



# FCC / IC Test Report

FOR:

## Intel Corporation

Model Name: EP110

**Product Description: Intel 4.7-inch Smartphone with GSM, GPRS, EDGE, UMTS, HSPA+, LTE, WLAN, BT and GPS radios**

**FCC ID: O2Z-EP110**

**IC ID: 1000W-EP110**

**47 CFR PART 15.403 U-NII, DFS**

**IC RSS-210 Issue 8, Annex 9 (Local Area Network Devices), DFS**

**TEST REPORT #: EMC\_INTEL-054-14001\_UNII\_Rev1**

**DATE: 2014-11-13**



FCC :  
Accredited

IC recognized #  
3462B-1

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**1 Assessment**

The following equipment (and as identified in Ch.3 of this test report) was evaluated against the applicable criteria specified in FCC CFR47 Part 15.403 subpart E and Industry Canada Standards RSS-210 Issue 8, Annex 9.

No deviations were ascertained during the course of the tests performed.

Company	Description	Model #
Intel Corporation	Intel 4.7-inch Smartphone with GSM,GPRS,EDGE,UMTS,HSPA+,LTE, WLAN, BT and GPS radios	EP110

**Responsible for Testing Laboratory:**

Franz Engert  
(Manager Compliance)

2014-11-13 Compliance

Date	Section	Name	Signature
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**Responsible for the Report:**

Jennifer Huang  
(Compliance Technician)

2014-11-13 Compliance

Date	Section	Name	Signature
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The test results of this test report relate exclusively to the test item specified in Section3. CETECOM Inc. USA does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of CETECOM Inc. USA.



**2 Administrative Data**

**2.1 Identification of the Testing Laboratory Issuing the Test Report**

<b>Company Name:</b>	CETECOM Inc.
<b>Department:</b>	Compliance
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<b>Test Lab Manager:</b>	Franz Engert
<b>Responsible Project Leader:</b>	Saman Rami

**2.2 Identification of the Client**

<b>Applicant's Name:</b>	Intel Corporation
<b>Street Address:</b>	2200 Mission College MS:SC1-20
<b>City/Zip Code</b>	Santa Clara, CA 94085
<b>Country</b>	USA
<b>Contact Person:</b>	Christine Ryan
<b>Phone No.</b>	+1 (408) 300-2167
<b>e-mail:</b>	Christine.m.ryan@intel.com

**2.3 Identification of the Manufacturer**

<b>Manufacturer's Name:</b>	Same as client.
<b>Manufacturers Address:</b>	
<b>City/Zip Code</b>	
<b>Country</b>	

### 3 Equipment under Test (EUT)

#### 3.1 Specification of the Equipment under Test

<b>Marketing Name / Model No:</b>	Intel 4.7-inch Smartphone / EP110
<b>HW Revision :</b>	PR2
<b>FCC-ID / IC-ID:</b>	O2Z-EP110 / 1000W-EP110
<b>Product Description:</b>	Intel 4.7-inch Smartphone with GSM,GPRS,EDGE,UMTS,HSPA+,LTE, WLAN, BT and GPS radios
<b>Authorized Frequency Range:</b>	Nominal bands: 5150 – 5250 (band 1) 5250 – 5350 (band 2) 5470 – 5725 (band 3) 5.725– 5825 (band 4)
<b>Modes of Operation</b>	UNII-1 Client with passive scan for indoor use only UNII-2/2e Client with passive scan UNII-3 Client with Active Scan, Hotspot and ad-hoc mode DFS client only TCP is not supported Channels 12-14, 118 - 128, 138 – 144 are not supported 1 transmit and 1 receive chain (no MIMO technology support) The detail channel plan is given in the manufacturer's Operational Description which is part of the exhibits for the FCC/IC filings.
<b>Type(s) of Modulation:</b>	Wi-Fi: 802.11a,n,ac: OFDM with either BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM
<b>Channel Bandwidth:</b>	This report covers all channels with 20MHz, 40MHz and 80MHz bandwidths for UNII-1, UNII-2 and UNII-2e as well as the 40MHz and 80MHz bandwidths of UNII-3 under rule part 15.407(15E) 20MHz channels 149 - 165 are treated under rule part 15.247 (15C) in the corresponding report.
<b>Data rates used:</b>	802.11b: 1 Mbps ; 802.11a/g: 6 Mbps ; 802.11n: 6.5 Mbps; 802.11 ac
<b>Antenna/Antenna gain:</b>	Internal PCB-trace antenna / highest declared Antenna Gain: -1.8dBi in band 4.
<b>Declared Output Powers:</b>	According to "EP110 Maximum RF Output Power Declaration" included in filing.
<b>power supply</b>	AA lithium battery pack (dedicated) Voltage Range 3.6V-4.2V DC Nominal Voltage 3.8V DC
<b>Operating temperature range</b>	-10°C to +55°C

Test Report #: EMC\_INTEL-054-14001\_DFS\_Rev1

FCC ID: O2Z-EP110

Date of Report : 2014-11-13

IC ID: 1000W-EP110



<b>Prototype / Production unit</b>	Prototype
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**3.2 Identification of the Equipment Under Test (EUT)**

EUT #	Serial Number	HW Version	SW Version	Notes/Comments
1	INV141400226	PR2	4.4.4 KTU84P main engineering 53181-dev-keys	RF Conducted Sample

**3.3 Identification of Accessory equipment**

STE #	Type	Manufacturer	Model	Serial Number
1	AC/DC Adapter	Solcomp	SC1402	1309500144736

#### **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 specified in

- FCC CFR47 Parts 15.403
- IC RSS-210 Issue 8, Annex 9
- 905462 D01 UNII DFS Compliance Procedures Old Rules v01

This test report is to support a request for new equipment authorization under the FCC ID: O2Z-EP110 and IC ID: 1000W – EP110.





**5 Summary of Measurement Results**

Test Specification	Test Case	Temperature and Voltage Conditions	Mode	Pass	Fail	NA	NP	Result
15.403 RSS-210 A9.4	DFS	Nominal	802.11 a/n/ac	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Complies

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



**6 Measurements**

**6.1 Measurement Uncertainty**

	<b>Uncertainty in dB radiated &lt;30MHz</b>	<b>Uncertainty in in dB radiated 30MHz - 1GHz</b>	<b>Uncertainty in dB radiated &gt; 1GHz</b>	<b>Uncertainty in dB Conducted measurement</b>
<b>standard deviation k=1</b>	2.48	1.93	2.16	0.63
<b>95% confidence interval in dB</b>	4.86	3.79	4.23	1.24
<b>95% confidence interval in dB in delta to Result</b>	+ -2.5 dB	+ -2.0 dB	+ - 2.3dB	+ -0.7dB

**6.2 Test Conditions**

Temperature: 19°C to 25°C;  
 Operating Voltage: 3.8V for radio measurements;  
 Relative Humidity 20% to 50%

**6.3 Dates of Testing:**

09/19/2014 – 10/03/2014

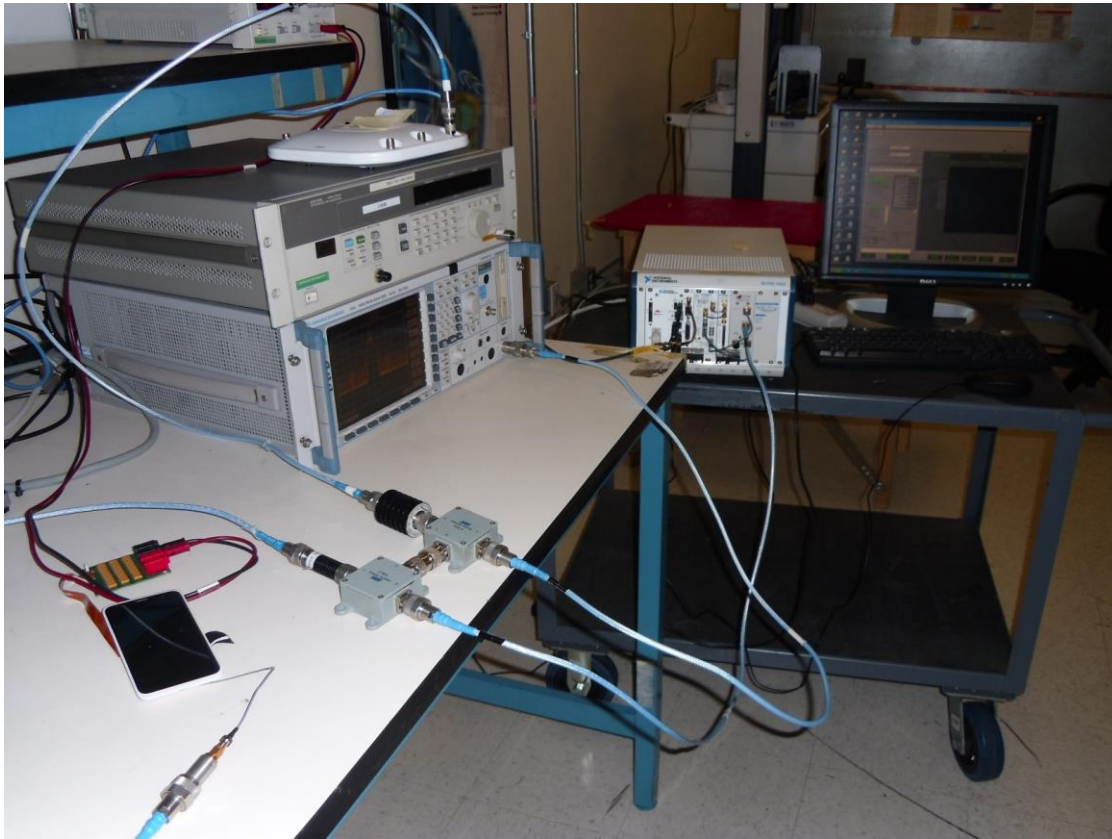
## 6.4 DFS

### 6.4.1 References:

- 905462 D01 UNII DFS Compliance Procedures Old Rules v01

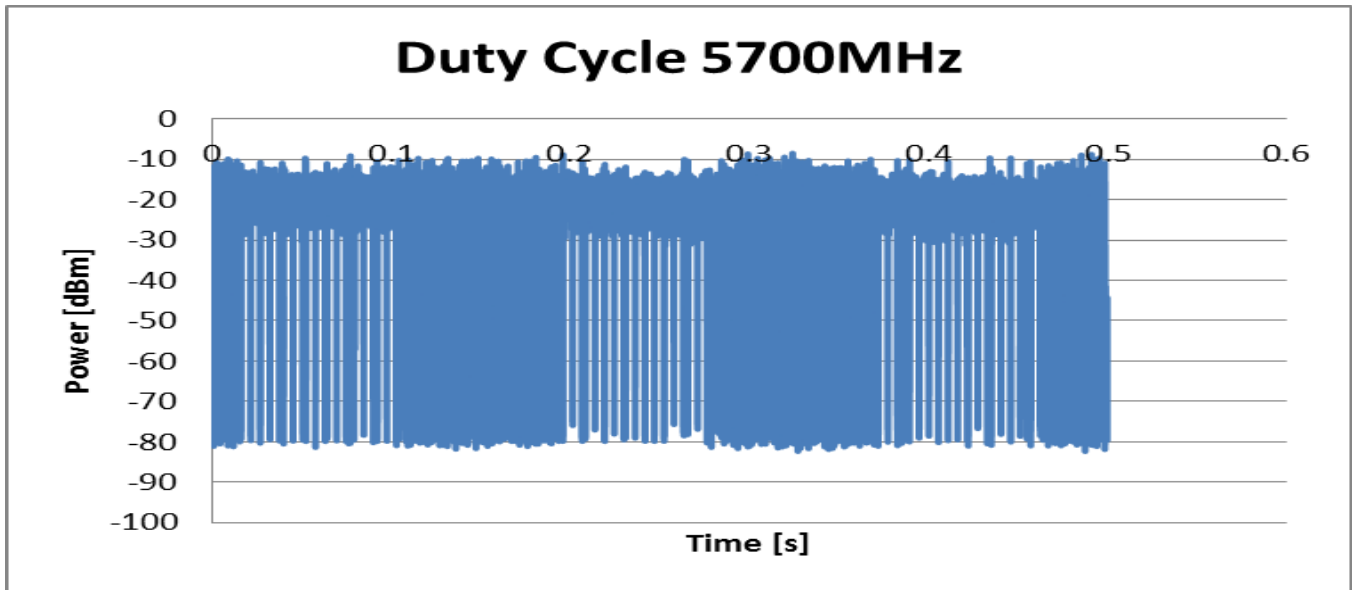
### 6.4.2 Test Setup:

The DUT was connected via 50Ohm conducted port to a CISCO AP (AIR-AP1262N-A-K9) with FCC ID: LDK102073 and S/N: FTX1553E037. Traffic was stimulated by means of several ping processes. The levels of AP and station were setup in a way that the station level was 20dB higher than the AP level by the usage of attenuators. The connection utilized a 40MHz bandwidth as described in KDB 848637 as an AP with 80MHz support was not available at the time of testing. The SA trace was triggered by the radar signal from the DFS Generator / PXI-5421 card.



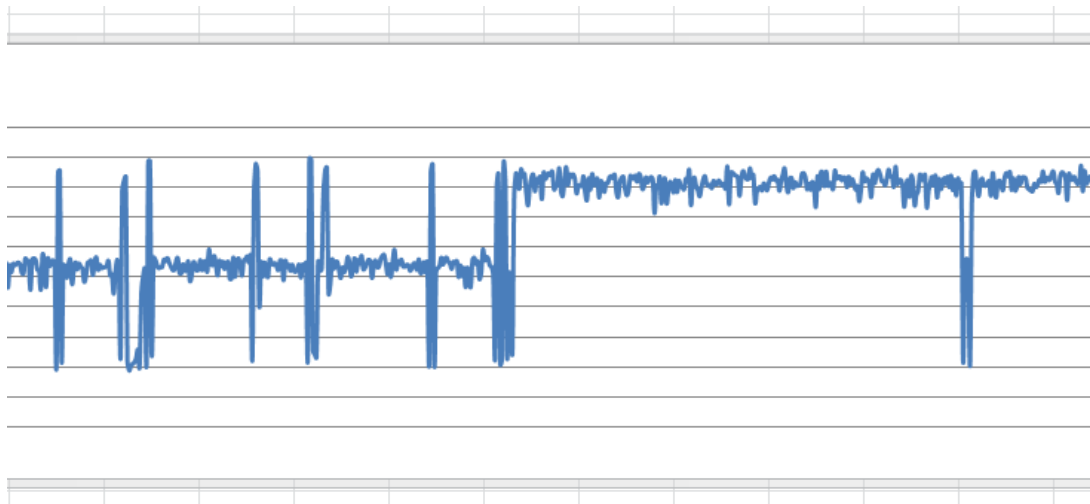
### 6.4.3 Result:

#### 6.4.3.1 Effective Duty Cycle during Traffic 49.1%



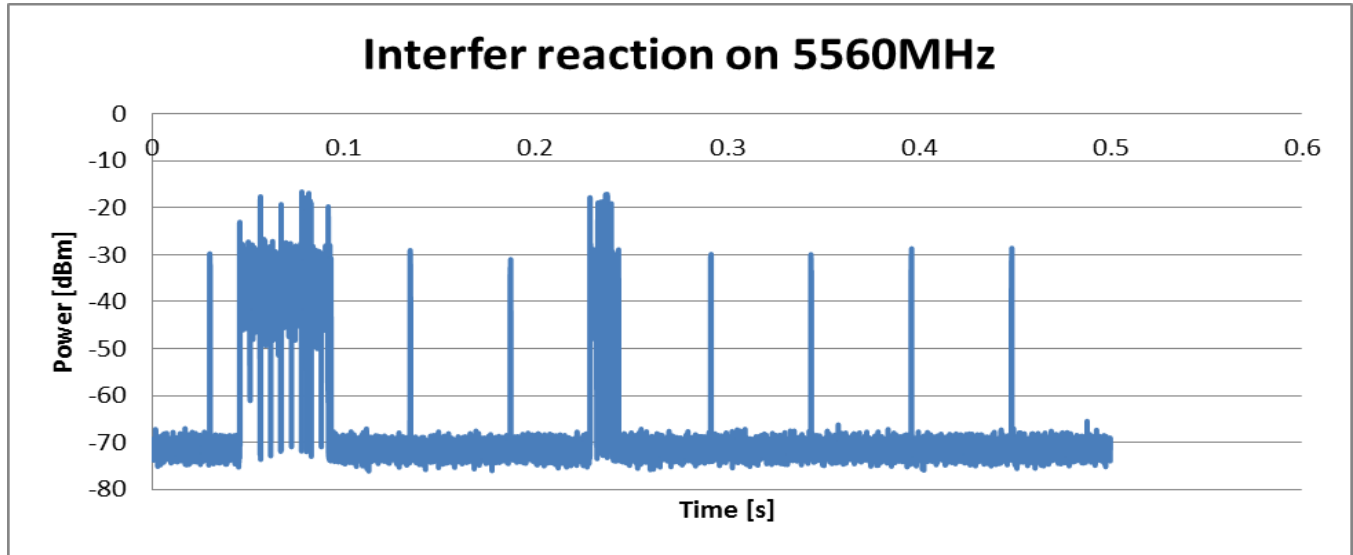
Note: The Duty Cycle of 49.1% was calculated from the raw data used to generate this plot. A longer swept time will result in incorrect calculation of the duty cycle as no more than 25k trace points are available.

#### 6.4.3.2 Zoom of a random region of duty cycle plot



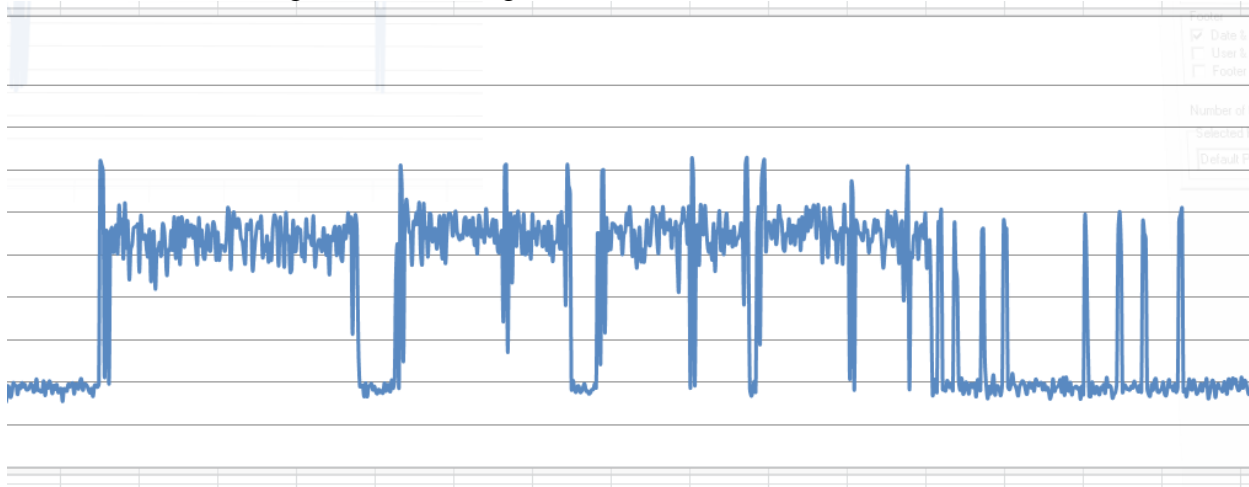
### 6.4.3.3 Reaction to Radar interferer first 500ms of channel move time

After the initial 200ms after radar interferer there is a 0.24ms accumulated transmit time. Well below the limit of 60ms.



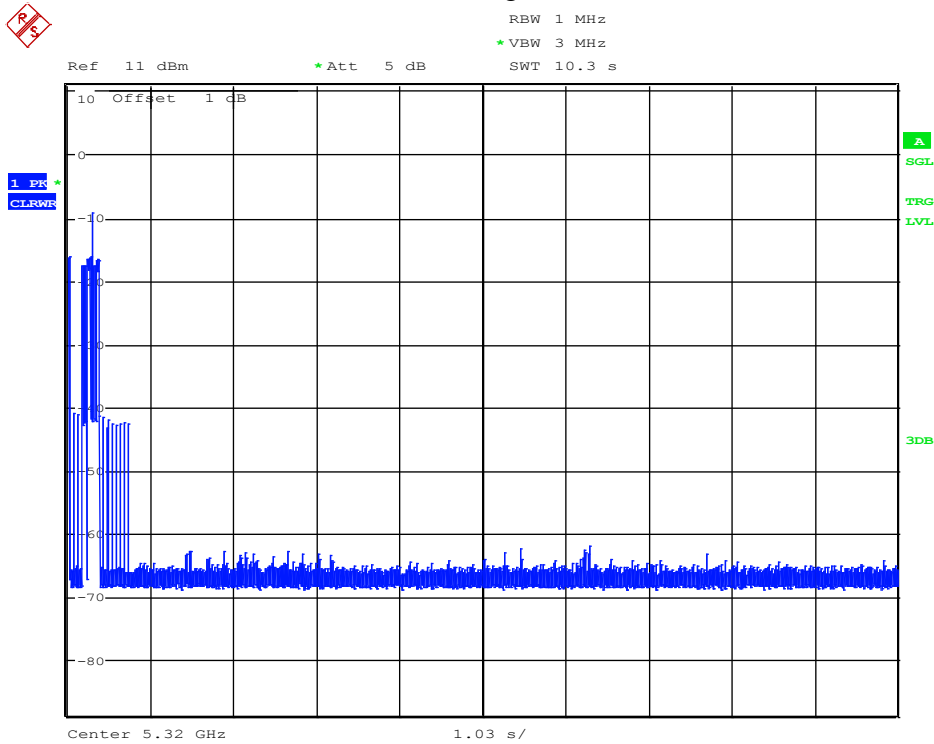
Note: The 0.24ms accumulated transmit time was calculated from the raw data used to generate this plot. A longer swept time will result in incorrect calculation of the duty cycle as no more than 25k trace points are available.

### 6.4.3.4 Zoom into region of remaining transmits after initial 200ms



Note: The zoom shows only short ACK transmissions from the EUT. No more traffic.

### 6.4.3.5 Reaction to Radar interferer remaining channel move time



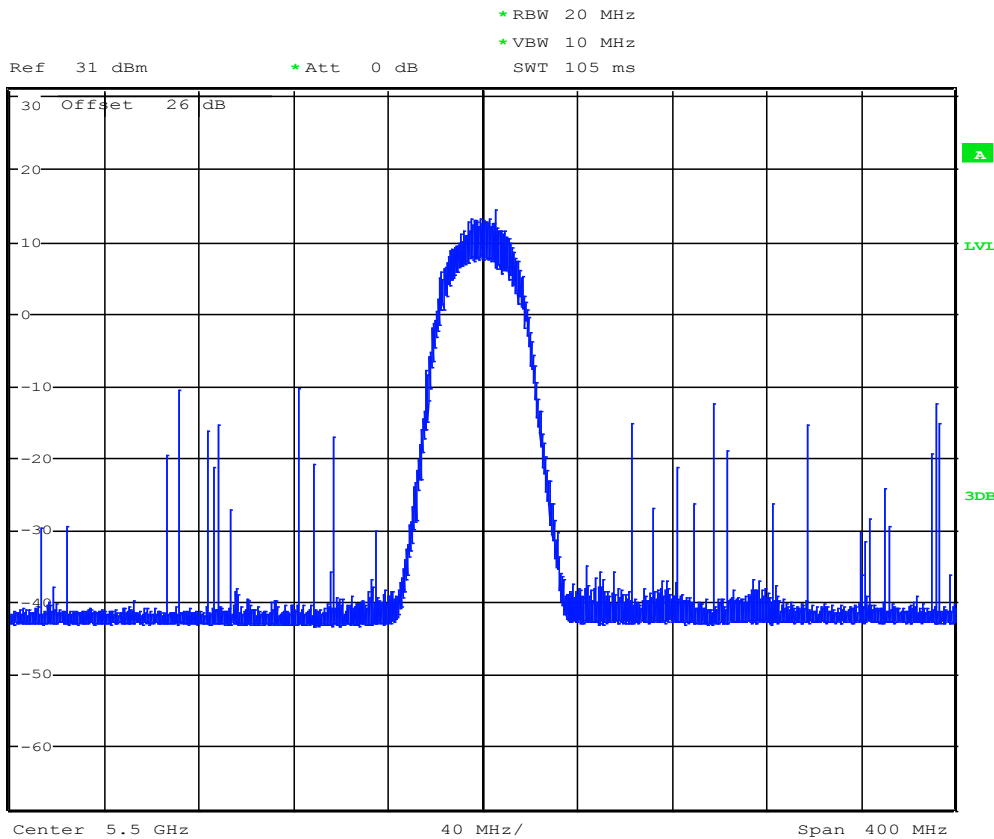
Date: 19.SEP.2014 15:34:20

Note: There are no remaining transmit bursts from the EUT after the initial 500ms covered by the high resolution results above.

### 6.4.3.6 Non occupancy time

After the channel change is successfully done the ping commands automatically resume traffic on the new channel (5500MHz). The associated TX from the EUT results in sporadic spurious emissions across the entire 5GHz band. These spurious emissions cannot be considered emissions as subject to the non-occupancy time and will be quantified in the UNII report in the chapter for emissions into restricted and non-restricted bands.

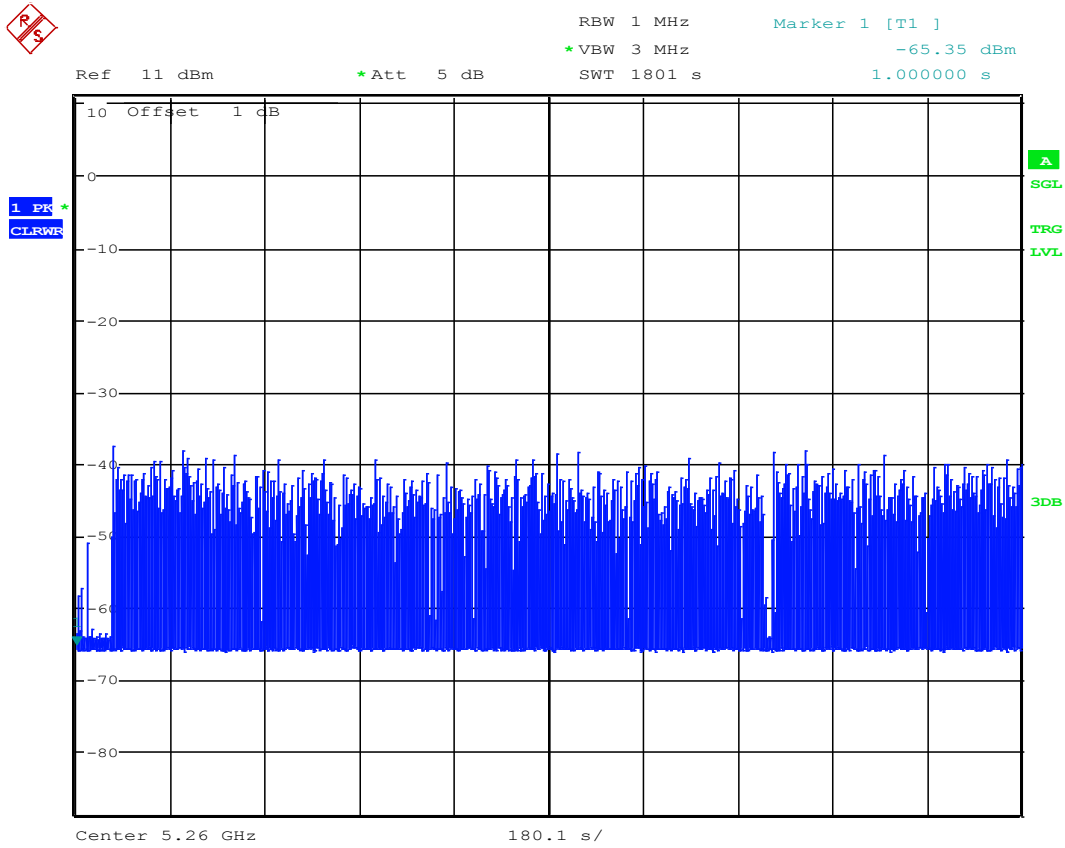
### 6.4.3.7 30min non occupancy time in frequency domain:



low

Date: 3.OCT.2014 16:10:43

6.4.3.8 30min non occupancy time in time domain:



Date: 19.SEP.2014 17:09:43

6.4.3.9 Verdict:

Passed in the scope of DFS slave. Spurious emissions will be quantified in the UNII report.





**7 Test Equipment and Ancillaries used for tests**

Item Name	Manufacturer	Equipment Type	Model	Serial #	Calibration Cycle	Last Calibration Date
FSU 26	R&S	Spectrum Analyzer	FSU 26	100189	2 Years	6/1/2013
DFS Generator / PXI-5421 card	National Instruments	NI PXI-1042		E965F1	3 years	7/3/2012
DFS Upconverter PXI-5610 card	National Instruments	NI PXI-1042		E93740	3 years	6/29/2012



**8 Revision History**

Date	Report Name	Changes to report	Report prepared by
2014-10-03	EMC_INTEL-054-14001_DFS	First official version	Franz Engert
2014-11-13	EMC_INTEL-054-14001_DFS_Rev1	Corrected Antenna Gain, Corrected KDB reference to old version	Franz Engert