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REPORT ON ELECTROMAGNETIC COMPATIBILITY TESTS

Performed at:
TWENTY PENCE TEST SITE

Twenty Pence Road,
Cottenham,
Cambridge
U.K.
CB24 8PS

on

AlertMe.com Ltd

SPG800/SPG130

dated

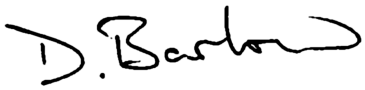
10th May 2012

Document History

Issue	Date	Affected page(s)	Description of modifications	Revised by	Approved by
1	10/05/12		Initial release		
2	17/05/12	17-19,26-34	Conducted antenna measurements repeated with EBW interpreted as -26dB points	DS	DB
3	31/05/12	1,6 and 16	Incorrect reference to internal battery removed. AC Power conducted emissions 9kHz RBW clarified.	PB	DB

Based on report template:
v090319

Equipment Under Test (EUT):	SPG800/SPG130
Test Commissioned by:	AlertMe.com Ltd Compass House 80 Newmarket Road Cambridge CB5 8DZ
Representative:	Bruce Benson
Test Started:	28th April 2012
Test Completed:	8th May 2012
Test Engineer:	Dave Smith
Date of Report:	10th May 2012

Written by:	Dave Smith	Checked by:	Derek Barlow
Signature:		Signature:	
Date:	10th May 2012	Date:	15th May 2012

dB Technology can only report on the specific unit(s) tested at its site. The responsibility for extrapolating this data to a product line lies solely with the manufacturer.

Test Standards Applied

CFR 47	*Code of Federal Regulations: Pt 15 Subpart C - Radio Frequency Devices - Intentional Radiators*

In particular, the rules of part 15.247 were applied.

Device operating in the 2400-2483.5 MHz band (part 15.247)

FCC Part	Parameter	
15.207	Conducted Emissions	PASS
15.209	Radiated Emissions	PASS (for frequencies in the Restricted Bands list of 15.205 only - all other parts of 15.209 are not applicable - 15.247 takes precedence.)
15.247(a)(2)	Minumum 6dB bandwidth (must be >500kHz)	PASS
15.247(b)(3)	Peak power (must be <1W)	PASS
15.247(b)(4)	Antenna gain (must be <6dBi)	Manufacturer data states a gain of 1dBi. Only integral antenna.
15.247(b)(5)	Exposure to RF	See separate declaration based on calculation.
15.247(d)	Conducted Antenna Spurious (Must be at least 20dB below carrier in - 100kHz bw)	PASS
15.247(e)	Spectral Density (must not exceed 8dBm in any 3kHz band)	PASS

Contents

1 EUT Details

1.1 General

The EUT was an AlertMe Smart Plug. The device incorporates an intentional radiator:

(a) Zigbee: operating in the 2.4GHz to 2.4835GHz band. Operates on 15 equally spaced channels starting at 2.405GHz (channel 11) and ending at 2.475GHz (channel 25). O-QPSK (digital) modulation. Integral antenna. Gain of the antenna declared to be 1dBi.

For Zigbee transmit mode tests were performed on:

Ch 11: 2.405 GHz
Ch 18: 2.440 GHz
Ch 25: 2.475 GHz

The device is powered from ac mains.

Details of the EUT and associated peripherals used during the tests are listed below. Figure 1 shows the interconnections between the EUT and peripherals.

Item	Manufacturer	Model	Description	Serial No:	Notes
1	Alertme	SPG800/SPG130	Sample 1 with wired co-axial connection to Zigbee transmitter		
2	Alertme	SPG800/SPG130	Sample 2 - with integral antenna.		

1.2 Modifications to EUT and Peripherals

Details of any modifications that were required to achieve compliance are listed below. The modification numbers are referred to in the results sections as appropriate.

Mod No:	Details	Implemented for
0	Original. No modifications were made during the course of testing.	

1.3 EUT Operating Modes

The EUT was tested in the following operating mode or modes. Generally, operating modes are chosen that will exercise the functions of the EUT as fully as possible and in a manner likely to produce maximum emission levels or susceptibility. Individual test result sheets reference the operating mode of the EUT.

Operating Mode	Details
1	Zigbee transmit. Continuously transmitting constant packet stream. The transmit channel was set to either Channel 11, 18 or 25. Individual test results show the actual operating channel. Output set to 0dBm.

1.4 Zigbee Duty Cycle

All Zigbee transmit measurements were made with the device sending continuous packet streams. In the intended application transmissions only occur in short bursts. The manufacturer has stated that in any one 100msec period transmissions are limited to a burst of approximately 2 msec. This is backed up by the traces provided by the manufacturer (see Figure 2 and Figure 3).

This allows an additional duty cycle correction factor to be applied where average limits are specified. This duty cycle correction factor has been calculated as -20dB (=20*log 10/100 assuming a transmit time of no more than 10msec in a 100msec period). This additional correction factor has only been applied where necessary and it is clearly indicated in the results tables.

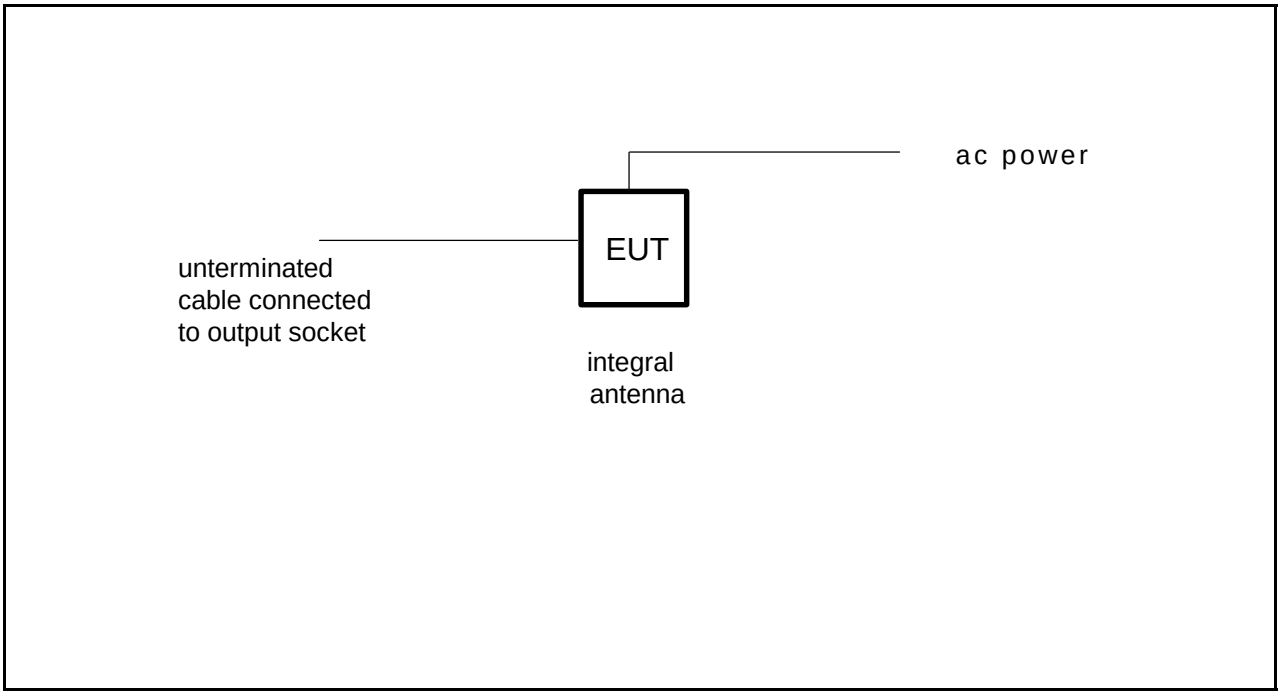


Figure 1 EUT and Peripherals

	Description	Type	Length	Notes
#1	Mains extension lead	Unscreened	1.5m	
#2	Unterminated power lead	Unscreened	2.0m	

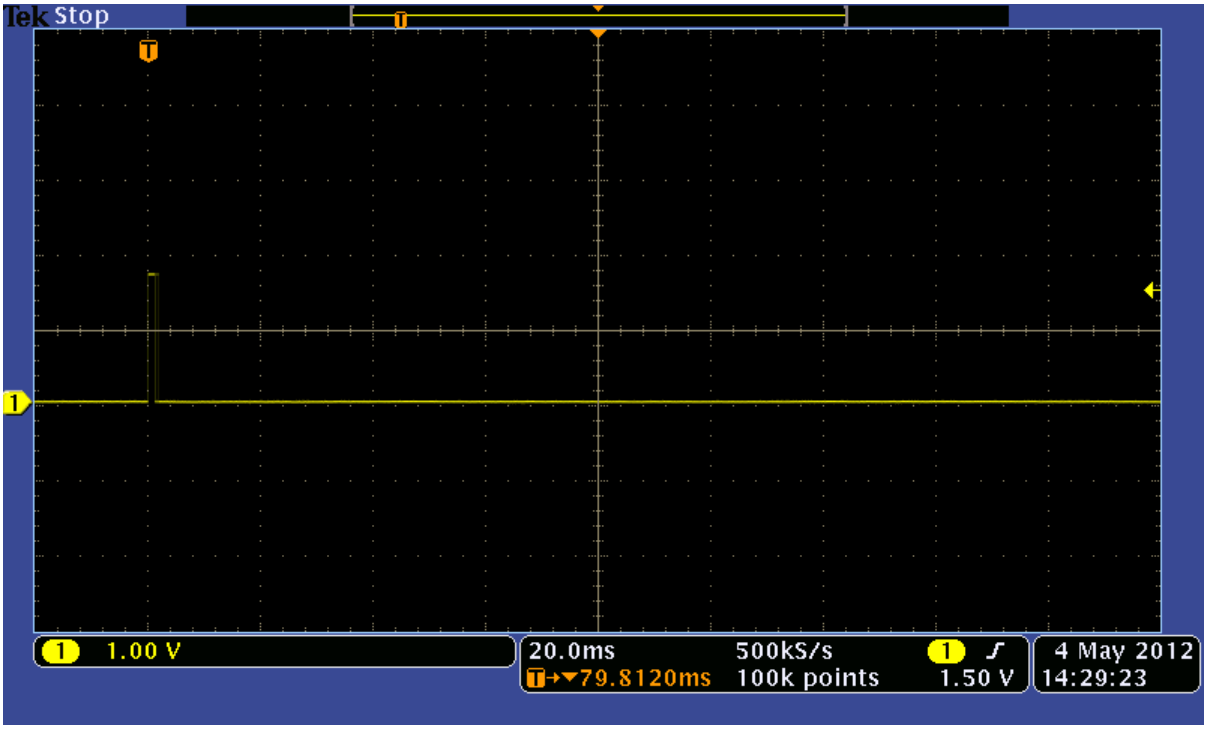


Figure 2 Manufacturer's trace showing Zigbee 2msec burst in 100msec period

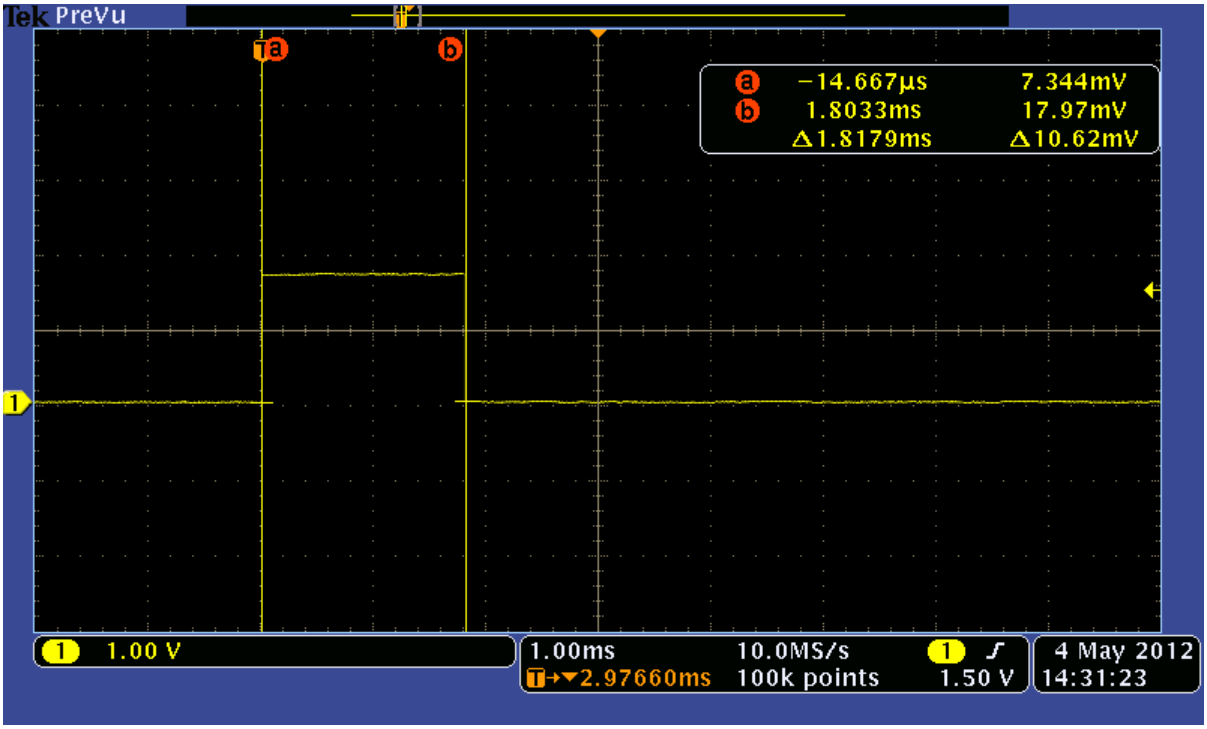
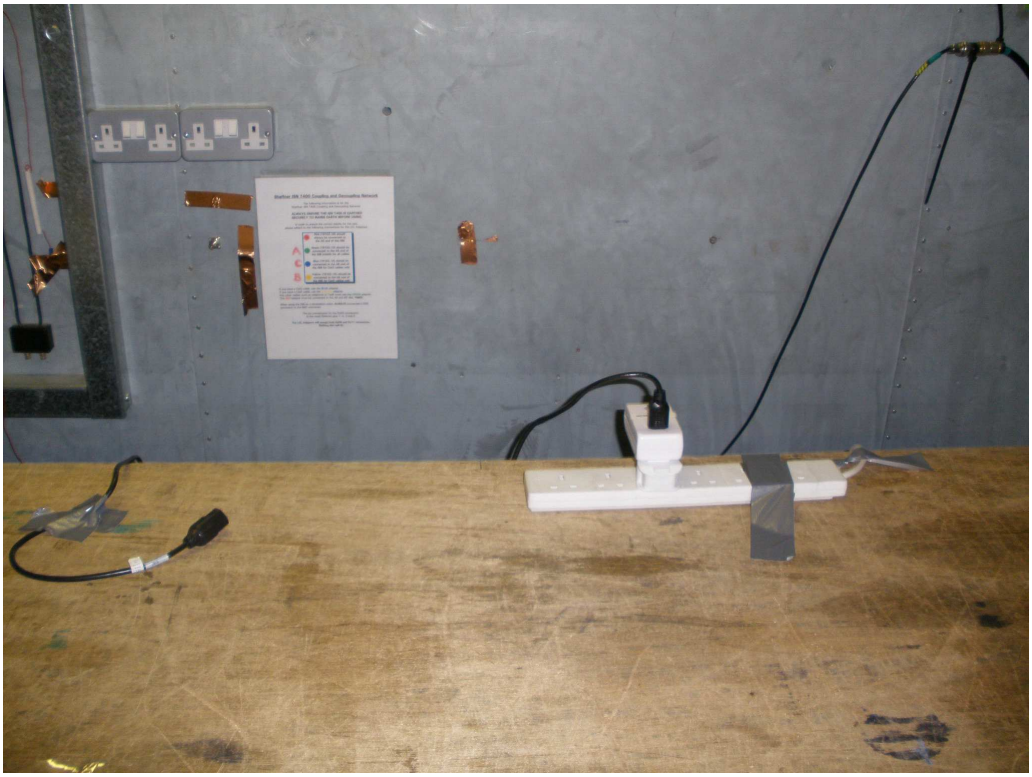
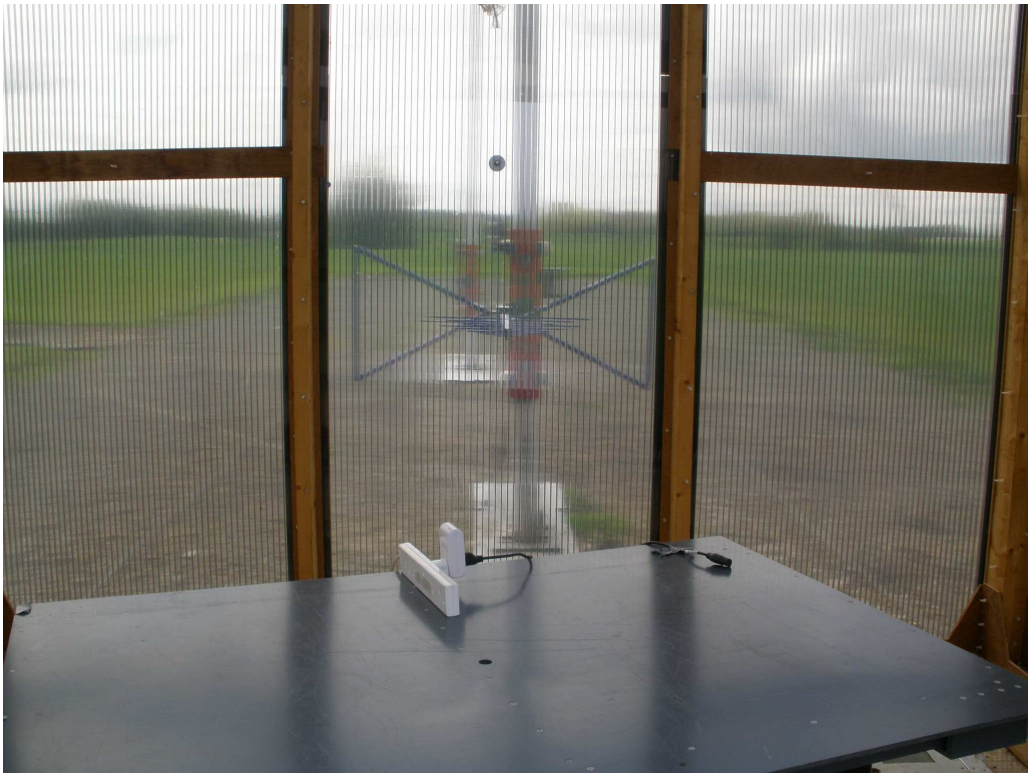


Figure 3 Manufacturer's trace showing duration of Zigbee 2msec



Photograph 1 Conducted Emissions - Front

Photograph 2 Conducted Emissions - Back



Photograph 3 Radiated Emissions - Upright - Front

Photograph 4 Radiated Emissions - Flat - Back

Photograph 5 Conducted Antenna

2 Test Equipment

The test equipment used during the tests was one or more of the items listed below. Individual test result sheets indicate which items were used.

Ref No:	Details	Serial Number	Cal Date	Cal Interval
A15	Chase X-wing Bilog CBL6140 20MHz-2GHz	1047	18/11/2011	1 year
A20	Alpha 61932500 Horn Antenna (18-26GHz)	50	#1	
A22	Alpha 61932400 Horn Antenna (12.4-18GHz)	55	#1	
A23	EMCO 3115 DR Guide (1-18GHz)	4982	31/01/2012	1 year
A5	Chase Bilog CBL6111A	1760	31/01/2012	1 year
L1	EMCO 3825/2 LISN	1358	16/02/2012	1 year
PRE7	LUCIX 0.1GHz to 20GHz	24485	08/01/2012	1 year
PRE8	LUCIX 18GHz to 26.5GHz	24486	08/01/2012	1 year
R1	CHASE LHR 7000	1056	31/01/2012	1 year
R4	R&S ESVS10	421872	16/10/2011	1 year
R8	Agilent E7405A Spectrum Analyser	MY44212494	19/09/2011	1 year
R9	Agilent E7405A Spectrum Analyser	MY45110758	21/11/2011	1 year
RFF01	High Pass RF Filter 3GHz to 12.75GHz	1	08/02/2012	1 year
RFF04	Low Pass RF Filter 0MHz to 2GHz	4	08/02/2012	1 year

#1 Standard Gain Horns - Factors derived by calculation from dimensions.

3 Test Methods

3.1 Conducted Emissions - ac power

This section describes the general method of performing this test. The specific method used and any deviations from this general method are listed in the appropriate results section.

Bench top EUTs and peripheral equipment are normally placed on a 0.8m high non-conducting bench, positioned 0.4m from one of the metallic walls of a screened room. Floor standing EUTs are normally placed 0.1m above the metallic floor of the screened room. Mains leads are bundled so as not to exceed 1m.

The EUT is powered using a 50ohm/50uH Line Impedance Stabilisation Network (LISN). Peripherals are powered using a second a 50ohm/50uH LISN. These LISNs are bonded to the screened room floor.

With the correct supply voltage applied to the EUT scans are performed on both the live and neutral line outputs of the LISN using quasi-peak detection over the specified frequency range. The results of these scans are shown in the plots section at the end of the report.

Significant emissions identified by the scans are measured and the results tabulated. The table of results is shown in the conducted emissions results section.

Final Level (dBuV)	=	Receiver Reading (dBuV)	+	Combined Cable & Attenuator Correction Factor (dB)

Example: if at 191kHz the receiver level is 45.8 dBuV

@ 191kHz Final Level = 45.8 + 10.0 = 55.8 dBuV

3.2 Radiated Emissions

This section describes the general method of performing this test. The specific method used and any deviations from this general method are listed in the appropriate results section.

Initial scans are performed in a semi-anechoic screened room at a distance of up to 3m. Scans are performed over the frequency range specified in the test standard with the antenna both horizontally and vertically polarised. During these scans the EUT and peripherals are rotated through 360°. Bench top EUTs are placed on a non-conducting bench at a height of 0.8m above the ground plane. Floor standing EUTs are placed 0.1m above the ground plane. The results of the scans are shown in the plots included at the end of the report. Attempts are made to identify the layout of cables that give highest readings.

Significant emissions identified by the scans are measured on an open area test site at the appropriate test distance using the specified detector function. Maximised readings are obtained by rotating the EUT through 360° and adjusting the height of the antenna from 1 m to 4m. Measurements are made with the antenna both horizontally and vertically polarised and the results tabulated.

Tabulated results show levels based on the following calculation:

Field Strength (dBuV) = receiver reading (dBuV) + CF (dB/m)

CF is the correction factor for the antenna and cable.

For example:

if at 434.478MHz receiver reading was 57.8dBuV and combined correction factor = 20.4 (dB/m).

Total field strength = 57.8 + 20.4 = 78.2dBuV/m.

3.3 Conducted Antenna Emissions

This section describes the general method of performing this test. The specific method used and any deviations from this general method are listed in the appropriate results section.

The antenna port of the EUT was connected directly to the input of a spectrum analyser. Sweeps were made over the required frequency ranges with the specified detectors applied.

4 Test Results

The following sections contain tabulated test results. Plots of various scans are included at the back of this section.

4.1 Conducted Emissions (Power) - Results

Factor Set 1: L1_11A AB002_CBL005_CBL039_11A - -
Factor Set 2: - - - -
Factor Set 3: - - - -
Test Equipment: R1 L1

Conducted Emissions (Power)

Company: AlertMe.com Ltd *Product:* SPG800/SPG130
Date: 04/05/12 *Test Eng:* Dave Smith
Ports: ac power
Test: ANSI C63.4:2003 using limits of FCC(B)
Ports:
Test: using limits of

Plot	Op Mode	Mod State	Line (L/N)	Fact Set	Freq. MHz	Det qp/ av	Rec. Level dBuV	Corr'n Factor dB	Total Level dBuV	Limit FCC dBuV	Margin FCC dB	Notes
28	1	0	L	1	0.194	qp	27.1	10.0	37.1	63.9	26.8	
28	1	0	L	1	0.194	av	16.8	10.0	26.8	53.9	27.1	
28	1	0	L	1	0.263	qp	24.4	10.0	34.4	61.4	26.9	
28	1	0	L	1	0.263	av	14.3	10.0	24.3	51.4	27.0	
28	1	0	L	1	1.587	qp	24.1	10.0	34.1	56.0	21.9	
28	1	0	L	1	1.587	av	14.0	10.0	24.0	46.0	22.0	
29	1	0	N	1	0.200	qp	28.0	10.0	38.0	63.6	25.6	
29	1	0	N	1	0.200	av	8.0	10.0	18.0	53.6	35.6	
29	1	0	N	1	0.319	qp	22.8	10.0	32.8	59.7	26.9	
29	1	0	N	1	0.319	av	10.0	10.0	20.0	49.7	29.7	
29	1	0	N	1	1.587	qp	24.6	10.0	34.6	56.0	21.4	
29	1	0	N	1	1.587	av	12.0	10.0	22.0	46.0	24.0	

Results	**Minimum Margin**	**21.4 dB**	
	PASS/FAIL	**PASS**	

Notes	Comments and Observations
	Results of scans shown in plots 28 and 29. All AC power conducted emissions measurements were made using a 9kHz resolution bandwidth. Limits for 15.207 were applied.

4.2 Zigbee Peak Power - 15.247(b)(3)

Test Equipment: R8

Peak Power

Company:	AlertMe.com Ltd	*Product:*	SPG800/SPG130
Date:	17/05/2012	*Test Eng:*	Dave Smith
Ports:	Antenna		
Test:	15.247(b)(3		
Ports:			
Test:			

Notes	Comments and Observations

This was performed as a conducted measurement on sample 1.

Results of scans are shown in plots 1 to 3.

The method of 558074 D01 DTS Meas Guidance v01 section 5.2.1.2 was applied. The spectrum analyser's "band power" measurement was used with a peak detector selected.

Results were as follows:

Channel	Level (dBm)	Limit (dBm)	
11	3.91	30	PASS
18	3.56	30	PASS
25	3.17	30	PASS

4.3 Zigbee Bandwidth - 15.247(a)(2)

Test Equipment: R8

Bandwidth

Company:	AlertMe.com Ltd	*Product:*	SPG800/SPG130
Date:	17/05/2012	*Test Eng:*	Dave Smith
Ports:	Antenna		
Test:	15.247(a)(2)		
Ports:			
Test:			

Notes	Comments and Observations

This was performed as a conducted measurement on sample 1.

Results of scans are shown in plots 4 to 6.

The method of 558074 D01 DTS Meas Guidance v01 section 5.1.1 was applied.

The results are as follows:

Channel	Measured Bandwidth (MHz)	Limit	
11	1.600	>500kHz	PASS
18	1.590	>500kHz	PASS
25	1.560	>500kHz	PASS

PASS

4.4 Zigbee Power Spectral Density in 3kHz bw - 15.247(e)

Test Equipment: R8

Spectral Density

Company:	AlertMe.com Ltd	*Product:*	SPG800/SPG130
Date:	17/05/2012	*Test Eng:*	Dave Smith
Ports:	Antenna		
Test:	15.247(e)		
Ports:			
Test:			

Notes	Comments and Observations
	This was performed as a conducted measurement on sample 1. The method of 558074 D01 DTS Meas Guidance v01 section 5.3.1 was applied. As specified, measurements were made with a RBW of 100kHz and an additional CF of -15.2dB applied to convert to dBm/3kHz. Results of scans are shown in plots 7 to 9. In all cases the spectral density is below 8dBm/3kHz. **PASS**

4.5 Zigbee Antenna Conducted Spurious Emissions (100kHz bw) - 15.247(d)

Test Equipment: R8

Conducted Emissions (Signal)

Company:	AlertMe.com Ltd	*Product:*	SPG800/SPG130
Date:	17/05/2012	*Test Eng:*	Dave Smith
Ports:	Antenna		
Test:	15.247(d)		
Ports:			
Test:			

Notes	Comments and Observations

This was performed as a conducted measurement on sample 1.

The method of 558074 D01 DTS Meas Guidance v01 section 5.4.1 was applied.

Results of scans shown in plots 10 to 14.

Frequency	Tx Ch	Level	Level w.r.t Fundamental	Limit	Margin	
MHz		*dBm*	*dB*	*dB*	*dB*	
2.4050	*Ch 11*	*-2.3*				
2.4000	Ch 11	-42.5	-40.2	-20	20.2	PASS
4.8094	Ch 11	-40.5	-38.3	-20	18.3	N/A *
2.4400	*Ch 18*	*-2.6*				
4.8794	Ch 18	-42.9	-40.2	-20	20.2	N/A *
2.4750	*Ch 25*	*-2.9*				
2.4835	Ch 25	-49.3	-49.3	-20	29.3	PASS
4.9494	Ch 25	-42.4	-39.5	-20	19.5	N/A *

* This emission falls within a restricted band and was therefore also measured as a radiated test using the limits of 15.209. Providing an emission meets the radiated limits of 15.209 there is no requirement to additionally meet -20dBc conducted limit.

PASS

4.6 Zigbee Radiated Emissions - Channel 11 - 15.209

Factor Set 1: A23_3m_10A PRE7_CBL052_CBL093_11A RFF01_11A -
Factor Set 2: - - - -
Factor Set 3: - - - -
Test Equipment: R8 A23 PRE8 PRE7 RFF01 RFF04 A20 A22 A15

Radiated Emissions

Company: AlertMe.com Ltd *Product:* SPG800/SPG130
Date: 01/05/2012 *Test Eng:* Dave Smith
Ports:
Test: ANSI C63.4:2003 using limits of 15.209
Ports:
Test: using limits of

Plot	Op Mode	Mod State	Dist m	Fact Set	Freq. MHz	Ant Pol	Rec. Level dBuV	Corr'n Factor dB/m	Corr'n Factor dB	Total Level dBuV/m	Limit FCC_B dBuV/m	Margin FCC_B dB	Notes
	Channel 11												
21	1	0	3	1	4809.095	V	60.9	-5.3		55.5	74.0	18.5	Pk
21	1	0	3	1	4809.095	V	54.0	-5.3		48.7	54.0	5.3	Av
21	1	0	3	1	4809.095	H	64.6	-5.3		59.2	74.0	14.8	Pk
21	1	0	3	1	4809.095	H	58.0	-5.3		52.7	54.0	1.3	Av

Results	**Minimum Margin**	**1.3 dB**
	PASS/FAIL	**PASS**

Notes	Comments and Observations
	Results of scans shown in plots 17 to 27. All average measurements could be reduced by a further 20dB if the "Duty Cycle Correction" were applied.

Key: qp - quasi-peak, av - average, pk - peak

4.7 Zigbee Radiated Emissions - Channel 18 - 15.209

Factor Set 1: A23_3m_10A PRE7_CBL052_CBL093_11A RFF01_11A -
Factor Set 2: - - - -
Factor Set 3: - - - -
Test Equipment: R8 A23 PRE8 PRE7 RFF01 RFF04 A20 A22 A15

Radiated Emissions

Company: AlertMe.com Ltd *Product:* SPG800/SPG130
Date: 01/05/2012 *Test Eng:* Dave Smith
Ports:
Test: ANSI C63.4:2003 using limits of 15.209
Ports:
Test: using limits of

Plot	Op Mode	Mod State	Dist m	Fact Set	Freq. MHz	Ant Pol	Rec. Level dBuV	Corr'n Factor dB/m	Corr'n Factor dB	Total Level dBuV/m	Limit FCC_B dBuV/m	Margin FCC_B dB	Notes
	Channel 18												
21	0	0	3	1	4879.520	V	60.4	-5.0		55.3	74.0	18.7	Pk
21	0	0	3	1	4879.520	V	53.4	-5.0		48.4	54.0	5.6	Av
21	0	0	3	1	4879.520	H	63.1	-5.0		58.1	74.0	15.9	Pk
21	0	0	3	1	4879.520	H	56.5	-5.0		51.4	54.0	2.6	Av
22	0	0	3	1	7319.300	V	50.9	-0.7		50.2	74.0	23.8	Pk
22	0	0	3	1	7319.300	V	41.0	-0.7		40.3	54.0	13.7	Av
22	0	0	3	1	7319.300	H	54.4	-0.7		53.7	74.0	20.3	Pk
22	0	0	3	1	7319.300	H	45.7	-0.7		45.0	54.0	9.0	Av

Results	**Minimum Margin**	**2.6 dB**	
	PASS/FAIL	**PASS**	

Notes	Comments and Observations
	Results of scans shown in plots 17 to 27. All average measurements could be reduced by a further 20dB if the "Duty Cycle Correction" were applied.
Key:	qp - quasi-peak, av - average, pk - peak

4.8 Zigbee Radiated Emissions - Channel 25 - 15.209

Factor Set 1: A23_3m_10A PRE7_CBL052_CBL093_11A RFF01_11A -
Factor Set 2: - - - -
Factor Set 3: - - - -
Test Equipment: R8 A23 PRE8 PRE7 RFF01 RFF04 A20 A22 A15

Radiated Emissions

Company: AlertMe.com Ltd *Product:* SPG800/SPG130
Date: 01/05/2012 *Test Eng:* Dave Smith
Ports:
Test: ANSI C63.4:2003 using limits of 15.209
Ports:
Test: using limits of

Plot	Op Mode	Mod State	Dist m	Fact Set	Freq. MHz	Ant Pol	Rec. Level dBuV	Corr'n Factor dB/m	Corr'n Factor dB	Total Level dBuV/m	Limit FCC_B dBuV/m	Margin FCC_B dB	Notes
	Channel 25												
21	0	0	3	1	4949.235	V	57.8	-5.0		52.7	74.0	21.3	Pk
21	0	0	3	1	4949.235	V	50.0	-5.0		45.0	54.0	9.0	Av
21	0	0	3	1	4949.235	H	61.0	-5.0		56.0	74.0	18.0	Pk
21	0	0	3	1	4949.235	H	54.7	-5.0		49.7	54.0	4.3	Av
21	0	0	3	1	7423.750	V	46.9	-0.1		46.9	74.0	27.1	Pk
21	0	0	3	1	7423.750	V	35.4	-0.1		35.3	54.0	18.7	Av
21	0	0	3	1	7423.750	H	50.2	-0.1		50.2	74.0	23.8	Pk
21	0	0	3	1	7423.750	H	40.4	-0.1		40.4	54.0	13.6	Av

Results	**Minimum Margin**	**4.3 dB**	
	PASS/FAIL	**PASS**	

Notes	Comments and Observations
	Results of scans shown in plots 17 to 27. All average measurements could be reduced by a further 20dB if the "Duty Cycle Correction" were applied.
Key:	qp - quasi-peak, av - average, pk - peak

4.9 Zigbee Radiated Emissions - Band Edges - 15.209

Factor Set 1: A23_3m_10A CBL049_11A - -
Factor Set 2: - - - -
Factor Set 3: - - - -
Test Equipment: R8 A23

Radiated Emissions

Company: AlertMe.com Ltd *Product:* SPG800/SPG130
Date: 28/04/2012 *Test Eng:* Dave Smith
Ports:
Test: ANSI C63.4:2003 using limits of 15.209
Ports:
Test: using limits of

Plot	Op Mode	Mod State	Dist m	Fact Set	Freq. MHz	Ant Pol	Rec. Level dBuV	Corr'n Factor dB/m	Corr'n Factor dB	Total Level dBuV/m	Limit FCC_B dBuV/m	Margin FCC_B dB	Notes
	Channel 11												
15	1	0	3	1	2390.000	V	14.0	29.7		43.7	74.0	30.3	Pk
15	1	0	3	1	2390.000	V	2.4	29.7		32.1	54.0	21.9	Av
15	1	0	3	1	2390.000	H	14.8	29.7		44.5	74.0	29.5	Pk
15	1	0	3	1	2390.000	H	3.5	29.7		33.3	54.0	20.7	Av
	Channel 25												
16	1	0	3	1	2483.500	V	19.6	29.9		49.5	74.0	24.5	Pk
16	1	0	3	1	2483.500	V	11.1	29.9		41.0	54.0	13.0	Av
16	1	0	3	1	2483.500	H	21.1	29.9		51.0	74.0	23.0	Pk
16	1	0	3	1	2483.500	H	11.5	29.9		41.5	54.0	12.5	Av

Results	**Minimum Margin**	**12.5 dB**
	PASS/FAIL	**PASS**

Notes	Comments and Observations
	Results of scans shown in plots 15 and 16. All average measurements could be reduced by a further 20dB if the "Duty Cycle Correction" were applied.

Key: qp - quasi-peak, av - average, pk - peak

4.10 Zigbee Radiated Emissions - Below 1GHz - 15.209

Factor Set 1: A5_FS_10C CBL015_11A - -
Factor Set 2: - - - -
Factor Set 3: - - - -
Test Equipment: R4 A5

Radiated Emissions

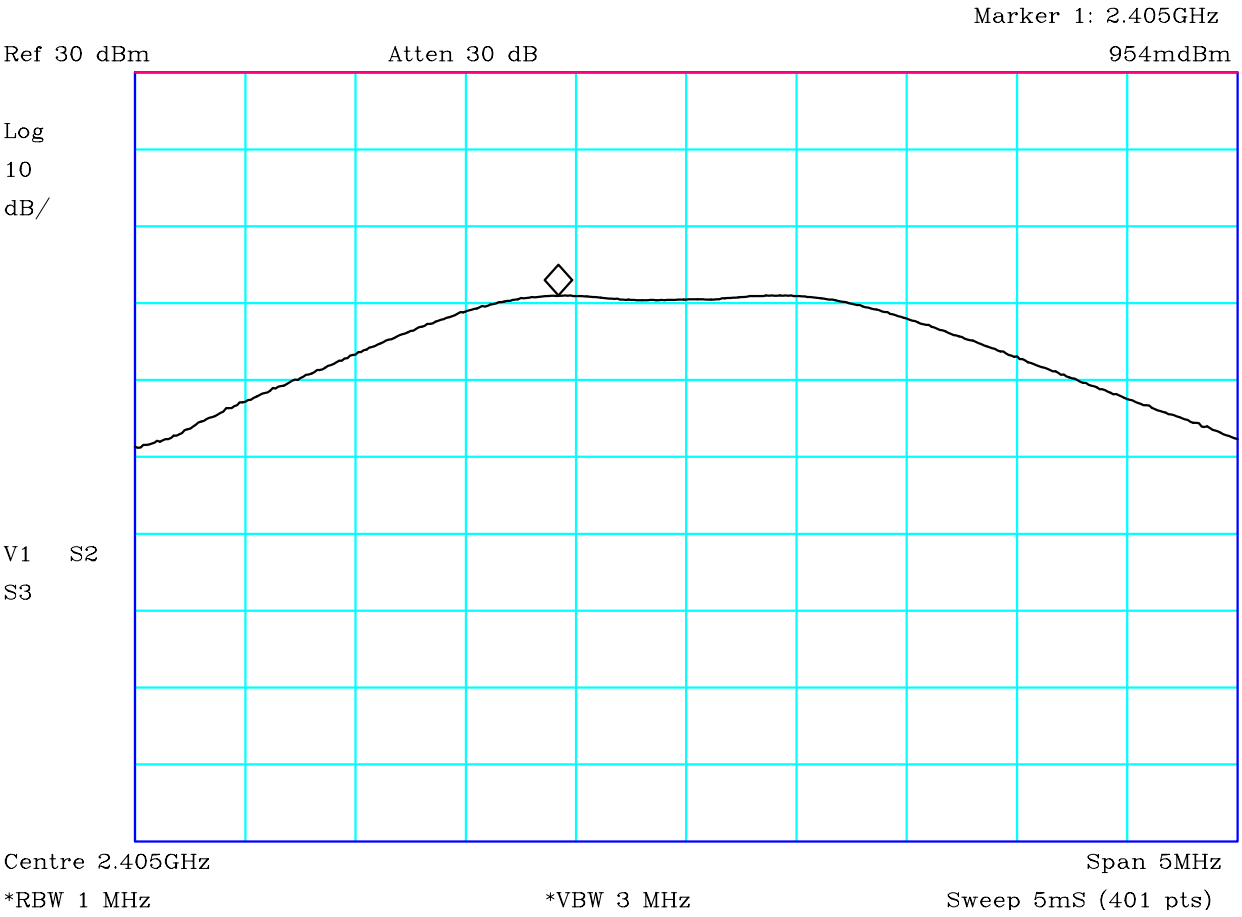
Company: AlertMe.com Ltd *Product:* SPG800/SPG130
Date: 08/05/2012 *Test Eng:* Dave Smith
Ports:
Test: ANSI C63.4:2003 using limits of 15.209
Ports:
Test: using limits of

Plot	Op Mode	Mod State	Dist m	Fact Set	Freq. MHz	Ant Pol	Rec. Level dBuV	Corr'n Factor dB/m	Corr'n Factor dB	Total Level dBuV/m	Limit FCC dBuV/m	Margin FCC dB	Notes
17	1	0	3	1	48.004	V	4.5	9.6		14.1	40.0	25.9	qp
17	1	0	3	1	48.004	H	1.0	9.6		10.6	40.0	29.4	qp
17	1	0	3	1	60.003	V	9.1	6.3		15.4	40.0	24.6	qp
17	1	0	3	1	60.003	H	2.0	6.3		8.3	40.0	31.7	qp
17	1	0	3	1	69.876	V	25.5	6.7		32.2	40.0	7.8	qp
17	1	0	3	1	69.876	H	8.7	6.7		15.4	40.0	24.6	qp

Results	**Minimum Margin**	**7.8 dB**
	PASS/FAIL	**PASS**

Notes	Comments and Observations
	Results of scans shown in plots 17 and 18, Emissions levels did not change with transmit channel. The above results were taken with the EUT transmitting on channel 18.

Key: qp - quasi-peak, av - average, pk - peak

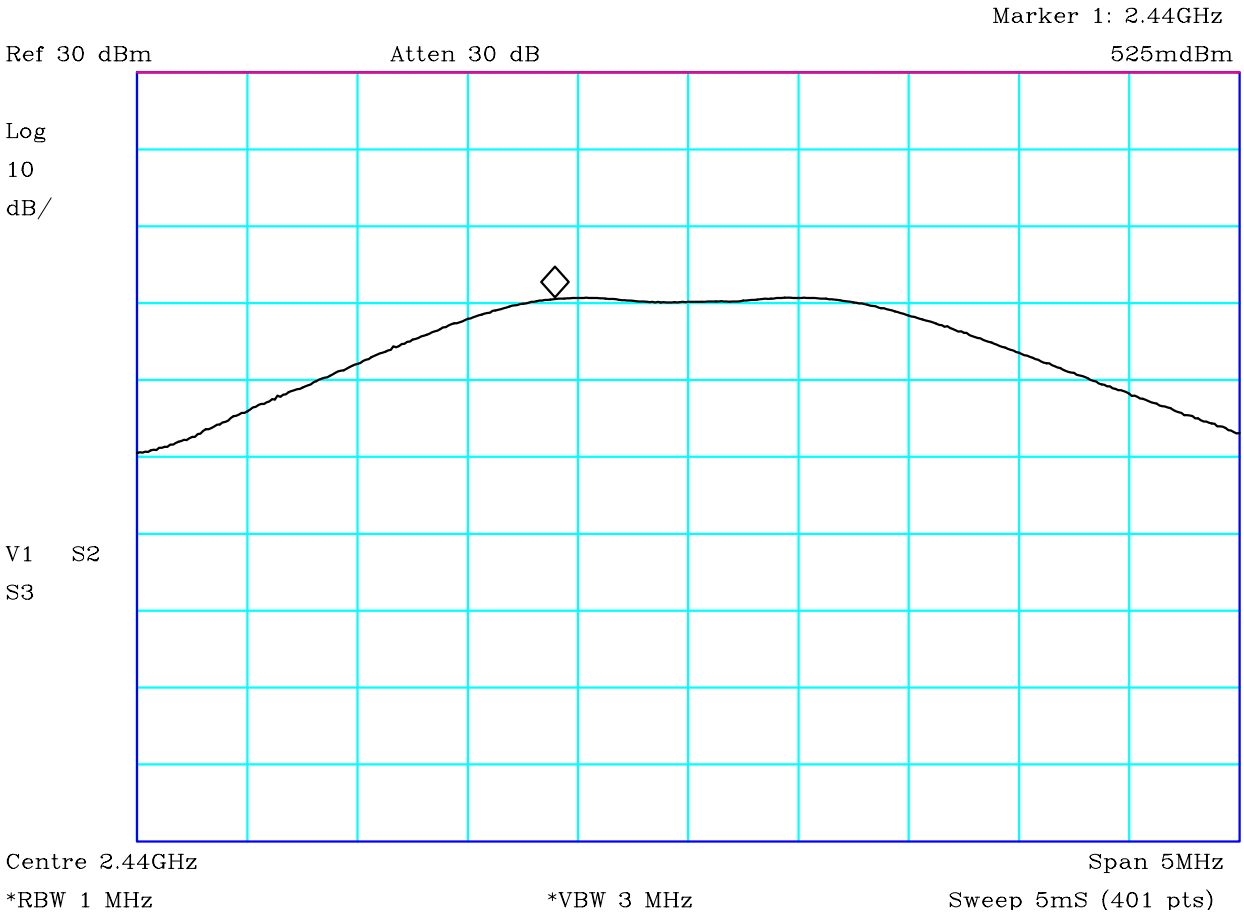


PLOT 1 Peak Power - Channel 11

Company:	Alertme	Product:	Smart Plug
Date:	17/05/2012	Test Eng:	Dave Smith
Method:	D01 DTS Meas Guidance v01	Method:	
Limit1:(VIO)	30dBm	Limit2:	
Limit3:		Limit4:	

Channel 11
Band power measured over EBW (-26dB points) using peak detector.
Level = 3.913 dBm which therefore complies with the upper limit of
Part 15.247(b)(3) of 30dBm (1W).

Facility:	GTEM_1	Mode:	1
		Modification State:	0
	File: H2417401		

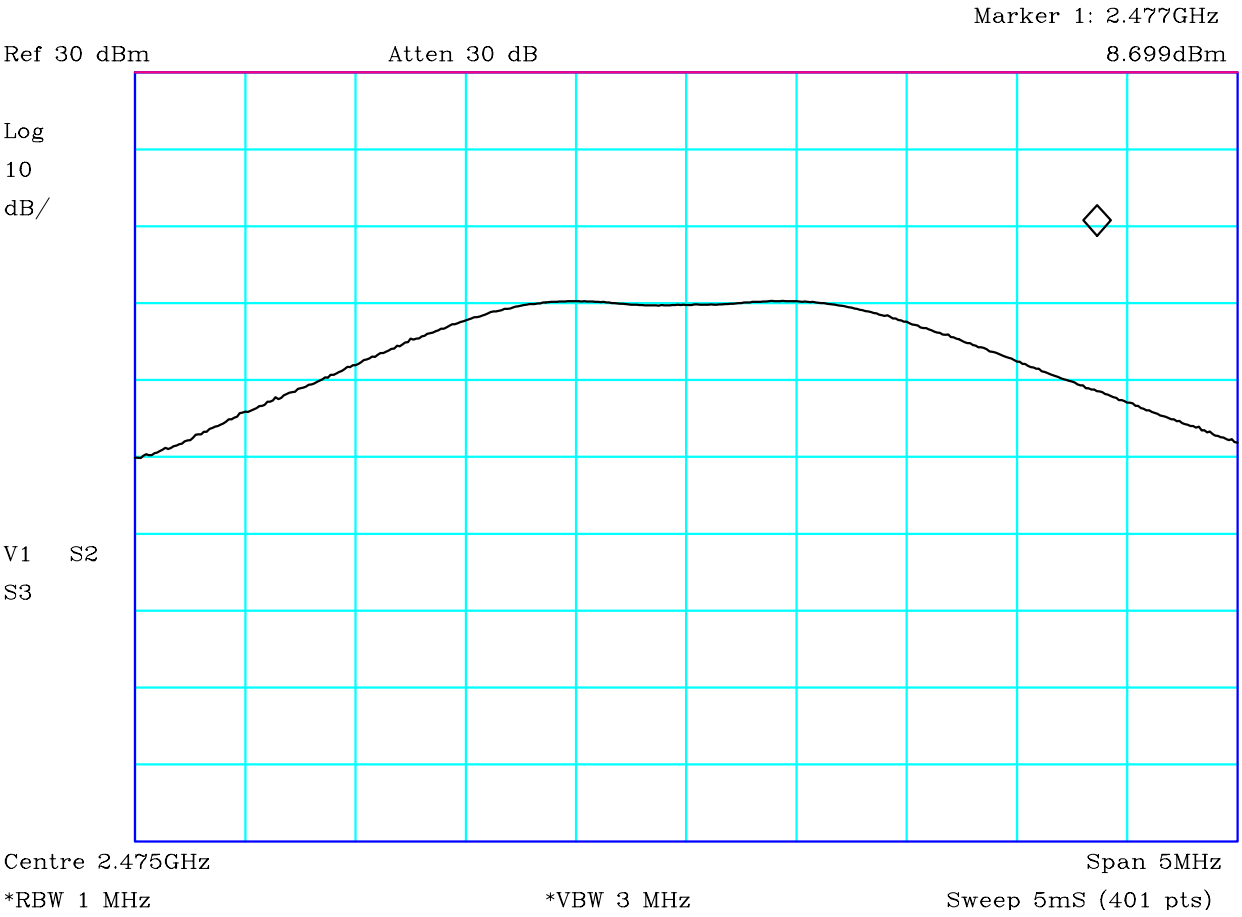


PLOT 2 Peak Power - Channel 18

Company:	Alertme	Product:	Smart Plug
Date:	17/05/2012	Test Eng:	Dave Smith
Method:	D01 DTS Meas Guidance v01	Method:	
Limit1:(VIO)	30dBm	Limit2:	
Limit3:		Limit4:	

Channel 18
Band power measured over EBW (-26dB points) using peak detector.
Level = 3.562 dBm which therefore complies with the upper limit of
Part 15.247(b)(3) of 30dBm (1W).

Facility:	GTEM_1	Mode:	1
		Modification State:	0
File:	H2417404		

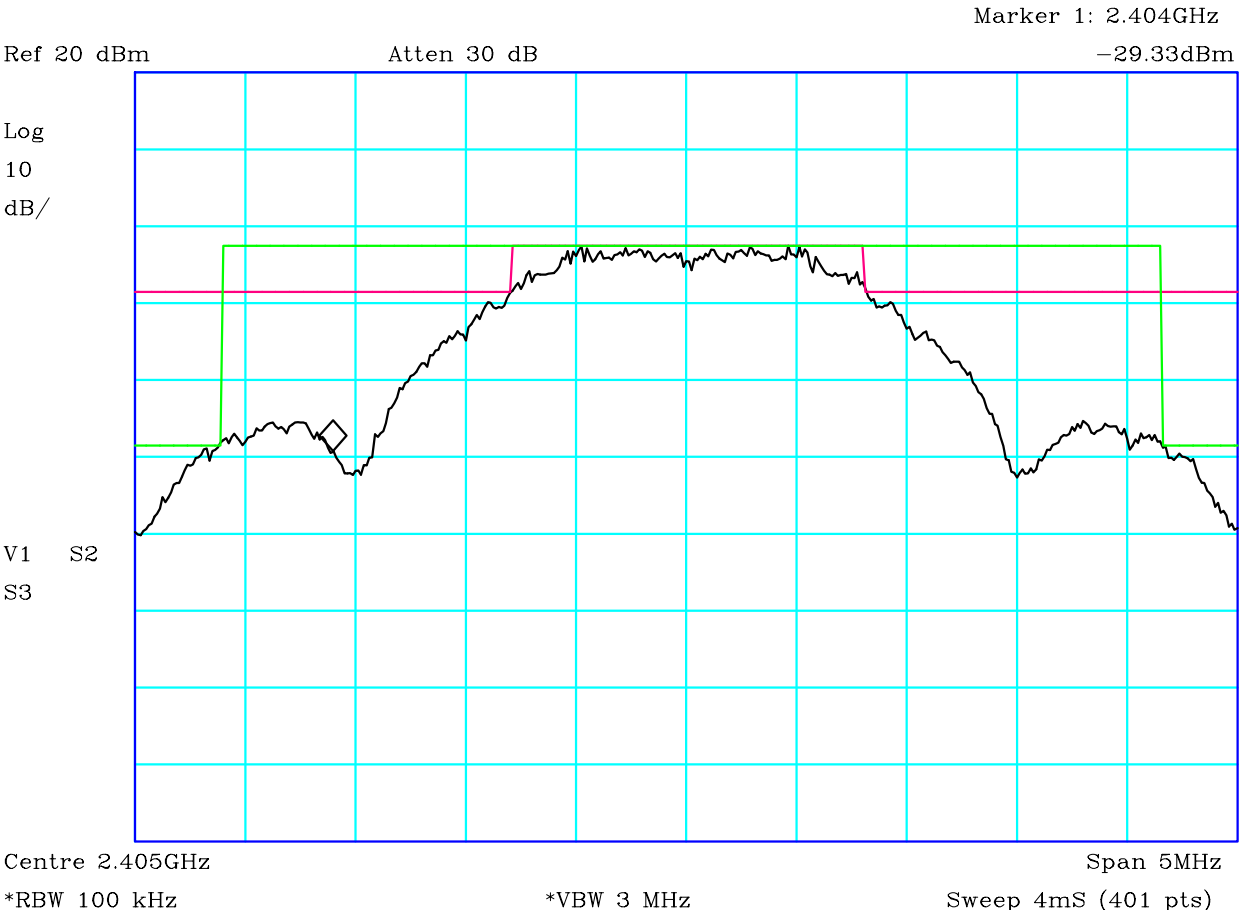


PLOT 3 Peak Power - Channel 25

Company:	Alertme	Product:	Smart Plug
Date:	17/05/2012	Test Eng:	Dave Smith
Method:	D01 DTS Meas Guidance v01	Method:	
Limit1:(VIO)	30dBm	Limit2:	
Limit3:		Limit4:	

Channel 25
Band power measured over EBW (-26dB points) using peak detector.
Level = 3.169 dBm which therefore complies with the upper limit of
Part 15.247(b)(3) of 30dBm (1W).

Facility:	GTEM_1	Mode:	1
		Modification State:	0
	File: H24173FA		



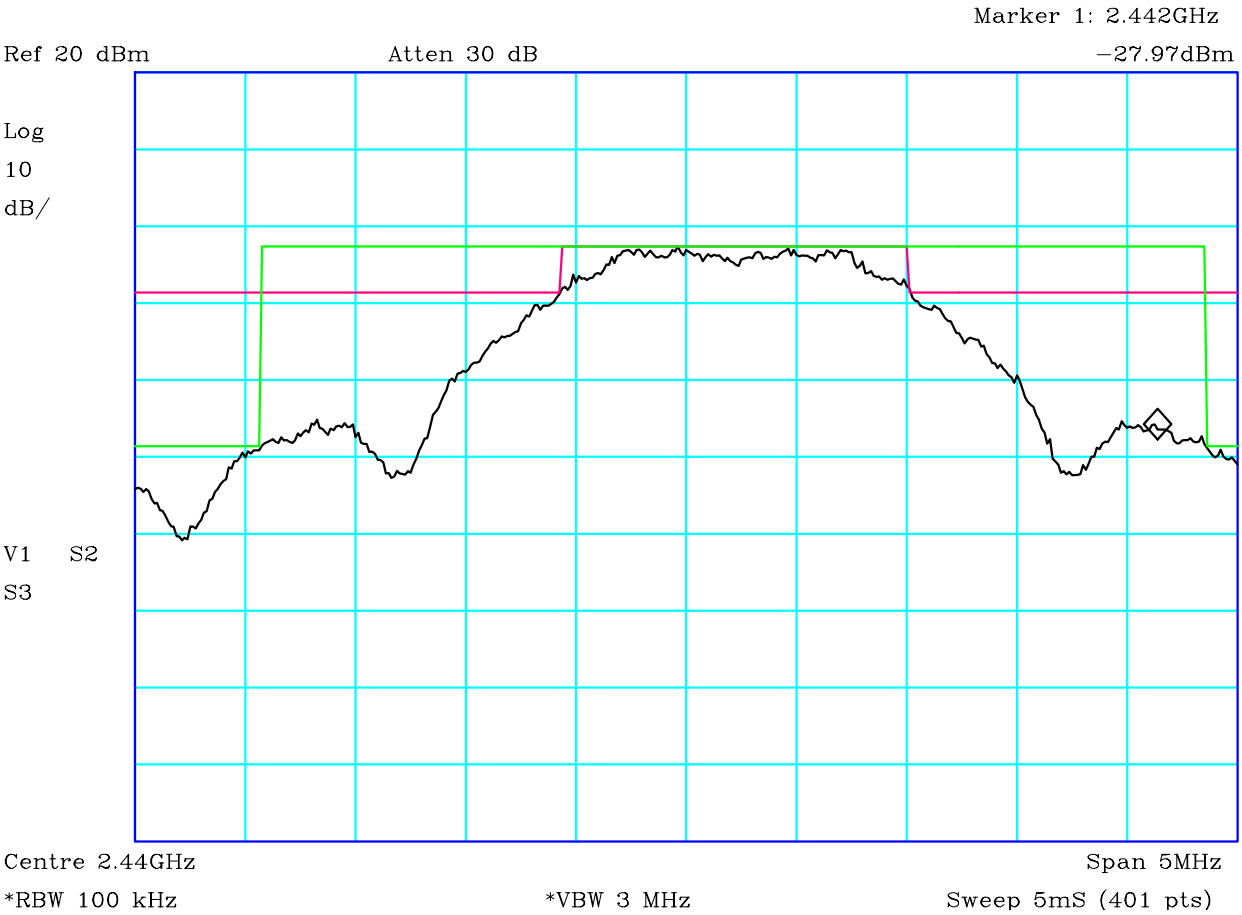
PLOT 4 6dB Bandwidth - Channel 11

Company:	Alertme	Product:	Smart Plug
Date:	17/05/2012	Test Eng:	Dave Smith
Method:	D01 DTS Meas Guidance v01	Method:	
Limit1:(VIO)	-6dB	Limit2:(GRN)	-26dB
Limit3:		Limit4:	

Channel 11

6dB Bandwidth lies between 2.4044125 GHz and 2.4060125GHz.
6dB Bandwidth = 1.60MHz.
26dB Bandwidth = 4.26MHz.
Part 15.247(a)(2) requires the 6dB bandwidth to be more than 500kHz.

Facility:	GTEM_1	Mode:	1
		Modification State:	0
	File: H24173E2		



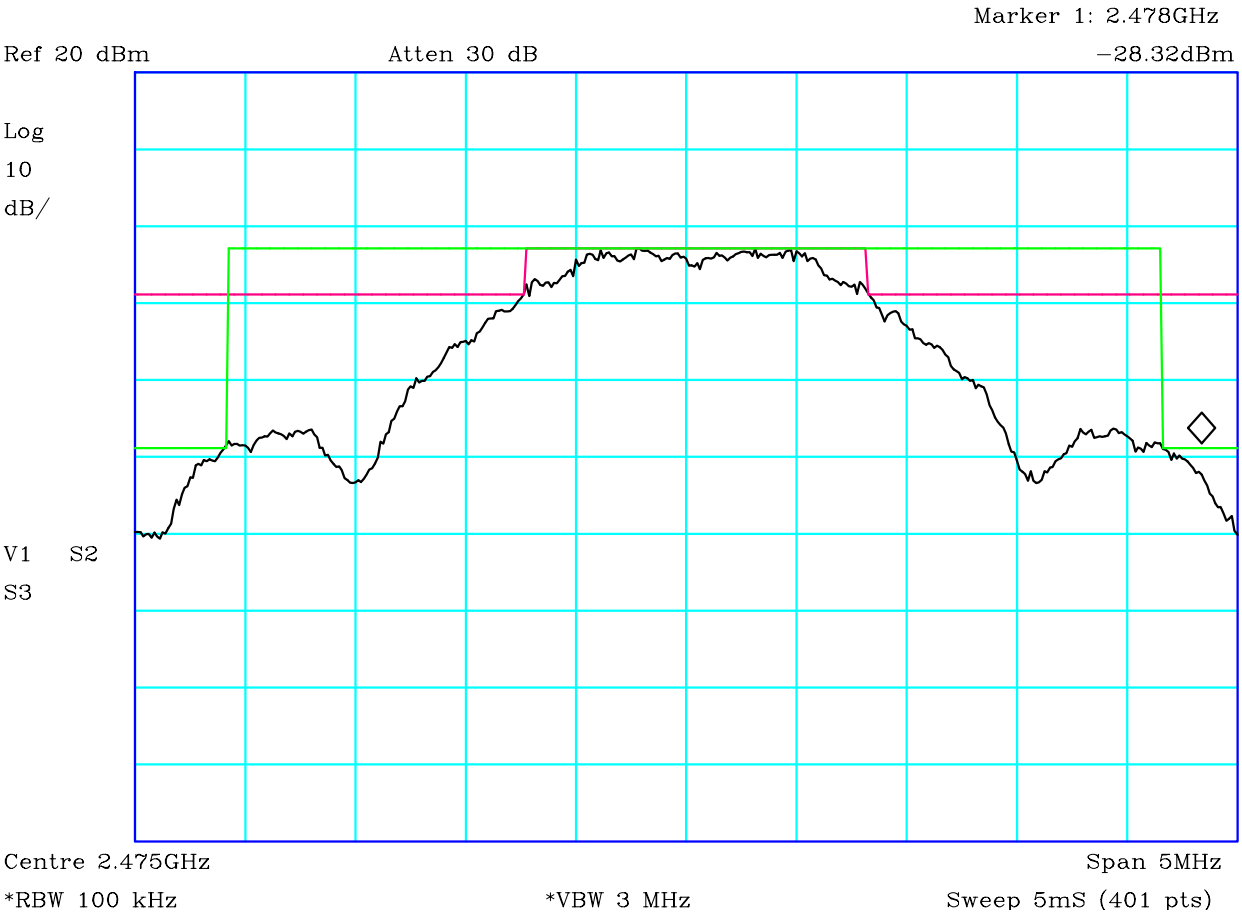
PLOT 5 6dB Bandwidth - Channel 18

Company:	Alertme	Product:	Smart Plug
Date:	17/05/2012	Test Eng:	Dave Smith
Method:	D01 DTS Meas Guidance v01	Method:	
Limit1:(VIO)	-6dB	Limit2:(GRN)	-26dB
Limit3:		Limit4:	

Channel 18

6dB Bandwidth lies between 2.4394250 GHz and 2.4410125GHz.
6dB Bandwidth = 1.59MHz.
26dB Bandwidth = 4.27MHz.
Part 15.247(a)(2) requires the 6dB bandwidth to be more than 500kHz.

Facility:	GTEM_1	Mode:	1
		Modification State:	0
	File: H24173EA		



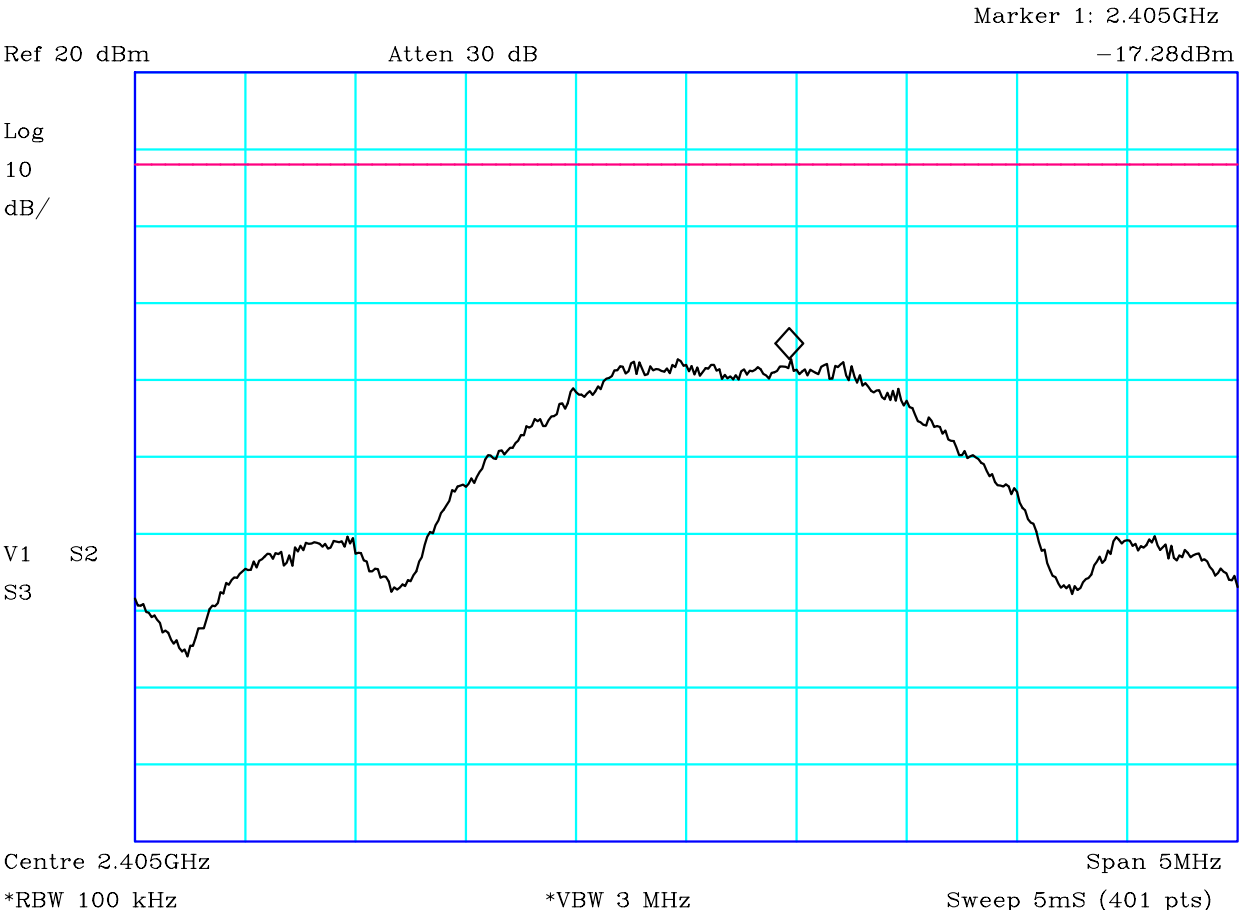
PLOT 6 6dB Bandwidth - Channel 25

Company:	Alertme	Product:	Smart Plug
Date:	17/05/2012	Test Eng:	Dave Smith
Method:	D01 DTS Meas Guidance v01	Method:	
Limit1:(VIO)	-6dB	Limit2:(GRN)	-26dB
Limit3:		Limit4:	

Channel 25

6dB Bandwidth lies between 2.4744500 GHz and 2.4760125GHz.
6dB Bandwidth = 1.56MHz.
26dB Bandwidth = 4.24MHz.
Part 15.247(a)(2) requires the 6dB bandwidth to be more than 500kHz.

Facility:	GTEM_1	Mode:	1
		Modification State:	0
	File: H24173F2		



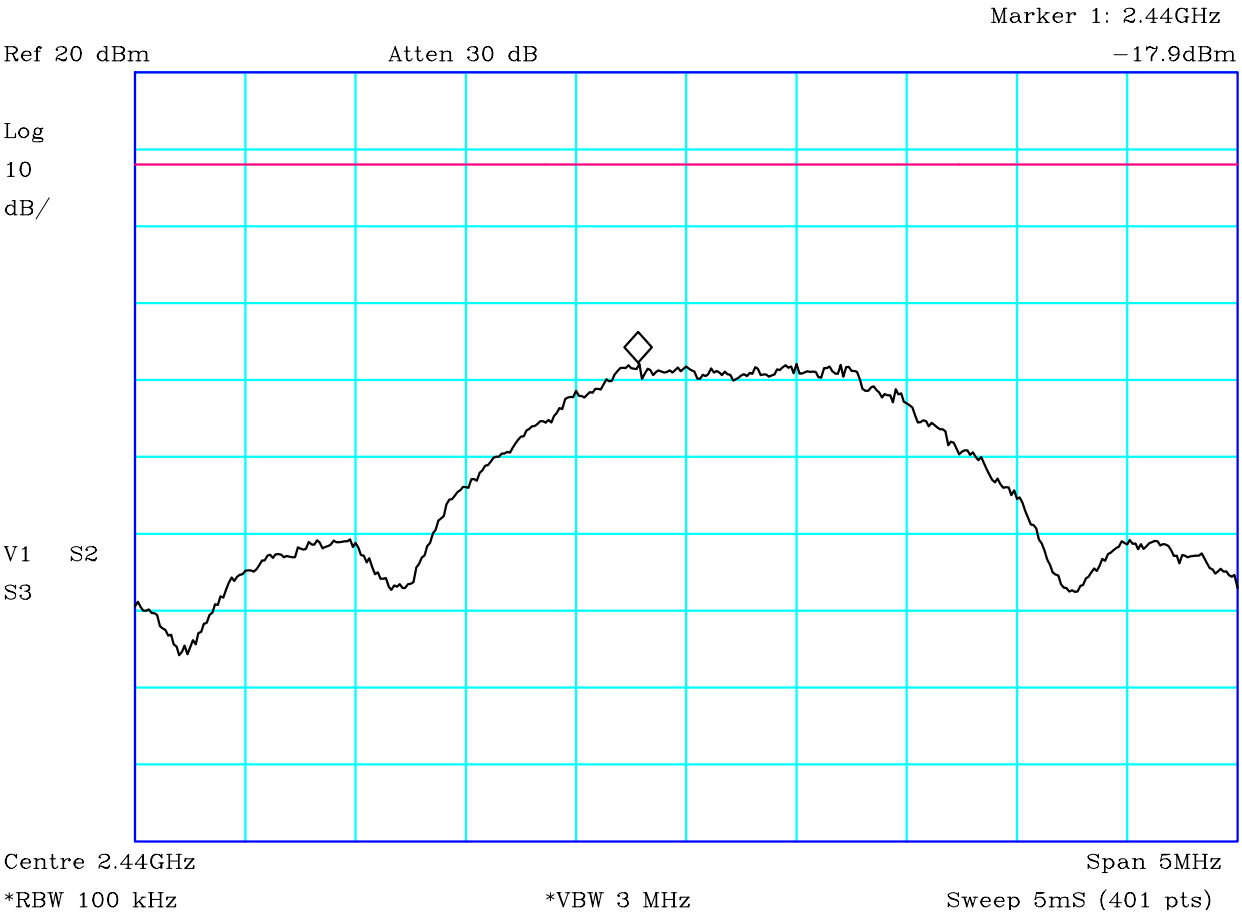
CF1:-15.2

PLOT 7 Spectral Density - Channel 11

Company:	Alertme	Product:	Smart Plug
Date:	17/05/2012	Test Eng:	Dave Smith
Method:	D01 DTS Meas Guidance v01	Method:	
Limit1:(VIO)	8dBm/3kHz	Limit2:	
Limit3:		Limit4:	

Channel 11
Maximum spectral density = -17.28 dBm/3kHz
Includes correction factor to convert from 100kHz to 3kHz bandwidth (-15.2dB)
Part 15 Subpart (c) 15.247(e) requires the spectral density to be below
8dBm/3kHz

Facility:	GTEM_1	Mode:	1
		Modification State:	1
	File: H241740E		



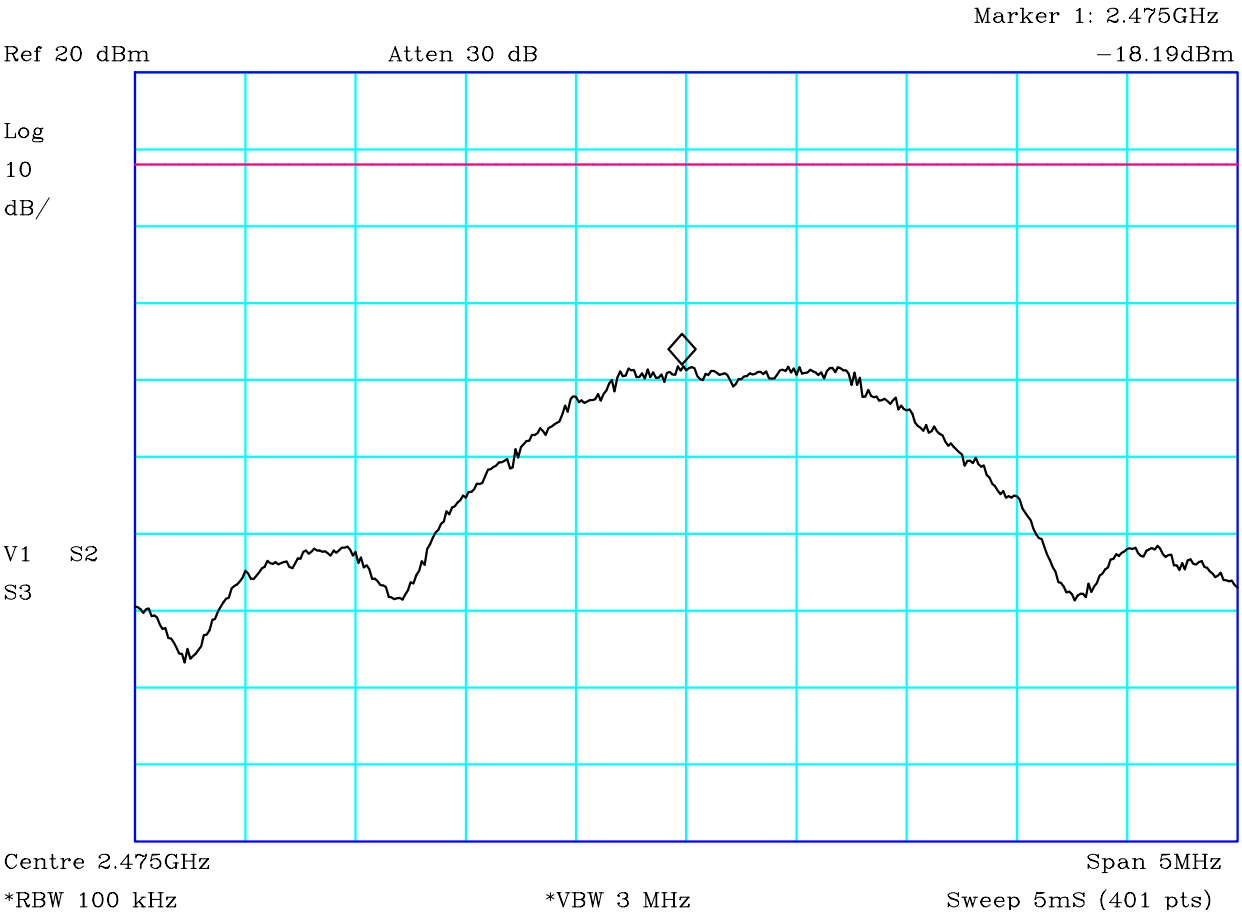
CF1:-15.2

PLOT 8 Spectral Density - Channel 18

Company:	Alertme	Product:	Smart Plug
Date:	17/05/2012	Test Eng:	Dave Smith
Method:	D01 DTS Meas Guidance v01	Method:	
Limit1:(VIO)	8dBm/3kHz	Limit2:	
Limit3:		Limit4:	

Channel 18
Maximum spectral density = -17.9 dBm/3kHz
Includes correction factor to convert from 100kHz to 3kHz bandwidth (-15.2dB)
Part 15 Subpart (c) 15.247(e) requires the spectral density to be below
8dBm/3kHz

Facility:	GTEM_1	Mode:	1
		Modification State:	1
	File: H2417408		



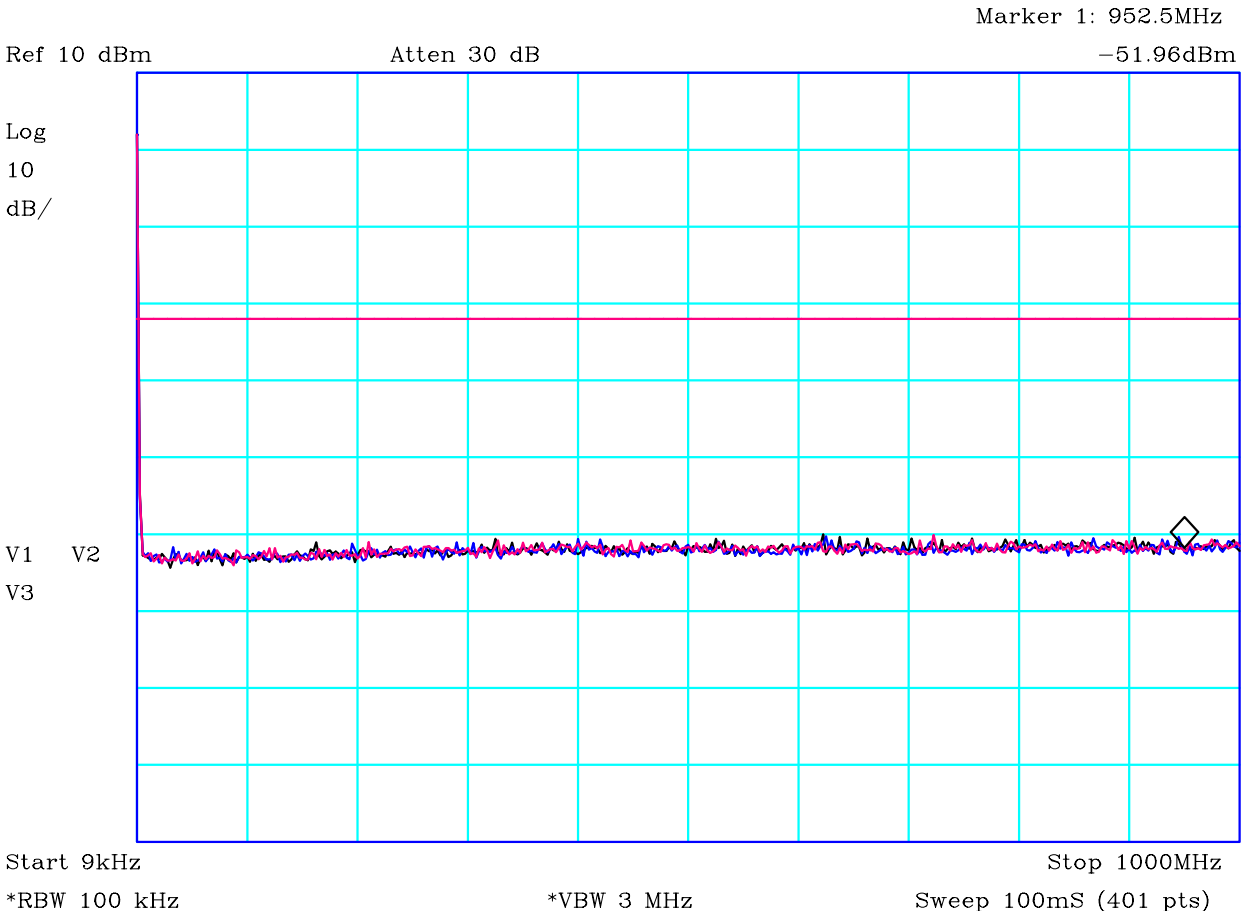
CF1:-15.2

PLOT 9 Spectral Density - Channel 25

Company:	Alertme	Product:	Smart Plug
Date:	17/05/2012	Test Eng:	Dave Smith
Method:	D01 DTS Meas Guidance v01	Method:	
Limit1:(VIO)	8dBm/3kHz	Limit2:	
Limit3:		Limit4:	

Channel 25
Maximum spectral density = -18.19 dBm/3kHz
Includes correction factor to convert from 100kHz to 3kHz bandwidth (-15.2dB)
Part 15 Subpart (c) 15.247(e) requires the spectral density to be below
8dBm/3kHz

Facility:	GTEM_1	Mode:	1
		Modification State:	1
	File: H241740C		

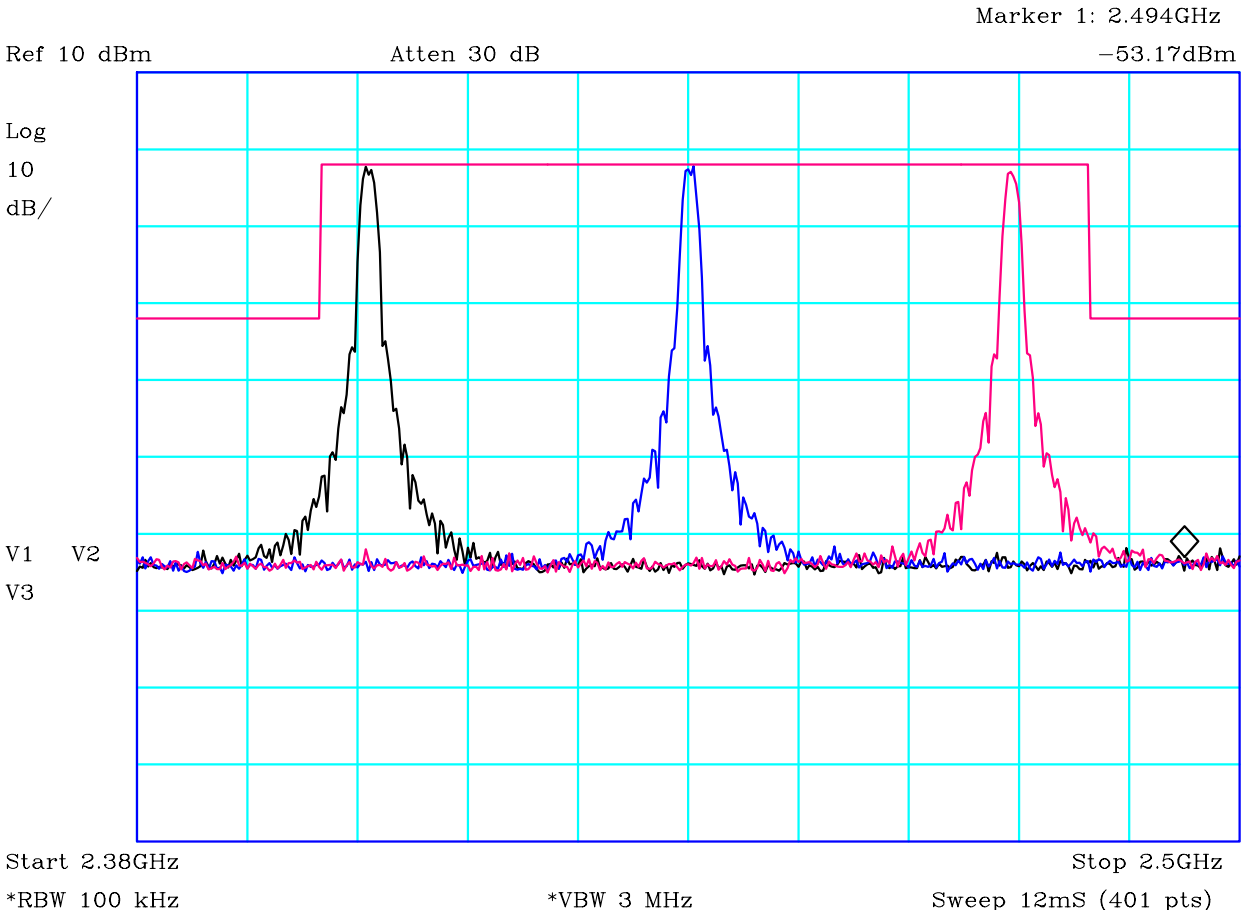


PLOT 10 Antenna Conducted Spurious - 9kHz to 1GHz

Company:	Alertme	Product:	Smart Plug
Date:	03/05/2012	Test Eng:	Dave Smith
Method:	D01 DTS Meas Guidance v01	Method:	
Limit1:(VIO)	-20dBc	Limit2:	
Limit3:		Limit4:	

Black = Channel 11
Blue = Channel 18
Red = Channel 25
Part 15 Subpart (c) 15.247(d) requires spurious conducted emissions to be at least 20dB below carrier.
Carrier level of -2dBm used to set limit. (With 100kHz RBW all channels measured within 0.5dB of -2dBm)

Facility:	GTEM_1	Mode:	1
		Modification State:	0
	File: H240363B		

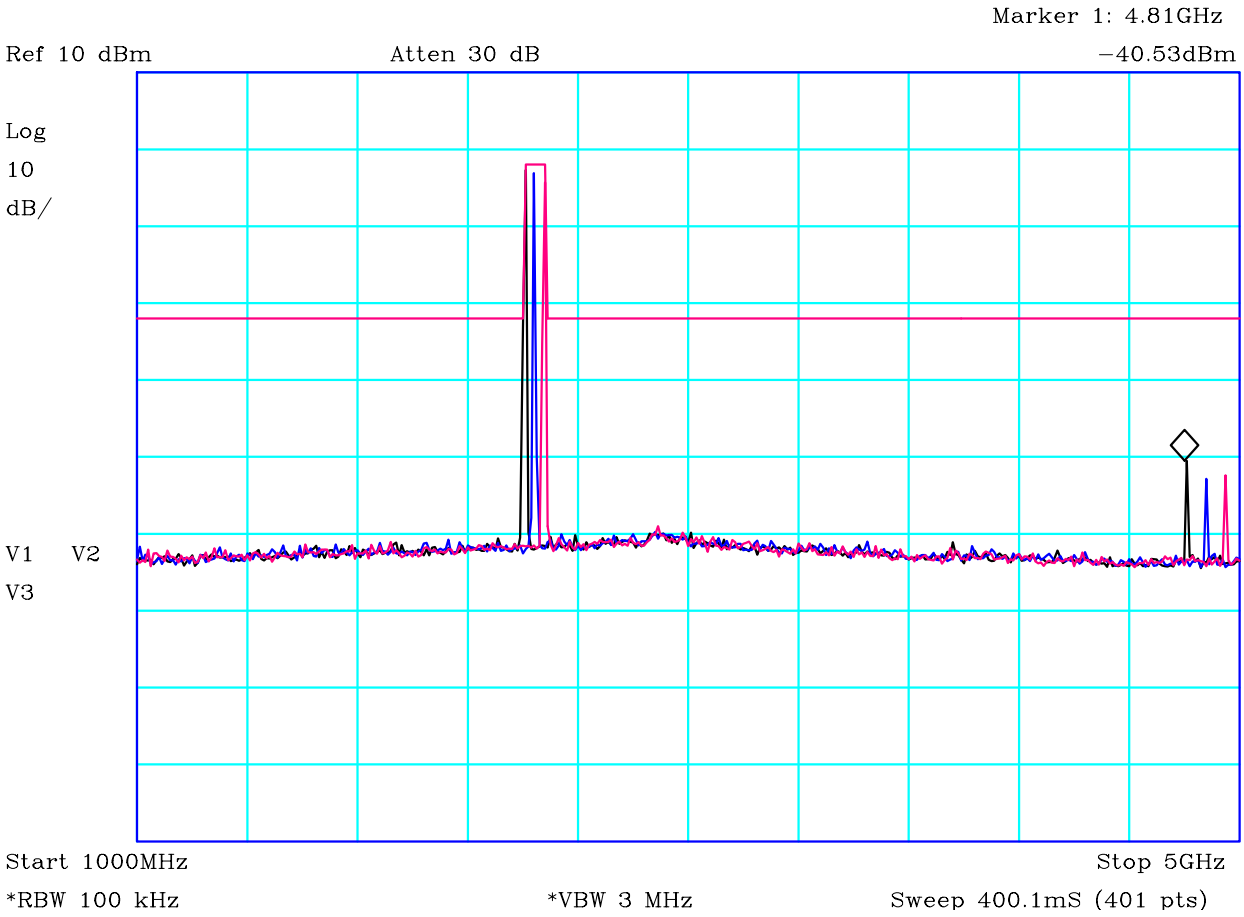


PLOT 11 Antenna Conducted Spurious - near band edges

Company:	Alertme	Product:	Smart Plug
Date:	03/05/2012	Test Eng:	Dave Smith
Method:	D01 DTS Meas Guidance v01	Method:	
Limit1:(VIO)	-20dBc	Limit2:	
Limit3:		Limit4:	

Black = Channel 11
Blue = Channel 18
Red = Channel 25
Part 15 Subpart (c) 15.247(d) requires spurious conducted emissions to be at least 20dB below carrier.
Carrier level of -2dBm used to set limit. (With 100kHz RBW all channels measured within 0.5dB of -2dBm)

Facility:	GTEM_1	Mode:	1
		Modification State:	0
	File: H2403620		

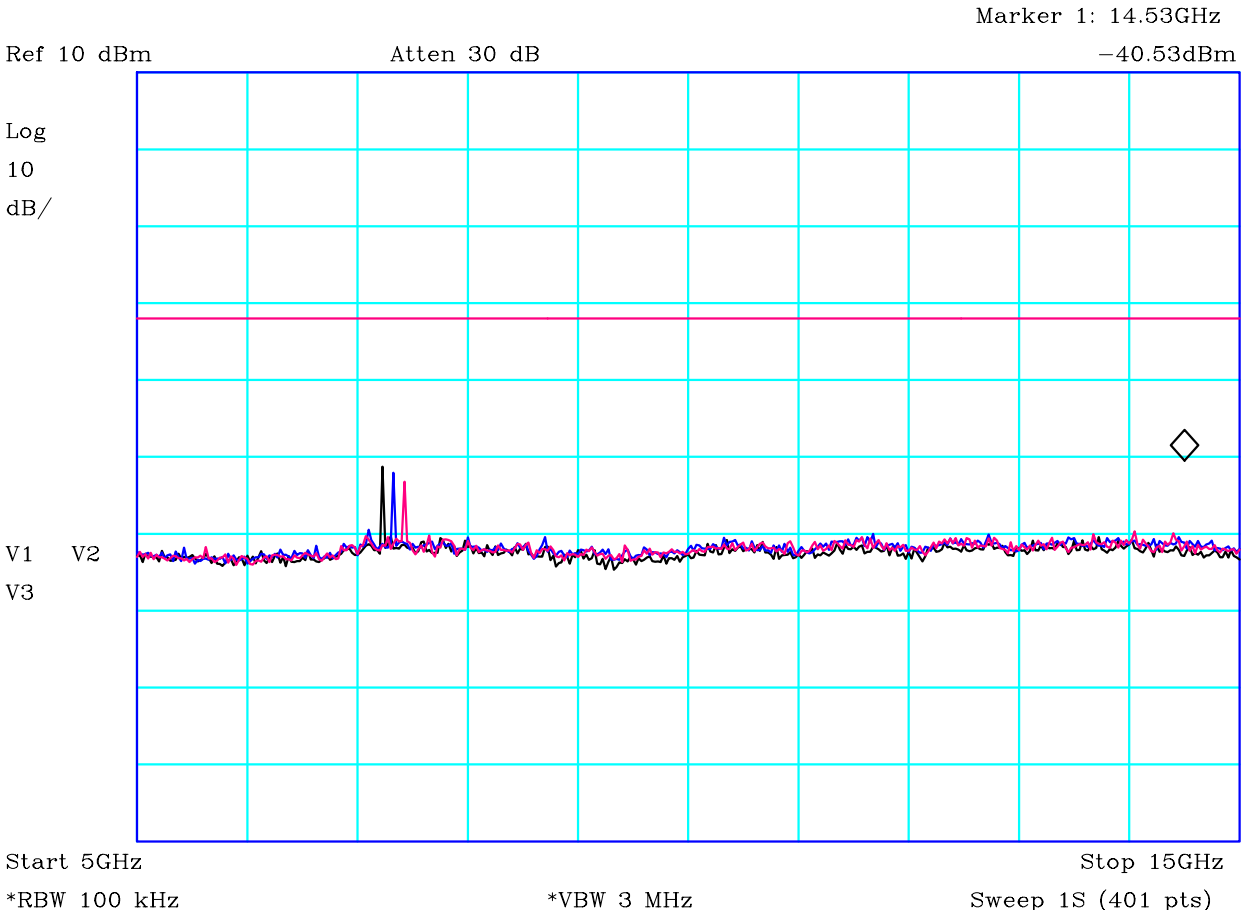


PLOT 12 Antenna Conducted Spurious - 1GHz to 5GHz

Company:	Alertme	Product:	Smart Plug
Date:	03/05/2012	Test Eng:	Dave Smith
Method:	D01 DTS Meas Guidance v01	Method:	
Limit1:(VIO)	-20dBc	Limit2:	
Limit3:		Limit4:	

Black = Channel 11
Blue = Channel 18
Red = Channel 25
Part 15 Subpart (c) 15.247(d) requires spurious conducted emissions to be at least 20dB below carrier.
Carrier level of -2dBm used to set limit. (With 100kHz RBW all channel measured within 0.5dB of -2dBm)

Facility:	GTEM_1	Mode:	1
		Modification State:	0
	File: H2403623		

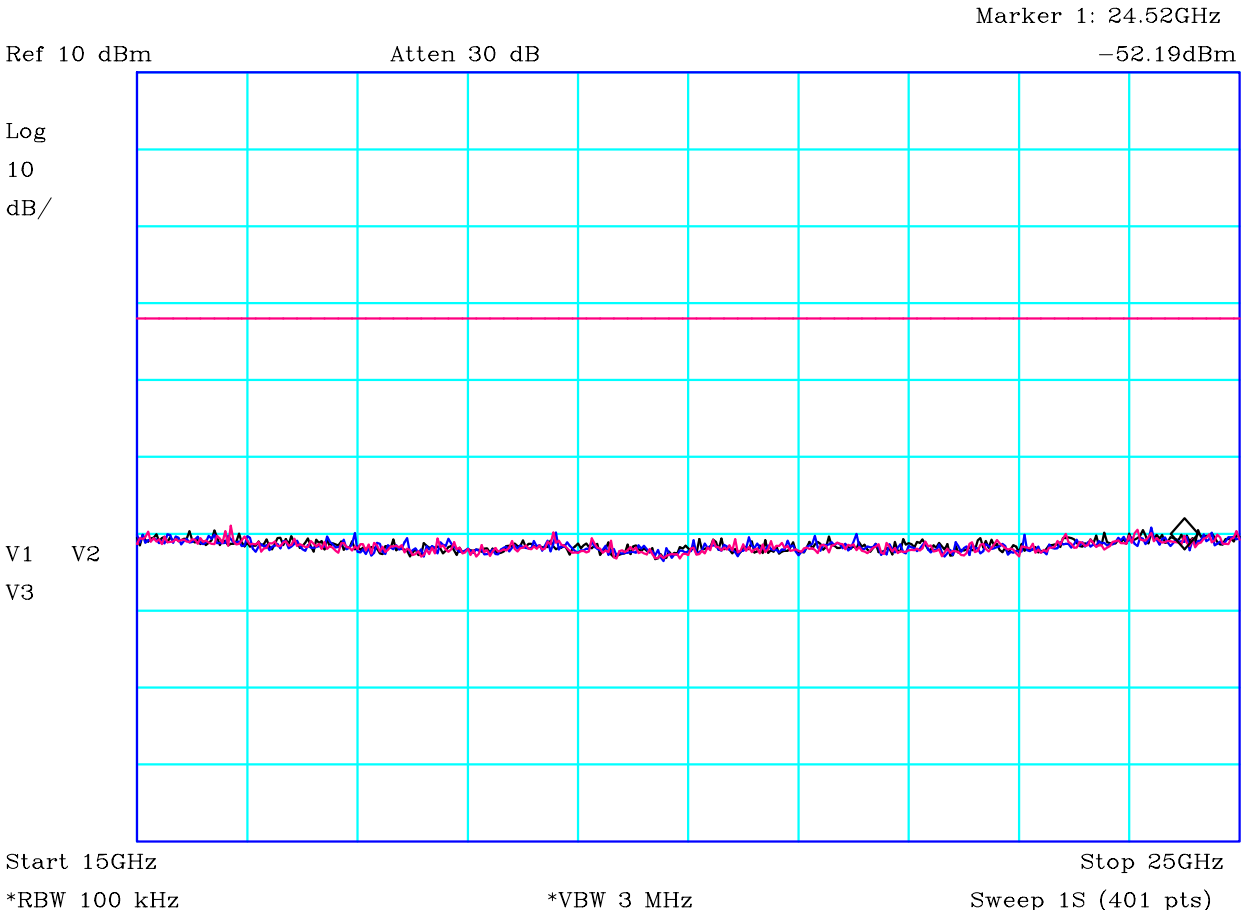


PLOT 13 Antenna Conducted Spurious - 5GHz to 15GHz

Company:	Alertme	Product:	Smart Plug
Date:	03/05/2012	Test Eng:	Dave Smith
Method:	D01 DTS Meas Guidance v01	Method:	
Limit1:(VIO)	-20dBc	Limit2:	
Limit3:		Limit4:	

Black = Channel 11
Blue = Channel 18
Red = Channel 25
Part 15 Subpart (c) 15.247(d) requires spurious conducted emissions to be at least 20dB below carrier.
Carrier level of -2dBm used to set limit. (With 100kHz RBW all channel measured within 0.5dB of -2dBm)

Facility:	GTEM_1	Mode:	1
		Modification State:	0
	File: H2403629		

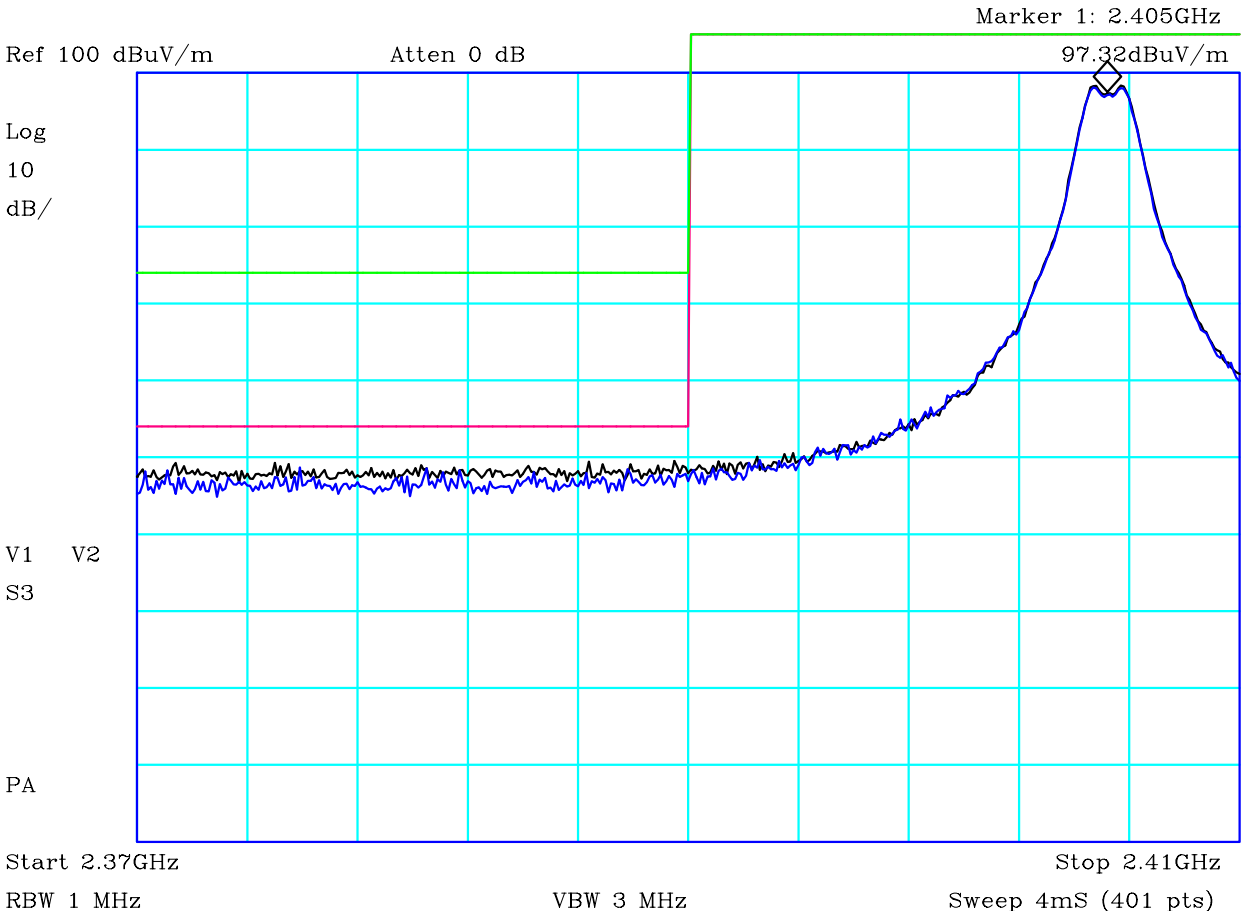


PLOT 14 Antenna Conducted Spurious - 15GHz to 25GHz

Company:	Alertme	Product:	Smart Plug
Date:	03/05/2012	Test Eng:	Dave Smith
Method:	D01 DTS Meas Guidance v01	Method:	
Limit1:(VIO)	-20dBc	Limit2:	
Limit3:		Limit4:	

Black = Channel 11
Blue = Channel 18
Red = Channel 25
Part 15 Subpart (c) 15.247(d) requires spurious conducted emissions to be at least 20dB below carrier.
Carrier level of -2dBm used to set limit. (With 100kHz RBW all channel measured within 0.5dB of -2dBm)

Facility:	GTEM_1	Mode:	1
		Modification State:	0
	File: H2403636		



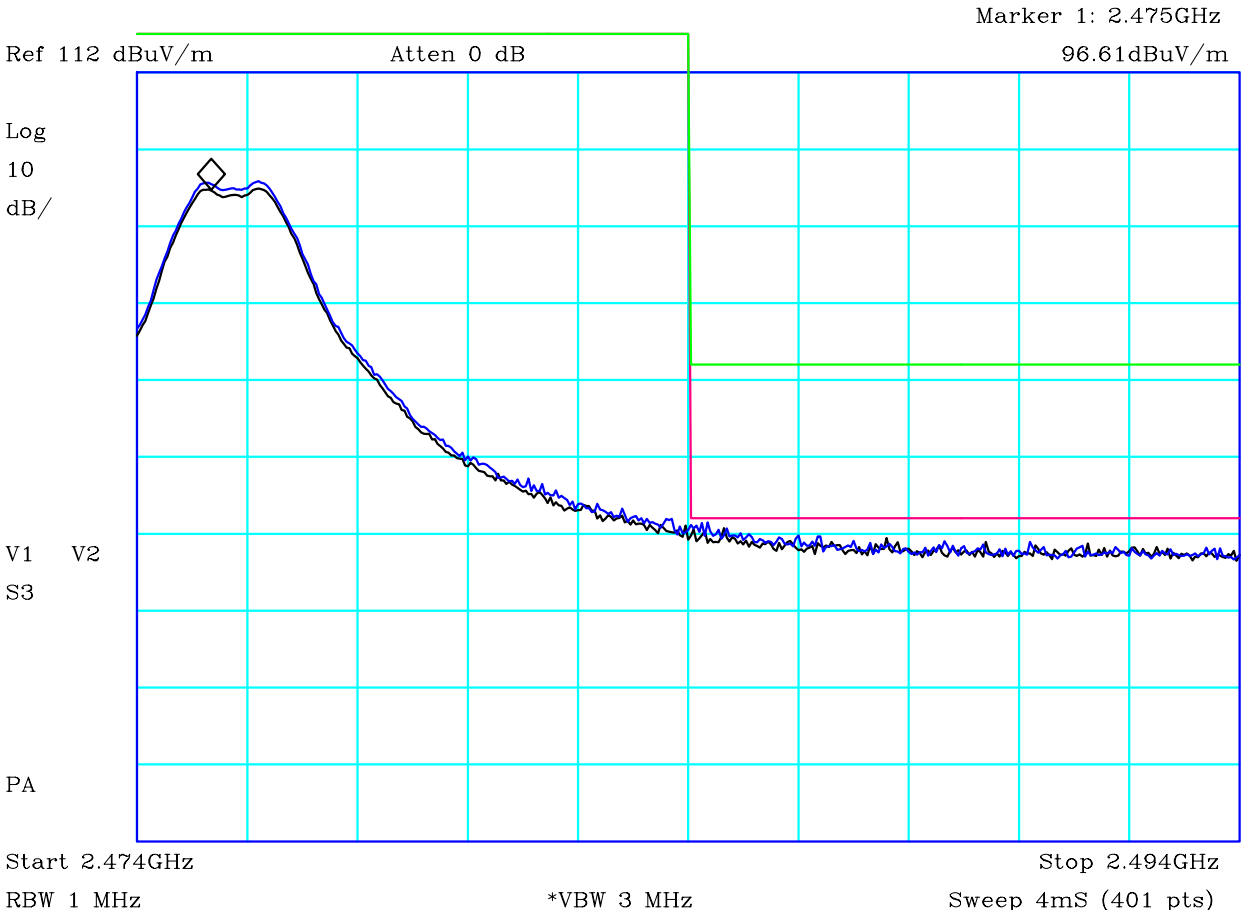
CF1:A23_3m_100806 CF2:CBL059_CBL018_CBL065_CBL060_100806

PLOT 15 Radiated Emissions - Ch 11 - Band Edge

Company:	Alertme	Product:	Smart Plug
Date:	28/04/2012	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(VIO)	FCC Restricted Bands@3m Av	Limit2:(GRN)	FCC Restricted Bands@3m Pk
Limit3:		Limit4:	

Black:Vertical, Blue: Horizontal
Transmitting on channel 11.
Peak measurement.
Maximum of EUT upright and flat.

Facility:	Anech_2	Height	1.5m	Mode:	1
Distance	3m	Polarisation	V+H	Modification State:	0
Angle	0-360	File:	H23285D3		



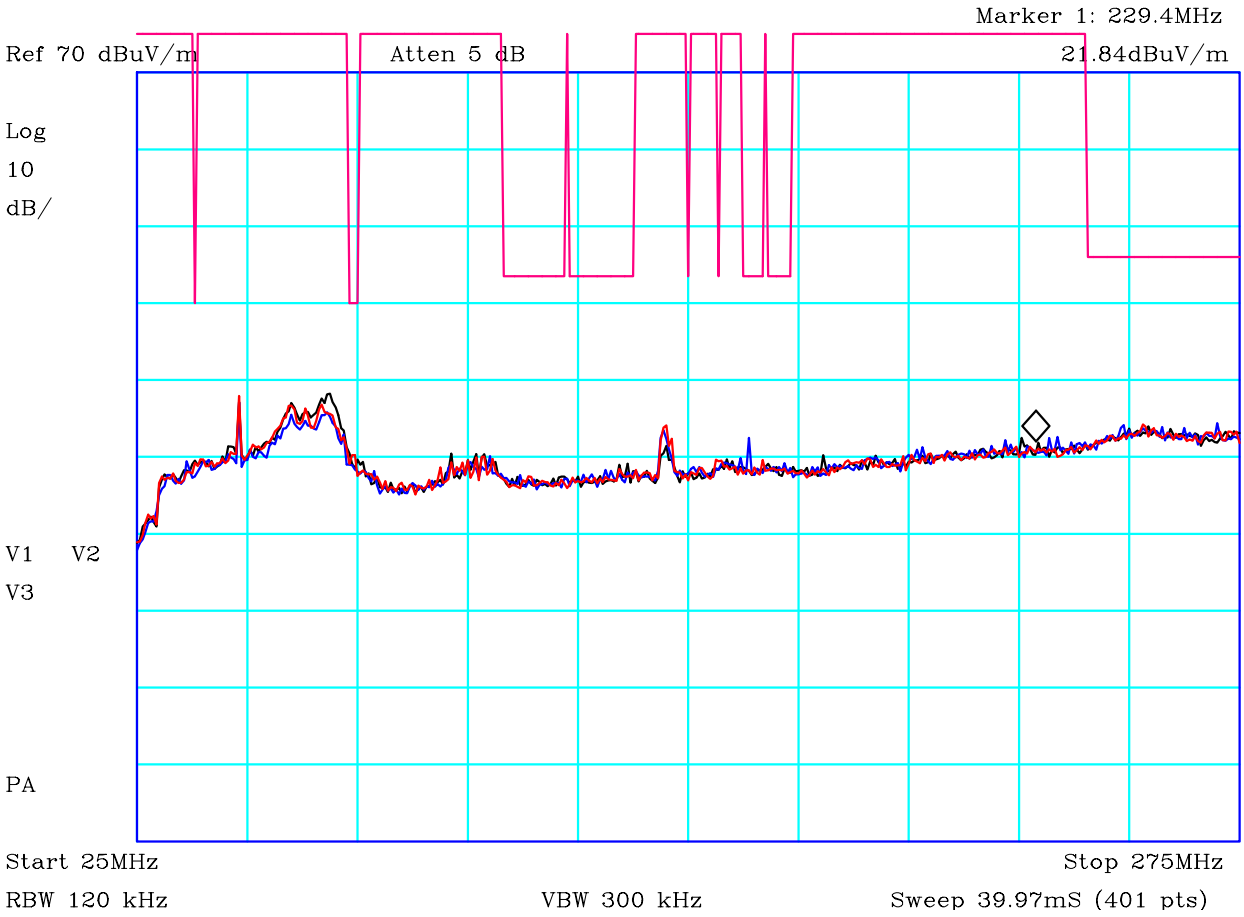
CF1:A23_3m_100806 CF2:CBL059_CBL018_CBL065_CBL060_100806

PLOT 16 Radiated Emissions - Ch 25 - Band Edge

Company:	Alertme	Product:	Smart Plug
Date:	28/04/2012	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(VIO)	FCC Restricted Bands@3m Av	Limit2:(GRN)	FCC Restricted Bands@3m Pk
Limit3:		Limit4:	

Black:Vertical, Blue: Horizontal
Transmitting on channel 25.
Peak measurement
Maximum of EUT upright and flat.

Facility:	Anech_2	Height	1.5m	Mode:	1
Distance	3m	Polarisation	V+H	Modification State:	0
Angle	0-360	File:	H23285FB		



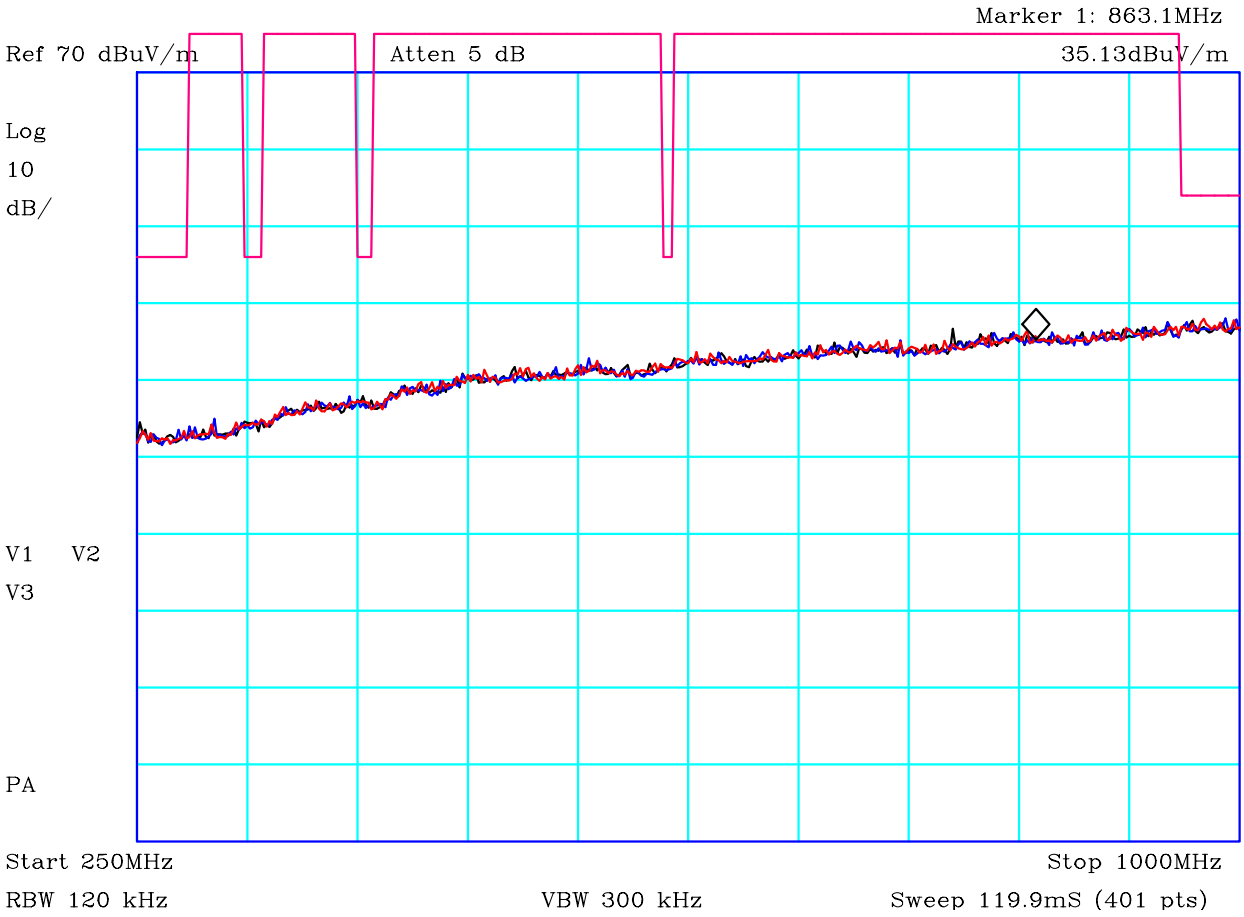
CF1:A15_100811 CF2:CBL002_CBL069_100809 CF4:RFF04_110112

PLOT 17 Radiated Emissions - 25MHz to 275MHz

Company:	Alertme	Product:	Smart Plug
Date:	02/05/2012	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(VIO)	FCC Restricted Bands	Limit2:	
Limit3:		Limit4:	

Black: Ch11, Blue: Ch18, Red: Ch25
Peak measurement
Maximum of EUT upright and flat.

Facility:	Anech_1	Height	1m,1.5m,2m	Mode:	1
Distance	3m	Polarisation	V+H	Modification State:	0
Angle	0-360	File:	H240267C		



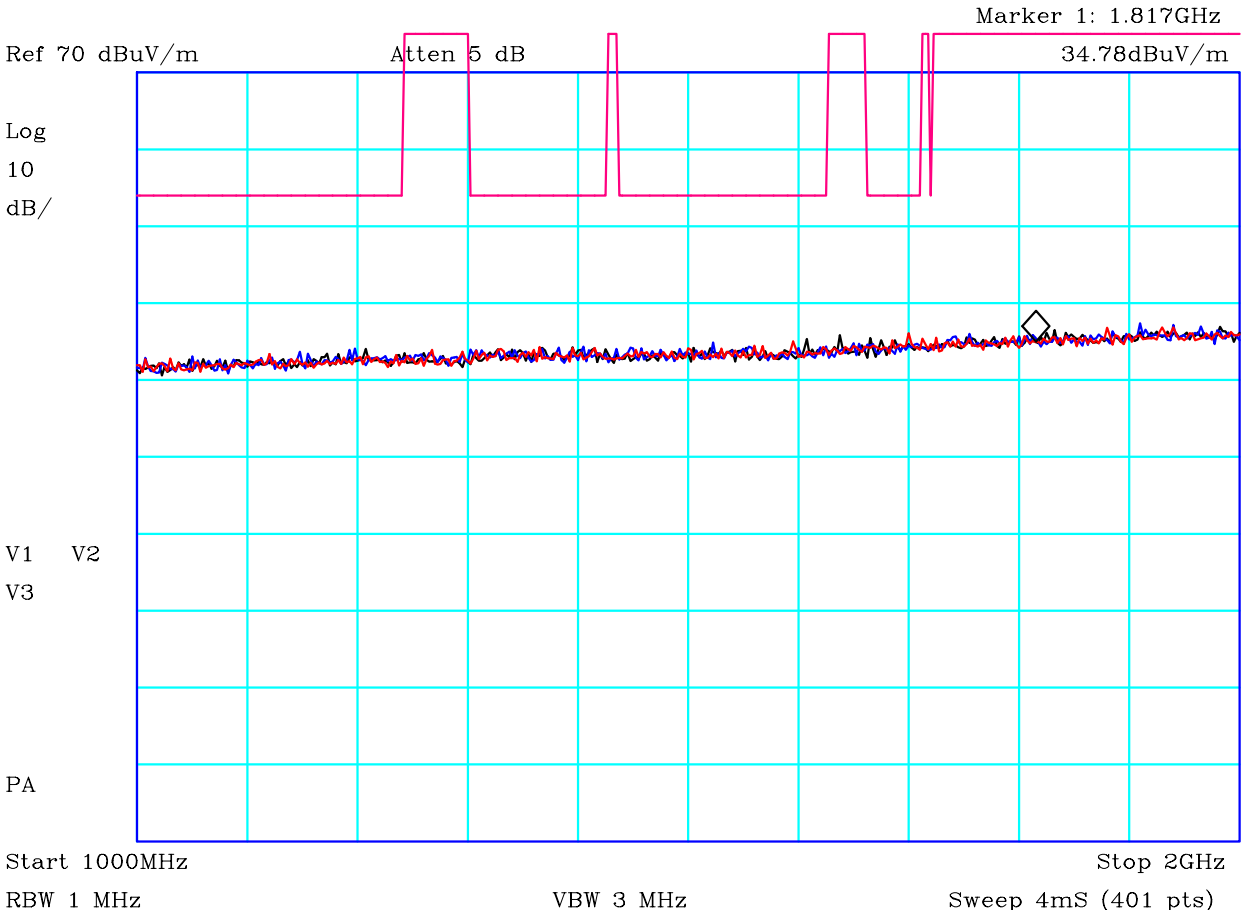
CF1:A15_100811 CF2:CBL002_CBL069_100809 CF4:RFF04_110112

PLOT 18 Radiated Emissions - 250MHz to 1GHz

Company:	Alertme	Product:	Smart Plug
Date:	02/05/2012	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(VIO)	FCC Restricted Bands	Limit2:	
Limit3:		Limit4:	

Black: Ch11, Blue: Ch18, Red: Ch25
Peak measurement
Maximum of EUT upright and flat.

Facility:	Anech_1	Height	1m,1.5m,2m	Mode:	1
Distance	3m	Polarisation	V+H	Modification State:	0
Angle	0-360	File:	H2402688		



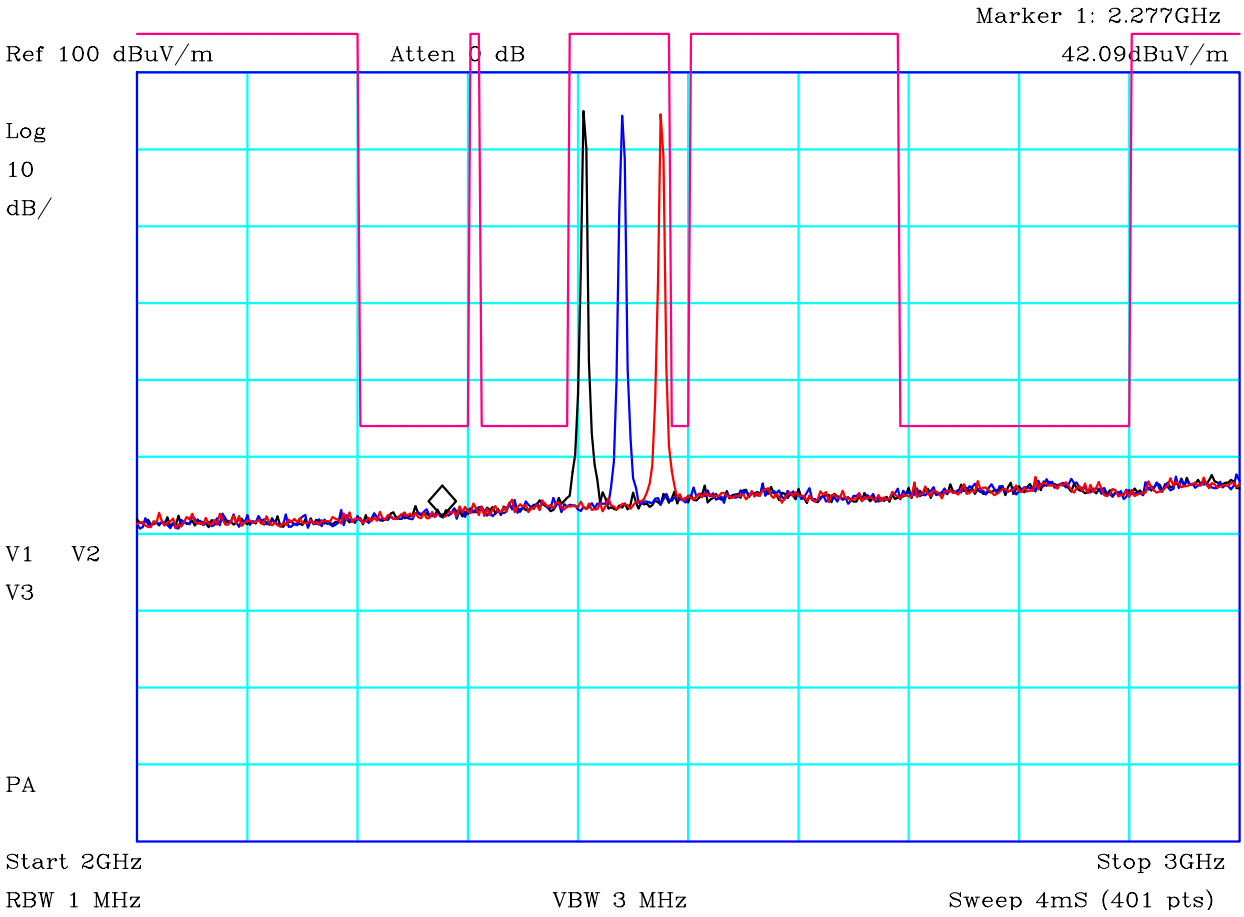
CF1:A23_3m_100806 CF2:CBL002_CBL069_100809 CF3:PRE7_110112 CF4:RFF04_110112

PLOT 19 Radiated Emissions - 1GHz to 2GHz

Company:	Alertme	Product:	Smart Plug
Date:	02/05/2012	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(VIO)	FCC Restricted Bands	Limit2:	
Limit3:		Limit4:	

Black: Ch11, Blue: Ch18, Red: Ch25
Peak measurement
Maximum of EUT upright and flat.

Facility:	Anech_1	Height	1m	Mode:	1
Distance	3m	Polarisation	V+H	Modification State:	0
Angle	0-360	File:	H2402600		



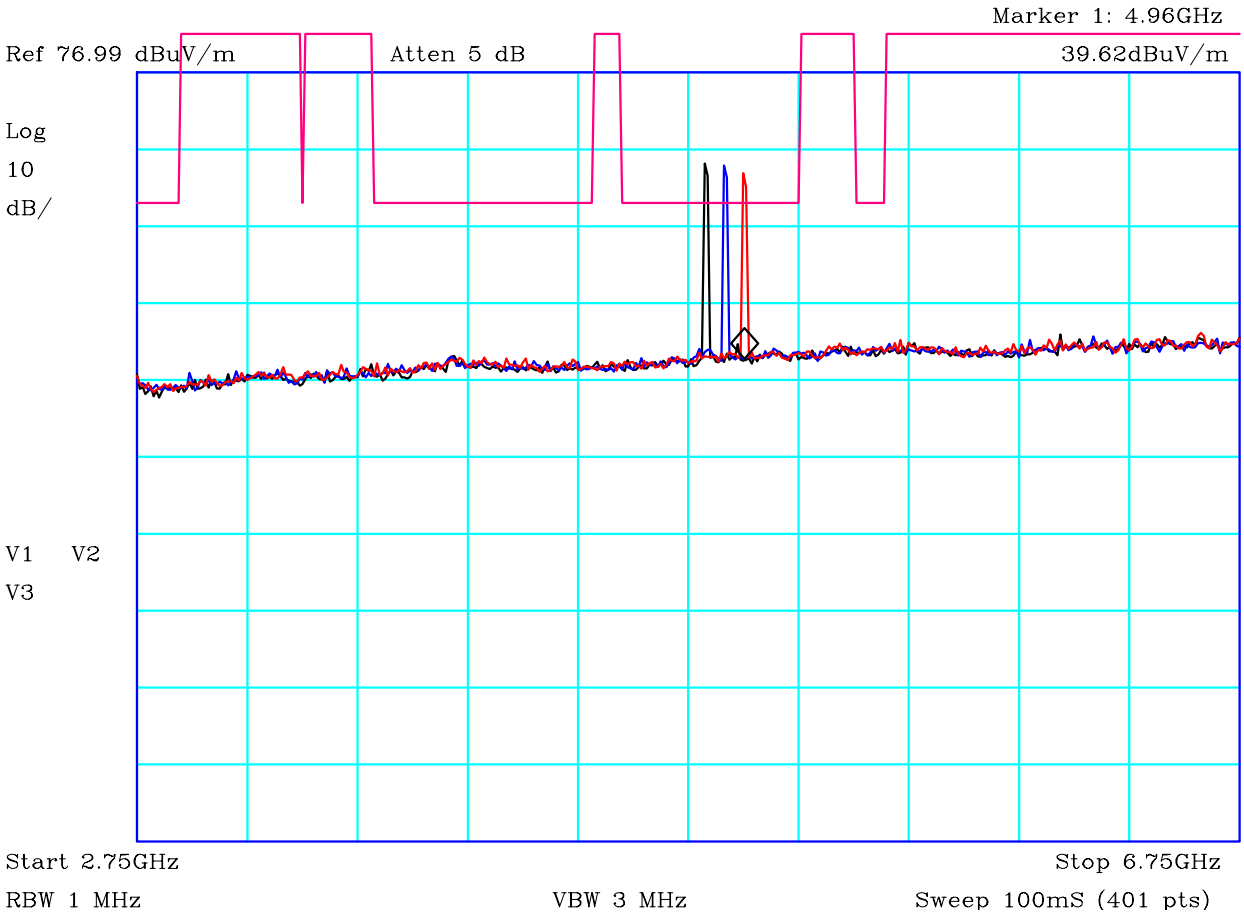
CF1:A23_3m_100806 CF2:CBL049_110107

PLOT 20 Radiated Emissions - 2GHz to 3GHz

Company:	Alertme	Product:	Smart Plug
Date:	28/04/2012	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(VIO)	FCC Restricted Bands@3m Av	Limit2:	
Limit3:		Limit4:	

Black: Ch11, Blue: Ch18, Red: Ch25
Peak measurement
Maximum of EUT upright and flat.

Facility:	Anech_2	Height	1.5m	Mode:	1
Distance	3m	Polarisation	V+H	Modification State:	0
Angle	0-360	File:	H23285A8		



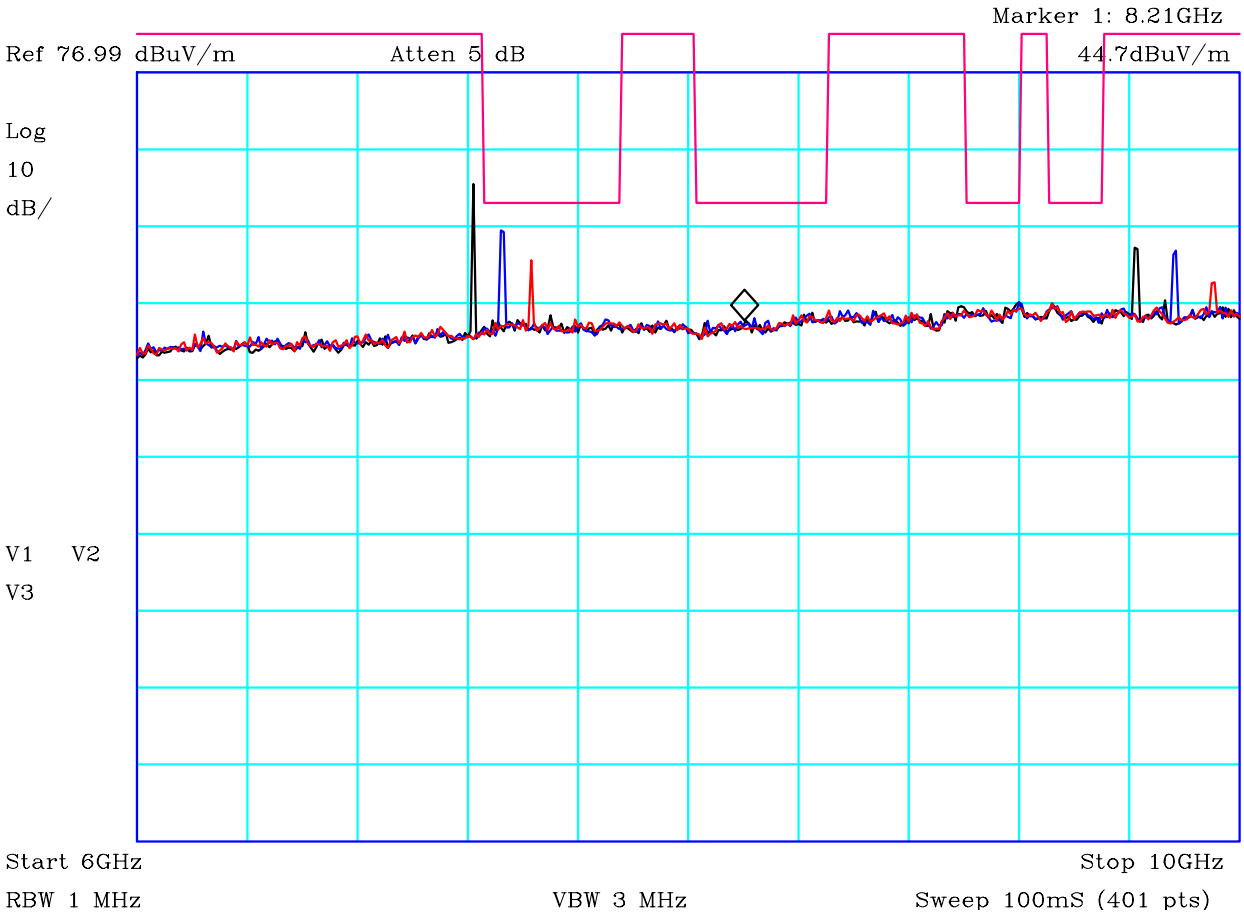
CF1:A23_3m_100806 CF2:PRE7_CBL052_CBL093_110112 CF3:RFF01_110112

PLOT 21 Radiated Emissions - 2.75GHz to 6.75GHz

Company:	Alertme	Product:	Smart Plug
Date:	28/04/2012	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(VIO)	FCC Restricted Bands@1.5m	Limit2:	
Limit3:		Limit4:	

Black: Vertical, Blue: Horizontal
Black: Ch11, Blue: Ch18, Red: Ch25
Peak measurement
Maximum of EUT upright and flat.

Facility:	Anech_2	Height	1.5m	Mode:	1
Distance	1.5m	Polarisation	V+H	Modification State:	0
Angle	0-360	File:	H2328638		



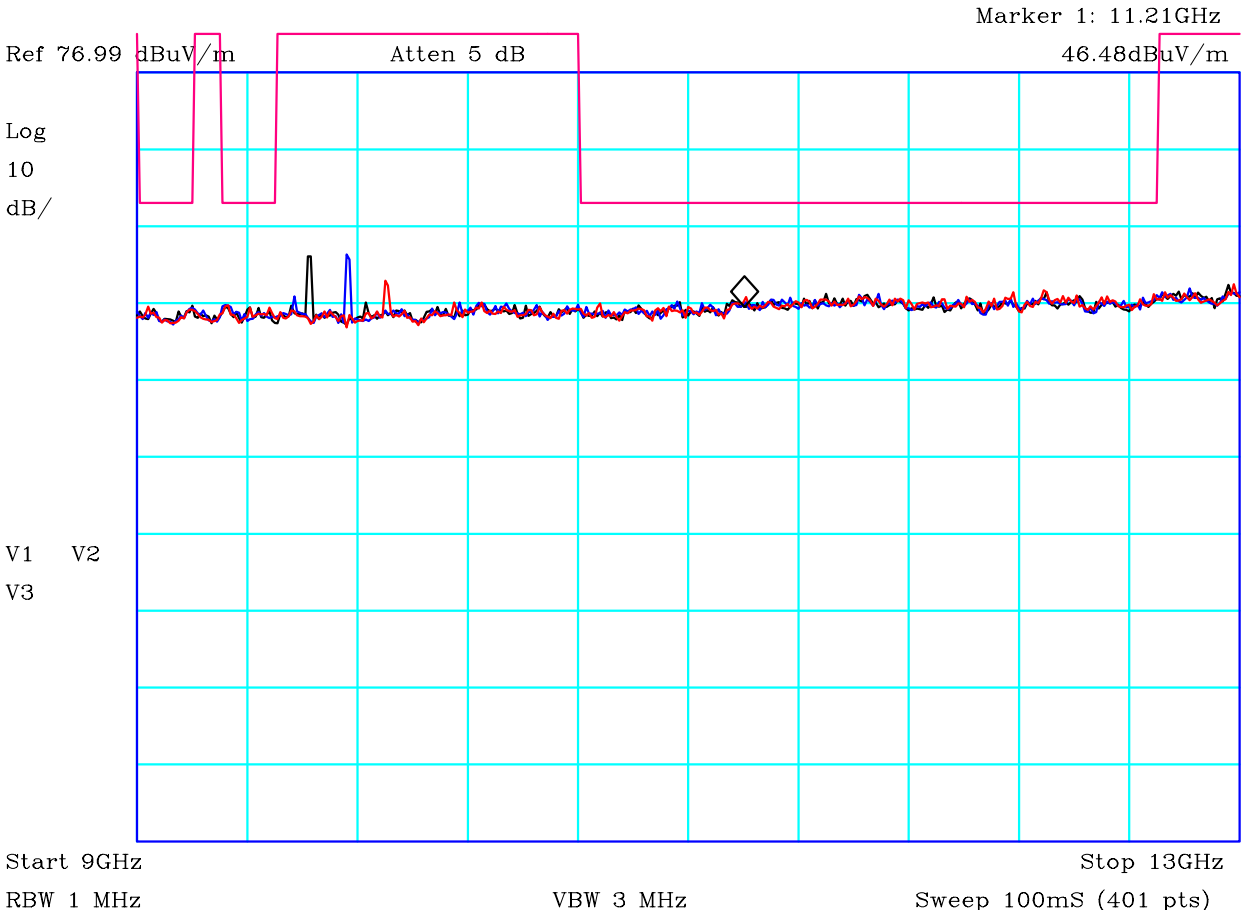
CF1:A23_3m_100806 CF2:PRE7_CBL052_CBL093_110112 CF3:RFF01_110112

PLOT 22 Radiated Emissions - 6GHz to 10GHz

Company:	Alertme	Product:	Smart Plug
Date:	28/04/2012	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(VIO)	FCC Restricted Bands@1.5m	Limit2:	
Limit3:		Limit4:	

Black: Vertical, Blue: Horizontal
Black: Ch11, Blue: Ch18, Red: Ch25
Peak measurement
Maximum of EUT upright and flat.

Facility:	Anech_2	Height	1.5m	Mode:	1
Distance	1.5m	Polarisation	V+H	Modification State:	0
Angle	0-360	File:	H2328660		



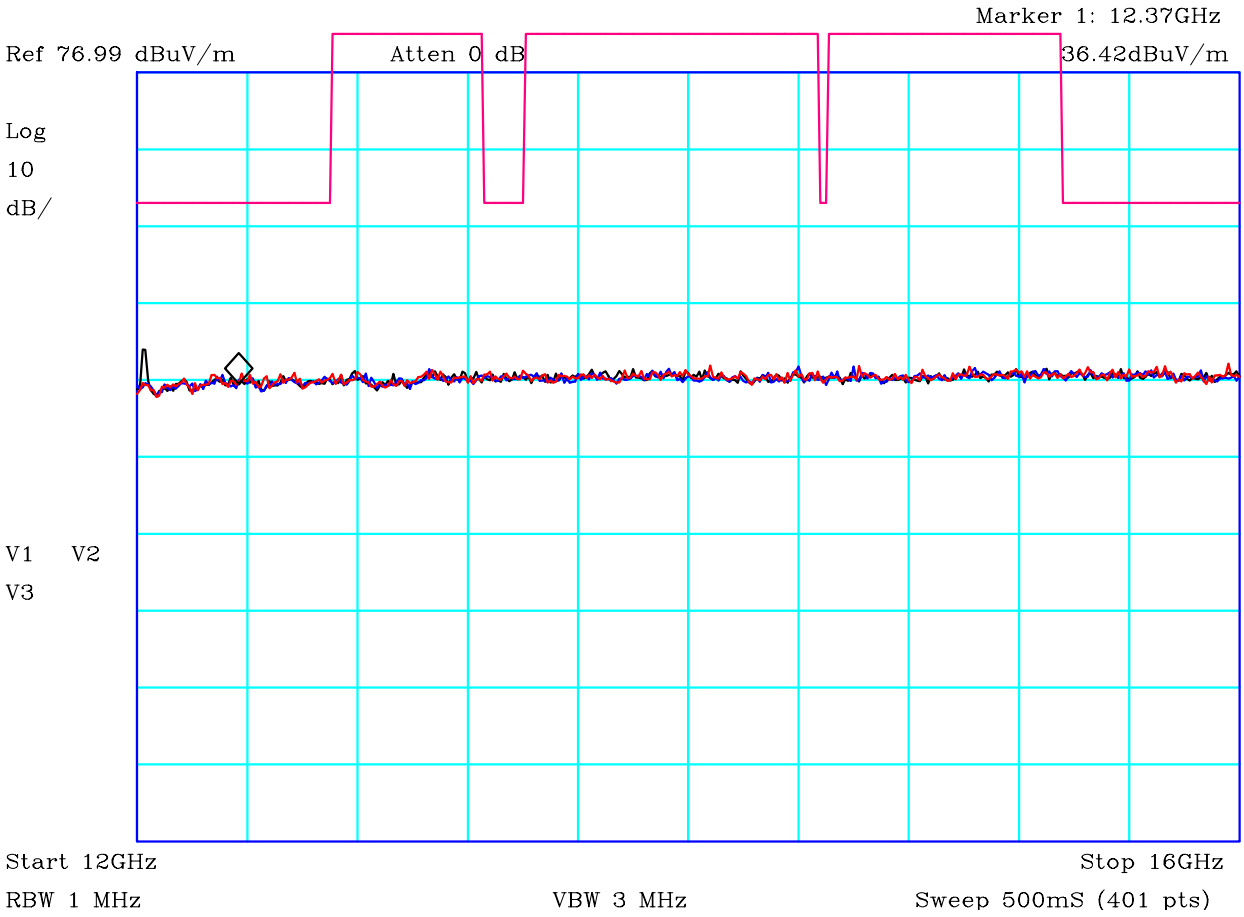
CF1:A23_3m_100806 CF2:PRE7_CBL052_CBL093_110112 CF3:RFF01_110112

PLOT 23 Radiated Emissions - 9GHz to 13GHz

Company:	Alertme	Product:	Smart Plug
Date:	28/04/2012	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(VIO)	FCC Restricted Bands@1.5m	Limit2:	
Limit3:		Limit4:	

Black: Vertical, Blue: Horizontal
Black: Ch11, Blue: Ch18, Red: Ch25
Peak measurement
Maximum of EUT upright and flat.

Facility:	Anech_2	Height	1.5m	Mode:	1
Distance	1.5m	Polarisation	V+H	Modification State:	0
Angle	0-360	File:	H232867F		



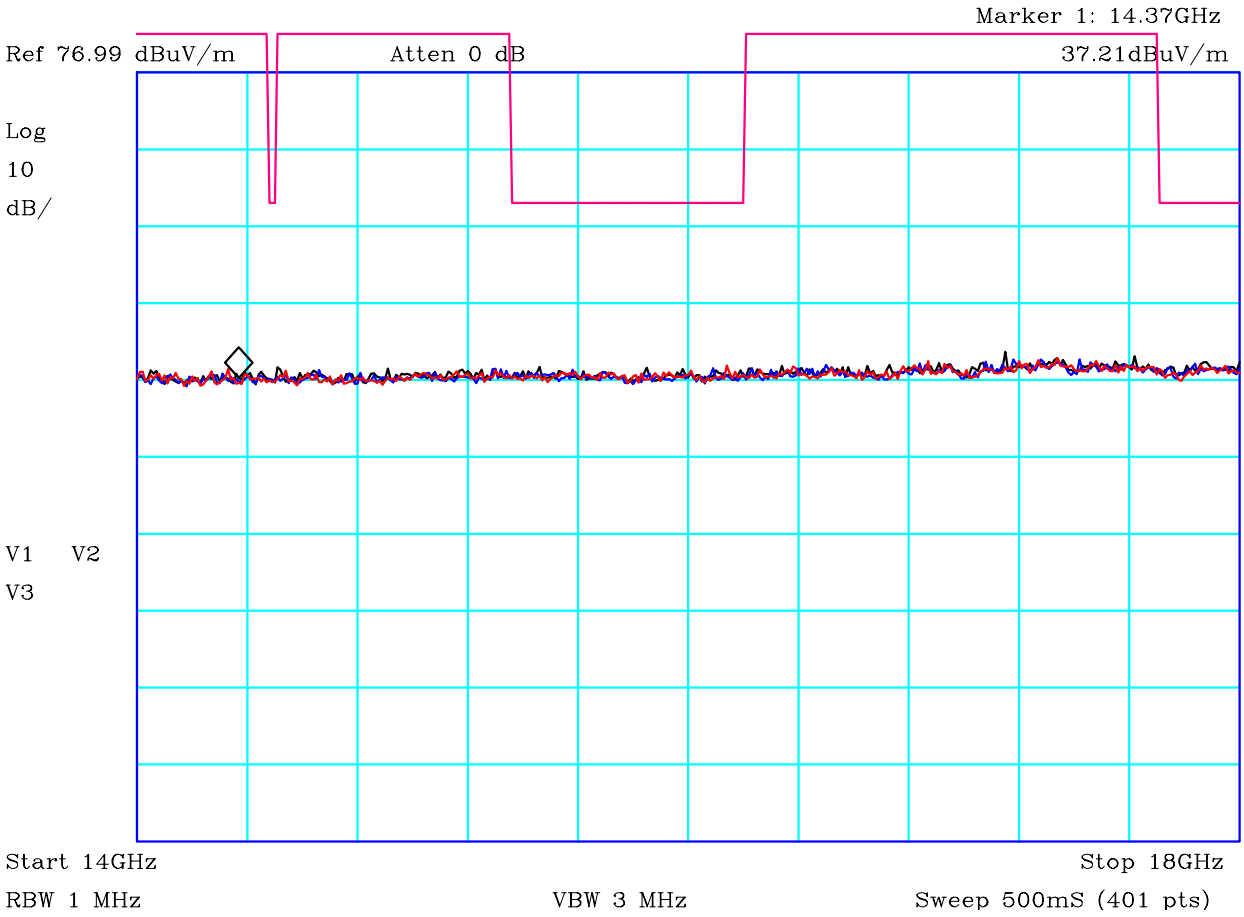
CF1:A22_3m_100201 CF2:PRE7_CBL052_CBL093_110112

PLOT 24 Radiated Emissions - 12GHz to 16GHz

Company:	Alertme	Product:	Smart Plug
Date:	01/05/2012	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(VIO)	FCC Restricted Bands@1.5m	Limit2:	
Limit3:		Limit4:	

Black: Vertical, Blue: Horizontal
Black: Ch11, Blue: Ch18, Red: Ch25
Peak measurement
Maximum of EUT upright and flat.

Facility:	Anech_2	Height	1.5m	Mode:	1
Distance	1.5m	Polarisation	V+H	Modification State:	0
Angle	0-360	File:	H24016EF		



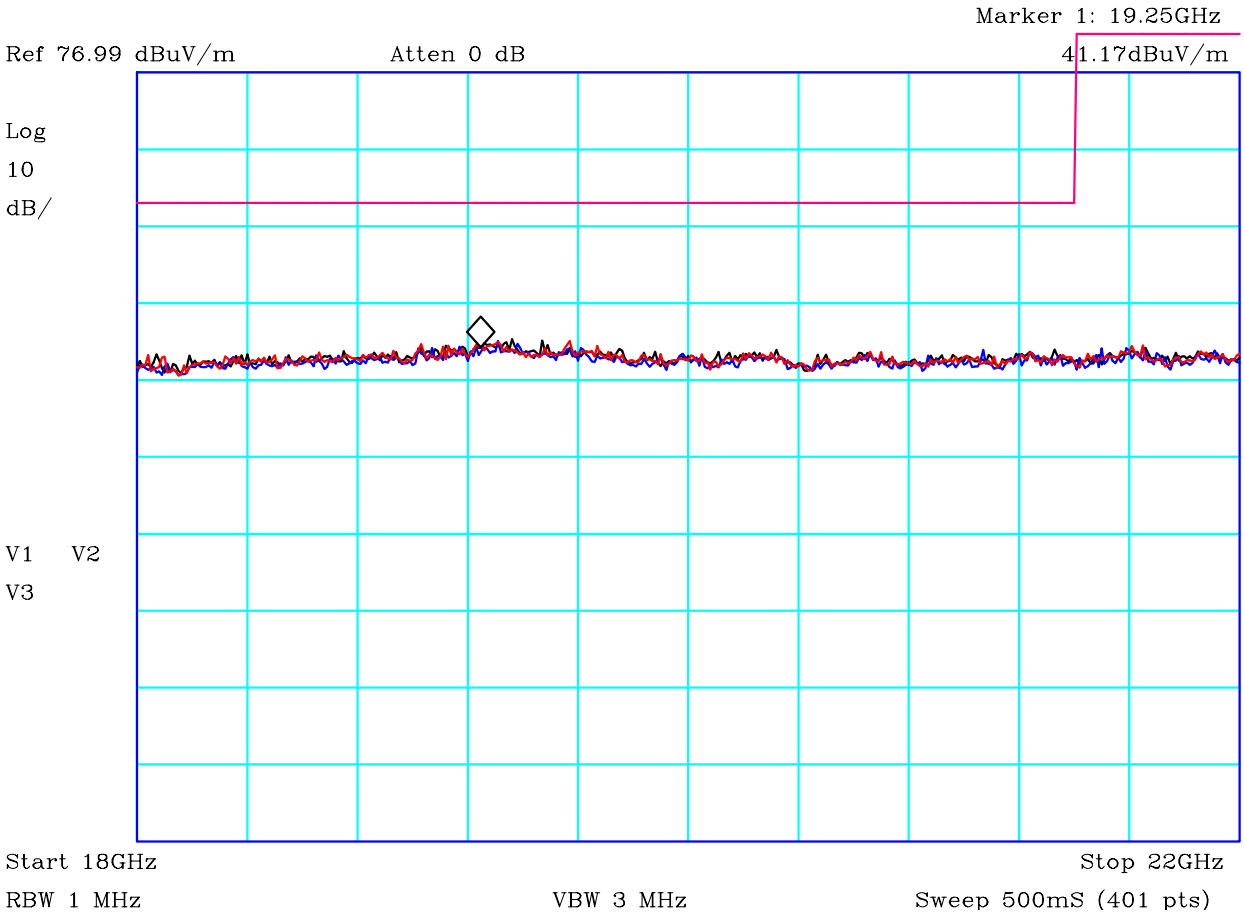
CF1:A22_3m_100201 CF2:PRE7_CBL052_CBL093_110112

PLOT 25 Radiated Emissions - 14GHz to 18GHz

Company:	Alertme	Product:	Smart Plug
Date:	01/05/2012	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(VIO)	FCC Restricted Bands@1.5m	Limit2:	
Limit3:		Limit4:	

Black: Vertical, Blue: Horizontal
Black: Ch11, Blue: Ch18, Red: Ch25
Peak measurement
Maximum of EUT upright and flat.

Facility:	Anech_2	Height	1.5m	Mode:	1
Distance	1.5m	Polarisation	V+H	Modification State:	0
Angle	0-360	File:	H2401711		



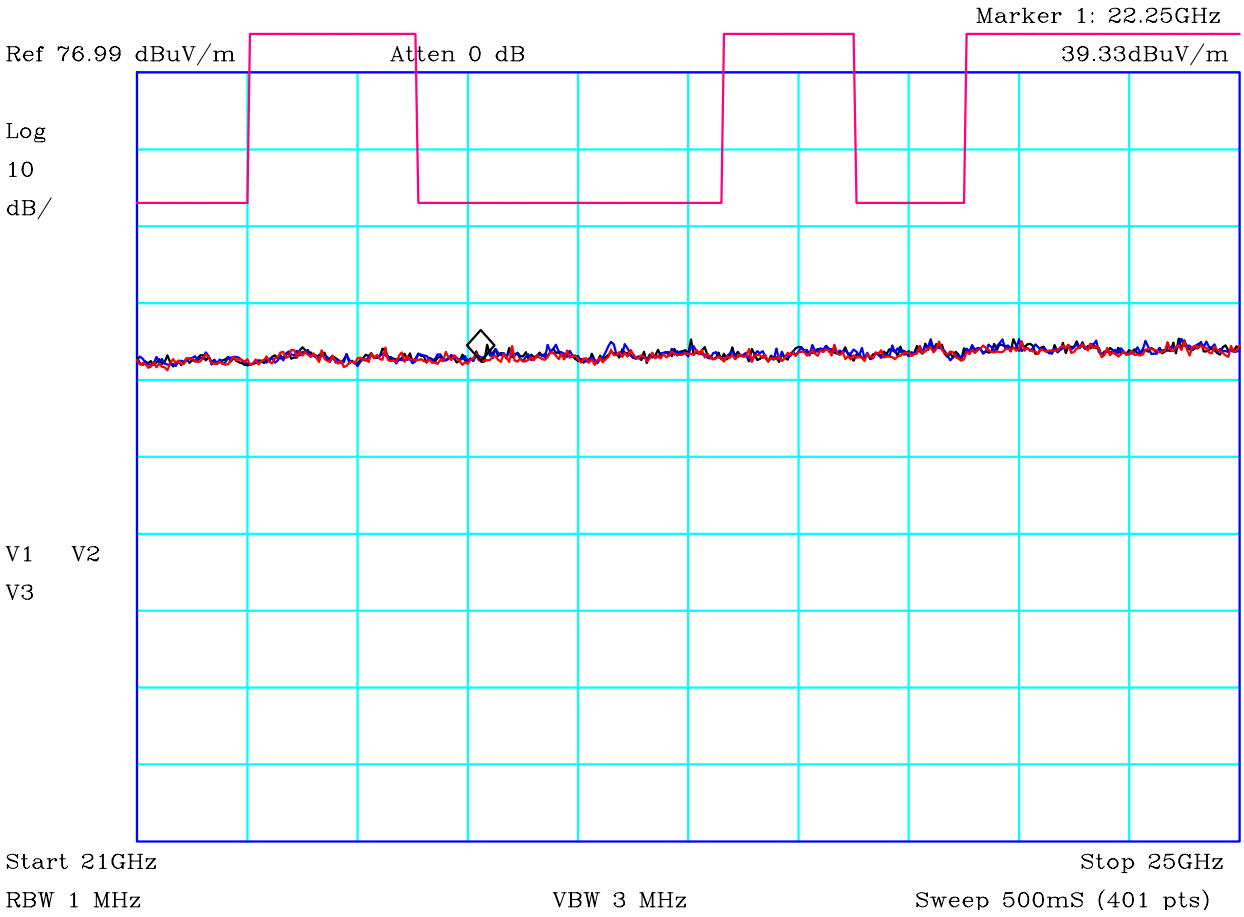
CF1:A20_3m_100201 CF2:PRE8_CBL052_CBL092_110112

PLOT 26 Radiated Emissions - 18GHz to 22GHz

Company:	Alertme	Product:	Smart Plug
Date:	01/05/2012	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(VIO)	FCC Restricted Bands@1.5m	Limit2:	
Limit3:		Limit4:	

Black: Vertical, Blue: Horizontal
Black: Ch11, Blue: Ch18, Red: Ch25
Peak measurement
Maximum of EUT upright and flat.

Facility:	Anech_2	Height	1.5m	Mode:	1
Distance	1.5m	Polarisation	V+H	Modification State:	0
Angle	0-360	File:	H2401810		



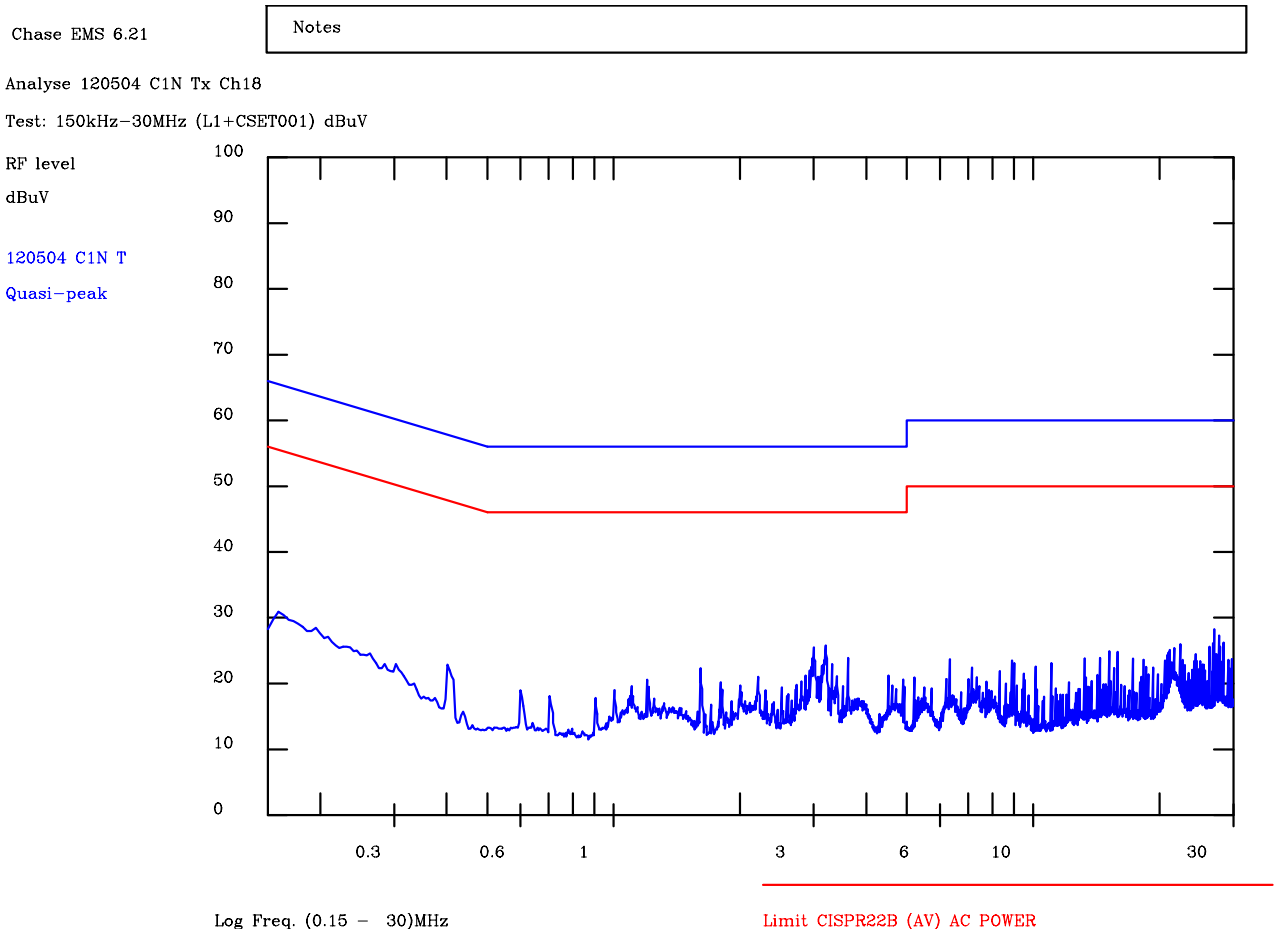
CF1:A20_3m_100201 CF2:PRE8_CBL052_CBL092_110112

PLOT 27 Radiated Emissions - 21GHz to 25GHz

Company:	Alertme	Product:	Smart Plug
Date:	01/05/2012	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(VIO)	FCC Restricted Bands@1.5m	Limit2:	
Limit3:		Limit4:	

Black: Vertical, Blue: Horizontal
Black: Ch11, Blue: Ch18, Red: Ch25
Peak measurement
Maximum of EUT upright and flat.

Facility:	Anech_2	Height	1.5m	Mode:	1
Distance	1.5m	Polarisation	V+H	Modification State:	0
Angle	0-360	File:	H24017FA		



PLOT 28 Conducted Emissions - Neutral Line - Zigbee Tx

Company:	Alertme	Product:	SmartPlug
Date:	04 May 12	Test Engineer:	Dave Smith
Test:	FCC Part 15	Limit:	FCC classB

Notes:
Transmitting on Ch 18

Equip:R1,L1,AB002,CBL005,CBL039

Line:	Neutral	Attenuator:	10dB PAD	Operating Mode:	1
Detector:	QuasiPeak			Mod. State:	0
LISN:	EMCO	Filename:	C2504735.plt		

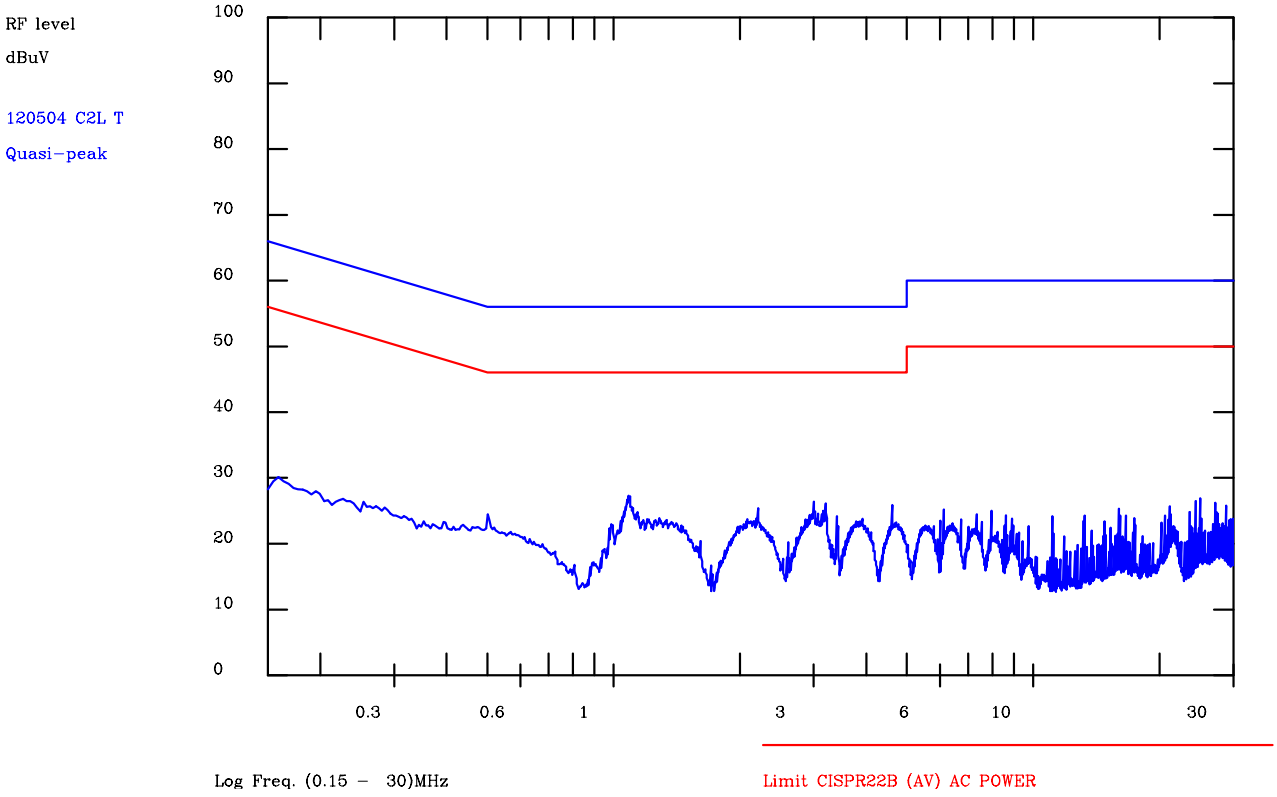
Frequency List (MHz)

Chase EMS 6.21

Notes

Analyse 120504 C2L Tx Ch18

Test: 150kHz-30MHz (L1+CSET001) dBuV



PLOT 29 Conducted Emissions - Live Line - Zigbee Tx

Company:	Alertme	Product:	SmartPlug
Date:	04 May 12	Test Engineer:	Dave Smith
Test:	FCC Part 15	Limit:	FCC classB

Notes:
Transmitting on Ch 18

Equip:R1,L1,AB002,CBL005,CBL039

Line:	Live	Attenuator:	10dB PAD	Operating Mode:	1
Detector:	QuasiPeak			Mod. State:	0
LISN:	EMCO	Filename:	C2504747.plt		

Frequency List (MHz)
