Engineering Change Notice (ECN)

QAFO 0001

Originated By:	Cottrill	Effective Date:	6-9-2014

Document Number	REVISION		Initial Release Y / N	Document Title
	NEW	OLD		
EERE 0625	1.1	--	Y	Model 4100 Pocket Programmer Conducted Transmit Power Output
N/A				
N/A				
N/A				
N/A				
N/A				
N/A				
N/A				
N/A				
N/A				
N/A				
N/A				
N/A				
N/A				
N/A				

Change Description

Initial Release

Reason for Change (Justification)

This document describes the RF Test Method and Conducted Transmit Power Output Test Results for Pocket Programmer (POP), Model 4100.

Training Required per Approved Matrix		YES	X	NO (requires a brief rationale)

Rationale: Document type does not require training.

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Disposition of Material	
X	**No Material Affected** (Comments): Sample is representative of manufactured devices.
N/A	**Scrap** (Comments):
N/A	**Rework** (Instructions):
N/A	**Use As Is** (Justification):
N/A	**Other:** (Describe)

CURRENT CHANGE AFFECTS (If "Yes", list document number)			
☒ NO IMPACT (requires rationale)	Verification (Y/N) Doc.#:	Validation(Y/N) Doc.#:	Risk Management(Y/N) Doc.#:
☐ Documentation, Procedures, Forms and Work Instructions	Regulatory(Y/N) Doc.#:	Other: (Y/N) Doc.#:	Other: (Y/N) Doc.#:

"NO IMPACT" was selected please provide a brief justification rationale:

This engineering report is to ensure compliance with FCC regulations. It does not impact existing design verification, validation, risk management, or other regulatory submissions.

YES	NO	
n/a	n/a	One or more of the element(s) from "Current Change Affects" were selected which requires that effects of the change be described and the appropriate documentation to implement the change be provided.

"Current Change Affects" element(s) were selected which require the effects of the change be described below:

N/A

If changes affects a Device model, please list all affected model numbers below:

1	Model 4100	2	N/A	3	N/A	4	N/A

REVIEW SIGNATURES				DATE	DIST
X	Document Author:	David Petsko	David P. Petsko	6-9-14	
X	Director:	Mike Labbe		6/9/14	
X	Regulatory:	Doug Atkins	SEE ATTACHED SHEET	5-29-14	
X	Quality:	KM Ahsan	SEE ATTACHED SHEET	6-4-14	
X	Engineering Manager:	Jeff Weisgarber	Jeff A. Weis	6/6/2014	
N/A	Executive Management:				
N/A	Marketing:				
X	Other:	Ben Cottrill		2014-May-28	

Processed By: RG Zog Date: 6/9/2014

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N/A	Executive Management:			
N/A	Marketing:			
N/A	Other: Ben Cottrill			

Processed By: _____ Date: _____

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X	Director: Mike Labbe			
X	Regulatory: Doug Atkins			
X	Quality: KM Ahsan	Ekhsan	6-4-14	
X	Engineering Manager: Jeff Weisgarber			
N/A	Executive Management:			
N/A	Marketing:			
N/A	Other: Ben Cottrill			

Processed By: _____ Date: _____

Test Report

Title: **Model 4100 Pocket Programmer Conducted Transmit Power Output Report**	
Document Number and Revision: **EERE 0625 Revision 1.2**	Page 1 of 4
Prepared By: Dave Petsko	Approved By:

1. Purpose

FCC Rules §2.1046 requires the conducted measurement of transmitter power output be included in the EMC test report documents submitted to the FCC for product certification. This document describes the RF Test Method and Conducted Transmit Power Output Test Results for Pocket Programmer (POP), Model 4100.

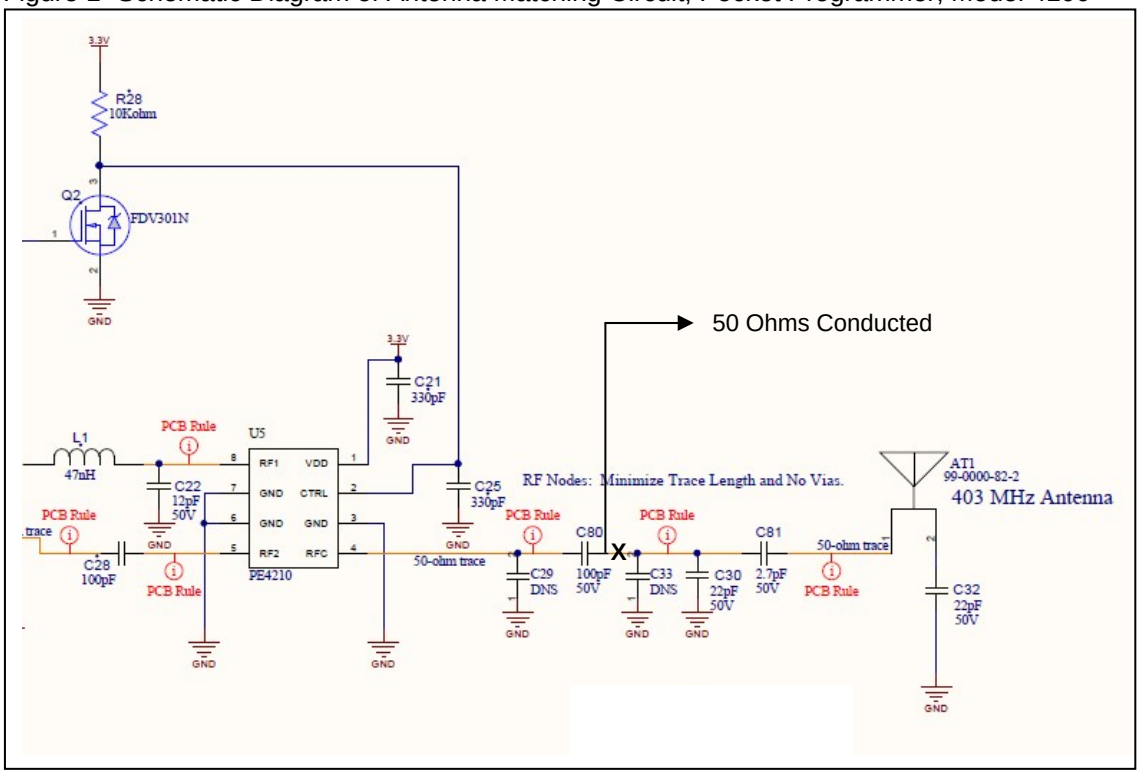
2. References

- 47 CFR § 2.1046(a)
- DS-0000-77-2 Torpedo Pocket Programmer Schematic
- AP-0000-97-2 ASBY PCB Torpedo Pocket Programmer

3. RF Test Method

The 402-405 MHz conducted transmit power output of the Pocket Programmer, Model 4100 may be measured directly by attaching a Murata MM8130-2600 coaxial connector with switch to the 50 Ohms I/O point of the PCB (AP-0000-97-2 ASBY PCB Torpedo Pocket Programmer) as shown in Figure 1.

Figure 1- Schematic Diagram of Antenna Matching Circuit, Pocket Programmer, Model 4100



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The connector body (ground terminal) was soldered to the PCB ground flood area adjacent to capacitor C50. Capacitors C30 and C31 were positioned upright (tombstone) such that C50 was disconnected from the antenna (AT1) matching components. The connector center conductor (hot terminal) was soldered to the PCB trace adjacent to the output end of capacitor C50 (See the schematic location marked **X**).

Note: Attachment of the coaxial connector to the PCB assembly should be done by a trained electronics technician to allow for proper soldering and prevention of undue stress on the PCB solder connection (I.e. PCB pad area damage may easily occur).

The PCB is then connected to a spectrum analyzer via coax cable for measurement of transmitter conducted power output.

4. Equipment Used

Table 1 – List of Test Equipment

Equipment	Mfg.	Model	Cal ID	Cal Due
Spectrum Analyzer	Rohde Schwartz	FSL6	10055	8 NOV 2014
Coax Cable*	Johnson/Emerson	415-0033-012	NA	NA

5. Sample Information

A single sample was used for the Conducted Transmit Power Output Test as described in Table 2 below.

Table 2 – Sample Used

	PoP Sample 1
PCB Serial Number	0023
PoP Serial Number [EXID]	0x00001D
DBR [includes all HW revisions]	1613
SW Version	Custom EMC Test Software \Torpedo\Software\PoP\RadioTest, MKS Checkpoint 1.4

5.1. Sample Traceability

Traceability records are defined for the sample including workflow/traveler, which includes reference to BOM revision, manufacturing procedures with revision number and component lot or serial numbers. A description of the methods and processes used to assemble/process the materials are recorded in the Minnetronix Development Build Record (DBR) so that the method and processes can be repeated if necessary. The DBR incorporates:

- DA-0001-89-7 ASBY Assembly Procedure for Torpedo PoP Pocket Programmer
- Revision information for BOMs
- Supplements for updates (e.g. software changes, any rework, etc.)

5.2. Sample Retention

Sample is retained at QIG's Cleveland facility.

6. Transmitter Power Output Test Results

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The 402-405 MHz transmitter measured conducted power output data was recorded for low, medium, and high RF channels selected. The test results are shown in Figure 2 and recorded in Table 3. Test limits are not applicable per FCC §2.1046 requirements.

Figure 2 - Conducted Transmitter Power, Pocket Programmer, Model 4100

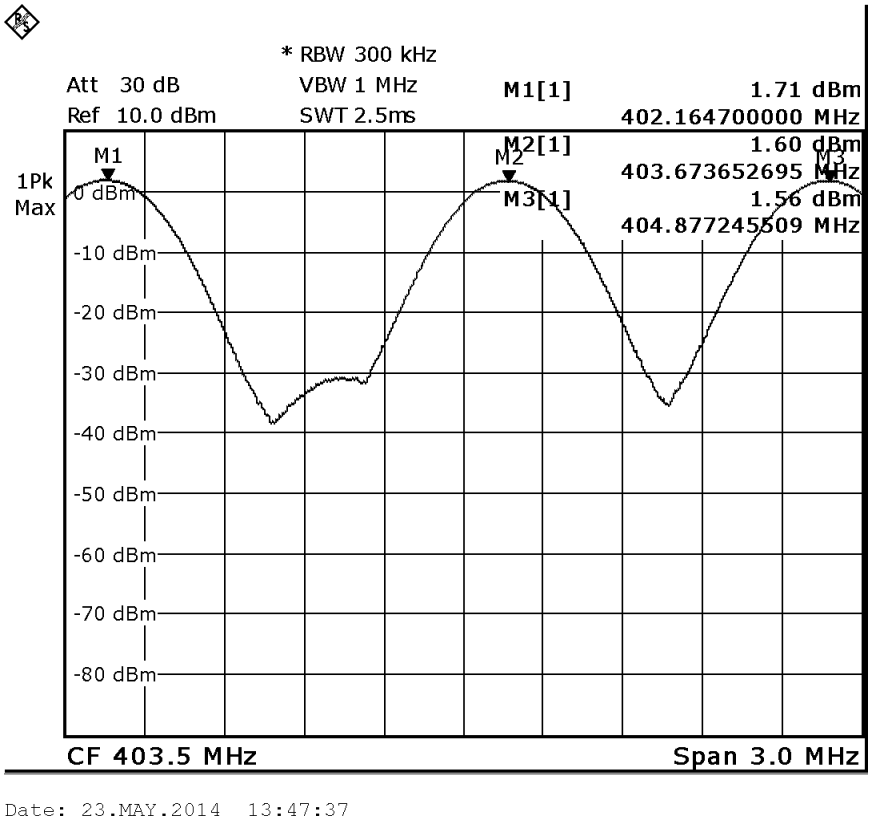

Table 3 – Pocket Programmer, Model 4100, Conducted Transmit Power Output

Transmit Power Setting 52	Channel 0	Channel 5	Channel 9
Frequency (MHz)	402.15	403.65	404.85
Power Output (dBm)	2.01	1.90	1.86

* Coax Cable Insertion Loss – 0.3 dB

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7. Revision History

Revision Level	Revision Description	ECN No#	Effective Date
1.1	Initial release	2318	06/09/14
1.2	Removed internal device photo.	2365	07/02/14

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