

FCC PART 90

TEST AND MEASUREMENT REPORT

For

Teltronic S.A.U.

Poligono Malpica, Calle F Oeste, Parcela 12,
50057 Zaragoza, Spain

FCC ID: WT7PTRUNK25RF410
Model: RF Unit 409-430MHz

Report Type: CIIPC Report	Product Type: Repeater 2-Way Radio
Test Engineer: Lionel Lara	<i>Lionel Lara</i>
Report Number: R1111101-90	
Report Date: 2012-04-06	
Reviewed By: Victor Zhang EMC/RF Lead	<i>Victor Zhang</i>
Prepared By: (RZ)	Bay Area Compliance Laboratories Corp. 1274 Anvilwood Avenue, Sunnyvale, CA 94085, U.S.A. Tel: (408) 732-9162 Fax: (408) 732 9164 www.baclcorp.com

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* This report may contain data that are not covered by the NVLAP accreditation and are marked with an asterisk "*" ...

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R1111101-90	CIIPC Report	2012-04-06

1. General Information

1.1 Product Description for Equipment under Test (EUT)

The report has been prepared on behalf of Teltronic S.A.U. and their product FCC ID: WT7PTRUNK25RF410, Model: RF Unit 409-430 MHz, or the EUT as referred to in the rest of this report. The EUT is repeater 2-way radio.

The EUT is a 409-430 MHz Transceiver that operates under FCC Part 90

Specifications	
Frequency Band	409-430 MHz
Emission designator	16K0F3E, 11K0F3E, 8K10F1W, 8K10F1E, 8K10F1D, 8K70D7W, 8K70D7E, 8K70D7D
Modulation	H-DQPSK
RF Output Power	100W
RF Channel Spacing	12.5 kHz
Necessary / authorized Bandwidth	11.25 kHz
Power Supply	26.4 DC volt supply input

1.2 Mechanical Description EUT

The EUT measures approximately 43cm (L) x 34cm (W) x 13cm (H) and weighs 10886.22 g.

The test data gathered are from production sample. Serial number: 814400 provided by the manufacturer.

1.3 Objective

This type approval report is prepared on behalf of *Teltronic S.A.U.* in accordance with Part 90 of the Federal Communication Commissions rules.

This is class II permissive change report is based on the new modulation adding with no hardware change, only H-DQPSK (12.5kHz) modulation was added with the s/w modification. RF output Power, Spurious Emission, and Occupied Bandwidth are determined compliance with the FCC rules.

This test and measurement report only pertains to the new modulation H-DQPSK (12.5kHz).

1.4 Related Submittal(s)/Grant(s)

FCC ID: WT7PTRUNK25RF410, Report number: 550AUT10 from Timco.

1.5 Test Methodology

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 individual parts:

Part 90 – Private Land Mobile Radio Service

Applicable Standards: TIA603-C and ANSI 63.4-2003, American National Standard for Method of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

1.6 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the values ranging from +2.0 dB for Conducted Emissions tests and ± 4.0 dB for Radiated Emissions tests are the most accurate estimates pertaining to uncertainty of EMC measurements at BACL Corp.

1.7 Test Facility

The test site used by BACL Corp. to collect radiated and conducted emissions measurement data is located at its facility in Sunnyvale, California, USA.

The test sites at BACL, Corp. have been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports has been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997 and Article 8 of the VCCI regulations on December 25, 1997. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission, Industry Canada, and Voluntary Control Council for Interference has the reports on file and is listed under FCC registration number: 90464, IC registration number: 3062A, and VCCI Registration Number: C-2463 and R-2698. The test site has been approved by the FCC, IC, and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200167-0). The current scope of accreditations can be found at <http://ts.nist.gov/ts/htdocs/210/214/scopes/2001670.htm>

2 EUT Test Configuration

2.1 Justification

The EUT was configured for testing according to TIA/EIA-603-C.

The EUT was tested in the normal (native) operating mode to represent *worst*-case results during the final qualification test.

2.2 EUT Exercise Software

The EUT is using Hyperterminal.

2.3 Equipment Modifications

No modifications were made to the EUT.

2.4 Local Support Equipment

Manufacturer	Description	Model No.	Serial No.
Dell	Laptop	PP05L	7T390 A02

2.5 Internal Configuration

Manufacturer	Description	Model No.	Serial No.
Teltronic S.A.U.	RPS PCB Board	F067022_5	-
Teltronic S.A.U.	RPA 1 st PCB Board	F067013_10	-
Teltronic S.A.U.	RPA 2 nd PCB Board	F067013_10	-
Teltronic S.A.U.	RPA 3 rd PCB Board	F067340_2	-
Teltronic S.A.U.	RPA 4 th PCB Board	F067345_2	-
Teltronic S.A.U.	RTX PCB Board	F073012_1	-
Teltronic S.A.U.	RRX PCB Board	F067019_5	-
Teltronic S.A.U.	BSYNC PCB Board	F067158_4	-
Teltronic S.A.U.	RCPU 1 st PCB Board	F073082_2	-
Teltronic S.A.U.	RCPU 2 nd PCB Board	E465010	-
Teltronic S.A.U.	Backplane PCB Board	F067348_5	-

2.6 Local Support Equipment Power Supply and Line Filters

Manufacturer	Description	Model	Serial Number
Electronic Measurements Inc.	TCR power supply	TCR 80S34-2-0V	92D-6839

2.7 Interface Ports and Cabling

Cable Description	Length (m)	From	To
Maintenance cable	<1.0	Laptop Serial port	EUT Ethernet Port
Power Supply Cable	>1.0	Power Supply	EUT
Ethernet Cable	<1.0	EUT Ethernet Port	EUT Ethernet Port
Ethernet Cable	<1.0	EUT Ethernet Port	EUT Ethernet Port
RF cable	<1.0	EUT Output	PSA

3 Summary of Test Results

FCC Rules	Description of Test	Result
FCC §1.1310, §2.1093	RF Exposure Information	Compliant
FCC §2.1046, §90.205	RF Output Power	Compliant
FCC §2.1047, §90.207	Modulation Characteristics, Audio Frequency Response and Audio Filter Response	N/A ¹
FCC §2.1051, §90.210	Spurious Emissions at Antenna Terminals	Compliant
FCC §2.1055, §90.213	Frequency Stability	N/A ¹
FCC §2.1053, §90.210	Field Strength of Spurious Radiation	Compliant
FCC §90.214	Transient Frequency Behavior	N/A ¹
FCC §2.1049, §90.209/90.210	Occupied Bandwidth and Emission Mask	Compliant

Note¹: Refer to FCC ID: WT7PTRUNK25RF410, Timco report No.: 550AUT10

4 FCC §2.1091 - RF Exposure Information

4.1 Applicable Standards

FCC §2.1091, (a) Requirements of this section are a consequence of Commission responsibilities under the National Environmental Policy Act to evaluate the environmental significance of its actions. See subpart I of part 1 of this chapter, in particular §1.1307(b).

According to §1.1310 and §2.1091 RF exposure is calculated.

Limits for Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f ²)	6
30-300	61.4	0.163	1.0	6
300-1500	/	/	f/300	6
1500-100,000	/	/	1	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	842/f	2.19/f	*(180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1	30

f = frequency in MHz

* = Plane-wave equivalent power density

Note 1 to Table 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

Note 2 to Table 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

Antenna

The manufacturer does not specify an antenna. This device has provisions for operation in a vehicle, or a fixed location

MPE Prediction

Predication of MPE limit at a given distance, Equation from OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2$$

Where: S = power density

P = power input to antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna

Maximum peak output power at antenna input terminal (dBm):	<u>50.76</u>
Maximum peak output power at antenna input terminal (mW):	<u>119124.2</u>
Prediction distance (cm):	<u>210</u>
Prediction frequency (MHz):	<u>409</u>
Maximum Antenna Gain, typical (dBi):	<u>8</u>
Maximum Antenna Gain (numeric):	<u>6.31</u>
Power density of prediction frequency at 215 cm (mW/cm ²):	<u>1.356</u>
MPE limit for controlled exposure at prediction frequency (mW/cm ²):	<u>1.363</u>

Conclusion

The device complies with the MPE requirements by providing a safe separation distance of at least 210 cm between the antenna with maximum 8 dBi gain, including any radiating structure, and any persons when normally operated.

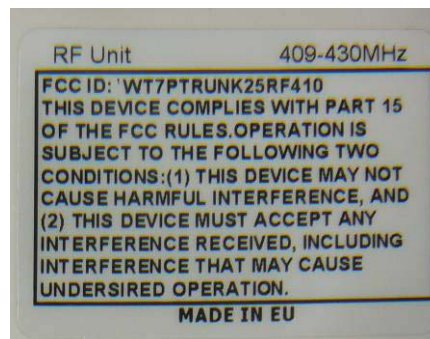
Proposed RF exposure safety information to include in User's Manual:

CAUTION:

The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

- Antennas used for this transmitter must not exceed an antenna gain of 8 dBi
- For rear deck trunk and roof top installations, the antenna must be located at least 210 cm away from rear-seat passengers and bystanders in order to comply with the FCC RF exposure requirements.

The following label will be mounted in conspicuous view on the radio.



5 FCC §2.1046 & §90.205 – RF Output Power

5.1 Applicable Standard

According to FCC §2.1046, and §90.205, 450–470 MHz. (1) The maximum allowable station effective radiated power (ERP) is dependent upon the station's antenna HAAT and required service area and will be authorized in accordance with table 2.

5.2 Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

5.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Agilent	Spectrum Analyzer	E4440A	MY44303352	2011-05-10

Statement of Traceability: BACL Corp. attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

5.4 Test Environmental Conditions

Temperature:	20-24 °C
Relative Humidity:	40-42 %
ATM Pressure:	101.6kPa

The testing was performed by Lionel Lara on 2011-11-16 to 2011-11-18 in RF site.

5.5 Test Results

Test Mode: Transmitting H-DQPSK

Power Level	Channel Spacing (kHz)	Frequency (MHz)	Conducted Output Power (dBm)	Conducted Output Power (Watt)
High	12.5 kHz	409.0	50.76	119.12
	12.5 kHz	419.5	50.62	115.35
	12.5 kHz	430.0	50.54	113.24
Low	12.5 kHz	409.0	30.75	1.19
	12.5 kHz	419.5	30.72	1.18
	12.5 kHz	430.0	30.37	1.09

6 FCC §2.1047 & §90.207 – Modulation Characteristic

6.1 Applicable Standard

FCC §2.1047 & §90.207:

- (a) Equipment which utilizes voice modulated communication shall show the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz. for equipment which is required to have a low pass filter, the frequency response of the filter, or all of the circuitry installed between the modulation limited and the modulated stage shall be supplied.
- (b) Equipment which employs modulation limiting, a curve showing the percentage of modulation versus the modulation input voltage shall be supplied.

6.2 Test Results

Please refer to FCC ID: WT7PTRUNK25RF410, Timco report No.: 550AUT10.

7 FCC §2.1051 & §90.210- Spurious Emissions at Antenna Terminals

7.1 Applicable Standard

FCC §2.1051 and §90.210(d)

On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 12.5 kHz: At least $50 + 10 \log(P)$ dB or 70 dB, whichever is the lesser attenuation.

7.2 Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100 kHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.

7.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Agilent	Spectrum Analyzer	E4440A	MY44303352	2011-05-10

Statement of Traceability: BACL Corp. attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

7.4 Test Environmental Conditions

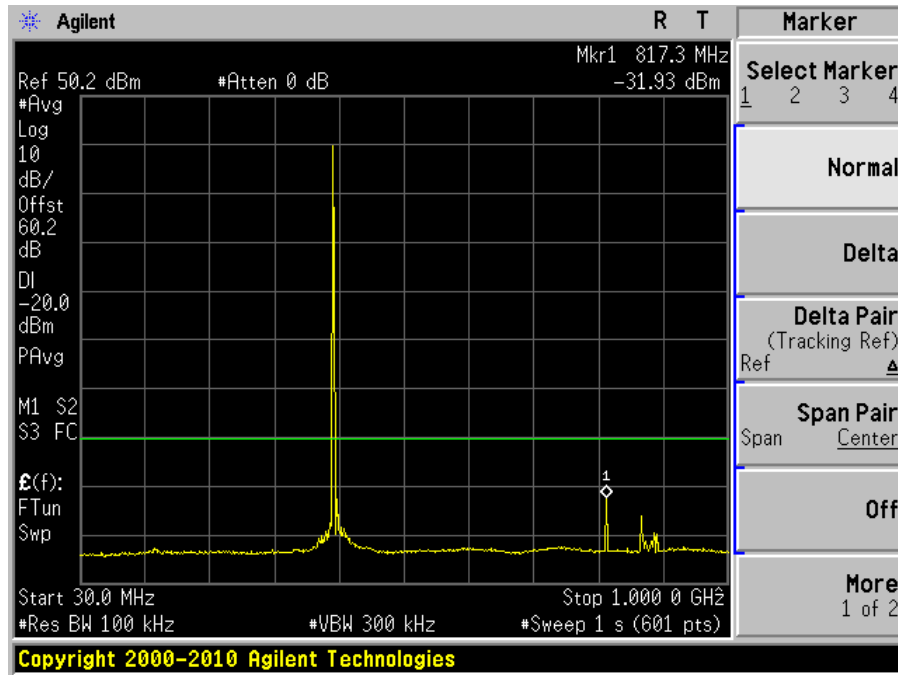
Temperature:	20-24 °C
Relative Humidity:	40-42 %
ATM Pressure:	101.6kPa

The testing was performed by Lionel Lara on 2011-11-16 to 2011-11-18 in RF site.

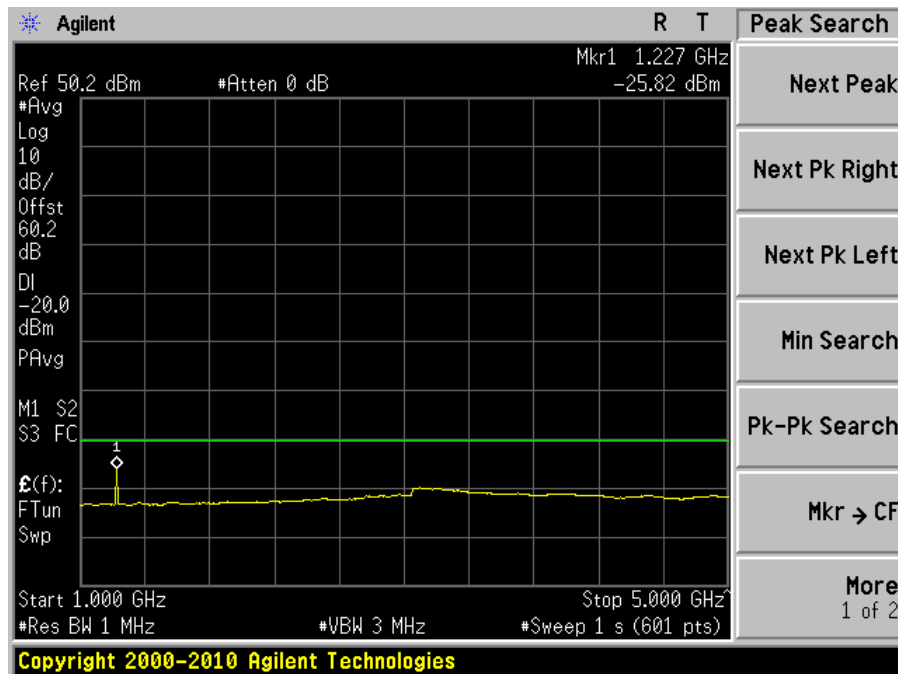
7.5 Test Results

Please refer to the hereinafter plots.

Low channel (409.0 MHz) High Power H-DQPSK

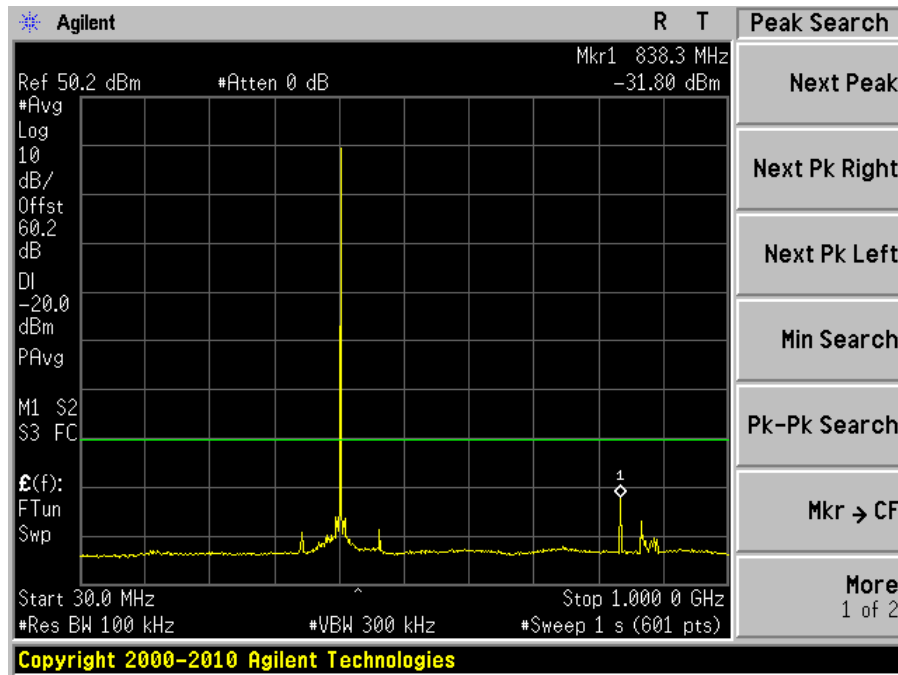


30 MHz to 1 GHz

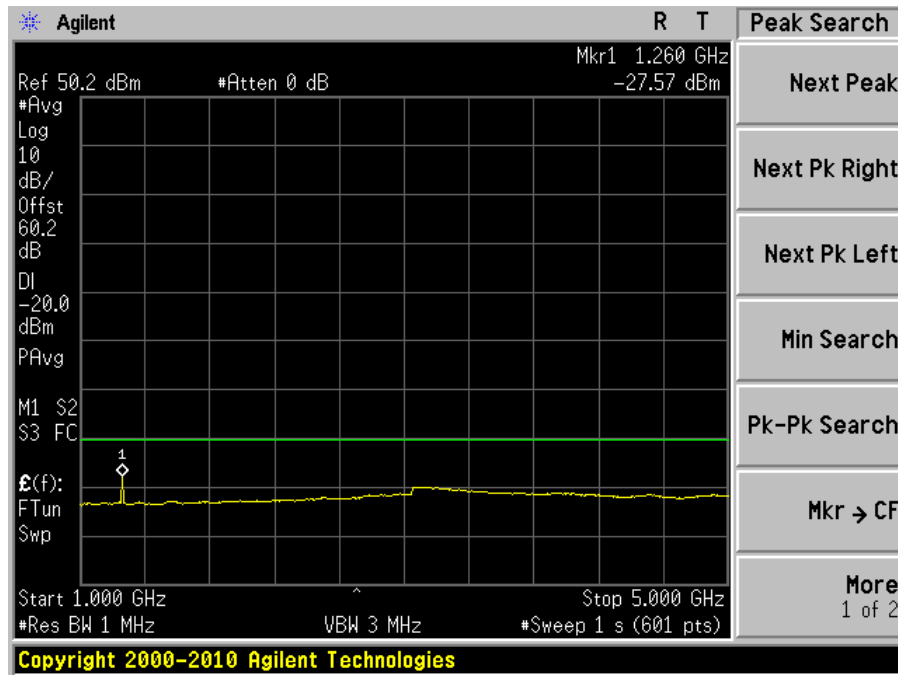


1 GHz to 5 GHz

Middle channel (419.5 MHz) High Power H-DQPSK

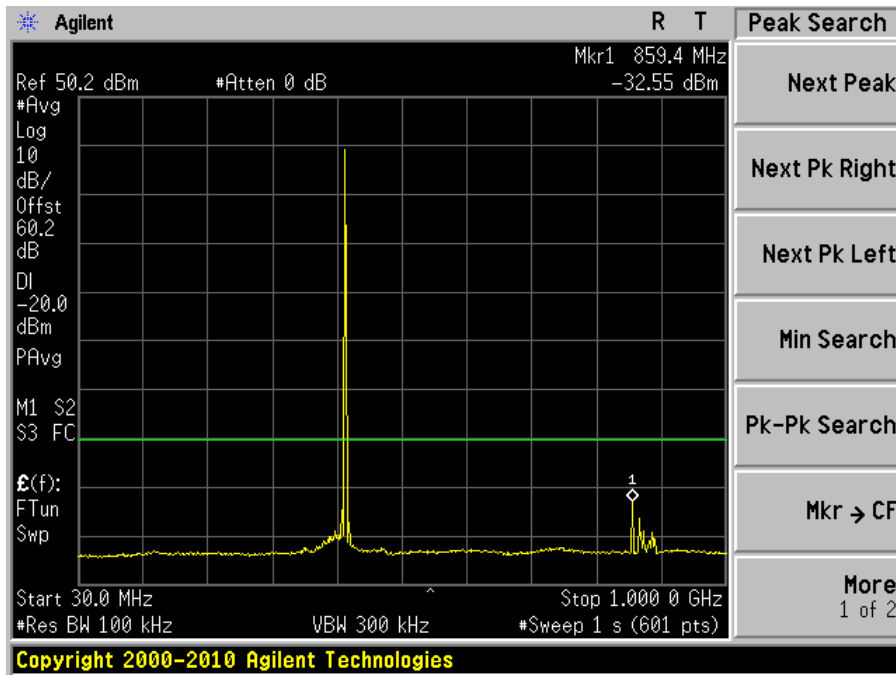


30 MHz to 1 GHz

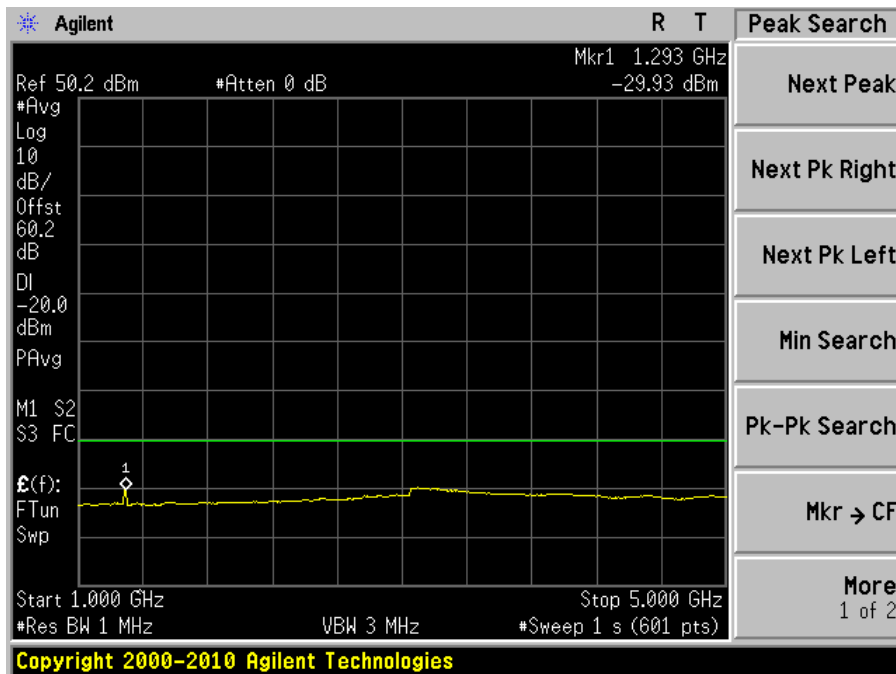


1 GHz to 5 GHz

High channel (430.0 MHz) High Power H-DQPSK



30 MHz to 1 GHz



1 GHz to 5 GHz

8 FCC §2.1055 (d) & §90.213 - Frequency Stability

8.1 Applicable Standard

FCC §2.1055 (d), §90.213

Minimum Frequency Stability

[Parts per million (ppm)]

Frequency range (MHz)	Fixed and base stations	Mobile stations	
		Over 2 watts output power	2 watts or less output power
Below 25	1,2,3 ¹⁰⁰	100	200
25-50	20	20	50
72-76	5		50
150-174	5,11 ⁵	6 ⁵	4,6 ⁵⁰
216-220	1.0		1.0
220-222 ¹²	0.1	1.5	1.5
421-512	7,11,14 ^{2.5}	8 ⁵	8 ⁵
806-809	14 ^{1.0}	1.5	1.5
809-824	14 ^{1.5}	2.5	2.5
851-854	1.0	1.5	1.5
854-869	1.5	2.5	2.5
896-901	14 ^{0.1}	1.5	1.5
902-928	2.5	2.5	2.5
902-928 ¹³	2.5	2.5	2.5
929-930	1.5		
935-940	0.1	1.5	1.5
1427-1435	9 ³⁰⁰	300	300
Above 2450 ¹⁰			

¹⁴Control stations may operate with the frequency tolerance specified for associated mobile frequencies.

(b) For the purpose of determining the frequency stability limits, the power of a transmitter is considered to be the maximum rated output power as specified by the manufacturer.

8.2 Test Results

Please refer to FCC ID: WT7PTRUNK25RF410, Timco report No.: 550AUT10.

9 FCC §2.1053 & §90.210 – Field Strength of Spurious Radiation

9.1 Applicable Standard

FCC §2.1051 and §90.210

On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 12.5 kHz: At least $50 + 10 \log(P)$ dB or 70 dB, whichever is the lesser attenuation.

9.2 Test Procedure

The transmitter was placed on a Styrofoam with wooden turntable, and it was normal transmitting with 50ohm termination which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB = $10 \lg(\text{TXpwr in Watts}/0.001)$ – the absolute level

9.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100337	2012-03-22
Agilent	Spectrum Analyzer	E4440A	MY44303352	2011-05-10
Sunol Science Corp	System Controller	SC99V	122303-1	N/R
Sunol Science Corp	Combination Antenna	JB3	A020106-2	2011-08-10
A.R.A Inc	Horn antenna	DRG-1181A	1132	2010-11-29
Hewlett Packard	Pre amplifier	8447D	2944A06639	2011-06-09
Mini-Circuits	Pre Amplifier	ZVA-183-S	570400946	2011-05-09

Statement of Traceability: BACL attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

9.4 Test Environmental Conditions

Temperature:	20-24 °C
Relative Humidity:	40-42 %
ATM Pressure:	101.6kPa

The testing was performed by Lionel Lara on 2011-11-16 to 2011-11-18 in chamber 3.

9.5 Test Results

High Power Middle Channel (419.5 MHz) H-DQPSK

Test Mode: Transmission Using substitution method

Indicated		Turntable Azimuth degrees	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Freq. (MHz)	Amp. (dBuV)		Height (cm)	Polar (H/V)	Freq. (MHz)	Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)		
2097.51	65.74	176	106	V	2097.51	-29.01	8.9	2.73	-22.84	-20	-2.84
2097.51	58.81	208	146	H	2097.51	-35.94	8.91	2.73	-29.76	-20	-9.76
1677.93	46.36	166	145	V	1677.93	-55.08	8.88	2.4	-48.60	-20	-28.60
320.01	61.48	96	151	H	320.01	-48.94	0	1.02	-49.96	-20	-29.96
1677.93	42.58	293	173	H	1677.93	-58.86	9.3	2.4	-51.96	-20	-31.96
320.01	56.9	10	100	V	320.01	-53.52	0	1.02	-54.54	-20	-34.54
160.01	58.65	50	124	H	160.01	-55.90	0	0.78	-56.68	-20	-36.68
839	49.98	240	111	V	839	-55.32	0	1.9	-57.22	-20	-37.22
839	49.53	51	148	H	839	-55.77	0	1.9	-57.67	-20	-37.67
575.96	43.13	38	149	H	575.96	-65.62	0	1.47	-67.09	-20	-47.09
160.01	47.32	247	149	V	160.01	-67.23	0	0.78	-68.01	-20	-48.01
575.96	39.05	140	202	V	575.96	-69.70	0	1.47	-71.17	-20	-51.17

10 FCC §90.214 - Transient Frequency Behavior

10.1 Applicable Standard

FCC §90.214: Transmitters designed to operate in the 150–174 MHz and 421–512 MHz frequency bands must maintain transient frequencies within the maximum frequency difference limits during the time intervals indicated:

Time intervals ^{1,2}	Maximum frequency difference ³	All equipment
		421 to 512 MHz
Transient Frequency Behavior for Equipment Designed to Operate on 25 kHz Channels		
t_1^4	± 25.0 kHz	10.0 ms
t_2	± 12.5 kHz	25.0 ms
t_3^4	± 25.0 kHz	10.0 ms
Transient Frequency Behavior for Equipment Designed to Operate on 12.5 kHz Channels		
t_1^4	± 12.5 kHz	10.0 ms
t_2	± 6.25 kHz	25.0 ms
t_3^4	± 12.5 kHz	10.0 ms

10.2 Test Results

Please refer to FCC ID: WT7PTRUNK25RF410, Timco report No.: 550AUT10.

11 FCC §2.1049, §90.209 & §90.210 – Occupied Bandwidth and Emission Mask

11.1 Applicable Standard

FCC §90.210: Except as indicated elsewhere in this part, transmitters used in the radio services governed by this part must comply with the emission masks outlined in this section. Unless otherwise stated, per paragraphs (d)(4), (e)(4), and (m) of this section, measurements of emission power can be expressed in either peak or average values provided that emission powers are expressed with the same parameters used to specify the unmodulated transmitter carrier power. For transmitters that do not produce a full power unmodulated carrier, reference to the unmodulated transmitter carrier power refers to the total power contained in the channel bandwidth. Unless indicated elsewhere in this part, the table in this section specifies the emission masks for equipment operating in the frequency bands governed under this part.

Applicable Emission Masks

Frequency band (MHz)	Mask for equipment with Audio low pass filter	Mask for equipment without audio low pass filter
Below 25 ¹	A or B	A or C
25–50	B	C
72–76	B	C
150–174 ²	B, D, or E	C, D, or E
150 Paging-only	B	C
220–222	F	F
421–512 ²	B, D, or E	C, D, or E
450 Paging-only	B	G
806–809/851–854	B	H
809–824/854–869 ³	B	G
896–901/935–940	I	J
902–928	K	K
929–930	B	G
4940–4990 MHz	L or M	L or M.
5850–5925 ⁴		
All other bands	B	C

²Equipment designed to operate with a 25 kHz channel bandwidth must meet the requirements of Emission Mask B or C, as applicable. Equipment designed to operate with a 12.5 kHz channel bandwidth must meet the requirements of Emission Mask D, and equipment designed to operate with a 6.25 kHz channel bandwidth Must meet the requirements of Emission Mask E.

d) *Emission Mask D—12.5 kHz channel bandwidth equipment.* For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

- (1) On any frequency from the center of the authorized bandwidth f_0 to 5.625 kHz removed from f_0 : Zero dB.
- (2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 5.625 kHz but no more than 12.5 kHz: At least $7.27(f_d - 2.88)$ dB.
- (3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 12.5 kHz: At least $50 + 10 \log(P)$ dB or 70 dB, whichever is the lesser attenuation.

11.2 Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The resolution bandwidth of the spectrum analyzer was set at 100 Hz and the spectrum was recorded in the frequency band ± 50 kHz from the carrier frequency.

11.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Agilent	Spectrum Analyzer	E4440A	MY44303352	2011-05-10

11.4 Test Environmental Conditions

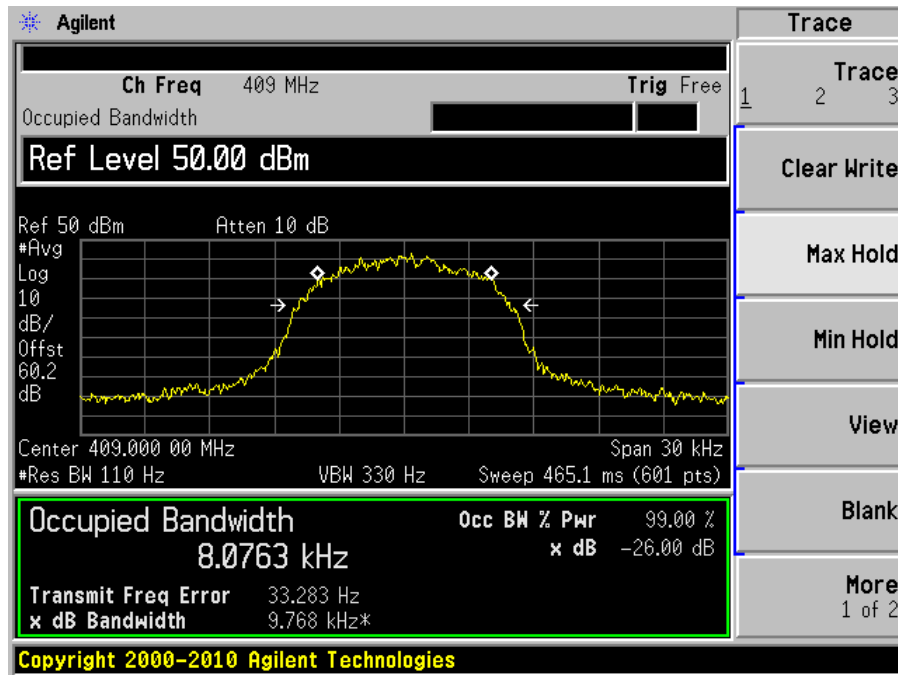
Temperature:	20-24 °C
Relative Humidity:	40-42 %
ATM Pressure:	101.6kPa

The testing was performed by Lionel Lara on 2011-11-16 to 2011-11-18 in RF site.

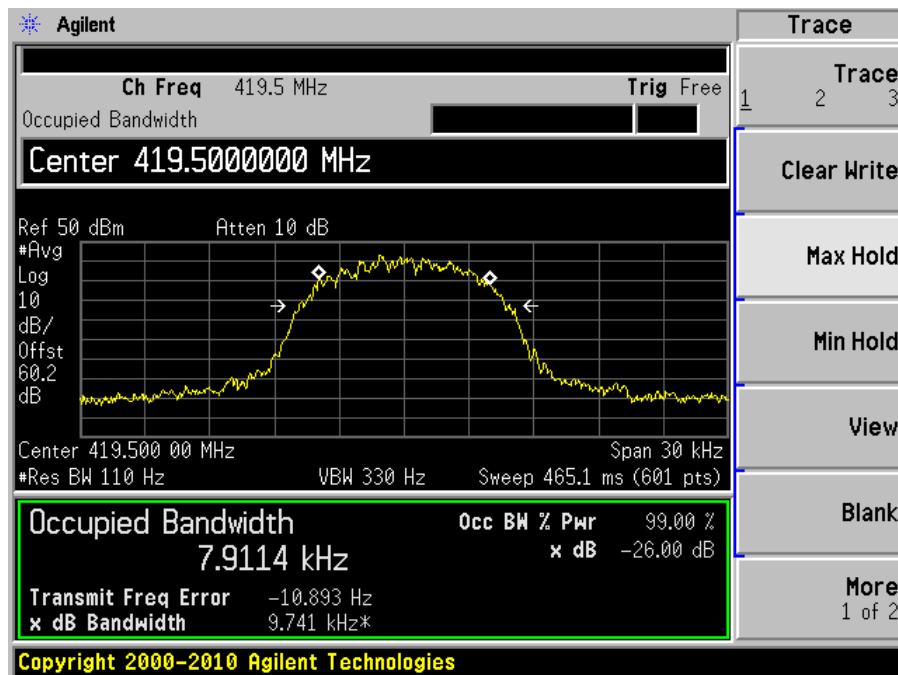
11.5 Test Results

Please refer to the following plots.

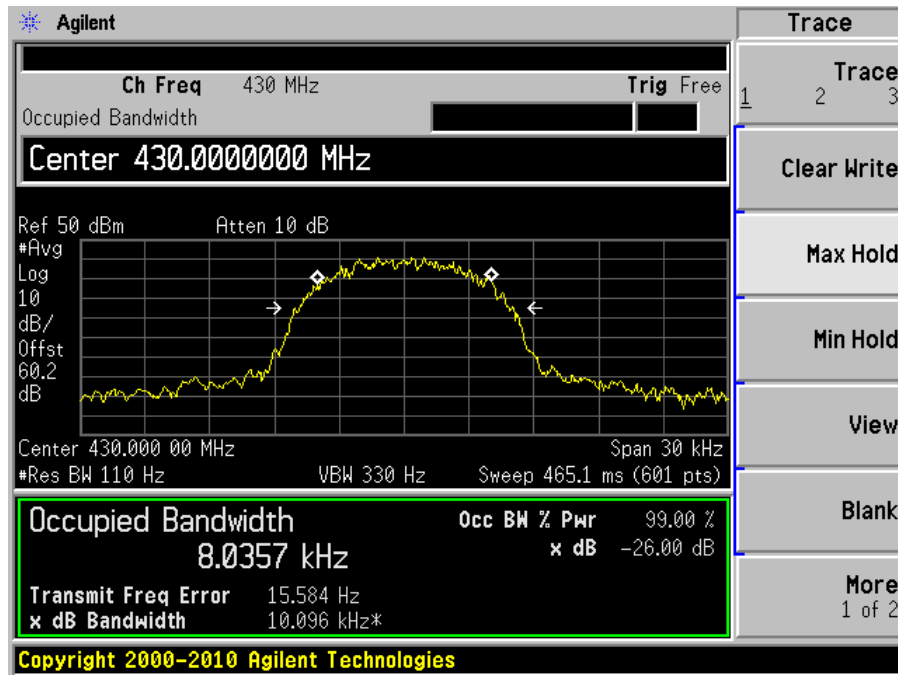
Occupied Bandwidth H-DQPSK



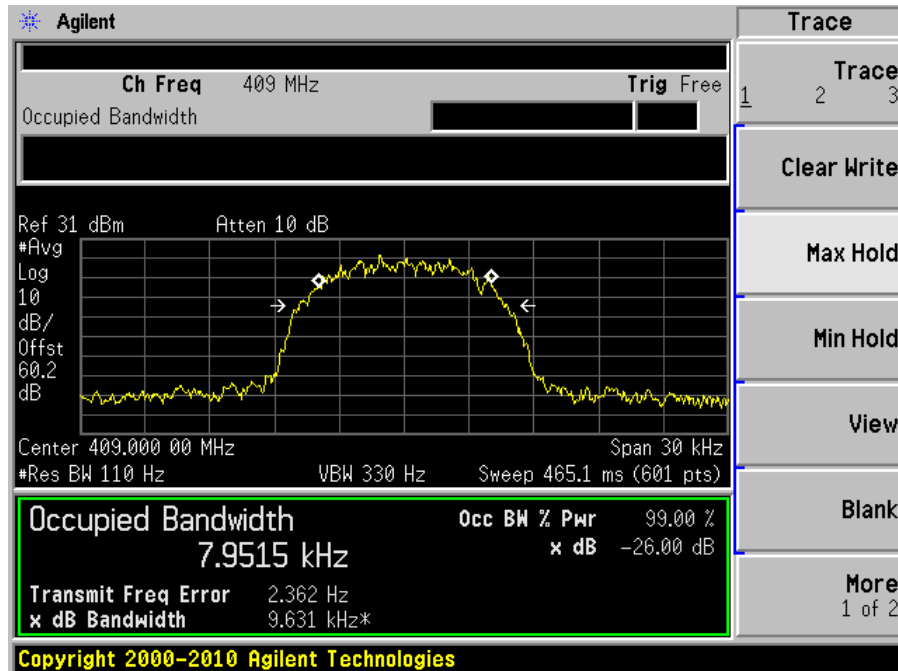
High Power Low Channel – 409.0 MHz



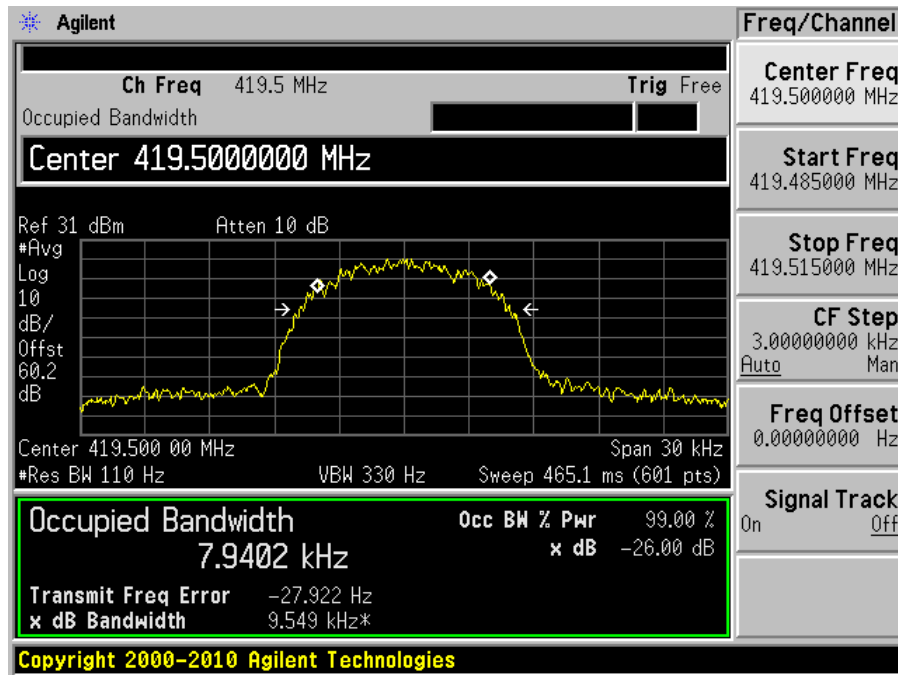
High Power Middle Channel – 419.5 MHz



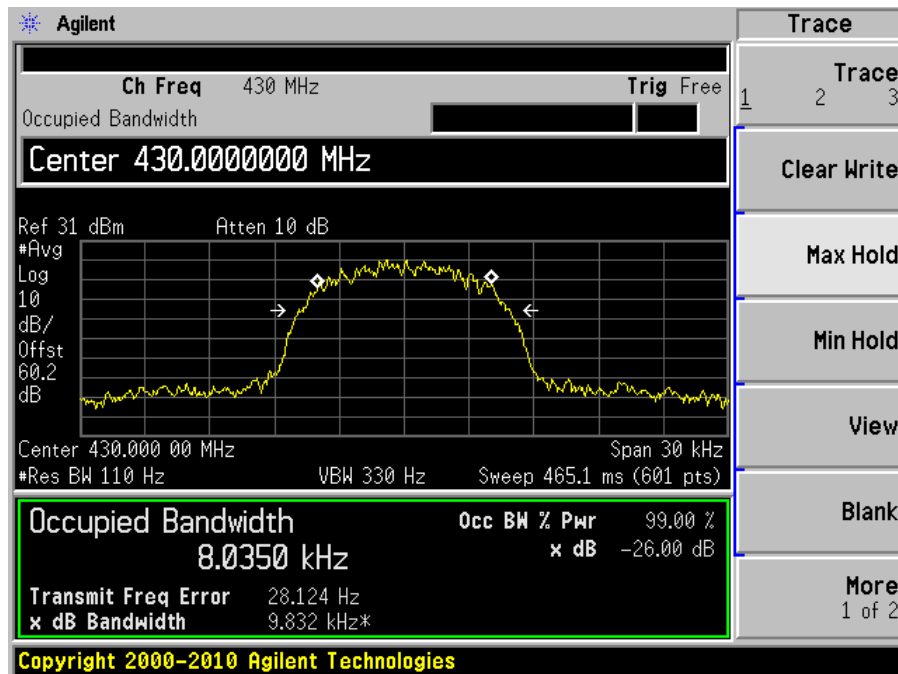
High Power High Channel – 430.0 MHz



Low Power Low Channel – 409.0 MHz

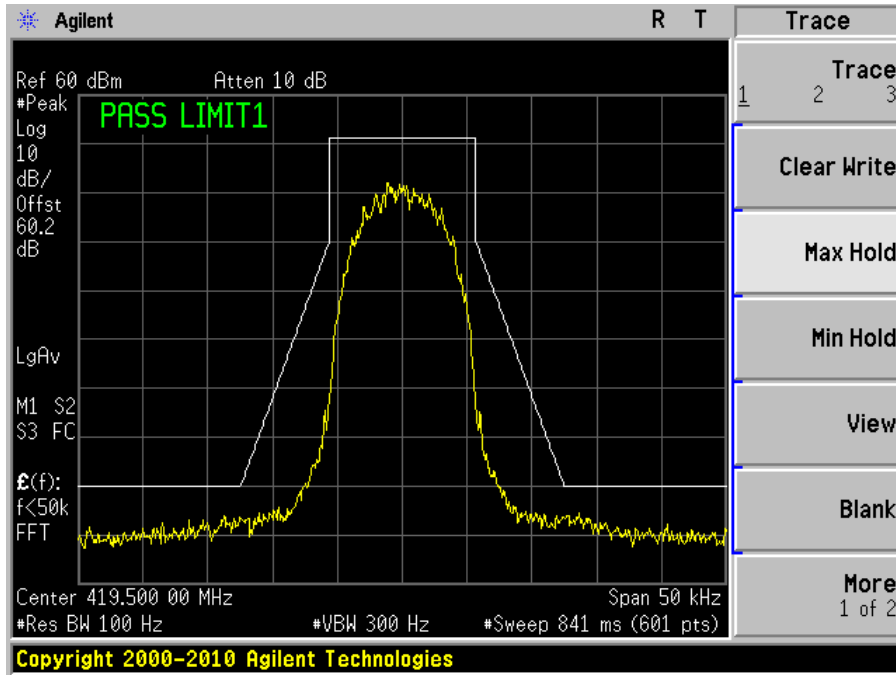


Low Power Middle Channel – 419.5 MHz

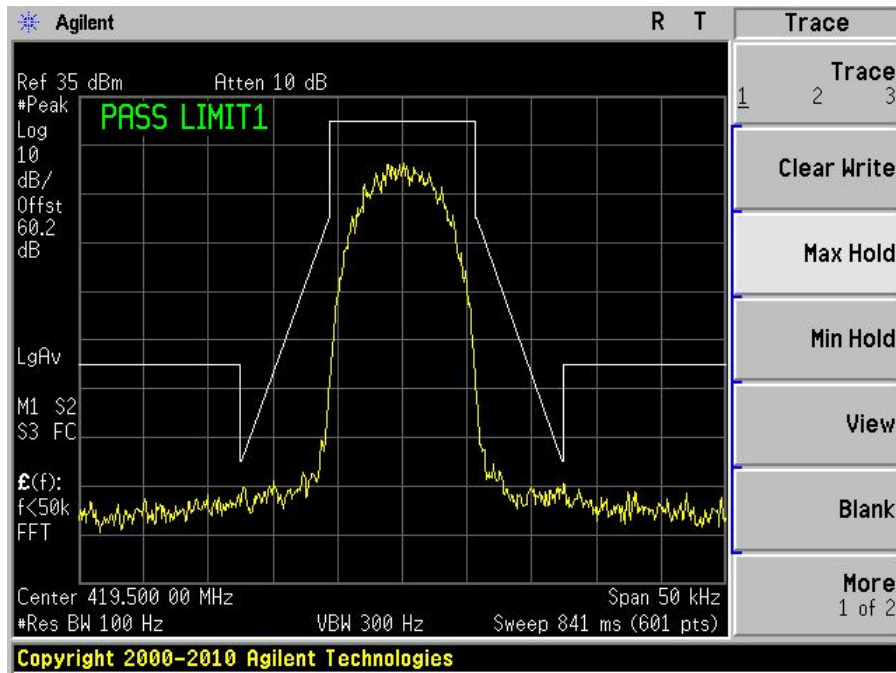


Low Power High Channel – 430.0 MHz

Emission Mask D H-DQPSK



High Power Middle Channel



Low Power Middle Channel

12 Exhibit A - FCC Labeling Requirements

12.1 FCC ID Label Requirement

Per FCC Part 2.925, (a) Each equipment covered in an application for equipment authorization shall bear a nameplate or label listing the following:

(1) FCC Identifier consisting of the two elements in the exact order specified in §2.926. The FCC Identifier shall be preceded by the term FCC ID in capital letters on a single line, and shall be of a type size large enough to be legible without the aid of magnification.

Example: FCC ID: XXX123

Where: XXX—Grantee Code, 123—Equipment Product Code

(b) The grantee code assigned pursuant to paragraph (c) of this section is assigned permanently to applicants/grantees and is valid only for the party specified as the applicant/grantee in the code assignment(s).

(c) A grantee code will have three characters consisting of Arabic numerals, capital letters, or combination thereof

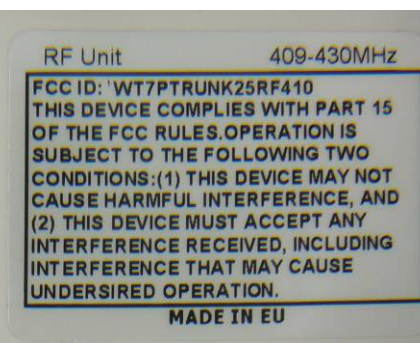
(d) The equipment product code assigned by the grantee shall consist of a series of Arabic numerals, capital letters or a combination thereof, and may include the dash or hyphen (-). The total of Arabic numerals, capital letters and dashes or hyphens shall not exceed 14 and shall be one which has not been previously used in conjunction with:

12.2 FCC Label Contents

Label 1



Label 2

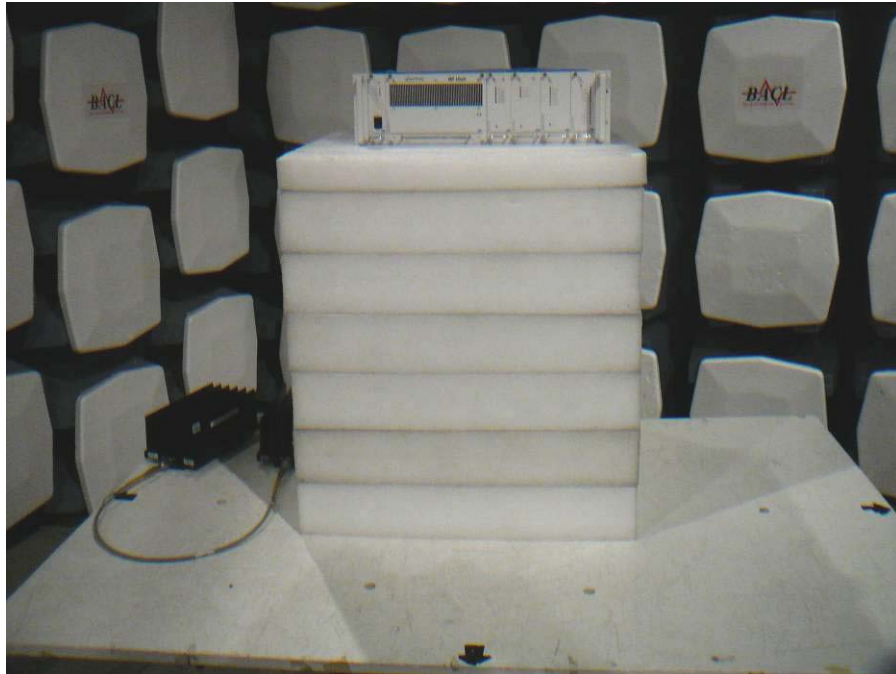


12.3 FCC Label Location on EUT

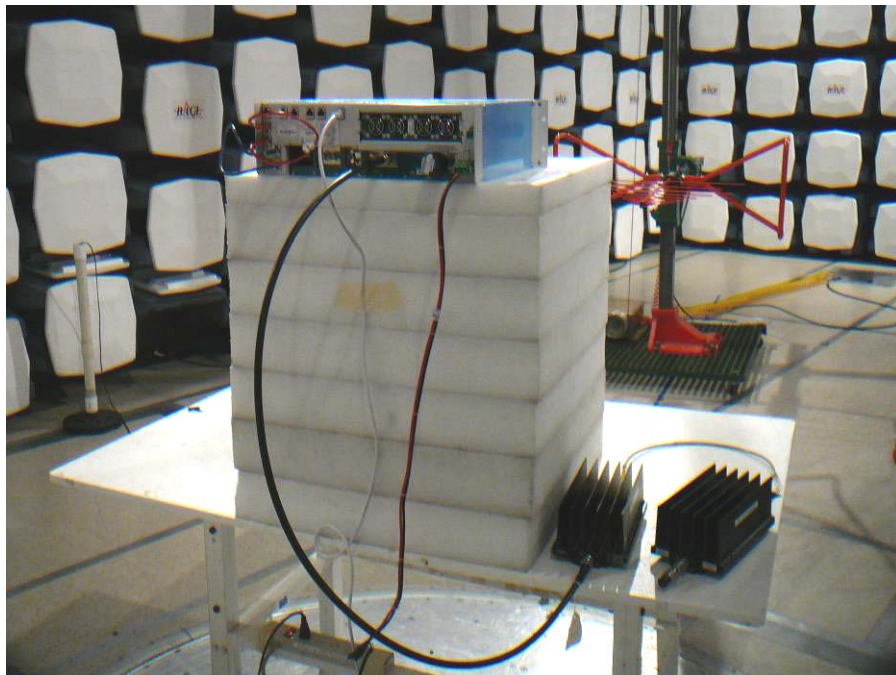


13 Exhibit B - Test Setup Photographs

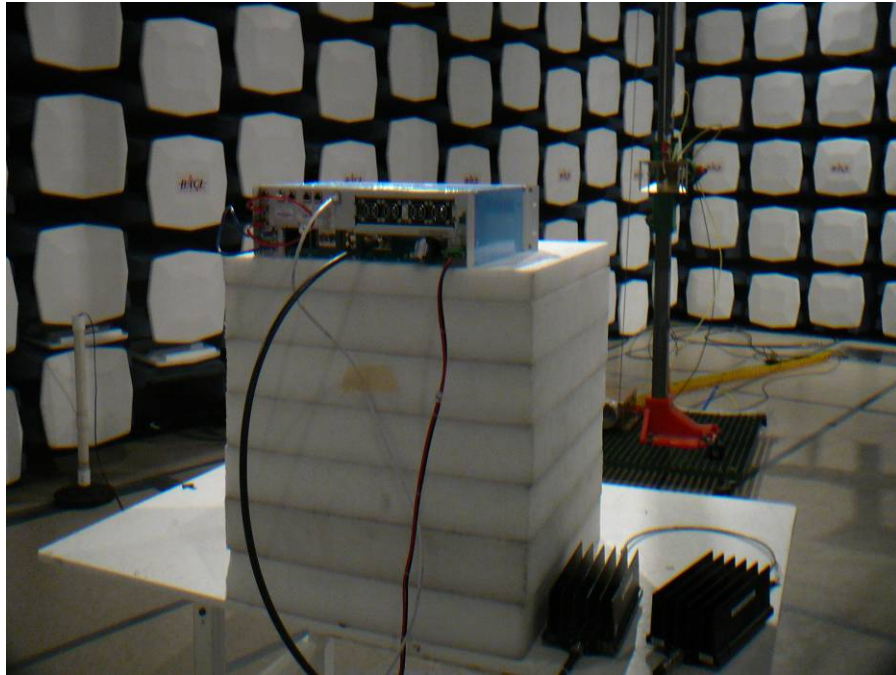
13.1 Radiated Emission – Front View



13.2 Below 1 GHz Radiated Emission – Rear View



13.3 Above 1 GHz Radiated Emission – Rear View



14 Exhibit C - EUT Photographs

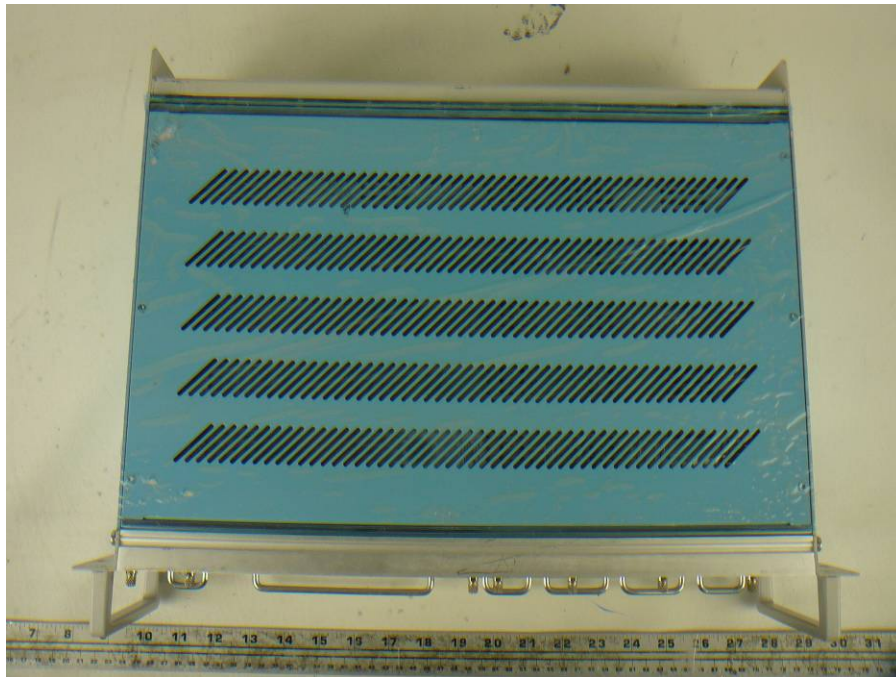
14.1 EUT - Front View



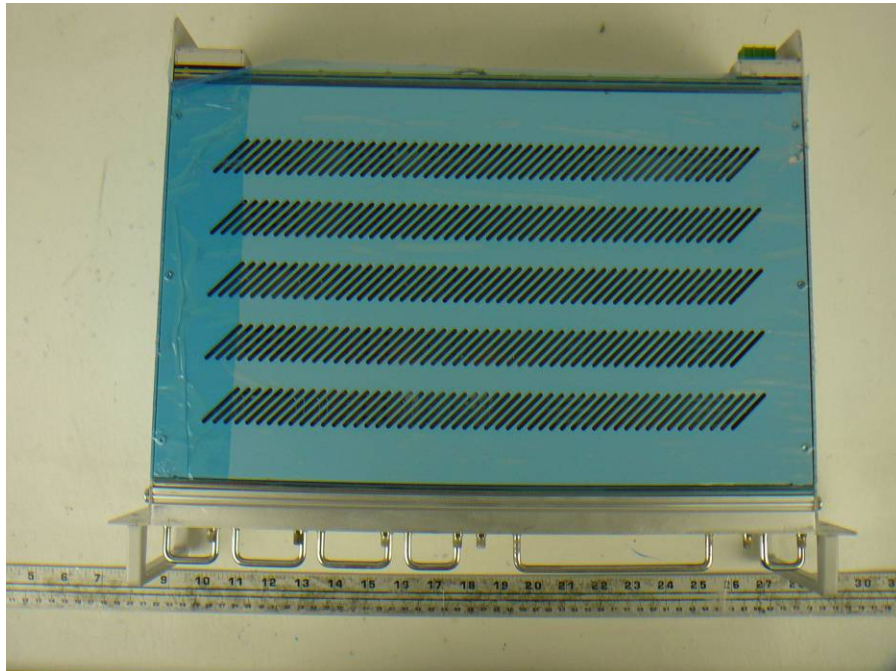
14.2 EUT - Rear View



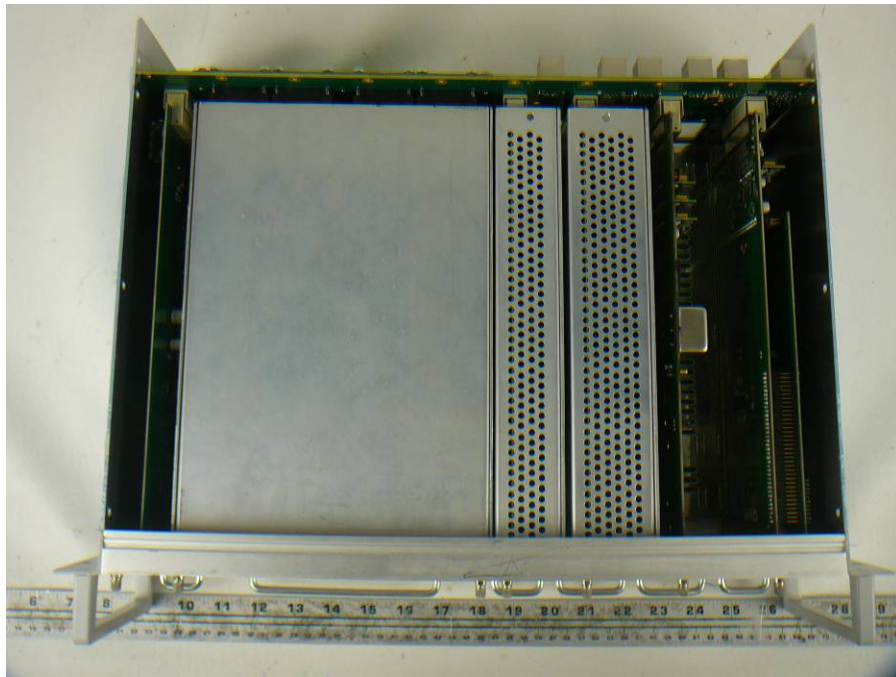
14.3 EUT – Top View



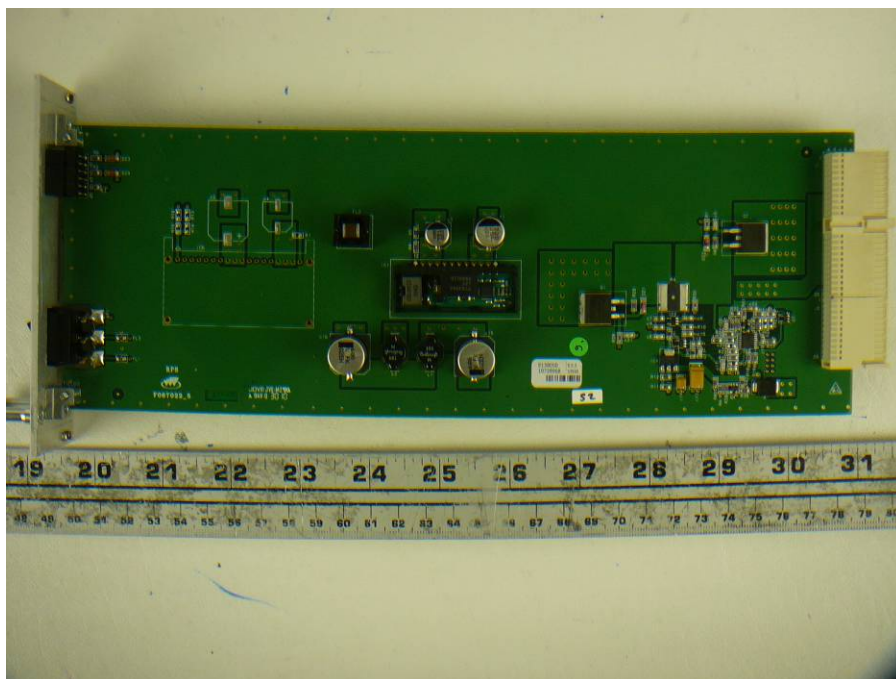
14.4 EUT – Bottom View



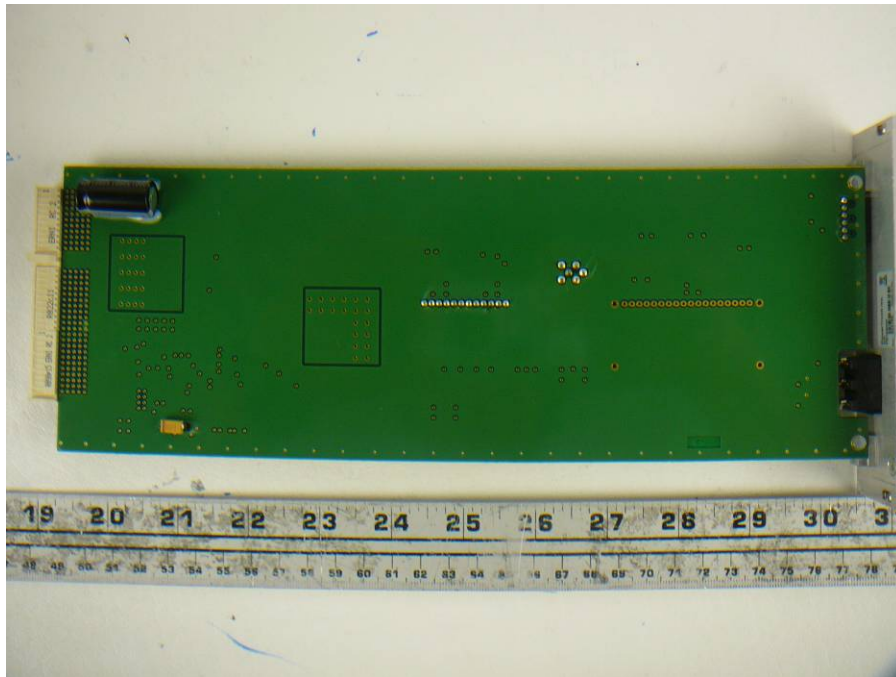
14.5 EUT- Cover Off View



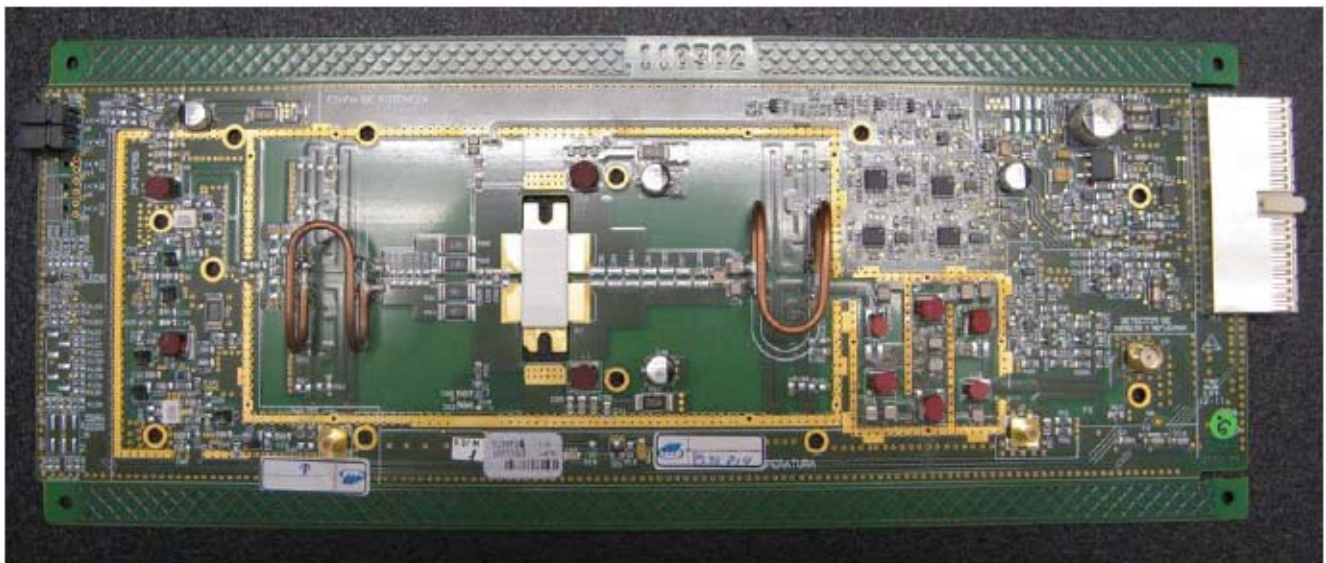
14.6 EUT- RPS Board – Top View



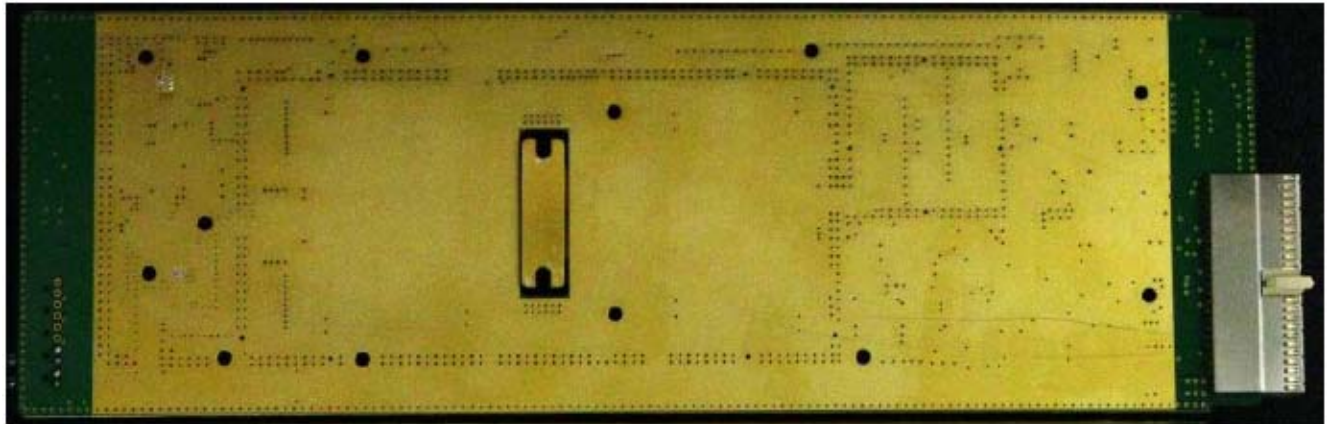
14.7 EUT- RPS Board – Bottom View



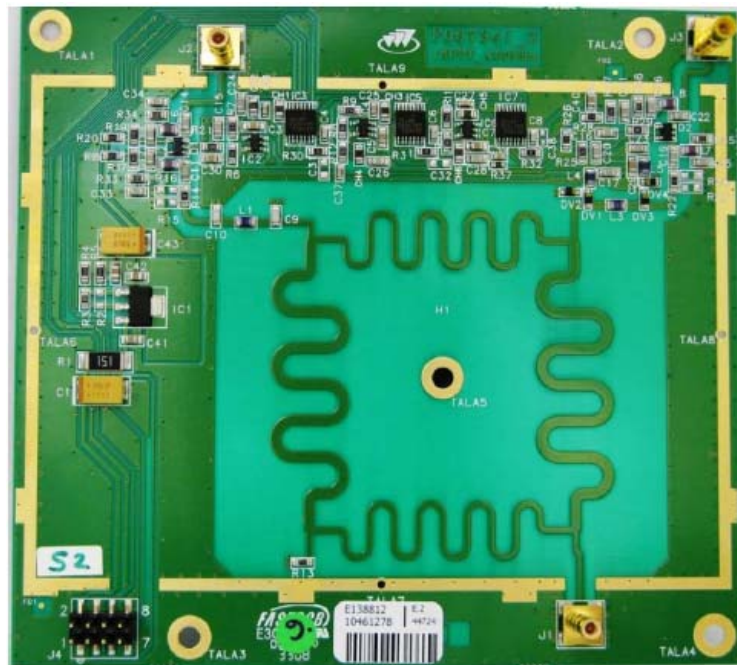
14.8 EUT-RPA Board – Top View



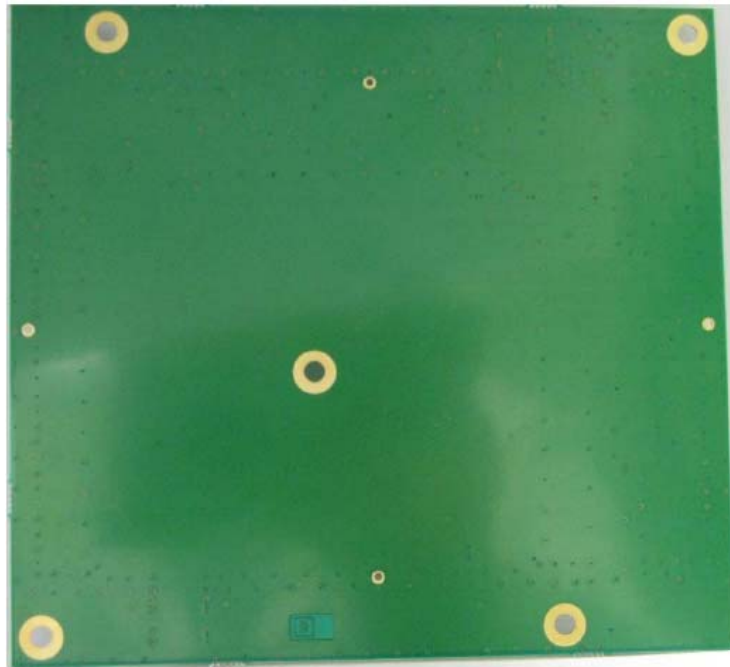
14.9 EUT-RPA Board – Bottom View



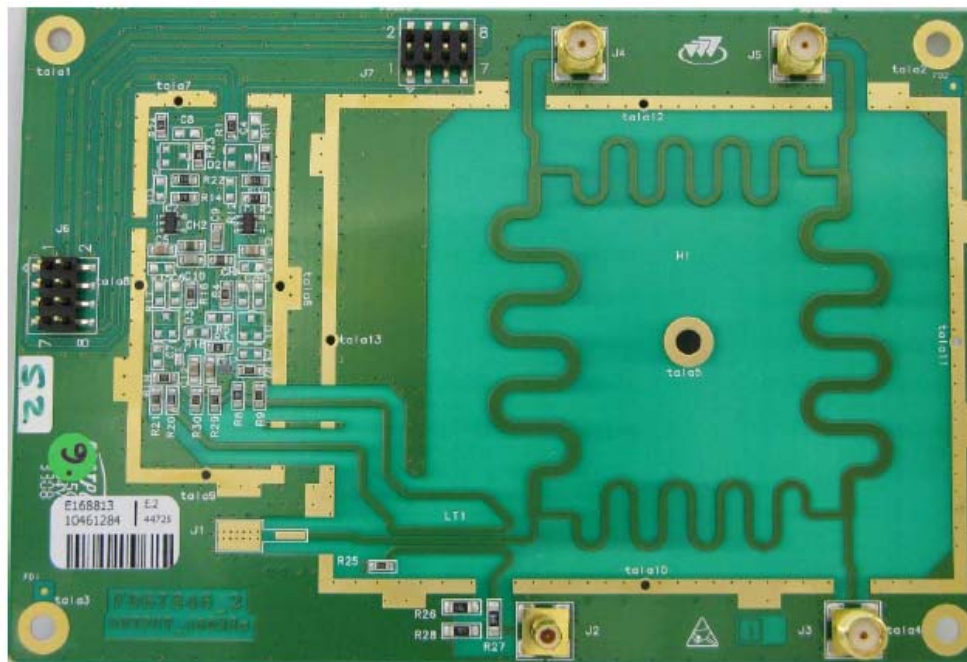
14.10 EUT-Input Board – Top View



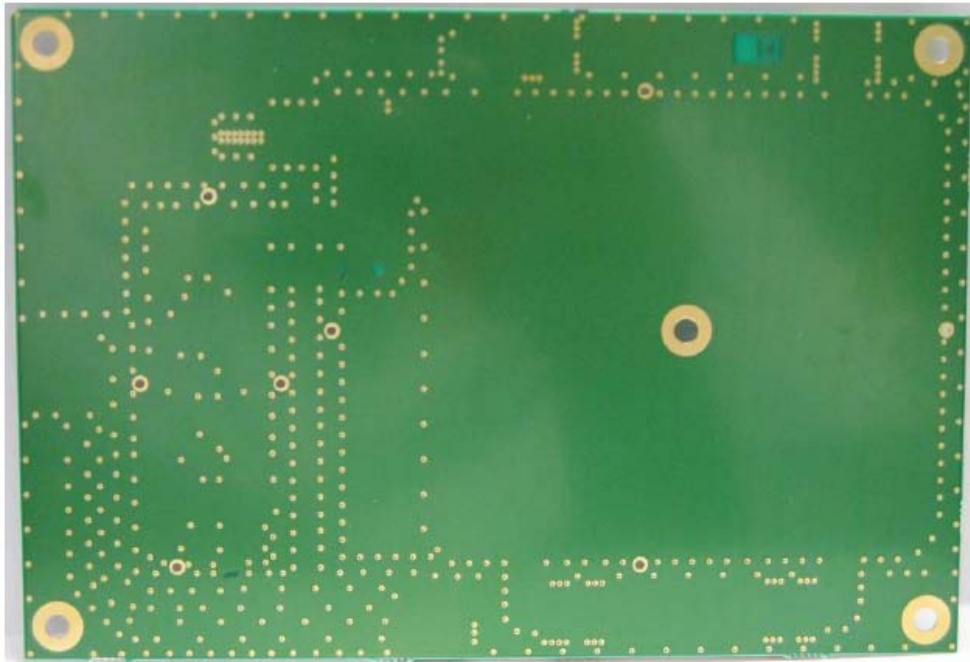
14.11 EUT- Input Board – Bottom View



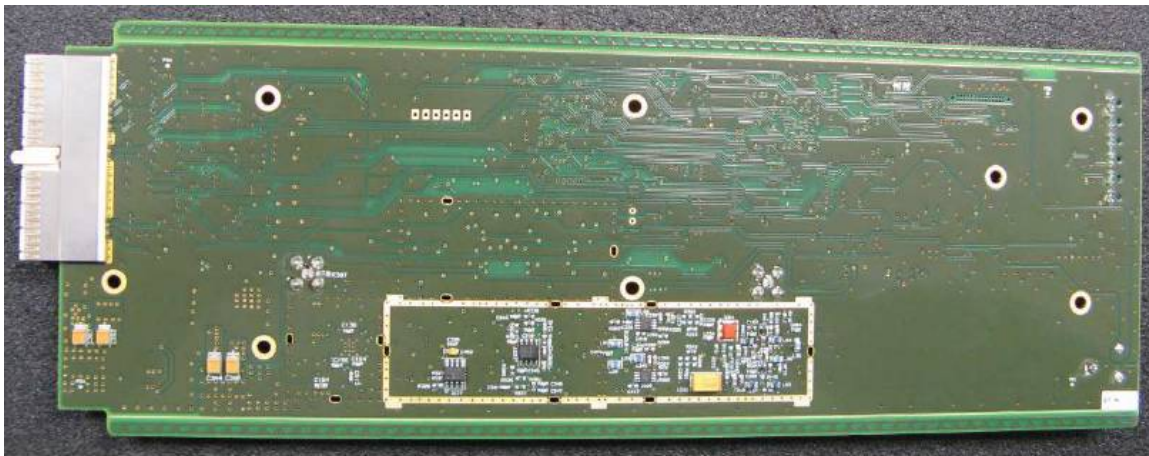
14.12 EUT-Output Board – Top View



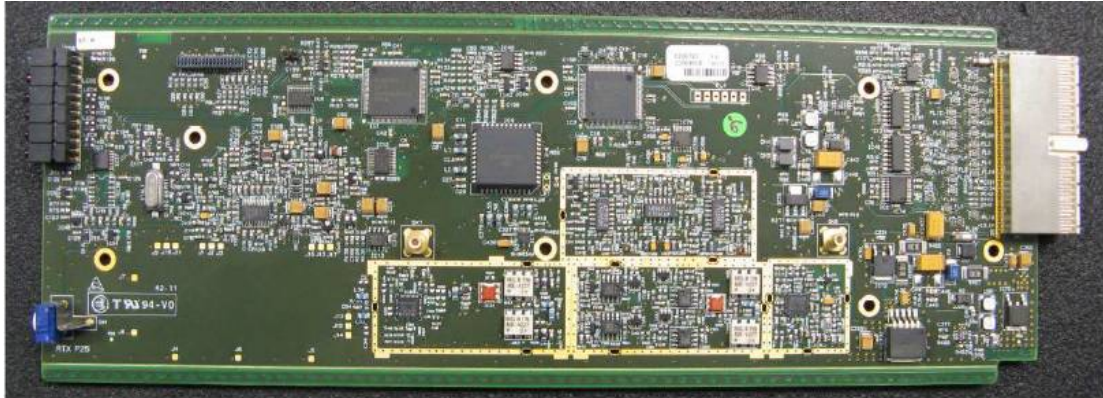
14.13 EUT-Output Board – Bottom View



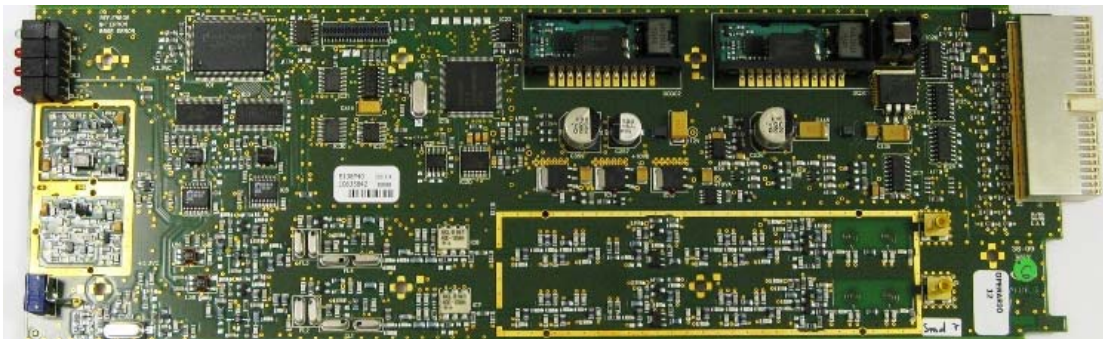
14.14 EUT-RTX Board – Top View



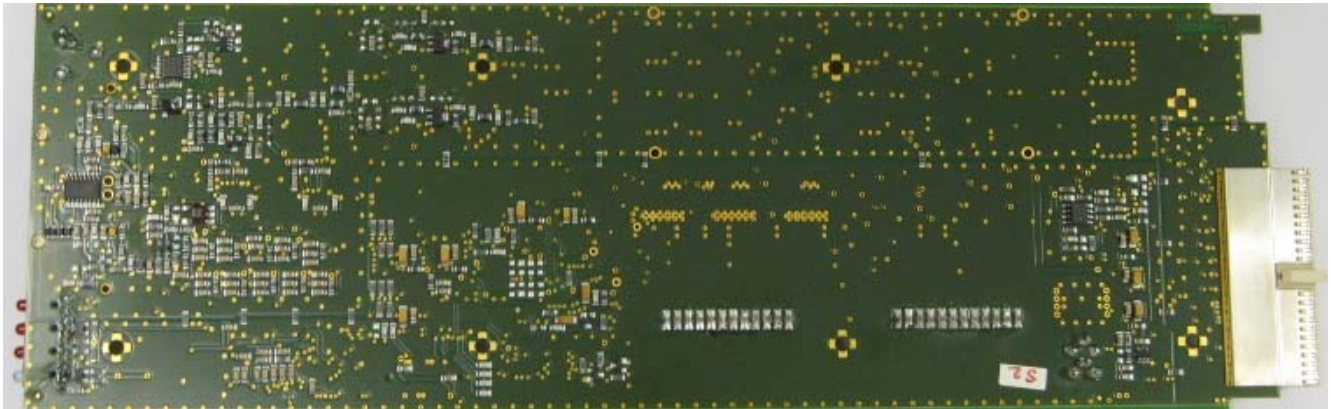
14.15 EUT- RTX Board – Bottom View



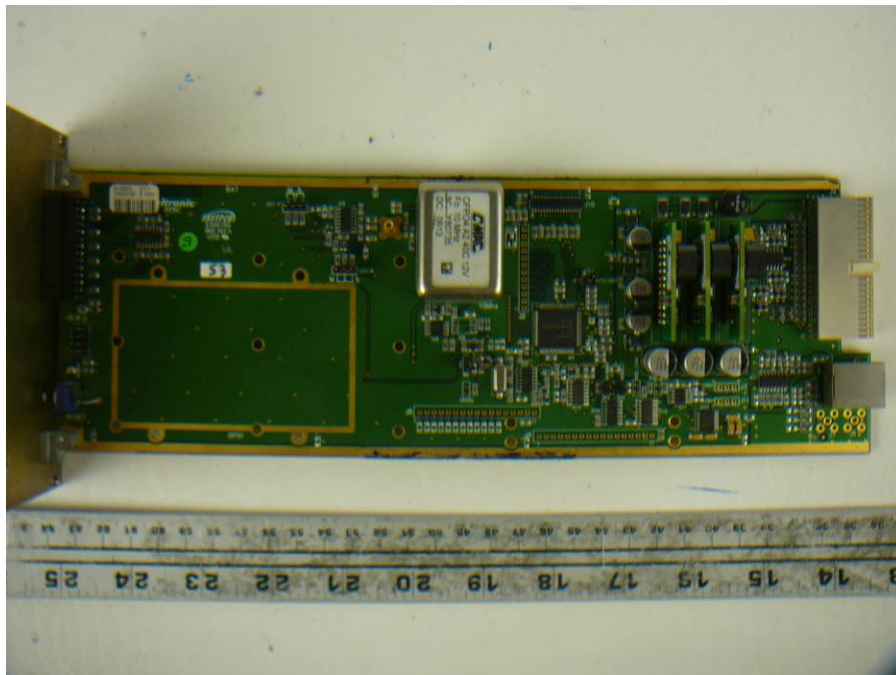
14.16 EUT-RRX Board – Top View



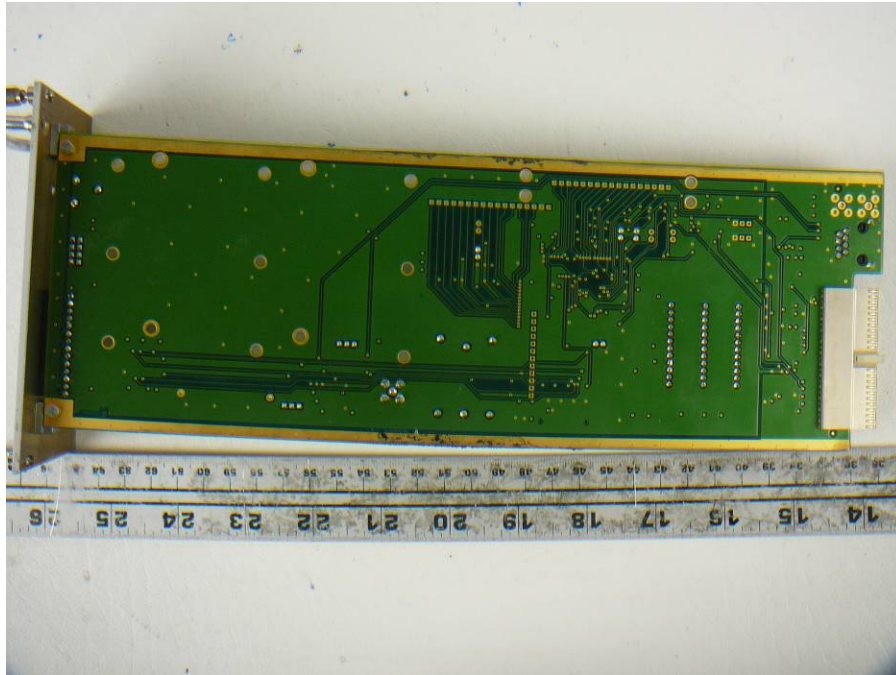
14.17 EUT- RRX Board – Bottom View



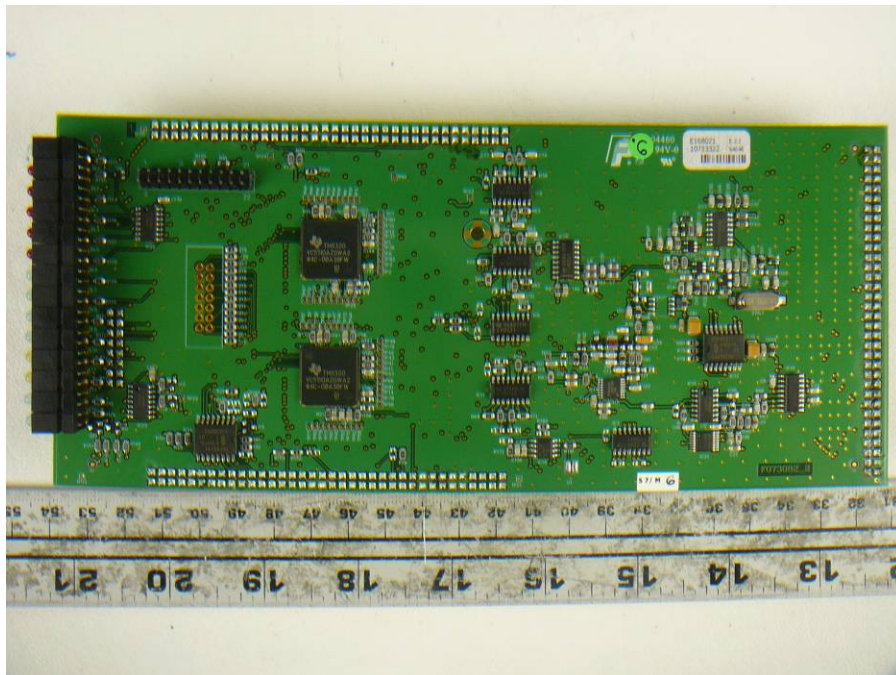
14.18 EUT-BSYNC Board – Top View



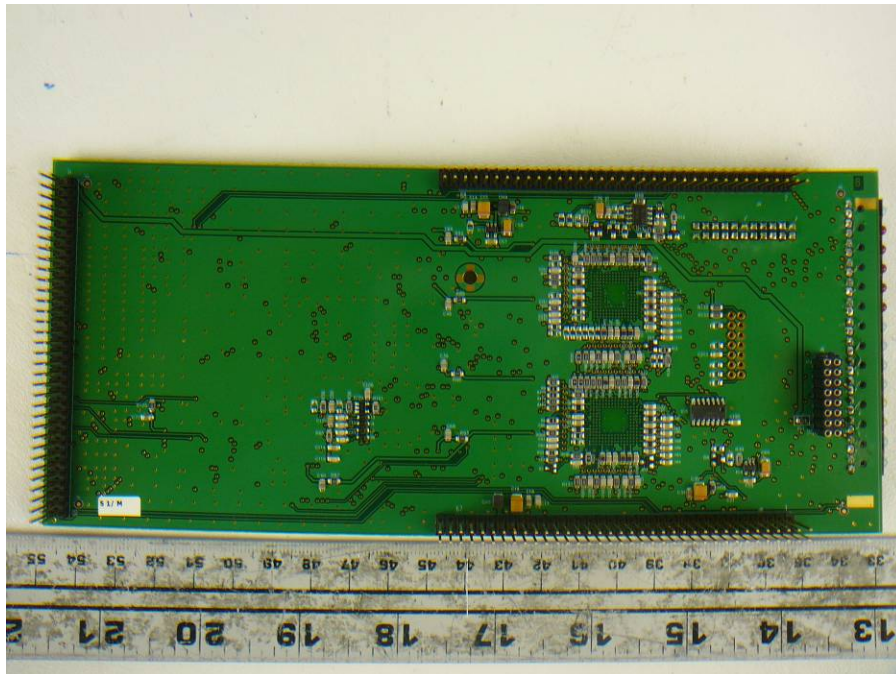
14.19 EUT- BSYNC Board – Bottom View



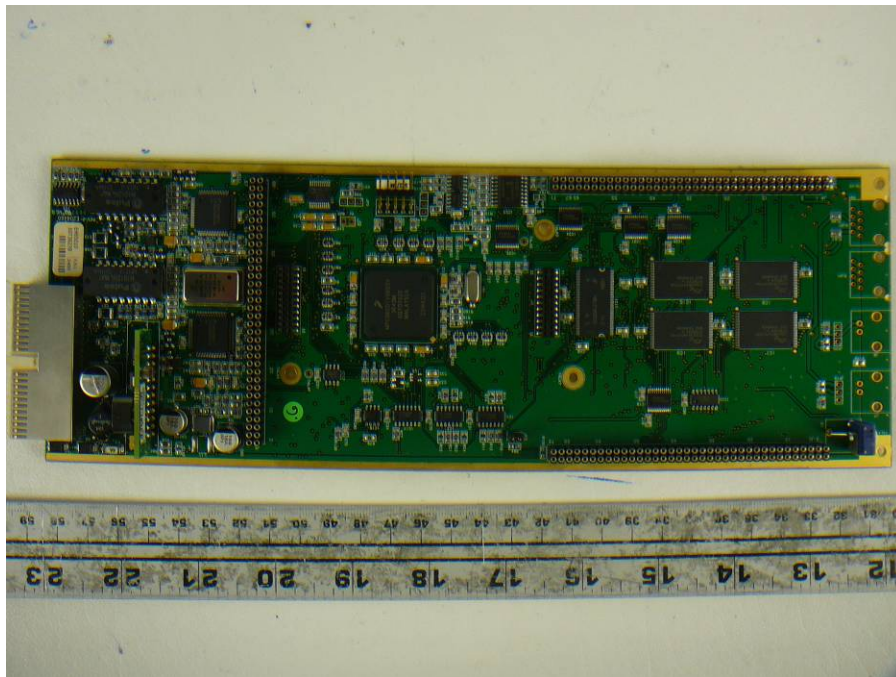
14.20 EUT-RCPU 1st Board – Top View



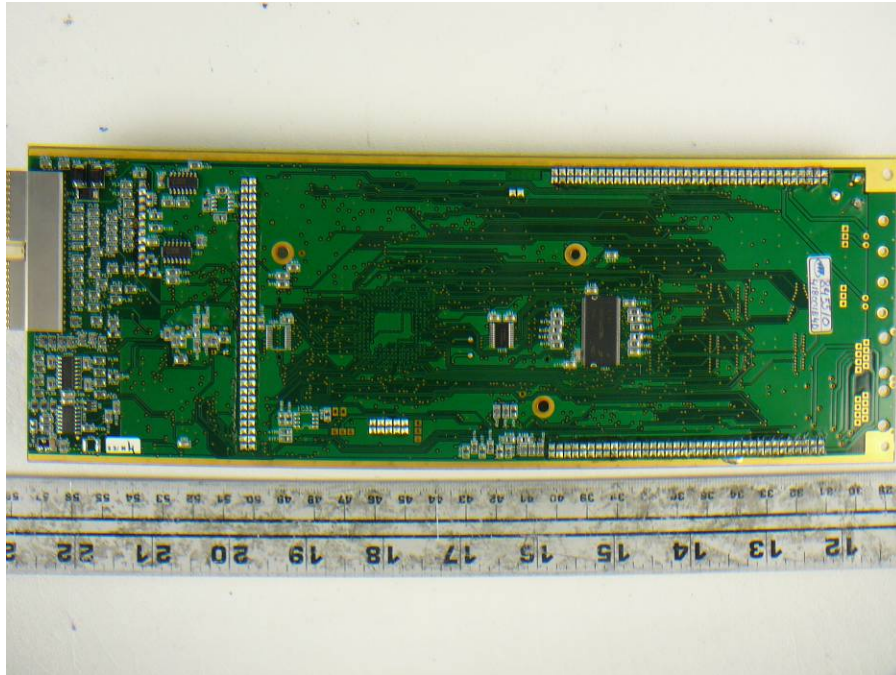
14.21 EUT- RCPU 1st Board – Bottom View



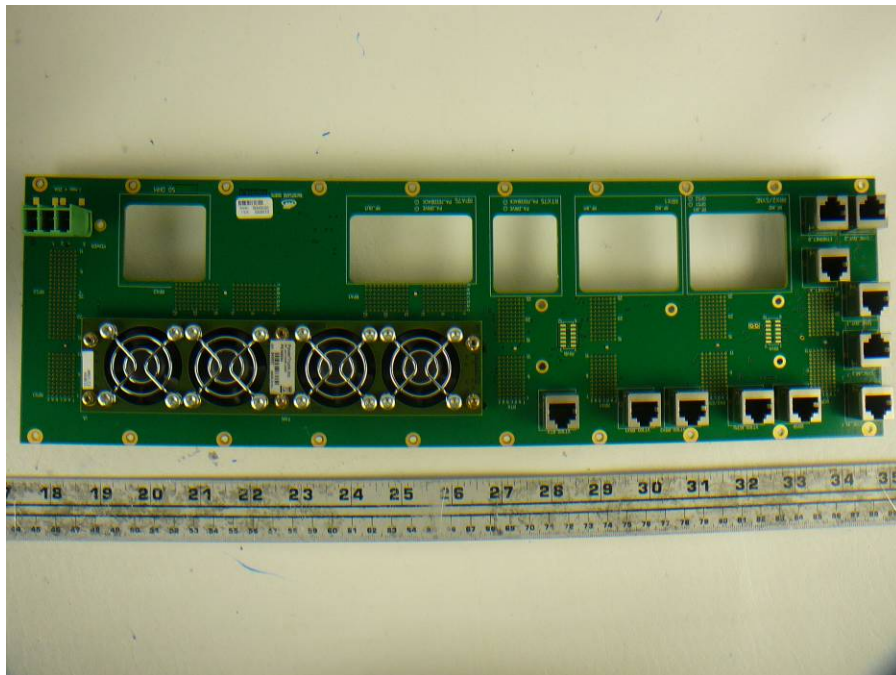
14.22 EUT-RCPU 2nd Board – Top View



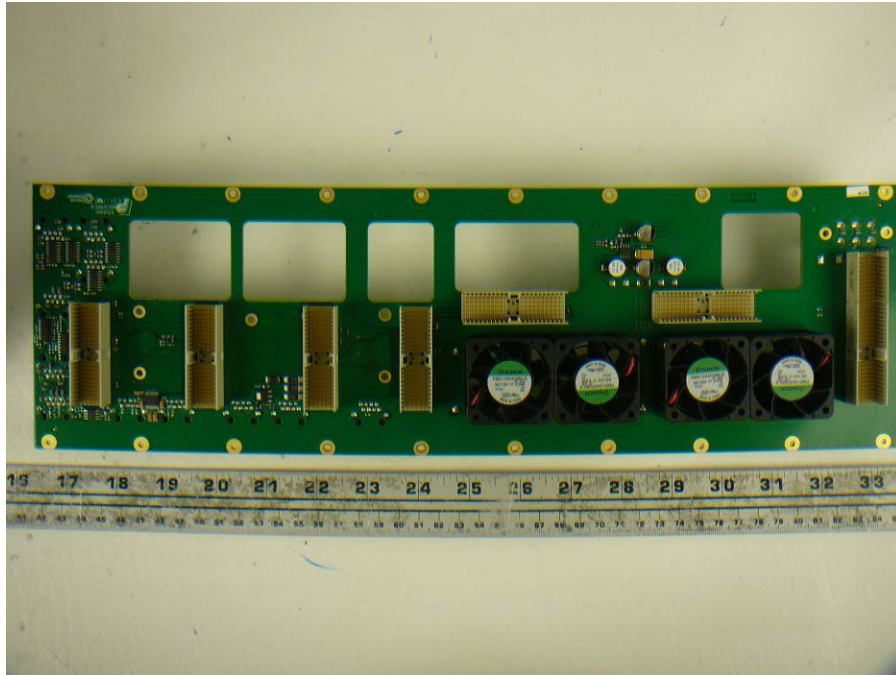
14.23 EUT- RCPU 2nd Board – Bottom View



14.24 EUT-Backplane Board – Top View



14.25 EUT- Backplane Board – Bottom View



---- END OF REPORT ----