



**MOTOROLA**

**MOBILE DEVICES BUSINESS**

**PRODUCT SAFETY AND COMPLIANCE  
EMC LABORATORY**

**EMC TEST REPORT - Addendum**

**Test Report Number** – 22089-1BT

**Report Date** – 2008-06-26

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:

A handwritten signature in black ink, appearing to read 'Uffe L. Svejgaard'.

Name: Uffe Lund Svejgaard  
Test: 2008-06-18 to 2008-06-19

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

Signature:

A handwritten signature in black ink, appearing to read 'Per K. Nielsen'.

Name: Per K. Nielsen

Title: Sr. Staff Engineer

Date: 2008-06-26

This report must not be reproduced, except in full, without written approval from this laboratory.

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: Triple band 800/1700 AWS/1900 CDMA 1x  
with EV-DO release 0/A, Bluetooth Class 1 and  
aGPS.

Serial Numbers: A0000002C65066

FCC ID: IHDT56JW1

Project number: 22089-1

Testing Complete Date: 19-06-2009

## **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 2006**, 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 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 21.4° C +- 1.5 ° C and relative humidity of 45.1% +-5% over the days of 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:

<b>Equipment</b>	<b>Model/type</b>	<b>Serial number</b>	<b>Operational range</b>	<b>Date of calibration</b>
EMI analyzers	ESIB 26	100179	20 Hz – 26.5 GHz	15.05.2007
	ESU 40	100040	20 Hz – 40 GHz	07.02.2008
Pre-amplifiers	Sonoma 310N	185680	9 kHz – 1 GHz	19.06.2007
	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
	3 x 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 – 18 GHz	26.06.2007 and 13.03.2008
Filter	F-3S-2S (SK-Bypass)	na	30 MHz – 40 GHz	06.03.2008

Equipment related to carrier spectrum testing:

<b>Equipment</b>	<b>Model/type</b>	<b>Serial number</b>	<b>Operational range</b>	<b>Date of calibration</b>
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 + 2x 2-18 GHz pre-amp+3x 3dB attenuator.)	EMCO 3115	05896	1 GHz – 18 GHz	13.12.07
Double rigid horn (w. 2x 18-40 GHz pre-amp+6dB 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 Transmitter**

The 22089-1 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 $\mu$ V/m) = EMI Receiver Level (dB $\mu$ 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 used standard battery type was BT60 with model number SNN5782C.

#### **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 in slider open position 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 X orientation in horizontal polarity, see picture section.

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

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

#### Open:

Title: FCC 15.247(c)  
 File: Halo 22089 (5.31)(ESU) FCC15.247 BT2400 Tch-mid\_X 2008-06-18 Carrier -PK-open.set  
 Operator: ADR\_AAL\_EMC\_TL1\_usv001  
 EUT Type: Halo, FCC ID: IHDT56JW1, IMEI: A0000002C85088  
 EUT Condition: Board Rev: P3  
 Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.  
 BT channel 39 (2441 MHz) up/do in test mode. Orientation X=H  
 HLP 3009C antenna (30MHz - 3 GHz). Peak detector used.

18-06-2008 12:23:10  
 Sequence: Final Measurements

Halo 22089 - Table -Open

Freq (MHz)	Freq (Max) (MHz)	(PEAK) EMI (dBμV/m)	(1) Limit (dBμV/m)	(PEAK) Margin Limit (dB)	Tilt Ang (deg)	Pol	(PEAK) Trace (dBμV)
2441.00	2440.91	101.24	114.00	-12.76	296.50	H	94.92
2441.00	2441.07	87.03	114.00	-26.97	190.30	V	80.71

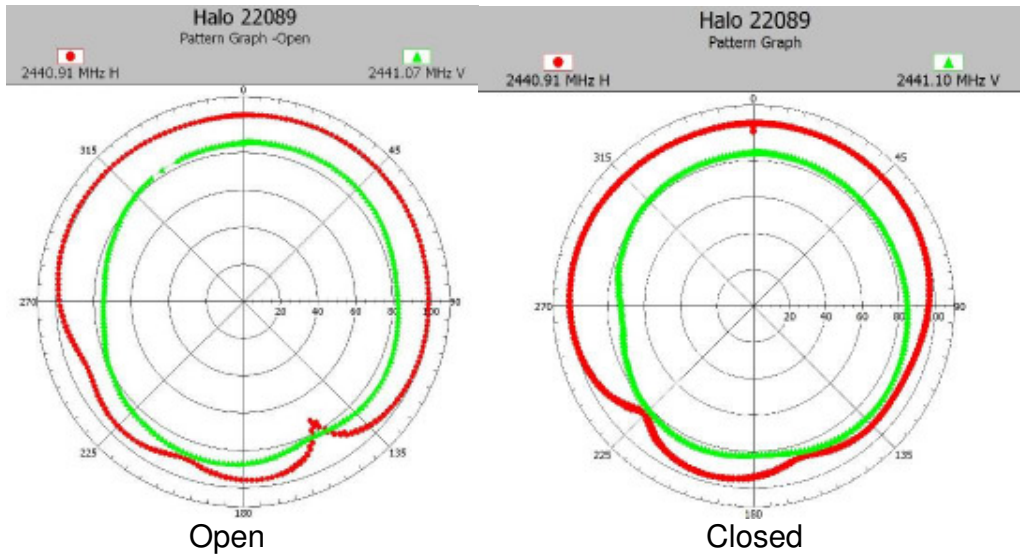
#### Closed:

Title: FCC 15.247(c)  
 File: Halo 22089 (5.31)(ESU) FCC15.247 BT2400 Tch-mid\_X 2008-06-18 Carrier -PK.set  
 Operator: ADR\_AAL\_EMC\_TL1\_usv001  
 EUT Type: Halo, FCC ID: IHDT56JW1, IMEI: A0000002C65066  
 EUT Condition: Board Rev: P3  
 Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.  
 BT channel 39 (2441 MHz) up/do in test mode. Orientation X=V  
 HLP 3009C antenna (30MHz - 3 GHz). Peak detector used.

18-06-2008 12:29:15  
 Sequence: Final Measurements

Halo 22089 - Table

Freq (MHz)	Freq (Max) (MHz)	(PEAK) EMI (dBμV/m)	(1) Limit (dBμV/m)	(PEAK) Margin Limit (dB)	Tilt Ang (deg)	Pol	(PEAK) Trace (dBμV)
2441.00	2440.91	101.07	114.00	-12.93	294.80	H	94.75
2441.00	2441.10	87.04	114.00	-26.96	127.20	V	80.71

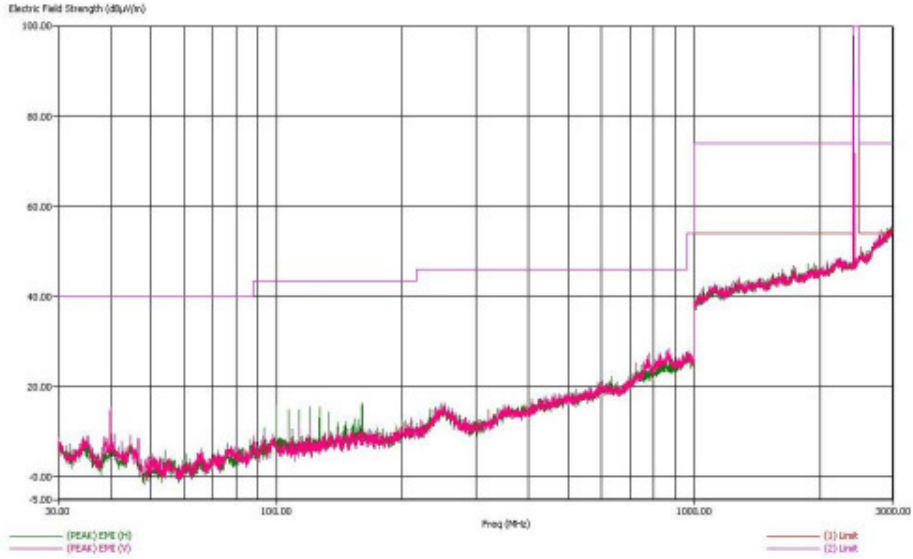


The Bluetooth radiated TX power is measured to 3.84 dBm on channel 39 with RBW=1 MHz (6 dB).

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

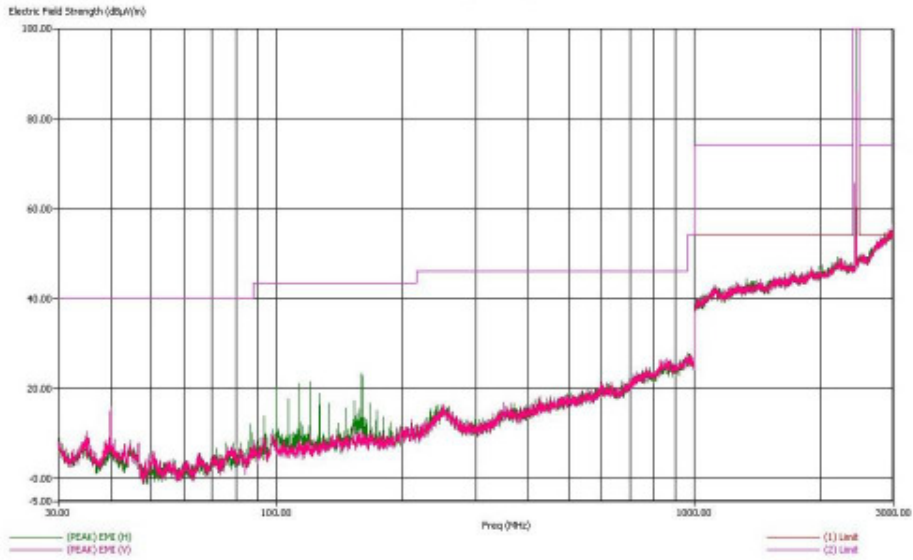
Only one worst case plot for each test frequency are shown in the below plots in the range from 30 MHz – 3000 MHz.

Title: FCC 15.247(c)  
File: Halo 22089 (5.31)(ESF) FCC15.247 BT2400 Tch-low\_X 2008-06-18 -3.set  
Operator: ADR\_AAE\_EMC\_TL1\_usw001  
EUT Type: Halo, FCC ID: IHDT56JW1, IMEI: A0000002C65066  
EUT Condition: Board Rev: P3, Open  
Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.  
BT ch. 39 (2441 MHz) up/down in test mode. Orientation X=V  
EIP 3003C antenna (30MHz - 3 GHz). Peak detector used.  
18-06-2008 14:24:07  
Sequence: Preliminary Scan  
Halo 22089 (30 MHz-3 GHz)



**30-3000 MHz Low Channel Dual Polarization X**

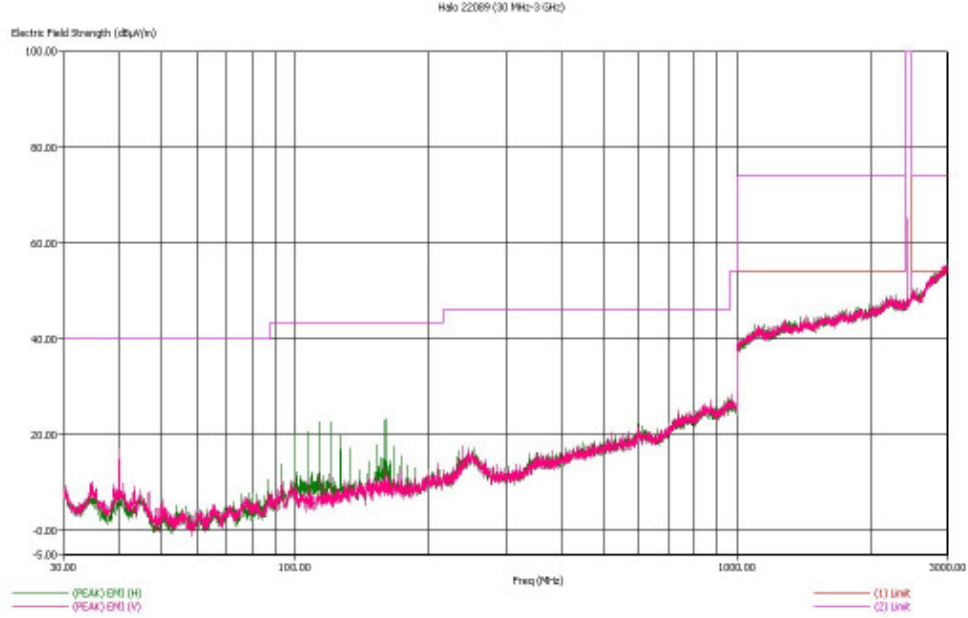
Title: FCC 15.247(c)  
File: Halo 22089 (5.31)(ESF) FCC15.247 BT2400 Tch-mid\_X 2008-06-18 -3.set  
Operator: ADR\_AAE\_EMC\_TL1\_usw001  
EUT Type: Halo, FCC ID: IHDT56JW1, IMEI: A0000002C65066  
EUT Condition: Board Rev: P3, Open  
Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.  
BT ch. 39 (2441 MHz) up/down in test mode. Orientation X=H/V  
EIP 3003C antenna (30MHz - 3 GHz). Peak detector used.  
18-06-2008 14:37:20  
Sequence: Preliminary Scan  
Halo 22089 (30 MHz-3 GHz)



**30-3000 MHz Middle Channel Dual Polarization X**

Title: FCC 15.247(c)  
File: Halo 22089 (5.31)(ESU) FCC15.247 BT2400 Tch-bgh\_X 2008-06-18 -3.set  
Operator: ADR\_AAL\_EMC\_TL1 usv001  
EUT Type: Halo, FCC ID: IHDT56JW1, IMEI: A0000002C65066  
EUT Condition: Board Rev: P3, Open  
Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.  
BT ch. 7B (2480 MHz) up/down in test mode. Orientation X=H/V  
HLP 3003C antenna (30MHz - 3 GHz). Peak detector used.

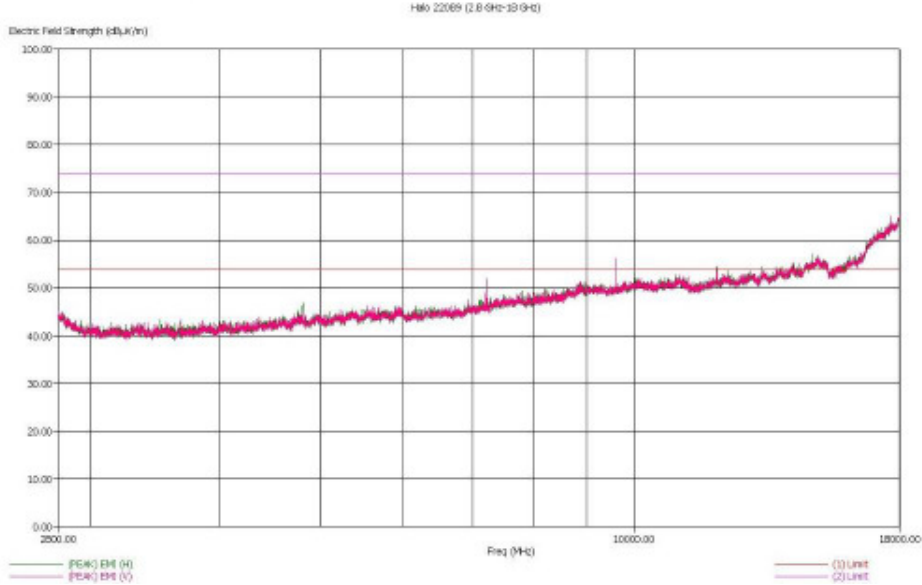
18-06-2008 15:12:14  
Sequence: Preliminary Scan



**30-3000 MHz High Channel Dual Polarization Z**

Title: FCC 15.247(c)  
File: Halo 22089 (5.31)(E9) FCC15.247 BT2400 Tech\_low\_X 2018-06-18 -3-18.net  
Operator: ADR\_AAL\_DMC\_TL1, usv001  
EUT Type: Holo, FCC ID: IHDT56JW1, IMEI: A6000002C65066  
EUT Condition: Board Rev: P3, Open  
Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCM mode.  
BT ch. 0 (2402 MHz) up/down in test mode. Orientation X=45°  
EM50 3115 antenna (30Hz - 10GHz). Peak detector used.

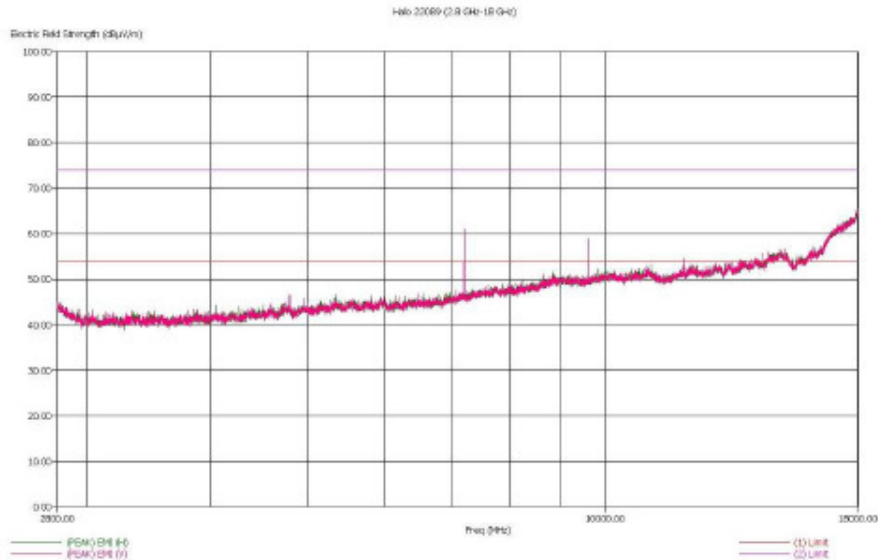
18-06-2018 17:50:35  
Sequence: Preliminary Scan



**3-18 GHz Low Channel Dual Polarization X**

Title: FCC 15.247(c)  
File: Halo 22089 (5.31)(E9) FCC15.247 BT2400 Tech\_low\_Y 2018-06-18 -3-18.net  
Operator: ADR\_AAL\_DMC\_TL1, usv001  
EUT Type: Holo, FCC ID: IHDT56JW1, IMEI: A6000002C65066  
EUT Condition: Board Rev: P3, Open  
Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCM mode.  
BT ch. 0 (2402 MHz) up/down in test mode. Orientation Y=45°  
EM50 3115 antenna (30Hz - 10GHz). Peak detector used.

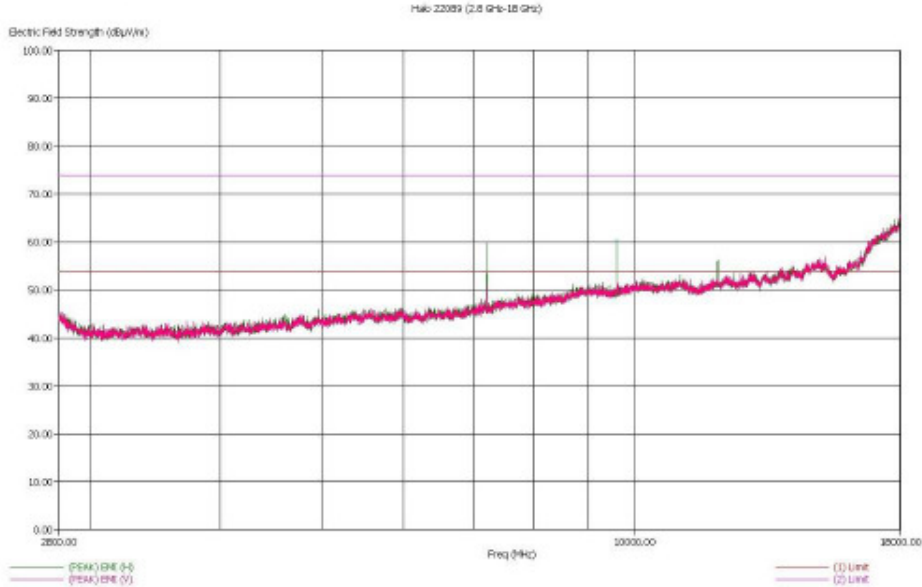
18-06-2018 18:02:34  
Sequence: Preliminary Scan



**3-18 GHz Low Channel Dual Polarization Y**

Title: FCC 15.247(c)  
File: Holo 22089 (5.31)(ESU) FCC15.247 ET1400 Tch-low\_X 2008-06-18 -3-18.net  
Operator: ADR\_MAL\_EMC\_TL1\_usr001  
EUT Type: Holo, FCC ID: IHDT56JW1, DMEI: A000002056066  
EUT Condition: Board Rev: P3, Open  
Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.  
ET ch. 0 (2402 MHz) up/down in test mode. Orientation Z-H/V  
EMCO 3115 antenna (30Hz - 18GHz). Peak detector used.

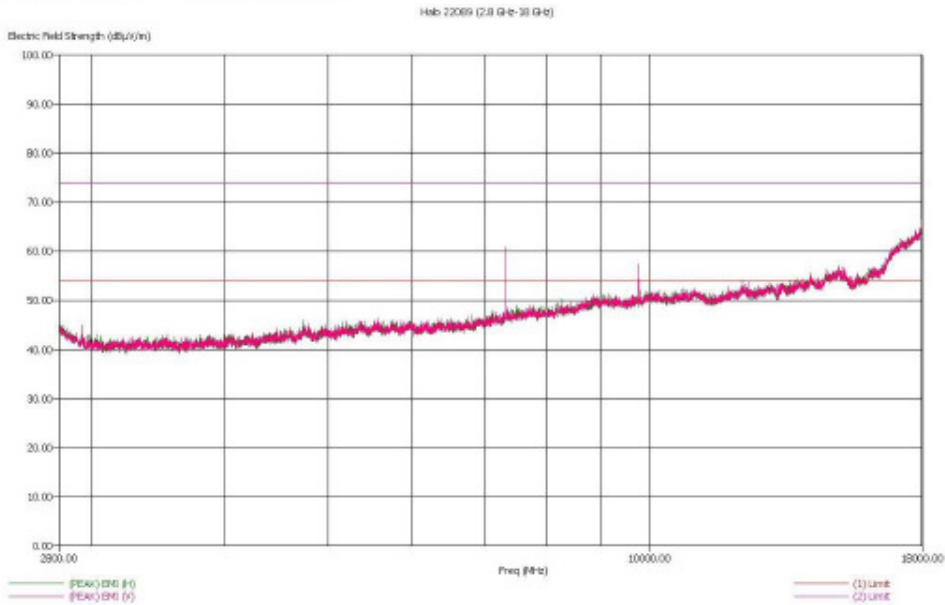
18-06-2008 16:53:29  
Sequence: Preliminary Scan



### 3-18 GHz Low Channel Dual Polarization Z

Title: FCC 15.247(c)  
File: Holo 22089 (5.31)(ESU) FCC15.247 ET1400 Tch-mid\_X 2008-06-18 -3-18.net  
Operator: ADR\_MAL\_EMC\_TL1\_usr001  
EUT Type: Holo, FCC ID: IHDT56JW1, DMEI: A000002056066  
EUT Condition: Board Rev: P3, Open  
Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.  
ET ch. 38 (2441 MHz) up/down in test mode. Orientation X-H/V  
EMCO 3115 antenna (30Hz - 18GHz). Peak detector used.

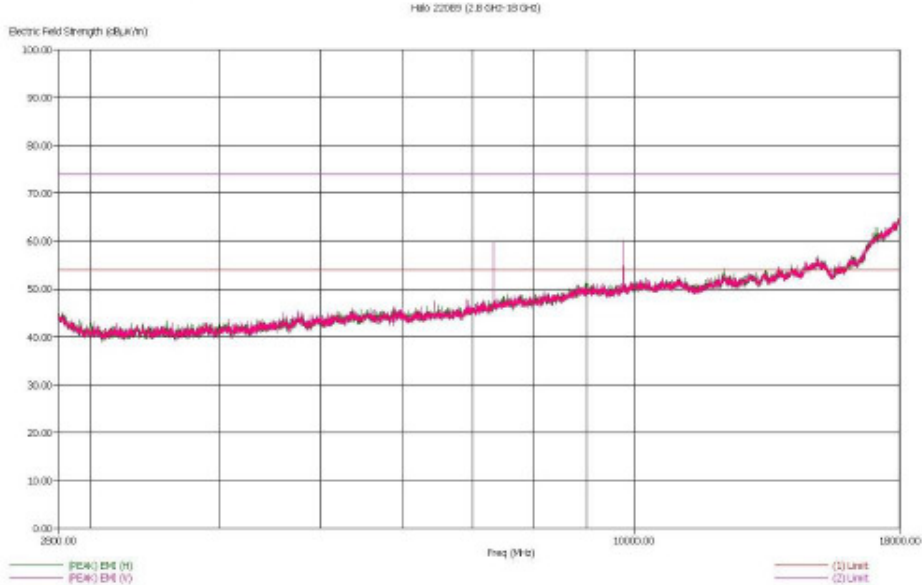
18-06-2008 17:39:33  
Sequence: Preliminary Scan



### 3-18 GHz Middle Channel Dual Polarization X

Title: FCC 15.247(c)  
File: Holo 22089 (5.31)(ESU) FCC15.247 BT2400 Tch-mid\_Y 2008-06-18 -3-18.net  
Operator: ADR\_AAL\_EMC\_TL1, usw001  
EUT Type: Holo, FCC ID: IHDT56JW1, IMEI: A800002C65066  
EUT Condition: Board Rev: F3, Open  
Comments: FCC 15.247(c)(1) Discontinuity (BT) emission in TCM mode.  
BT ch. 39 (2441 MHz) up-to in test mode. Orientation Y-H/V  
EMC 3115 antenna (30Hz - 18GHz). Peak detector used.

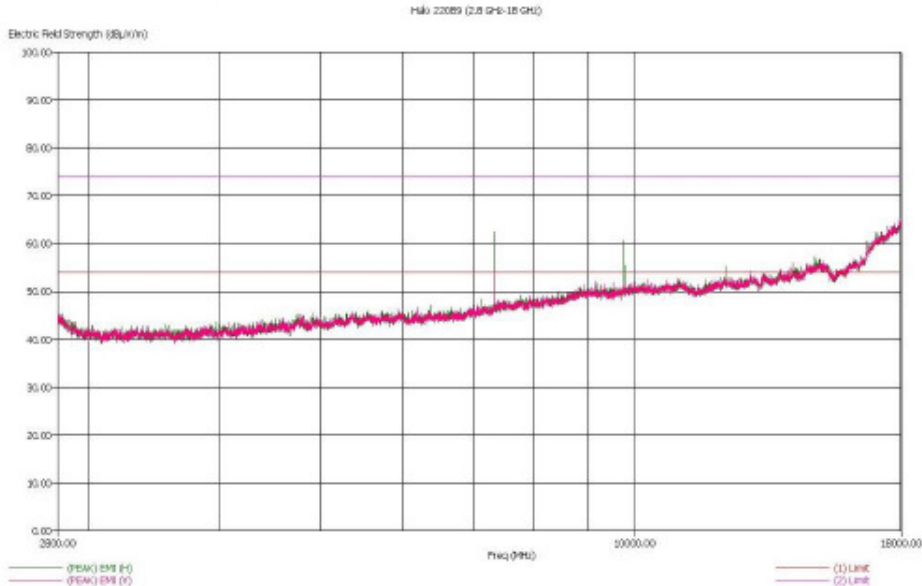
18-06-2008 18:13:24  
Sequence: Preliminary Scan



### 3-18 GHz Middle Channel Dual Polarization Y

Title: FCC 15.247(c)  
File: Holo 22089 (5.31)(ESU) FCC15.247 BT2400 Tch-mid\_Z 2008-06-18 -3-18.net  
Operator: ADR\_AAL\_EMC\_TL1, usw001  
EUT Type: Holo, FCC ID: IHDT56JW1, IMEI: A800002C65066  
EUT Condition: Board Rev: F3, Open  
Comments: FCC 15.247(c)(1) Discontinuity (BT) emission in TCM mode.  
BT ch. 38 (2441 MHz) up-to in test mode. Orientation Z-H/V  
EMC 3115 antenna (30Hz - 18GHz). Peak detector used.

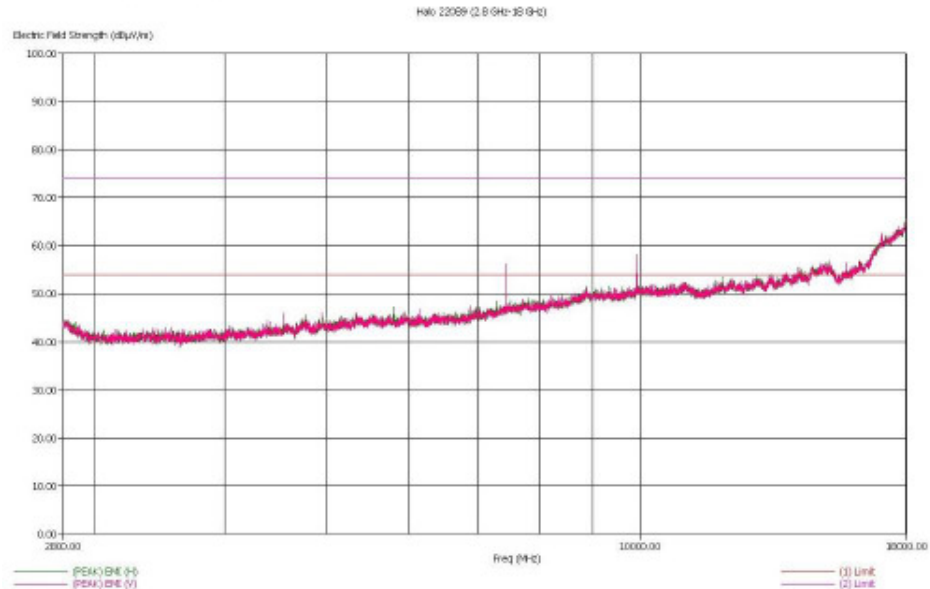
18-06-2008 17:55:09  
Sequence: Preliminary Scan



### 3-18 GHz Middle Channel Dual Polarization Z

Title: FCC 15.247(e)  
File: Holo 22089 (5,31) (ESU) FCC15.247 BT2460 Tok-high\_X 2008-06-18 -3-18.set  
Operator: RFR\_MAL\_ENC\_TLL. 220001  
EUT Type: Holo, FCC ID: IHDT56JW1, IMEI: A0101002045066  
EUT Condition: Board Rev: P3, Open  
Comments: FCC 15.247(e)(1) Bluetooth (BT) emission in TCH mode.  
BT ch. 79 (2480 MHz) up/down in test mode. Orientation X-Y-Z  
EMCO 3115 antenna (30Hz = 100Hz). Peak detector used.

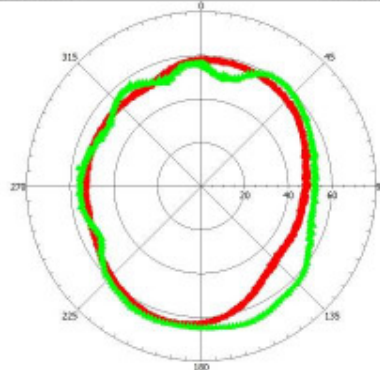
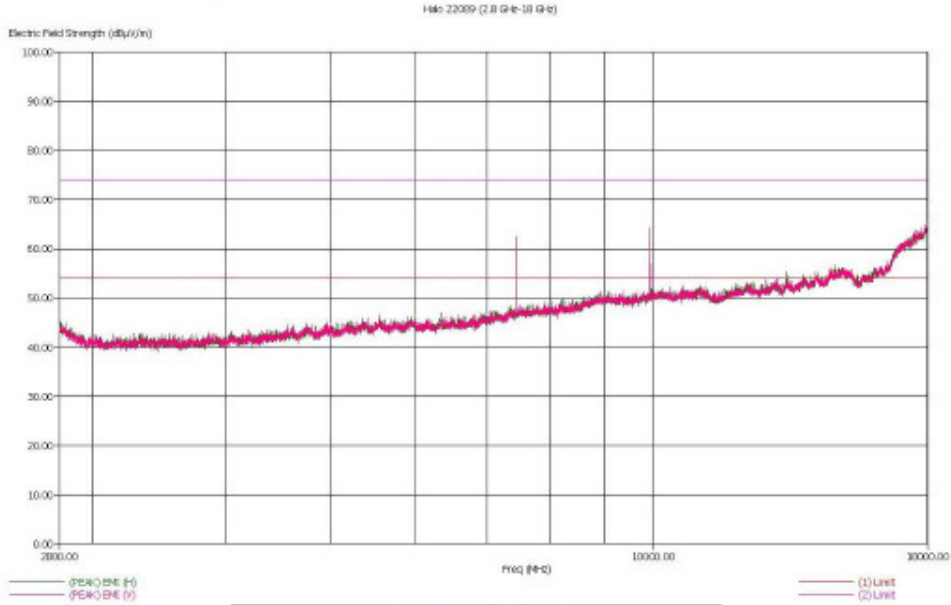
18-06-2008 17:28:41  
Sequence: Preliminary Scan



### 3-18 GHz High Channel Dual Polarization X

Title: FCC 15.247(c)  
 File: Halo 22089 (5.31)(ESU) FCC15.247 BT2400 Teh-hgh\_Y 2008-06-18 -3-18.net  
 Operator: ADP\_RAL\_EMC\_TLT\_sav001  
 EUT Type: Halo, FCC ID: IHDT56JW1, IMEI: A0000002065066  
 EUT Condition: Board Rev: P3, Open  
 Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.  
 BT ch. 78 (2480 MHz) up/do in test mode. Orientation Y=H/V  
 EMC0 3115 antenna (3GHz - 18GHz). Peak detector used.

18-06-2008 18:24:23  
 Sequence: Preliminary Scan



Title: FCC 15.247(c)  
 File: Halo 22089 (5.31)(ESU) FCC15.247 BT2400 Teh-hgh\_Y 2008-06-18 -Har -AV.net  
 Operator: ADP\_RAL\_EMC\_TLT\_sav001  
 EUT Type: Halo, FCC ID: IHDT56JW1, IMEI: A0000002065066  
 EUT Condition: Board Rev: P3, Open  
 Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.  
 BT ch. 78 (2480 MHz) up/do in test mode. Orientation Y=H/V  
 EMC0 3115 antenna (3GHz - 18GHz). AV detector used.

19-06-2008 08:16:16  
 Sequence: Final Measurements

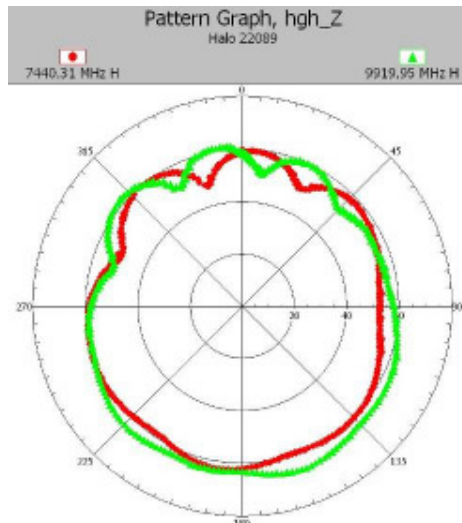
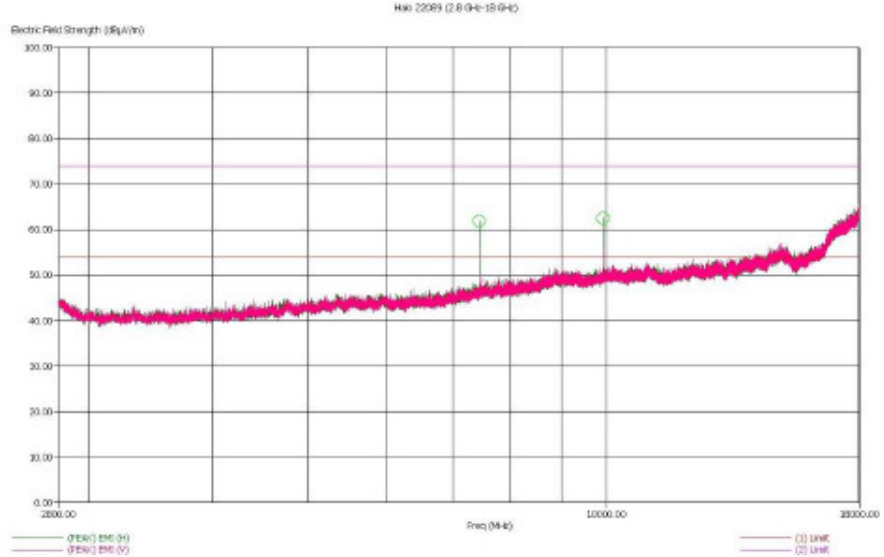
Halo 22089, hgh\_Y - Table

Freq (MHz)	Freq (Max) (MHz)	(AVG) EMI (dB(uV/m))	(1) Limit (dB(uV/m))	(AVG) Margin Limit (dB)	Tilt Ang (deg)	Pol
7440.00	7439.65	49.62	54.00	-4.38	197.60	V
9921.00	9919.89	50.52	54.00	-3.48	158.90	V

### 3-18 GHz High Channel Dual Polarization Y

Title: FCC 15.247(g)  
 File: Halo 22089 (3.31)(ESU) FCC15.247 BT2400 Tch-hgh\_Z 2008-06-18 -3-18.set  
 Operator: ADR\_AAL\_EMC\_TL1\_usv001  
 EUT Type: Halo, FCC ID: IHDT56JW1, IMEI: A0000002660366  
 EUT Conditions: Board Rev: P3, Open  
 Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.  
 BT ch. 7B (2480 MHz) up/down in test mode. Orientation Z-H/V  
 EMC0 3115 antenna (30Hz - 18GHz). Peak detector used.

19-06-2009 17:16:02  
 Sequence: Preliminary Scan



Title: FCC 15.247(c)  
 File: Halo 22089 (5.31)(ESU) FCC15.247 BT2400 Tch-hgh\_Z 2008-06-18 -Har -AV.set  
 Operator: ADR\_AAL\_EMC\_TL1\_usv001  
 EUT Type: Halo, FCC ID: IHDT56JW1, IMEI: A0000002660366  
 EUT Condition: Board Rev: P3, Open  
 Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.  
 BT ch. 7B (2480 MHz) up/down in test mode. Orientation Z-H/V  
 EMC0 3115 antenna (3GHz - 18GHz). AV detector used.

19-08-2009 09:24:31  
 Sequence: Final Measurements

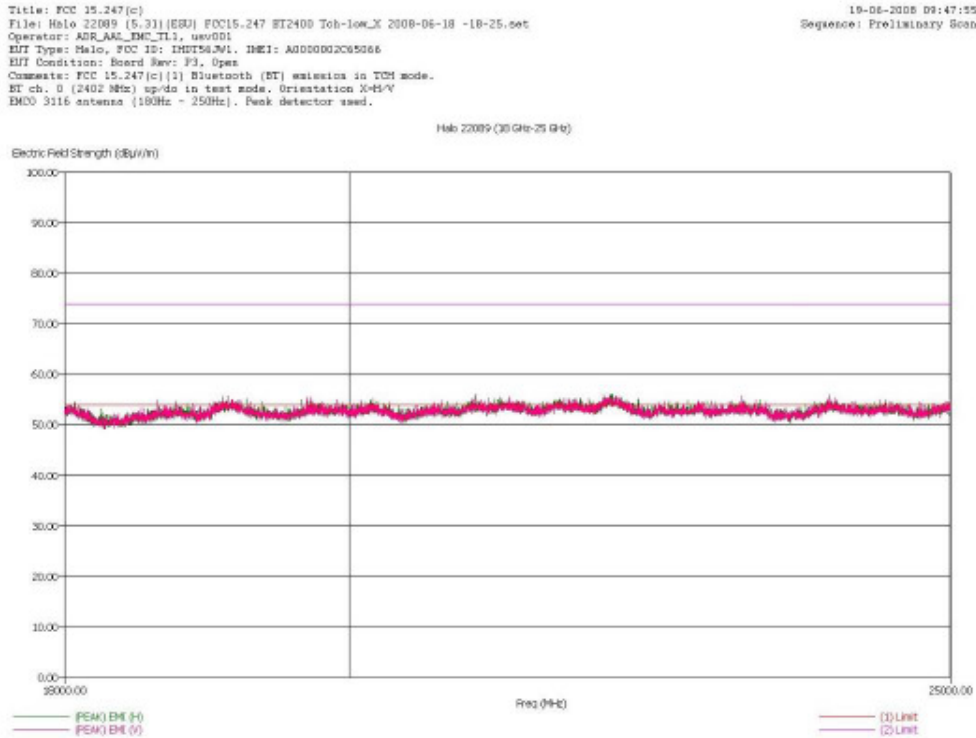
Halo 22089, hgh\_Z -Table

Freq (MHz)	Freq (MHz)	(A)S (dB)	(1) Limit (dBµV/m)	(A)S Margin Unit (dB)	Totl Adj (dB)	Pol
7440.30	7440.31	47.46	54.00	-6.54	184.80	H
9919.90	9919.95	50.90	54.00	-3.10	199.20	H

**3-18 GHz High Channel Dual Polarization Z**

**There were no discernible emissions above the noise floor for 18-26 GHz for Low, Mid and High Channels and all polarizations in Bluetooth band**

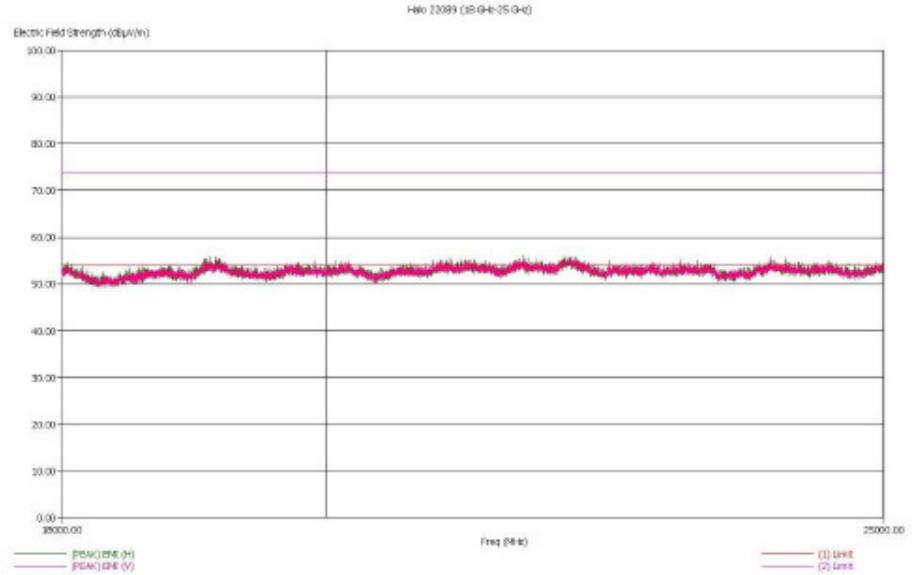
Only one worst case plot for each test frequency are shown in the below plots in the range from 18 GHz – 26 GHz.



**18-25 GHz Low Channel Dual Polarization X**

Title: FCC 15.247(c)  
File: Holo 22089 (5.31)[ESU] FCC15.247 BT2400 Tch-mid\_X 2008-08-18 -18-25.net  
Operator: ADL\_AAL\_EMC\_IL1, sav001  
EUT Type: Holo, FCC ID: IHDT56JW1, DMEI: A0010002055056  
EUT Condition: Board Rev: F3, Open  
Comments: FCC 15.247(c)(1) Flawtooth (BT) emission in TCH mode.  
BT ch. 39 (2441 MHz) up/down in test mode. Orientation S-H/V  
EMC 3116 antenna (180Hz - 25GHz). Peak detector used.

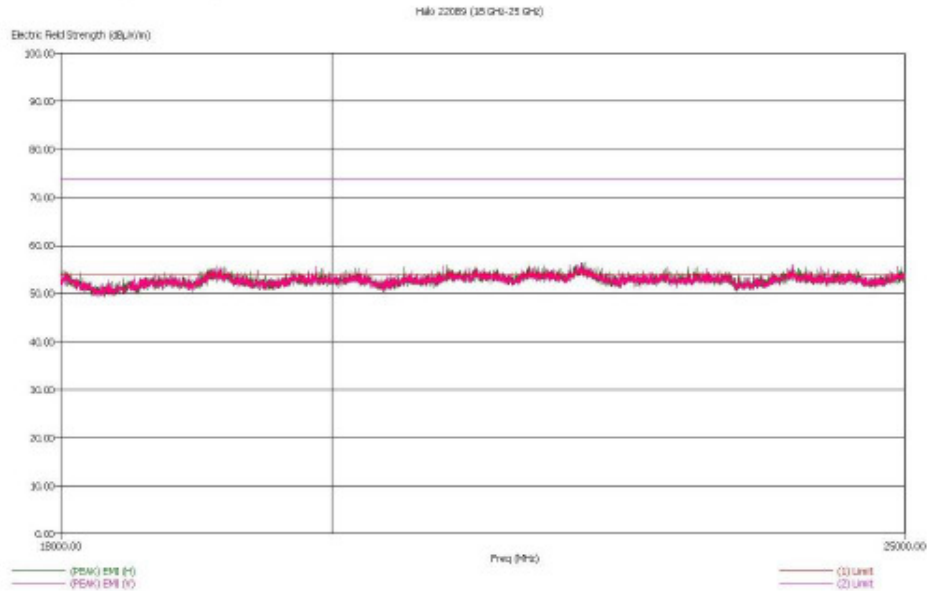
19-06-2008 09:55:25  
Sequence: Preliminary Scan



### 18-25 GHz Middle Channel Dual Polarization X

Title: FCC 15.247(c)  
File: Holo 22089 (5.31)[ESU] FCC15.247 BT2400 Tch-hgh\_X 2008-08-18 -18-25.net  
Operator: ADL\_AAL\_EMC\_IL1, sav001  
EUT Type: Holo, FCC ID: IHDT56JW1, DMEI: A0010002055056  
EUT Condition: Board Rev: F3, Open  
Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.  
BT ch. 78 (2480 MHz) up/down in test mode. Orientation X-H/V  
EMC 3116 antenna (180Hz - 25GHz). Peak detector used.

19-06-2008 09:59:35  
Sequence: Preliminary Scan



### 18-25 GHz High Channel Dual Polarization X

## **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 $\mu$ V/m) = EMI Receiver Level (dB $\mu$ 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.

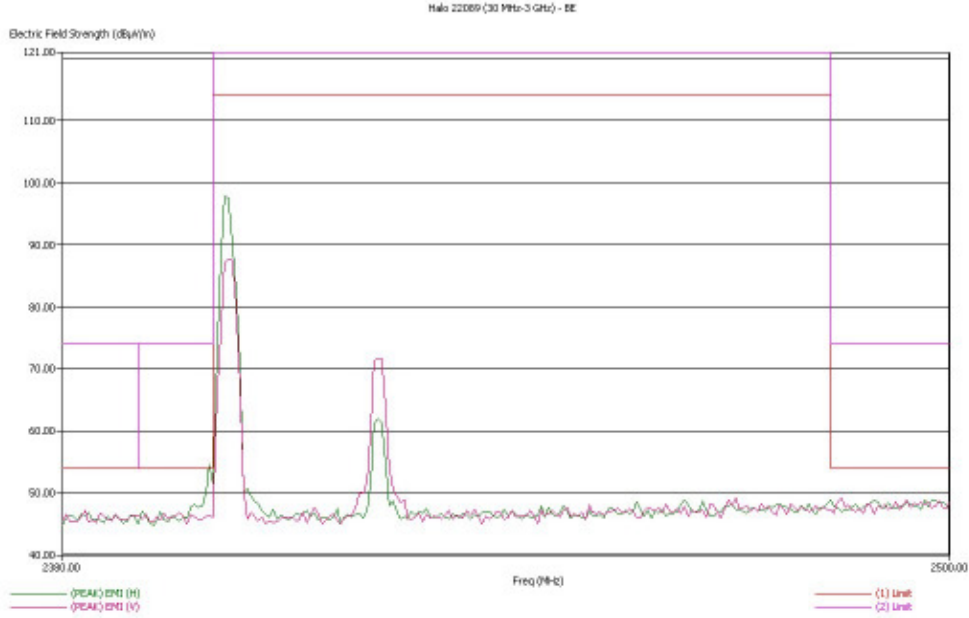
The test was performed in 22.5 degree angular step size when the band edge crossing is measured to be +6 dB above the AVG limit line.

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

See Attached:

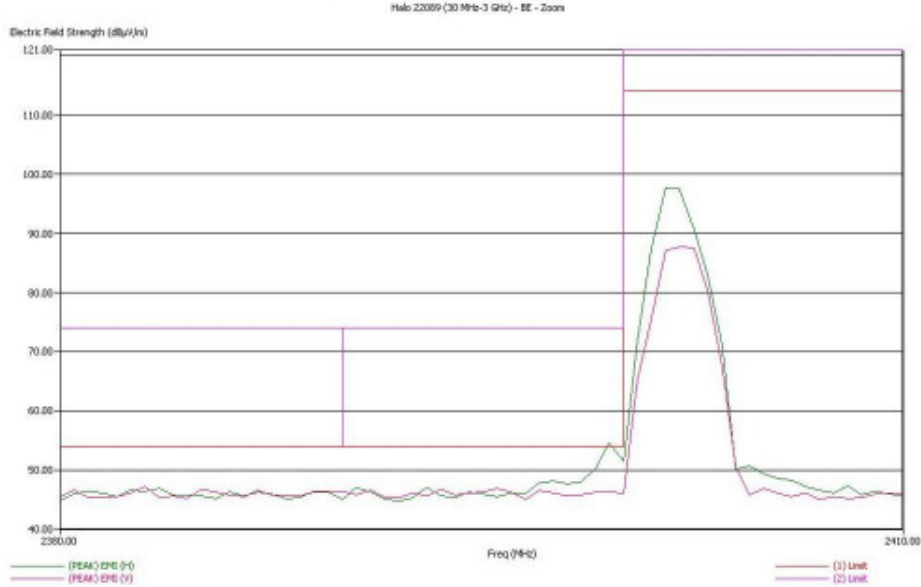
Title: FCC 15.247(c)  
File: Halo 22089 (5.31)(ESU) FCC15.247 BT2400 Tch-low\_X 2008-06-18 -3.mat  
Operator: ADR\_AAL\_ENG\_TL1\_usw001  
EUT Type: Halo, FCC ID: IHDT56JW1, IMEI: A0000002C65066  
EUT Condition: Board Rev: P3, Open  
Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.  
BT ch. 0 (2402 MHz) up/down in test mode. Orientation X=V  
HLP 3003C antenna (30MHz - 3 GHz). Peak detector used.

18-06-2008 14:24:07  
Sequence: Preliminary Scan



Title: FCC 15.247(c)  
File: Halo 22089 (5.31)(ESU) FCC15.247 BT2400 Tch-low\_X 2008-06-18 -3.set  
Operator: ADR\_AAL\_ENG\_TL1\_usw001  
EUT Type: Halo, FCC ID: IHDT56JW1, IMEI: A0000002C65066  
EUT Condition: Board Rev: P3, Open  
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  
HLP 3003C antenna (30MHz - 3 GHz). Peak detector used.

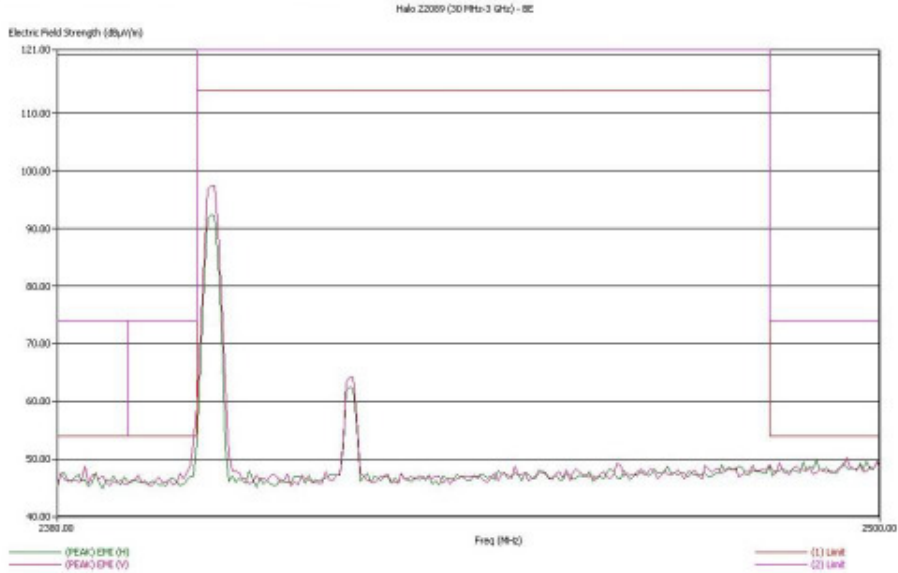
18-06-2008 14:24:07  
Sequence: Preliminary Scan



**Authorized Band Emissions Low Channel Dual Polarization X**

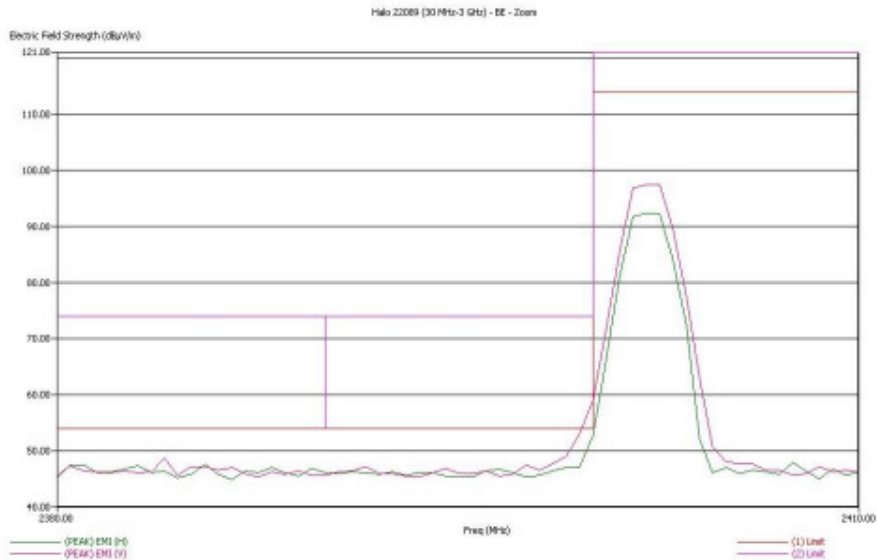
Title: FCC 15.247(c)  
File: Halo 22089 (5.31)(ESU) FCC15.247 ET2400 Tch-Low\_Y 2008-06-18 -3.set  
Operator: ADR\_A&L EMC\_TL1\_up=001  
EUT Type: Halo, FCC ID: IHDT56JW1, IMEI: A000002C65066  
EUT Condition: Board Rev: P3, Open  
Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.  
BT ch. 0 (2402 MHz) up/down in test mode. Orientation T=B-V  
HLP 3003C antenna (30MHz - 3 GHz). Peak detector used.

18-06-2008 15:49:48  
Sequence: Preliminary Scan



Title: FCC 15.247(c)  
File: Halo 22089 (5.31)(ESU) FCC15.247 ET2400 Tch-Low\_Y 2008-06-18 -3.set  
Operator: ADR\_A&L EMC\_TL1\_up=001  
EUT Type: Halo, FCC ID: IHDT56JW1, IMEI: A000002C65066  
EUT Condition: Board Rev: P3, Open  
Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.  
BT ch. 0 (2402 MHz) up/down in test mode. Orientation T=B-V  
HLP 3003C antenna (30MHz - 3 GHz). Peak detector used.

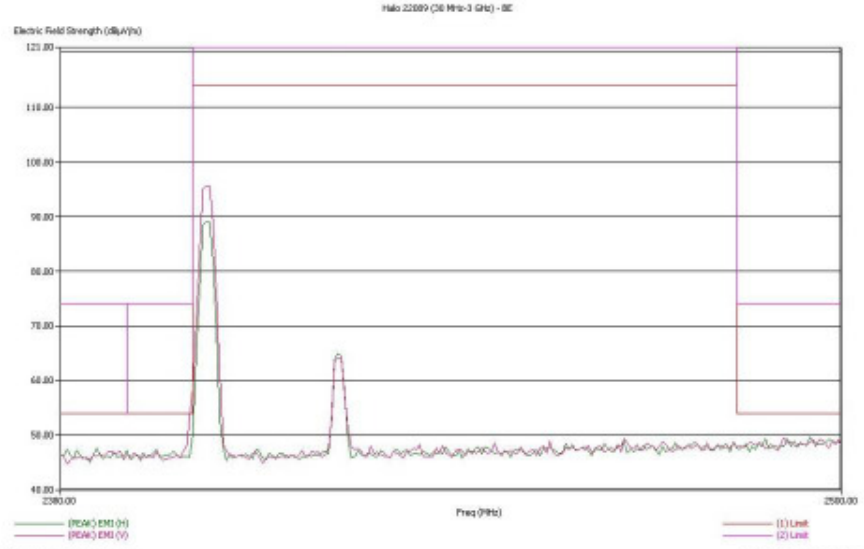
18-06-2008 15:49:48  
Sequence: Preliminary Scan



**Authorized Band Emissions Low Channel Dual Polarization Y**

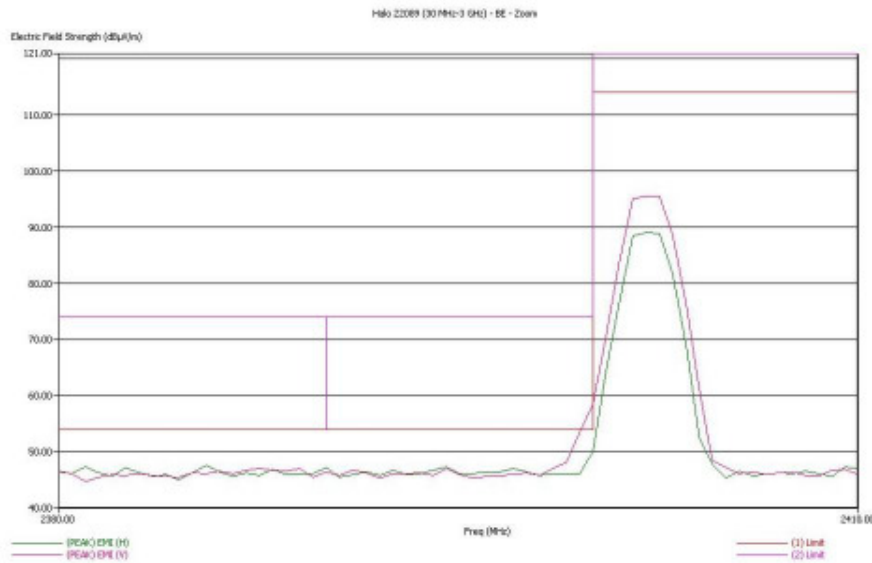
Title: FCC 15.247(c)  
File: Hslo 22089 (S 311)(ESU) FCC15.247 BT2400 Tch-low\_Z 2008-06-18 -3.set  
Operator: ADR\_AAL\_EMC\_TLI\_usr001  
EUT Type: Hslo, FCC ID: IHDT56JW1, IMEI: A000002065066  
EUT Condition: Board Rev: P3, Open  
Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode  
BT ch. 0 (2402 MHz) up/down in test mode, Orientation Z-H/V  
HLP 3803C antenna (30MHz - 3 GHz), Peak detector used.

18-06-2008 16:08:22  
Sequence: Preliminary Scan



Title: FCC 15.247(c)  
File: Hslo 22089 (S 311)(ESU) FCC15.247 BT2400 Tch-low\_Z 2008-06-18 -3.set  
Operator: ADR\_AAL\_EMC\_TLI\_usr001  
EUT Type: Hslo, FCC ID: IHDT56JW1, IMEI: A000002065066  
EUT Condition: Board Rev: P3, Open  
Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode  
BT ch. 8 (2402 MHz) up/down in test mode, Orientation Z-H/V  
HLP 3003C antenna (30MHz - 3 GHz), Peak detector used.

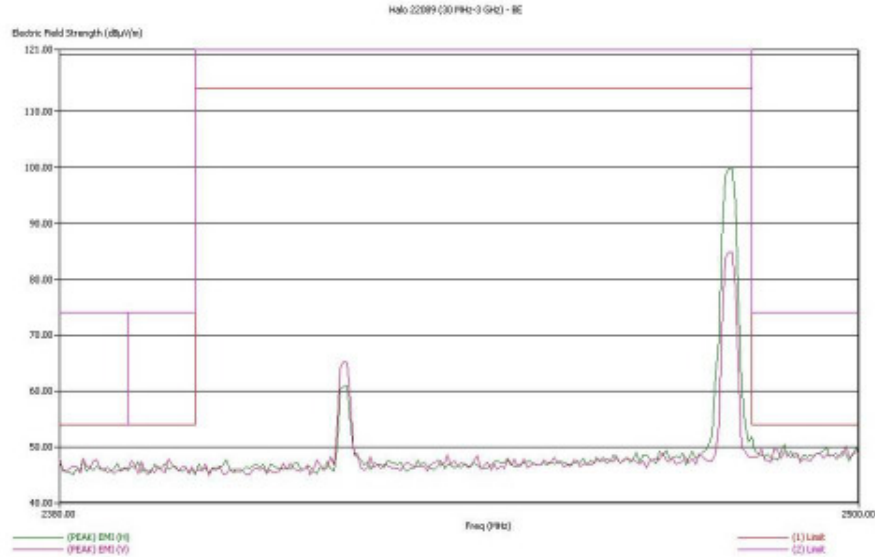
18-06-2008 16:08:22  
Sequence: Preliminary Scan



**Authorized Band Emissions Low Channel Dual Polarization Z**

Title: FCC 15.247(c)  
File: Halo 22089 (5.31)(ESU) FCC15.247 BT2400 Tch-hgh\_X 2008-06-18 -3.set  
Operator: ADR\_AAI\_EMC\_TL1\_usv001  
EUT Type: Halc. FCC ID: IHDT56JW1. INEI: A000002C65066  
EUT Condition: Board Rev: P3. Open  
Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.  
BT ch: 78 (2440 MHz) up/down in test mode. Orientation L-R-Y  
HLP 3003C antenna (30MHz - 3 GHz). Peak detector used.

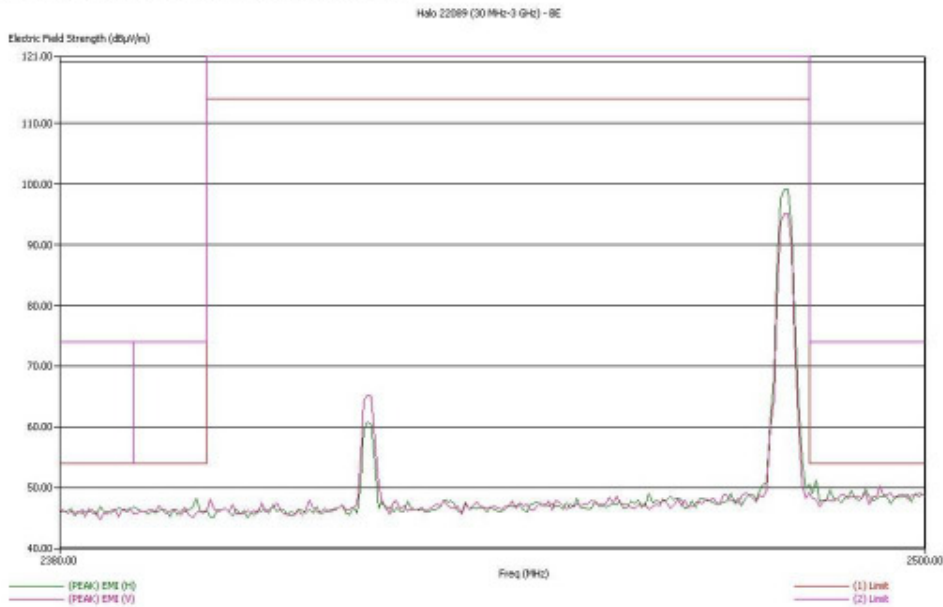
18-06-2008 15:12:14  
Sequence: Preliminary Scan



### Authorized Band Emissions High Channel Dual Polarization X

Title: FCC 15.247(c)  
File: Halo 22089 (5.31)(ESU) FCC15.247 BT2400 Tch-hgh\_Y 2008-06-18 -3.set  
Operator: ADR\_AAI\_EMC\_TL1\_usv001  
EUT Type: Halc. FCC ID: IHDT56JW1. INEI: A000002C65066  
EUT Condition: Board Rev: P3. Open  
Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.  
BT ch: 78 (2440 MHz) up/down in test mode. Orientation T-B-Y  
HLP 3003C antenna (30MHz - 3 GHz). Peak detector used.

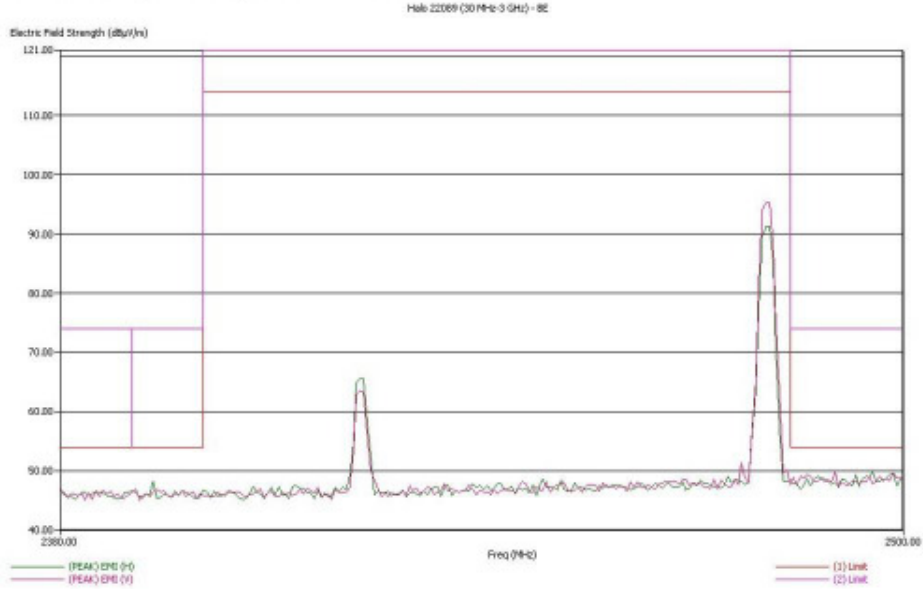
18-06-2008 15:25:37  
Sequence: Preliminary Scan



### Authorized Band Emissions High Channel Dual Polarization Y

Title: FCC 15.247(c)  
File: Halc 22089 (5.31)(ESU) FCC15.247 BT2400 Tch-hgh\_Z 2008-06-18 -3.met  
Operator: ADR\_AAI\_EMC\_TL1\_uav001  
EUT Type: Halc, FCC ID: IHDT56JW1, IMEI: A0000002C65D44  
EUT Condition: Board Rev: P3, Open  
Comments: FCC 15.247(c)(1) Bluetooth (BT) emission in TCH mode.  
BT ch. 78 (24489 MHz) up/do in test mode. Orientation Z-H/V  
HP 3681C antenna (30MHz - 3 GHz). Peak detector used.

18-06-2008 16:33:18  
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

**End of Test Report**