Report On

FCC and Industry Canada Testing of the
Bridge Systems BV Bridgemate II BMS2-1 Base Station
In accordance with FCC CFR 47 Part 15C, Industry Canada RSS-210 and Industry Canada RSS-GEN

COMMERCIAL-IN-CONFIDENCE

FCC ID: UVIBMS21A
IC ID: 6946A-BMS21A

Document 75921258 Report 02 Issue 1 February 2013

Product Service

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REPORT ON

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Bridge Systems BV Bridgemate II BMS2-1 Base Station
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PREPARED FOR

Bridge Systems BV
Van Vollenhovenstraat 56 B
3016 BK
Rotterdam
Netherlands

PREPARED BY

Natalie Bennett
Senior Administrator (Technical)

APPROVED BY

Tony Pither
Authorised Signatory

DATED 19 February 2013

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47 Part 15C, Industry Canada RSS-210 and Industry Canada RSS-GEN. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

G Lawler

UKAS TESTING 0141

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SECTION 1

REPORT SUMMARY

FCC and Industry Canada Testing of the
Bridge Systems BV Bridgemate II BMS2-1 Base Station
In accordance with FCC CFR 47 Part 15C, Industry Canada RSS-210 and Industry Canada RSS-GEN

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1.1 INTRODUCTION

The information contained in this report is intended to show verification of the FCC and Industry Canada Testing of the Bridge Systems BV Bridgemate II BMS2-1 Base Station to the requirements of FCC CFR 47 Part 15C, Industry Canada RSS-210 and Industry Canada RSS-GEN.

Objective	To perform FCC and Industry Canada Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	Bridge Systems BV
Model Number(s)	BMS2-1
Serial Number(s)	Not Serialised (75921258_TSR0002)
Number of Samples Tested	1
Test Specification/Issue/Date	FCC CFR 47 Part 15C (2012) Industry Canada RSS-210 (2010) Industry Canada RSS-GEN (2010)
Incoming Release Date	Application Form 01 February 2013
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	Quote Acceptance Form 9 January 2013
Start of Test	6 February 2013
Finish of Test	9 February 2013
Name of Engineer(s)	G Lawler
Related Document(s)	ANSI C63.10: 2009

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1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC CFR 47 Part 15C, Industry Canada RSS-210 and Industry Canada RSS-GEN is shown below.

Section	Spec Clause			Test Description	Result	Comments/Base Standard
	FCC	RSS-210	RSS-GEN			
Base Station Unit						
2.1	15.207	-	7.2.4	AC Line Conducted Emissions	Pass	
2.2	15.249 (a)	A2.9	-	Field Strength of Fundamental	Pass	
2.3	15.249 (a)(d), 15.209	A2.9	-	Field Strength of Spurious Emissions	Pass	

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1.3 APPLICATION FORM

APPLICANT'S DETAILS	
COMPANY NAME :	Bridge Systems BV
ADDRESS :	Van Vollenhovenstraat 56 B 3016 BK, Rotterdam, The Netherlands
NAME FOR CONTACT PURPOSES :	Ron Bouwland
TELEPHONE NO: +31-10-4149171	FAX NO: …… E-MAIL: bouwland@bridgemate.nl

EQUIPMENT INFORMATION

Model name/number	BMS2-1	Identification/Part number	n/a
Hardware Version	1.1	Software Version	2.0.5
Manufacturer	Bridge Systems BV.	Country of Origin	The Netherlands
FCC ID	UVIBMS21A	Industry Canada ID	6946A-BMS21A

Technical description (a brief description of the intended use and operation)

Wireless base station for Bridgemate scoring system

Supply Voltage:

[ ]	AC mains	State AC voltage …… V	and AC frequency …… Hz
[X]	DC (external)	State DC voltage 5 V	and DC current 0.1 A
[X]	DC (internal)	State DC voltage 6 V	and Battery type 4xAA

Frequency characteristics:

Transmitter Frequency range	902.3 MHz to 927.7 MHz	Channel spacing 200 kHz (if channelized)
Receiver Frequency range (if different)	902.3 MHz to 927.7 MHz	Channel spacing 200 kHz (if channelized)

Designated test frequencies:

Bottom: 902.3 MHz Middle: 914.9 or 915.1 MHz Top: 927.7 MHz

Intermediate Frequencies : 307.2 kHz

Highest Internally Generated Frequency : 96 MHz

Power characteristics:

Maximum transmitter power 5 mW Minimum transmitter power …… W (if variable)

[ ] Continuous transmission

[X] Intermittent transmission State duty cycle <1%

If intermittent, can transmitter be set to continuous transmit test mode? Yes

Antenna characteristics:

[ ]	Antenna connector	State impedance …… ohm
[ ]	Temporary antenna connector	State impedance …… ohm
[X]	Integral antenna Type ¼λ wire whip	State gain best case 2 dBi
[ ]	External Antenna Type ……..……	State gain …… dBi

Modulation characteristics:

[ ]	Amplitude	[ ] Other
[X]	Frequency	Details: 2-FSK @ 19.2 kbps
[ ]	Phase	(GMSK, QSPK etc)

Can the transmitter operate un-modulated? No (except in test mode for certification)

ITU Class of emission: 19K2F1D

Battery/Power Supply

Model name/number ……..…… Identification/Part number ……..……

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Manufacturer	……..…….	Country of Origin	……..…….
Ancillaries (if applicable)			
Model name/number	USB A-B cable shielded	Identification/Part number	……..…….
Manufacturer	TE	Country of Origin	……..…….
Extreme conditions:			
Maximum temperature	…… ºC	Minimum temperature	…… ºC
Maximum supply voltage	6.6 V Minimum supply voltage	3.6 V	

I hereby declare that I am entitled to sign on behalf of the applicant and that the information supplied is correct and complete.

Signature :

Name : RF Bouwland

Position held : Managing Director

Date : February 1st, 2013

Product Service

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Bridge Systems BV Bridgemate II BMS2-1 Base Station. A full technical description can be found in the manufacturer's documentation.

1.5 TEST CONDITIONS

For all tests the EUT was set up in accordance with the relevant test standard and to represent typical operating conditions. Tests were applied with the EUT situated in a shielded enclosure.

The EUT was powered from a 6 V DC supply.

FCC Accreditation
90987 Octagon House, Fareham Test Laboratory

Industry Canada Accreditation
IC2932B-1 Octagon House, Fareham Test Laboratory

1.6 DEVIATIONS FROM THE STANDARD

No deviations from the applicable test standard were made during testing.

1.7 MODIFICATION RECORD

Modification 0 - No modifications were made to the test sample during testing.

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SECTION 2

TEST DETAILS

FCC and Industry Canada Testing of the
Bridge Systems BV Bridgemate II BMS2-1 Base Station
In accordance with FCC CFR 47 Part 15C, Industry Canada RSS-210 and Industry Canada RSS-GEN

2.1 AC LINE CONDUCTED EMISSIONS

2.1.1 Specification Reference

FCC CFR 47 Part 15C, Clause 15.207
Industry Canada RSS-GEN, Clause 7.2.4

2.1.2 Equipment Under Test and Modification State

BMS2-1 S/N: Not Serialised (75921258_TSR0002) - Modification State 0

2.1.3 Date of Test

9 February 2013

2.1.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.1.5 Test Procedure

The EUT is set up on a test table 800mm above a horizontal ground plane. A vertical ground plane is also required and is placed 400mm from the EUT. Where a EUT is floor standing it will be stood on but insulated from the ground plane by up to 12mm.

The EUT is powered through a Line Impedance Stabilisation Network (LISN) which is bonded to the ground plane. The EUT is located so that the distance between the EUT and the LISN is no less than 800mm. Where possible the cable between the mains input of the EUT and the LISN is 1m. Where this is not possible the cable is non inductively bundled with the bundle not exceeding 400mm in length.

A preliminary profile of the Conducted Emissions is obtained over the frequency range 150kHz to 30MHz. Any points of interest are noted for formal measurements.

During formal measurements, the measuring receiver is tuned to the emission of interest where Quasi – Peak and Average measurements are performed in a 9kHz Video and Resolution Bandwidth.

2.1.6 Environmental Conditions

Ambient Temperature	17.4°C
Relative Humidity	31.0%

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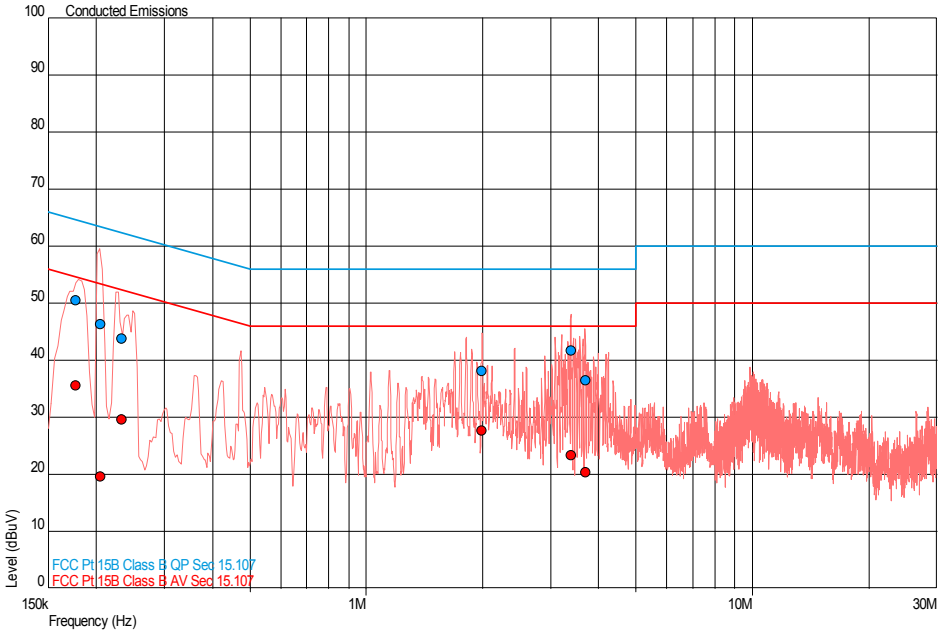
2.1.7 Test Results

Live Line



Frequency (MHz)	QP Level (dBµV)	QP Limit (dBµV)	QP Margin (dBµV)	AV Level (dBµV)	AV Limit (dBµV)	AV Margin (dBµV)
0.177	50.6	64.6	-14.1	35.6	54.6	-19.0
0.205	46.3	63.4	-17.1	19.6	53.4	-33.8
0.233	43.8	62.3	-18.5	29.6	52.3	-22.7
1.993	38.2	56.0	-17.8	27.6	46.0	-18.4
3.384	41.7	56.0	-14.3	23.4	46.0	-22.6
3.692	36.4	56.0	-19.6	20.4	46.0	-25.6

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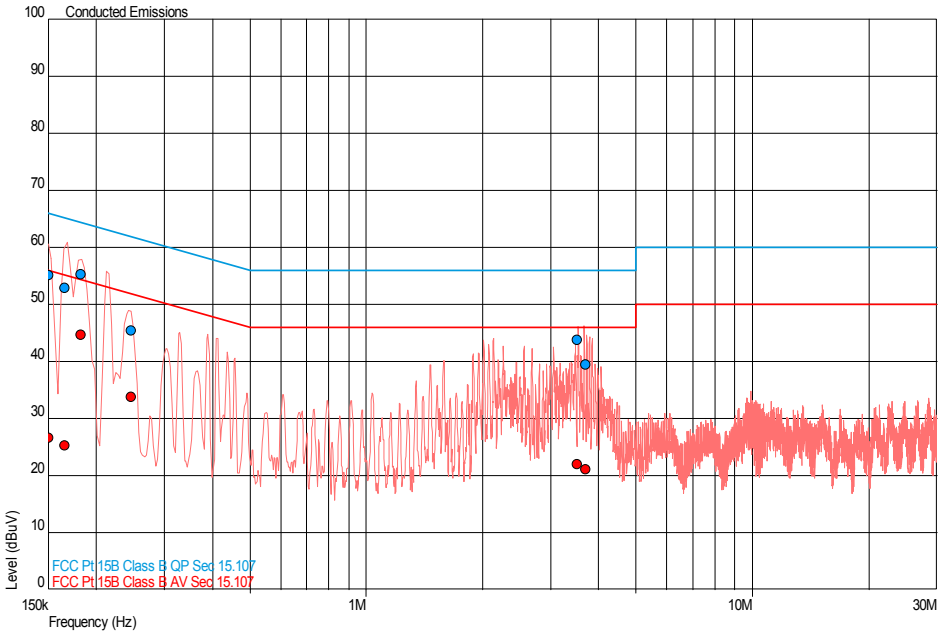
Neutral Line



Frequency (MHz)	QP Level (dBµV)	QP Limit (dBµV)	QP Margin (dBµV)	AV Level (dBµV)	AV Limit (dBµV)	AV Margin (dBµV)
0.150	55.1	66.0	-10.9	26.7	56.0	-29.3
0.165	52.9	65.2	-12.3	25.3	55.2	-29.8
0.182	55.4	64.4	-9.0	44.8	54.4	-9.6
0.246	45.5	61.9	-16.4	33.9	51.9	-18.0
3.519	43.8	56.0	-12.2	22.0	46.0	-24.0
3.692	39.5	56.0	-16.5	21.1	46.0	-24.9

2.2 FIELD STRENGTH OF FUNDAMENTAL

2.2.1 Specification Reference

FCC CFR 47 Part 15C, Clause 15.249 (a)
Industry Canada RSS-210, Clause A2.9

2.2.2 Equipment Under Test and Modification State

BMS2-1 S/N: Not Serialised (75921258_TSR0002) - Modification State 0

2.2.3 Date of Test

6 February 2013

2.2.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.2.5 Test Procedure

The EUT is placed on a test table 800mm above the ground plane.

During formal measurement the spectrum analyser is tuned to the frequency of the fundamental. The turntable azimuth is adjusted from 0 to 360 degrees to determine the point at which the maximum level occurs. Then the height of the measuring antenna is adjusted from a height of 1m to 4m to determine the height at which the maximum level occurs. Once the point of maximum emission has been determined the emission is measured.

2.2.6 Environmental Conditions

Ambient Temperature	20.3°C
Relative Humidity	27.0%

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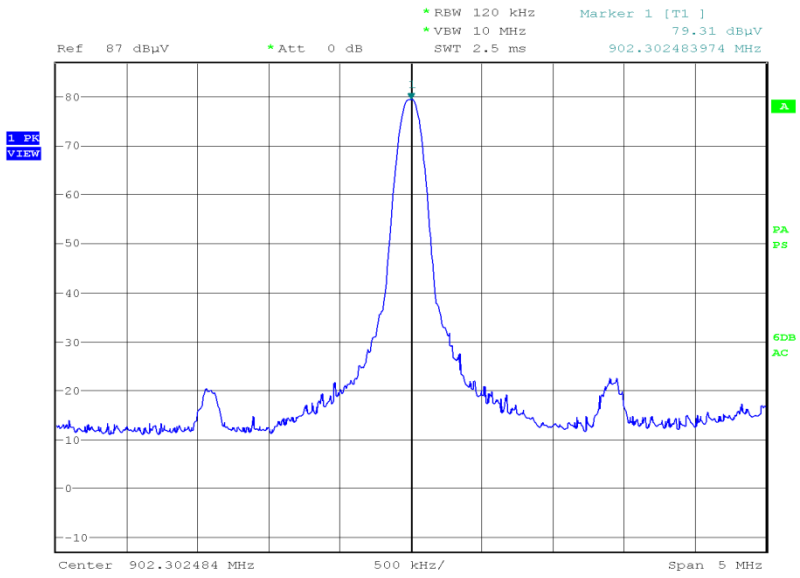
2.2.7 Test Results

902.300 MHz

Fundamental



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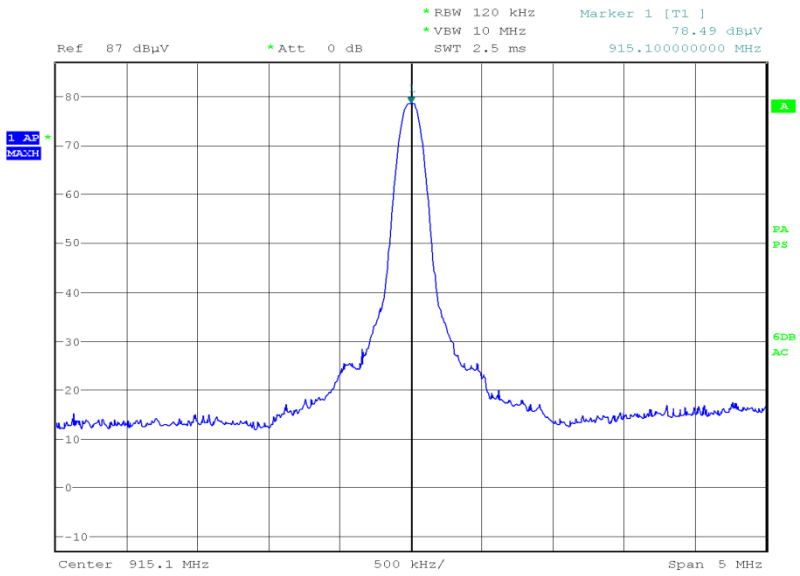
Frequency (MHz)	Result (dBµv/m)	Limit (dBµv/m)
902.3	80.80	94.0

915.100 MHz

Fundamental



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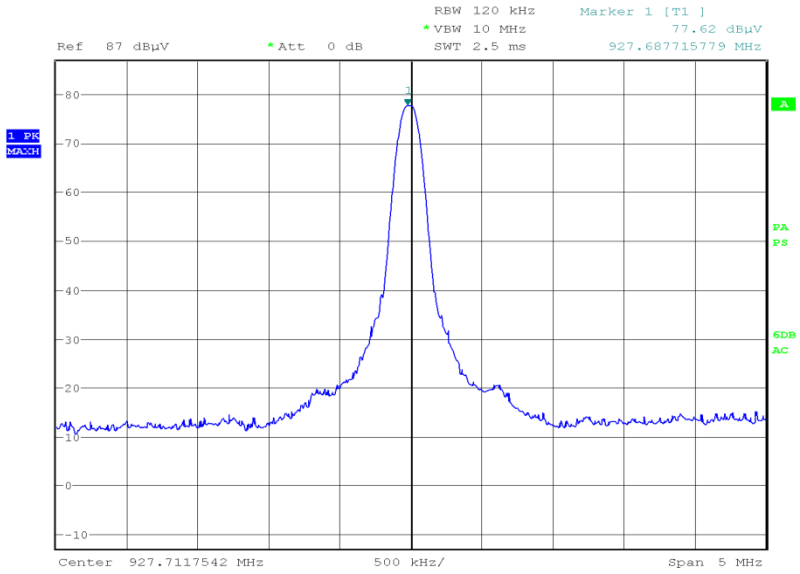
Frequency (MHz)	Result (dBµv/m)	Limit (dBµv/m)
915.10	78.80	94.0

927.700 MHz

Fundamental



Frequency (MHz)	Result (dBµv/m)	Limit (dBµv/m)
927.70	78.80	94.0

The customer has declared the following statement: The transmitter is pulse modulated. The duty cycle of the transmitter is well below 1%, transmissions typically last for only a few milliseconds, and there will be less than 5 transmissions per second. During a 100ms interval, you will never have more than 1 transmission, and in a really worst-case situation, that transmission will last 8ms. Therefore the following calculation has been used to determine a duty cycle correction factor:

20 log 8ms/8ms+100ms = -22.61 dB

-22.61 dB was applied to the peak measurement of the fundamental to obtain the final result.

Limit Clause 15.249 (a) and A2.9

Fundamental Frequency (MHz)	Field Strength of Fundamental (millivolts/meter)
902 to 928	50
2400 to 2483.5	50
5725 to 5875	50
24000 to 24250	250

2.3 FIELD STRENGTH OF SPURIOUS EMISSIONS

2.3.1 Specification Reference

FCC CFR 47 Part 15C, Industry Canada RSS-210 and Industry Canada RSS-GEN, Clause 15.249 (a)(d), 15.209 and A2.9

2.3.2 Equipment Under Test and Modification State

BMS2-1 S/N: Not Serialised (75921258_TSR0002) - Modification State 0

2.3.3 Date of Test

6 February 2013

2.3.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.3.5 Test Procedure

A preliminary profile of the Spurious Radiated Emissions is obtained up to the 10th harmonic of the EUT's fundamental frequency. For frequencies from 30MHz to 18GHz the EUT is placed on a test table 800mm above the ground plane. For frequencies above 18GHz, the EUT height is increased by 200mm to a height of 1000mm. This is to ensure the beam width of the measuring antenna gives sufficient vertical coverage of the EUT.

During characterisation the turntable azimuth is adjusted from 0 to 360 degrees with the measuring antenna in one polarity. It is then repeated for the other polarity. Any frequencies of interest are noted for formal measuring later. The distance from the measuring antenna to the boundary of the EUT is 3m. Above 18GHz this distance may be reduced to 1m.

During formal measurement the spectrum analyser is tuned to the frequency of the emission. The turntable azimuth is adjusted from 0 to 360 degrees to determine the point at which the maximum emission level occurs. Then the height of the measuring antenna is adjusted from a height of 1m to 4m to determine the height at which the maximum emission level occurs. Once the point of maximum emission has been determined the emission is measured. Emissions in the 30MHz to 1GHz range are measured using a CISPR Quasi – Peak detector function in a 120kHz bandwidth. Emissions in the range 1GHz to 40GHz require Peak and Average measurements. The Peak measurements are made using oa peak detector with 1MHz Resolution and Video bandwidths. The average measurements employ a peak detector with a Resolution bandwidth of 1MHz and a Video bandwidth of 10Hz. If measurements are made at a 1m measuring distance, then 10dB is added to the specification limit.

2.3.6 Environmental Conditions

Ambient Temperature	20.3°C
Relative Humidity	27.0%

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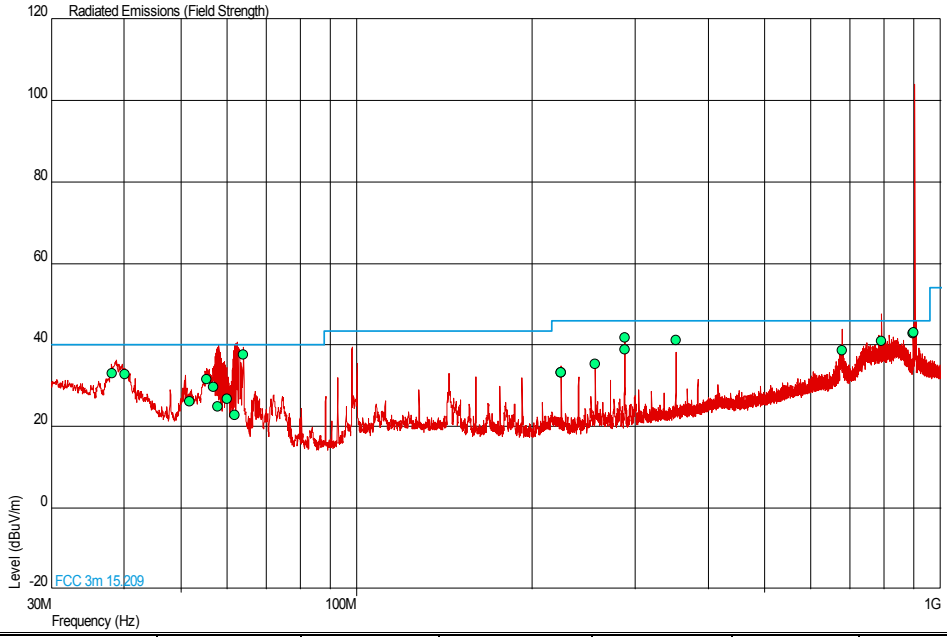
2.3.7 Test Results

902.300 MHz

30 MHz to 1 GHz



Frequency (MHz)	QP Level (dBµV/m)	QP Limit (dBµV/m)	QP Margin (dBµV/m)	Angle(Deg)	Height(m)	Polarity
38.203	33.0	40.0	-7.0	48	1.00	Vertical
40.047	32.8	40.0	-7.2	360	1.00	Vertical
51.855	26.1	40.0	-13.9	5	1.00	Vertical
55.443	31.6	40.0	-8.4	360	1.00	Vertical
56.908	29.5	40.0	-10.5	318	1.00	Vertical
57.849	24.8	40.0	-15.2	91	1.00	Vertical
60.002	26.6	40.0	-13.4	20	1.00	Vertical
61.884	22.6	40.0	-17.4	85	1.00	Vertical
64.002	37.5	40.0	-2.5	243	1.25	Vertical
224.005	33.3	46.0	-12.7	288	3.98	Horizontal
224.012	33.3	46.0	-12.7	261	1.93	Vertical
256.016	35.3	46.0	-10.7	78	1.69	Horizontal
287.988	41.8	46.0	-4.2	248	1.00	Horizontal
287.988	38.9	46.0	-7.1	315	1.00	Vertical
351.977	41.2	46.0	-4.8	121	1.54	Vertical
678.279	38.7	46.0	-7.3	107	3.89	Vertical
791.707	40.8	46.0	-5.2	115	3.20	Vertical
896.330	42.9	46.0	-3.1	103	1.00	Horizontal
900.895	43.0	46.0	-3.0	100	1.00	Horizontal

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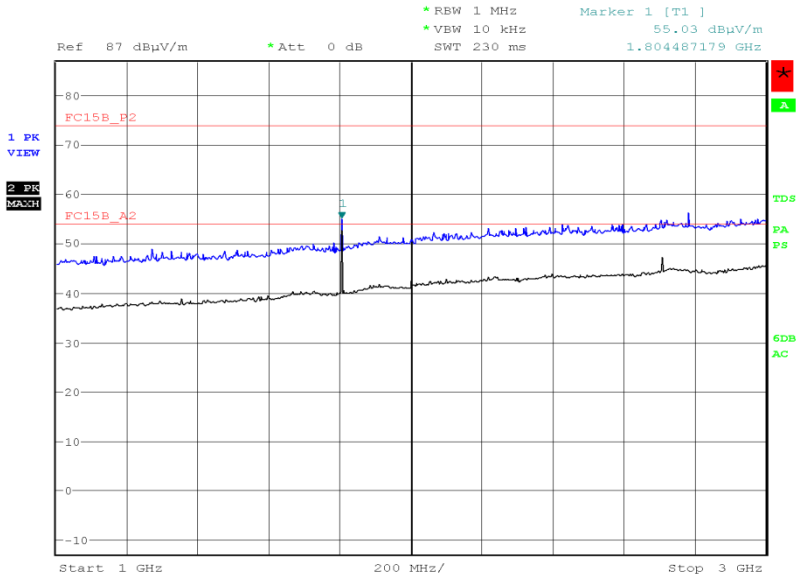
1 GHz to 3 GHz



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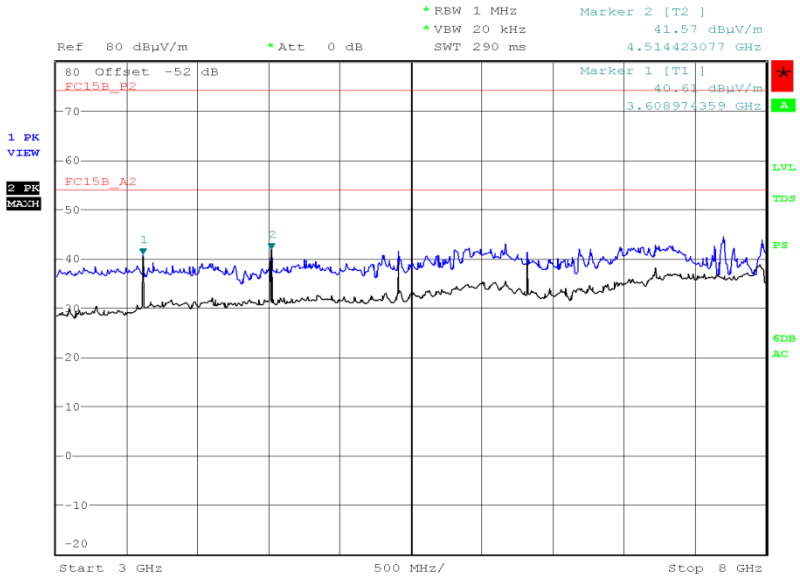
3 GHz to 8 GHz



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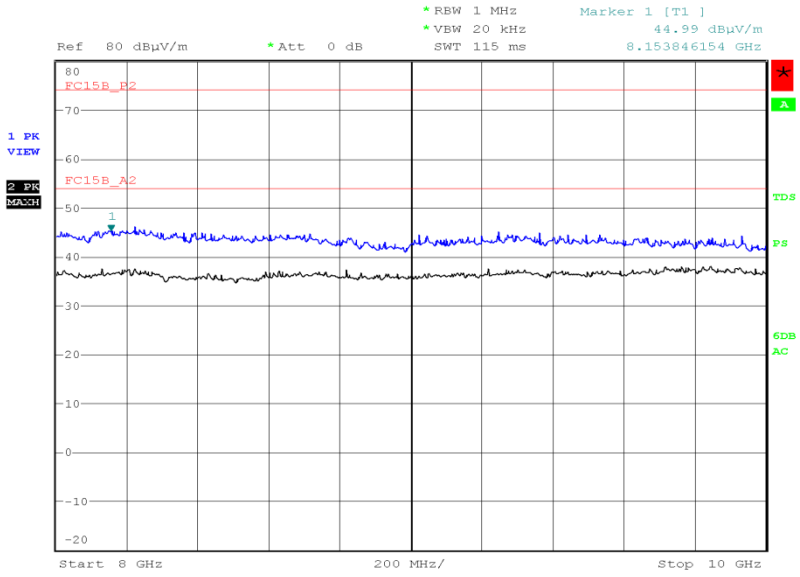
Product Service

8 GHz to 10 GHz



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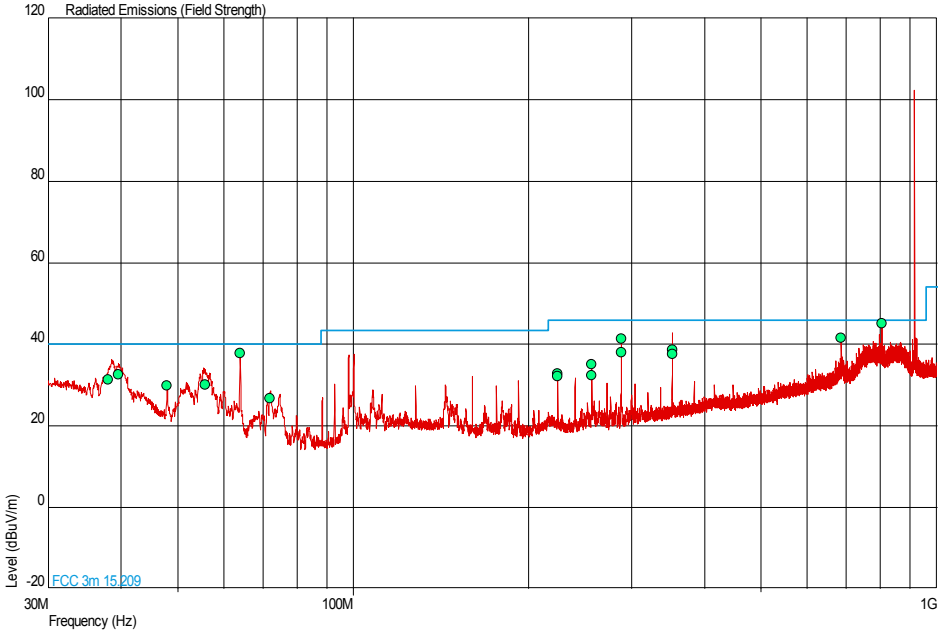
915.100 MHz

30 MHz to 1 GHz



Frequency (MHz)	QP Level (dBµV/m)	QP Limit (dBµV/m)	QP Margin (dBµV/m)	Angle(Deg)	Height(m)	Polarity
37.990	31.2	40.0	-8.8	288	1.00	Vertical
39.515	32.7	40.0	-7.3	136	1.00	Vertical
48.009	29.9	40.0	-10.1	360	1.00	Vertical
55.701	30.0	40.0	-10.0	106	1.00	Vertical
63.997	37.8	40.0	-2.2	291	1.91	Vertical
72.081	26.7	40.0	-13.3	111	2.10	Vertical
223.998	32.8	46.0	-13.2	247	1.71	Horizontal
224.009	32.0	46.0	-14.0	291	1.00	Vertical
256.011	32.3	46.0	-13.7	298	1.00	Vertical
256.024	35.1	46.0	-10.9	252	1.54	Horizontal
287.983	38.0	46.0	-8.0	283	1.00	Vertical
287.988	41.3	46.0	-4.7	236	1.15	Horizontal
351.990	38.5	46.0	-7.5	251	1.00	Horizontal
351.996	37.5	46.0	-8.5	149	1.72	Vertical
685.678	41.5	46.0	-4.5	230	2.98	Horizontal
804.538	45.0	46.0	-1.0	101	1.03	Horizontal

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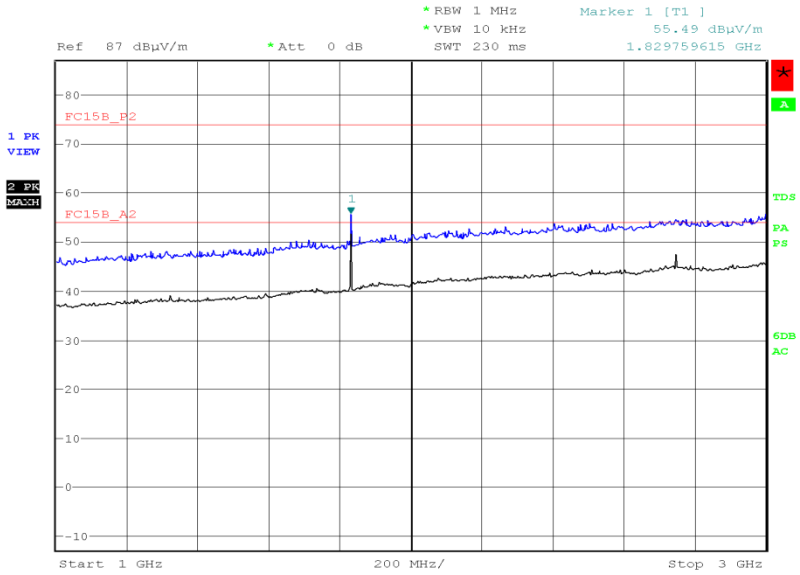
1 GHz to 3 GHz



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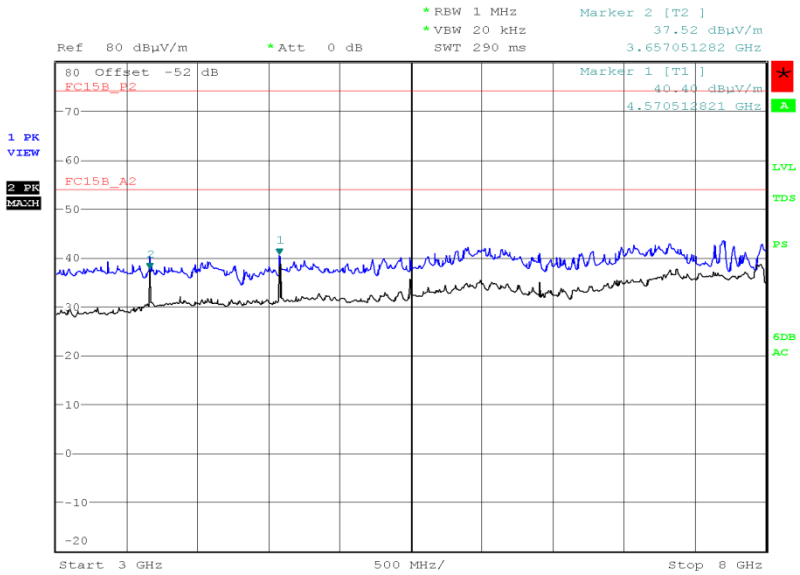
3 GHz to 8 GHz



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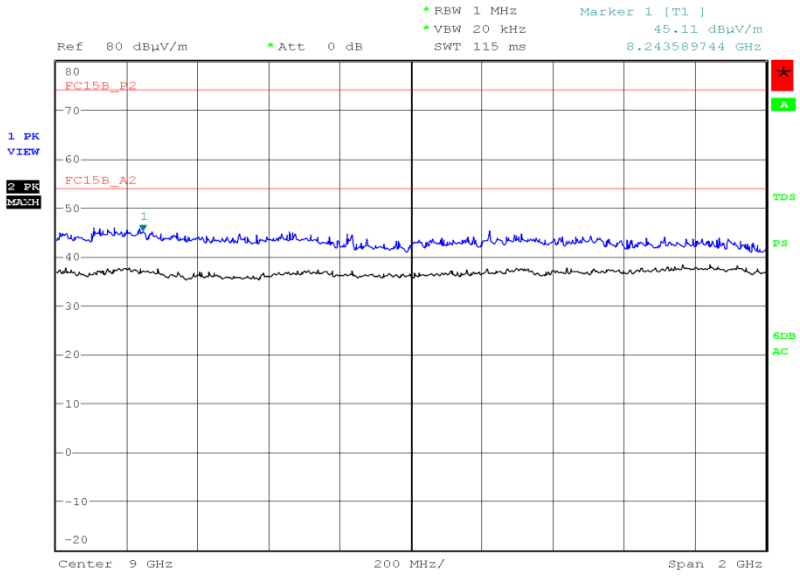
8 GHz to 10 GHz



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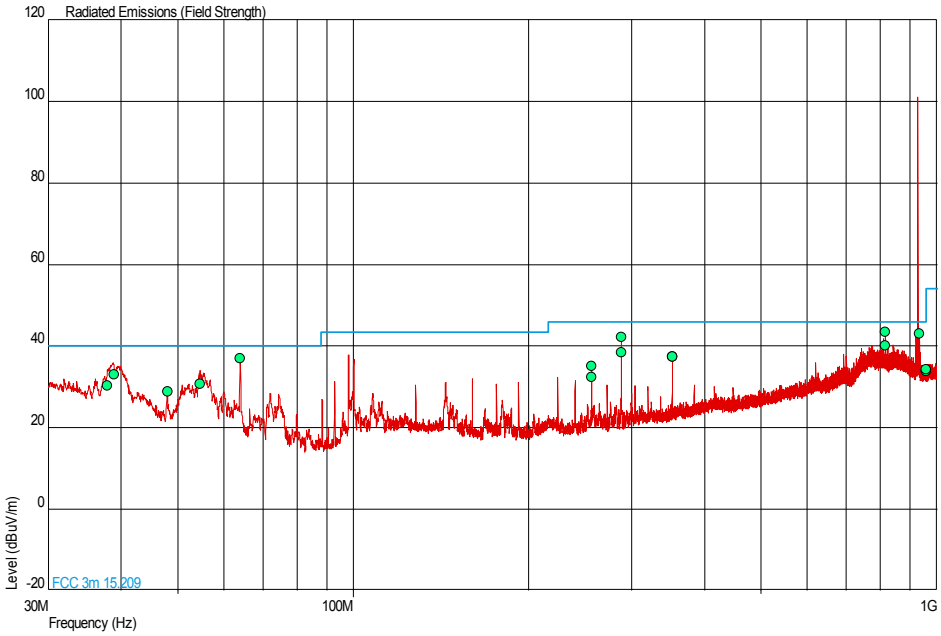
927.700 MHz

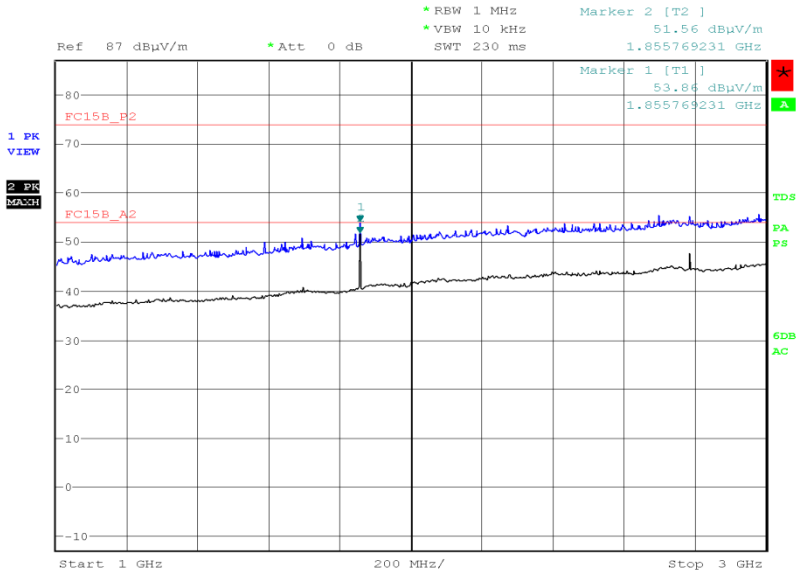
30 MHz to 1 GHz



Frequency (MHz)	QP Level (dBµV/m)	QP Limit (dBµV/m)	QP Margin (dBµV/m)	Angle(Deg)	Height(m)	Polarity
37.930	30.3	40.0	-9.7	90	1.00	Vertical
38.907	32.9	40.0	-7.1	355	1.00	Vertical
48.013	28.8	40.0	-11.2	14	1.00	Vertical
54.606	30.6	40.0	-9.4	347	1.00	Vertical
64.011	37.0	40.0	-3.0	138	2.34	Vertical
255.995	32.4	46.0	-13.6	282	1.00	Vertical
256.024	35.0	46.0	-11.0	257	1.53	Horizontal
287.997	38.3	46.0	-7.7	265	1.00	Vertical
288.006	42.1	46.0	-3.9	233	1.08	Horizontal
351.991	37.3	46.0	-8.7	252	1.00	Horizontal
352.007	37.3	46.0	-8.7	136	1.70	Vertical
817.112	40.0	46.0	-6.0	190	2.32	Vertical
817.123	43.4	46.0	-2.6	89	2.30	Horizontal
934.428	43.1	46.0	-2.9	80	1.00	Horizontal
960.000	33.8	46.0	-12.2	236	1.00	Vertical
960.000	34.1	46.0	-11.9	207	1.00	Horizontal

Product Service

1 GHz to 3 GHz



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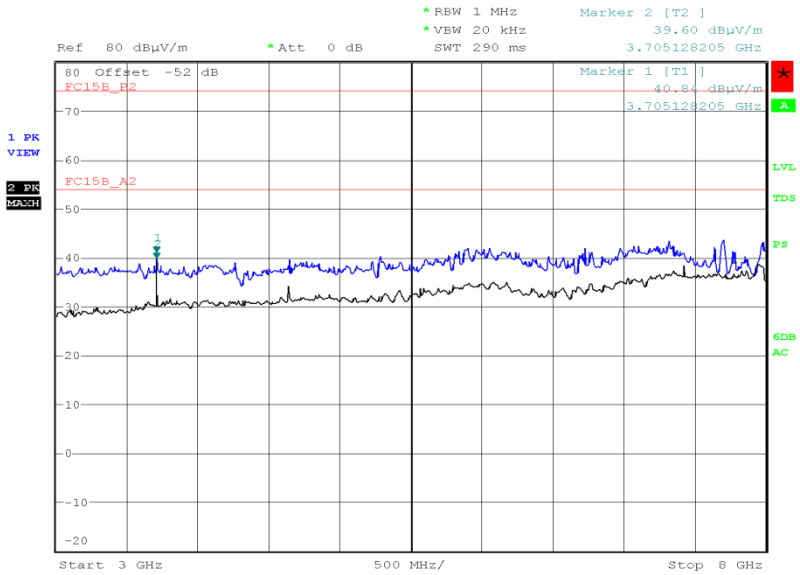
3 GHz to 8 GHz



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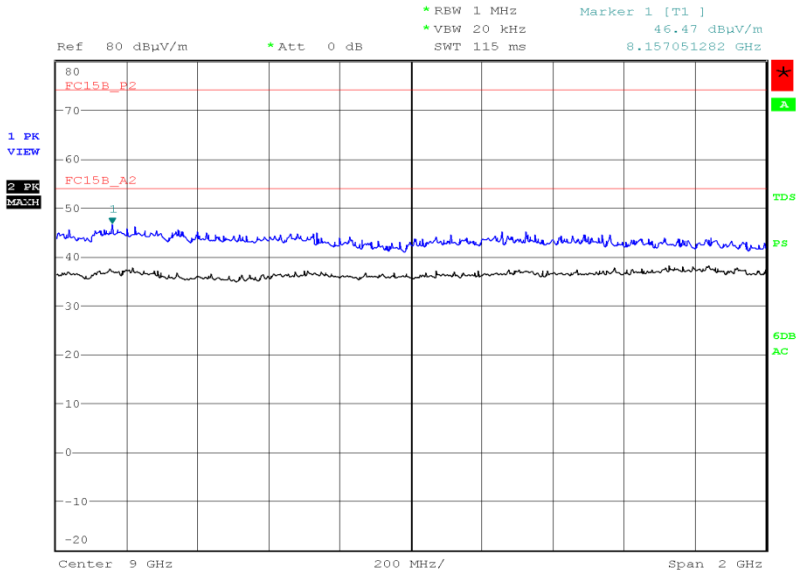
Product Service

8 GHz to 10 GHz



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Limit Clause

15.249 (a) and A2.9

Fundamental Frequency (MHz)	Field Strength of Harmonics (microvolts/meter)
902 to 928	500
2400 to 2483.5	500
5725 to 5875	500
24000 to 24250	2500

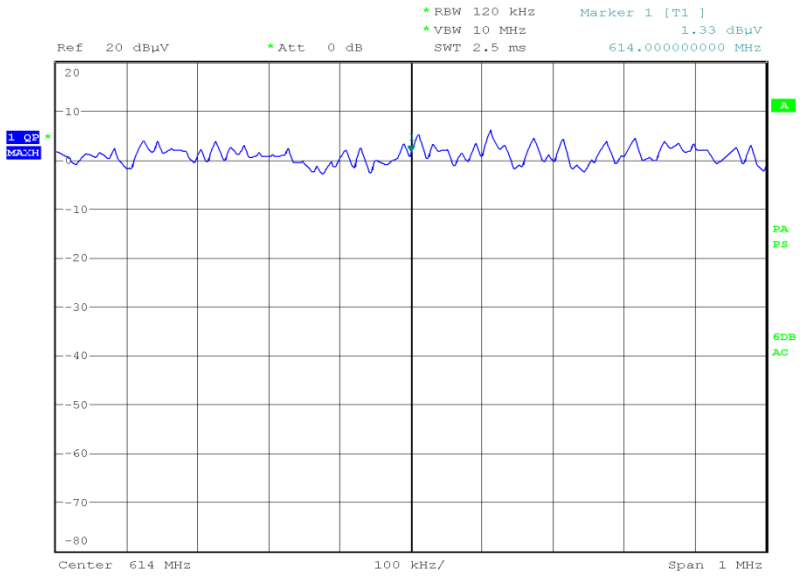
15.249 (d), 15.209

Frequency (MHz)	Field Strength (microvolts/meter)
0.009 to 0.490	2400/F (kHz)
0.490 to 1.705	24000/F (kHz)
1.705 to 30.0	30
30 to 88	100
88 to 216	150
216 to 960	200
Above 960	500

Band Edge Emissions

902.300 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Vertical	31.90	N/A



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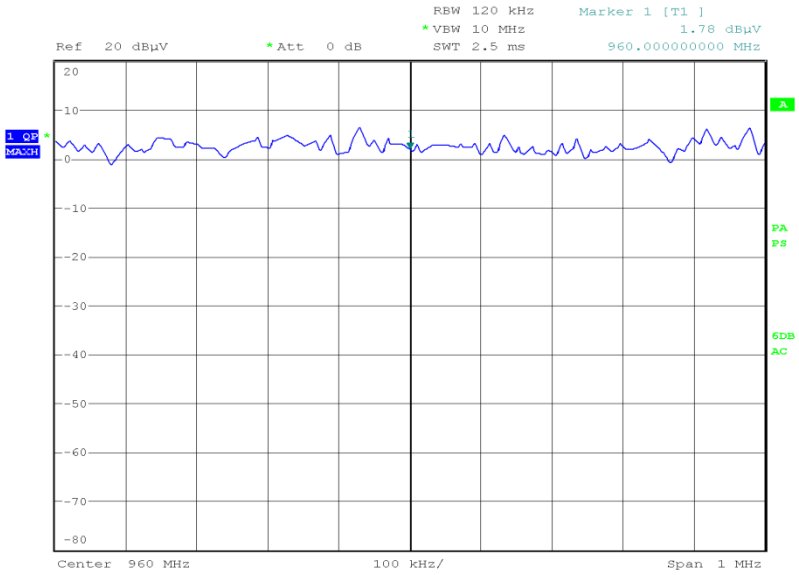
Product Service

927.700 MHz

Polarisation	Final Peak (dBµV/m)	Final Average (dBµV/m)
Horizontal	34.10	N/A



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Limit

Peak (dBµV/m)	Average (dBµV/m)
74.0	54.0

Product Service

SECTION 3

TEST EQUIPMENT USED

Product Service

3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.1 – AC Line Conducted Emissions					
LISN (1 Phase)	Chase	MN 2050	336	12	23-Mar-2013
Transient Limiter	Hewlett Packard	11947A	1032	12	28-Jun-2013
Screened Room (5)	Rainford	Rainford	1545	36	25-Dec-2013
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	11-Oct-2013
7m Armoured RF Cable	SSI Cable Corp.	1501-13-13-7m WA(-)	3600	-	TU
Section 2.2 and 2.3- Field Strength of Fundamental and Field Strength of Spurious Emissions					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	12	9-Nov-2013
Pre-Amplifier	Phase One	PS04-0086	1533	12	27-Sep-2013
Screened Room (5)	Rainford	Rainford	1545	36	25-Dec-2013
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Antenna (Bilog)	Chase	CBL6143	2904	24	12-May-2013
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	12	30-Aug-2013
Amplifier (1 - 8GHz)	Phase One	PS06-0060	3175	12	10-Jul-2013
High Pass Filter (3GHz)	RLC Electronics	F-100-3000-5-R	3349	12	29-May-2013
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	11-Oct-2013
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	-	TU
LISN, 5µH +10µF	ACME LISN Foundry	Def Stan 59-41/411	3904		14-Jun-2013
Tilt Antenna Mast	maturo Gmbh	TAM 4.0-P	3916	-	TU
Mast Controller	maturo Gmbh	NCD	3917	-	TU

TU – Traceability Unscheduled

Product Service

3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:-

Test Discipline	MU
Field Strength of Fundamental	30MHz to 1GHz: ± 5.1 dB 1GHz to 40GHz: ± 6.3 dB
Field Strength of Spurious Emissions	30MHz to 1GHz: ± 5.1 dB 1GHz to 40GHz: ± 6.3 dB
AC Line Conducted Emissions	± 3.2 dB

Product Service

SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

Product Service

4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

UKAS TESTING 0141

This report relates only to the actual item/items tested.

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation.

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA (Not UKAS Accredited).