

TEST REPORT FROM RADIO FREQUENCY INVESTIGATION LTD.

Test Of: Nokia UK Ltd.
Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset
(Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001
(Intentional Radiators)
Section 15.247

Test Report Serial No:
RFI/MPTB1/RP44367JD01

This Test Report Is Issued Under The Authority Of Richard Jacklin, Operations Director: 	Checked By: 
Tested By: 	Release Version No: PDF01
Issue Date: 23 December 2002	Test Dates: 18 December 2002 to 22 December 2002

This report covers the Bluetooth part of the Cameron 3650 (NHL-8) only.

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The results in this report apply only to the sample(s) tested.

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RADIO FREQUENCY INVESTIGATION LTD.

TEST REPORT

Conformance Testing Department

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1. Client Information

Company Name:	Nokia UK Ltd.
Address:	Nokia House Summit Avenue Southwood Farnborough Hampshire GU14 0NG
Contact Name:	Mr A White

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2. Equipment Under Test (EUT)

The following information (with the exception of the Date of Receipt) has been supplied by the client:

2.1. Identification Of Equipment Under Test (EUT)

Brand Name:	Nokia
Model Name or Number:	Cameron Imaging Phone
Unique Type Identification:	3650 (NHL-8)
IMEI Number:	004400/16/161824/2
Country of Manufacture:	Finland
Date of Receipt:	20 Dec 2002

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2.2. Description Of EUT

The equipment under test is a tri-band (900, 1800 & 1900) camera mobile handset, which supports IR and Bluetooth.

2.3. Modifications Incorporated In EUT

The EUT has not been modified from what is described by the Model Number and Unique Type Identification stated above.

2.4. Additional Information Related To Testing

Power Supply Requirement: (non-removable lithium ion battery)	Internal battery supply of 3.7 V
Power Supply Requirement: (AC Battery Charger)	Nominal 115 V 60 Hz AC Mains supply
Intended Operating Environment:	Within GSM/Bluetooth Network Coverage
Equipment Category:	Portable
Type of Unit:	Mobile handset
Weight:	130 g
Dimensions:	130 x 55 x 23 mm
Interface Ports:	Battery Connection Headset Connection
Highest Declared Generated Frequency within the EUT.	3980 MHz
Transmit Frequency Range Tested	2402 to 2481 MHz (Bluetooth)
Receive Frequency Range Tested	2402 to 2481 MHz (Bluetooth)
Maximum Measured Output Power (EIRP)	0.306 dBm, (Bluetooth)

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2.5. Support Equipment

The following support equipment was used to exercise the EUT during testing:

Description:	Universal Radio Communications Tester
Brand Name:	Rohde & Schwartz
Model Name or Number:	CMU200
Serial Number:	1100.0008.02
Connected to Port:	RF Link

Description:	Li-ion Battery
Brand Name:	Nokia
Model Name or Number:	BL-5C
Serial Number:	067040063663222411
Cable Length And Type:	N/A
Connected to Port:	Battery

Description:	AC Power Supply
Brand Name:	Nokia
Model Name or Number:	Travel Charger
Serial Number:	ACP-12U
Cable Length And Type:	175 cm
Connected to Port:	Charger

Description:	Headset
Brand Name:	Nokia
Model Name or Number:	Headset
Serial Number:	HDE-2
Cable Length And Type:	108 cm
Connected to Port:	Not Stated by Applicant

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3. Test Specification, Methods And Procedures

3.1. Test Specification

Reference:	FCC Part 15 Subpart C: 2001 (Section 15.247)
Title:	Code of Federal Regulations, Part 15 (47CFR15) Radio Frequency Devices: Digital Devices.
Comments:	A description of the test facility used for this test is on file with, and has been accepted by, the Federal Communications Commission as required by Section 2.948 of Federal Rules.
Purpose of Test:	To determine whether the equipment complied with the requirements of the specification for the purposes of certification.

Reference:	FCC Part 15 Subpart B: 2001 (Section 15.107 and 15.109)
Title:	Code of Federal Regulations, Part 15 (47CFR15) Radio Frequency Devices: Radio Frequency Devices.
Comments:	A description of the test facility used for this test is on file with, and has been accepted by, the Federal Communications Commission as required by Section 2.948 of Federal Rules.
Purpose of Test:	To determine whether the equipment complied with the requirements of the specification for the purposes of certification.

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3.2. Methods And Procedures

The methods and procedures used were as detailed in:

FCC Code of Federal Regulations 47.

Telecommunication. Parts 0 to 19, October 2001.

ANSI C63.2 (1987)

Title: American National Standard for Instrumentation - Electromagnetic noise and field strength.

ANSI C63.4 (2001)

Title: American National Standard Methods of Measurement of Electromagnetic Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

ANSI C63.5 (1988)

Title: American National Standard for the Calibration of antennas used for Radiated Emission measurements in Electromagnetic Interference (EMI) control.

ANSI C63.7 (1988)

Title: American National Standard Guide for Construction of Open Area Test Sites for performing Radiated Emission Measurements.

CISPR 16-1: (1999)

Title: Specification For Radio Disturbance and Immunity Measuring Apparatus and Methods. Part 1: Radio Disturbance and Immunity Measuring Apparatus.

3.3. Definition Of Measurement Equipment

The measurement equipment used complied with the requirements of the standards referenced in the Methods & Procedures section above. Appendix 1 contains a list of the test equipment used.

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4. Deviations From The Test Specification

None.

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5. Operation Of The EUT During Testing

5.1. Operating Conditions

The EUT was tested in a normal laboratory environment.

During testing, the EUT was powered by a 110 V, 60 Hz AC Mains supply.

5.2. Operating Modes

The EUT was tested in the following operating modes:

Bluetooth mode Transmitting on Top, Middle, Bottom channels or in receive mode.

The reason for choosing these modes was that the client defined it as being likely to be the worst case with regards EMC.

5.3. Configuration And Peripherals

The EUT was tested in the following configuration:

Configured with hands free kit, AC battery charger and internal battery.

A link was established and channels selected using the CMU200 Bluetooth test set.

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6. Summary Of Test Results

Range Of Measurements	Specification Reference	Port Type	Compliance Status
Receiver Conducted Emissions (AC Mains)	C.F.R. 47 FCC Part 15: 2001 Section 15.107	AC Mains Terminals	Complied
Receiver Radiated Emissions	C.F.R. 47 FCC Part 15: 2001 Section 15.109	Antenna	Complied
Transmitter Conducted Emissions (AC Mains)	C.F.R. 47 FCC Part 15: 2001 Section 15.207	AC Mains Terminals	Complied
Transmitter Carrier Frequency Separation	C.F.R. 47 FCC Part 15: 2001 Section 15.247(a)(1)	Antenna Terminals	Complied
Transmitter 20dB Bandwidth	C.F.R. 47 FCC Part 15: 2001 Section 15.247(a)(1)	Antenna Terminals	Complied
Transmitter Average Time of Occupancy	C.F.R. 47 FCC Part 15: 2001 Section 15.247(a)(1)(iii)	Antenna Terminals	Complied
Transmitter Maximum Peak Output Power	C.F.R. 47 FCC Part 15: 2001 Section 15.247(b)(1)	Antenna Terminals	Complied
Transmitter Conducted Emissions	C.F.R. 47 FCC Part 15: 2001 Section 15.247 (c)	Antenna Terminals	Complied
Transmitter Radiated Emissions	C.F.R. 47 FCC Part 15: 2001 Section 15.247(c) Section 15.209(a)	Antenna	Complied
Transmitter Band Edge Conducted Emissions	CFR 47: 2001, Section 15.247(c)	Antenna Terminals	Complied
Transmitter Band Edge Radiated Emission	CFR 47: 2001, Section 15.247(c) Section 15.209(a)	Antenna	Complied

6.1. Location Of Tests

All the measurements described in this report were performed at the premises of Radio Frequency Investigation Ltd, Ewhurst Park, Ramsdell, Basingstoke, Hampshire, RG26 5RQ, England.

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7. Measurements, Examinations And Derived Results

7.1. General Comments

7.1.1. This section contains test results only. Details of the test methods and procedures can be found in Appendix 2 of this report.

7.1.2. Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to Section 8 for details of measurement uncertainties.

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7.2. Receiver Conducted Emissions: AC Mains - Section 15.107**7.2.1. Quasi-Peak Detector Measurements On Live And Neutral Lines**

7.2.1.1. Preliminary AC conducted spurious scans were performed with the EUT set to receive mode.

7.2.1.2. Final measurements were performed on the worst-case configuration as described in Part 15.31(i).

7.2.1.3. Plots of all the initial scans can be found in Appendix 4.

7.2.1.4. The following tables lists frequencies at which emissions were measured using a Quasi-Peak and Average detector:

Quasi-Peak Detector Measurements on Live and Netral Lines

Frequency (MHz)	Line	Q-P Level (dB μ V)	Q-P Limit (dB μ V)	Margin (dB)	Result
4.13628	Neutral	21.14	56.00	34.86	Complied
4.38018	Live	21.47	56.00	34.53	Complied

Average Detector Measurements on Live and Netral Lines

Frequency (MHz)	Line	Q-P Level (dB μ V)	Q-P Limit (dB μ V)	Margin (dB)	Result
4.13628	Neutral	16.59	46.00	29.41	Complied
4.38018	Live	16.21	46.00	29.79	Complied

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7.3. Receiver Radiated Emissions: Section 15.109**7.3.1. Electric Field Strength Measurements (Frequency Range: 30 to 1000 MHz)**

7.3.1.1. The EUT was operated in receive mode to the limits specified in Part 15.109.

7.3.1.2. Preliminary Radiated spurious scans were performed with the EUT set to Receive Mode, as stated in section 5.2. Final measurements were made on any visible spurious that were within 20 dB of the limit.

7.3.1.3. Plots of the initial scans can be found in Appendix 4.

Frequency (MHz)	Ant. Pol.	Q-P Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
553.996	Vert	23.8	46.0	22.0	Complied

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7.4. Receiver Radiated Emissions: Section 15.109**7.4.1. Electric Field Strength Measurements (Frequency Range: 1.0 to 26.5 GHz)**

7.4.1.1. Tests were performed up to five times the highest generated clock frequency.

7.4.1.2. Preliminary Radiated spurious scans were performed with final measurements being taken for any emission within 20dB of the limit.

7.4.1.3. Due to dynamic range limitations of the measuring receiver, scans at high frequencies above 12 GHz were performed at 1 metre measurement distances, with an corrected limit line for the reduced test distances.

7.4.1.4. Plots of all the initial scans can be found in Appendix 4.

7.4.1.5. The following table indicates results or the EUT configured with an internal antenna connected and operating.

Highest Average Level:

Frequency (GHz)	Antenna Polarity (H/V)	Average Detector level (dB μ V)	Antenna factor (dB)	Cable loss (dB)	Actual Average Level (dB μ V/m)	Average Limit (dB μ V/m)	Average Margin (dB)	Result
4.526	Vert	7.6	24.1	1.5	33.2	54	20.8	Complied

Highest Peak Level:

Frequency (GHz)	Antenna Polarity (H/V)	Peak Detector level (dB μ V)	Antenna factor (dB)	Cable loss (dB)	Actual Peak Level (dB μ V/m)	Peak Limit (dB μ V/m)	Peak Margin (dB)	Result
4.526	Vert	7.6	24.1	1.5	42.7	74	31.3	Complied

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7.5. Transmitter Conducted Emissions: AC Mains - Section 15.207**7.5.1. Quasi-Peak Detector Measurements On Live And Neutral Lines**

7.5.1.1. Preliminary conducted spurious scans were performed with the EUT set to Top, Middle, Bottom as requested in FCC Part 15.31(m).

7.5.1.2. Final measurements were then performed on the worst-case configuration as described in Part 15.31(i).

7.5.1.3. Plots of all the initial scans can be found in Appendix 4.

7.5.1.4. The following table lists frequencies at which emissions were measured using a Quasi-Peak detector:

Quasi-Peak Detector Measurements on Live and Netral Lines**Bottom Channel**

Frequency (MHz)	Line	Q-P Level (dB μ V)	Q-P Limit (dB μ V)	Margin (dB)	Result
4.13628	Neutral	21.14	56	34.86	Complied
4.53421	Live	21.54	56	34.46	Complied

Middle Channel

Frequency (MHz)	Line	Q-P Level (dB μ V)	Q-P Limit (dB μ V)	Margin (dB)	Result
4.38018	Live	21.47	56	34.53	Complied
4.64775	Neutral	22.76	56	33.24	Complied

Top Channel

Frequency (MHz)	Line	Q-P Level (dB μ V)	Q-P Limit (dB μ V)	Margin (dB)	Result
4.45821	Live	21.67	56	34.33	Complied
4.63130	Live	23.85	56	32.15	Complied

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7.5.2. Quasi-Peak Detector Measurements On Live And Neutral Lines - (Continued)**Average Detector Measurements on Live and Netral Lines****Bottom Channel**

Frequency (MHz)	Line	Q-P Level (dB μ V)	Q-P Limit (dB μ V)	Margin (dB)	Result
4.13628	Neutral	16.76	46	29.24	Complied
4.53421	Live	15.82	46	30.18	Complied

Middle Channel

Frequency (MHz)	Line	Q-P Level (dB μ V)	Q-P Limit (dB μ V)	Margin (dB)	Result
4.38018	Live	16.42	46	29.58	Complied
4.64775	Neutral	16.05	46	29.95	Complied

Top Channel

Frequency (MHz)	Line	Q-P Level (dB μ V)	Q-P Limit (dB μ V)	Margin (dB)	Result
4.45821	Live	16.29	46	29.71	Complied
4.63130	Live	15.98	46	30.02	Complied

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7.6. Transmitter Carrier Frequency Separation: Section 15.247(a)(1)

7.6.1. Tests were performed to identify the carrier frequency separation as per FCC Part 15.247(a)(1).

7.6.2. Section 15.247 (a)(1) specifies that the channels should be separated by at least 25kHz or the 20dB bandwidth of the channel.

7.6.3. The following table shows the measured Carrier Frequency Separation with reference to a graphical plot in appendix 4 of this report:

Result:

Transmitter Carrier Frequency Separation (kHz)	Graph
1000	GPH/44367JD01/A001 Appendix 4

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7.7.Transmitter 20dB Bandwidth: Section 15.247(a)(1)

7.7.1. Tests were performed to identify the 20dB bandwidth as per FCC Part 15.247(a)(1).

7.7.2. The following table shows the measured 20 dB bandwidth with reference to a graphical plot in appendix 4 of this report:

Result:

Transmitter 20dB Bandwidth (kHz)	Graph
657.314	GPH/44367JD01/A006 Appendix 4

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7.8.Transmitter Average Time of Occupancy: Section 15.247(a)(1)(iii)

7.8.1. Tests were performed to identify the average time occupancy as per FCC Part 15.247(a)(1)(iii).

7.8.2. Section 15.247 (a)(1)(iii) specifies that the average time occupancy shall not be greater than 0.4 seconds.

7.8.3. The time occupancy of the system was tested on a single carrier. The maximum packet length was measured and multiplied by the number of transmissions within a 30 second period. The result was noted as being the average time of occupancy and can be seen in the following table with references the a graphical plot in appendix 4 of this report:

Result:

Packet Width (μs)	Number of Transmissions in 30 Seconds	Average Time of Occupancy (s)	Graph
440.882	244	0.107575	GPH/44367JD01/A003 Appendix 4 GPH/44367JD01/A004 Appendix 4

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7.9. Transmitter Peak Output Power: Section 15.247(b)(1)

7.9.1. Tests were performed to identify the maximum transmit power in accordance with FCC Part 15.247(b)(1).

7.9.2. The client has provided a temporary antenna port to allow a direct connection to be made.

7.9.3. The client has specified that the EUT employs frequency hopping with 79 hopping channels. Therefore the maximum transmitter power level under FCC Part 15.247(b)(1) is 1 Watt.

7.9.4. Results are shown for the EUT set to Top, Middle and Bottom channels as stated in FCC Part 15.31 (m) and section 5.2 of this report. Graphical measurements are shown for the transmit power levels within Appendix 4.

7.9.5. Measurements were performed on the Top, Middle and Bottom channels for the specified extremes of input voltages:

Results:

Number of Hopping Channels Employed	Graph
79	GPH/44367D01/A002 Appendix 4

Channel	Input Voltage (AC)	Maximum Transmitter Conducted Output Level (Watts)	Antenna Gain (dBi)	EIRP (Watts)	Limit (Watts)	Margin (dB)	Result
Bottom	93.5	0.000875	-1.0	0.000695	1.0	0.999125	Complied
Bottom	110.0	0.000927	-1.0	0.000736	1.0	0.999073	Complied
Bottom	126.5	0.000880	-1.0	0.000699	1.0	0.999120	Complied
Middle	93.5	0.001249	-1.0	0.000992	1.0	0.998751	Complied
Middle	110.0	0.001245	-1.0	0.000989	1.0	0.998755	Complied
Middle	126.5	0.001230	-1.0	0.000977	1.0	0.998770	Complied
Top	93.5	0.001340	-1.0	0.001064	1.0	0.998660	Complied
Top	110.0	0.001341	-1.0	0.001065	1.0	0.998659	Complied
Top	126.5	0.001351	-1.0	0.001073	1.0	0.998649	Complied

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7.10. Transmitter Conducted Emissions: Section 15.247(c)

7.10.1. Spurious emissions tests on the antenna port were performed in accordance with FCC Part 15.247(c).

7.10.2. Section 15.247(c) specifies that all spurious emissions measured within a 100 kHz bandwidth shall be attenuated by at least 20 dB below the level of the highest fundamental level measured in a 100 kHz bandwidth.

7.10.3. Conducted spurious emission scans were performed between 30MHz to 10 times the highest generated frequency with the EUT operating at the Top, Middle, Bottom channels as specified within clause 15.31(m). All channels were active and transmitting data.

7.10.4. Plots of the initial scans can be found in Appendix 4.

Results:**Highest Peak Level: Bottom**

Frequency (GHz)	Peak Detector level (dBm)	Peak Limit (dBm)	Peak Margin (dB)	Result
2.2894	-40.50	20.67	19.83	Complied

Highest Peak Level: Middle

Frequency (GHz)	Peak Detector level (dBm)	Peak Limit (dBm)	Peak Margin (dB)	Result
1.8549	-40.33	-20.67	19.66	Complied

Highest Peak Level: Top

Frequency (GHz)	Peak Detector level (dBm)	Peak Limit (dBm)	Peak Margin (dB)	Result
1.29005	-40.67	-20.67	20.00	Complied

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7.11. Transmitter Radiated Emissions: Section 15.247(c) and 15.209(a)**7.11.1. Electric Field Strength Measurements: 30 to 1000 MHz.**

7.11.1.1. The following table specifies frequencies, which fall close to the restricted bands as specified in section 15.205(a).

7.11.1.2. The client has stated that the highest clock frequency for the EUT was 2.480GHz. Therefore measurements were performed up to 26 GHz.

7.11.1.3. Preliminary Radiated spurious scans were performed with the EUT set to Top, Middle and Bottom channels and with all channels active (transmitting data on pseudo random hopping channels) as stated in section 5.2.

7.11.1.4. Due to dynamic range limitations of the measuring receiver, scans at high frequencies above 12 GHz were performed at a 1 metre measurement distance. The measured value was then corrected by 9.5 dB using the formula $20\log(D1/D2)$ Where D1 was 3 meters and D2 was 1 meter.

7.11.1.5. Plots of the initial scans can be found in Appendix 4.

7.11.1.6. The following table lists frequencies at which emissions were measured using a Quasi-Peak detector at a test distance of 3m (results incorporate antenna factors and cable losses):

7.11.1.7. The following results are for the EUT configured with an internal antenna connected and operating.

Bottom Channel

Frequency (MHz)	Ant. Pol.	Q-P Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
332.169	Hor	33.8	46.0	12.2	Complied
597.904	Hor	31.9	70.4	38.5	Complied
400.000	Hor	30.9	46.0	15.1	Complied
960.000	Ver	37.8	46.0	8.2	Complied

Note: The preliminary scans showed similar emission levels for each mode below 1 GHz, therefore final radiated emissions measurements were performed with the EUT set to the Middle channel only.

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Transmitter Radiated Emissions: Section 15.247(c) and 15.209(a) (continued)**7.11.2. Electric Field Strength Measurements: 1.0 to 26.0 GHz****Highest Average Level: Middle Channel**

Frequency (GHz)	Antenna Polarity (H/V)	Average Detector level (dB μ V)	Antenna factor (dB)	Cable loss (dB)	Actual Average Level (dB μ V/m)	Average Limit (dB μ V/m)	Average Margin (dB)	Result
4.213	Vert	8.6	24.1	1.5	34.2	54	19.8	Complied

Highest Peak Level: Middle Channel

Frequency (GHz)	Antenna Polarity (H/V)	Peak Detector level (dB μ V)	Antenna factor (dB)	Cable loss (dB)	Actual Peak Level (dB μ V/m)	Peak Limit (dB μ V/m)	Peak Margin (dB)	Result
4.213	Vert	18.1	24.1	1.5	43.7	74	30.1	Complied

Note: The preliminary scans showed similar emission levels for each mode below 1 GHz, therefore final radiated emissions measurements were performed with the EUT set to the Middle channel only.

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7.12. Transmitter Band Edge Conducted Emissions FCC 15.247(c)

7.12.1. The EUT and spectrum analyser were configured as for conducted antenna port measurements, and as per FCC Public Notice DA 00-705, Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems.

7.12.2. The applicant to allow for conducted measurements provided a temporary antenna port.

7.12.3. A plot of the upper channel and the protected band closest to the upper channel was produced. A marker was set to the peak of the highest channel and a delta marker set to the highest out of band peak. (The specification states that either the band edge level must be measured or the highest out of band emission, whichever is greater). The plots show that the emission complies with the 20dBc limit.

7.12.4. A plot of the lower channel and the protected band closest to the lower channel was produced. A marker was set to the peak of the lowest channel and a delta marker set to the highest out of band peak. (The specification states that either the band edge level must be measured or the highest out of band emission, whichever is greater). The plots show that the emission complies with the 20dBc limit.

7.12.5. Two graphs in total were produced, with the device set to top and bottom channels. The plots can be seen in appendix 4 of this report.

Highest Peak Level Lower Band Edge

Frequency (GHz)	Peak Detector level (dBµV)	Peak Limit (dBµV)	Peak Margin (dB)	Result
2.4000	-41.79	-20.67	21.12	Complied

Highest Peak Level Upper Band Edge

Frequency (GHz)	Peak Detector level (dBµV)	Peak Limit (dBµV)	Peak Margin (dB)	Result
2.4835	-40.21	-20.67	19.54	Complied

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7.13. Transmitter Band Edge Radiated Emissions**7.13.1. Electric Field Strength Measurements**

7.13.1.1. The EUT and spectrum analyser were configured for radiated measurements as per FCC Public Notice DA 00-705, Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems.

7.13.1.2. The marker delta method described in FCC Public Notice DA 00-705 page 9 was used to measure the band edge. The band edge emissions were measured using a peak and average detector as required by FCC Part 15.209, the delta obtained in dB from the marker delta method was then applied as described in DA 00-705 to obtain the correct reading.

7.13.1.3. Graphs 44367JD01/025 to 44367JD01/028 in Appendix 4 were produced showing the marker delta traces and the peak in band power.

Average Level

Frequency (GHz)	Antenna Polarity (H/V)	Average Detector level (dB μ V)	Antenna factor (dB)	Cable loss (dB)	Actual Average Level (dB μ V/m)	Average Limit (dB μ V/m)	Average Margin (dB)	Result
2.400	Vert	10.2	20.5	1.5	32.2	70.4	38.2	Complied
2.4835	Vert	8.9	20.5	1.5	30.9	54	23.1	Complied

Peak Level

Frequency (GHz)	Antenna Polarity (H/V)	Peak Detector level (dB μ V)	Antenna factor (dB)	Cable loss (dB)	Actual Peak Level (dB μ V/m)	Peak Limit (dB μ V/m)	Peak Margin (dB)	Result
2.400	Vert	19.5	20.5	1.5	41.5	70.4	28.9	Complied
2.4835	Vert	18.2	20.5	1.5	40.2	74.0	33.8	Complied

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8. Measurement Uncertainty

8.1. No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently, the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

8.2. The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

8.3. The uncertainty of the result may need to be taken into account when interpreting the measurement results.

8.4. The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor, such that a confidence level of approximately 95% is maintained. For the purposes of this document "approximately" is interpreted as meaning "effectively" or "for most practical purposes".

Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
Conducted Emissions AC Mains	0.15 MHz to 30 MHz	95%	+/- 3.25 dB
Time Occupancy	Not applicable	95%	+/- 10 %
Channel Separation	Not applicable	95%	+/- 10 %
Occupied Bandwidth	1850 to 1910 MHz	95%	+/- 0.12 %
Effective Isotropic Radiated Power	1.0 GHz to 26 GHz	95%	+/- 1.78 dB
Radiated Emissions at 3.0 metres	30 MHz to 1000 MHz	95%	+/- 5.26 dB
Conducted Emissions Antenna Port	0.009 kHz to 26 GHz	95%	+/- 1.2 dB
Radiated Emissions at 3.0 metres	1 GHz to 26 GHz	95%	+/- 1.78 dB

8.5. The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty, the published guidance of the appropriate accreditation body is followed.

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Appendix 1. Test Equipment Used

RFI No.	Instrument	Maker	Type No.	Serial No.
A004	ESH3-Z5 LISN	Rohde & Schwarz	ESH3-Z5	890 604/027
A027	Horn Antenna	Eaton	9188-2	301
A031	2 to 4 GHz Eaton Horn Antenna	Eaton	91889-2	557
A201	WG 20 Horn Antenna	Flann Microwave Ltd	20240-20	266
A246	30 dB Attenuator	Schaffner	6830-17-B	None
A253	WG 12 Microwave Horn	Flann Microwave	12240-20	128
A254	WG 14 Microwave Horn	Flann Microwave	14240-20	139
A255	WG 16 Microwave Horn	Flann Microwave	16240-20	519
A256	WG 18 Microwave Horn	Flann Microwave	18240-20	400
A259	Bilog Antenna	Chase	CBL6111	1513
A276	OATS Positioning Controller	Rohde & Schwarz	HCC	
A392	3 dB attenuator (9)	Suhner	6803.17.B	None
A490	Bilog Antenna	Chase	CBL6111A	1590
C341	Cable	Andrews	None	None
C362	Cable	Rosenberger	UFA210A-1-1181-70x70	1925
G013	SMHU Signal Generator	Rohde & Schwarz	SMHU	894 055/003
M003	Spectrum Monitor	Rohde & Schwarz	EZM	883 580/008
M044	ESVP Receiver	Rohde & Schwarz	ESVP	891 845/026
M127	Spectrum Analyser	Rohde & Schwarz	FSEB 30	842 659/016

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Test Equipment Used (continued)

RFI No.	Instrument	Maker	Type No.	Serial No.
M173	Turntable Controller	R.H.Electrical Services	RH351	3510020
M198	Thermal Power Sensor	Rohde & Schwarz	NRV-Z52	827 191/003
M199	Power Meter	Rohde & Schwarz	NRVS	827023/075
M295	HP 8564E	Hewlett Packard	8564E	3846A01561
M505	Analyser Display Unit	Rohde & Schwarz	ESAI-D	825316/010
M506	RF unit	Rohde & Schwarz	ESBI-RF	827060/004
S003	Power Control	Zen	E08	736699
S201	Site 1	RFI	1	
S202	Site 2	RFI	2	-
S207	Site 7	RFI	7	-
S209	Site 9	RFI	9	-

NB In accordance with UKAS requirements, all the measurement equipment is on a calibration schedule.

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Appendix 2. Measurement Methods

AC Mains Conducted Emissions

AC mains conducted emissions measurements were performed in accordance with the standard, against appropriate limits for each detector function.

The test was performed in a shielded enclosure with the equipment arranged as detailed in the standard on a wooden bench using the floor of the screened enclosure as the ground reference plane and with the EUT powered via a 60 Hz AC mains supply.

Initial measurements in the form of swept scans covering the entire measurement band were performed in order to identify frequencies on which the EUT was generating interference. In order to minimise the time taken for these swept measurements, a Peak detector was used in conjunction with the appropriate detector IF measuring bandwidths (see table below). Repetitive scans were performed to allow for emissions with low repetition rates, and the duty cycle of the EUT. The test configuration was the same for the initial scans as for the final measurements.

Following the initial scans, a graph was produced giving an overview of the emissions from the EUT plotted against the appropriate specification limit. A tolerance line was set 6 dB below the specification limit and levels above the tolerance line were re-tested (at individual frequencies) using the appropriate detector function.

The test equipment settings for conducted emissions measurements were as follows:

Receiver Function	Initial Scan	Final Measurements
Detector Type:	Peak	Quasi-Peak (CISPR)*
Mode:	Max Hold	Not applicable
Bandwidth:	9 kHz	9 kHz
Amplitude Range:	60 dB	20 dB
Measurement Time:	Not applicable	> 1 s
Observation Time:	Not applicable	> 15 s
Step Size:	Continuous sweep	Not applicable
Sweep Time:	Coupled	Not applicable

* In some instances an Average detector function may also have been used.

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Radiated Field Strength Emissions

Radiated emissions measurements were performed in accordance with the standard, against appropriate limits for each detector function.

Initial measurements covering the entire measurement band in the form of swept scans in a shielded enclosure were performed in order to identify frequencies on which the EUT was generating interference. This determined the frequencies on which the EUT should be re-measured in full on the open area test site. In order to minimise the time taken for the swept measurements, a Peak detector was used in conjunction with the appropriate detector IF measuring bandwidth (see table below). Repetitive scans were performed to allow for emissions with low repetition rates, and for the duty cycle of the EUT. The test configuration was the same for the initial scans as for the final measurements.

The initial scans were performed using an antenna height of 1.5 m and a measurement distance of 3 m. Following the initial scans, graphs were produced giving an overview of the emissions from the EUT plotted against the appropriate specification limit. A tolerance line was set 6 dB below the specification limit and levels above the tolerance line were re-tested on the open area test site, at the appropriate distance, using a measuring receiver with a Quasi-Peak (below 1000 MHz), Average and Peak (above 1000 MHz) detector, where applicable.

For the main (final) measurements the EUT was arranged on a non-conducting table on an open area test site, as detailed in the specification.

All measurements on the open area test site were performed using broadband antennas.

On the open area test site, at each frequency where a signal was found, the levels were maximised by initially rotating the turntable through 360°. For frequencies below 1000 MHz, the antenna was varied in height between 1 m and 4 m. For frequencies above 1000 MHz, the antenna was fixed at a height of 1.5m. At this point, any signals found to be between the limit and a level 6 dB below it were further maximised by changing the configuration of the EUT, e.g. re-routing cables to peripherals and moving peripherals with respect to the EUT.

Once the signal amplitude is determined the EUT is replaced with a substitution antenna. A signal generator is connected to the antenna and its level adjusted in order to obtain the same indicated level as that which was observed from the EUT. The receive antenna is then adjusted in height until the signal measured has peaked. The signal generator level is then re-adjusted to regain the original reading. The level on the signal generator – cable losses plus the antenna gain is the recorded ERP.

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The test equipment settings for radiated emissions measurements were as follows:

Receiver Function	Initial Scan Below 1000 MHz	Final Measurements Below 1000 MHz
Detector Type:	Peak	Quasi-Peak (CISPR)
Mode:	Max Hold	Not applicable
Bandwidth:	100 kHz	120 kHz
Amplitude Range:	60 dB	20 dB
Measurement Time:	Not applicable	> 1 s
Observation Time:	Not applicable	> 15 s
Step Size:	Continuous sweep	Not applicable
Sweep Time:	Coupled	Not applicable

Receiver Function	Initial Scan Above 1000 MHz	Final Measurements Above 1000 MHz
Detector Type:	Peak	Peak/Average
Mode:	Max Hold	Not applicable
Bandwidth:	1 MHz	1 MHz
Amplitude Range:	60 dB	20 dB (typical)
Measurement Time:	Not applicable	> 1 s
Observation Time:	Not applicable	> 15 s
Step Size:	Continuous sweep	Not applicable
Sweep Time:	Coupled	Not applicable

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Conducted Antenna Port Emissions

Conducted Antenna Port Emissions measurements were performed in accordance with the standard, against appropriate limits for each detector function.

Prior to testing being performed a suitable RF attenuator and cable were calibrated for the required frequency range. For each measurement range performed, the calibrated level of the attenuator and cable were entered as an offset into the spectrum analyser to compensate for the measurement setup.

Initial measurements covering the entire measurement band in the form of swept scans were performed in order to identify frequencies on which the EUT was generating interference. This determined the frequencies on which measurements were performed. In order to minimise the time taken for the swept measurements, a Peak detector was used in conjunction with the appropriate detector IF measuring bandwidth (see table below). Repetitive scans were performed to allow for emissions with low repetition rates, and for the duty cycle of the EUT. The test configuration was the same for the initial scans as for the final measurements.

Due to the design of the EUT, conducted antenna port measurements were common for both the internal and external antenna connection.

To determine the transmitter output power, the EUT was operated as intended with the spectrum analyser operated in a maximum hold mode over the full operating frequency range of the EUT to identify the highest emission within the band.

To determine spurious emissions levels, the EUT was operated as intended with the spectrum analyser operated in a maximum hold mode over selected frequency ranges between 30 MHz and 26 GHz. A reference limit line of 20dB below the maximum output of the transmitter was noted. Levels within 20dB of this limit line were then recorded.

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Channel Separation FCC 15.247(1)

The EUT and spectrum analyser was configured as for conducted antenna port measurements, And as per FCC Public Notice DA 00-705, Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems.

To determine the bandwidth and separation of each transmission channel the analyser was configured to measure two adjacent channels.

To determine the occupied bandwidth, A resolution bandwidth of 10 kHz was used, which is greater than 1% of the 20 dB bandwidth. A video bandwidth of a least the same value was used. The analyser was set for a maximum hold scan to capture the profile of the signal. The peak level was then determined, and a reference line was drawn 20dB below the peak level. The bandwidth was determined at the points where the 20dB reference crossed the profile of the emission.

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Occupied Bandwidth FCC 15.247(1)

For channel separation, the analyser was configured with a resolution bandwidth and video bandwidth of at least 1% of the frequency span set on the analyser. The EUT was operated as intended and the analyser set to a maximum hold mode scan to capture the profile of the signals.

The peak points on the two adjacent channels were noted and the separation between them recorded.

The channel separation was then determined as the greater of 25kHz or the 20dB bandwidth.

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Average Time of Occupancy FCC 15.247(1)(ii)

The EUT and spectrum analyser was configured as for conducted antenna port measurements

To determine the maximum packet length on any given channel, the analyser was configured in the time domain mode and the EUT was configured to operate as intended.

To determine the average occupancy time on any given channel the analyser was configured in the time domain and a 30 second sweep carried out. The number of times the channel was occupied in any 30 second period multiplied by the maximum packet length will give the total time on the given channel.

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Number Of Hopping Frequencies FCC 15.247(a)(1)(ii)

The EUT and spectrum analyser was configured as for conducted antenna port measurements, And as per FCC Public Notice DA 00-705, Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems.

To determine the number of hopping frequencies the EUT was set to operate in its normal mode of operation, hopping over all channels that it is intended to operate on.

The spectrum analyser had a span set to cover the frequency band of operation. The resolution bandwidth was set to $\geq 1\%$ of the span. The video bandwidth was set to be no less than the resolution bandwidth. The sweep was set to auto, the detector function to peak and trace to max hold. This test was also performed with the span set to the lower half the operating frequency range and then to the upper half of the operating frequency range for better resolution.

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Peak Output Power FCC 15.247(b)

The EUT and spectrum analyser was configured as for conducted antenna port measurements, And as per FCC Public Notice DA 00-705, Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems.

The applicant to allow for conducted measurements provided a temporary antenna port.

As the frequency range of operation was greater than 10 MHz, The test was performed on the BOTTOM, MIDDLE and TOP channels as per FCC 15.31(m).

The tests were performed at extremes of voltage of +/- 15%. The test was also performed at 240 Volts + 15% at the applicants request.

The analyser was setup as per FCC Public Notice DA 00-705.

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Band Edge Compliance of RF Conducted Emissions FCC 15.247(c)

The EUT and spectrum analyser was configured as for conducted antenna port measurements, And as per FCC Public Notice DA 00-705, Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems.

A temporary antenna port was provided by the applicant to allow for conducted measurements.

To determine band-edge compliance, the analyser bandwidth resolution bandwidth was set to $\geq$ the analyser span. The video bandwidth was set to be no less than the resolution bandwidth. The sweep was set to auto and the detector to peak. The trace was set to max hold and a trace was produced.

A Plot of the upper channel and the protected band closest to the upper channel was produced. A marker was set to the peak of the highest channel and a delta marker set to the highest out of band peak. (The specification states that either the band edge level must be measured or the highest out of band emission. Which ever is greater). The plots show that the emission complies with the 20 dBc limit.

A Plot of the lower channel and the protected band closest to the lower channel was produced. A marker was set to the peak of the lowest channel and a delta marker set to the highest out of band peak. (The specification states that either the band edge level must be measured or the highest out of band emission. Which ever is greater). The plots show that the emission complies with the 20 dBc limit.

Four plots were produced, Two times top and bottom channels with hopping on and two time top and bottom channels with hopping off.

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Appendix 3. Test Configuration Drawings

This appendix contains the following drawings:

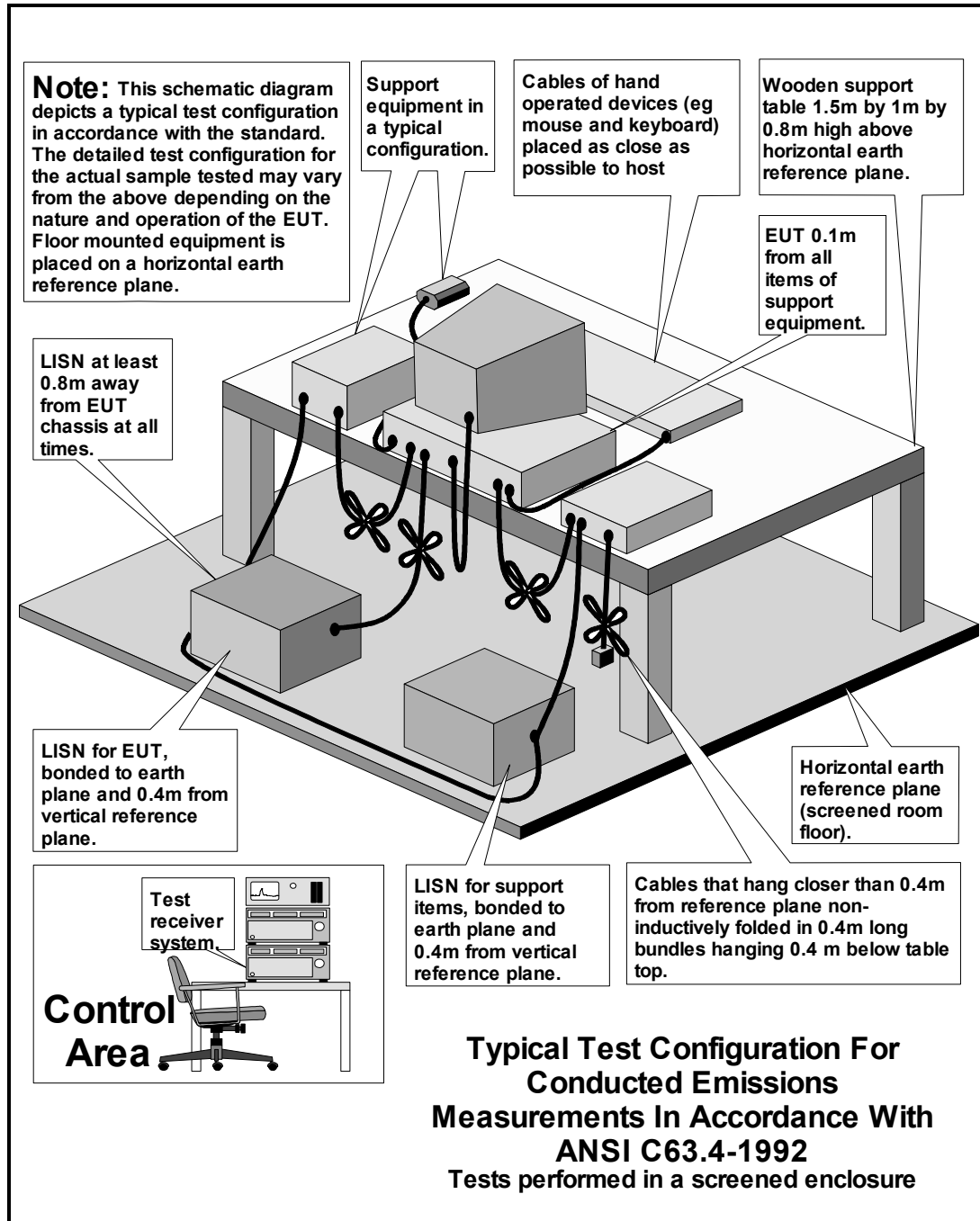
Drawing Reference Number	Title
DRG\44367JD01\EMICON	Test configuration for measurement of conducted emissions
DRG\44367JD01\EMIRAD	Test configuration for measurement of radiated emissions
DRG\44367JD01\001	Schematic diagram of the EUT, support equipment and interconnecting cables used for the test

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DRG\44367JD01\EMICON

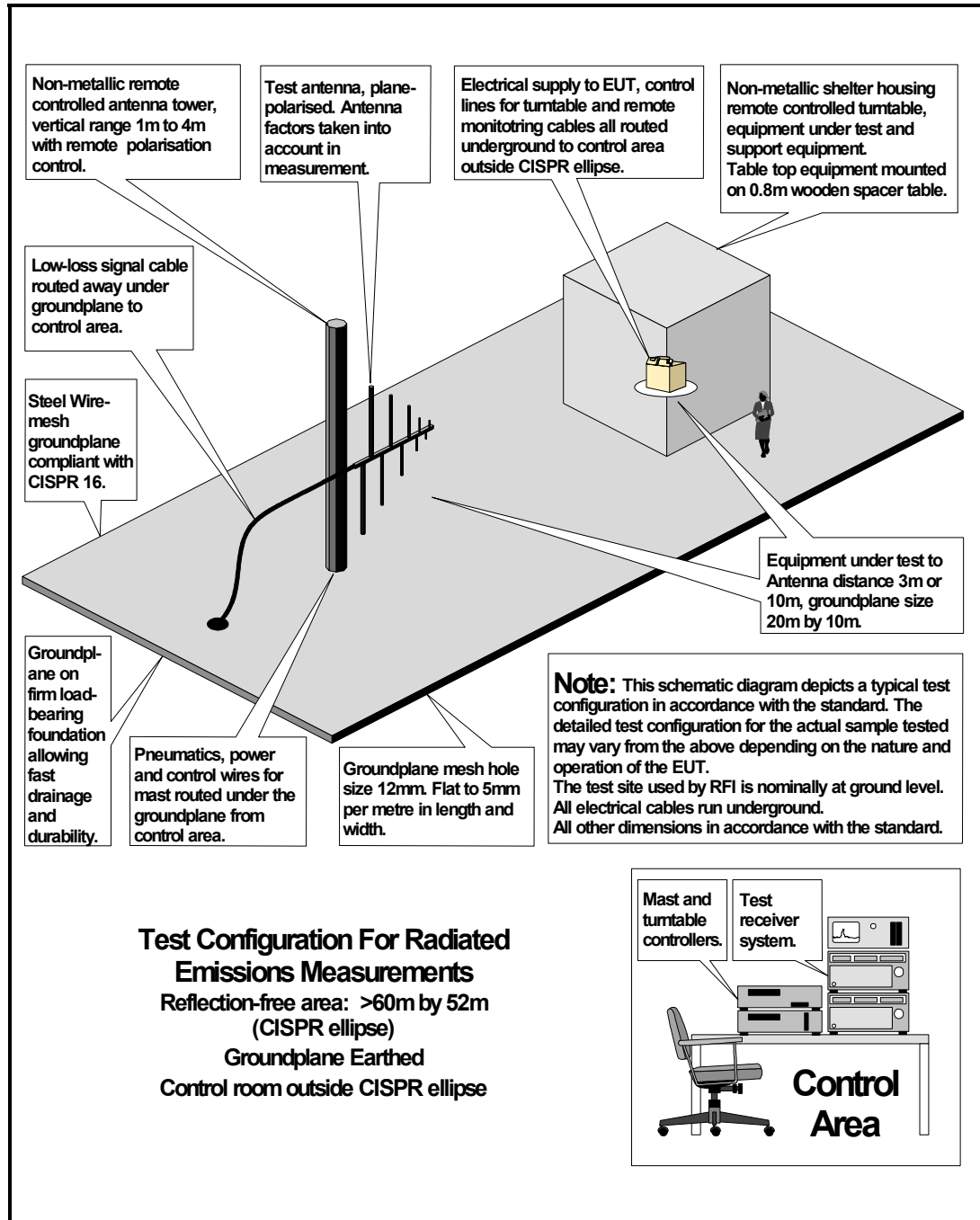


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DRG\44367JD01\EMIRAD



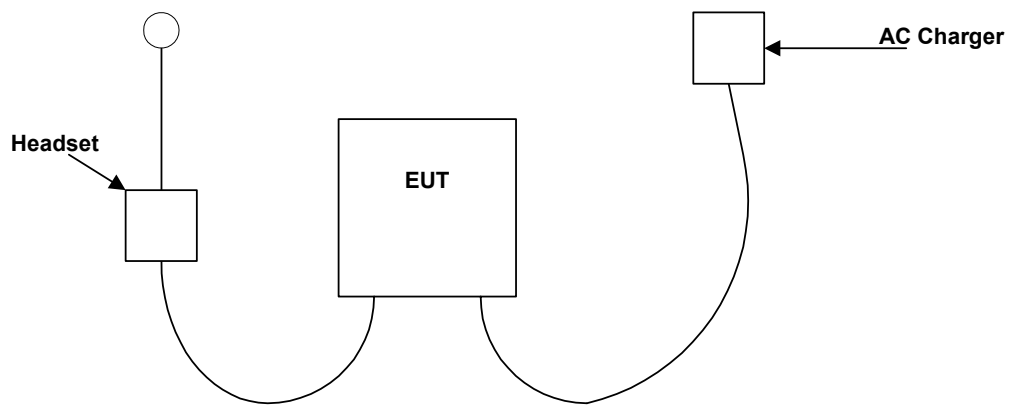
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DRG\44367JD01\001

Configuration of EUT and Local Support Equipment



Configuration of Remote Support Equipment

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Appendix 4. Graphical Test Results

This appendix contains the following graphs:

Graph Reference Number	Title
GPH\44367JD01\001	Spurious RF Conducted Emissions – Top Channel 30.0 MHz to 2.4 GHz
GPH\44367JD01\002	Spurious RF Conducted Emissions – Middle Channel 30.0 MHz to 2.4 GHz
GPH\44367JD01\003	Spurious RF Conducted Emissions – Bottom Channel 30.0 MHz to 2.4 GHz
GPH\44367JD01\004	Spurious RF Conducted Emissions – Bottom Channel 2.4835 GHz to 12.5 GHz
GPH\44367JD01\005	Spurious RF Conducted Emissions – Middle Channel 2.4835 GHz to 12.5 GHz
GPH\44367JD01\006	Spurious RF Conducted Emissions – Top Channel 2.4835 GHz to 12.5 GHz
GPH\44367JD01\007	Spurious RF Conducted Emissions – Top Channel 12.5 GHz to 26.5 GHz
GPH\44367JD01\008	Spurious RF Conducted Emissions – Middle Channel 12.5 GHz to 26.5 GHz
GPH\44367JD01\009	Spurious RF Conducted Emissions – Bottom Channel 12.5 GHz to 26.5 GHz
GPH\44367JD01\010	Spurious RF Conducted Emissions – Band Edges – Top Channel 2.48 GHz to 2.5025 GHz
GPH\44367JD01\011	Spurious RF Conducted Emissions – Band Edges – Bottom Channel 2.3 GHz to 2.41 GHz
GPH\44367JD01\015	Radiated Emissions TX Mode Channel 40 1.0 GHz to 2.0 GHz
GPH\44367JD01\016	Carrier Power measured in a 100 kHz RBW to allow definition of –20 dBc limit for Spurious Emissions 2.437 GHz to 2.447 GHz
GPH\44367JD01\017	Radiated Emissions TX Mode Middle Channel 40 2.0 GHz to 4.0 GHz
GPH\44367JD01\019	Radiated Emissions Standby Mode 2.0 GHz to 4.0 GHz
GPH\44367JD01\020	Radiated Emissions Standby Mode 1.0 GHz to 2.0 GHz
GPH\44367JD01\025	Radiated Upper Band Edge Delta 2.480591 GHz to 2.484821 GHz

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Graphical Test Results (continued)

Graph Reference Number	Title
GPH\44367JD01\026	Radiated Upper Band Edge Max Field Strength 2.478895 GHz to 2.483125 GHz
GPH\44367JD01\027	Radiated Lower Band Edge Delta 2.399674 GHz to 2.402131 GHz
GPH\44367JD01\028	Radiated Lower Band Edge Max Field Strength 2.40078 GHz to 2.403236 GHz
GPH\44367JD01\035	Standby Radiated Emissions Middle Channel (40) 4.0 GHz to 6.0 GHz
GPH\44367JD01\038	Standby Radiated Emissions Middle Channel (40) 6.0 GHz to 8.0 GHz
GPH\44367JD01\039	Standby Radiated Emissions Middle Channel (40) 8.0 GHz to 12.75 GHz
GPH\44367JD01\040	Standby Radiated Emissions Middle Channel (40) 12.75 GHz to 18.0 GHz
GPH\44367JD01\041	Standby Radiated Emissions Middle Channel (40) 18.0 GHz to 26.5 GHz
GPH\44367JD01\042	Transmitter Radiated Emissions Middle Channel (40) 4.0 GHz to 6.0 GHz
GPH\44367JD01\043	Transmitter Radiated Emissions Middle Channel (40) 6.0 GHz to 8.0 GHz
GPH\44367JD01\044	Transmitter Radiated Emissions Middle Channel (40) 8.0 GHz to 12.75 GHz
GPH\44367JD01\045	Transmitter Radiated Emissions Middle Channel (40) 12.75 GHz to 18.0 GHz
GPH\44367JD01\046	Transmitter Radiated Emissions Middle Channel (40) 18.0 GHz to 26.5 GHz
GPH\44367JD01\A001	Carrier Frequency Separation Operating Conditions Hopping Mode
GPH\44367JD01\A002	Frequency Hopping Operating Conditions. Hopping Mode
GPH\44367JD01\A003	Occupancy Dwell Time Operating Condition Hopping Mode
GPH\44367JD01\A004	Transmissions in 30 Sec Operating Conditions Hopping Mode
GPH\44367JD01\A005	20 dB Bandwidth FL Delta Operating Conditions Hopping Mode

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Graphical Test Results (continued)

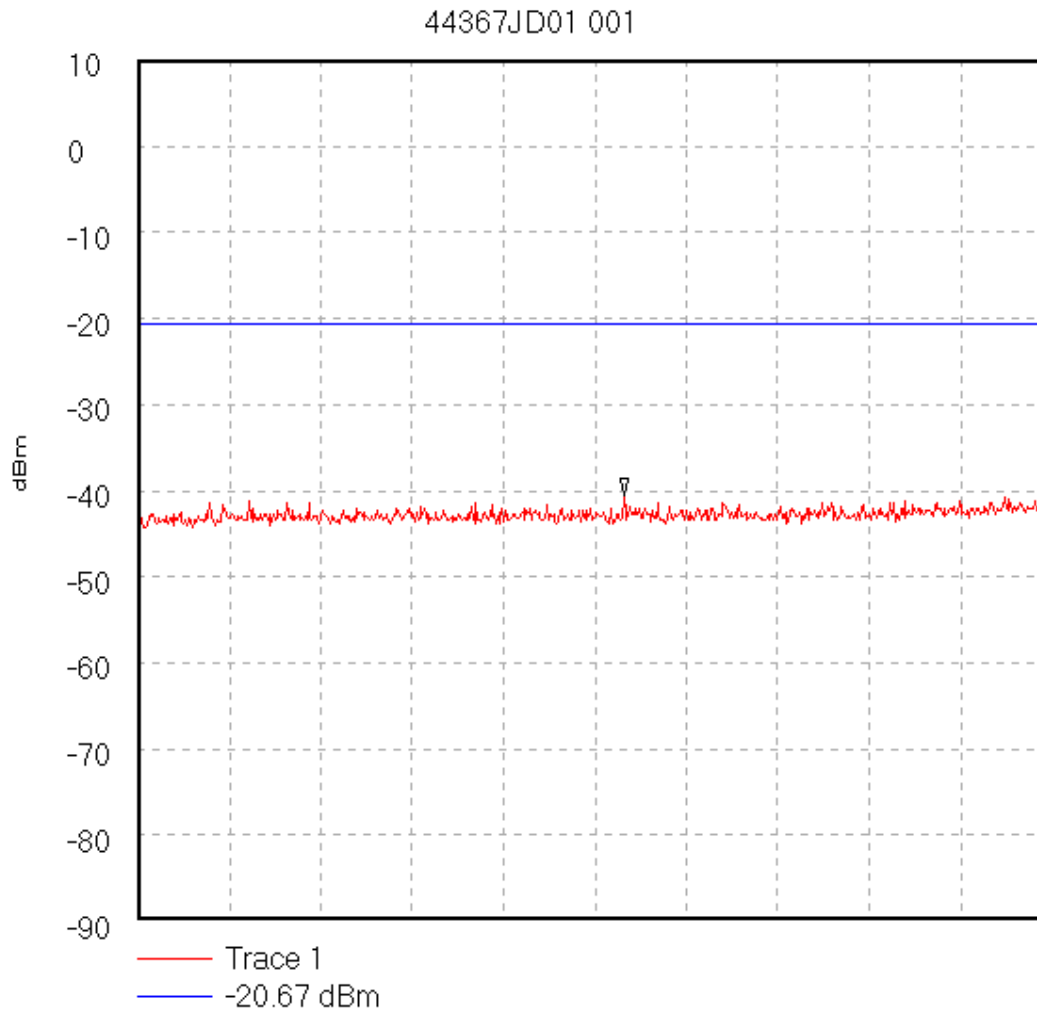
Graph Reference Number	Title
GPH\44367JD01\A006	20 dB Bandwidth FH Delta Operating Conditions Hopping Mode
GPH\44367JD01\A007	Peak Output Power Bottom Channel – 110 V
GPH\44367JD01\A008	Peak Output Power Bottom Channel – 93.5 V
GPH\44367JD01\A009	Peak Output Power Bottom Channel – 126.5 V
GPH\44367JD01\A010	Peak Output Power Middle Channel –126.5 V
GPH\44367JD01\A011	Peak Output Power Middle Channel – 110 V
GPH\44367JD01\A012	Peak Output Power Middle Channel – 93.5 V
GPH\44367JD01\A013	Peak Output Power Top Channel – 93.5 V
GPH\44367JD01\A014	Peak Output Power Top Channel – 110 V
GPH\44367JD01\A015	Peak Output Power Top Channel – 126.5 V

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GPH\44367JD01\001
Spurious RF Conducted Emissions Top Channel.
30.0 MHz to 2.4 GHz



Start 30.0 MHz; Stop 2.4 GHz

Ref 10 dBm; Ref Offset 36.0 dB; 10 dB/div

RBW 100.0 kHz; VBW 100.0 kHz; Att 10 dB; Swp 600.0 mS

Peak 1.29005 GHz, -40.67 dBm

Display Line: -20.67 dBm;

03/01/80 20:24:32

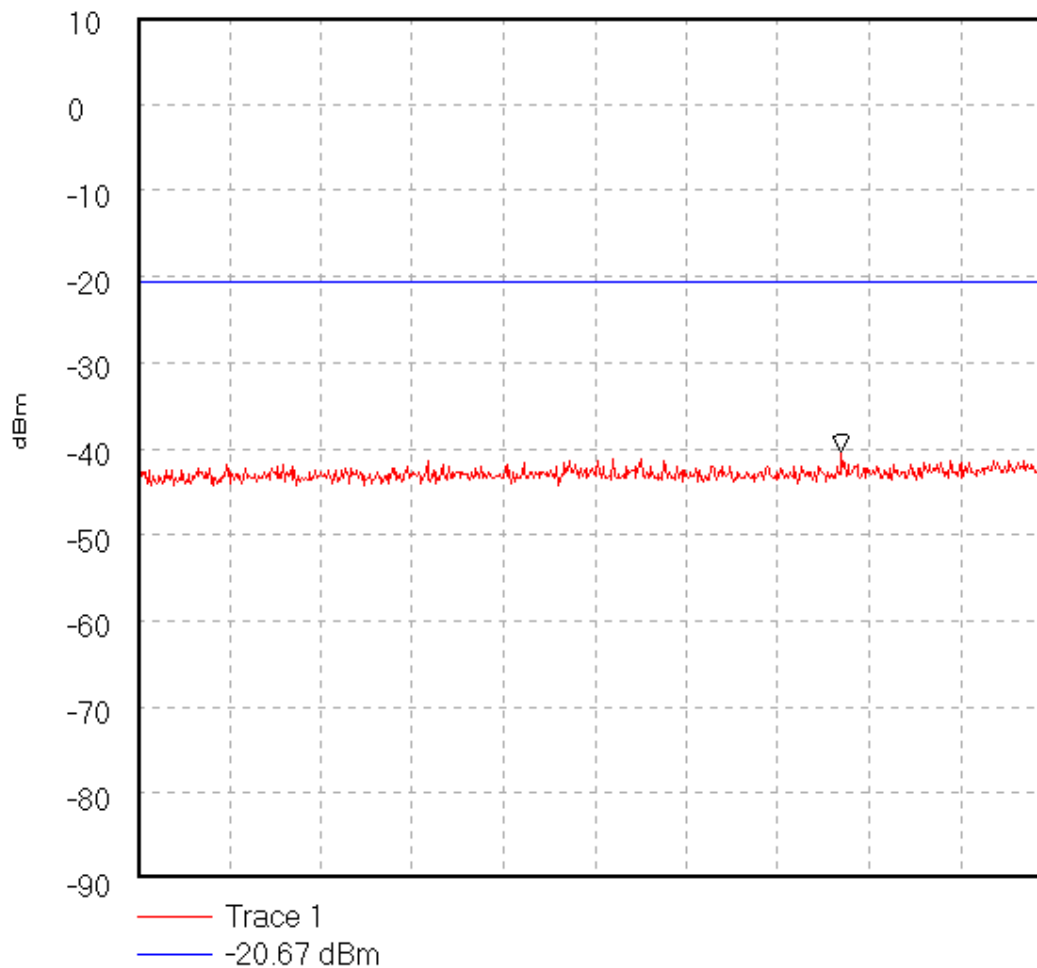
Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH\44367JD01\002Spurious RF Conducted Emissions Middle Channel.30.0 MHz to 2.4 GHz

44367JD01 002



Start 30.0 MHz; Stop 2.4 GHz

Ref 10 dBm; Ref Offset 36.0 dB; 10 dB/div

RBW 100.0 kHz; VBW 100.0 kHz; Att 10 dB; Swp 600.0 mS

Peak 1.8549 GHz, -40.33 dBm

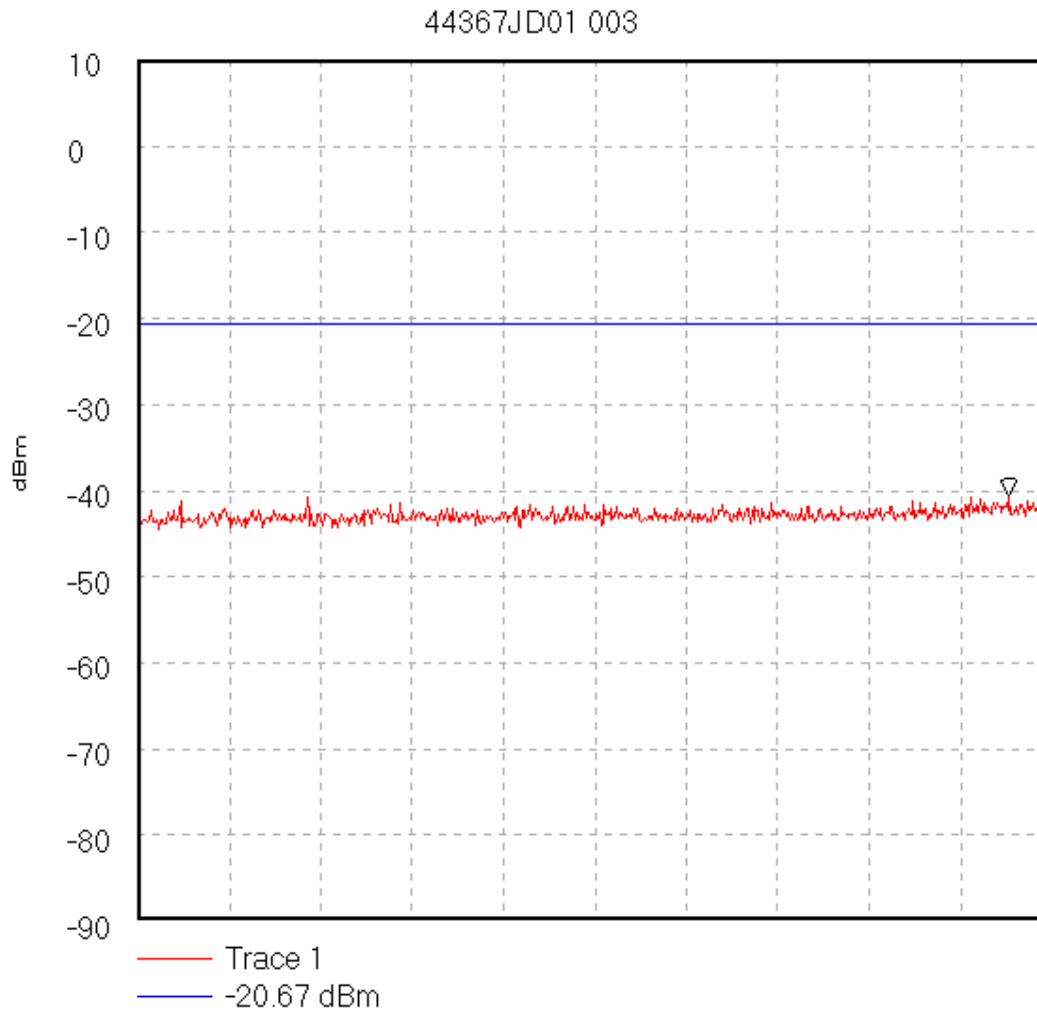
Display Line: -20.67 dBm;

03/01/80 20:28:50

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH\44367JD01\003Spurious RF Conducted Emissions Bottom Channel.30.0 MHz to 2.4 GHz

Start 30.0 MHz; Stop 2.4 GHz

Ref 10 dBm; Ref Offset 36.0 dB; 10 dB/div

RBW 100.0 kHz; VBW 100.0 kHz; Att 10 dB; Swp 600.0 mS

Marker 2.2894 GHz, -40.5 dBm

Display Line: -20.67 dBm;

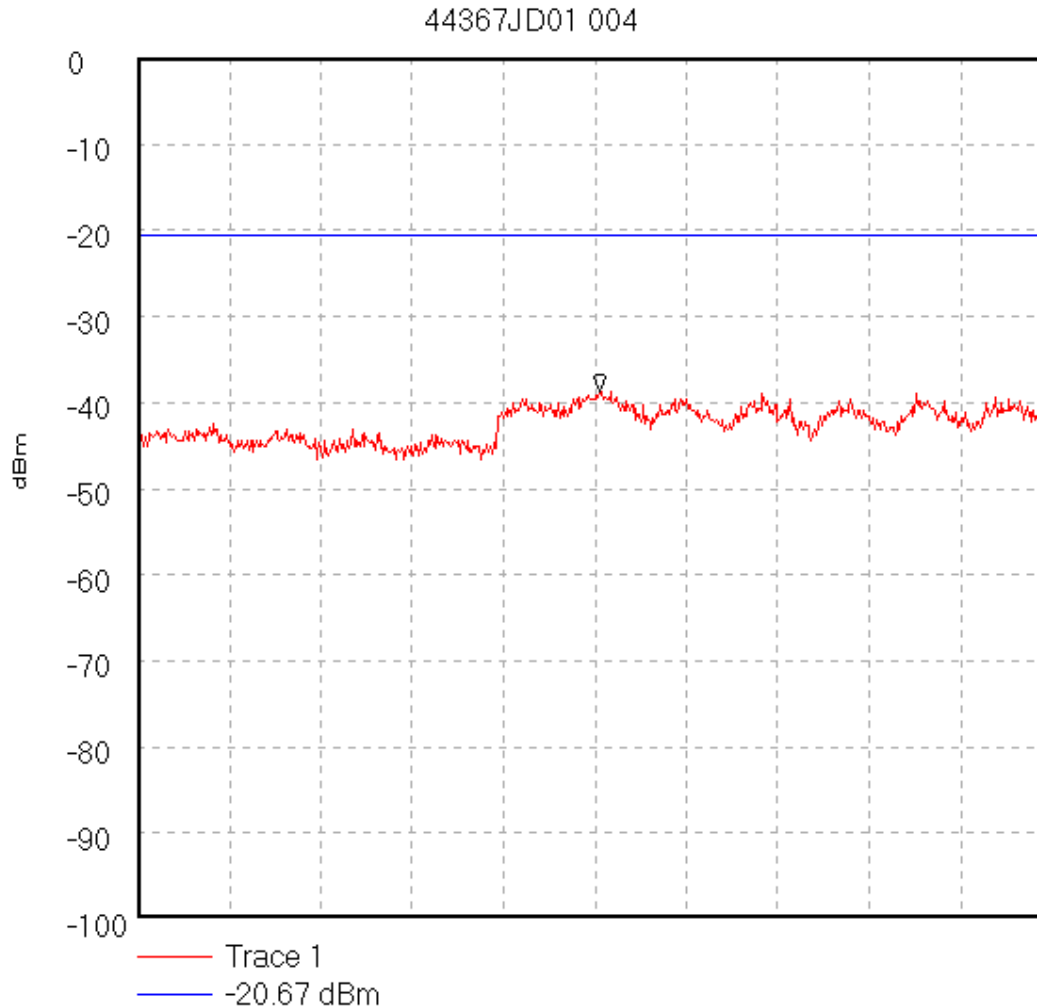
03/01/80 20:31:09

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH\44367JD01\004
Spurious RF Conducted Emissions Bottom Channel.
2.4835 GHz to 12.5 GHz



Start 2.4835 GHz; Stop 12.5 GHz

Ref 0 dBm; Ref Offset 36.0 dB; 10 dB/div

RBW 100.0 kHz; VBW 100.0 kHz; Att 10 dB; Swp 2.6 S

Peak 7.541833 GHz, -38.67 dBm

Display Line: -20.67 dBm;

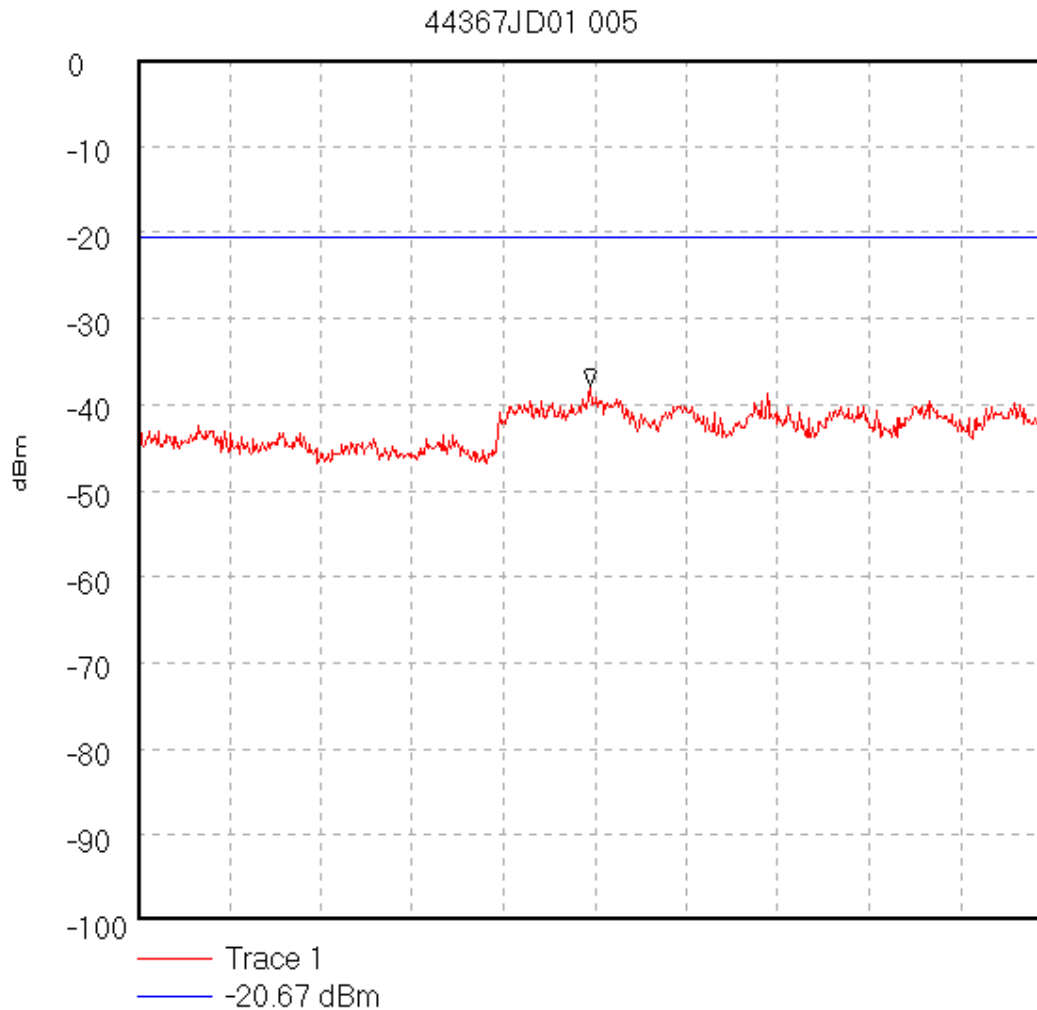
03/01/80 20:33:03

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH\44367JD01\005
Spurious RF Conducted Emissions Middle Channel.
2.4835 GHz to 12.5 GHz



Start 2.4835 GHz; Stop 12.5 GHz

Ref 0 dBm; Ref Offset 36.0 dB; 10 dB/div

RBW 100.0 kHz; VBW 100.0 kHz; Att 10 dB; Swp 2.6 S

Peak 7.441668 GHz, -37.83 dBm

Display Line: -20.67 dBm;

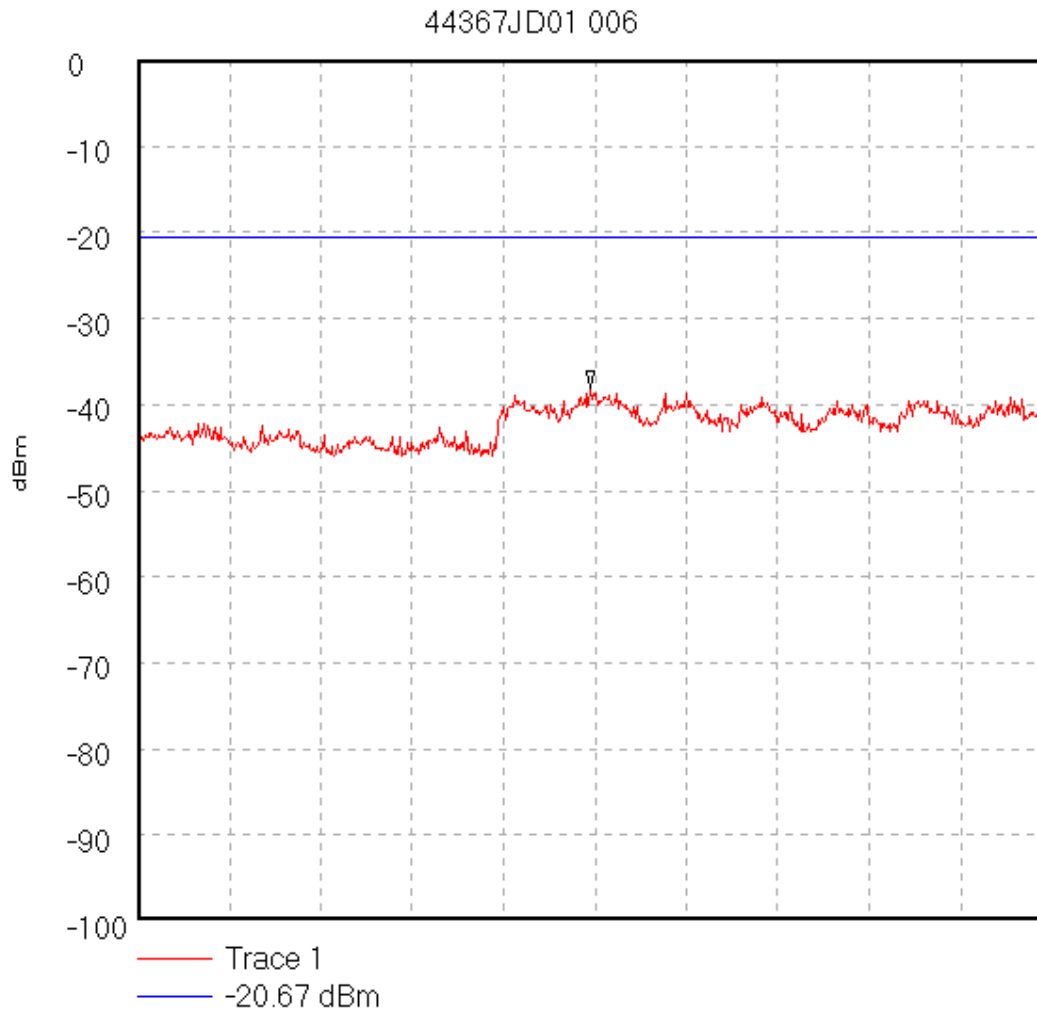
03/01/80 20:34:08

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH\44367JD01\006
Spurious RF Conducted Emissions Top Channel.
2.4835 GHz to 12.5 GHz



Start 2.4835 GHz; Stop 12.5 GHz

Ref 0 dBm; Ref Offset 36.0 dB; 10 dB/div

RBW 100.0 kHz; VBW 100.0 kHz; Att 10 dB; Swp 2.6 S

Peak 7.441668 GHz, -38.17 dBm

Display Line: -20.67 dBm;

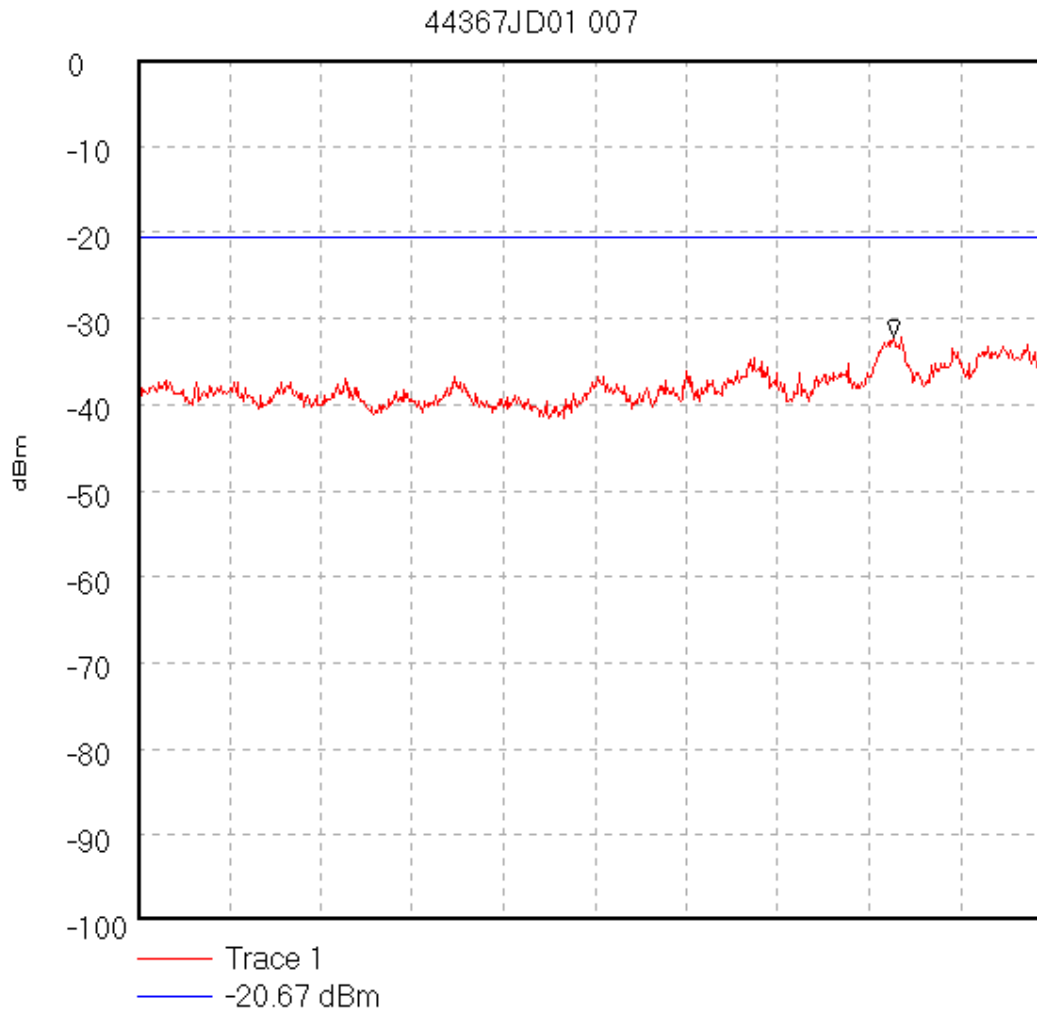
03/01/80 20:35:37

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH\44367JD01\007
Spurious RF Conducted Emissions Top Channel.
12.5 GHz to 26.5 GHz



Start 12.5 GHz; Stop 26.5 GHz

Ref 0 dBm; Ref Offset 36.0 dB; 10 dB/div

RBW 100.0 kHz; VBW 100.0 kHz; Att 10 dB; Swp 3.5 S

Peak 24.073333 GHz, -32.17 dBm

Display Line: -20.67 dBm;

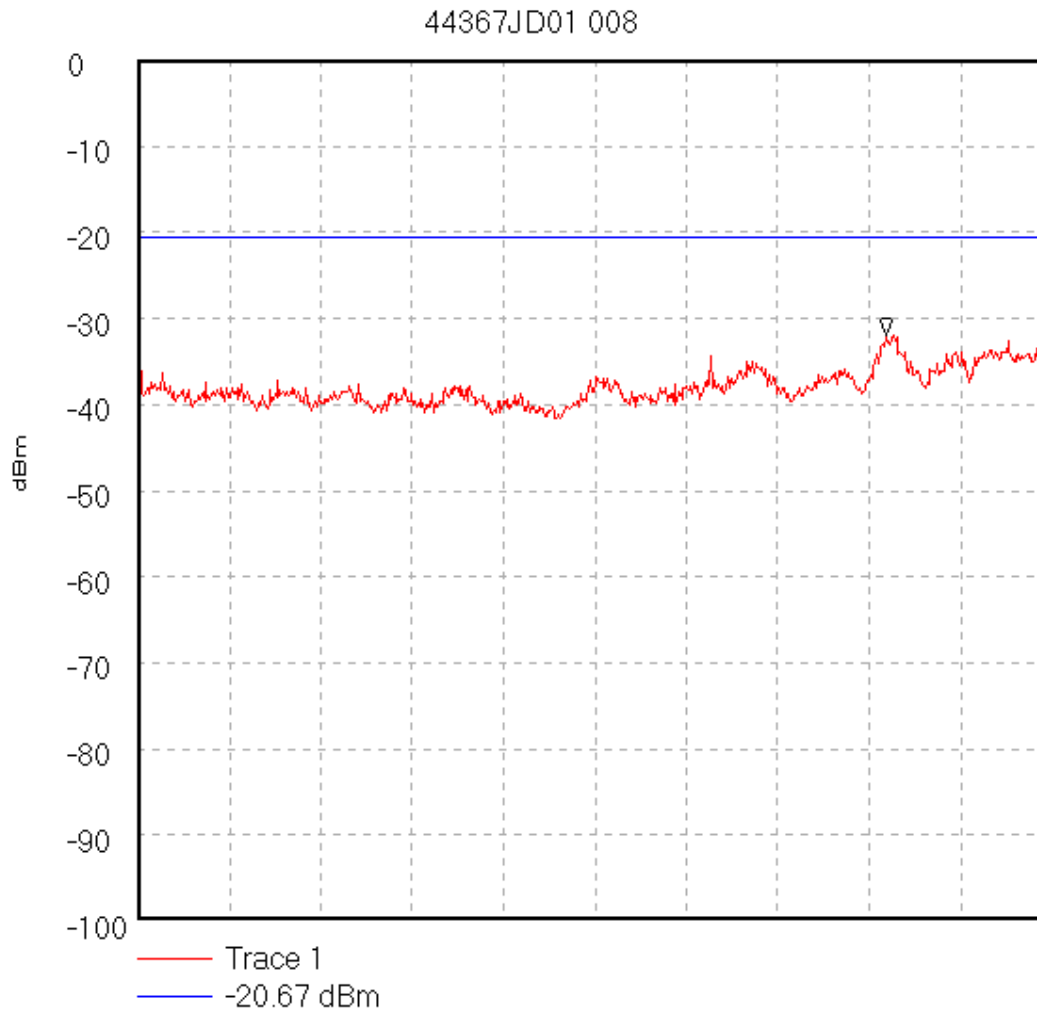
03/01/80 20:36:40

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH\44367JD01\008
Spurious RF Conducted Emissions Middle Channel.
12.5 GHz to 26.5 GHz



Start 12.5 GHz; Stop 26.5 GHz

Ref 0 dBm; Ref Offset 36.0 dB; 10 dB/div

RBW 100.0 kHz; VBW 100.0 kHz; Att 10 dB; Swp 3.5 S

Peak 23.956667 GHz, -32.0 dBm

Display Line: -20.67 dBm;

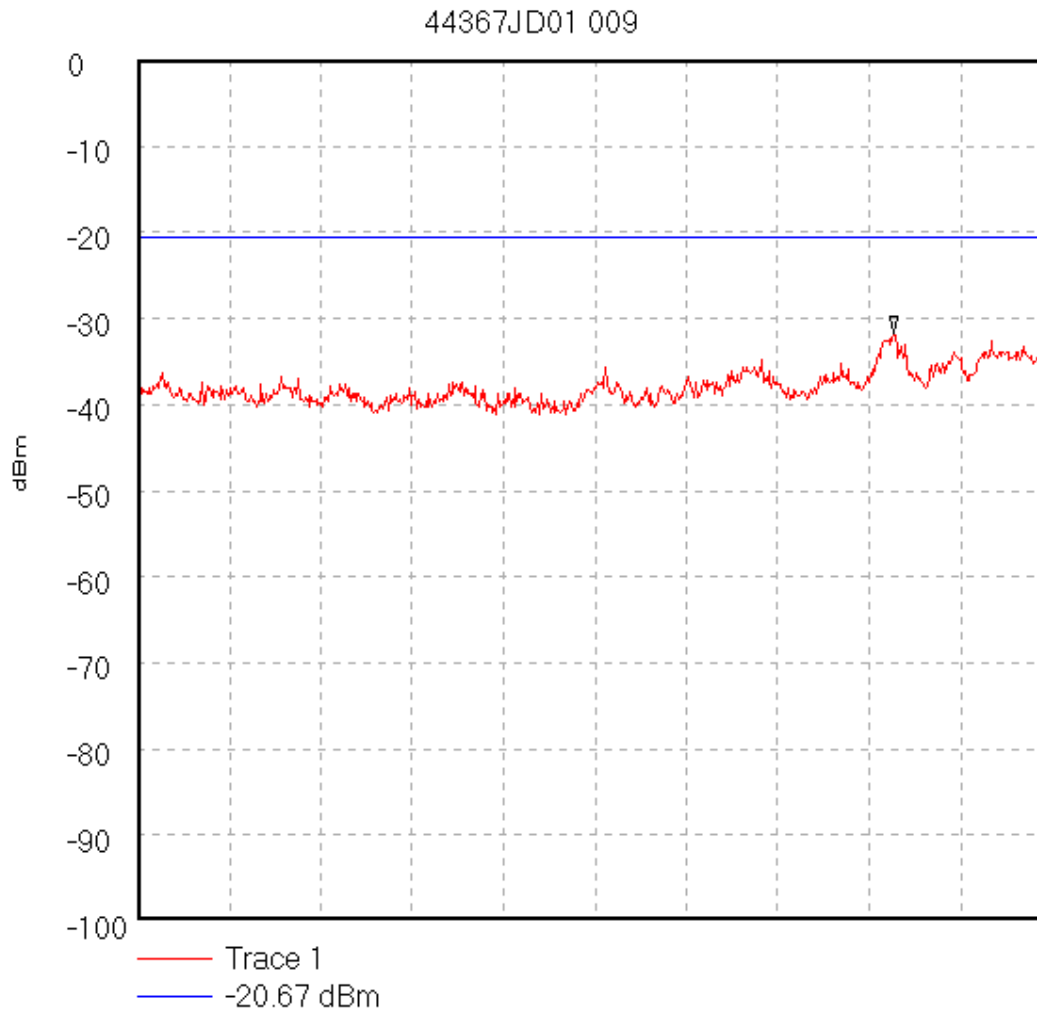
03/01/80 20:37:13

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH\44367JD01\009
Spurious RF Conducted Emissions Bottom Channel.
12.5 GHz to 26.5 GHz



Start 12.5 GHz; Stop 26.5 GHz

Ref 0 dBm; Ref Offset 36.0 dB; 10 dB/div

RBW 100.0 kHz; VBW 100.0 kHz; Att 10 dB; Swp 3.5 S

Peak 24.073333 GHz, -31.83 dBm

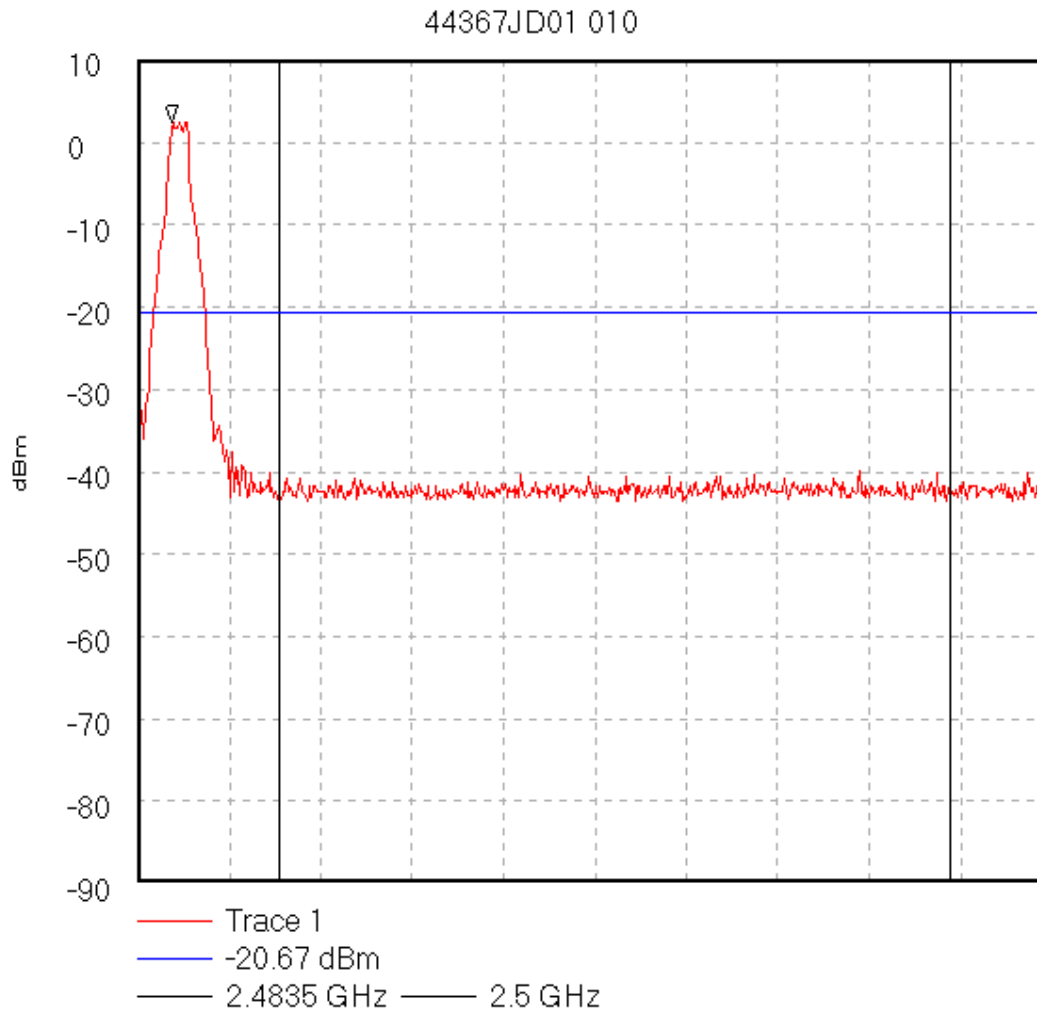
Display Line: -20.67 dBm;

03/01/80 20:37:58

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH\44367JD01\010Spurious RF Conducted Emissions F1 and F2 = Band Edges. Top Channel.2.48 GHz to 2.5025 GHz

Start 2.48 GHz; Stop 2.5025 GHz

Ref 10 dBm; Ref Offset 36.0 dB; 10 dB/div

RBW 100.0 kHz; VBW 100.0 kHz; Att 10 dB; Swp 50.0 mS

Peak 2.480863 GHz, 2.5 dBm

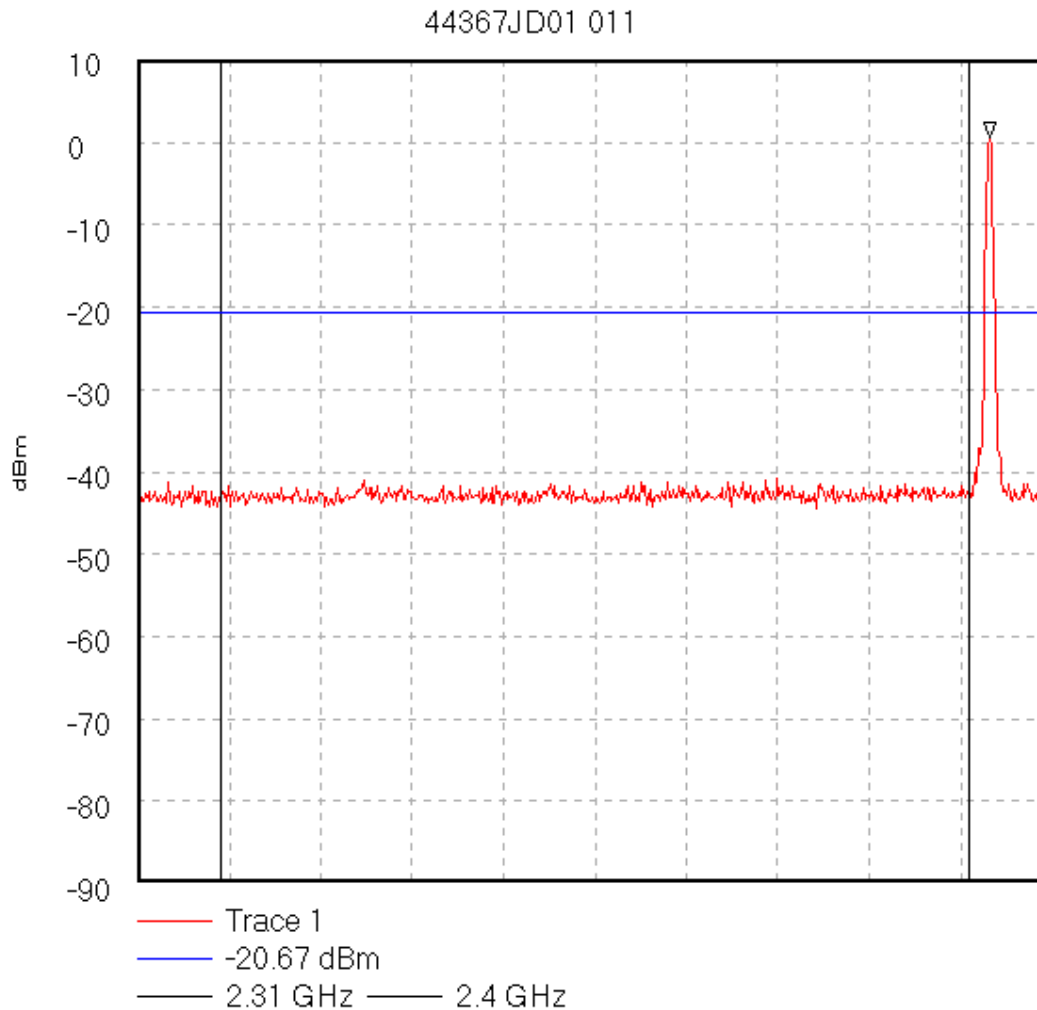
Display Line: -20.67 dBm;

03/01/80 20:44:12

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH44367JD01\011Spurious RF Conducted Emissions F1 and F2 = Band Edges. Bottom Channel.2.3 GHz to 2.41 GHz

Start 2.3 GHz; Stop 2.41 GHz

Ref 10 dBm; Ref Offset 36.0 dB; 10 dB/div

RBW 100.0 kHz; VBW 100.0 kHz; Att 10 dB; Swp 50.0 mS

Peak 2.402483 GHz, 0.5 dBm

Display Line: -20.67 dBm;

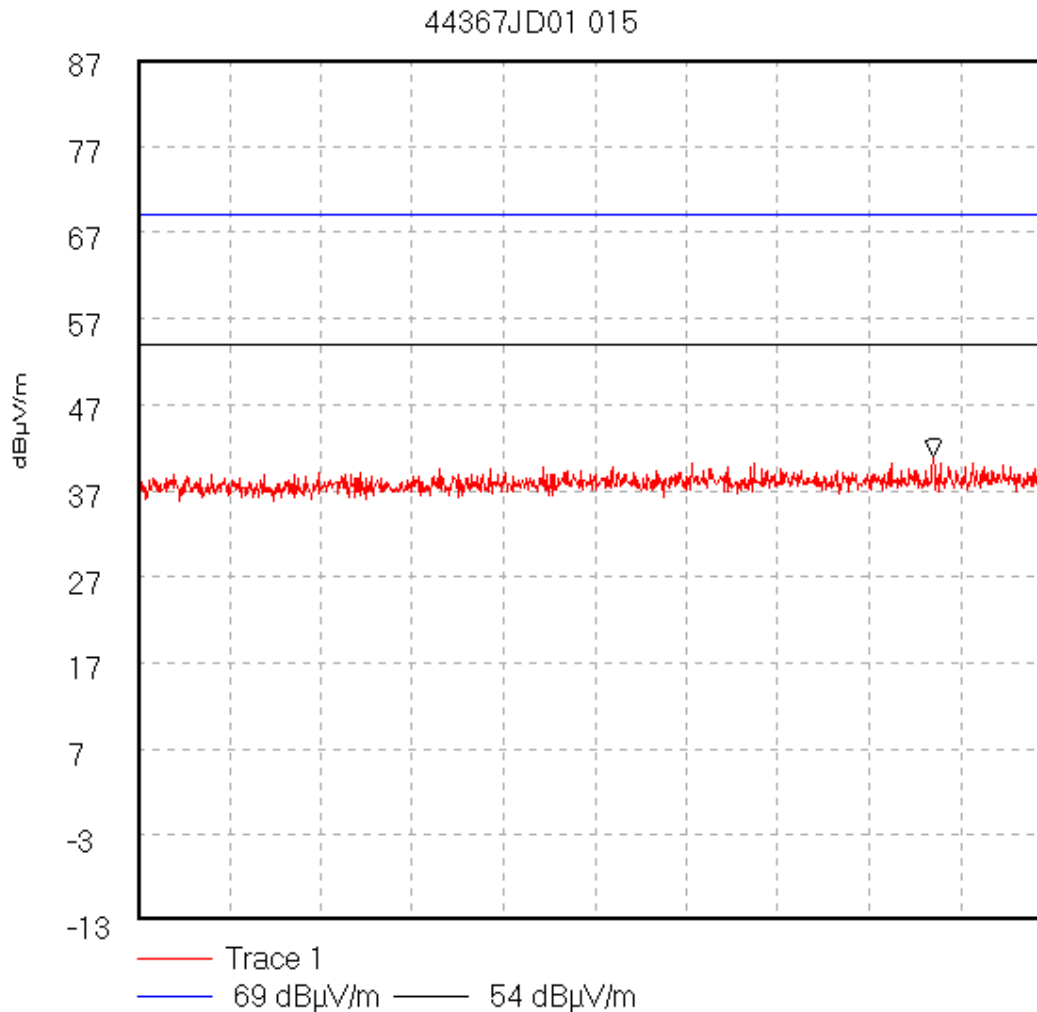
03/01/80 20:47:39

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH44367JD01\015
Radiated Emissions Tx Mode Channel 40
1.0 GHz to 2.0 GHz



Start 1.0 GHz; Stop 2.0 GHz

Ref 87 dB μ V/m; Ref Offset 0.0 dB; 10 dB/div

RBW 100.0 kHz; VBW 100.0 kHz; Att 0 dB; Swp 300.0 mS

Peak 1.871 GHz, 40.97 dB μ V/mDisplay Line: 69 dB μ V/m; 54 dB μ V/m;

04/01/80 17:50:38

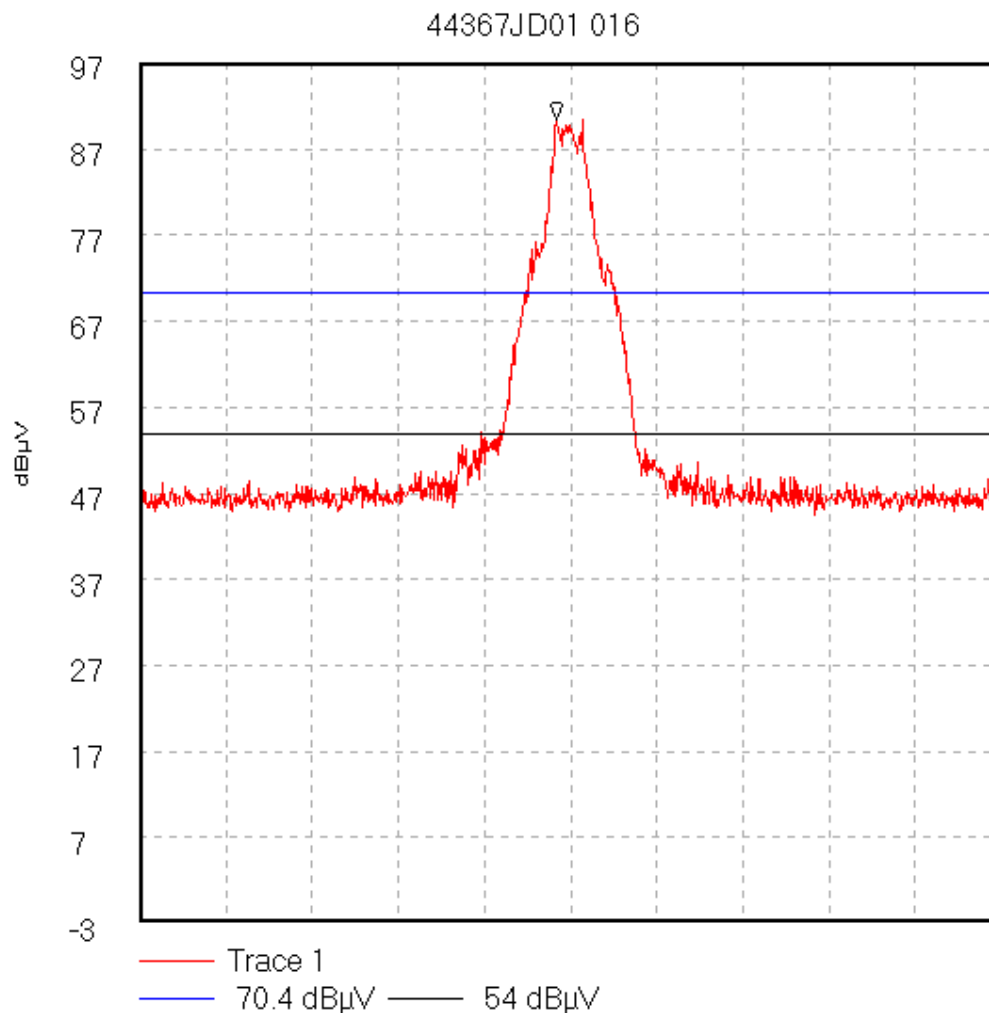
Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH44367JD01\016

Carrier Power measured in a 100 kHz RBW to allow definition of -20 dBc limit for Spurious Emissions as per Part 15.247(C) (excluding restricted bands where 15.209 (A) limits apply)



Start 2.437 GHz; Stop 2.447 GHz

Ref 97 dBμV; Ref Offset 0.0 dB; 10 dB/div

RBW 68.965517 kHz; VBW 100.0 kHz; Att 0 dB; Swp 20.0 mS

Peak 2.441833 GHz, 90.38 dBμV

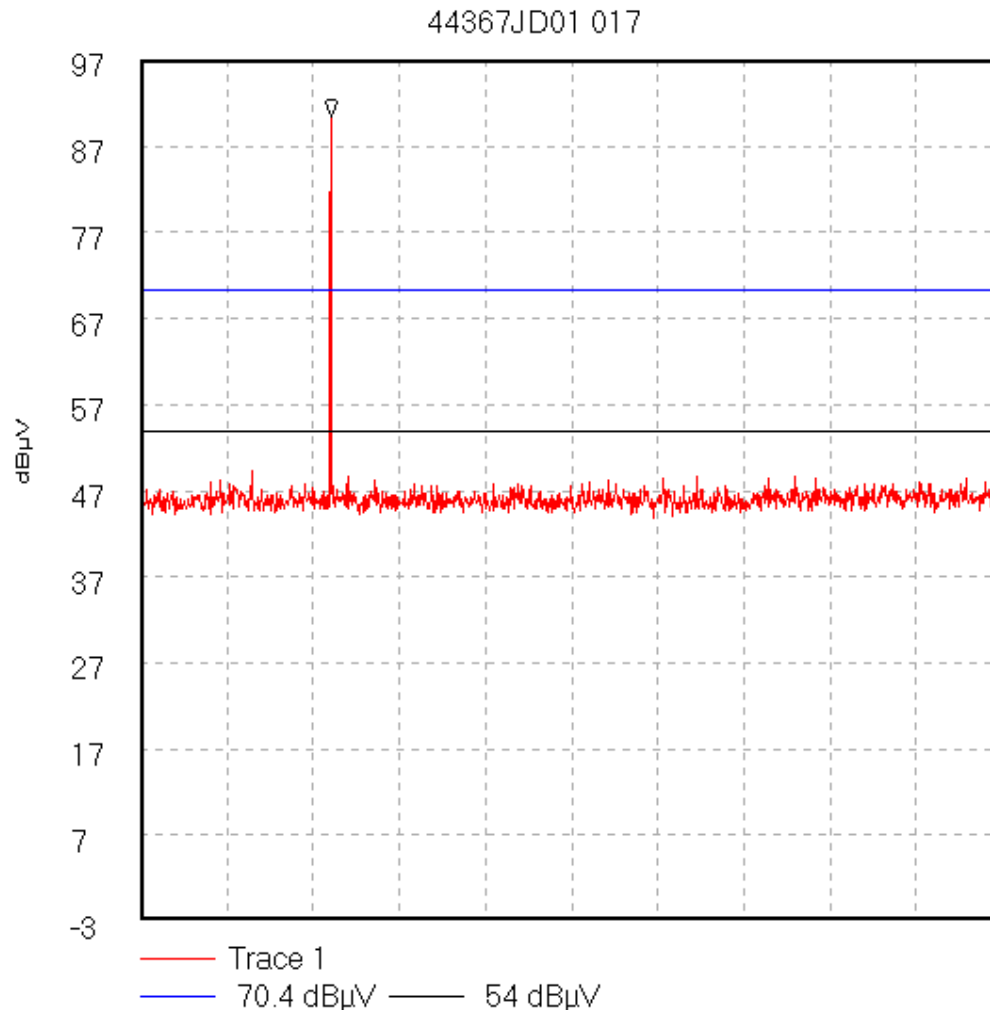
Display Line: 70.4 dBμV; 54 dBμV; ; Limit Test Failed

04/01/80 21:17:21

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH\44367JD01\017Radiated Emissions Tx Mode Middle Channel 402.0 GHz to 4.0 GHz

Start 2.0 GHz; Stop 4.0 GHz

Ref 97 dBμV; Ref Offset 0.0 dB; 10 dB/div

RBW 68.965517 kHz; VBW 100.0 kHz; Att 0 dB; Swp 600.0 mS

Peak 2.442222 GHz, 90.38 dBμV

Display Line: 70.4 dBμV; 54 dBμV; ; Limit Test Failed

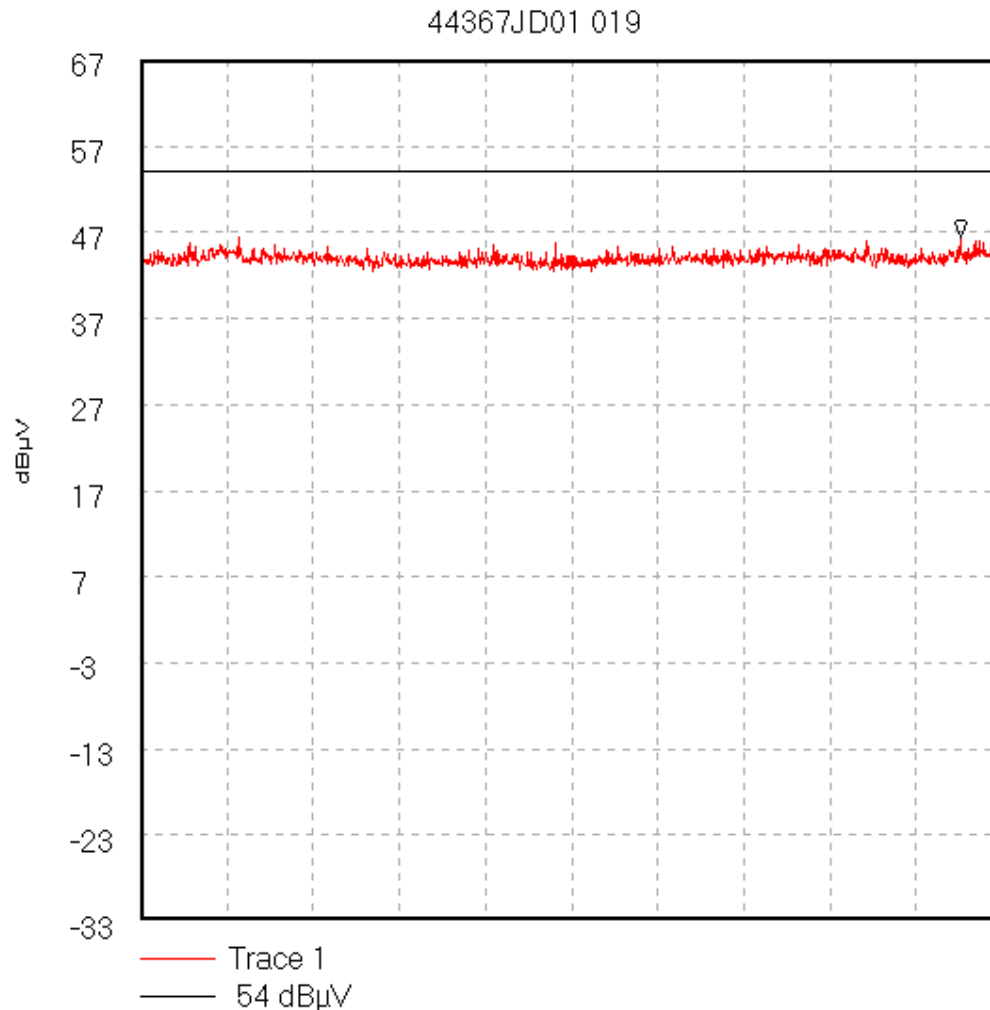
04/01/80 21:45:54

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH\44367JD01\019
Radiated Emissions Standby Mode
2.0 GHz to 4.0 GHz



Start 2.0 GHz; Stop 4.0 GHz

Ref 67 dBμV; Ref Offset 0.0 dB; 10 dB/div

RBW 689.655172 kHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS

Peak 3.904444 GHz, 46.49 dBμV

Display Line: 54 dBμV; ; Limit Test Passed

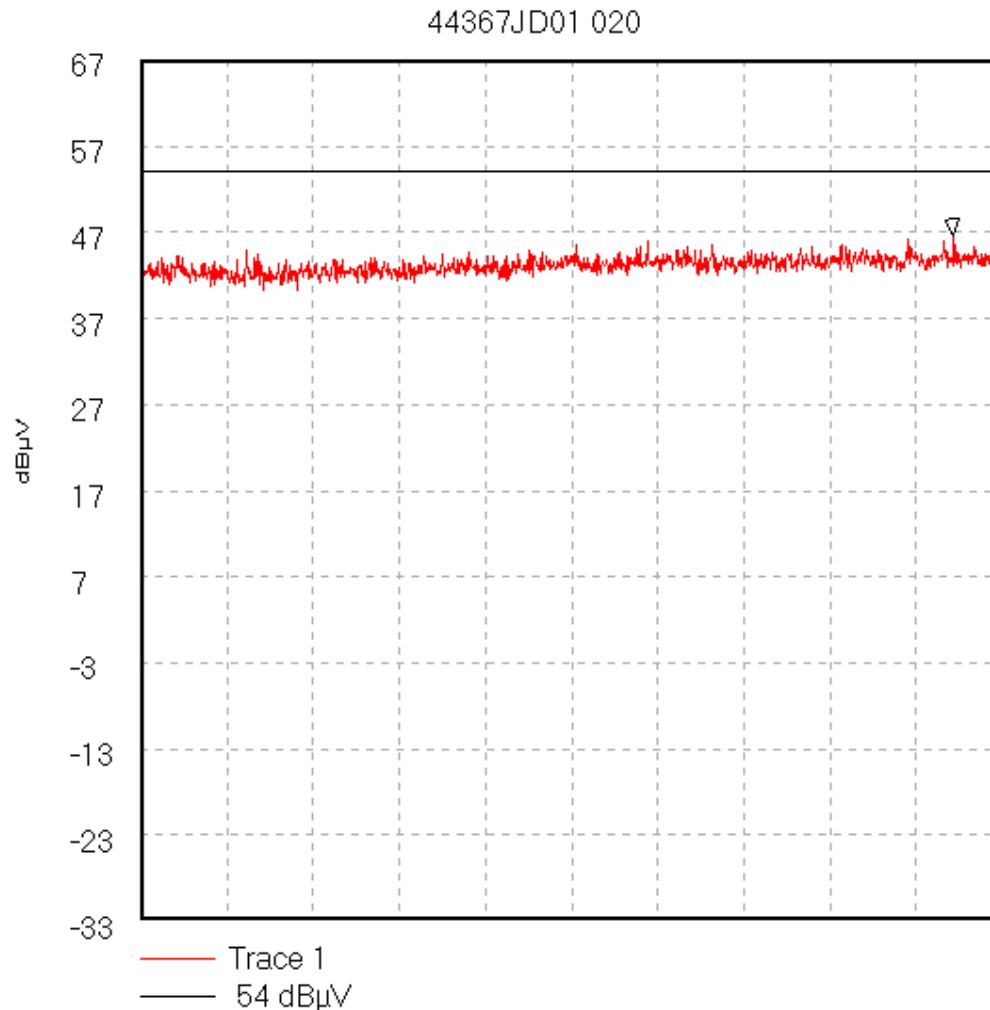
04/01/80 21:58:41

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH\44367JD01\020
Radiated Emissions Standby Mode
1.0 GHz to 2.0 GHz



Start 1.0 GHz; Stop 2.0 GHz

Ref 67 dBμV; Ref Offset 0.0 dB; 10 dB/div

RBW 689.655172 kHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS

Peak 1.944444 GHz, 46.54 dBμV

Display Line: 54 dBμV; ; Limit Test Passed

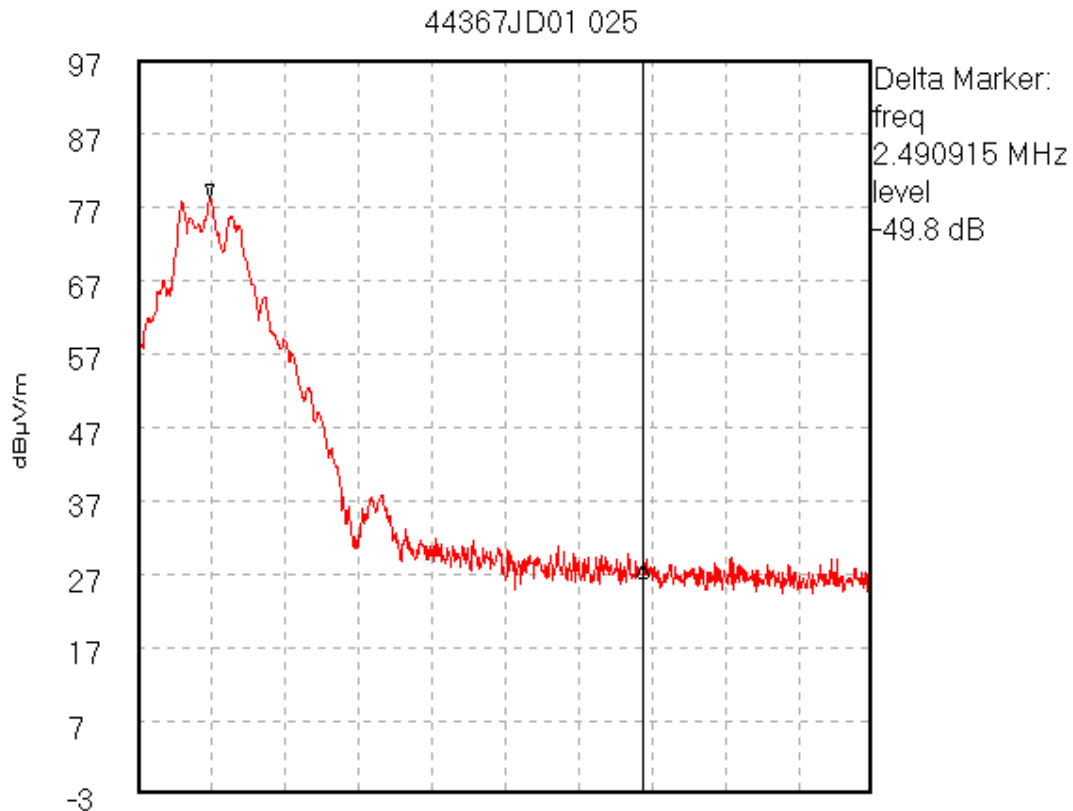
04/01/80 22:00:49

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH\44367JD01\025
Radiated Upper Band Edge Delta
2.480591 GHz to 2.484821 GHz



Trace 1
2.4835 GHz

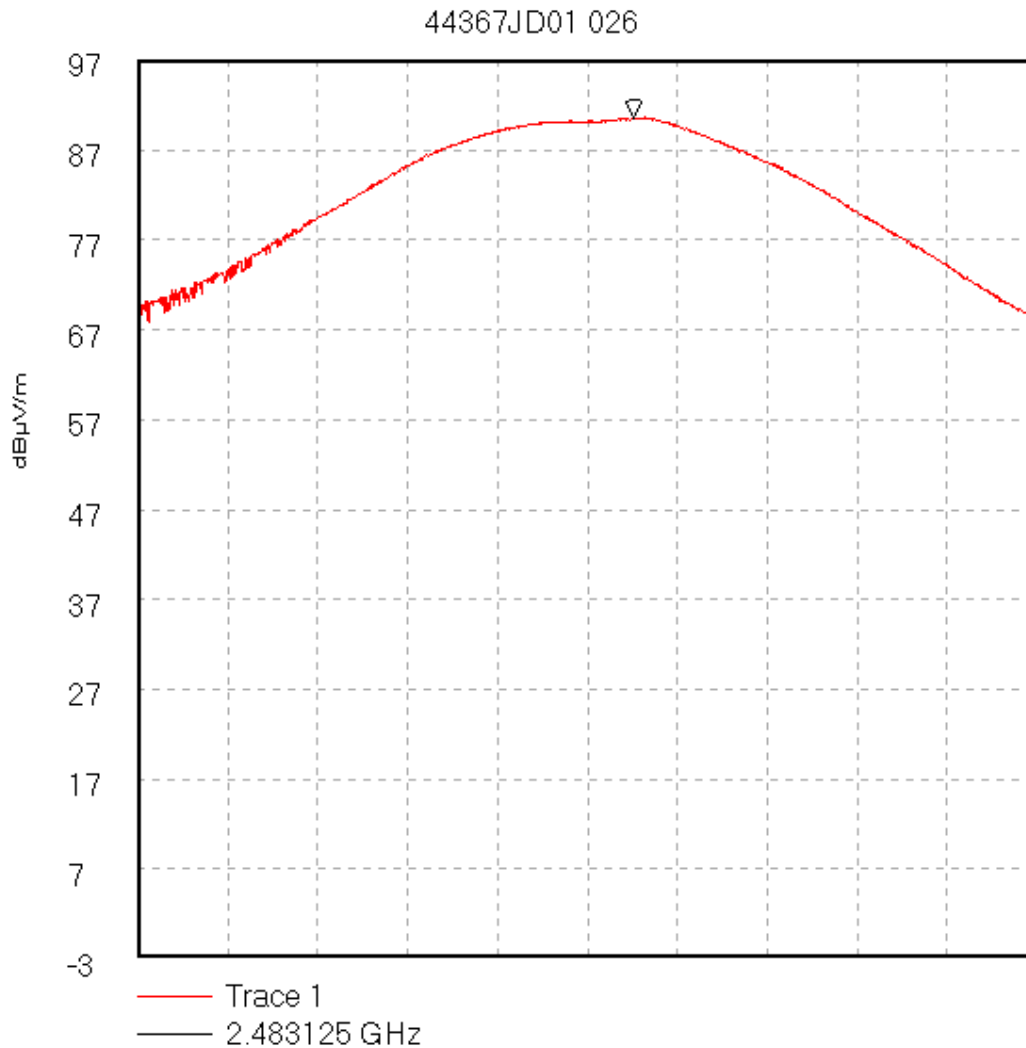
Start 2.480591 GHz; Stop 2.484821 GHz
Ref 97 dBμV/m; Ref Offset 0.0 dB; 10 dB/div
RBW 30.0 kHz; VBW 300.0 kHz; Att 20 dB; Swp 20.0 mS
Marker 2.481005 GHz, 78.19 dBμV/m
Delta 2.483496 GHz, 28.39 dBμV/m
04/01/80 23:09:15

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH\44367JD01\026
Radiated Upper Band Edge Max Field Strength
2.478895 GHz to 2.483125 GHz



Start 2.478895 GHz; Stop 2.483125 GHz

Ref 97 dBμV/m; Ref Offset 0.0 dB; 10 dB/div

RBW 1.0 MHz; VBW 1.0 MHz; Att 20 dB; Swp 20.0 mS

Marker 2.481231 GHz, 90.5 dBμV/m

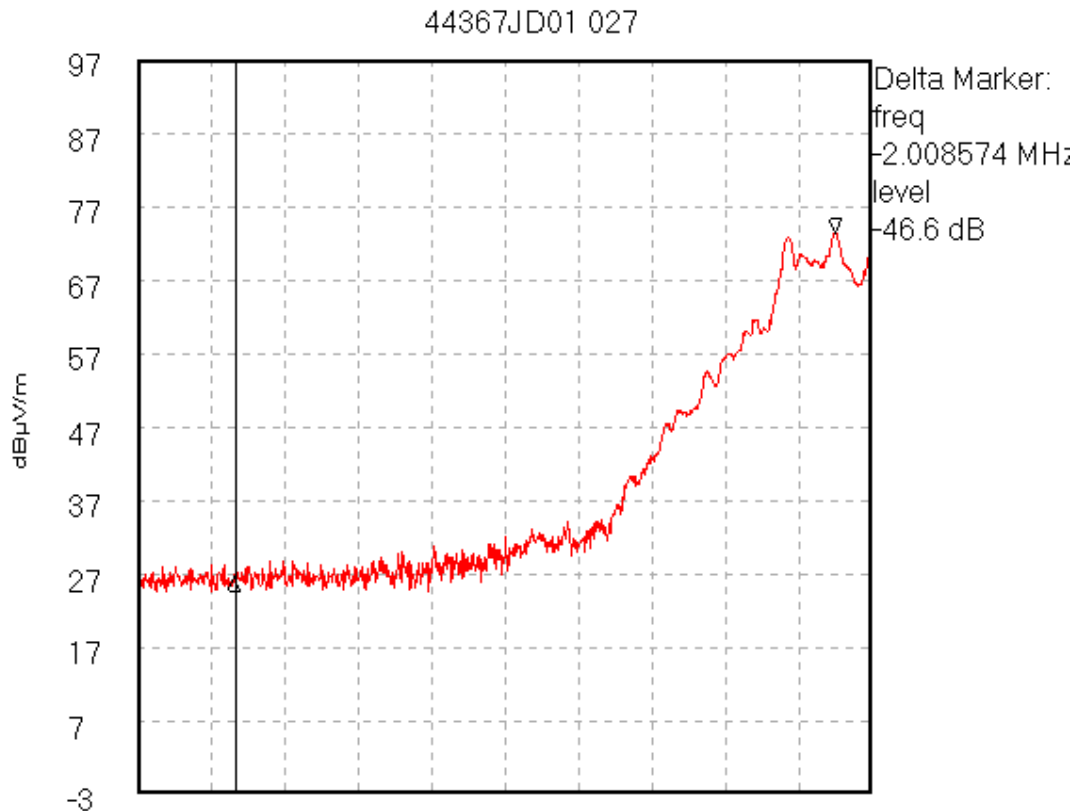
04/01/80 23:12:16

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH44367JD01\027
Radiated Lower Band Edge Delta
2.399674 GHz to 2.402131 GHz



— Trace 1
— 2.4 GHz

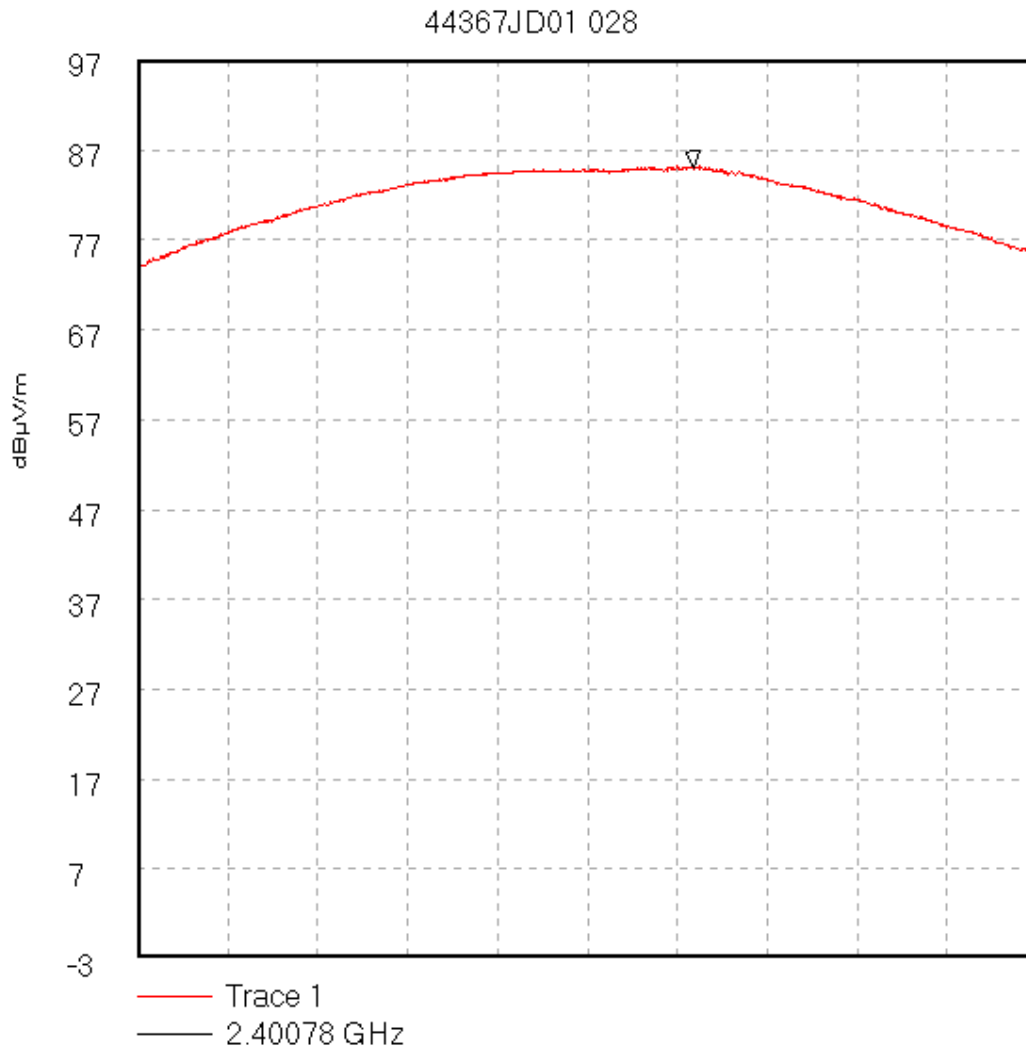
Start 2.399674 GHz; Stop 2.402131 GHz
Ref 97 dBµV/m; Ref Offset 0.0 dB; 10 dB/div
RBW 30.0 kHz; VBW 300.0 kHz; Att 20 dB; Swp 20.0 mS
Marker 2.402008 GHz, 73.39 dBµV/m
Delta 2.399999 GHz, 26.79 dBµV/m
04/01/80 23:27:36

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH\44367JD01\028
Radiated Lower Band Edge Max Field Strength
2.40078 GHz to 2.403236 GHz



Start 2.40078 GHz; Stop 2.403236 GHz

Ref 97 dBµV/m; Ref Offset 0.0 dB; 10 dB/div

RBW 1.0 MHz; VBW 1.0 MHz; Att 20 dB; Swp 20.0 mS

Peak 2.4023 GHz, 85.04 dBµV/m

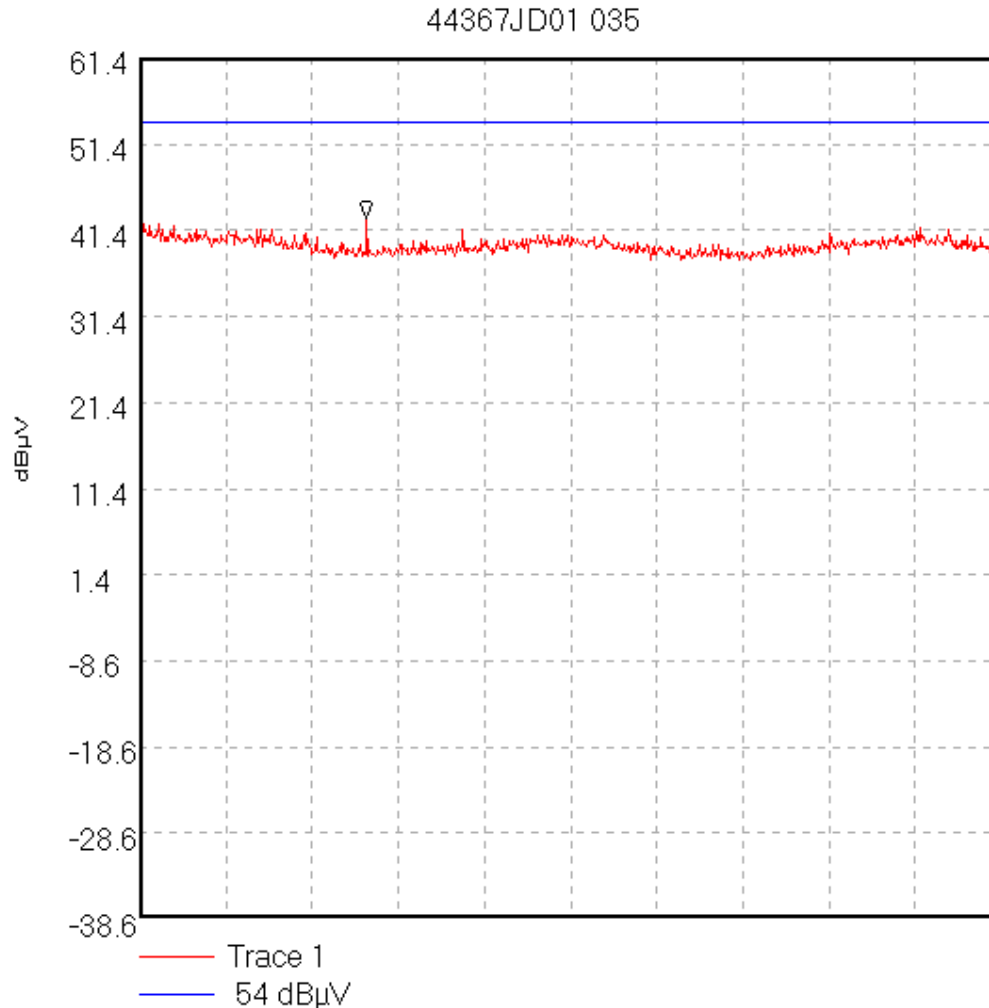
04/01/80 23:31:11

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH44367JD01\035
Standby Radiated Emissions Middle Channel (40).
4.0 GHz to 6.0 GHz.



Start 4.0 GHz; Stop 6.0 GHz

Ref 61.4 dBµV; Ref Offset 14.0 dB; 10 dB/div

RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 50.0 mS

Peak 4.526667 GHz, 42.73 dBµV

Display Line: 54 dBµV;

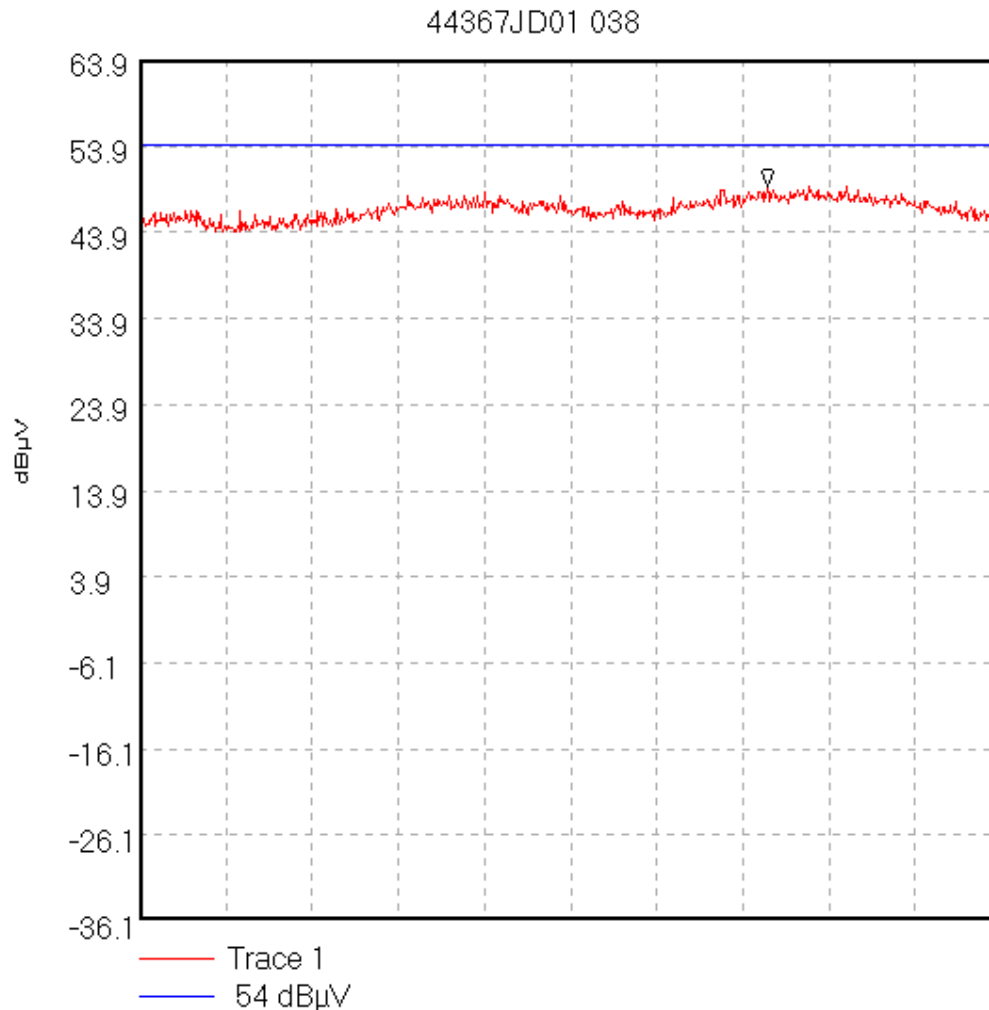
05/01/80 00:10:04

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH\44367JD01\038
Standby Radiated Emissions Middle Channel (40).
6.0 GHz to 8.0 GHz.



Start 6.0 GHz; Stop 8.0 GHz

Ref 63.9 dBµV; Ref Offset 17.0 dB; 10 dB/div

RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 50.0 mS

Peak 7.456667 GHz, 49.23 dBµV

Display Line: 54 dBµV;

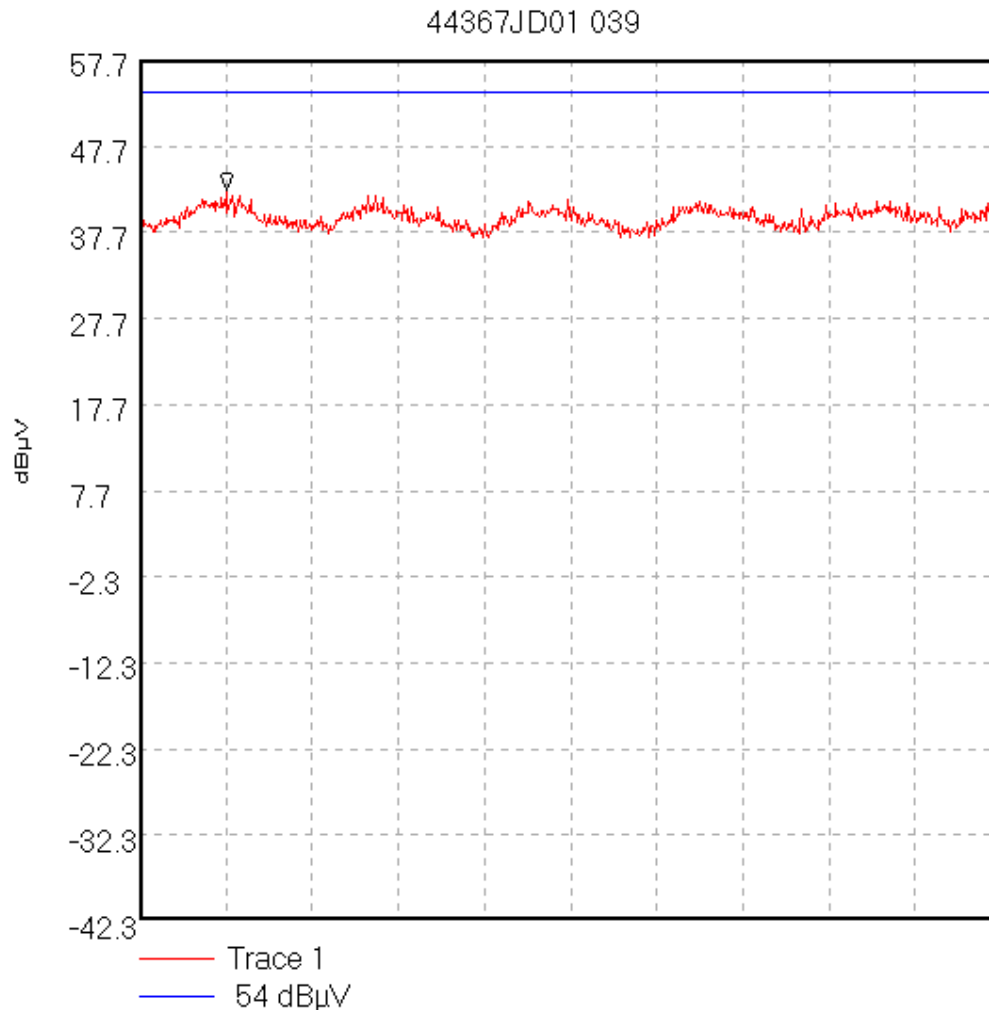
05/01/80 00:20:53

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH\44367JD01\039
Standby Radiated Emissions Middle Channel (40)
8.0 GHz to 12.75 GHz.



Start 8.0 GHz; Stop 12.75 GHz

Ref 57.7 dBµV; Ref Offset 11.0 dB; 10 dB/div

RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 95.0 mS

Peak 8.475 GHz, 42.53 dBµV

Display Line: 54 dBµV;

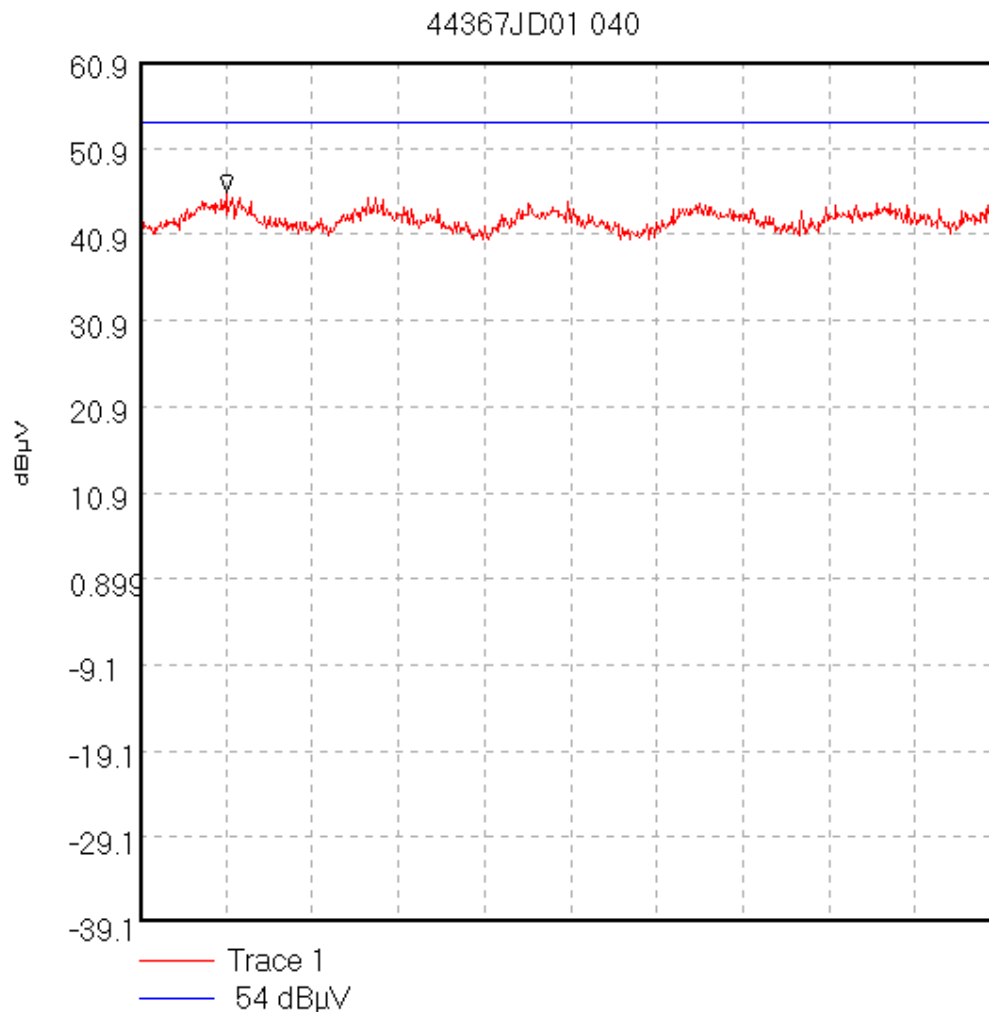
05/01/80 00:22:53

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH\44367JD01\040
Standby Radiated Emissions Middle Channel (40).
12.75 GHz to 18.0 GHz.



Start 12.75 GHz; Stop 18.0 GHz

Ref 60.9 dBµV; Ref Offset 14.0 dB; 10 dB/div

RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 110.0 mS

Peak 13.275 GHz, 45.73 dBµV

Display Line: 54 dBµV;

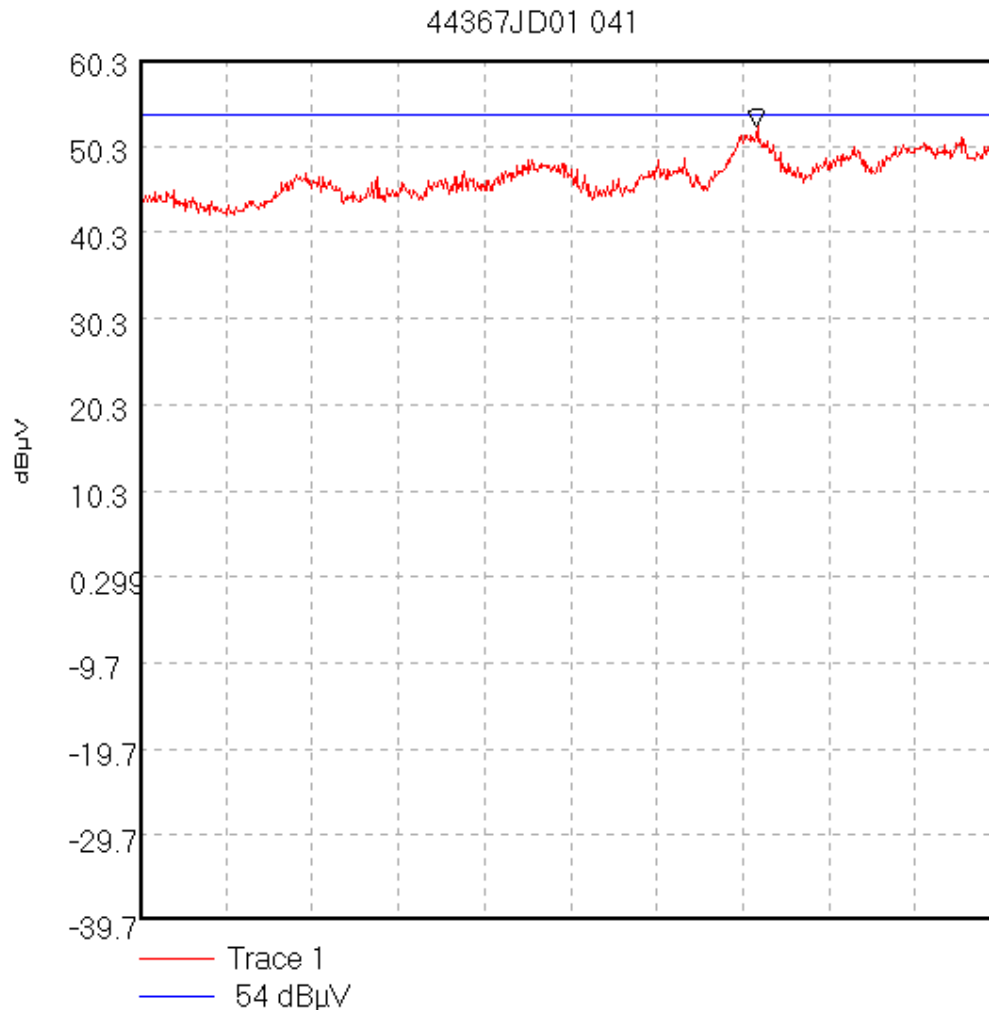
05/01/80 00:24:11

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH\44367JD01\041
Standby Radiated Emissions Middle Channel (40).
18.0 GHz to 26.5 GHz.



Start 18.0 GHz; Stop 26.5 GHz

Ref 60.3 dBµV; Ref Offset 13.0 dB; 10 dB/div

RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 170.0 mS

Peak 24.091667 GHz, 52.63 dBµV

Display Line: 54 dBµV;

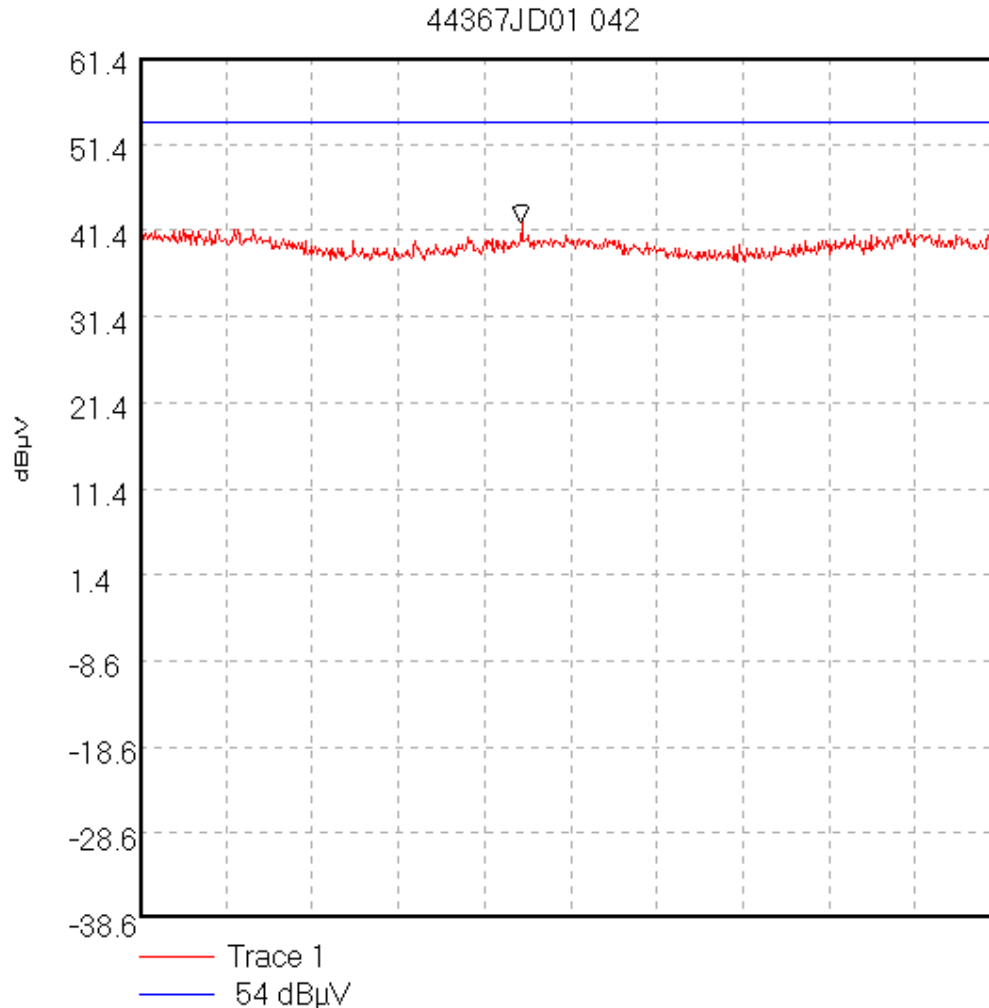
05/01/80 00:26:38

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH\44367JD01\042
Transmitter Radiated Emissions. Middle Channel (40).
4.0 GHz to 6.0 GHz.



Start 4.0 GHz; Stop 6.0 GHz

Ref 61.4 dBµV; Ref Offset 14.0 dB; 10 dB/div

RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 50.0 mS

Peak 4.886667 GHz, 42.4 dBµV

Display Line: 54 dBµV;

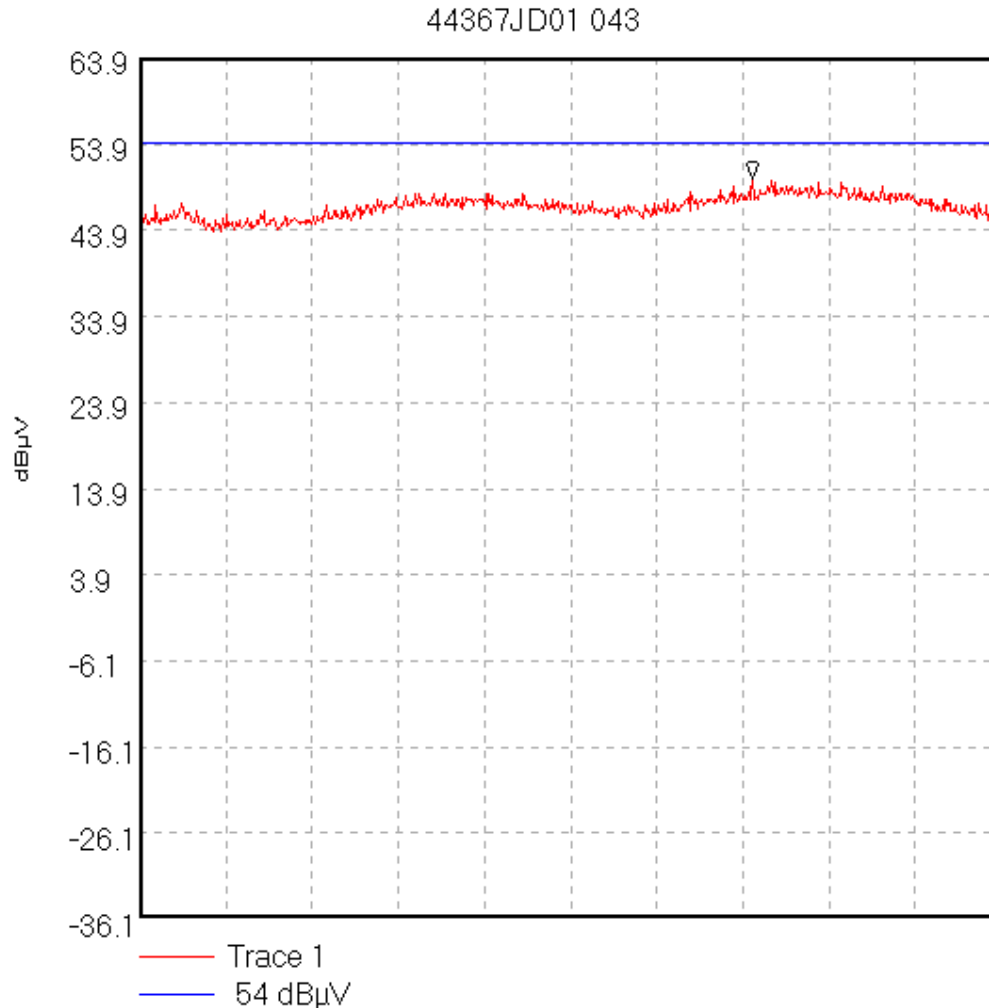
05/01/80 00:28:59

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH\44367JD01\043
Transmitter Radiated Emissions. Middle Channel (40).
6.0 GHz to 8.0 GHz.



Start 6.0 GHz; Stop 8.0 GHz

Ref 63.9 dBµV; Ref Offset 17.0 dB; 10 dB/div

RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 50.0 mS

Peak 7.423333 GHz, 49.9 dBµV

Display Line: 54 dBµV;

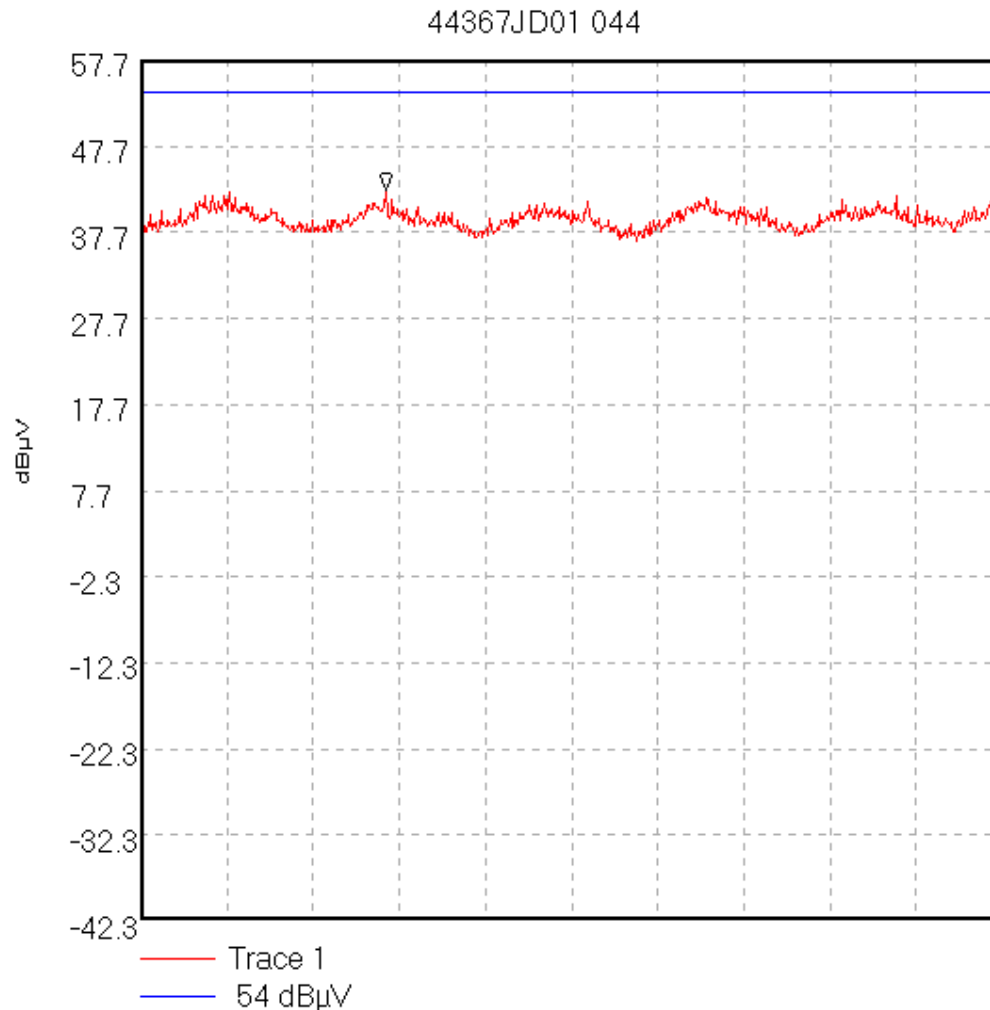
05/01/80 00:31:20

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH\44367JD01\044
Transmitter Radiated Emissions. Middle Channel (40).
8.0 GHz to 12.75 GHz.



Start 8.0 GHz; Stop 12.75 GHz

Ref 57.7 dBµV; Ref Offset 11.0 dB; 10 dB/div

RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 95.0 mS

Peak 9.35375 GHz, 42.53 dBµV

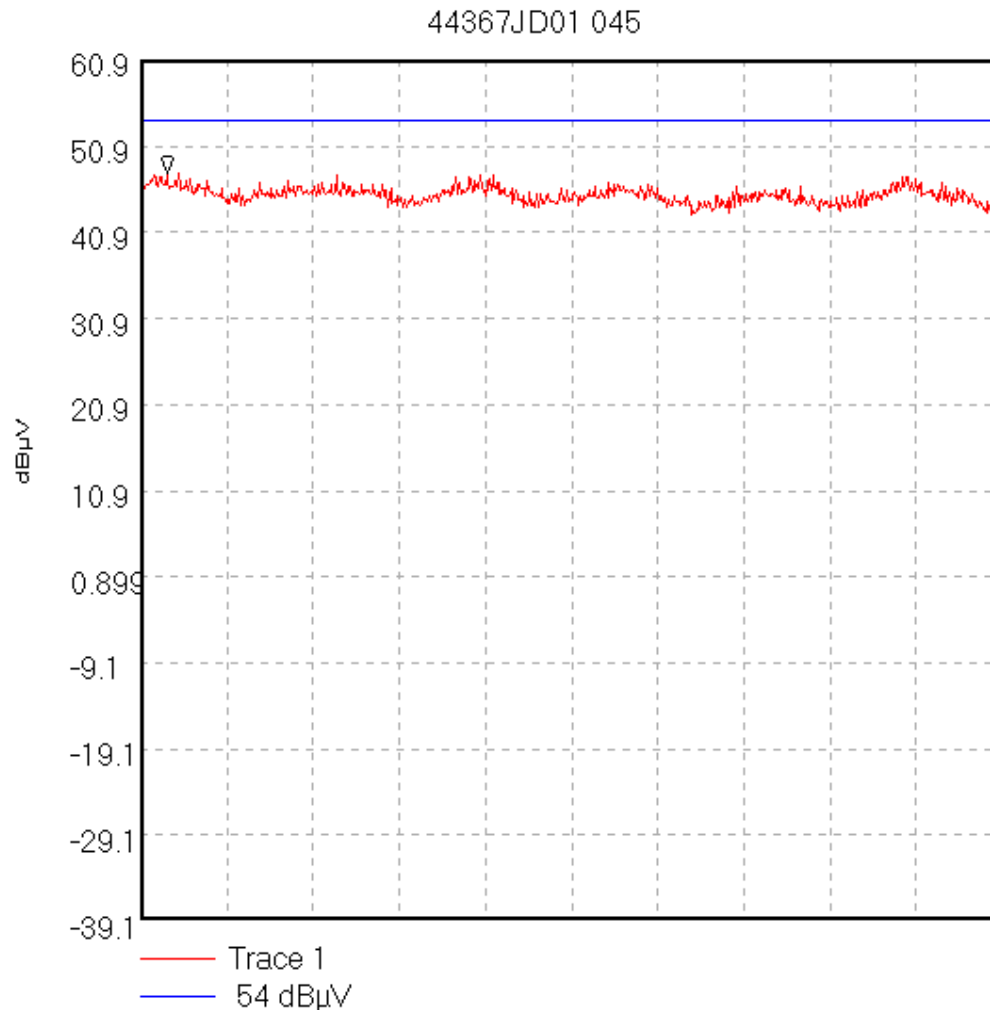
Display Line: 54 dBµV;

05/01/80 00:32:58

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH\44367JD01\045Transmitter Radiated Emissions. Middle Channel (40).12.75 GHz to 18.0 GHz.

Start 12.75 GHz; Stop 18.0 GHz

Ref 60.9 dBµV; Ref Offset 14.0 dB; 10 dB/div

RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 110.0 mS

Peak 12.9075 GHz, 47.73 dBµV

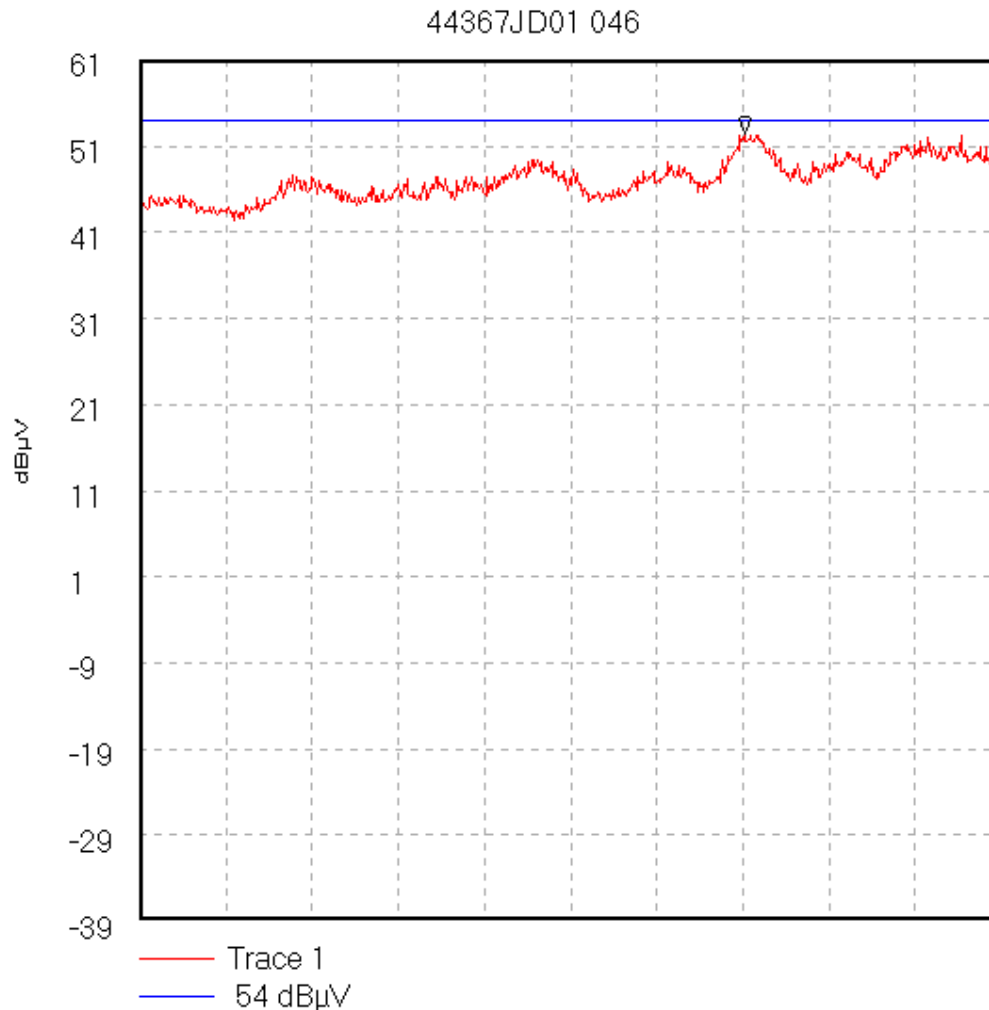
Display Line: 54 dBµV;

05/01/80 00:34:33

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH\44367JD01\046Transmitter Radiated Emissions. Middle Channel (40).18.0 GHz to 26.5 GHz.

Start 18.0 GHz; Stop 26.5 GHz

Ref 61 dBµV; Ref Offset 14.0 dB; 10 dB/div

RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 170.0 mS

Peak 23.964167 GHz, 52.5 dBµV

Display Line: 54 dBµV;

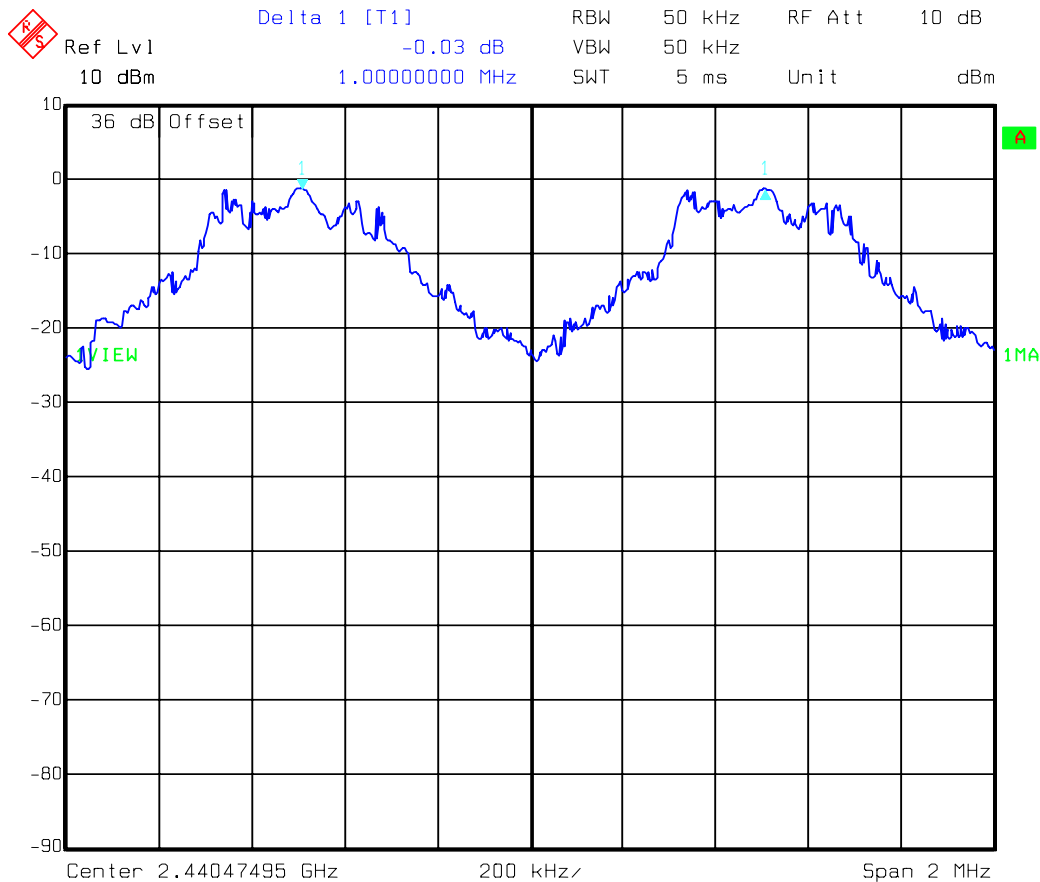
05/01/80 00:35:45

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH/44367JD01/A001
Carrier Frequency Separation
OpCond: Hopping Mode



Title: Carrier Frequency Separation FCC Part 15.247 (a)(1)

Comment A: Tested For Nokia Ltd by RFI Ltd.

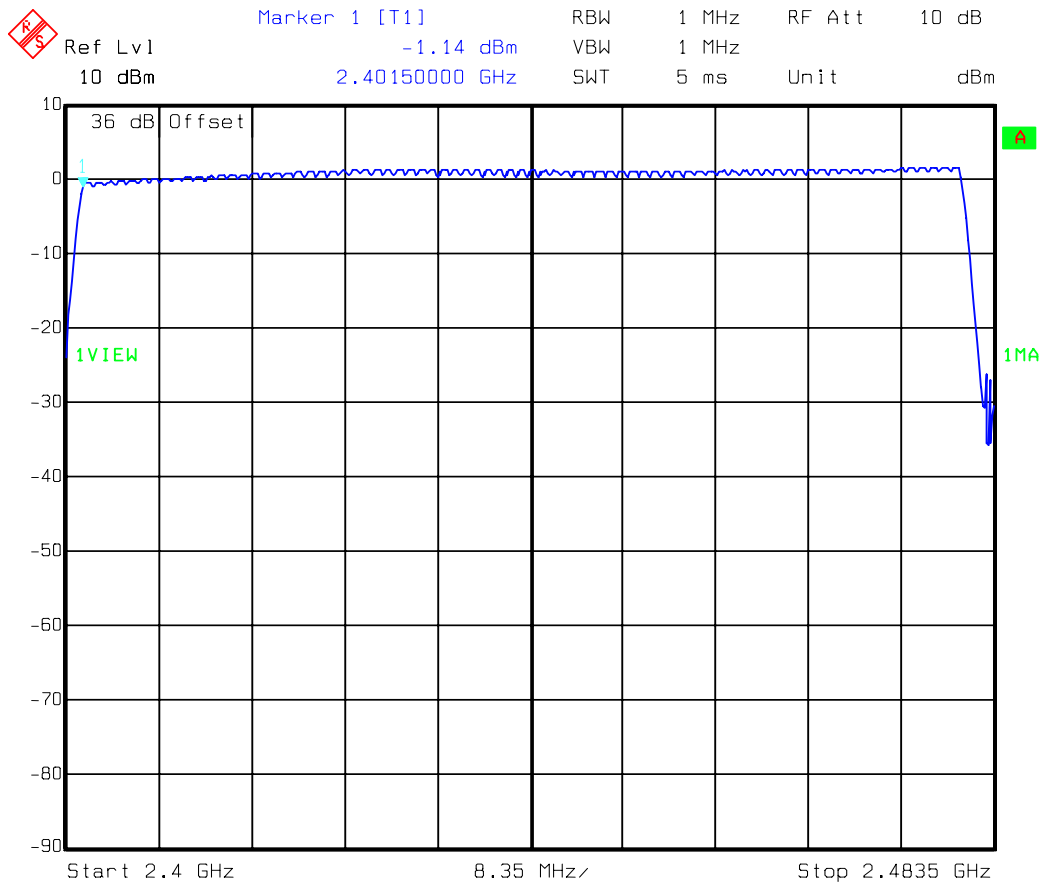
EUT: Cameron Imaging Phone 3650 (NHL-8)

Date: 18.DEC.2002 15:41:51

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH/44367JD01/A002Frequency HoppingOpCond: Hopping Mode

Title: Number Of Hopping Frequencies FCC Part 15.247 (a) (1) (ii)

Comment A: Tested For Nokia Ltd by RFI Ltd.

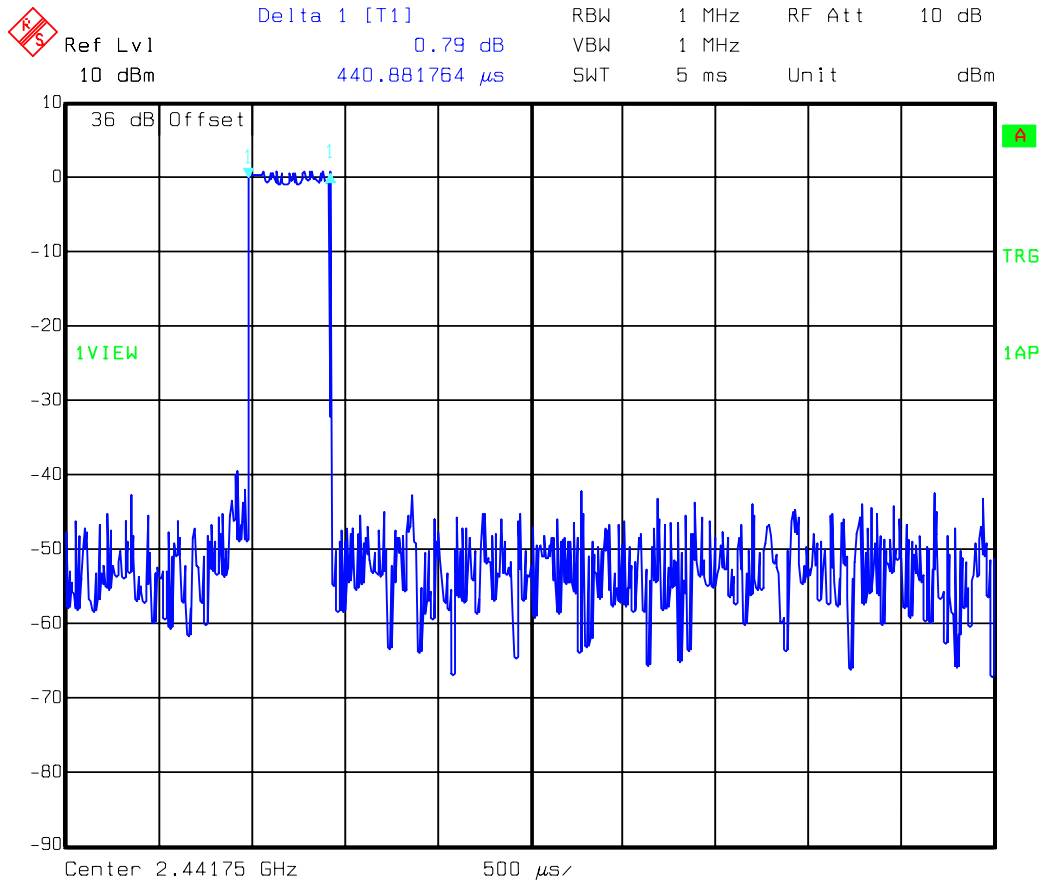
EUT: Cameron Imaging Phone 3650 (NHL-8)

Date: 19.DEC.2002 13:57:43

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH/44367JD01/A003Occupancy Dwell TimeOpCond: Hopping Mode

Title: Time Of Occupancy (Dwell Time) FCC Part 15.247 (a)(1)(ii)

Comment A: Tested For Nokia Ltd by RFI Ltd.

EUT: Cameron Imaging Phone 3650 (NHL-8)

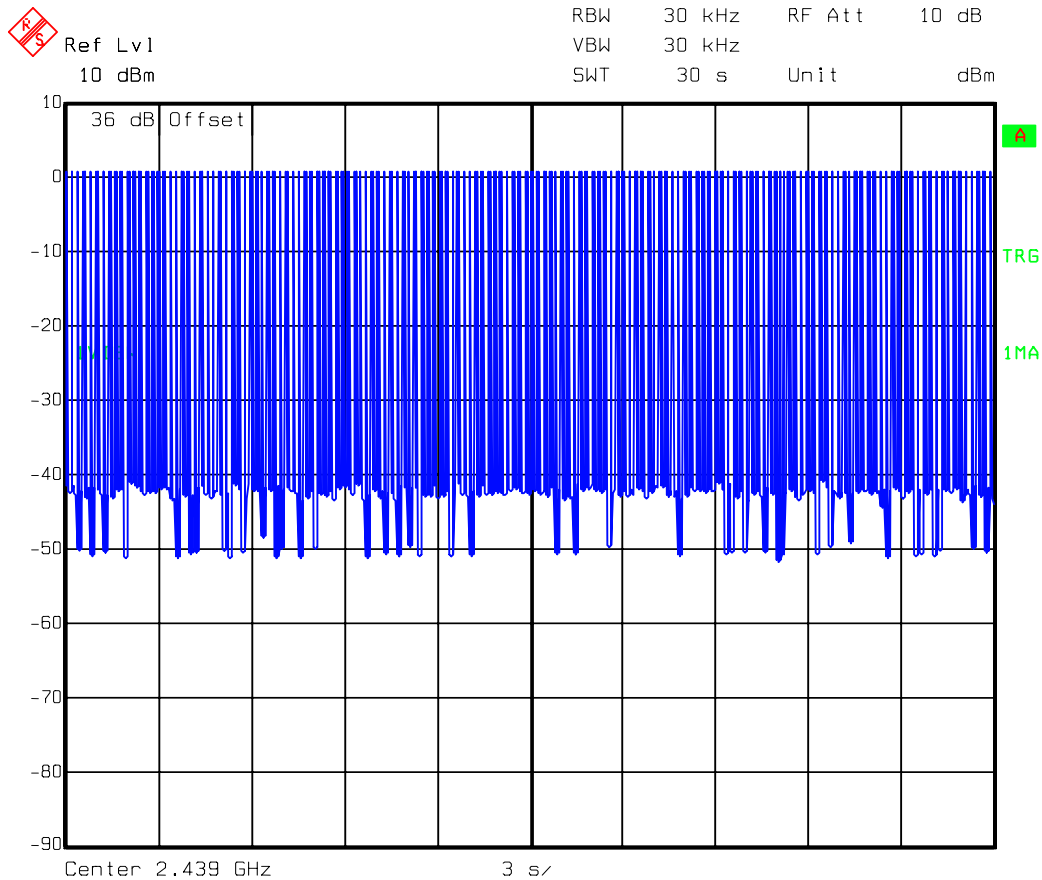
Date: 18.DEC.2002 15:57:19

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH/44367JD01/A004
Transmissions in 30 Sec.
OpCond: Hopping Mode



Title: Number Of Transmissions In 30 Seconds FCC Part 15.247 (a)

Comment A: Tested For Nokia Ltd by RFI Ltd.

EUT: Cameron Imaging Phone 3650 (NHL-8)

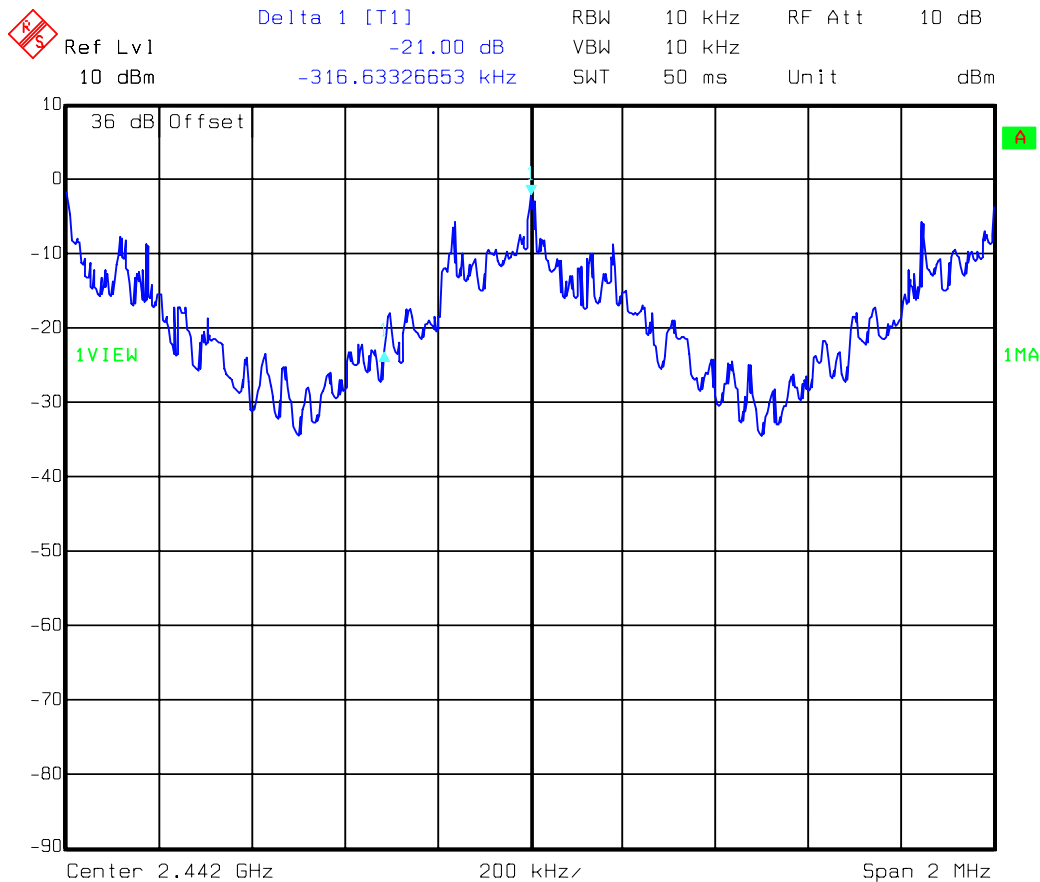
Date: 19.DEC.2002 14:00:04

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH/44367JD01/A005
20 dB Bandwidth FL Delta
OpCond: Hopping Mode



Title: 20dB Bandwidth FL Delta. FCC Part 15.247 (a) (1) (ii)

Comment A: Tested For Nokia Ltd by RFI Ltd.

EUT: Cameron Imaging Phone 3650 (NHL-8)

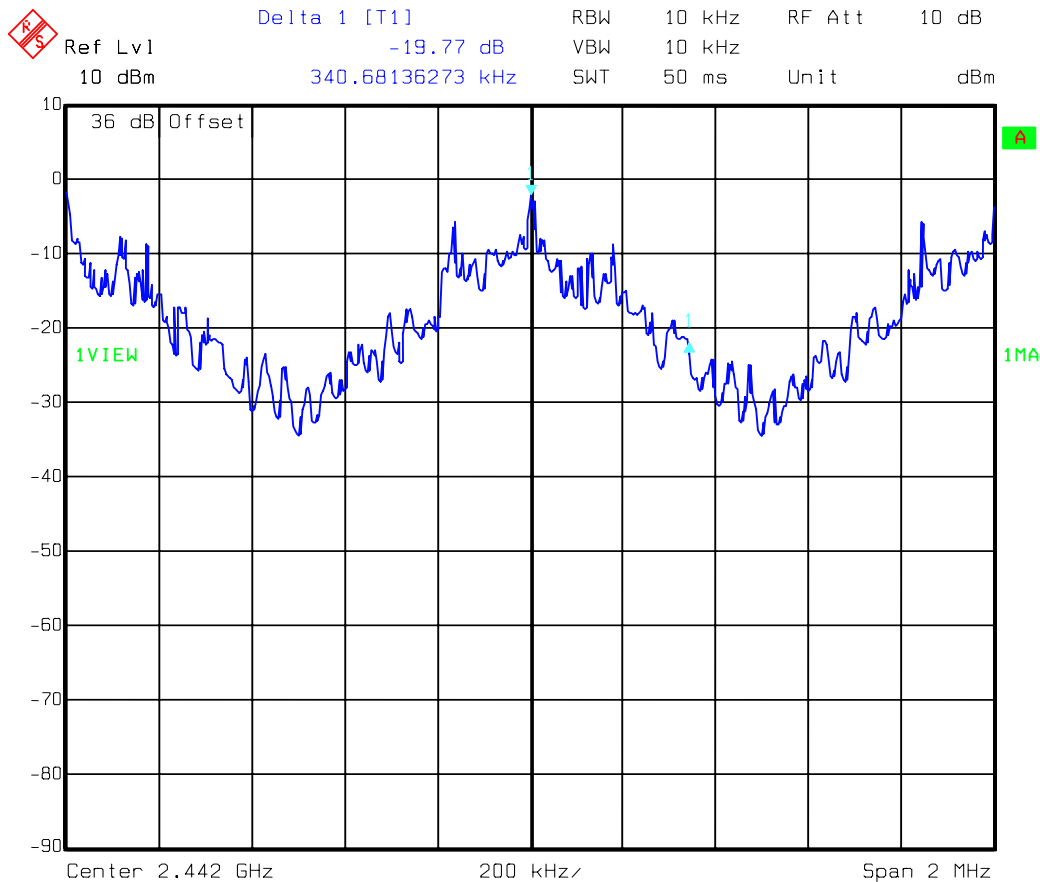
Date: 19.DEC.2002 14:05:27

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH/44367JD01/A006
20 dB Bandwidth FH Delta
OpCond: Hopping Mode



Title: 20dB Bandwidth FH Delta. FCC Part 15.247 (a) (1) (ii)

Comment A: Tested For Nokia Ltd by RFI Ltd.

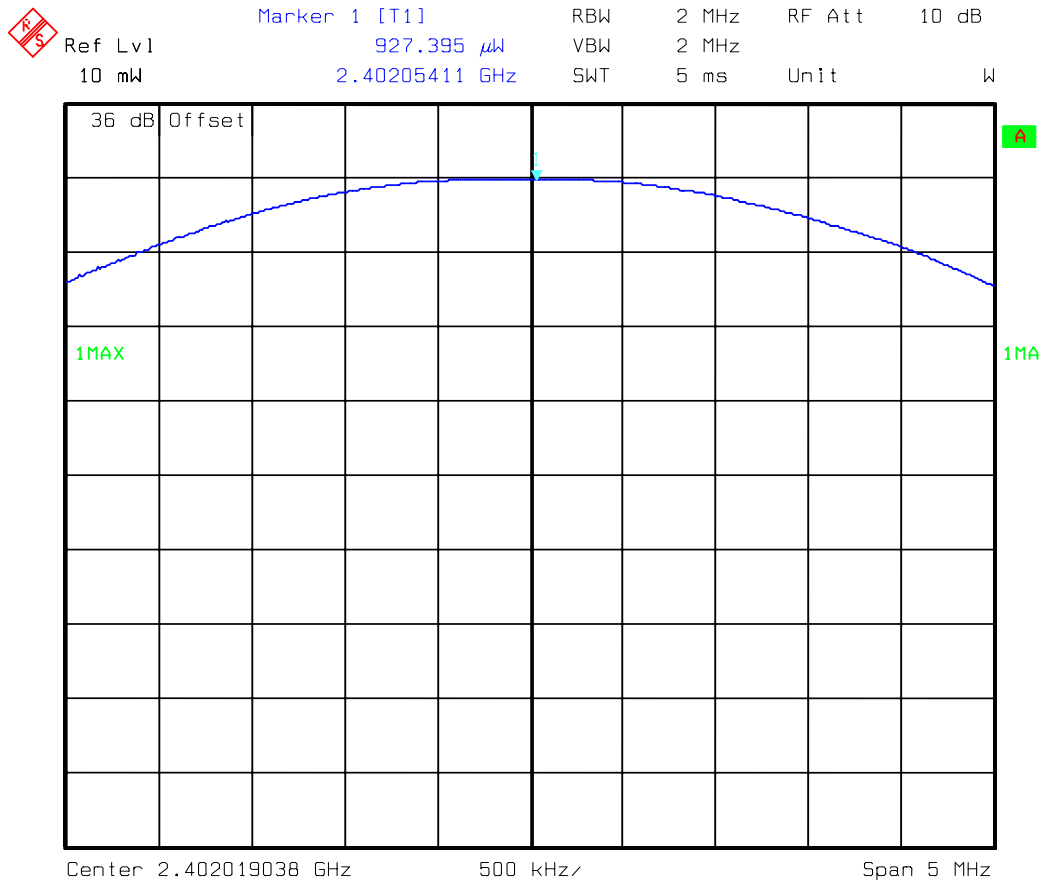
EUT: Cameron Imaging Phone 3650 (NHL-8)

Date: 19.DEC.2002 14:06:15

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH/44367JD01/A007Peak Output Power Bottom Channel 110 V

Title: Peak Output Power FCC Part 15.247 (b)100% Voltage: 110V

Comment A: Tested For Nokia Ltd by RFI Ltd.

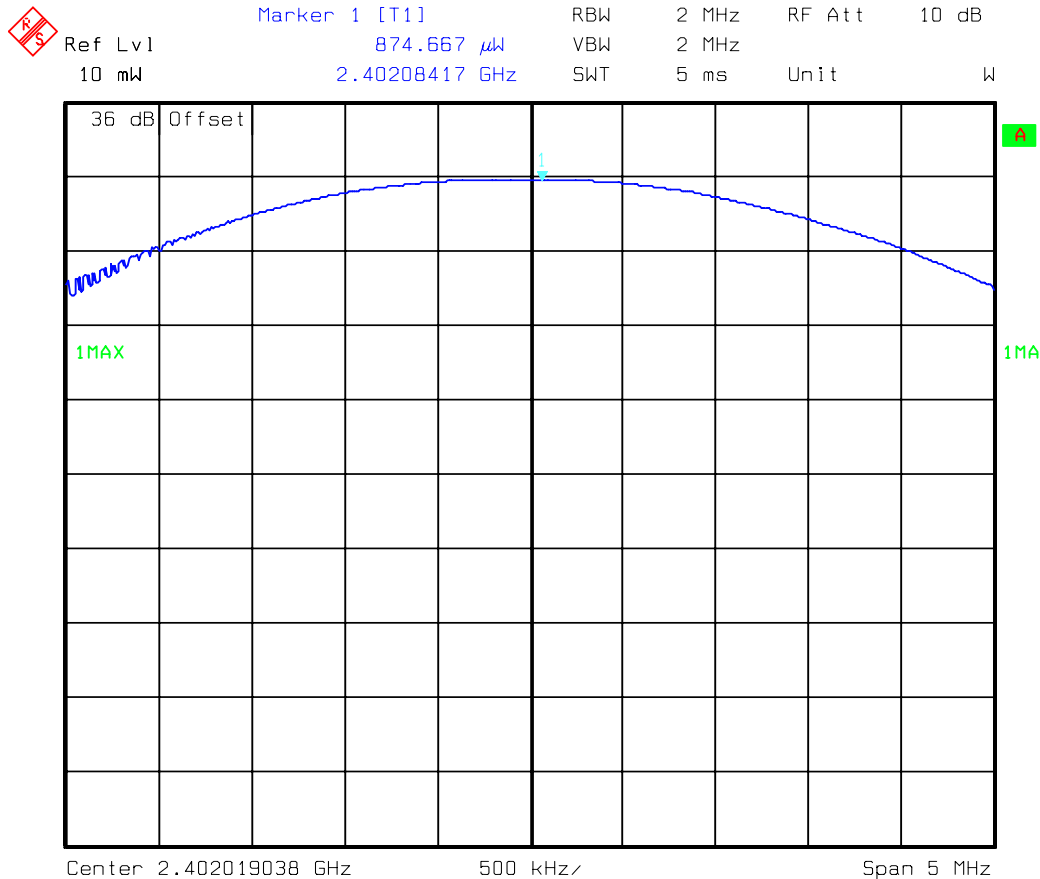
EUT: Cameron Imaging Phone 3650 (NHL-8) Bottom Channel

Date: 19.DEC.2002 10:29:18

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH/44367JD01/A008Peak Output Power Bottom Channel 93.5 V

Title: Peak Output Power FCC Part 15.247 (b)85% Voltage: 93.5V

Comment A: Tested For Nokia Ltd by RFI Ltd.

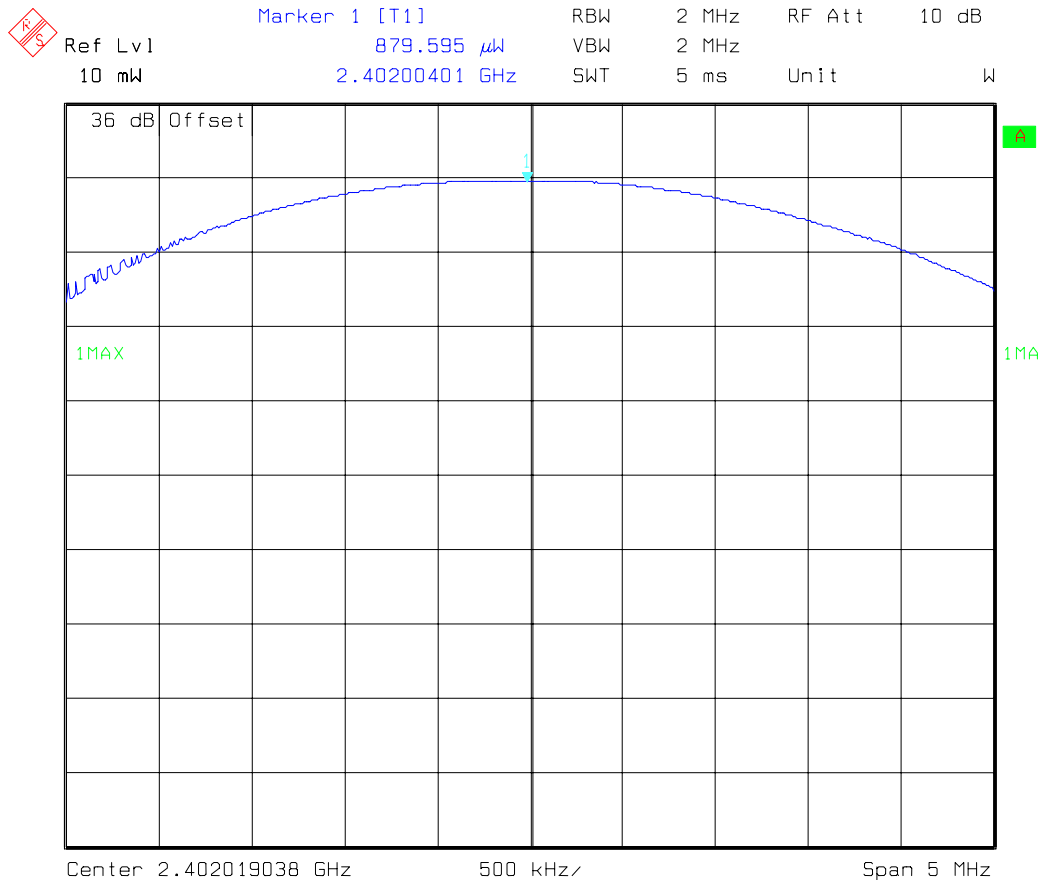
EUT: Cameron Imaging Phone 3650 (NHL-8) Bottom Channel

Date: 19.DEC.2002 10:55:38

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH/44367JD01/A009Peak Output Power Bottom Channel 126.5 V

Title: Peak Output Power FCC Part 15.247 (b)115% Voltage: 126.5V

Comment A: Tested For Nokia Ltd by RFI Ltd.

EUT: Cameron Imaging Phone 3650 (NHL-8) Bottom Channel

Date: 19.DEC.2002 10:57:21

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH/44367JD01/A010Peak Output Power Middle Channel 126.5 VRef Lvl
10 mW

Marker 1 [T1]

1.230 mW

2.44175451 GHz

RBW

2 MHz

RF Att

10 dB

VBW

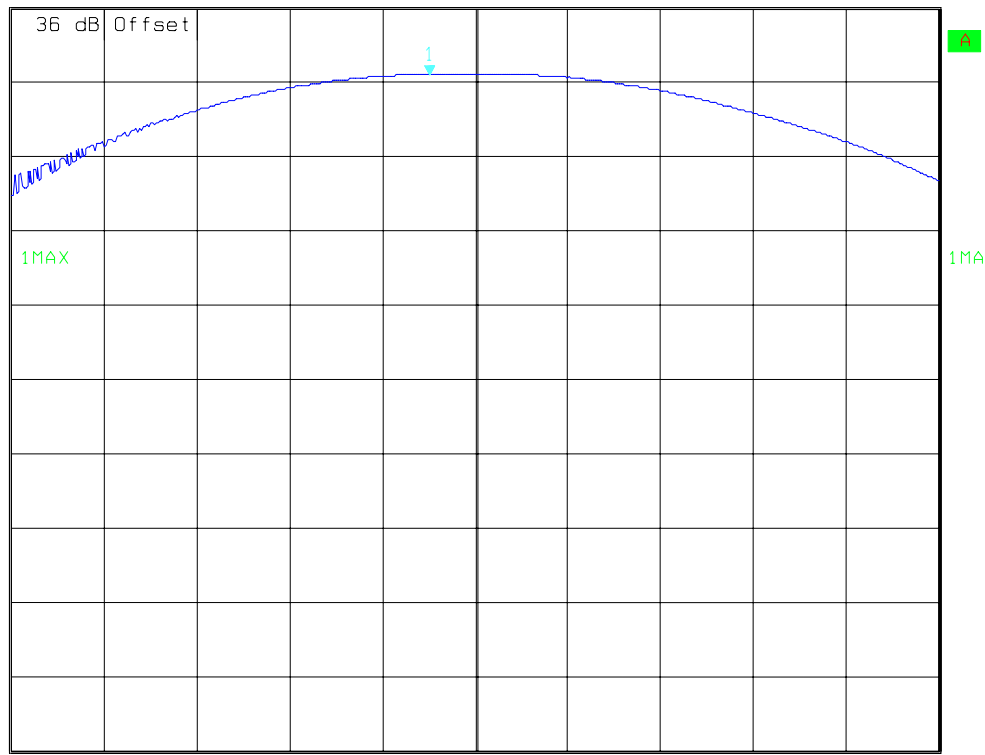
2 MHz

SWT

5 ms

Unit

W



Center 2.442 GHz

500 kHz/

Span 5 MHz

Title: Peak Output Power FCC Part 15.247 (b)115% Voltage: 126.5V

Comment A: Tested For Nokia Ltd by RFI Ltd.

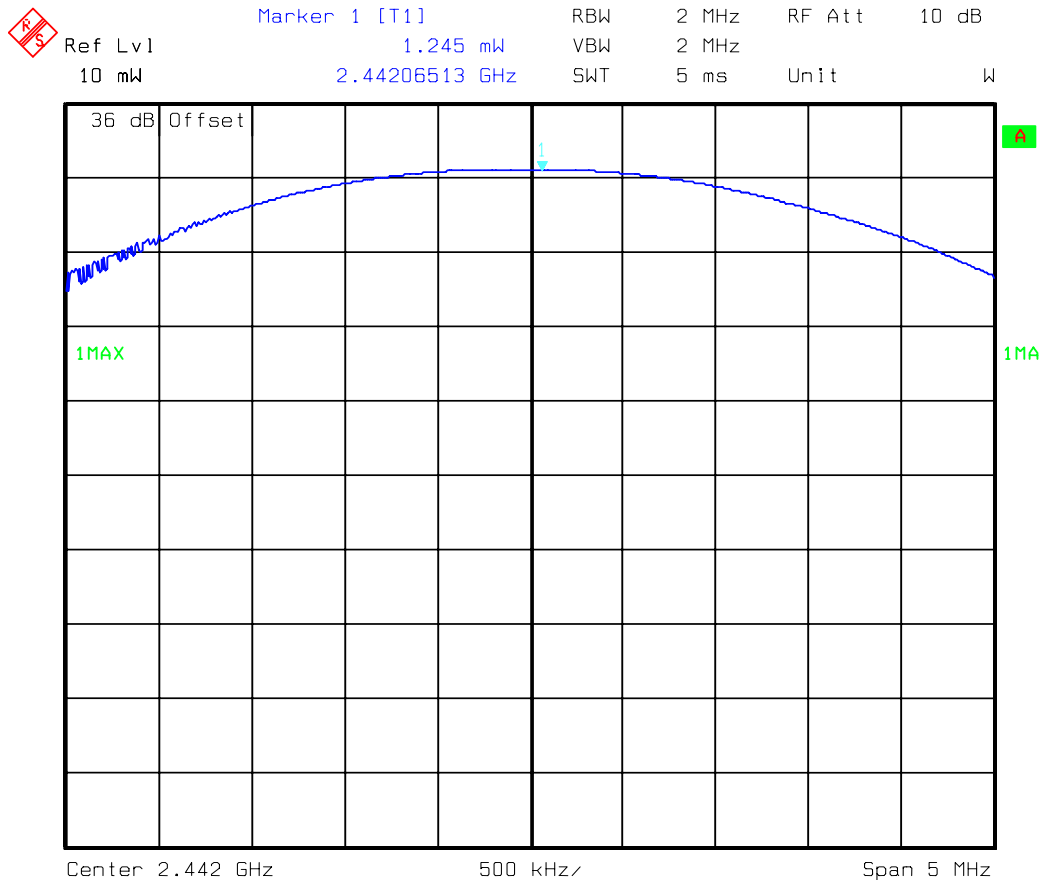
EUT: Cameron Imaging Phone 3650 (NHL-8) Middle Channel

Date: 19.DEC.2002 10:58:29

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH/44367JD01/A011Peak Output Power Middle Channel 110 V

Title: Peak Output Power FCC Part 15.247 (b)100% Voltage: 110.0V

Comment A: Tested For Nokia Ltd by RFI Ltd.

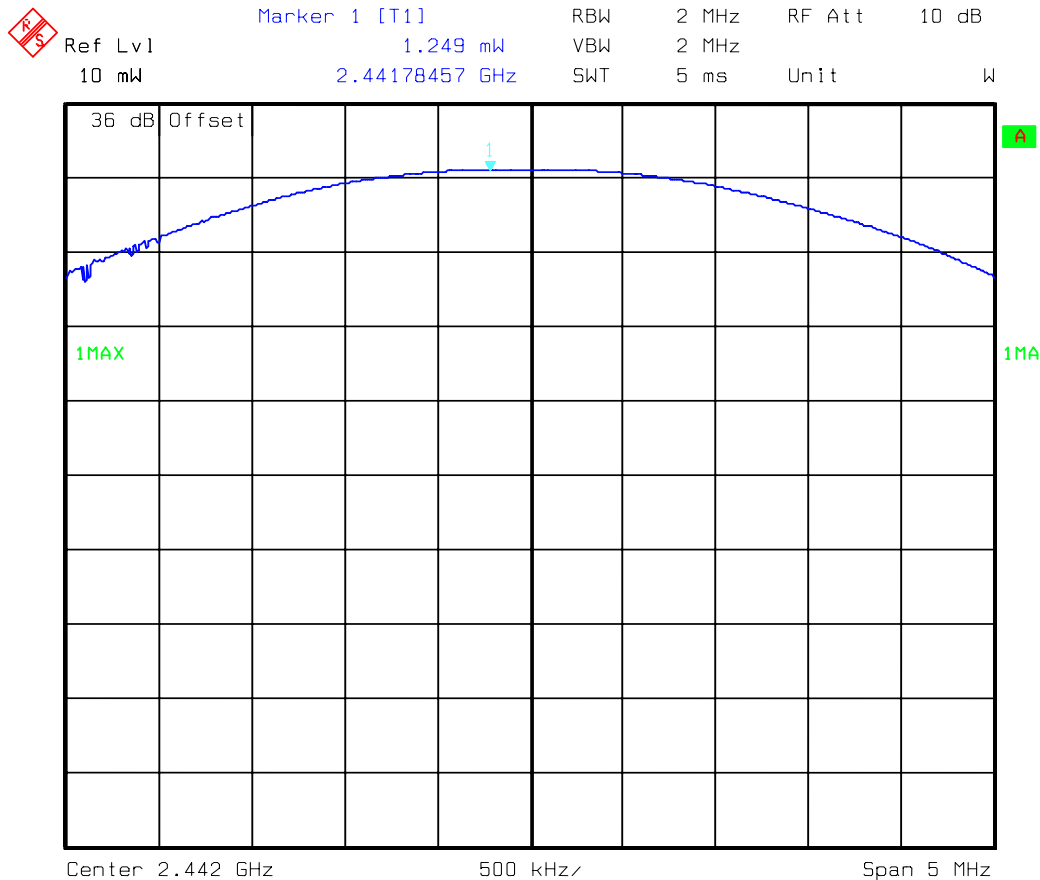
EUT: Cameron Imaging Phone 3650 (NHL-8) Middle Channel

Date: 19.DEC.2002 10:59:17

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH/44367JD01/A012Peak Output Power Middle Channel 93.5 V

Title: Peak Output Power FCC Part 15.247 (b) 85% Voltage: 93.5V

Comment A: Tested For Nokia Ltd by RFI Ltd.

EUT: Cameron Imaging Phone 3650 (NHL-8) Middle Channel

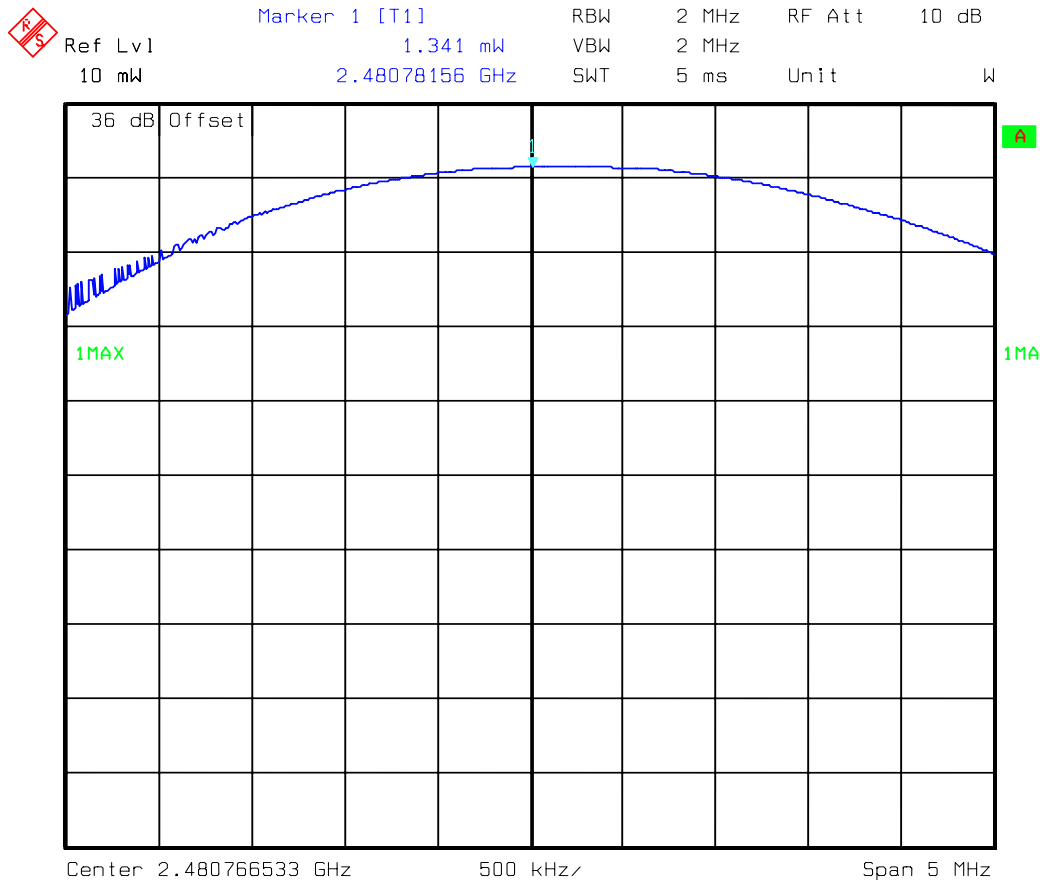
Date: 19.DEC.2002 11:00:37

Title: Peak Output Power FCC Part 15.247 (b) 85% Voltage: 93.5V
Comment A: Tested For Nokia Ltd by RFI Ltd.
EUT: Cameron Imaging Phone 3650 (NHL-8) Top Channel
Date: 19.DEC.2002 11:25:06

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH/44367JD01/A014Peak Output Power Top Channel 110 V

Title: Peak Output Power FCC Part 15.247 (b) 100% Voltage: 110.0V

Comment A: Tested For Nokia Ltd by RFI Ltd.

EUT: Cameron Imaging Phone 3650 (NHL-8) Top Channel

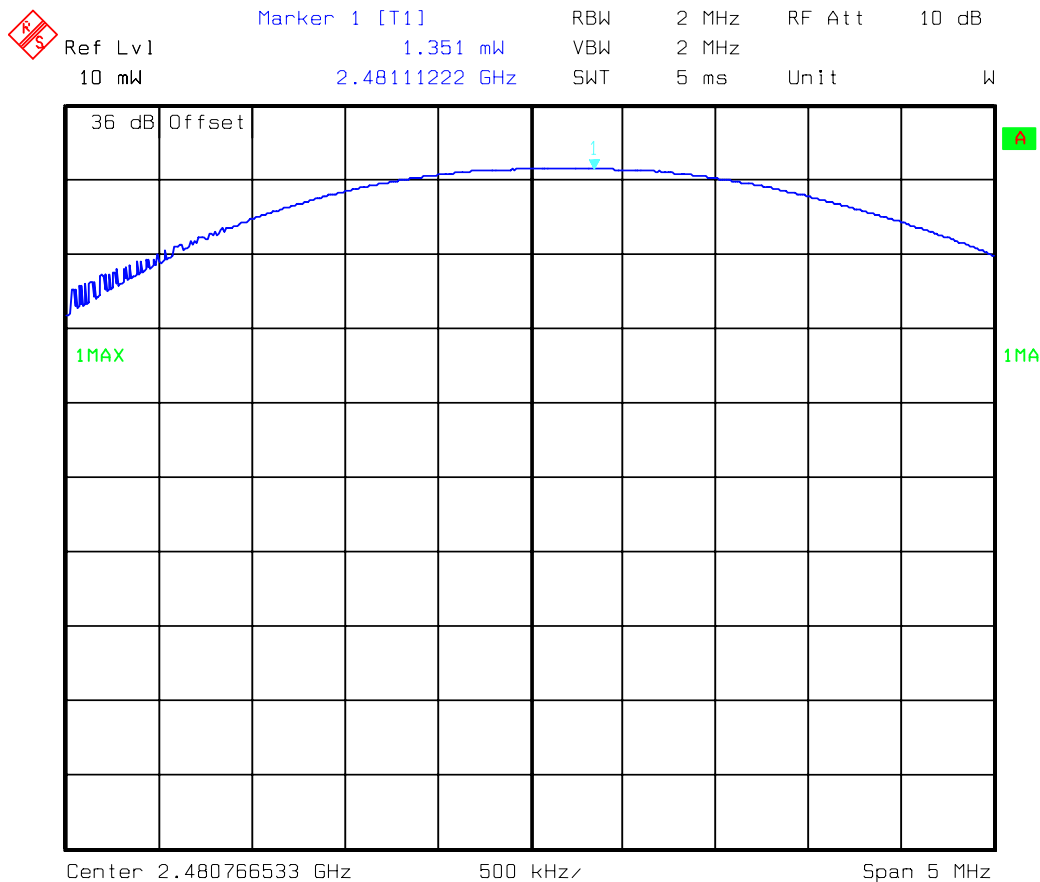
Date: 19.DEC.2002 11:25:49

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

GPH/44367JD01/A015
Peak Output Power Top Channel 126.5 V



Title: Peak Output Power FCC Part 15.247 (b) 115% Voltage: 126.5V

Comment A: Tested For Nokia Ltd by RFI Ltd.

EUT: Cameron Imaging Phone 3650 (NHL-8) Top Channel

Date: 19.DEC.2002 11:31:53

RADIO FREQUENCY INVESTIGATION LTD.

TEST REPORT

Conformance Testing Department

S.No: RFI/MPTB1/RP44367JD01

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Issue Date: 23 December 2002

Test Of: Nokia UK Ltd.

Cameron Imaging Phone 3650 (NHL-8) Mobile Phone Handset (Bluetooth Mode)

To: F.C.C. Part 15 Subpart C: 2001 (Intentional Radiators) Section 15.247

Appendix 5. Photographs of EUT

Please refer to Internal & External Photograph Appendices