DFS report

FCC / IC Test Report

FOR:

Honeywell

Product Description: Dolphin 75e, Handheld Computer
Models: 75eL00, 75eL0N

FCC ID: HD5-75EL0N and HD5-75EL00
IC ID: 1693B-75EL0N and 1693B-75EL00

FCC CFR47 Part 15, subpart E
IC RSS-210 Issue 8, Annex 9

TEST REPORT #: EMC_ HONEY_134_14001_DFS_75e
DATE: 2015-Feb-03

ACCREDITED
TESTING LABORATORY
Certificate #2135.01

Bluetooth Qualification Test Facility (BQTF)

CTIA Authorized Test Lab
LAB CODE 20020328-00

FCC listed
A2LA Accredited

IC recognized # 3462B

***CETECOM* Inc.**
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1 Assessment

The following device was evaluated against the applicable criteria concerning DFS (Dynamic Frequency Selection) specified in FCC rules Parts 15.E of Title 47 of the Code of Federal Regulations and IC standard RSS-210 issue 8, Annex 8 and no deviations were ascertained during the course of the tests performed.

As the Model 75eL0N and 75eL00 differ only in the additional support of NFC in the 75eL0N variant testing has been performed with a device of this variant.

Company	Description	Model #
Honeywell International, Inc	Dolphin 75e, Handheld Computer	75eL0N and 75eL00

Responsible for Testing Laboratory:

Date	Section	Name	Signature
2015-02-03	Compliance	Franz Engert (Compliance Manager)	Franz Engert Digitally signed by Franz Engert DN: cn=Franz Engert, c=US, o=CETECOM, ou=Complience, email=franz.engert@cetecom.com Date: 2015.02.05 12:20:38 -08'00'

Responsible for the Report:

Date	Section	Name	Signature
2015-02-03	Compliance	James Donnellan (Sr. EMC Engineer)	James Donnellan Digitally signed by James Donnellan DN: cn=James Donnellan, c=US, o=Cetecom Inc., ou=Compliance, email=james.donnellan@cetecom.com Date: 2015.02.05 13:29:03 -08'00'

2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the Test Report

Company Name:	CETECOM Inc.
Department:	Compliance
Address:	411 Dixon Landing Road Milpitas, CA 95035 U.S.A.
Telephone:	+1 (408) 586 6200
Fax:	+1 (408) 586 6299
Compliance Manager:	Franz Engert
Responsible Project Leader:	James Donnellan

2.2 Identification of the Client

Applicant's Name:	Honeywell International Inc.
Street Address:	9680 Old Bailes Road
City/Zip Code	Fort Mill SC 29707
Country	USA
Contact Person:	Mandana Salahshour
Phone No.	(803)835-8190; (803)835-8097
Fax:	----------
e-mail:	mandana.salahshour@honeywell.com

2.3 Identification of the Manufacturer

Manufacturer's Name:	Same as Applicant
Manufacturers Address:	---
City/Zip Code	---
Country	---

3 Equipment under Test (EUT)

3.1 Specification of the Equipment under Test

Model:	75eL0N and 75eL00
HW Version :	2.0
FCC-ID:	HD5-75EL0N/ HD5-75EL00
IC-ID:	1693B-75EL0N and 1693B-75EL00
Product Description:	Dolphin 75e, Handheld Computer
Technology/ Type(s) of Modulation:	802.11a/n/ac
Modes of Operation	Client in all UNII sub bands -> DFS client relying on master radar detection P2P supported only in UNII-1 and UNII-3
Channel Bandwidths	20 MHz / 40 MHz / 80 MHz
Operating Frequency Ranges (MHz)/ Channels:	According to the tables in the document „75e Paris FCC Functional Overview“ which is part of the exhibits.
Rated Operating Voltage / Power Supply:	Li-ion Battery Vmin: 3.3V dc/ Vnom: 3.7V dc / Vmax: 4.2V dc
Operating temperature range:	-20°C – 50°C
Test Sample:	Prototype

3.2 Identification of the Equipment under Test (EUT)

EUT #	Serial Number	HW Version	Model	SW Version	Notes/Comments
2	14268J0078	2.0	75eL0N	54.0	Conducted RF Sample

3.3 Identification of Accessory equipment

STE #	Type	Manufacturer	Model	Serial Number
1	AC/DC Adapter	PhiHong	PSA105R-050Q	P142302633A1
2	Li-ion Battery	BTEC	70e-BTEC	TGMX142071852

3.4 Environmental conditions during Test:

The following environmental conditions were maintained during the course of testing:
Ambient Temperature: 20-25°C
Relative humidity: 40-60%

3.5 Dates of Testing:

11/14/2014

3.6 Test mode of operation:

Mode	Data rate (Mbps)	Modulation scheme
802.11a	6	OFDM/BPSK
802.11n [40]	6.5	OFDM/BPSK
802.11ac [80]	29.3	OFDM/BPSK

4 Subject of Investigation

The objective of the measurements applied by CETECOM Inc. was to establish compliance of the EUT as described under Ch. 3 of this Test Report, with the applicable criteria concerning DFS (Dynamic Frequency Selection) specified in

- FCC CFR47 Parts 15, subpart E
- IC RSS-210 Issue 8, Annex 9

The evaluation has been applied according to the "NEW UNII Rules" according:

905462 D03 UNII Clients Without Radar Detection New Rules v01r01
905462 D02 UNII DFS Compliance Procedures New Rules v01r01

This test report is to support a request for new equipment authorization under the
FCC ID: HD5-75ELON/00 and IC ID: 1693B-75EL0N/00

5 Summary of Measurement Results

Test Specification	Test Case	Temperature and Voltage Conditions	Mode	Pass	Fail	NA	NP	Result
15.407 (h) RSS210 A9.4	DFS	Nominal	802.11a/n/ac	■	☐	☐	☐	Complies

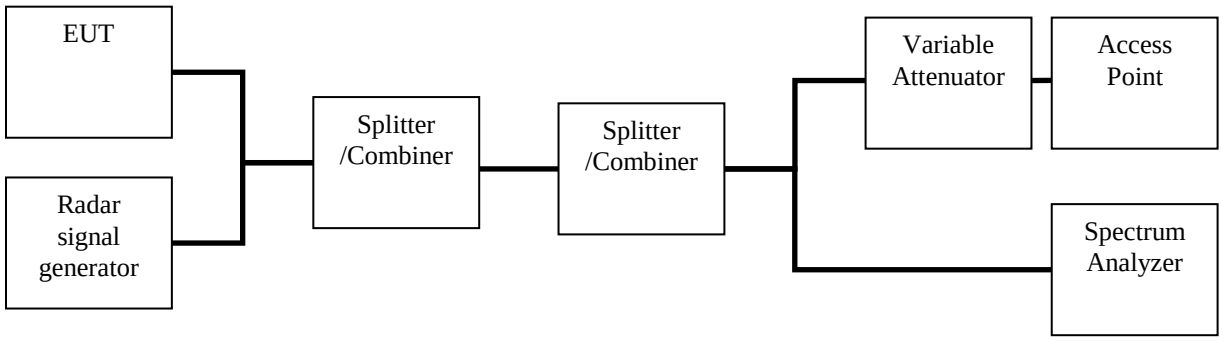
Note: NA= Not Applicable; NP= Not Performed.

6 DFS

6.1 References:

905462 D02 UNII DFS Compliance Procedures New Rules v01r01

6.2 Test Setup:



For The measurements at 20MHz and 40MHz channel bandwidth the DUT was connected via 50Ohm conducted port to a CISCO AP (AIR-AP1262N-A-K9) with FCC ID: LDK102073. Traffic was stimulated via pinging the EUT through an Ethernet connection at the access point.

For The measurements at 80MHz channel bandwidth the DUT was connected via 50Ohm conducted port to a CISCO AP AIR-CAP3702E-A-K9 with FCC ID LDK102097. Traffic was stimulated with the tool “Packet Generator” for Android by transmission of UDP packets from the EUT to a lab top.

The levels of AP and station were setup in a way that the station level was significantly higher than the AP level by the usage of attenuators.

The SA trace was triggered by the radar signal from the DFS Generator / PXI-5421 card.

6.3 Verdict:

PASS

6.4 Results:

6.4.1 Requirements of 905462 D03 UNII Clients Without Radar Detection New Rules v01r01

1. The CISCO AP DFS master is operated in AP mode. The EUT is properly associated and traffic is passed through a local network from a lap top to the AP to the client under test. The lab top, the AP and the EUT have IP addresses in this local network. This is considered proof that the traffic was passing through a properly associated connection.

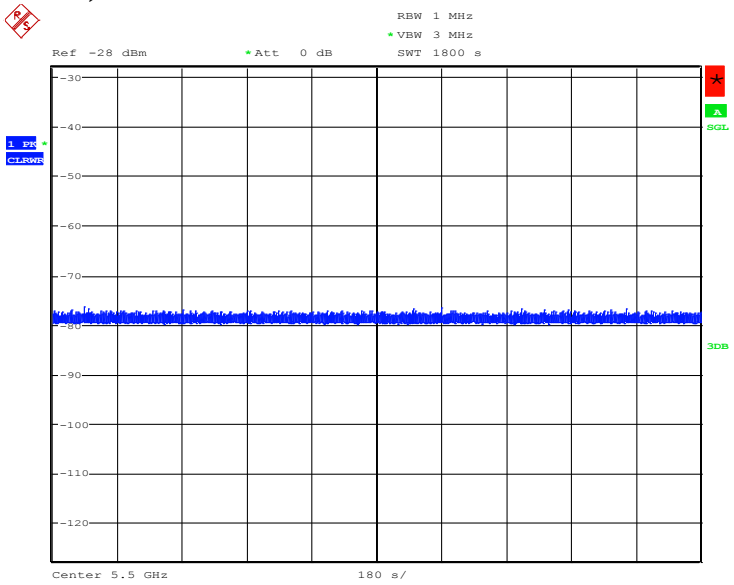
   According to the document „75e Paris FCC Functional Overview “which is part of the exhibits there is no listen only mode implemented in the client under test.

2. The argumentation under 1. Is considered sufficient to proof that AP and EUT are on the same channel and band.

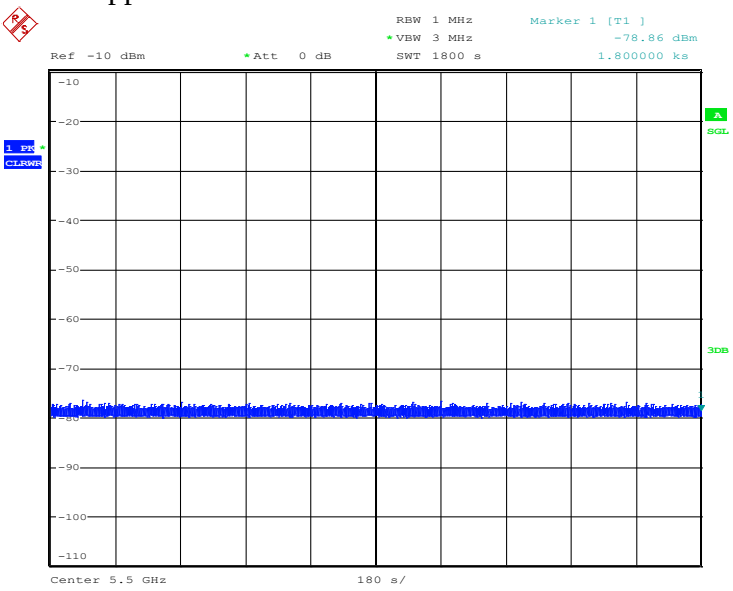
3. The EUT supports P2P (Miracast) only on UNII-1 and UNII-3 according to the document „75e Paris FCC Functional Overview“ which is part of the exhibits.

4. The EUT client and DFS-certified master device are associated, and a movie can be streamed as specified in the DFS Order for a non-occupancy period test. This is possible as the local test network described in 1. Is anchored at a router with WAN access. The streaming functionality was verified.

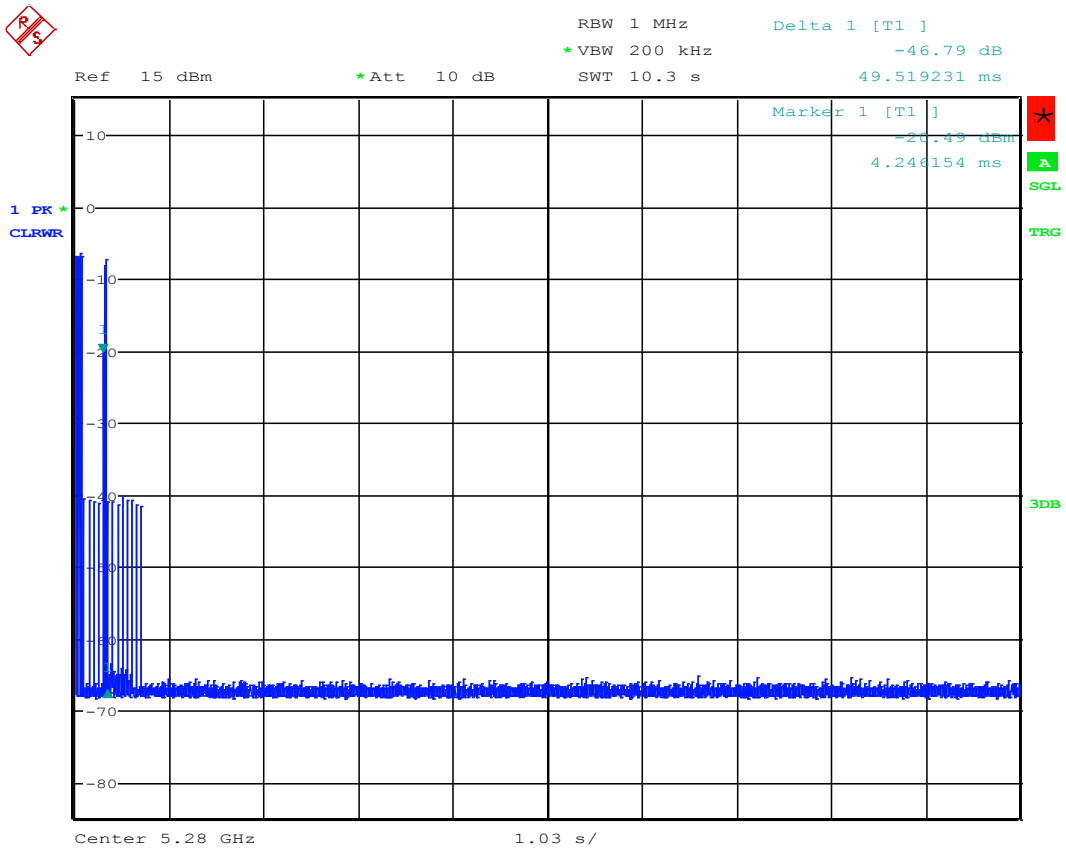
5. 30min sweep after channel change to prove that there are no emissions from EUT client (and master) after detection of radar interferer.



6. 30min sweep with EUT client and AP master connected to the setup but AP disabled and WLAN enabled at EUT client to prove that channel is not interfered with and no party transmits when it is not supposed to.



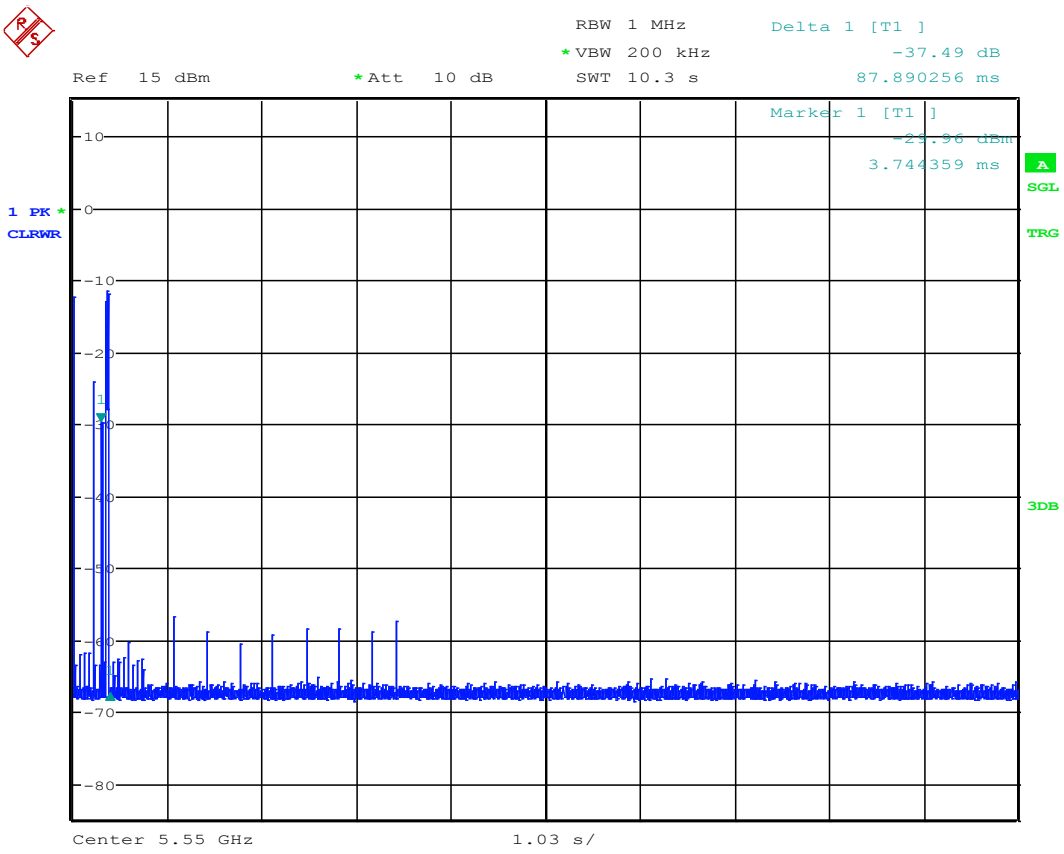
6.4.2 Channel move time and closing transmission time 20MHz channel



Date: 14.NOV.2014 17:08:52

Channel move time 10s – Passed
Channel closing transmission time 200ms/60ms – Passed
P2P connection via Miracast running during this test on a different channel
-0.3s trigger offset

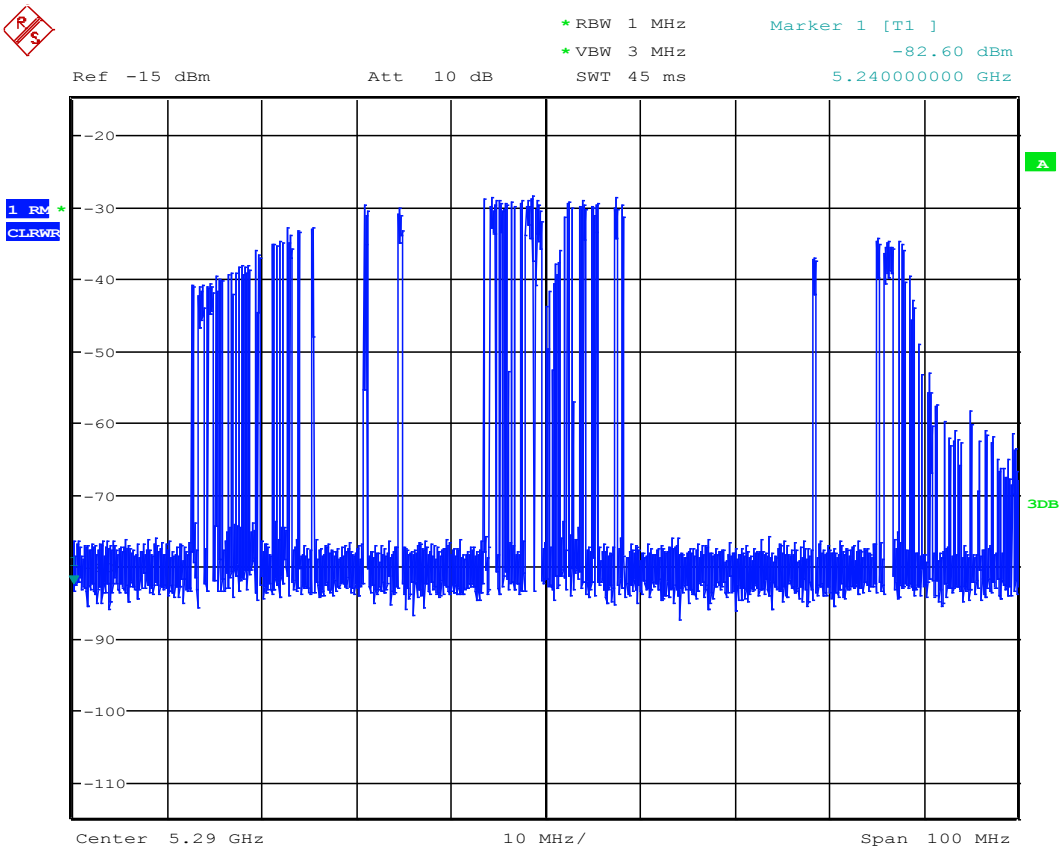
6.4.3 Channel move time and closing transmission time 40MHz channel



Date: 14.NOV.2014 18:44:42

Channel move time 10s – Passed
Channel closing transmission time 200ms/60ms – Passed
-0.3s trigger offset

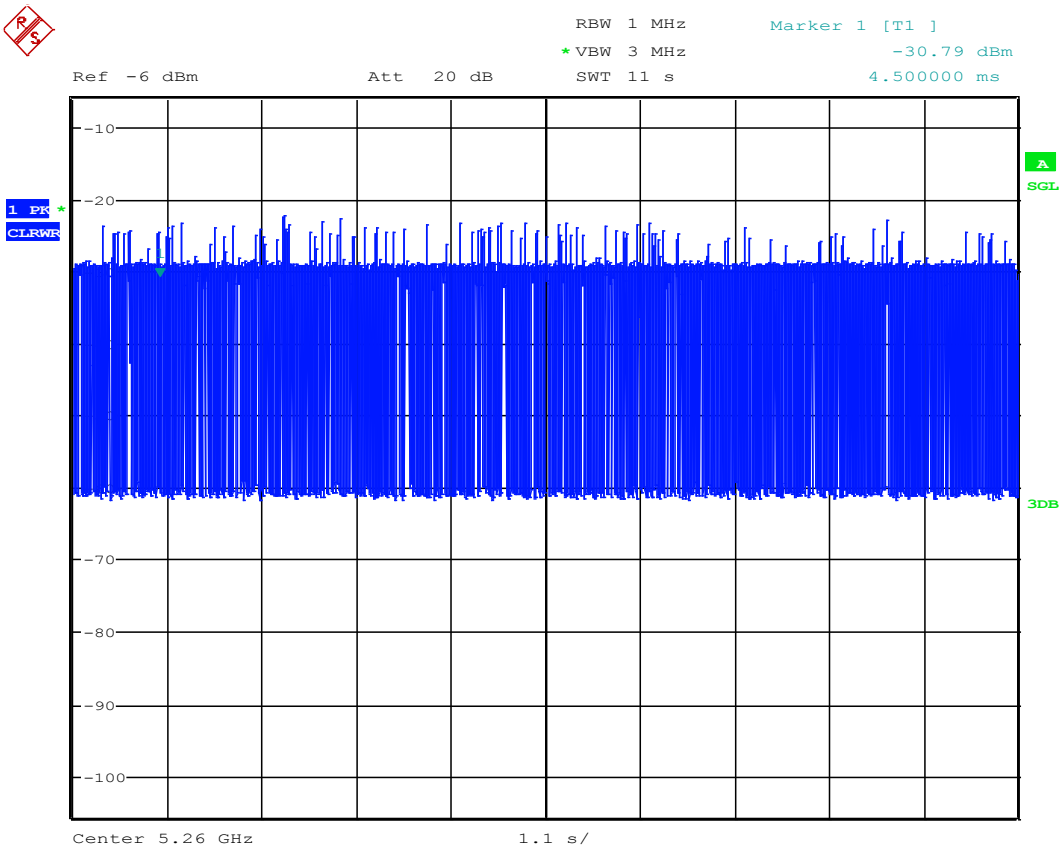
6.4.4 80MHz channel traffic in frequency domain



low

Date: 30.JAN.2015 11:52:56

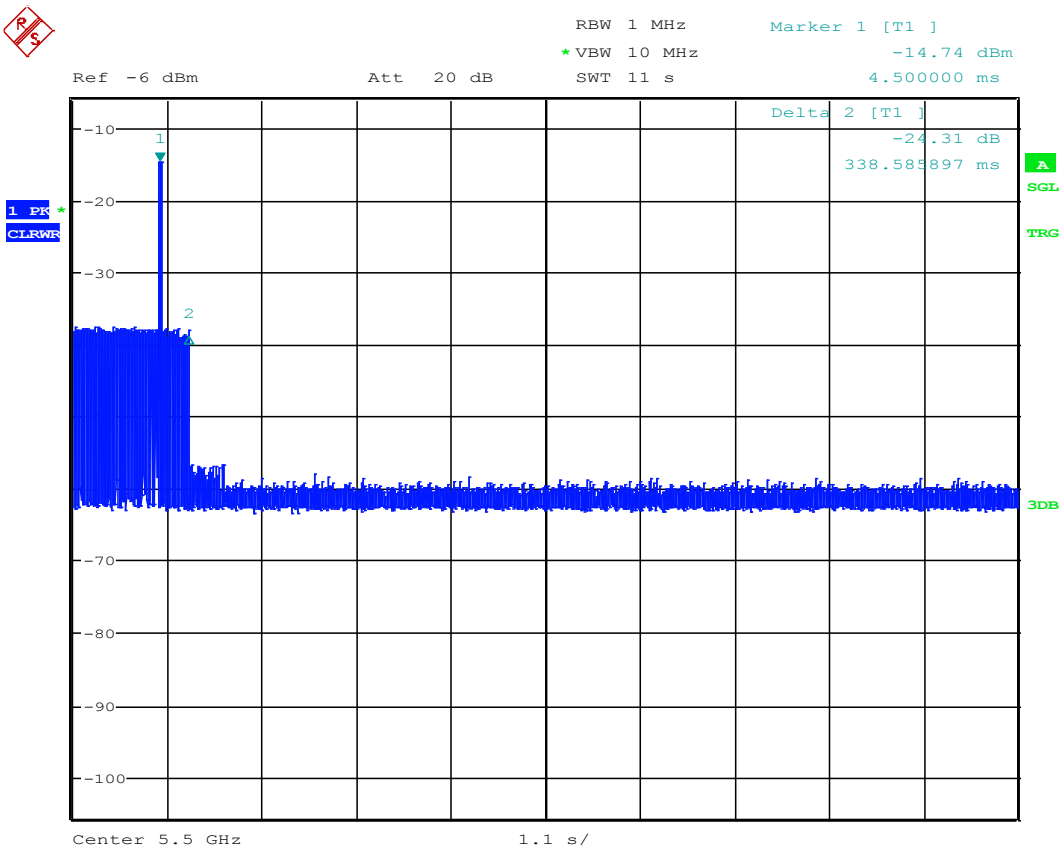
6.4.5 80MHz channel traffic in time domain



low

Date: 30.JAN.2015 11:56:49

6.4.6 Channel move time and closing transmission time 80MHz channel



low

Date: 30.JAN.2015 12:21:54

Channel move time 10s – Passed
Channel closing transmission time 200ms/60ms – Passed
Marker one on radar burst
Marker two on last transmission from EUT
-1.0s trigger offset

7. Test Equipment and Ancillaries used for tests

No.	Equipment Name	Manufacturer	Type/model	Serial No.	Cal Date	Cal Interval
3m Semi- Anechoic Chamber:						
	Turn table	EMCO	2075	N/A	N/A	N/A
	MAPS Position Controller	ETS Lindgren	2092	0004-1510	N/A	N/A
	Antenna Mast	EMCO	2075	N/A	N/A	N/A
	Relay Switch Unit	Rohde&Schwarz	RSU	338964/001	N/A	N/A
	EMI Receiver/Analyzer	Rohde&Schwarz	ESU 40	100251	Sep 2013	2 Year
	1500MHz HP Filter	Filtek	HP12/1700	14c48	N/A	N/A
	2800 MHZ HP Filter	Filtek	HP12/2800	14C47	N/A	N/A
	Pre-Amplifier	Miteq	JS40010260	340125	N/A	N/A
	Binconilog Antenna	EMCO	3141	0005-1186	Apr 2012	3 Years
	Horn Antenna	EMCO	3115	35114	Mar 2012	3 Years
Other Equipment						
	Spectrum Analyzer	Rohde&Schwarz	FSU 8	200256	Jun 2013	2 Years
X	Spectrum Analyzer	Rohde&Schwarz	FSU 26.5	100189	Jun 2013	2 Years
	Spectrum Analyzer	Rohde&Schwarz	FSU 26.5	200065	Jun 2013	2 Years
	Vector Signal Generator (Interferer)	Rohde&Schwarz	SMU200A	101935	Feb 2013	2 Years
	Signal Generator	Rohde&Schwarz	SMP04	100151	Jun 2013	2 Years
	Fast Power Detector 5Ms/s	ETS Lindgren	7002-006	00160034	Sep 2014	2 Years
	Temperature Sensor	Dickson	SM320	0929600	Apr 2014	2 Years
	Temperature Chamber	Test Equity	115	150384	N/A	N/A
	Vector Signal generator	Keysight	EE4438C	MY45094596	Jun 2013	2 Years
	WLAN AP (companion device)	Rhode&Schwarz	CMW500	125754	Jun 2013	2 Years
X	WLAN AP (companion device)	Cisco	Aironet 1260	FTX1553E037	N/A	N/A
X	WLAN AP (companion device)	Cisco	AIR-CAP3702E-A-K9	LDK102097	N/A	N/A
	DC Power Supply	HP	E3610A	KR83023316	N/A	N/A
X	DFS Generator PXI-5421 card	National Instruments	NI-PXI-1042	E965F1	Jul 2012	3 years
X	DFS Upconverter PXI-5610 card	National Instruments	NI-PXI-1042	E93740	Jun 2012	3 years

8. Revision History

Date	Report Name	Changes to the report	Report prepared by
2015-02-03	EMC_HONEY_134_14001_DFS_75E	First Revision	Franz Engert