ANT Orientation: H

EUT Orientation: V

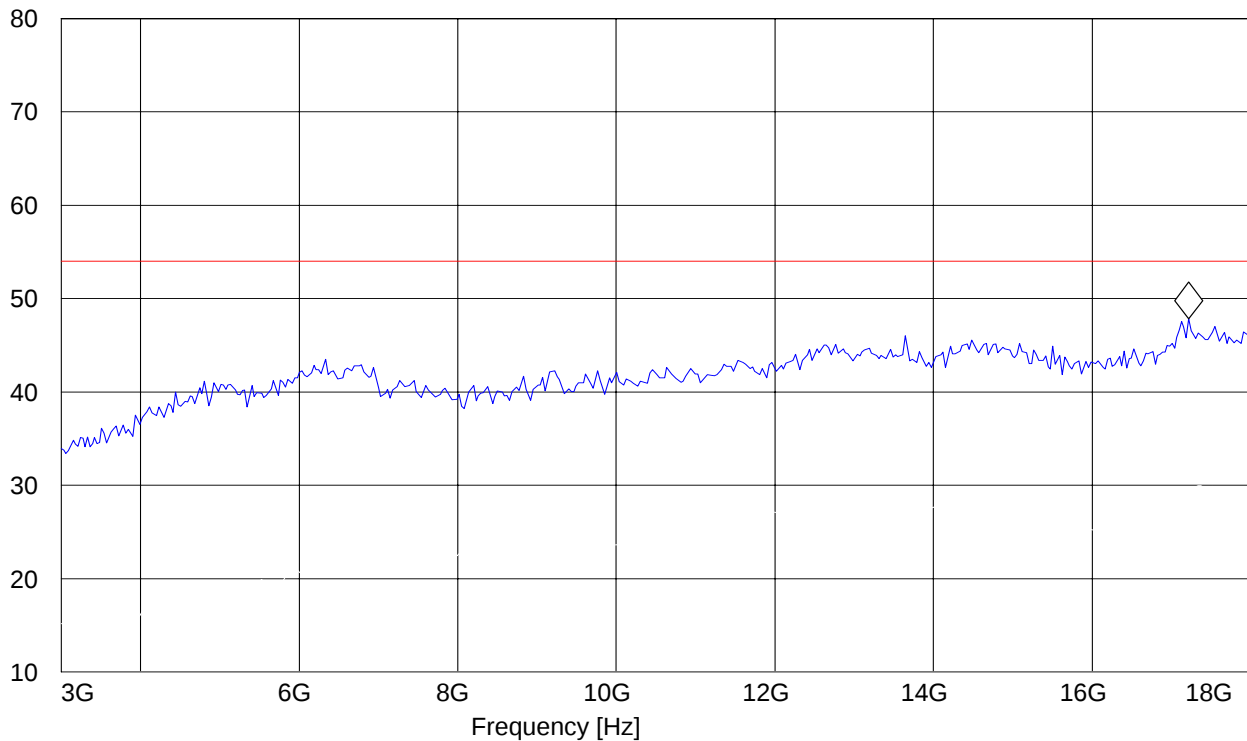
Test Engineer: Sam

Voltage: AC + Internal Battery

Comments:

SWEEP TABLE: "FCC15.247_3-18G"

Start	Stop	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time	Bandw.	
3.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert

Marker: 17.218436874 GHz 47.85 dB μ V/mLevel [dB μ V/m]

3-18GHz (2430MHz)**Note: Peak Reading vs. Average limit**

EUT: i210

Customer:: SmartSynch

Test Mode: zigbee mid ch

ANT Orientation: H

EUT Orientation: V

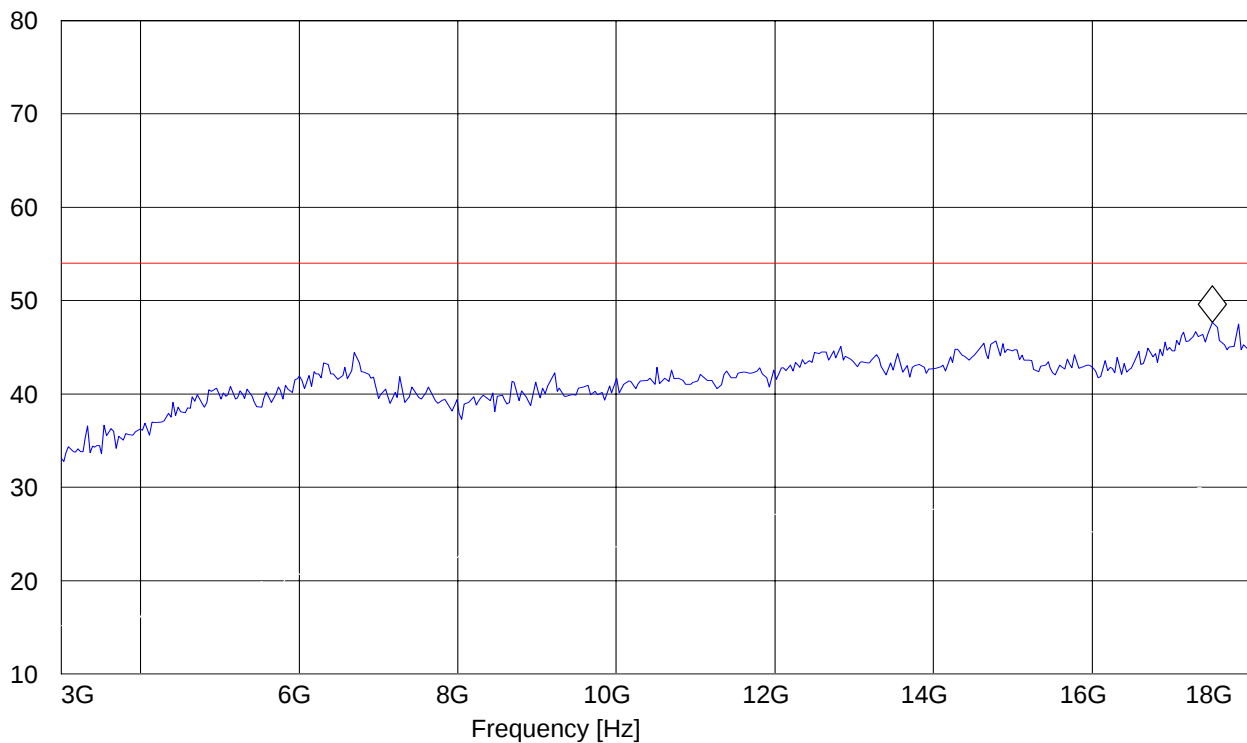
Test Engineer: Sam

Voltage: AC + Internal Battery

Comments:

SWEEP TABLE: "FCC15.247_3-18G"

Start	Stop	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time		Bandw.
3.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert

Marker: 17.519038076 GHz 47.65 dB μ V/mLevel [dB μ V/m]

3-18GHz (2475MHz)**Note: Peak Reading vs. Average limit**

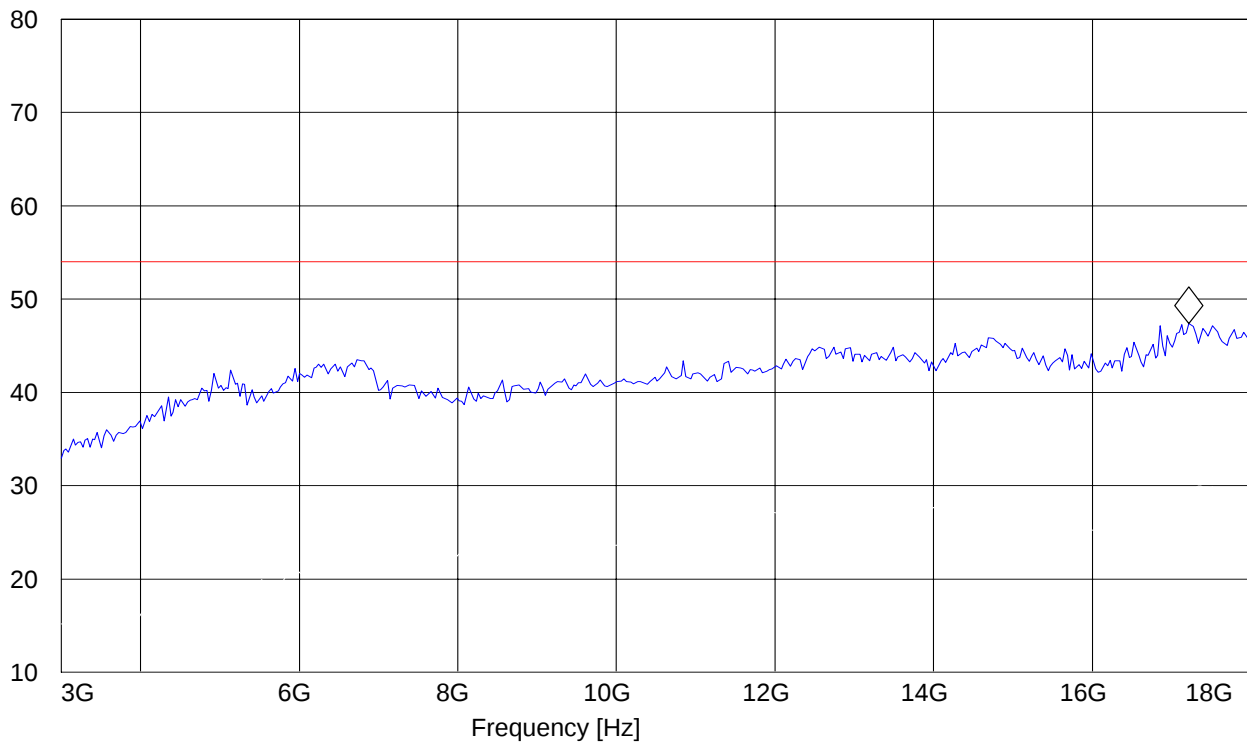
EUT: i210
Customer:: SmartSynch
Test Mode: zigbee high ch
ANT Orientation: H
EUT Orientation: V
Test Engineer: Sam
Voltage: AC + Internal Battery
Comments:

SWEEP TABLE: "FCC15.247_3-18G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
3.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert

Marker: 17.218436874 GHz 47.36 dBμV/m

Level [dBμV/m]



18-26GHz**Note: This plot is valid for low, mid, high channels (worst-case plot)****Note: Peak Reading vs. Average limit**

EUT: i210

Customer:: SmartSynch

Test Mode: zigbee mid ch

ANT Orientation: H

EUT Orientation: V

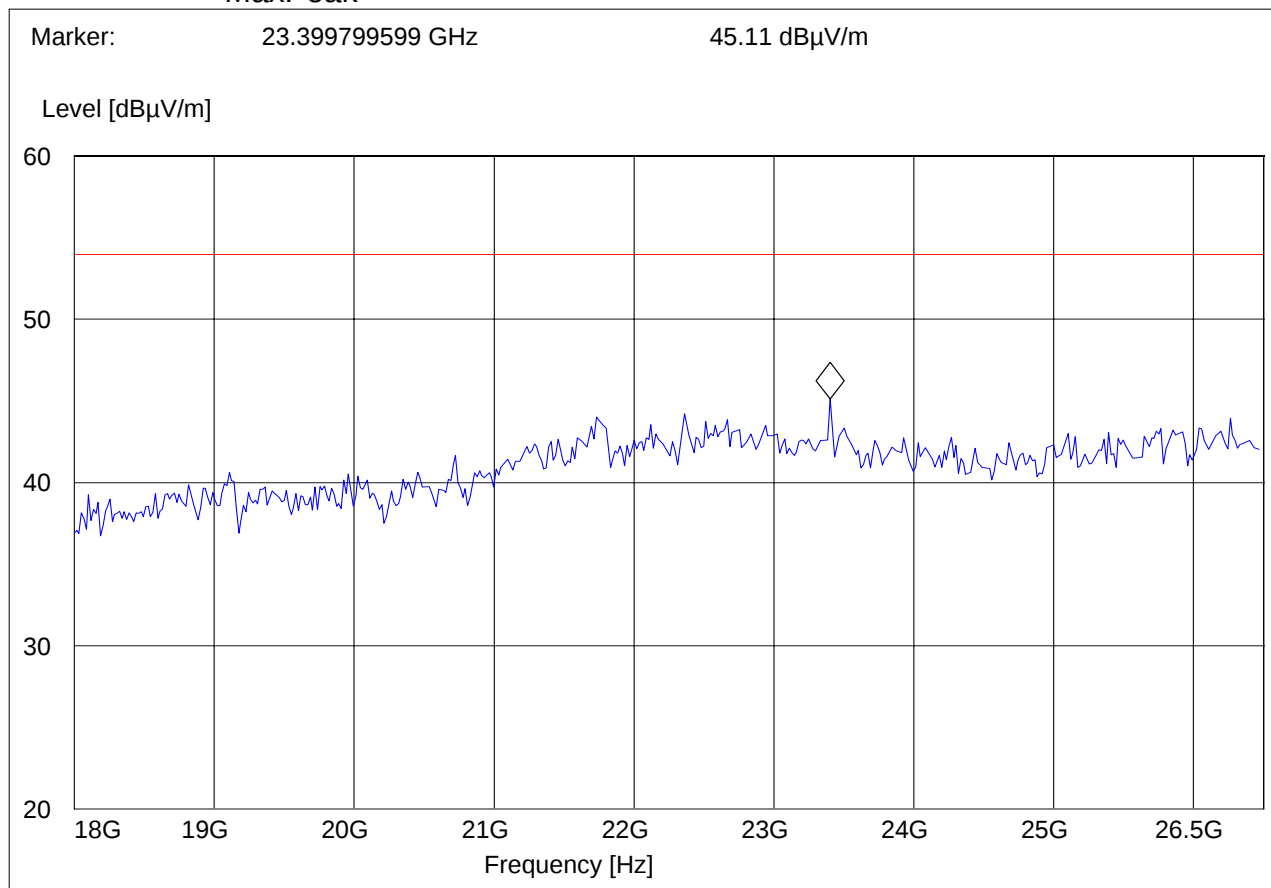
Test Engineer: Sam

Voltage: AC + Internal Battery

Comments:

SWEEP TABLE: "FCC15.247_18-26.5G"

Start	Stop	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time	Bandw.	
18.0 GHz	26.5 GHz	MaxPeak	Coupled	100 kHz	Horn # 3116_18-40G
MaxPeak					



5.4 RECEIVER SPURIOUS RADIATION § 15.209/RSS210**5.4.1 LIMITS**

Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)
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

NOTE:

1. The radiated emissions were done with different settings, using the relevant pre-amplifiers for the relevant frequency ranges. This is the reason that the graphs show different noise levels. In the range between 3 and 25 GHz very short cable connections to the antenna was used to minimize the noise level.

2. All measurements are done in peak mode using an average limit , unless specified with the plots.

30MHz – 1GHz**Antenna: vertical****Note: This plot is valid for low, mid, high channels and both polarizations (worst-case plot)**

EUT: i210

Customer:: SmartSynch

Test Mode: Rx

ANT Orientation: V

EUT Orientation: V

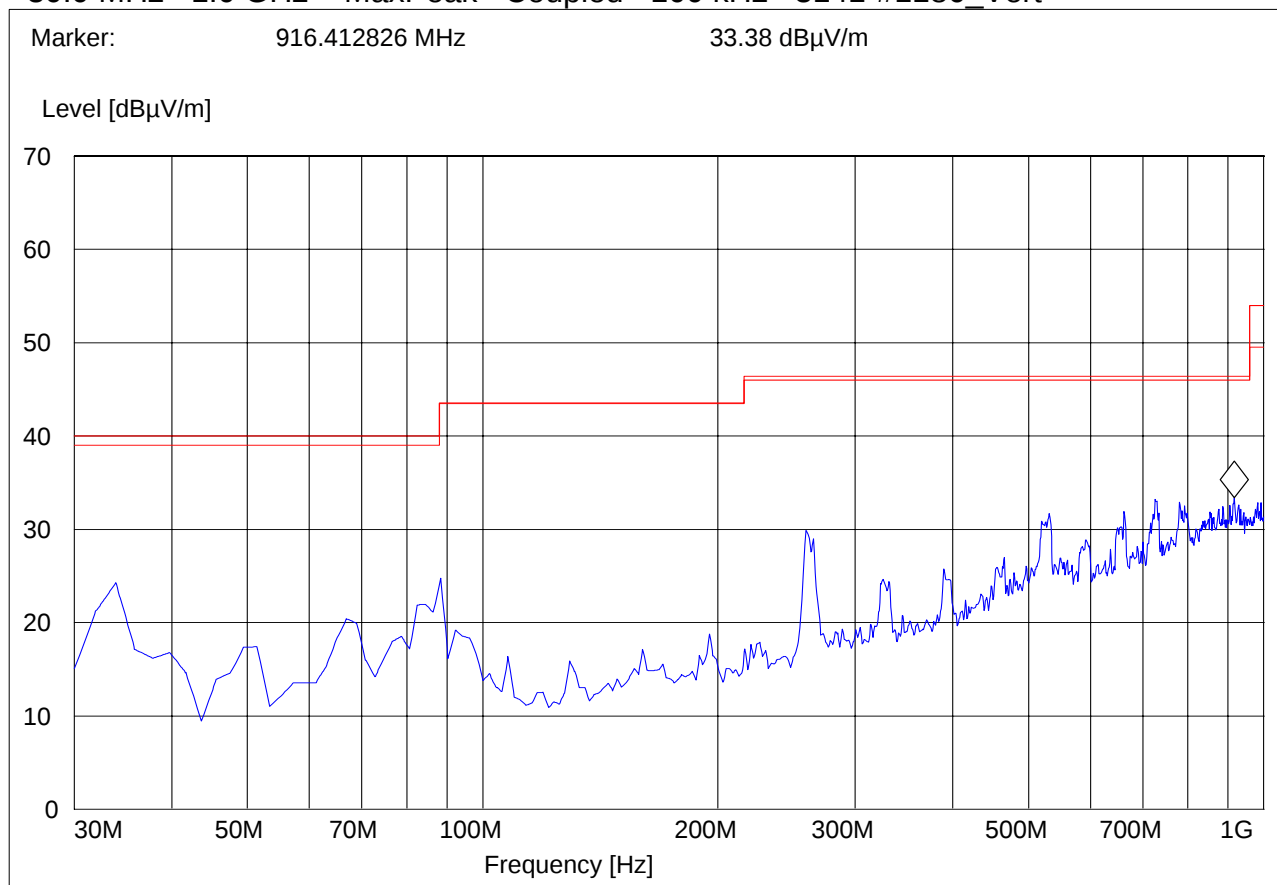
Test Engineer: Marc

Voltage: AC + Internal Battery

Comments:

SWEEP TABLE: "CANADA RE_30M-1G_Ver"

Start	Stop	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time	Bandw.	
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186_Ver

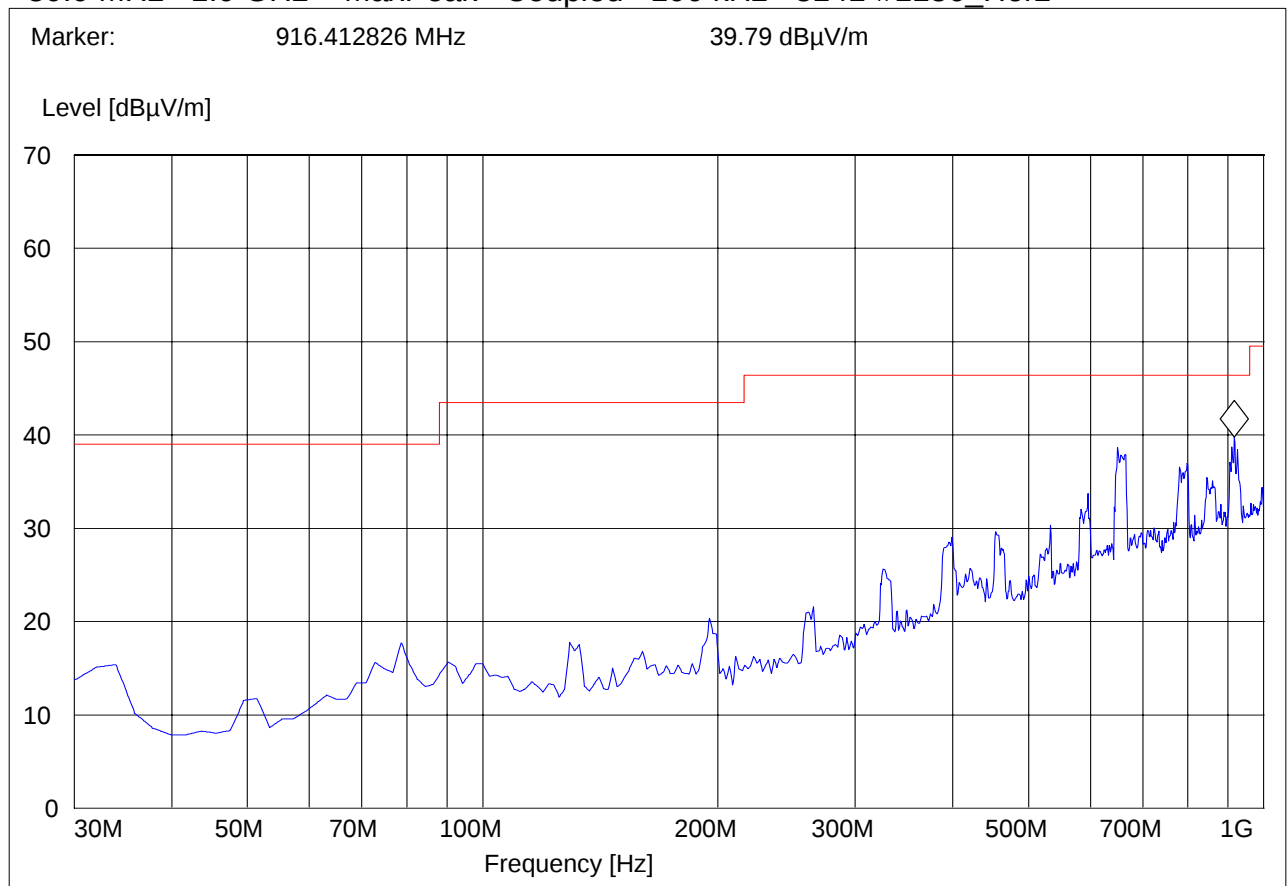


30MHz – 1GHz**Antenna: Horizontal****Note: This plot is valid for low, mid, high channels and both polarizations (worst-case plot)**

EUT: i210
Customer:: SmartSynch
Test Mode: Rx
ANT Orientation: H
EUT Orientation: V
Test Engineer: Marc
Voltage: AC + Internal Battery
Comments:

SWEEP TABLE: "CANDA RE_30M-1G_Hor"

Start	Stop	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time	Bandw.	
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186_Horz



1-3GHz**Note: Peak Reading vs. Average limit****Note: This plot is valid for low, mid, high channels and both polarizations (worst-case plot)**

EUT: i210

Customer:: SmartSynch

Test Mode: GSM 1900

ANT Orientation: V

EUT Orientation: V

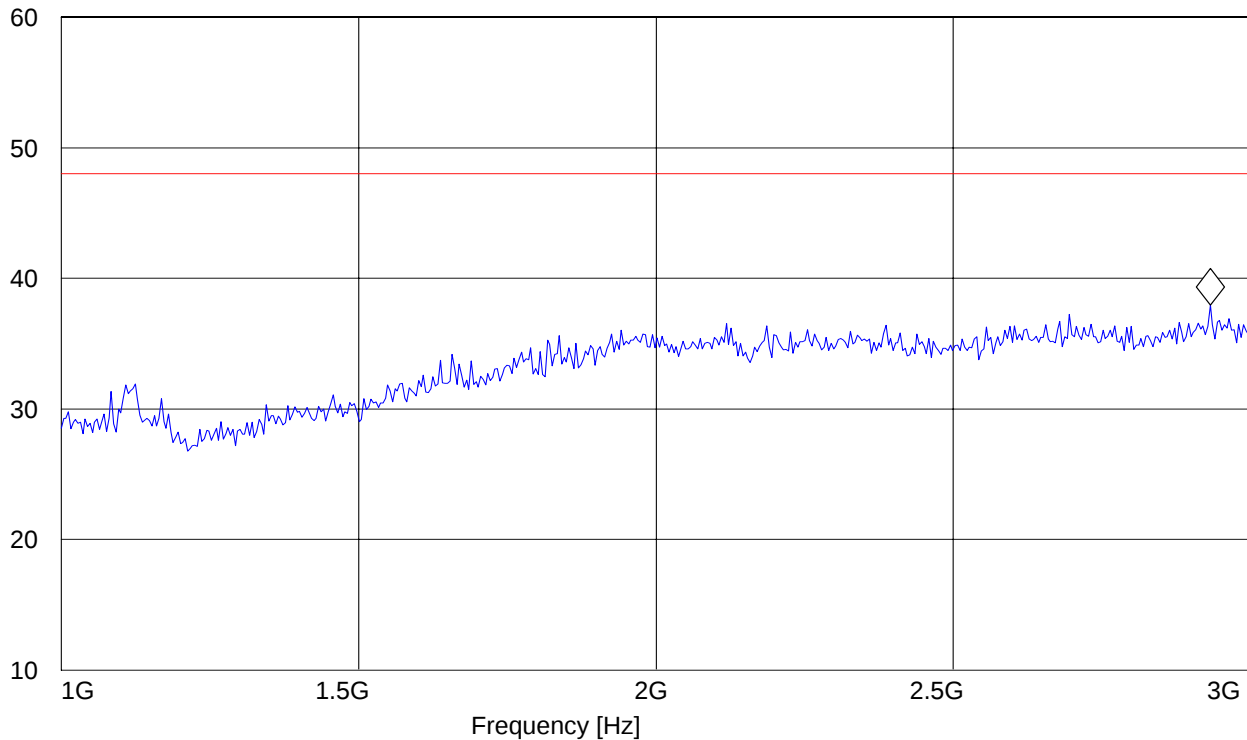
Test Engineer: Marc

Voltage: AC + Internal Battery

Comments:

SWEEP TABLE: "CANADA RE_1-3G"

Start	Stop	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time	Bandw.	
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_horz

Marker: 2.931863727 GHz 37.95 dB μ V/mLevel [dB μ V/m]

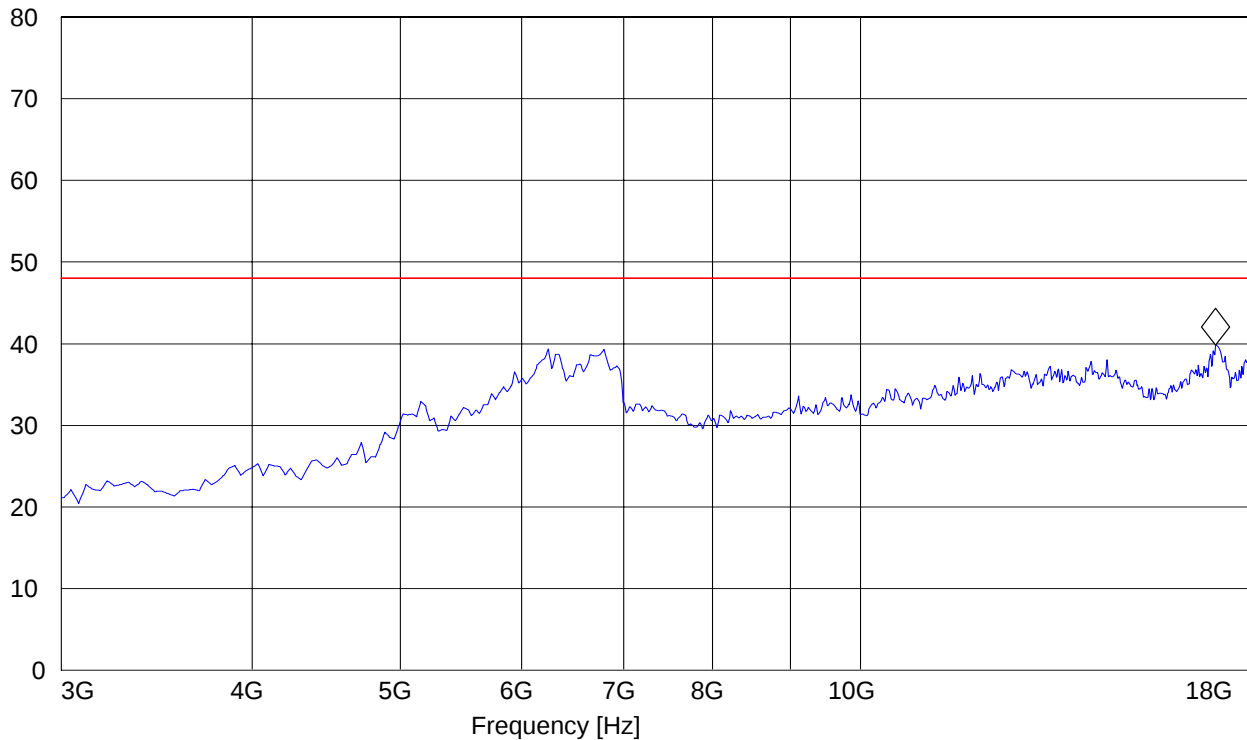
3-18GHz**Note: Peak Reading vs. Average limit****Note: This plot is valid for low, mid, high channels and both polarizations (worst-case plot)**

EUT: i210
Customer:: SmartSynch
Test Mode: GSM 1900
ANT Orientation: V
EUT Orientation: V
Test Engineer: Marc
Voltage: AC + Internal Battery
Comments:

SWEEP TABLE: "CANADA RE_3-18G"

Start	Stop	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time	Bandw.	
1.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_horz

Marker: 17.080160321 GHz 39.83 dB μ V/m

Level [dB μ V/m]

6 Measurements (CONDUCTED)**6.1 MAXIMUM OUTPUT POWER § 15.247 (CONDUCTED)****6.1.1 LIMIT SUB CLAUSE § 15.247 (b) (1)**

Frequency range	RF power output
2400-2483.5 MHz	30dBm

*limit is based upon antenna gain of less than or equal to 6dBi.

6.1.2 RESULTS:

TEST CONDITIONS	MAXIMUM OUTPUT POWER (dBm)		
Frequency (MHz)	2405 MHz	2430 MHz	2475 MHz
802.15.4	14.06	15.01	13.55

6.2 6dB BANDWIDTH

6.2.1 LIMIT SUB CLAUSE § 15.247 (a) (2)

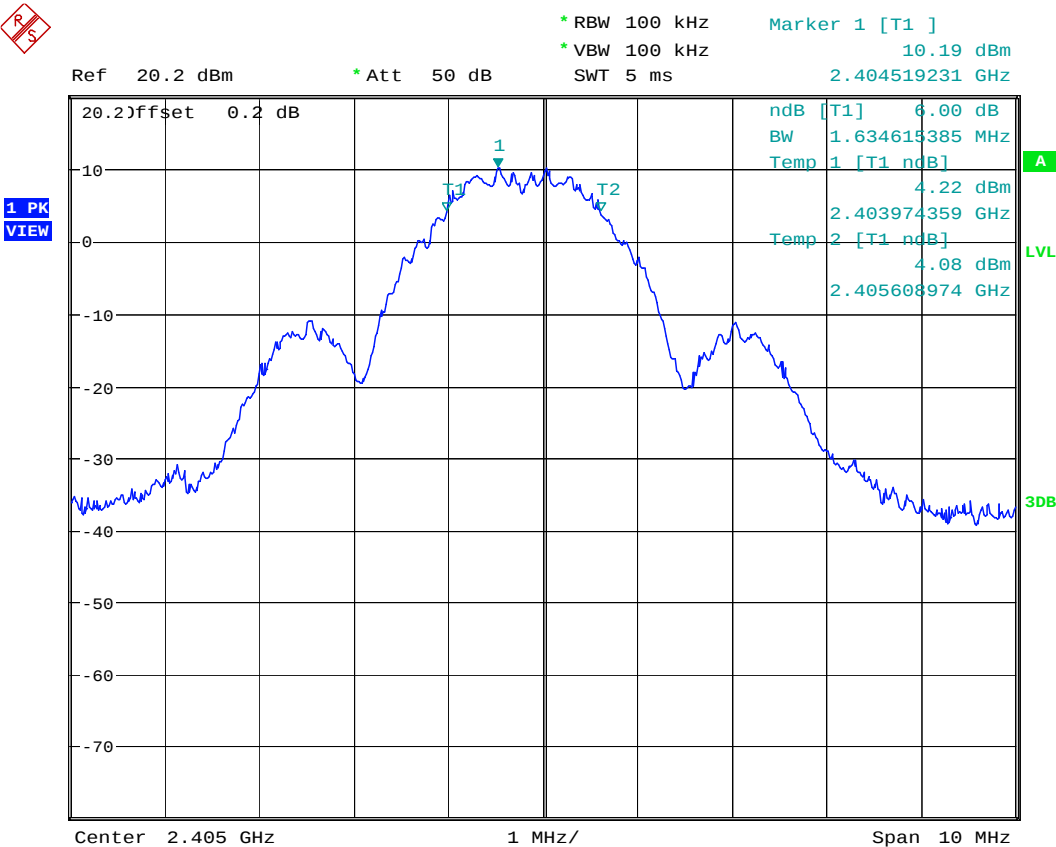
(2) Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

Frequency range	6dB Band width
2400-2483.5 MHz	500kHz

TEST CONDITIONS	6dB BANDWIDTH (MHz)		
Frequency (MHz)	2405 MHz	2430 MHz	2475 MHz
802.15.4	1.63	1.63	1.63

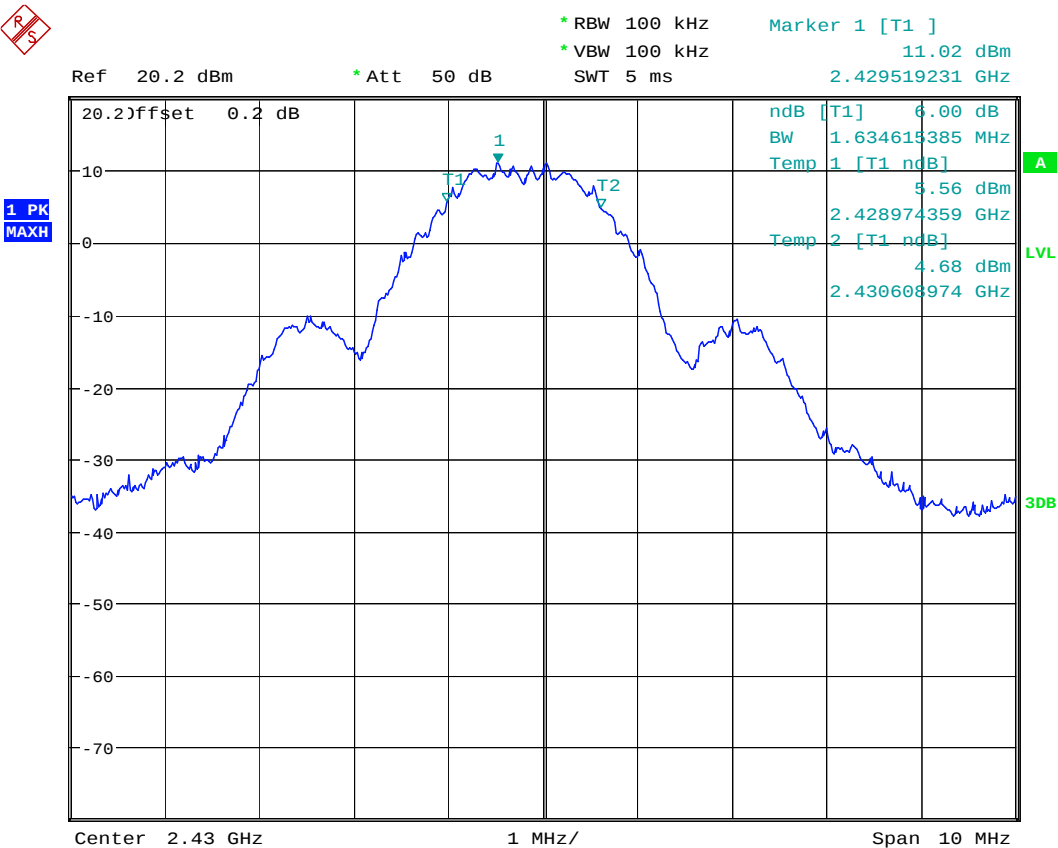


(2405 MHz) 6dB BW



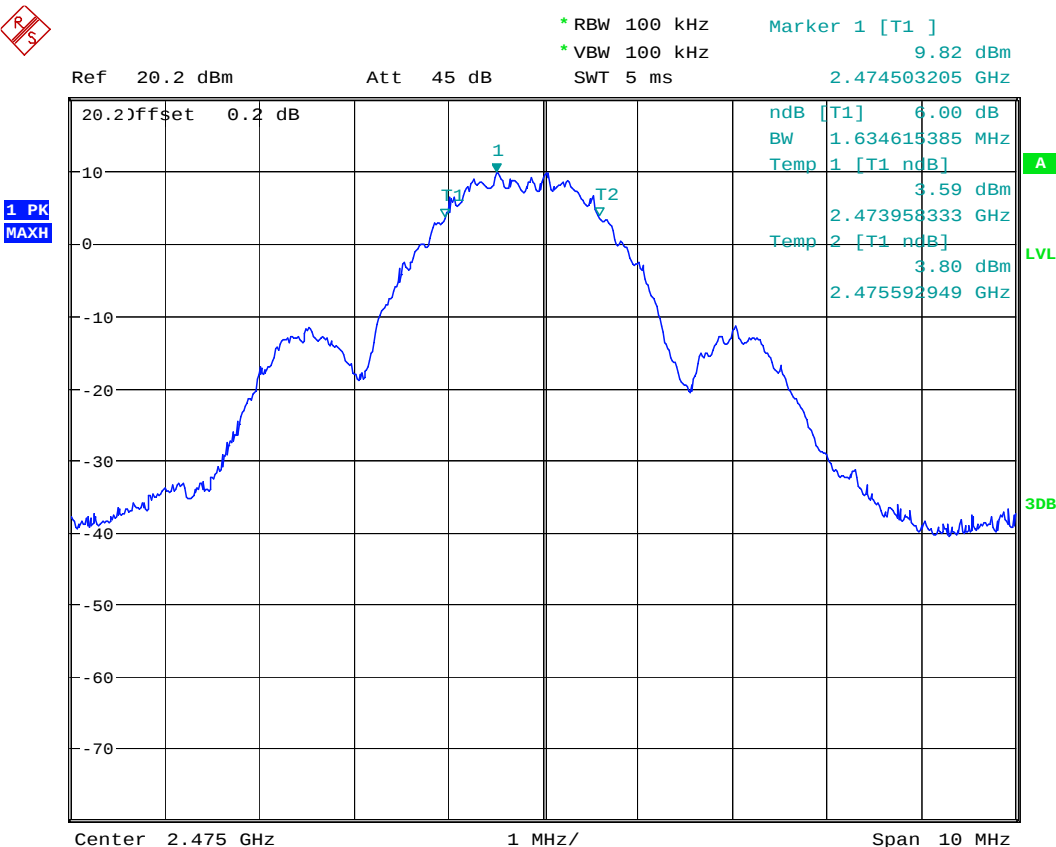


(2430 MHz) 6dB BW





(2475 MHz) 6dB BW



6.3 99% BANDWIDTH**6.3.1 LIMIT SUB CLAUSE § RSS-210 (A8.2)(a)**

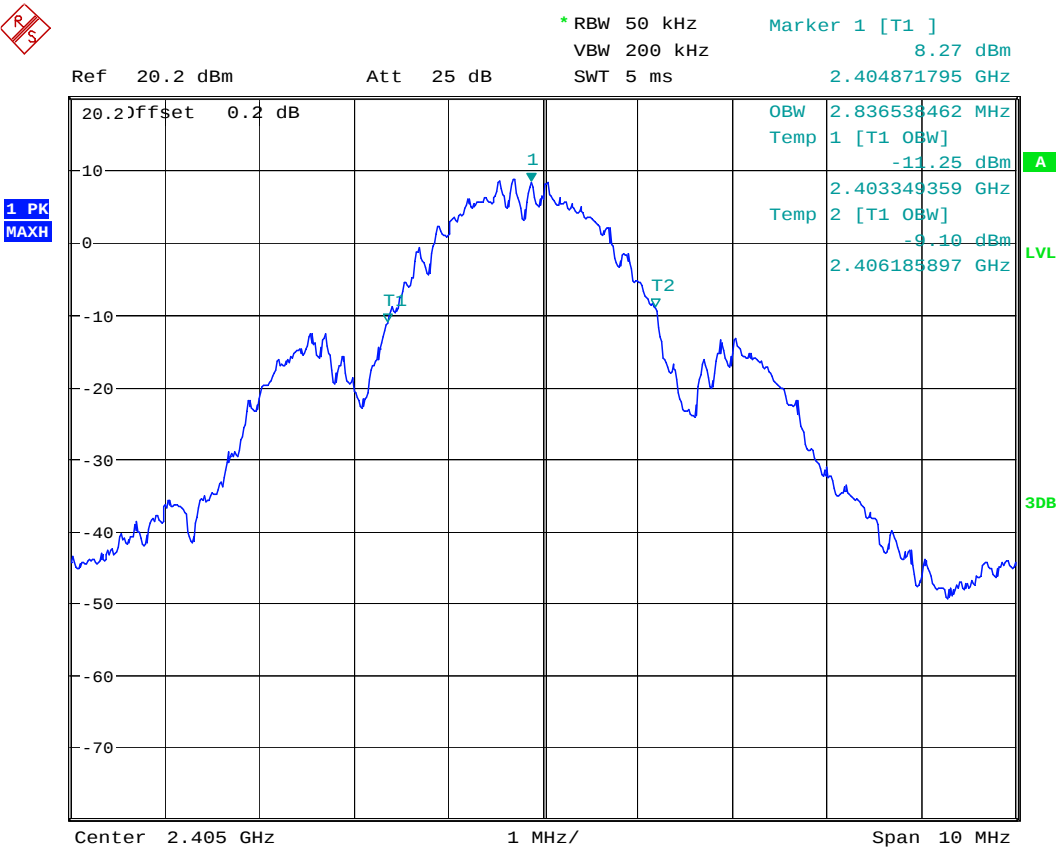
99% BW shall be at least 500kHz

Frequency range	99% Band width
2400-2483.5 MHz	500kHz

TEST CONDITIONS	99% BANDWIDTH (MHz)		
Frequency (MHz)	2405 MHz	2430 MHz	2475 MHz
802.15.4	2.84	2.87	2.84

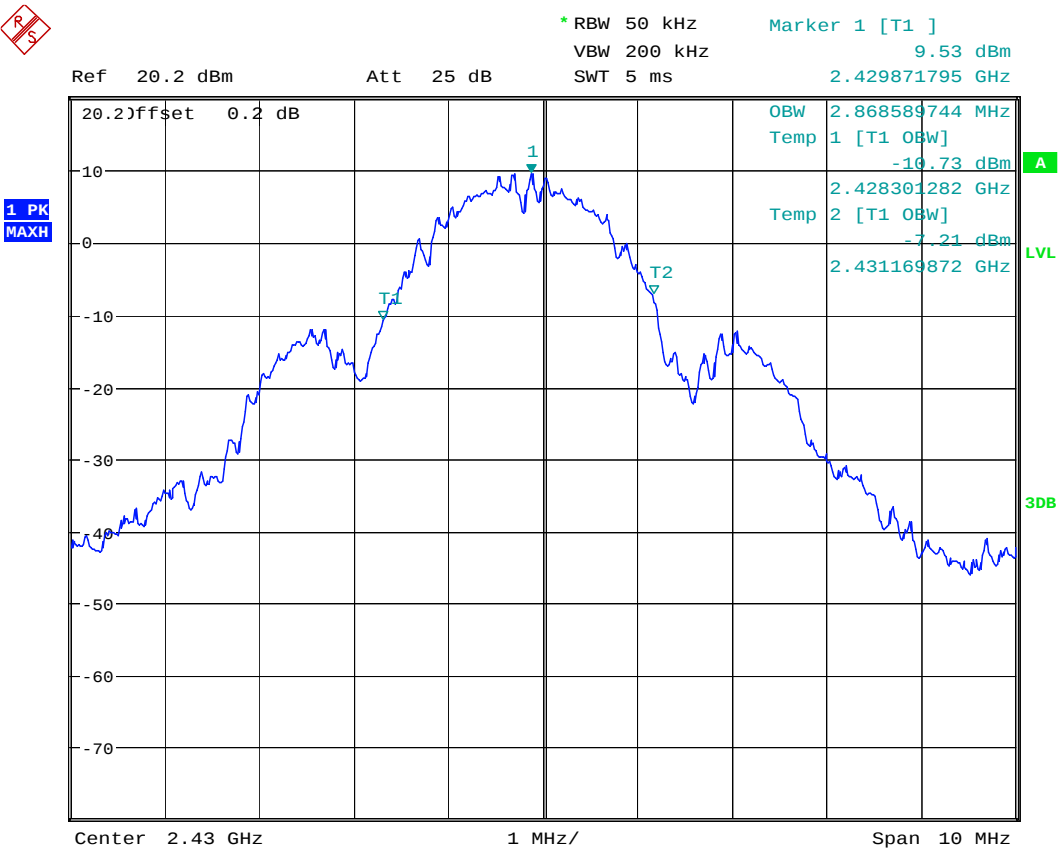


(2405 MHz) 99% BW



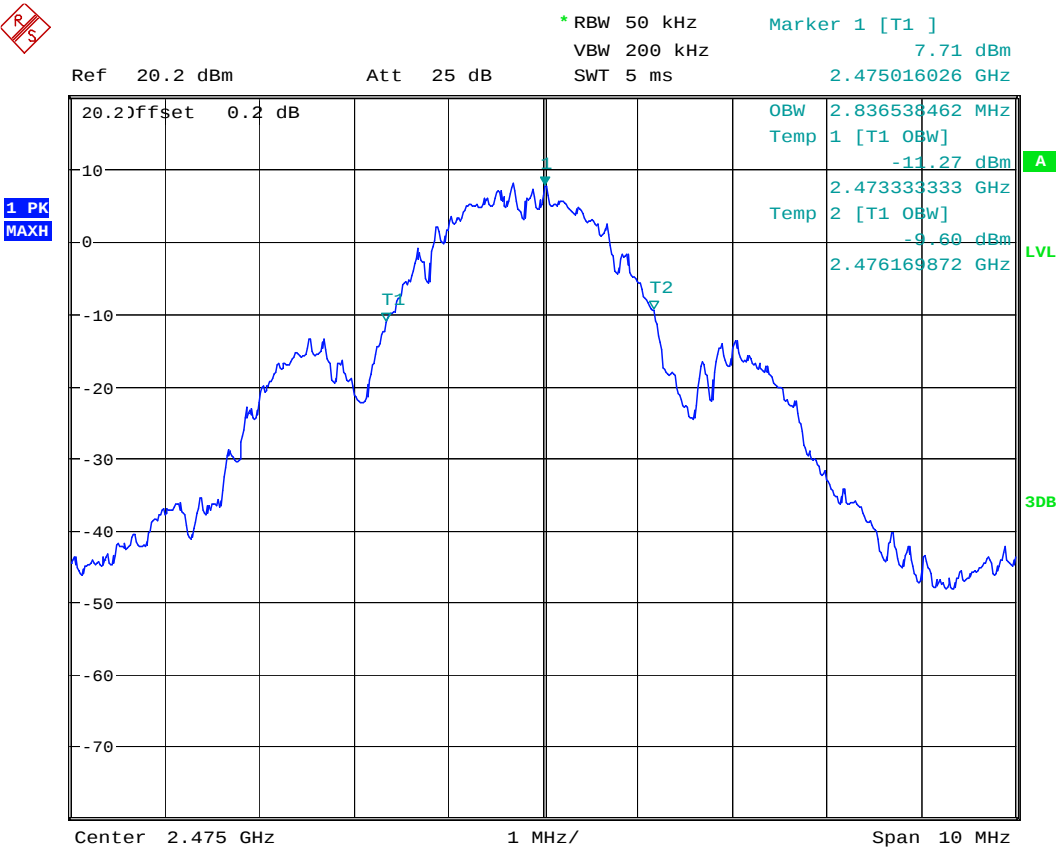


(2430 MHz) 99% BW





(2475 MHz) 99% BW



6.4 POWER SPECTRAL DENSITY**6.4.1 LIMIT SUB CLAUSE § 15.247 5 (d)**

FREQUENCY RANGE	limit
2400-2483.5	8dBm (in 3kHz BW)

6.4.2 RESULTS:

TEST CONDITIONS Frequency (MHz)	POWER SPECTRAL DENSITY (dBm)		
	2405 MHz	2430 MHz	2475 MHz
802.15.4	-0.52	0.38	-1.03

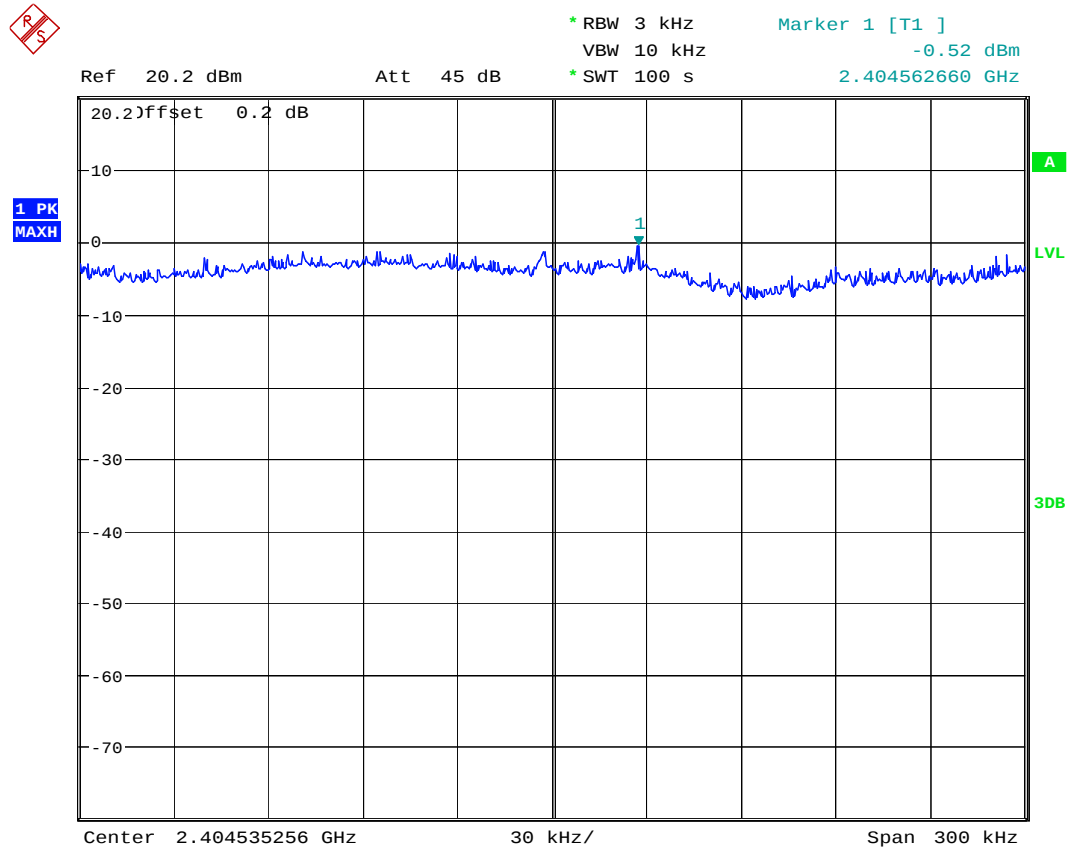
Test Report #: EMC_SMAR2_016_15.247

Date of Report: 2009-4-16

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(2405 MHz) POWER SPECTRAL DENSITY



Date: 13.JAN.2009 14:43:28

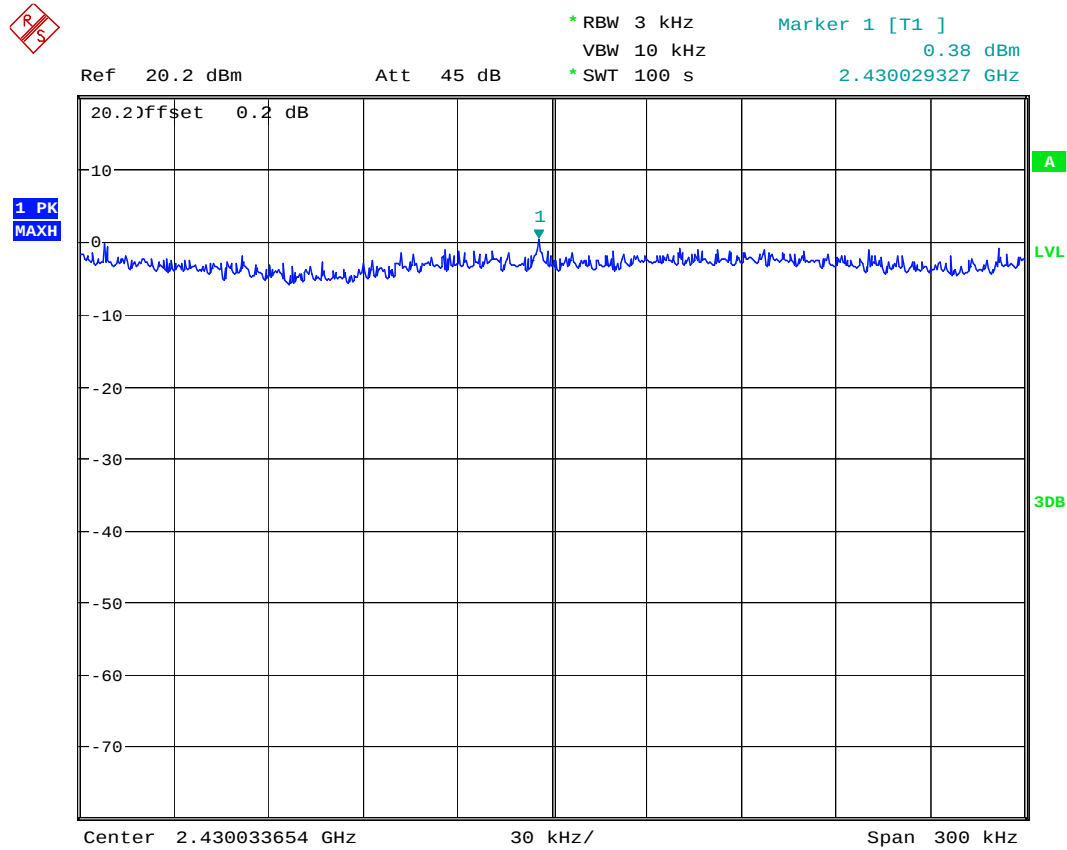
Test Report #: EMC_SMAR2_016_15.247

Date of Report: 2009-4-16

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(2430 MHz) POWER SPECTRAL DENSITY



Date: 13.JAN.2009 14:50:14

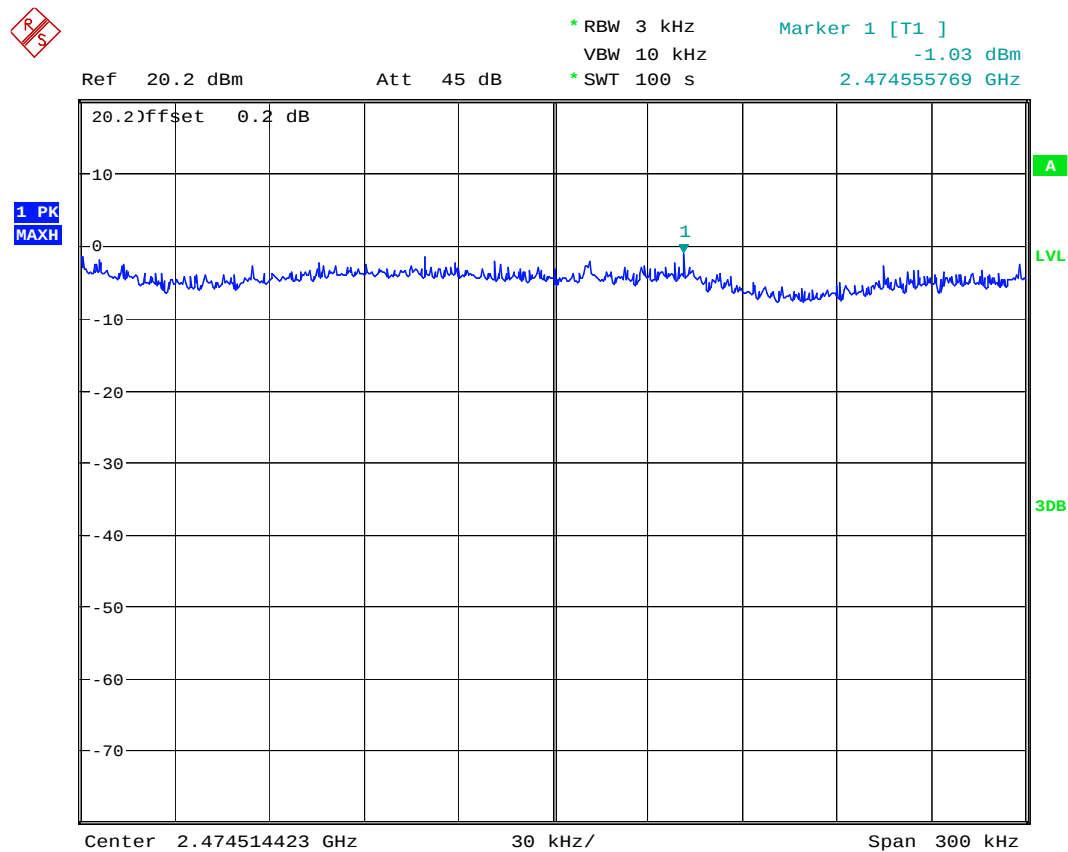
Test Report #: EMC_SMAR2_016_15.247

Date of Report: 2009-4-16

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(2475 MHz) POWER SPECTRAL DENSITY



Date: 13.JAN.2009 14:55:30

6.5 CONDUCTED SPURIOUS EMISSION

6.5.1 LIMIT SUB CLAUSE § 15.247 (d)

FREQUENCY RANGE	limit
5M-25GHz	-20dBc

6.5.2 RESULTS: Tnom(23)°C VnomVDC

(2405MHz)



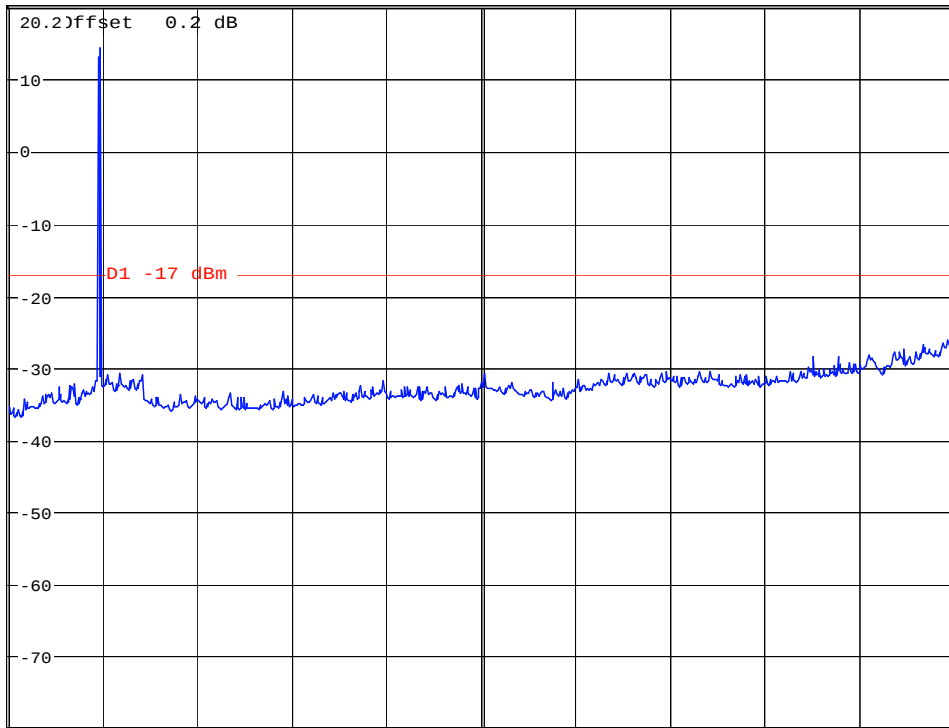
* RBW 1 MHz
VBW 3 MHz
SWT 145 ms

Ref 20.2 dBm

* Att 45 dB

20.2 offset 0.2 dB

1 PK
MAXH



Start 5 MHz

2.4995 GHz/

Stop 25 GHz

Test Report #: EMC_SMAR2_016_15.247

Date of Report: 2009-4-16

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(2430MHz)



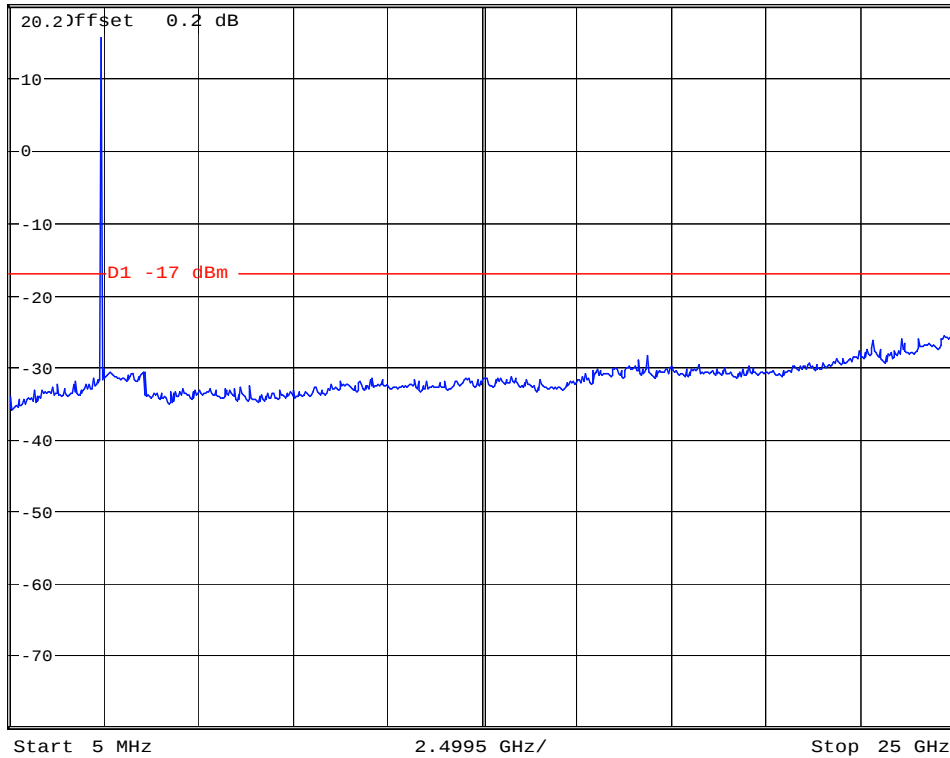
* RBW 1 MHz
VBW 3 MHz
SWT 145 ms

Ref 20.2 dBm

* Att 45 dB

SWT 145 ms

1 PK
MAXH



Date: 13.JAN.2009 15:13:39

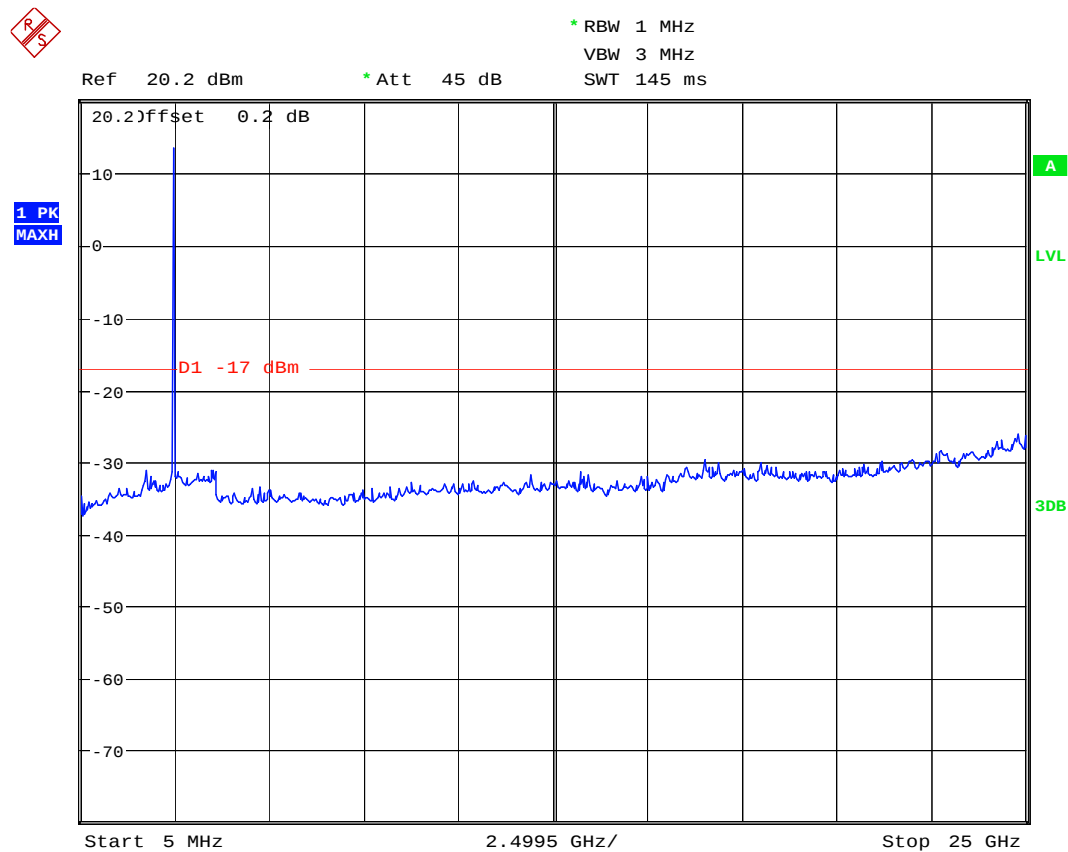
Test Report #: EMC_SMAR2_016_15.247

Date of Report: 2009-4-16

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(2475MHz)



Date: 13.JAN.2009 15:08:08

Test Report #: EMC_SMAR2_016_15.247

Date of Report: 2009-4-16

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FREQUENCY RANGE	limit
9kHz-5MHz	-20dBc



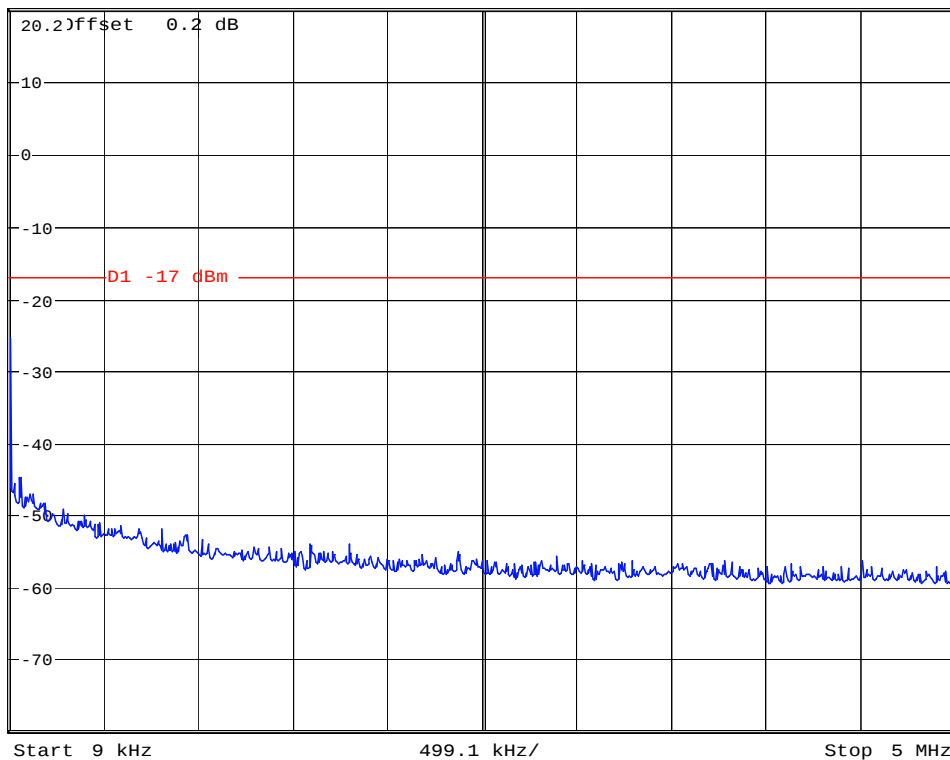
* RBW 5 kHz
VBW 20 kHz
SWT 200 ms

Ref 20.2 dBm

* Att 45 dB

SWT 200 ms

1 PK
MAXH



A

LVL

3DB

Date: 13.JAN.2009 15:16:17

6.6 AC POWER LINE CONDUCTED EMISSIONS § 15.107/207

6.6.1 LIMITS

Technical specification: 15.107 / 15.207 (Revised as of August 20, 2002)

§15.107 (a) Except for Class A digital devices, for equipment 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 μ H/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.

Limit

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi-Peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30	60	50
* Decreases with logarithm of the frequency		

ANALYZER SETTINGS: RBW = 10KHz

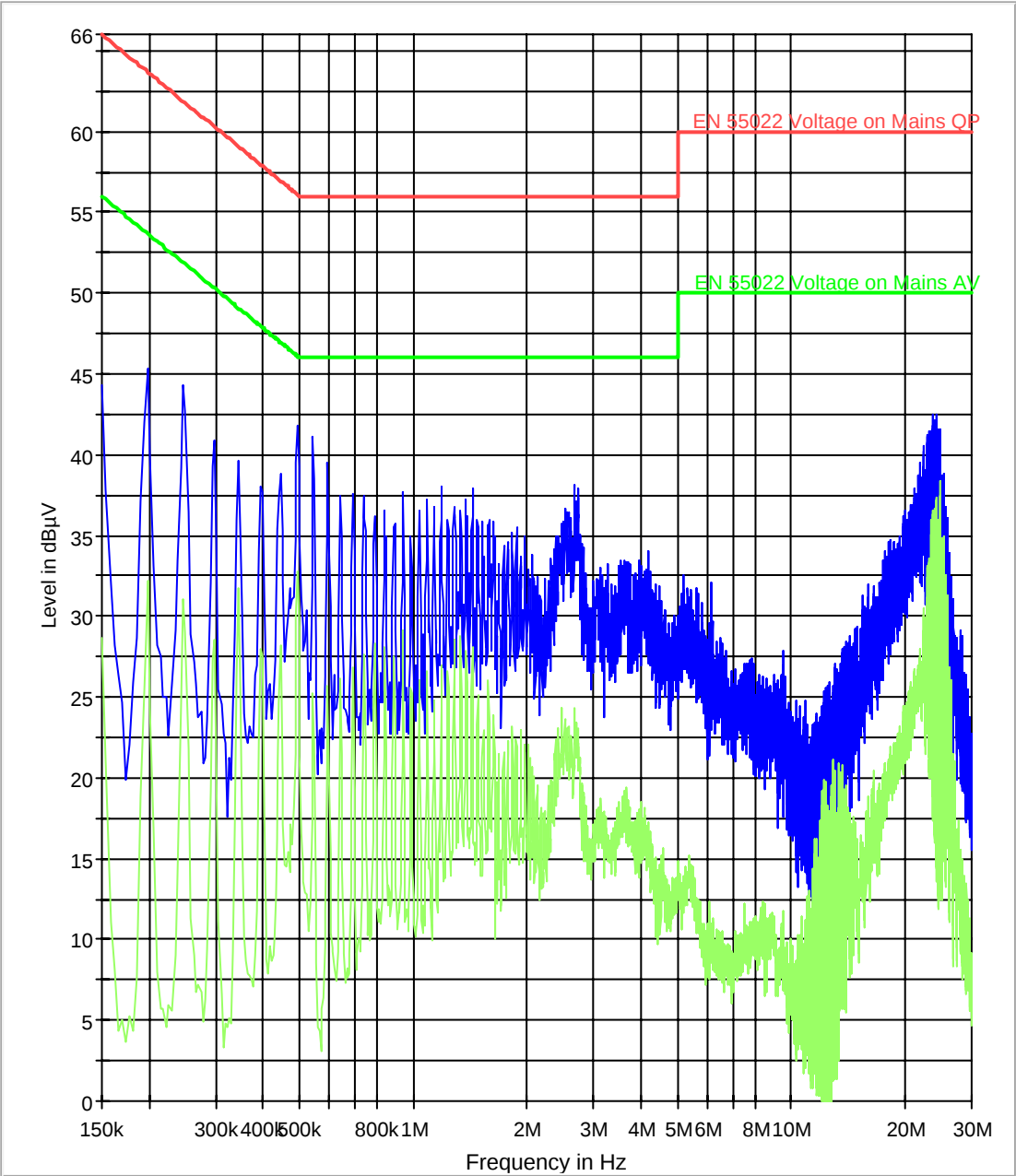
VBW = 10KHz

Results reports here represents the worse case emission in all operating modes.



Line

CISPR 22 Mains Conducted - L

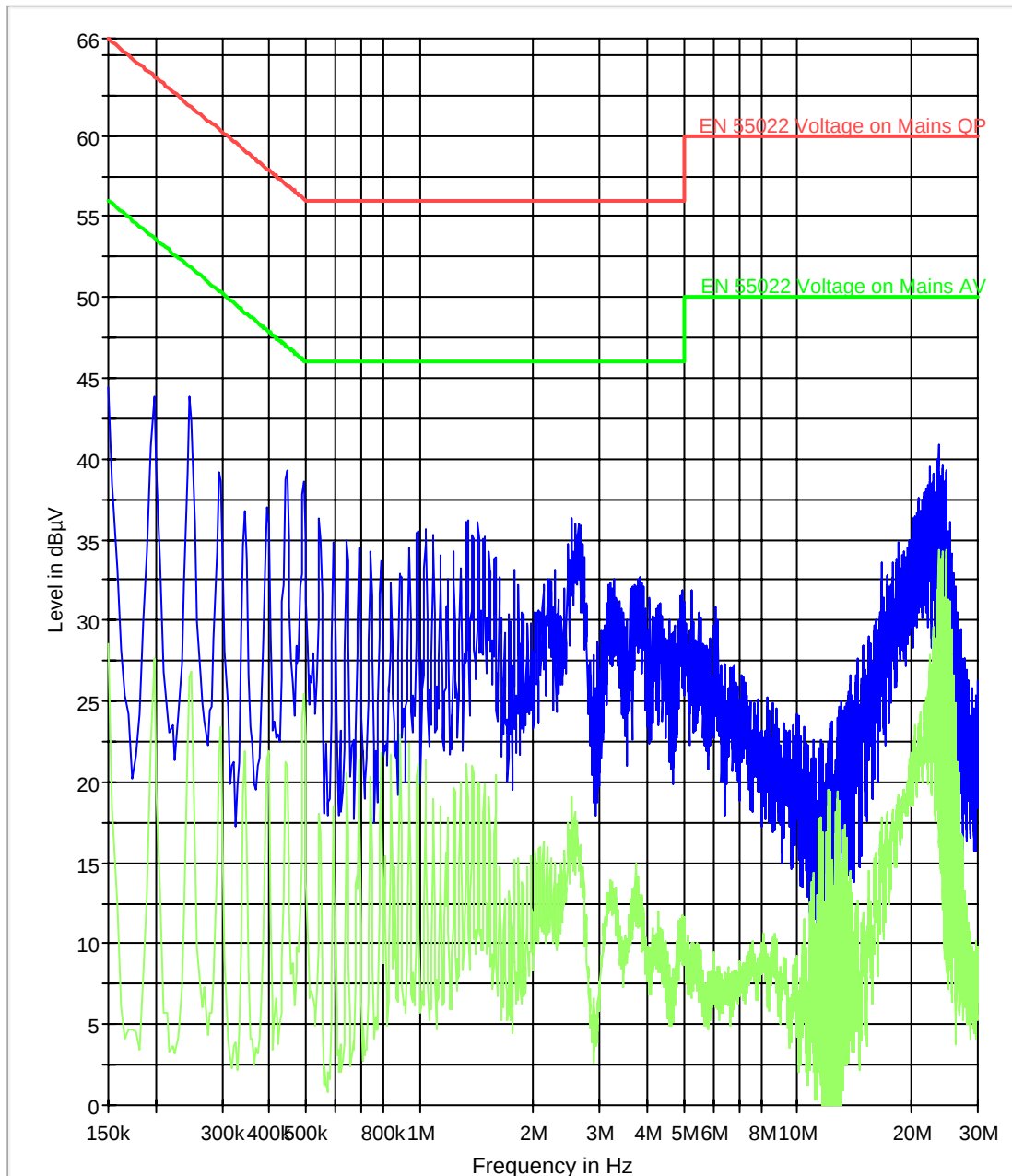


EN 55022 Voltage on Mains QP.LimitLine
Preview Result 1

EN 55022 Voltage on Mains AV.LimitLine
Preview Result 2

Neutral

CISPR 22 Mains Conducted - N



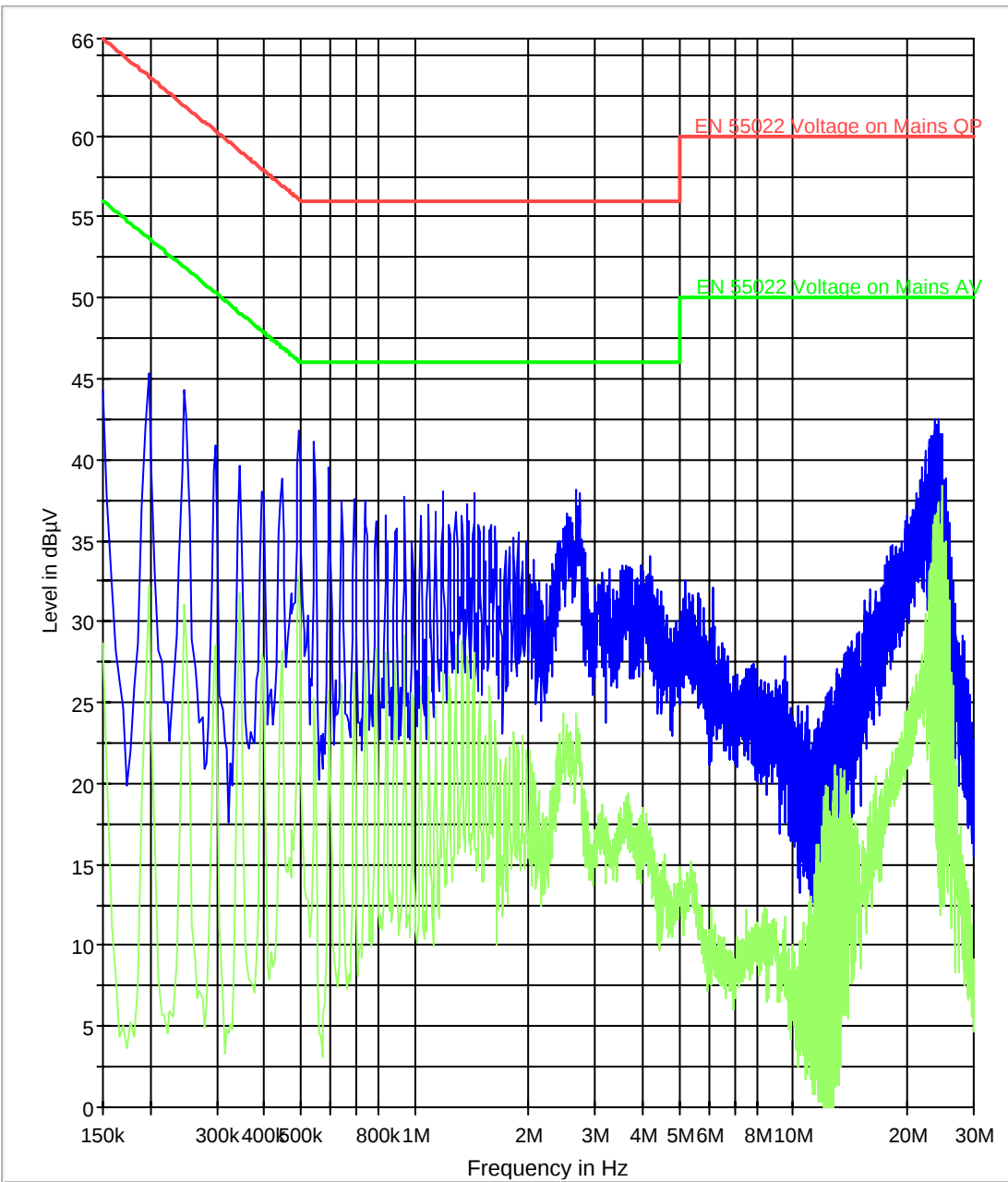
— EN 55022 Voltage on Mains QP.LimitLine
— Preview Result 1

— EN 55022 Voltage on Mains AV.LimitLine
— Preview Result 2

Receiver emissions

Line

CISPR 22 Mains Conducted - L

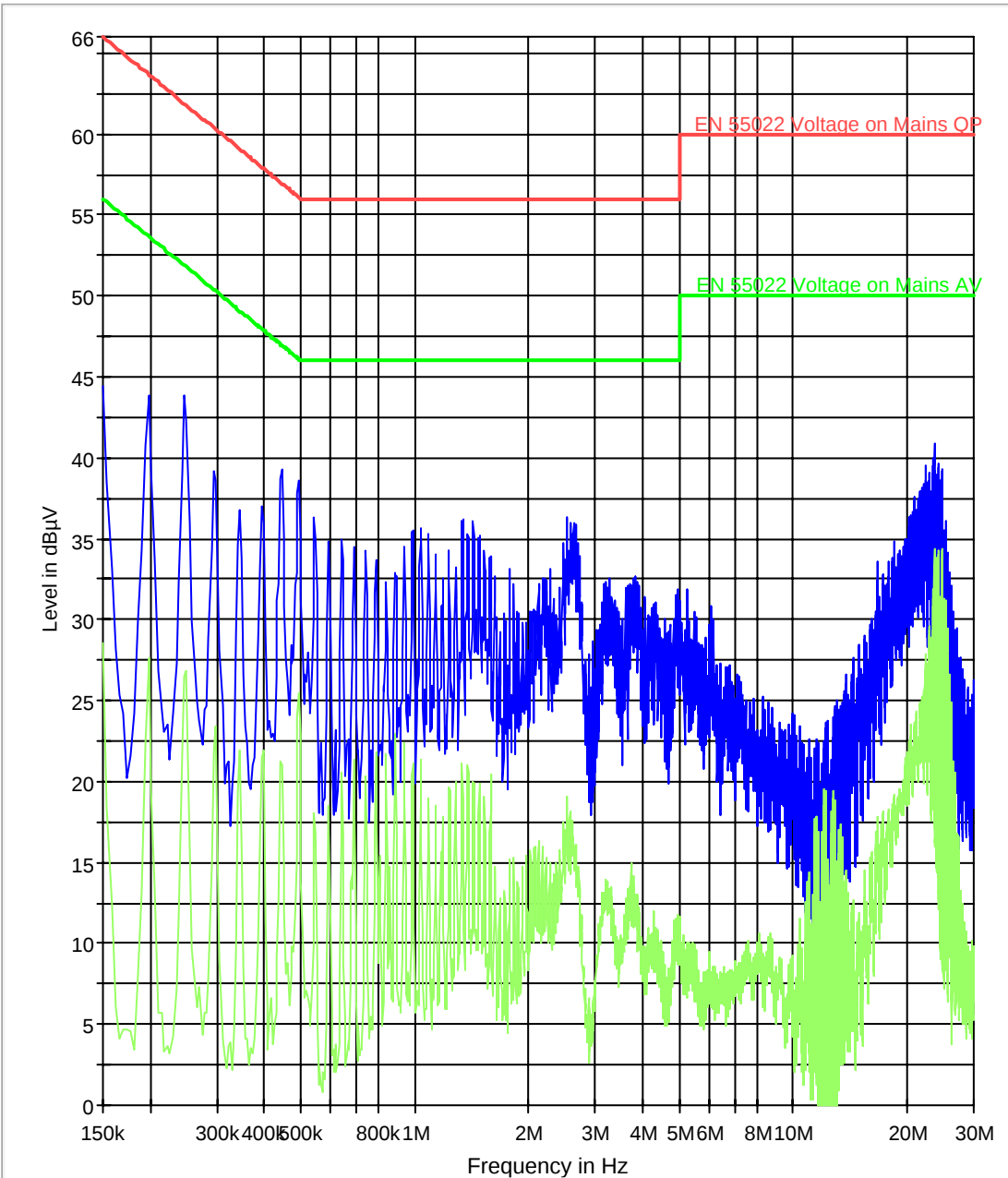


EN 55022 Voltage on Mains QP.LimitLine
Preview Result 1

EN 55022 Voltage on Mains AV.LimitLine
Preview Result 2

Neutral

CISPR 22 Mains Conducted - N



— EN 55022 Voltage on Mains QP.LimitLine
— Preview Result 1

— EN 55022 Voltage on Mains AV.LimitLine
— Preview Result 2

7 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

No	Instrument/Ancillary	Type	Manufacturer	Serial No.	Cal Due	Interval
01	Spectrum Analyzer	ESIB 40	Rohde & Schwarz	100107	May 2009	1 year
02	Spectrum Analyzer	FSEM 30	Rohde & Schwarz	100017	August 2009	1 year
03	Signal Generator	SMY02	Rohde & Schwarz	836878/011	May 2009	1 year
04	Power-Meter	NRVD	Rohde & Schwarz	0857.8008.02	May 2009	1 year
05	Biconilog Antenna	3141	EMCO	0005-1186	June 2009	1 year
06	Horn Antenna (1-18GHz)	SAS-200/571	AH Systems	325	June 2009	1 year
07	Horn Antenna (18-26.5GHz)	3160-09	EMCO	1240	June 2009	1 year
08	Power Splitter	11667B	Hewlett Packard	645348	n/a	n/a
09	Climatic Chamber	VT4004	Voltsch	G1115	May 2009	1 year
10	High Pass Filter	5HC2700	Trilithic Inc.	9926013	n/a	n/a
11	High Pass Filter	4HC1600	Trilithic Inc.	9922307	n/a	n/a
12	Pre-Amplifier	JS4-00102600	Miteq	00616	May 2009	1 year
13	Power Sensor	URV5-Z2	Rohde & Schwarz	DE30807	May 2009	1 year
14	Digital Radio Comm. Tester	CMD-55	Rohde & Schwarz	847958/008	May 2009	1 year
15	Universal Radio Comm. Tester	CMU 200	Rohde & Schwarz	832221/06	May 2009	1 year
16	LISN	ESH3-Z5	Rohde & Schwarz	836679/003	May 2009	1 year
17	Loop Antenna	6512	EMCO	00049838	July 2010	2 years

8 BLOCK DIAGRAMS

Radiated Testing

ANECHOIC CHAMBER

