



MOTOROLA

MOBILE DEVICES BUSINESS

**PRODUCT SAFETY AND COMPLIANCE
EMC LABORATORY**

EMC TEST REPORT - Addendum

Test Report Number – 22335-1BT

Report Date – 2008-10-02

The test results contained herein relate only to the model(s) identified. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics.

Technician:

Handwritten signature of Uffe Lund Svejgaard.

Name: Uffe Lund Svejgaard
Test: 2008-09-26 to 2008-10-02

As the responsible EMC Engineer, I hereby declare that the model tested as specified in this report conforms to the requirements indicated.

Signature:

Handwritten signature of Per K. Nielsen.

Name: Per K. Nielsen

Title: Sr. Staff Engineer

Date: 2008-10-02

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FCC Registration Number: 863448
IC Registration Number: 109AP-1

ADR Testing Service location ADR AL
ISO/IEC-17025:2005 accredited by UKAS



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Test Report Details

Tests Performed By: Motorola A/S
Product Safety and Compliance Group
Lindholm Brygge 35
9400 Nr.Sundby Fax (45) 7219-5002
Phone: (45) 7219-5000
Motorola PCS FRN: 0016105769
FCC Registration Number: 863448
IC Registration Number: 109AP-1

Tests Requested By: Motorola Inc.
Mobile Devices business
600 North US Hwy 45
Libertyville, IL 60048

Product Type: Cell phone with Bluetooth

Form factor: Slider

Signaling Capability: Quadra band 850/900/1800/1900 GSM with GPRS class 12 and EDGE class 12, Bluetooth class 1 and FM radio.

Serial Numbers: 355906020000872

Battery type: BC50 with model number SNN5811A.

FCC ID: IHDP56JC1

Project number: 22335-1

Testing Complete Date: 2008-10-02

Applicable Standards

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Sub-part J as well as the following parts:

- Part 15 Subpart C – Intentional Radiators
- Part 22 Subpart H - Public Mobile Services
- Part 24 - Personal Communications Services
- Part 27 - Wireless Communications Service
- Part 90 - Private Land Mobile Radio Service

Applicable Standards: ANSI 63.4-2003, RSS-GEN, RSS-210 (Bluetooth).

DA 00-705, "Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems" published by the Federal Communications Commission was also used in the testing of this product.

The following tests were performed according to the regulations:

- The **spurious radiated emission** requirements of § **15.247(d) of CFR47 Part 15 2007**, specifically" radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).
- Under this project only 30 to 1000MHz, 1 to 25GHz radiated emissions and radiated band-edge measurements were performed.
- For frequencies below 1 GHz a 100 kHz RBW (6 dB) is used and above 1 GHz a 1 MHz RBW (6 dB) is used.

Summary of Testing

Test	Test Name	Pass/Fail
1	Field Strength of Spurious Emissions	Pass (*)
2	Band-edge Compliance of RF Radiated Emissions	Pass

Test	Test Name	Results
1	Field Strength of Spurious Emissions	See plots
2	Band-edge Compliance of RF Radiated Emissions	See plots

(*) The dwell time rule as per DA 00-705 handled in appendix-1 was applied.

The margin with respect to the limit is the minimum margin for all modes and bands. () indicates the margin at which the product exceeds the limit.

General and Special Conditions

The test sample was tested using a fully charged battery when applicable. Where a battery could not be used due to the need for a controlled variation of input voltage, an external power supply was utilized.

All testing was done in an indoor controlled environment with an average temperature of 21.2° C +- 1° C and relative humidity of 45.5% +-5% over the dates used for testing.

Equipment and Cable Configurations

The test sample was tested in a stand-alone configuration that is representative of typical use.

Measuring Equipment and Calibration Information

Equipment related to the semi-anechoic chamber testing:

Equipment	Model/type	Serial number	Operational range	Date of calibration
EMI analyzers	ESIB 26	100179	20 Hz – 26.5 GHz	26.05.2008
	ESU 40	100040	20 Hz – 40 GHz	07.02.2008
Pre Amplifiers	EA PA 02 JCA12 300 JCA218 4003 JCA48 300 JCA1826 431 JCA1218 500	800002	(1 – 26 GHz) 1 GHz – 2 GHz 2 GHz – 18 GHz 4 GHz – 8 GHz 18 GHz – 26 GHz 12 GHz – 18 GHz	26.06.2007
	Sonoma 310N	185680	9 kHz – 1 GHz	15.05.2008
	JCA218-4003	104	1 GHz – 18 GHz	19.05.2008
Antenna amplifiers	AFS4-02001800-35-ULN (Mounted on EMCO 3115)	805815	2 GHz – 18 GHz	13.03.2008
	JSA-18004000-30-5A (Mounted on EMCO 3116)	965195	18 GHz – 40 GHz	06.03.2008
	JCA 1840-400 (Mounted on EMCO 3116)	101	18 – 40 GHz	06.03.2008
Radio com. Tester	CMU 200	112434	GSM 850/900/1800/1900 IS95, UMTS, CDMA, Bluetooth	20.02.2008
High pass filter	K&L 3DH1-3000/T13000-0/0 (Mounted on EMCO 3115)	8	3 GHz – 18 GHz	13.03.2008
Attenuator	Weinschel 54A-3 (3dB) (Mounted on EMCO 3116)	T8929	DC – 40 GHz	06.03.2008
	H&S 6603.19AA (3dB) (Mounted on EMCO 3115)	na	DC-18 GHz	13.03.2008
Cable	C-ANT-FP1-10S (SK)	na	18 GHz – 40 GHz	06.03.2008
	C-ANT-FP1-4S (SMA)	na	30 MHz –6 GHz 3 GHz – 18 GHz 18 GHz – 28 GHz	19.03.2008, 13.03.2008, 19.03.2008
Filter	F-3S-2S (SK-Bypass)	na	30 MHz – 40 GHz	06.03.2008

Equipment related to carrier max direction verification:

Equipment	Model/type	Serial number	Operational range	Date of calibration
Spectrum analysers	FSEA	845097/004	20 Hz – 3.5 GHz	23.04.07 (na)
Radio com. Tester	CMU 200	834639/003	GSM 850/900/1800/1900 IS95, UMTS, Bluetooth	14.11.07

The antennas used in the various tests are listed in the below table. All the log-periodic antennas are used as communication and link establishment antennas for (GSM, UMTS, CDMA, FM and/or Bluetooth).

Antenna	Type	Serial number	Operational range	Date of calibration
Hybrid-log periodic	HLP 3003C	060300	30 MHz – 3 GHz	07.12.07
Log-periodic (link)	LPDA 8030	090200	800 MHz – 3 GHz	(na)
Log-periodic (link)	LPDA 8030	090100	800 MHz – 3 GHz	(na)
Log-periodic (link)	PLP 3003	021701	300 MHz – 3 GHz	(na)
Horn (link)	AT4002A	28548	800 MHz – 5 GHz	(na)
Horn (link)	AT4002A	28547	800 MHz – 5 GHz	(na)
Double ridged horn (w. 3 GHz HP-filter + 1x 2-18 GHz pre-amp+1x 3dB attenuator.)	EMCO 3115	71502	1 GHz – 18 GHz	21.05.08
Double rigid horn (w. 2x 18-40 GHz pre-amp + 1x 3dB attenuator.)	EMCO 3116	2637	18 GHz – 40 GHz	20.12.07

All equipment is on a one-year calibration cycle except for link antennas.

Description of Bluetooth (BT) Transmitter

The 22335-1 cell phone sample offers Bluetooth as a feature. The Bluetooth spread-spectrum, frequency hopping transceiver is designed to operate between 2400 and 2483 MHz. The Bluetooth antenna is mounted on the PCB inside of the EUT. The antenna installation is permanent. For a more thorough description of the functionality please refer to Exhibit 12 of this package.

As a Bluetooth transmitter, it is designed operate with other Bluetooth devices as defined by the industrial standard. In this application, the test sample is battery-operated.

Measurement Procedures and Data

FIELD STRENGTH OF SPURIOUS EMISSIONS

CFR Part 2.1053, 15.247(d), 15.249

Measurement Procedure

The test sample is placed inside the semi-anechoic chamber on a polystyrene table at the turntable center. For each spurious frequency, the antenna mast is raised and lowered from 1 to 4 meters and the turntable is rotated 360 degrees to obtain a maximum reading on the spectrum analyzer. This is repeated for both horizontal and vertical polarizations of the receive antenna.

Field Strength (dB μ V/m) = EMI Receiver Level (dB μ V) + Cable Loss (dB) -
Amplifier Gain (dB) + Filter loss (dB) + Antenna
Correction Factor (3/m)

A fully charged battery was used for the supply voltage.

The test sample was operated during the measurements under the following conditions:

- Tests were performed at low, mid and high channels.
- Tests were performed in both horizontal and vertical polarity.
- Investigation of maximum radiation orientation and position of the product sample to determine test orientations angles.
 - Tests were performed with the sample orientated along X, Y and Z orthogonal axis based on findings.
 - Tests were performed with the test sample placed in worst case position either open or closed based on form factor. Verification tests were performed for the other position.

Measurement Results

For peak emissions detected above 1 GHz, only those emissions that are higher than the AVG limit line plus 8 dB are selected for final emission analysis.

Attached results:

Maximum radiating position and orientation

The test sample was placed on top of a none-conductive pedestal with slider closed and a Bluetooth link towards the communication test set was established. The test sample was scanned with a log-periodic antenna connected to a spectrum analyzer over the whole sphere and the maximum radiation orientation was determined to be the Y orientation in horizontal polarity.

With the test sample slider open it was determined that the open position caused maximum radiation in the Bluetooth band.

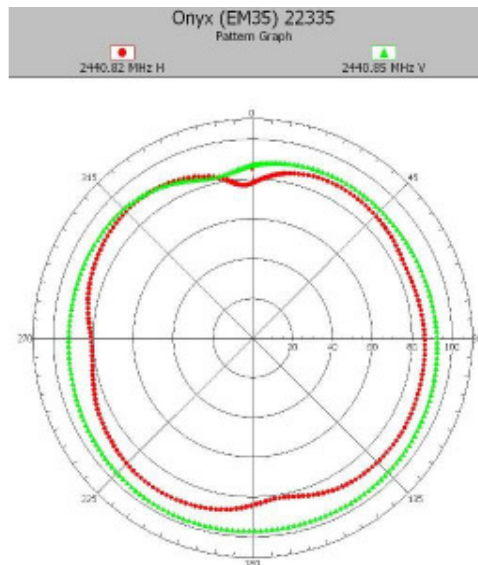
A check of carrier on the Bluetooth center channel 39 was performed to determine the expected maximum radiation of any Bluetooth harmonics for the test sample with slider closed and placed in orientation Y.

Closed:

Title: FCC 15.247(c) 26-09-2008 11:35:03
 File: Onyx (EM35) 22335 (5.31)(ESU) FCC15.247 BT2400 Tch-mid_Y 2008-09-26 Carrier -PK Sequence: Final Measurements
 Operator: ADR AAL EMC TL1.usv001
 EUT Type: Onyx (EM35). IMEI: 355906020000872
 EUT Condition: Board Rev: P3A . closed
 Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.
 BT ch. 39 (2441 MHz) up/do in test mode. Orientation Y=V
 HLP 3003C antenna (30MHz - 3 GHz). Peak detector used.

Onyx (EM35) 22335 - Table

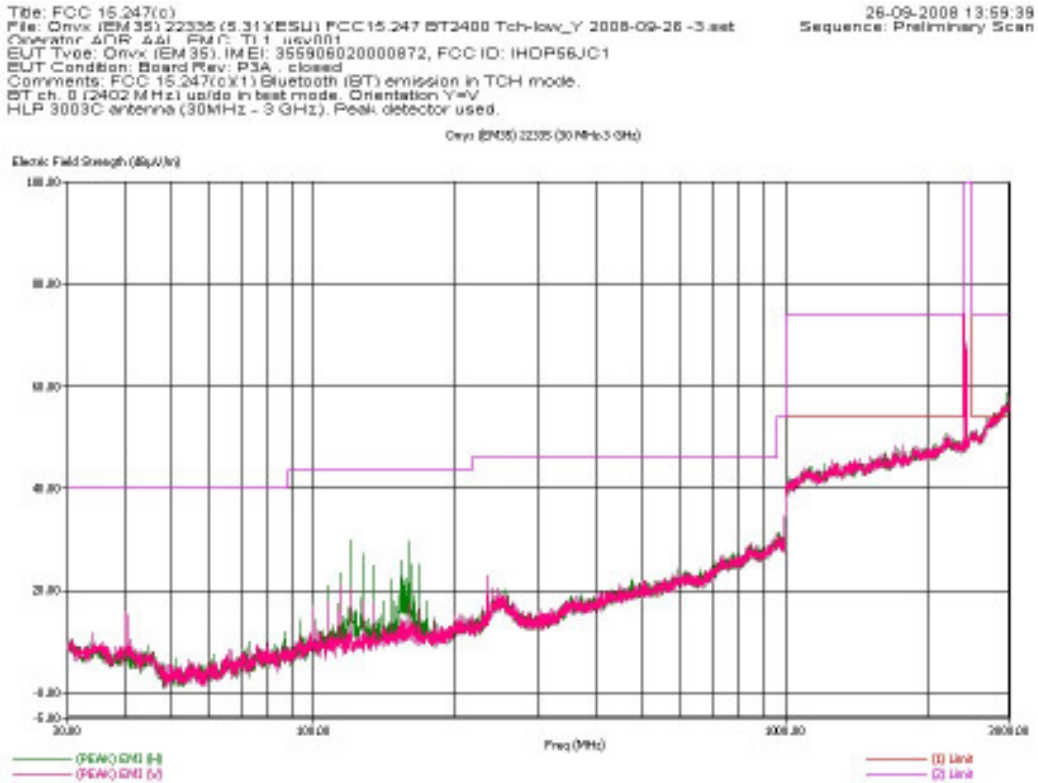
Freq (MHz)	Freq (Max) (MHz)	(PEAK) EMI (dBµV/m)	(2) Limit (dBµV/m)	(PEAK) Margin Lim2 (dB)	Ttbl Agl (deg)	Pol
2441.00	2440.82	89.57	134.00	-44.43	212.00	H
2441.00	2440.85	96.75	134.00	-37.25	199.20	V



The Bluetooth radiated TX power is measured to be -0.65 dBm on channel 39 with RBW = 1 MHz (6 dB).

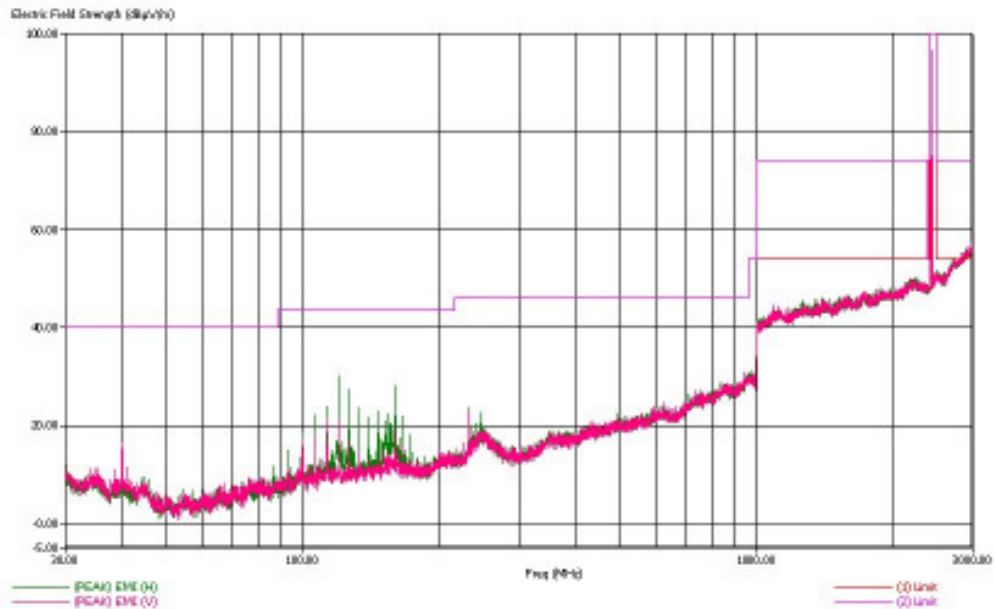
There were no discernible emissions above the noise floor for 30-3000MHz for Low, Mid and High Channels and all polarizations in Bluetooth band

Only one worst case plot for each test frequency are shown in the below plots in the range from 30 MHz – 3000 MHz.



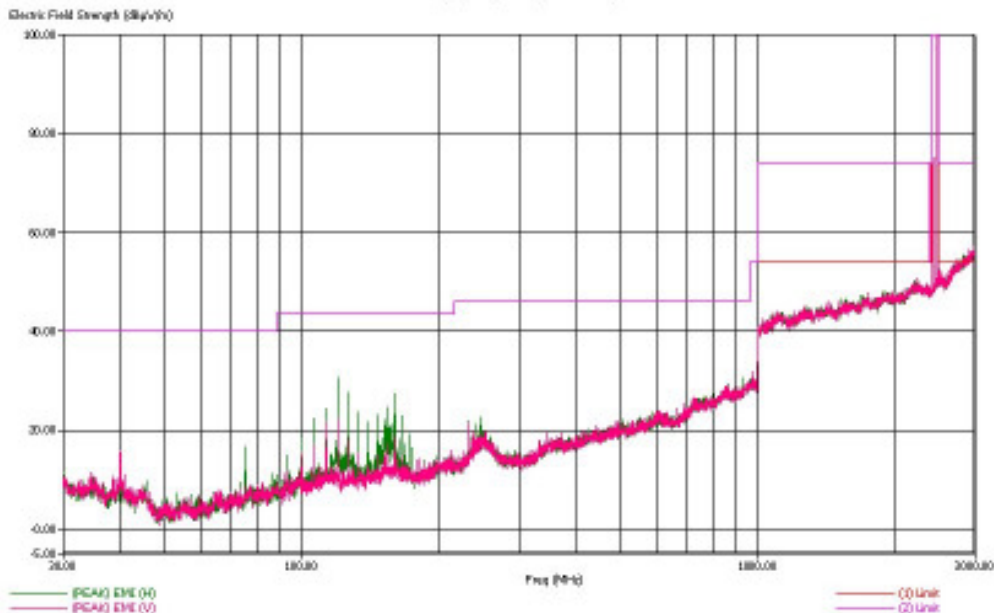
30-3000 MHz Low Channel Dual Polarization Y

Title: FCC 15.247(c)
File: Orwix (EM351) 22335 (5.31)(ESU) FCC15.247 BT2400 Tch-mid_Y 2008-09-26 -3.set
Operator: dfr d.dl FMC: T1 1jss001
EUT Type: Orwix (EM351), IMEI: 355906020000872, FCC ID: IHDP56JC1
EUT Condition: Board Rev: P3A , closed
Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.
BT ch. 39 (2441 MHz) up/down in test mode. Orientation Y=V
HLP 3003C antenna (30MHz - 3 GHz). Peak detector used.
26-09-2008 13:15:58
Sequence: Preliminary Scan



30-3000 MHz Middle Channel Dual Polarization Y

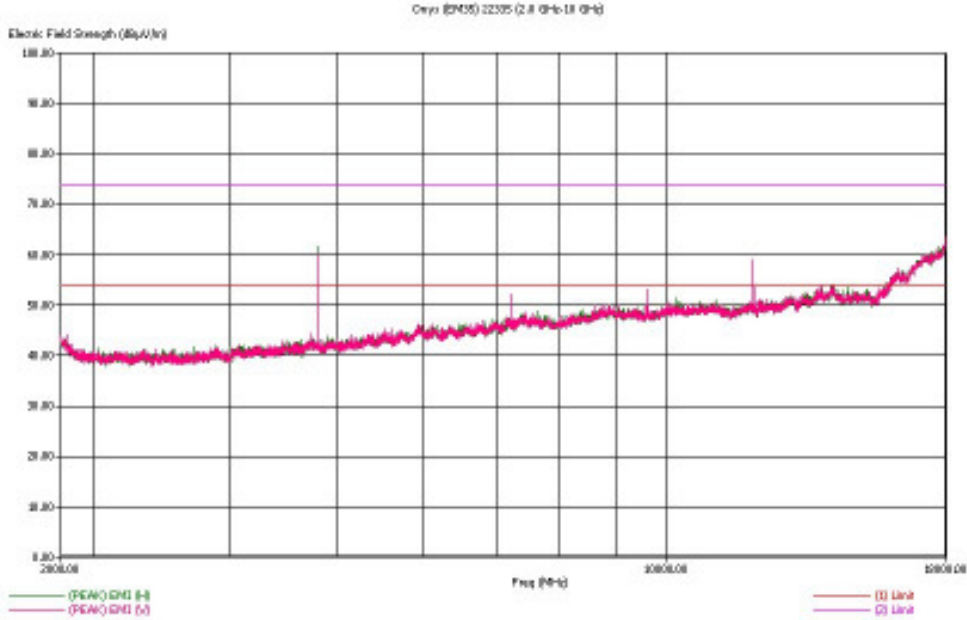
Title: FCC 15.247(c)
File: Orwix (EM351) 22335 (5.31)(ESU) FCC15.247 BT2400 Tch-high_Y 2008-09-26 -3.set
Operator: dfr d.dl FMC: T1 1jss001
EUT Type: Orwix (EM351), IMEI: 355906020000872, FCC ID: IHDP56JC1
EUT Condition: Board Rev: P3A , closed
Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.
BT ch. 78 (2480 MHz) up/down in test mode. Orientation Y=V
HLP 3003C antenna (30MHz - 3 GHz). Peak detector used.
26-09-2008 12:51:00
Sequence: Preliminary Scan



30-3000 MHz High Channel Dual Polarization Y

Title: FCC 15.247(c)
File: Omvix (EM 35) 22335 (S 31) (ESU) FCC15.247 BT2400 Tch-low_X 2008-09-26 -3-18.net
Operator: ADR 561 PM: T11 ucv001
EUT Type: Omvix (EM 35) IMEI: 355906020000872, FCC ID: IHDP56JC1
EUT Condition: Board Rev: P3A, closed
Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.
BT ch. 0 (2402 MHz) up/down in test mode. Orientation X=V
EM CO 3115 antenna (3GHz - 18GHz). Peak detector used.

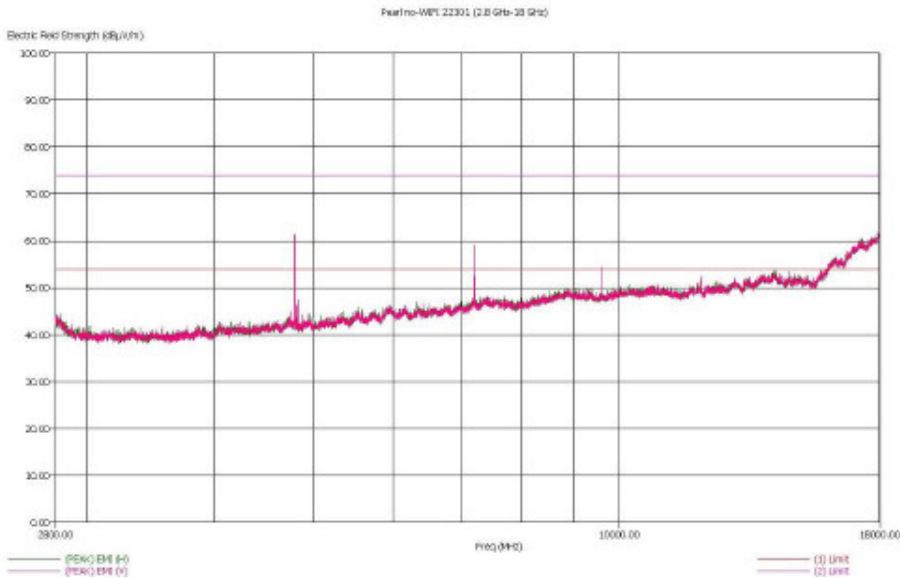
28-09-2008 10:05:09
Sequence: Preliminary Scan



3-18 GHz Low Channel Dual Polarization X

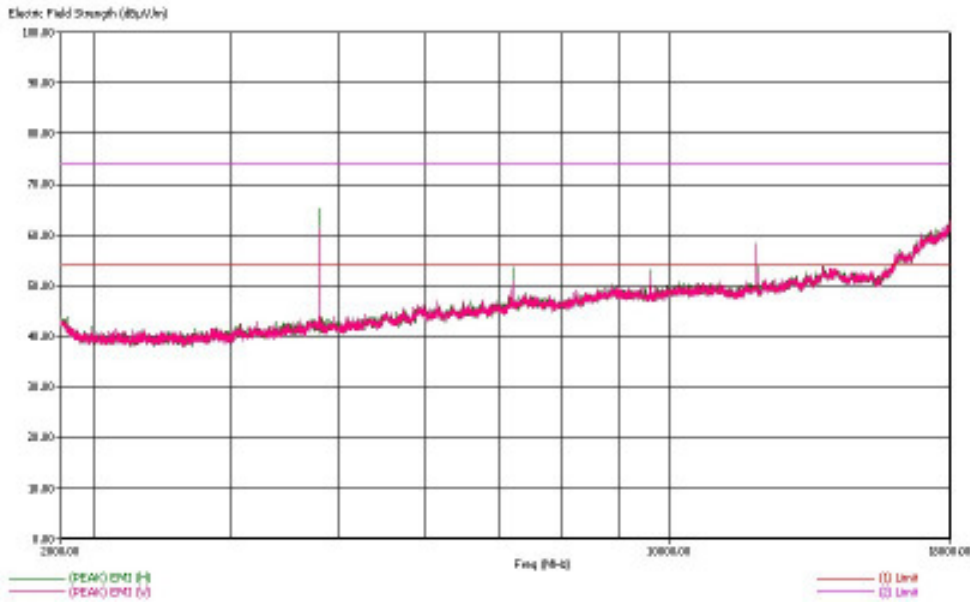
Title: FCC 15.247(c)
File: Pearl no-WIFI 22301 (S 21) (ESU) FCC15.247 BT2400 Tch-low_Y 2008-09-28 -3-18.net
Operator: ADR 561 EMC 111, hkr001
EUT Type: Pearl no-WIFI, FCC ID: IHDP56JF2, IMEI: 355908020000589
EUT Condition: Board Rev: P3A, Slider closed
Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.
BT ch. 0 (2402 MHz) up/down in test mode. Orientation Y=Z
EM CO 3113 antenna (3GHz - 18GHz). Peak detector used.

28-09-2008 17:01:48
Sequence: Preliminary Scan



3-18 GHz Low Channel Dual Polarization Y

Title: FCC 15.247(c)
 File: Onvx (EM35) 22335 (5.31)(ESU) FCC15.247 BT2400 Tch-low_Z 2008-09-26 -3-18.set
 Operator: ADR AAL EMC TL1 usv001
 EUT Type: Onvx (EM35). IMEI: 355906020000872, FCC ID: IHDP56JC1
 EUT Condition: Board Rev: P3A . closed
 Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.
 BT ch. 0 (2402 MHz) up/do in test mode. Orientation Z=V
 EMCO 3115 antenna (3GHz - 18GHz). Peak detector used.
 Onyx (EM35) 22335 (2.1 9-5-18 9-4)



Title: FCC 15.247(c)
 File: Onvx (EM35) 22335 (5.31)(ESU) FCC15.247 BT2400 Tch-low_Z 2008-09-26 -AV.set
 Operator: ADR AAL EMC TL1 usv001
 EUT Type: Onvx (EM35). IMEI: 355906020000872, FCC ID: IHDP56JC1
 EUT Condition: Board Rev: P3A . closed
 Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.
 BT ch. 0 (2402 MHz) up/do in test mode. Orientation Z=V
 EMCO 3115 antenna (3GHz - 18GHz). AV detector used.
 29-09-2008 11:34:37
 Sequence: Final Measurements

Onyx (EM35) 22335 - Table

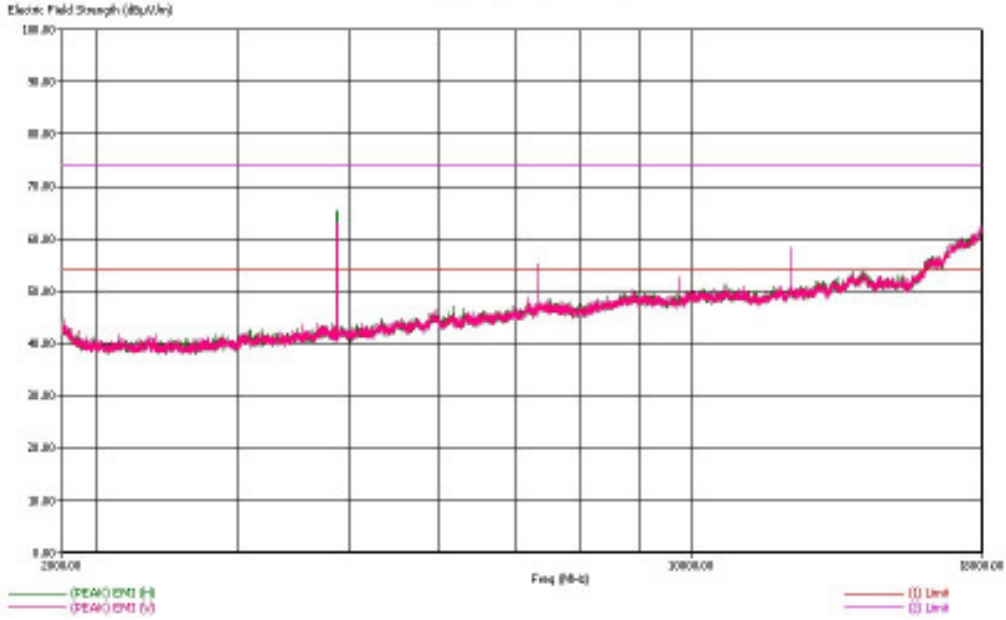
Freq (MHz)	Freq (Max) (MHz)	(AVG) EMI (dBuV/m)	(1) Limit (dBuV/m)	(AVG) Margin Lim1 (dB)	Ttbl Agl (deg)	Pol
4803.50	4803.62	52.00	54.00	-2.00	184.20	H
4804.50	4804.38	49.70	54.00	-4.30	307.40	V
7206.50	7205.96	41.22	54.00	-12.78	184.30	H
12009.00	12010.12	42.62	54.00	-11.38	169.50	V
12010.00	12010.12	43.35	54.00	-10.65	266.70	H

3-18 GHz Low Channel Dual Polarization Z

Title: FCC 15.247(c)
File: Onvx (EM 35) 22335 (5.31) (ESU) FCC15.247 BT2400 Tch-mid_X 2008-09-26 -3-18.set
Operator: ADM: AAI / PM: T1 / user: 001
EUT Type: Onvx (EM 35) IMEI: 35506020000872, FCC ID: IHDP56JC1
EUT Condition: Board Rev: P3A - closed
Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.
BT ch. 39 (2441 MHz) u0/00 in test mode. Orientation X=V
EM CO 3115 antenna (3GHz - 18GHz). Peak detector used.

29-09-2008 10:22:25
Sequence: Preliminary Scan

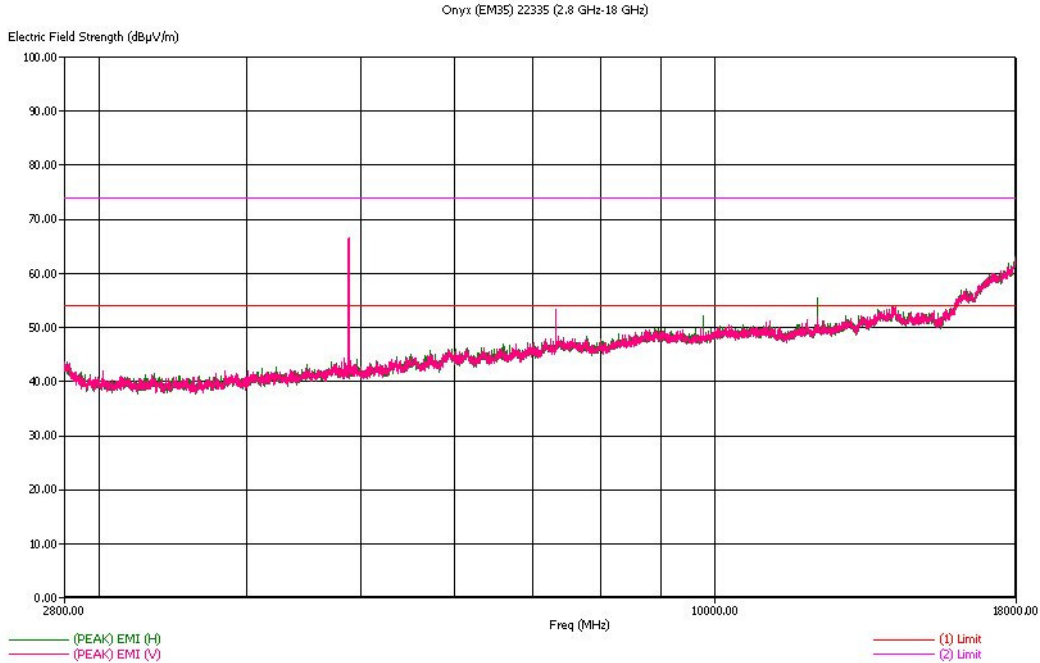
Key (NONE) 2225 (2.4 GHz-18 GHz)



3-18 GHz Middle Channel Dual Polarization X

Title: FCC 15.247(c)
 File: Onyx (EM35) 22335 (5.31)(ESU) FCC15.247 BT2400 Tch-mid_Y 2008-09-26 -3-18.set
 Operator: ADR AAL FMC TL1 usv001
 EUT Type: Onyx (EM35). IMEI: 355906020000872, FCC ID: IHDP56JC1
 EUT Condition: Board Rev: P3A , closed
 Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.
 BT ch. 39 (2441 MHz) up/do in test mode. Orientation Y=V
 EMCO 3115 antenna (3GHz - 18GHz). Peak detector used.

26-09-2008 15:31:39
 Sequence: Preliminary Scan



Peak detector:

Title: FCC 15.247(c)
 File: Onyx (EM35) 22335 (5.31)(ESIB) FCC15.247 BT2400 Tch-mid_Y 2008-09-26 -PK -VBW=#Sequence: Final Measurements
 Operator: ADR AAL EMC TL1 usv001
 EUT Type: Onyx (EM35). IMEI: 355906020000872, FCC ID: IHDP56JC1
 EUT Condition: Board Rev: P3A , closed
 Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.
 BT ch. 39 (2441 MHz) up/do in test mode. Orientation Y=V
 EMCO 3115 antenna (3GHz - 18GHz). PK detector used.

02-10-2008 10:02:37

Onyx (EM35) 22335 - Table

Freq (MHz)	Freq (Max) (MHz)	(PEAK) EMI (dBµV/m)	(2) Limit (dBµV/m)	(PEAK) Margin Lim2 (dB)	Ttbl Agl (deg)	Pol
4882.00	4882.00	64.02	74.00	-9.98	255.00	H
4882.50	4882.03	68.58	74.00	-5.42	125.80	V

Average detector:

Title: FCC 15.247(c)
 File: Onyx (EM35) 22335 (5.31)(ESU) FCC15.247 BT2400 Tch-mid_Y 2008-09-26 -AV -17.975Sequence: Final Measurements
 Operator: ADR AAL EMC TL1 usv001
 EUT Type: Onyx (EM35). IMEI: 355906020000872, FCC ID: IHDP56JC1
 EUT Condition: Board Rev: P3A , closed
 Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.
 BT ch. 39 (2441 MHz) up/do in test mode. Orientation Y=V
 EMCO 3115 antenna (3GHz - 18GHz). AV detector used.

26-09-2008 16:13:50

Onyx (EM35) 22335 - Table

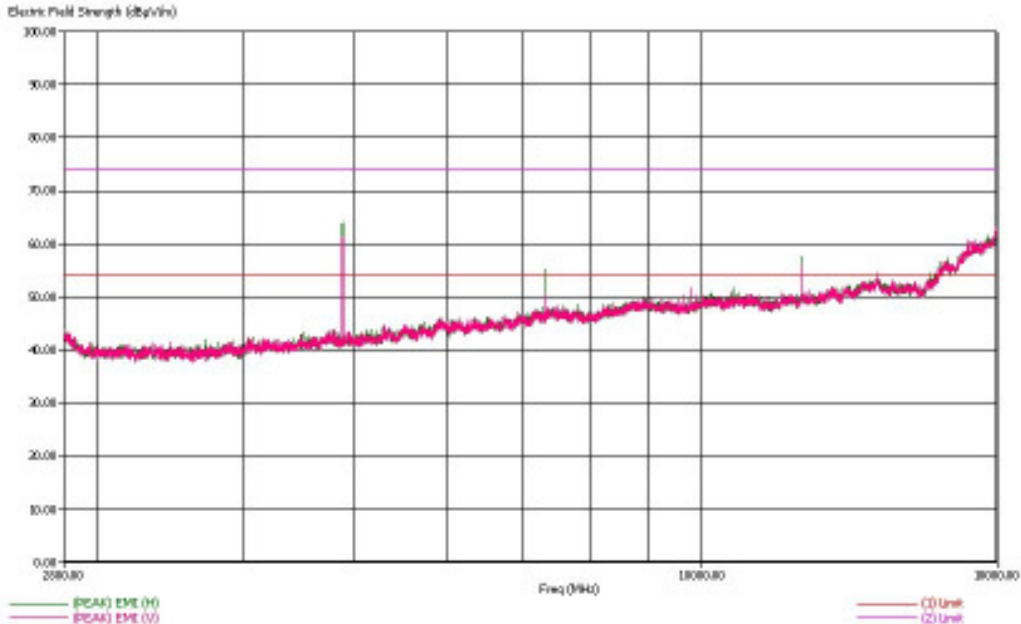
Freq (MHz)	Freq (Max) (MHz)	(AVG) EMI (dBµV/m)	(1) Limit (dBµV/m)	(AVG) Margin Lim1 (dB)	Ttbl Agl (deg)	Pol
17975.00	17966.82	49.53	54.00	-4.47	359.30	H
17975.00	17978.11	49.36	54.00	-4.64	0.10	V

3-18 GHz Middle Channel Dual Polarization Y
 (See appendix 1)

Title: FCC 15.247(c)
File: Orvx (EM35) 22335 (5.31)(ESU) FCC15.247 BT2400 Tch-mid_Z 2008-09-26 -3-18.set
Operator: ADR A.A. EMC: T1 10x001
EUT Type: Orvx (EM35), IMEI: 355906020000872, FCC ID: IHDP56JC1
EUT Condition: Board Rev: P3A - closed
Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.
BT ch. 39 (2441 MHz) up/down in test mode. Orientation Z=V
EMCO 3115 antenna (3GHz - 18GHz). Peak detector used.

26-09-2008 15:18:17
Sequence: Preliminary Scan

Orvx (EM35) 22335 (3.0 GHz-18 GHz)

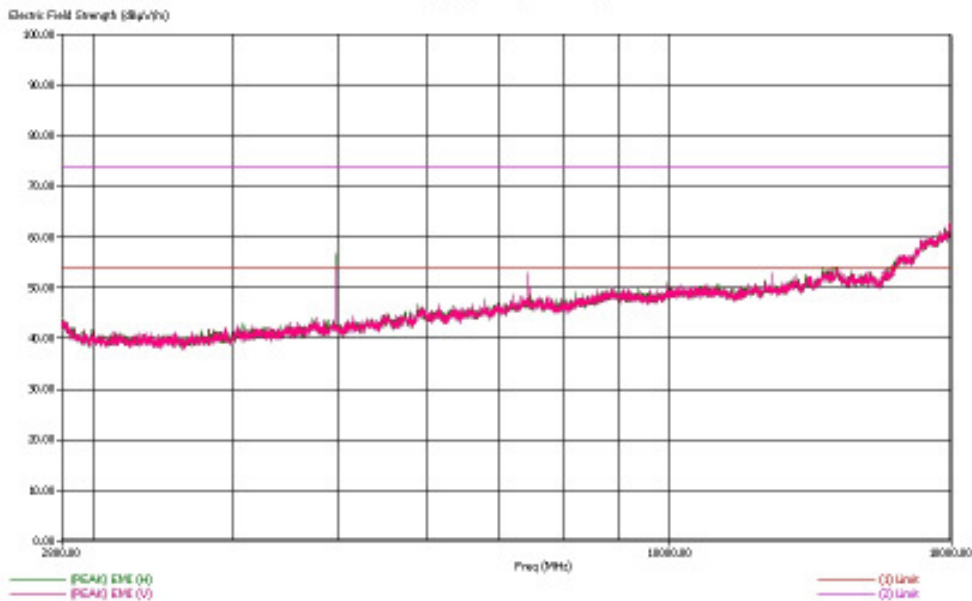


3-18 GHz Middle Channel Dual Polarization Z

Title: FCC 15.247(c)
File: Orvx (EM35) 22335 (5.31)(ESU) FCC15.247 BT2400 Tch-high_X 2008-09-26 -3-18.set
Operator: ADR A.A. EMC: T1 10x001
EUT Type: Orvx (EM35), IMEI: 355906020000872, FCC ID: IHDP56JC1
EUT Condition: Board Rev: P3A - closed
Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.
BT ch. 76 (2480 MHz) up/down in test mode. Orientation X=V
EMCO 3115 antenna (3GHz - 18GHz). Peak detector used.

29-09-2008 09:45:40
Sequence: Preliminary Scan

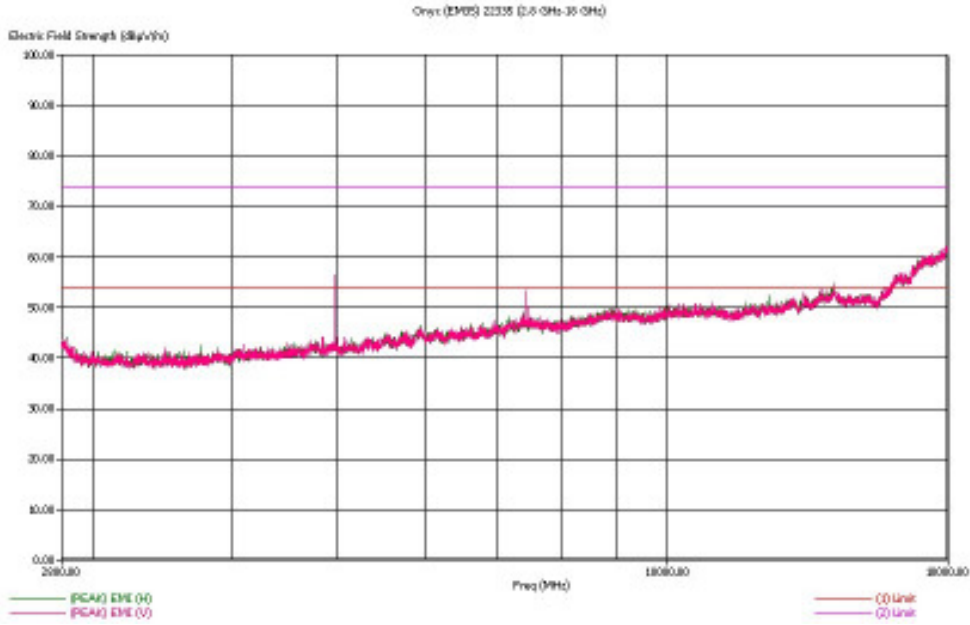
Orvx (EM35) 22335 (3.0 GHz-18 GHz)



3-18 GHz High Channel Dual Polarization X

Title: FCC 15.247(c)
File: Onyx (EM35) 22335 (5.31)(ESU) FCC15.247 BT2400 Tch-high_Y 2008-09-26 -3-16.asst
Operator: ADR, A&I, EMC, TI, I, usv001
EUT Type: Onyx (EM35), IMEI: 355906020000872, FCC ID: IHDP56JC1
EUT Condition: Board Rev: P3A, closed
Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.
BT ch. 75 (2480 MHz) up/down in test mode. Orientation Y=V
EMCO 3115 antenna (3GHz - 18GHz). Peak detector used.

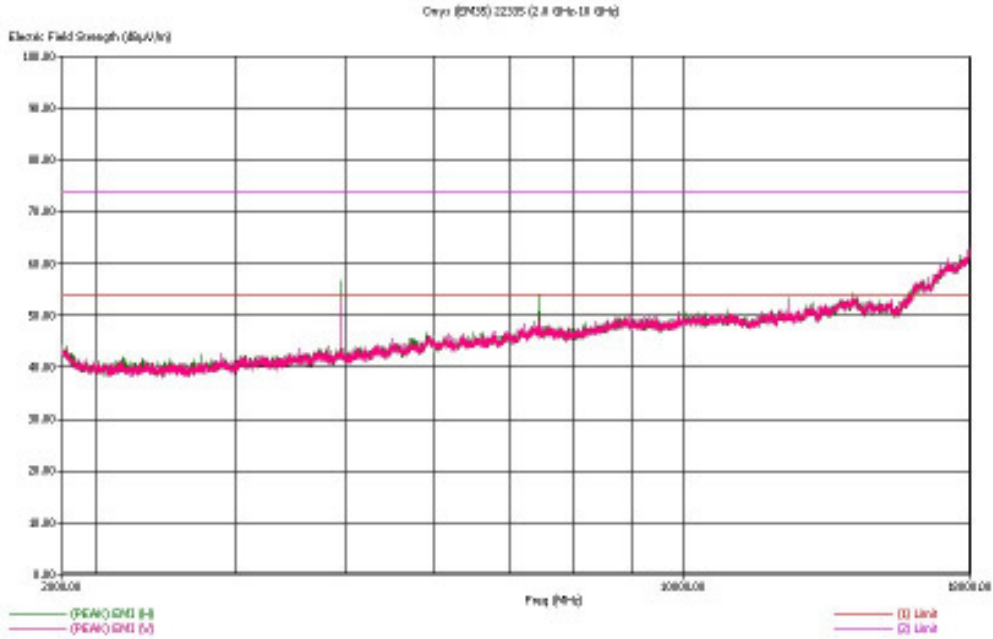
26-09-2008 15:59:03
Sequence: Preliminary Scan



3-18 GHz High Channel Dual Polarization Y

Title: FCC 15.247(c)
File: Onyx (EM35) 22335 (5.31)(ESU) FCC15.247 BT2400 Tch-high_Z 2008-09-26 -3-16.asst
Operator: ADR, A&I, EMC, TI, I, usv001
EUT Type: Onyx (EM35), IMEI: 355906020000872, FCC ID: IHDP56JC1
EUT Condition: Board Rev: P3A, closed
Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.
BT ch. 75 (2480 MHz) up/down in test mode. Orientation Z=V
EMCO 3115 antenna (3GHz - 18GHz). Peak detector used.

26-09-2008 14:51:16
Sequence: Preliminary Scan

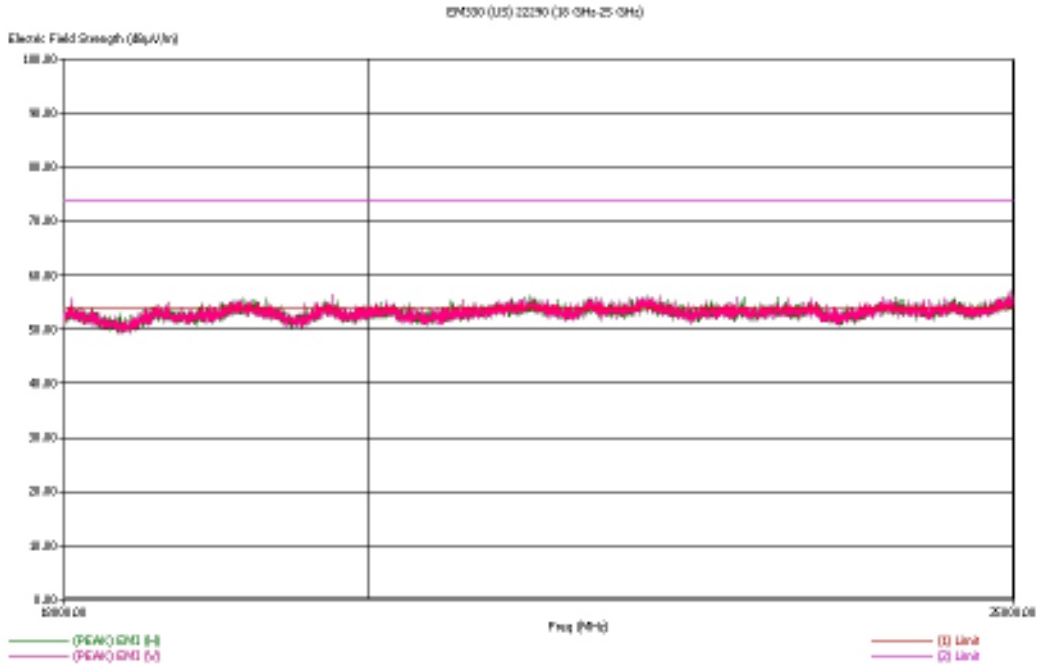


3-18 GHz High Channel Dual Polarization Z

There were no discernible emissions above the noise floor for 18-25 GHz for Low, Mid and High Channels and all polarizations in Bluetooth band

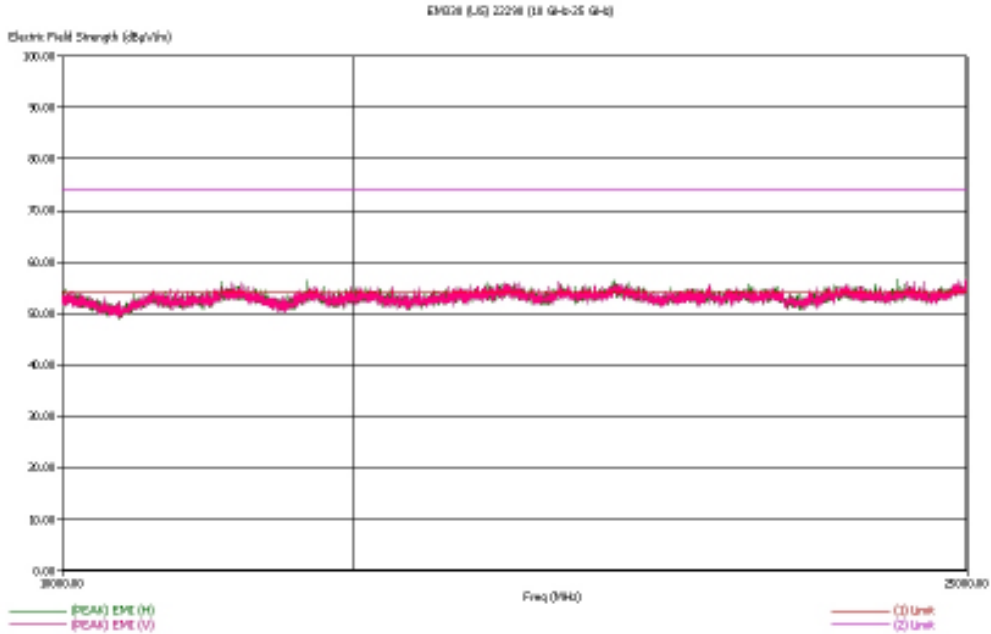
Only one worst case plot for each test frequency are shown in the below plots in the range from 18 GHz – 26 GHz.

Title: FCC 15.247(e)
File: Ornx (EM 35) 22335 (5.31 XESU) FCC15.247 BT3400 Tch-low_Y 2008-09-26 - 18-25.set
Operator: ΔNR ΔΔI EM: TI 1 usv001
EUT Type: Ornx (EM 35) IMEI: 355906020000872, FCC ID: IHDP56JC1
EUT Condition: Board Rev: P3A . closed
Comments: FCC 15.247(e)(1) Bluetooth (BT) emission in TCH mode.
BT ch. 0 (2402 MHz) up/down in best mode. Orientation Y=V
EM CO 3116 antenna (18GHz - 25GHz). Peak detector used.



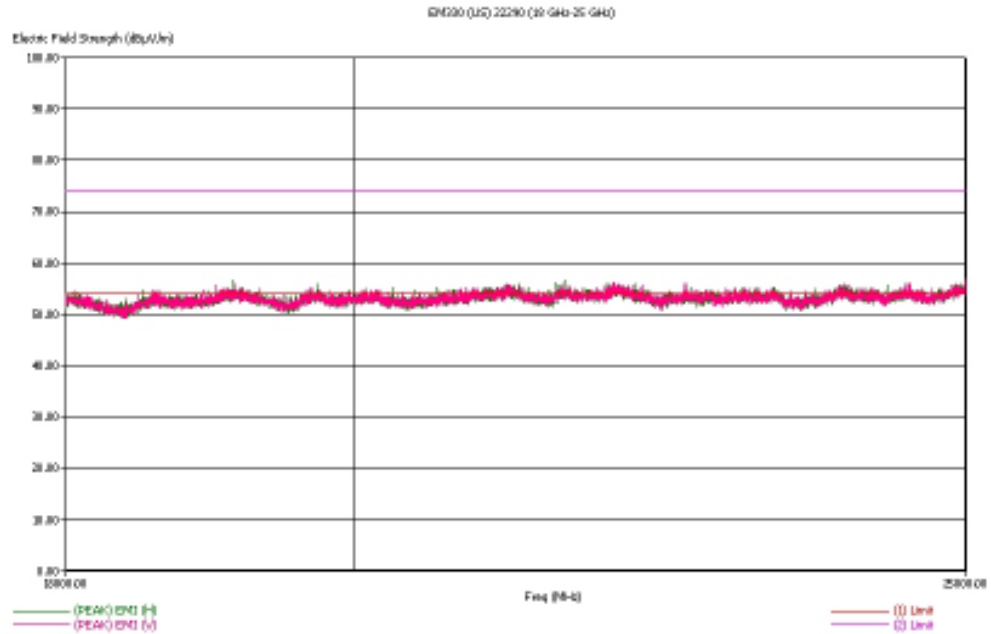
18-25 GHz Low Channel Dual Polarization Y

Title: FCC 15.247(c)
File: Orvx (EM35) 22335 (5.31)(ESU) FCC15.247 BT2400 Tch-mk_Y 2008-09-26 -18-25.set Sequence: Preliminary Scan
Operator: ADR: A41 PASC: TI 1 usv001
EUT Type: Orvx (EM35), IMEI: 355908020000872, FCC ID: IHDP56JC1
EUT Condition: Board Rev: P3A, closed
Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.
BT ch. 39 (2441 MHz) up/0 in test mode. Orientation Y=V
EMCO 3118 antenna (18GHz - 25GHz). Peak detector used.



18-25 GHz Middle Channel Dual Polarization Y

Title: FCC 15.247(c)
File: Orvx (EM35) 22335 (5.31)(ESU) FCC15.247 BT2400 Tch-high_Y 2008-09-26 -18-25.set Sequence: Preliminary Scan
Operator: ADR: A41 PASC: TI 1 usv001
EUT Type: Orvx (EM35), IMEI: 355908020000872, FCC ID: IHDP56JC1
EUT Condition: Board Rev: P3A, closed
Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.
BT ch. 78 (2450 MHz) up/0 in test mode. Orientation Y=V
EMCO 3118 antenna (18GHz - 25GHz). Peak detector used.



18-25 GHz High Channel Dual Polarization Y

BAND-EDGE COMPLIANCE OF RF RADIATED EMISSIONS

CFR Part 15.247

Measurement Procedure

The test sample is placed inside the semi-anechoic chamber on a polystyrene table at the turntable center. Test is repeated for both horizontal and vertical polarizations of the receive antenna.

Field Strength (dB μ V/m) = EMI Receiver Level (dB μ V) + Cable Loss (dB) + Filter Loss (dB) - Amplifier Gain (dB) + Antenna Correction Factor (3/m)

The test sample was operated in Bluetooth single channel test mode. A fully charged battery was used for the supply voltage.

Measurement Results

Comments:

The band edge measurements crossing the corner for the low channel with respect to the average limit line is acceptable when applying the FCC rule specified in CFR 47 part 15.35(b) for the use of peak detector above 1 GHz.

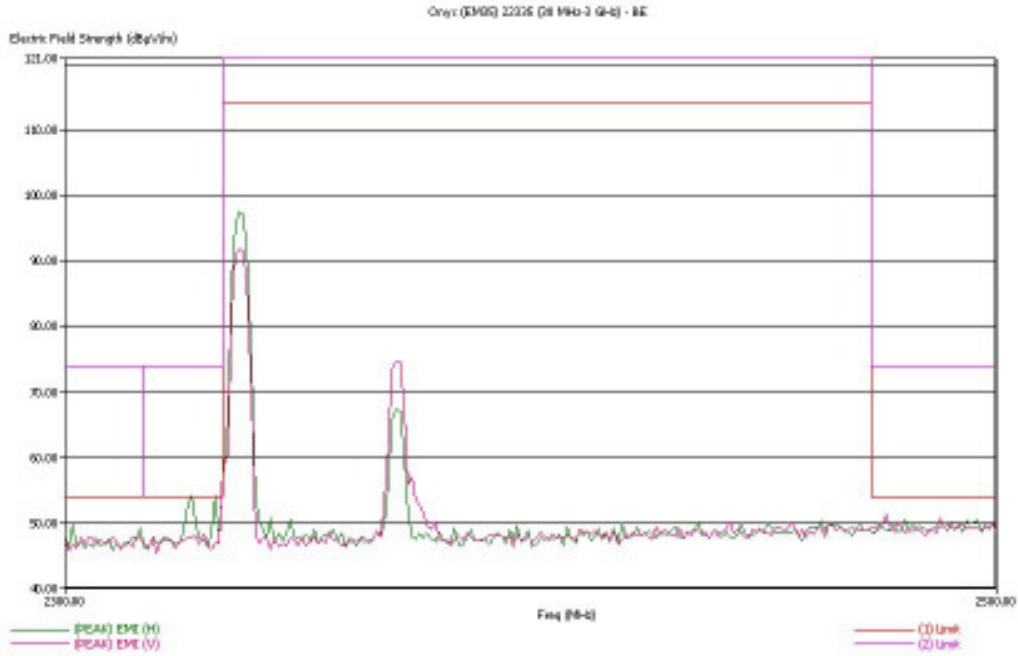
The test was performed in 22.5 degree angular step size when the band edge crossing is measured to be +6 dB above the AVG limit line.

The peak detector limit line has been added to the graphical plots.

See Attached:

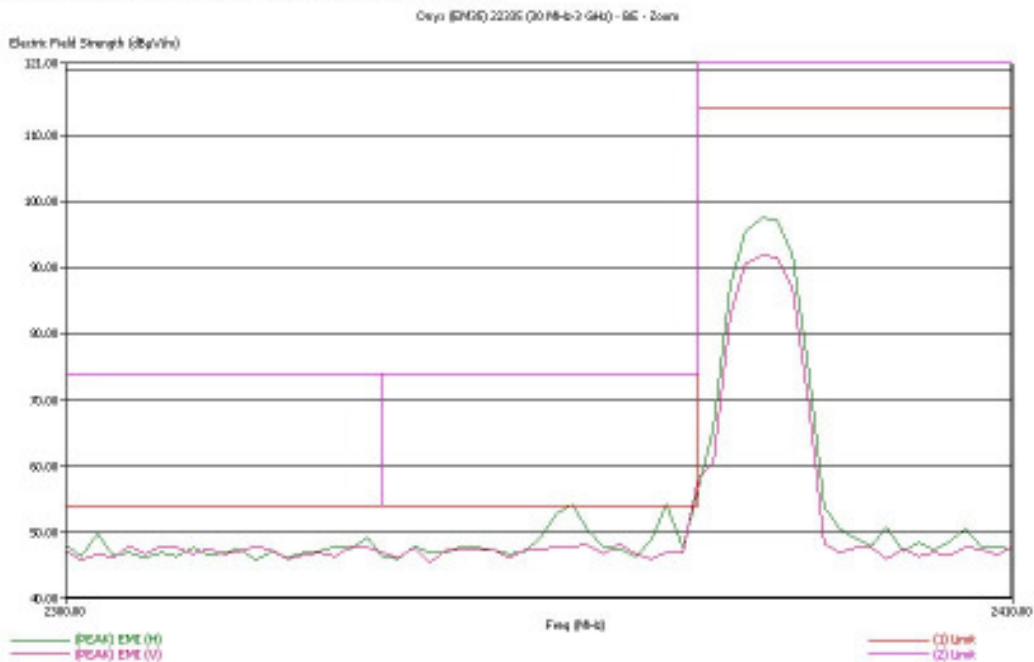
Title: FCC 15.247(c)
File: Orvx (EM35) 22335 (5.31)(ESU) FCC15.247 BT2400 Tch-low_X 2008-08-26 -3.set
Operator: ADP AA1 PNC T1 1 uw/011
EUT Type: Orvx (EM35), IMEI: 352906020000572, FCC ID: IHDP56JC1
EUT Condition: Board Rev: P3A, closed
Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.
BT ch. 0 (2402 MHz) up/lo in test mode. Orientation X=V
HLP 3003C antenna (30MHz - 3 GHz). Peak detector used.

26-09-2008 12:22:37
Sequence: Preliminary Scan



Title: FCC 15.247(c)
File: Orvx (EM35) 22335 (5.31)(ESU) FCC15.247 BT2400 Tch-low_X 2008-08-26 -3.set
Operator: ADP AA1 PNC T1 1 uw/011
EUT Type: Orvx (EM35), IMEI: 352906020000572, FCC ID: IHDP56JC1
EUT Condition: Board Rev: P3A, closed
Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.
BT ch. 0 (2402 MHz) up/lo in test mode. Orientation X=V
HLP 3003C antenna (30MHz - 3 GHz). Peak detector used.

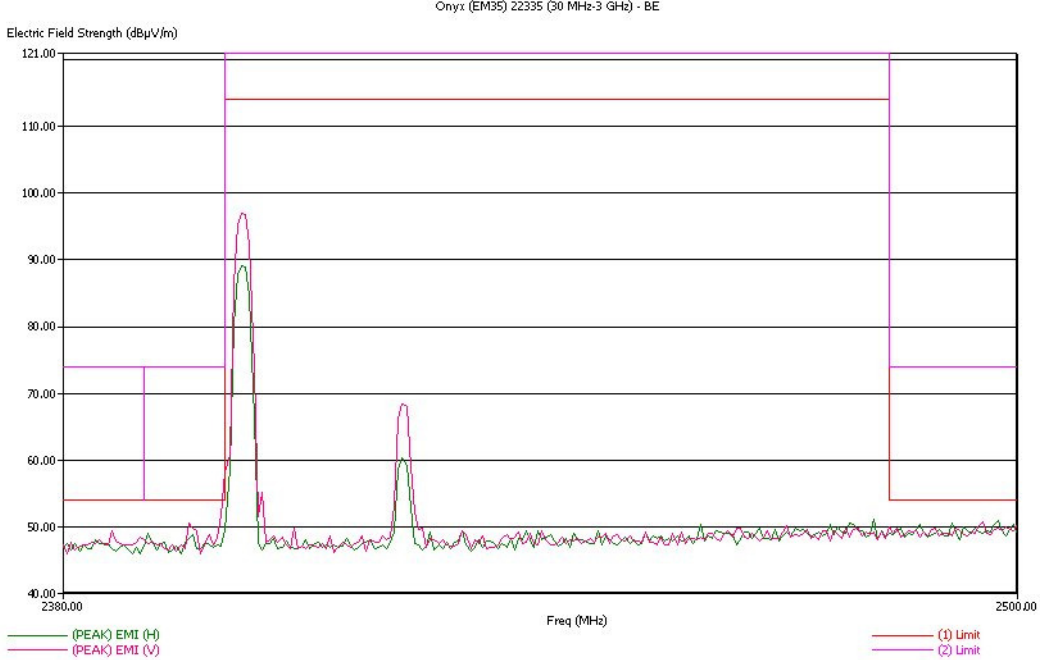
26-09-2008 12:22:37
Sequence: Preliminary Scan



Authorized Band Emissions, Low Channel, Dual Polarization, X

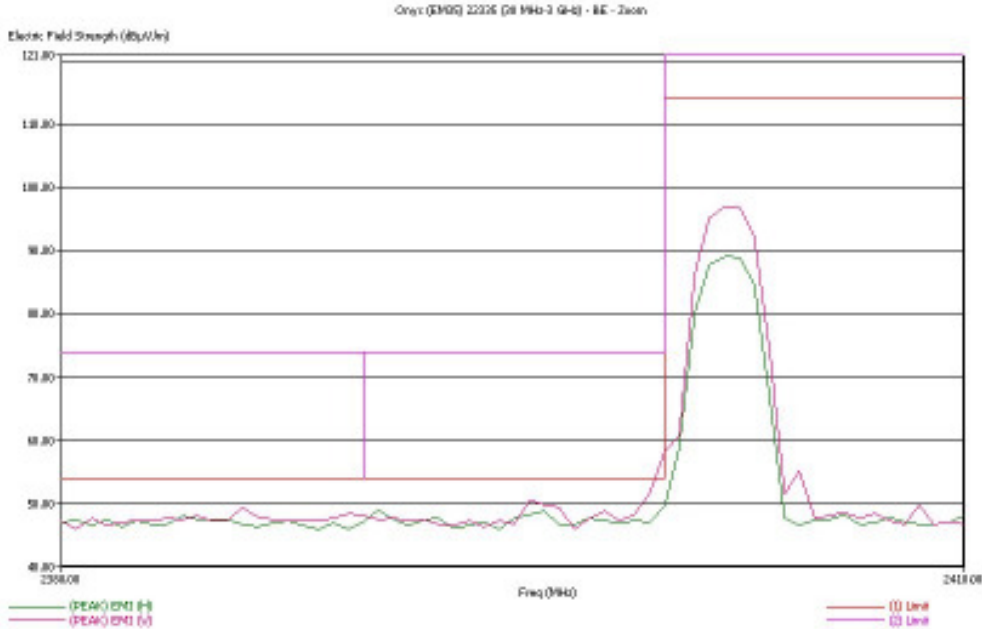
Title: FCC 15.247(c)
File: Onvx (EM 35) 22335 (5.31)(ESU) FCC15.247 BT2400 Tch-low_Y 2008-09-26 -3.set
Operator: ADR AAI FMC TI 1 usv001
EUT Type: Onvx (EM 35), IMEI: 355906020000872, FCC ID: IHDP56JC1
EUT Condition: Board Rev: P3A, closed
Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.
BT ch. 0 (2402 MHz) up/down in test mode, Orientation Y=V
HLP 3003C antenna (30MHz - 3 GHz), Peak detector used.

26-09-2008 13:59:39
Sequence: Preliminary Scan



Title: FCC 15.247(c)
File: Onvx (EM 35) 22335 (5.31)(ESU) FCC15.247 BT2400 Tch-low_Y 2008-09-26 -3.set
Operator: ADR AAI FMC TI 1 usv001
EUT Type: Onvx (EM 35), IMEI: 355906020000872, FCC ID: IHDP56JC1
EUT Condition: Board Rev: P3A, closed
Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.
BT ch. 0 (2402 MHz) up/down in test mode, Orientation Y=V
HLP 3003C antenna (30MHz - 3 GHz), Peak detector used.

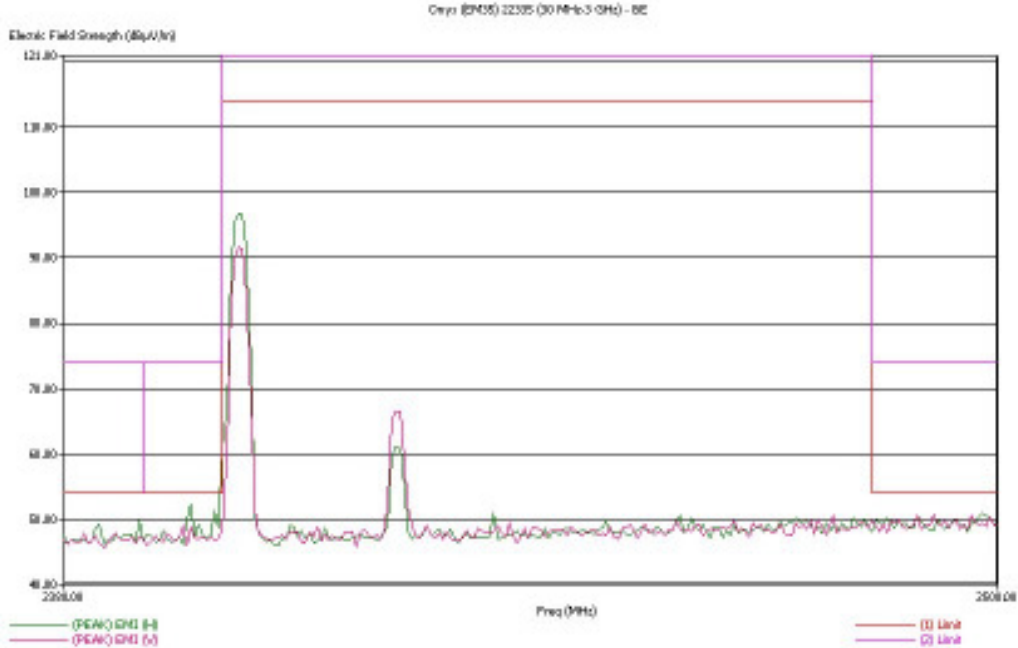
26-09-2008 13:59:39
Sequence: Preliminary Scan



Authorized Band Emissions, Low Channel, Dual Polarization, Y

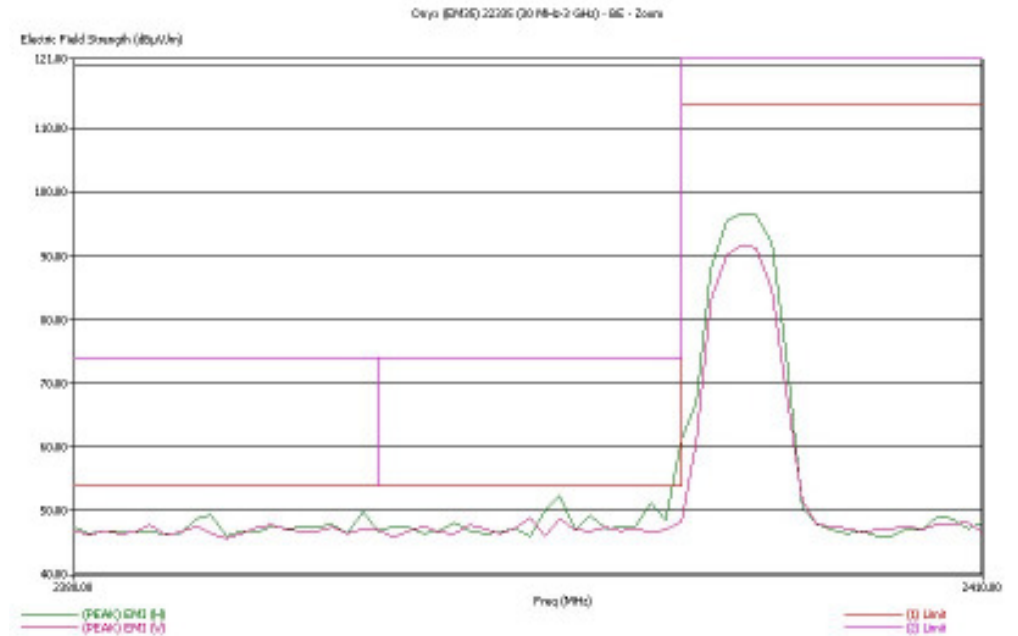
Title: FCC 15.247(c)
File: Omv (EM 35) 22335 (5.31)(ESU) FCC15.247 BT2400 Tch-low_Z 2008-09-26 -3.set
Operator: ADR 441 PRC: T1 1 usv001
EUT Type: Omv (EM 35), IMEI: 355906020000872, FCC ID: IHDP56JC1
EUT Condition: Board Rev: P3A, closed
Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.
BT ch. 39 (2441 MHz) up/down in test mode. Orientation Z=V
HLP 3003C antenna (30MHz - 3 GHz). Peak detector used.

26-09-2008 14:10:26
Sequence: Preliminary Scan



Title: FCC 15.247(c)
File: Omv (EM 35) 22335 (5.31)(ESU) FCC15.247 BT2400 Tch-low_Z 2008-09-26 -3.set
Operator: ADR 441 PRC: T1 1 usv001
EUT Type: Omv (EM 35), IMEI: 355906020000872, FCC ID: IHDP56JC1
EUT Condition: Board Rev: P3A, closed
Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.
BT ch. 39 (2441 MHz) up/down in test mode. Orientation Z=V
HLP 3003C antenna (30MHz - 3 GHz). Peak detector used.

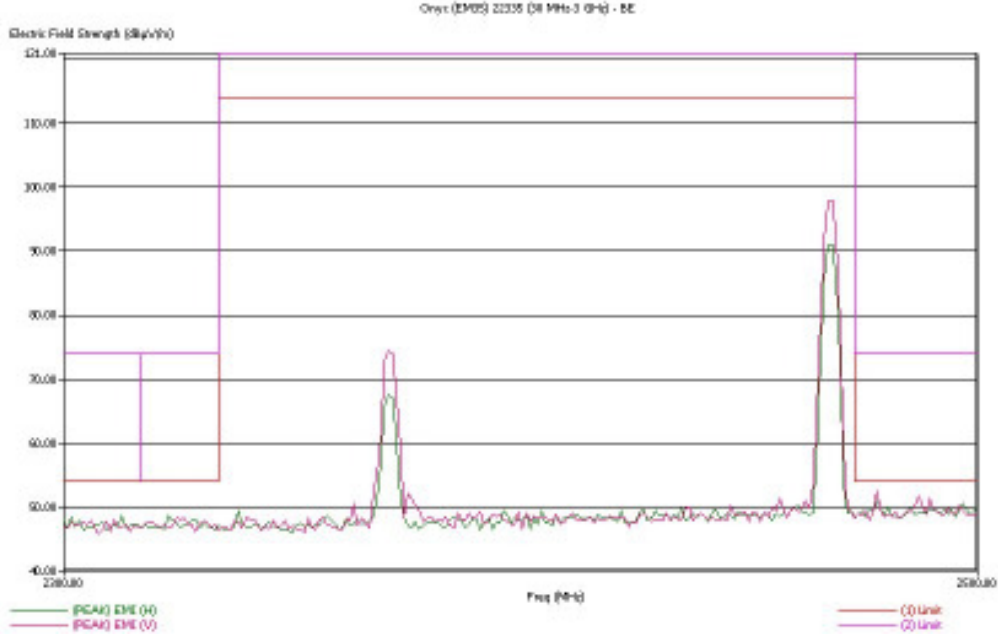
26-09-2008 14:10:26
Sequence: Preliminary Scan



Authorized Band Emissions, Low Channel, Dual Polarization, Z

Title: FCC 15.247(c)
File: Orvx (EM 35) 22335 (5.31)(ESU) FCC15.247 BT2400 Tch-hgh_X 2008-09-26 -3.aet
Operator: ADR 4.61 P.M.C. T1 1.00001
EUT Type: Orvx (EM 35) IMEI: 355906020000872, FCC ID: IHDP56JC1
EUT Condition: Board Rev: PSA - closed
Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.
BT ch. 76 (2480 MHz) up/down in test mode. Orientation X=V
HLP 3003C antenna (30MHz - 3 GHz). Peak detector used.

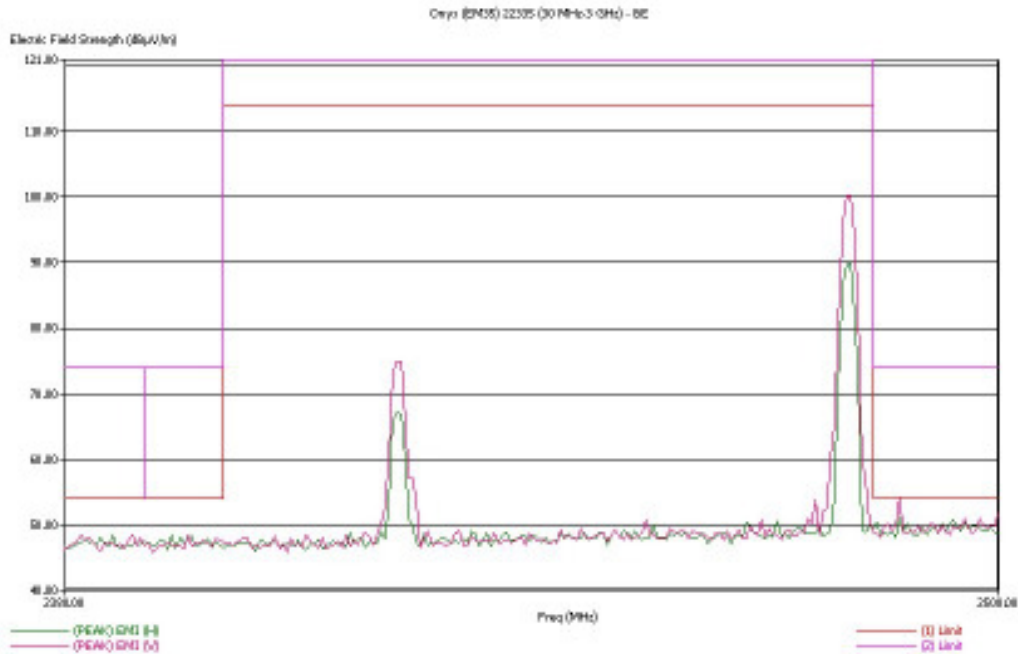
26-09-2008 12:32:42
Sequence: Preliminary Scan



Authorized Band Emissions High Channel Dual Polarization X

Title: FCC 15.247(c)
File: Orvx (EM 35) 22335 (5.31)(ESU) FCC15.247 BT2400 Tch-hgh_Y 2008-09-26 -3.aet
Operator: ADR 4.61 P.M.C. T1 1.00001
EUT Type: Orvx (EM 35) IMEI: 355906020000872, FCC ID: IHDP56JC1
EUT Condition: Board Rev: PSA - closed
Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.
BT ch. 76 (2480 MHz) up/down in test mode. Orientation Y=V
HLP 3003C antenna (30MHz - 3 GHz). Peak detector used.

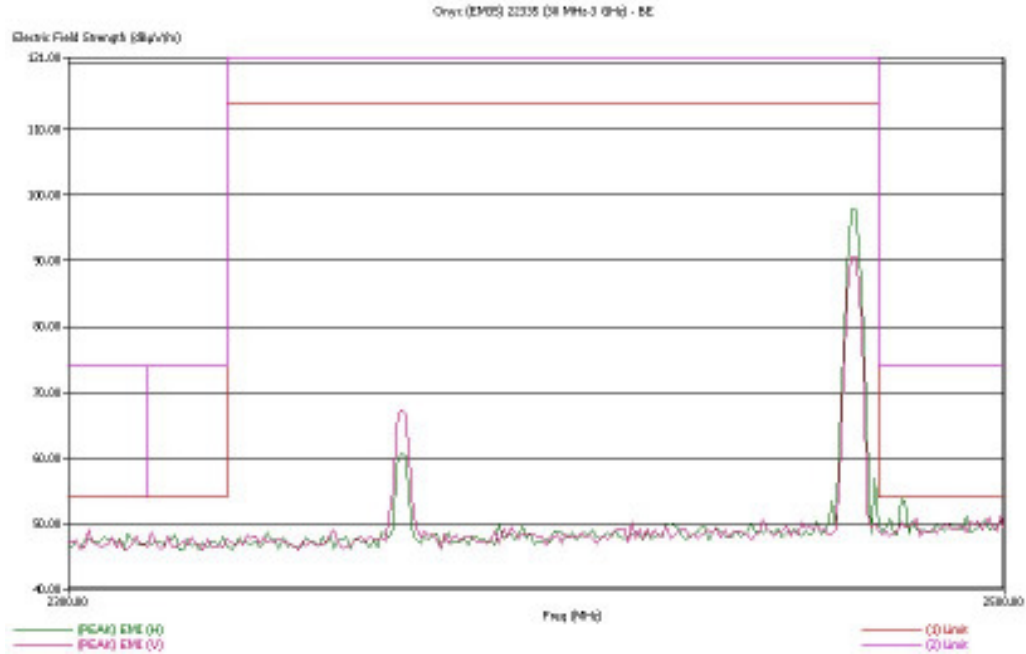
26-09-2008 12:51:00
Sequence: Preliminary Scan



Authorized Band Emissions High Channel Dual Polarization Y

Title: FCC 15.247(c)
File: Orux (EM35) 22335 (5.311)(E5U) FCC15.247 BT2400 Tech-high_Z 2008-09-26 -3.aes
Orux: a1R a.d1 F&C: T1 1450011
EUT Type: Orux (EM35) IMEI: 355906020000872, FCC ID: IHDP56JC1
EUT Condition: Board Rev: P3A - closed
Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.
BT ch. 75 (2480 MHz) up/down in test mode. Orientation Z=V
HLP 3003C antenna (30MHz - 3 GHz). Peak detector used.

26-09-2008 14:37:23
Sequence: Preliminary Scan



Authorized Band Emissions High Channel Dual Polarization Z

PICTURES

The pictures related to the above test results are placed in the associated report denoted as EXHIBIT 7A2.

APPENDIX

Appendix- 1 Dwell time analysis

Preliminary peak scans were performed in low, mid and high channels as well as with test sample configured along X, Y and Z orthogonal axis.

Per clause 15.35(c) of CFR 47, Part 15 and DA 00-705, the measured field strength was determined by averaging the pulse train over a 0.1 second interval.

Per data provided below the test sample dwell time, duty cycle was measured and the number of occurrences in 100 ms time interval was calculated. Finally

the time of occupancy on a single channel in various transmitting modes was calculated.

The worst case test scenario that is used for measured the test sample for this test report is single TX/RX channel. However the worst case real life scenario is a hopping sequence of 15 channels which is the minimum allowed number of hopping channels used in a Bluetooth session.

Based on the worst case dwell time of 3.1 ms in a 100 ms period as the channel will not be reused within that 100 ms period, the average value of measured emissions is calculated as follows:

$$3.14 \text{ ms} / 100\text{ms} = 0.031$$

$$20\log (0.031) = -30.2\text{dB}$$

When the calculated relaxation is applied to the measured peak field strength the levels were well below the limit and no average measurements were considered necessary.

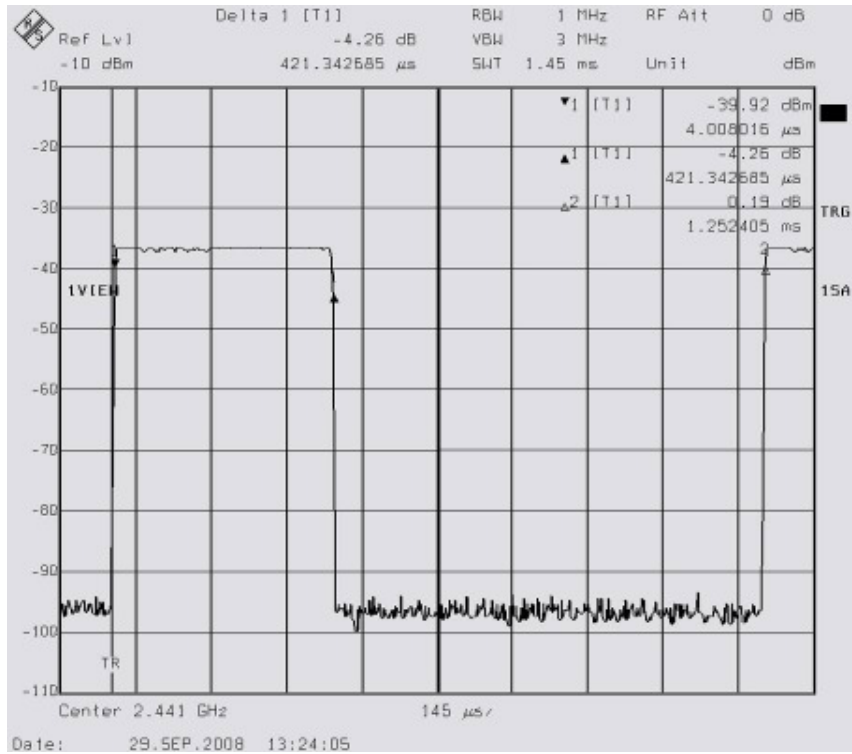
Packet Type	Dwell time (ms)	Period time (ms)	No. of Occurrence (100 ms)	Time of Occupancy [Single TX] (ms)	Time of Occupancy [Hop 15] (ms)	Time of Occupancy [Hop 79] (ms)
DH1	0.42	1.25	80.0	33.65	2.24	0.43
DH3	1.68	3.75	26.7	44.87	2.99	0.57
DH5	2.95	6.26	16.0	47.09	3.14	0.60

When the calculated relaxation is applied to the measured peak field strength the levels were well below the limit and no average measurements were considered necessary.

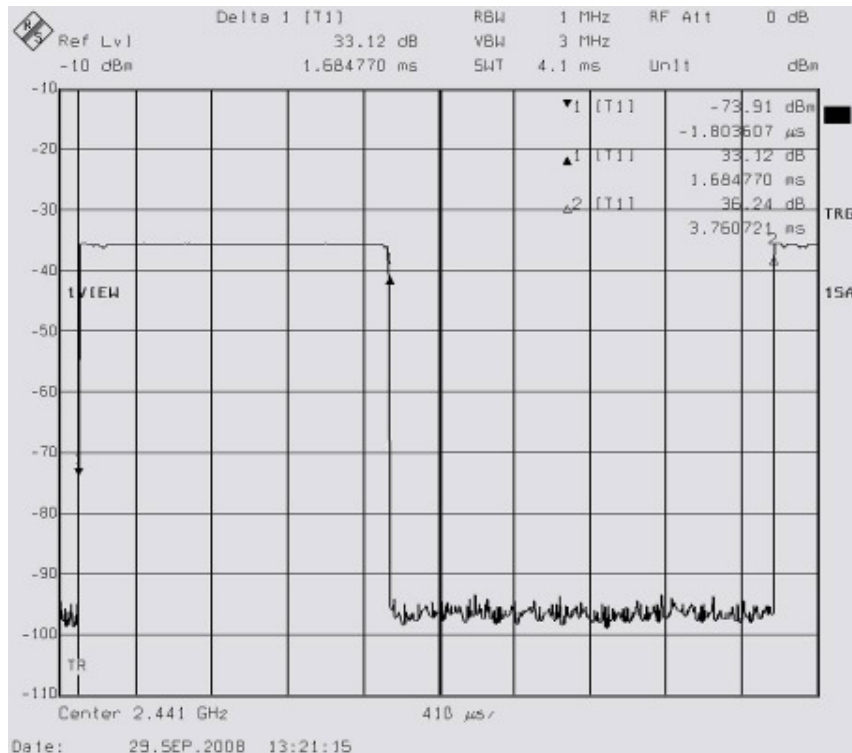
Worst case peak emission measured: 68.58 dBµV/m

Expected worst case emission when dwell time has been compensated:
 $68.58 \text{ dB}\mu\text{V/m} - 30.2 \text{ dB} = 38.38 \text{ dB}\mu\text{V/m}.$

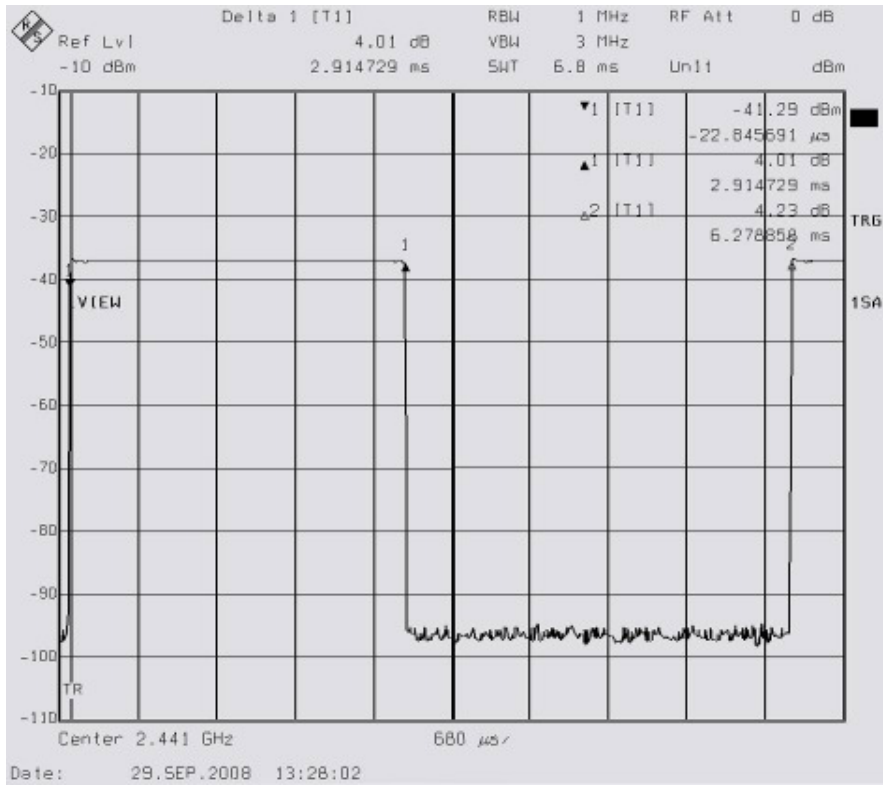
All measured emissions are found to be below the average limit line as defined in FCC part 15.209.



Dwell time and duty cycle for data pattern type DH1



Dwell time and duty cycle for data pattern type DH3



Dwell time and duty cycle for data pattern type DH5

End of Test Report