




# TEST REPORT


**Test Report No. : UL-RPT-RP10809253JD16A V2.0**

**Manufacturer** : AAVA MOBILE OY  
**Type No.** : INARI10-LTDN-2  
**IC Number** : 11875A-INARI102  
**FCC ID** : 2ABVH-INARI102  
**Technologies Assesed** : 802.11 a/b/g/n, GSM 850, PCS 1900, UMTS 1700, LTE Bands 13/17  
**Test Standard(s)** : FCC & Industry Canada, Intermodulation assessment to:  
FCC parts 15.247, 15.407, 22, 24, 27 and RSS 247, 130, 132, 139, 133

1. This test report shall not be reproduced in full or partial, without the written approval of UL VS LTD.
2. The results in this report apply only to the sample(s) tested.
3. The sample tested is in compliance with the above standard(s).
4. The test results in this report are traceable to the national or international standards.
5. Version 2.0 Supersedes all previous versions

**Date of Issue:** 04 September 2015

**Checked by:**   
Steven White  
Project Lead, Radio Laboratory

**Issued by :**   
John Newell  
Group Quality Manager, WiSE  
Basingstoke,  
UL VS LTD

---

## UL VS LTD

Pavilion A, Ashwood Park, Ashwood Way, Basingstoke, Hampshire, RG23 8BG, UK  
Telephone: +44 (0)1256 312000  
Facsimile: +44 (0)1256 312001

This page has been left intentionally blank.

---

## **Table of Contents**

<b>1. Customer Information.....</b>	<b>4</b>
<b>2. Summary of Testing.....</b>	<b>5</b>
2.1. General Information	5
2.2. Summary of Test Results	6
2.3. Methods and Procedures	7
2.4. Deviations from the Test Specification	7
<b>3. Equipment Under Test (EUT) .....</b>	<b>8</b>
3.1. Identification of Equipment Under Test (EUT)	8
3.2. Description of EUT	8
3.3. Modifications Incorporated in the EUT	8
3.4. Additional Information Related to Testing	9
3.5. Support Equipment	11
<b>4. Operation and Monitoring of the EUT during Testing .....</b>	<b>12</b>
4.1. Operating Modes	12
4.2. Configuration and Peripherals	12
4.3. Test setup for Radiated Emissions test	14
4.4. Test Results	15
4.4.1. WLAN 2.4G and GSM 850 Transmitter Radiated Emissions	15
4.4.2. WLAN 2.4G and UMTS 1700 Transmitter Radiated Emissions	19
4.4.3. WLAN 2.4G and PCS 1900 Transmitter Radiated Emissions	23
4.4.4. WLAN 2.4G and LTE Band 13 Transmitter Radiated Emissions	27
4.4.5. WLAN 2.4G and LTE Band 17 Transmitter Radiated Emissions	30
4.4.6. WLAN 5G and GSM 850 Transmitter Radiated Emissions	33
4.4.7. WLAN 5G and UMTS 1700 Transmitter Radiated Emissions	36
4.4.8. WLAN 5G and PCS 1900 Transmitter Radiated Emissions	40
4.4.9. WLAN 5G and LTE Band 13 Transmitter Radiated Emissions	45
4.4.10. WLAN 5G and LTE Band 17 Transmitter Radiated Emissions	48
<b>5. Measurement Uncertainty .....</b>	<b>51</b>
<b>6. Report Revision History .....</b>	<b>52</b>

### **1. Customer Information**

<b>Company Name:</b>	Aava Mobile Oy
<b>Address:</b>	Nahkatehtaankatu 2 90130 Oulu Finland

## **2. Summary of Testing**








### **2.1. General Information**








<b>Specification Reference:</b>	47CFR15.247
<b>Specification Title:</b>	Code of Federal Regulations Volume 47 (Telecommunications) 2010: Part 15 Subpart C (Intentional Radiators) – Section 15.247
<b>Specification Reference:</b>	47CFR15.407
<b>Specification Title:</b>	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart E (Unlicensed National Information Infrastructure Devices) – Sections 15.407
<b>Specification Reference:</b>	47CFR22
<b>Specification Title:</b>	Code of Federal Regulations Volume 47 (Telecommunications) 2010: Part 22 Subpart H (Public Mobile Services)
<b>Specification Reference:</b>	47CFR24
<b>Specification Title:</b>	Code of Federal Regulations Volume 47 (Telecommunications) 2010: Part 24 Subpart E (Personal Communication Services)
<b>Specification Reference:</b>	47CFR27
<b>Specification Title:</b>	Code of Federal Regulations Volume 47 (Telecommunications): Part 27 Subpart C (Miscellaneous Wireless Communication Services)
<b>Site Registration:</b>	FCC: 209735

<b>Specification Reference:</b>	RSS 247
<b>Specification Title:</b>	Digital Transmission Systems (DTSS), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices
<b>Specification Reference:</b>	RSS 130
<b>Specification Title:</b>	Mobile Broadband Services (MBS) Equipment Operating in the Frequency Bands 698-756 MHz and 777-787 MHz
<b>Specification Reference:</b>	RSS 132
<b>Specification Title:</b>	Cellular Telephone Systems Operating in the Bands 824-849 MHz and 869-894 MHz
<b>Specification Reference:</b>	RSS139
<b>Specification Title:</b>	Advanced Wireless Services (AWS) Equipment Operating in the Bands 1710-1780 MHz and 2110-2180 MHz
<b>Specification Reference:</b>	RSS 133
<b>Specification Title:</b>	2 GHz Personal Communications Services
<b>Site Registration:</b>	IC: 3245B-2

<b>Location of Testing:</b>	UL VS Ltd, Unit 3, Horizon, Wade Road, Kingsland Business Park, Basingstoke, Hampshire, RG24 8AH, United Kingdom
<b>Test Dates:</b>	06 August 2015 to 13 August 2015

**2.2. Summary of Test Results**

Reference	Measurement	Result
<b>2.4 GHz WLAN &amp; GSM 850</b>		
47CFR15.247 / RSS 247 / 47CFR22 / RSS 132	Transmitter Radiated Emissions	
<b>2.4 GHz WLAN &amp; UMTS 1700</b>		
47CFR15.247 / RSS 247 / 47CFR27 / RSS139	Transmitter Radiated Emissions	
<b>2.4 GHz WLAN &amp; PCS 1900</b>		
47CFR15.247 / RSS 247 / 47CFR24 / RSS 133	Transmitter Radiated Emissions	
<b>2.4 GHz WLAN &amp; LTE Band 13</b>		
47CFR15.247 / RSS 247 / 47CFR27 / RSS 130	Transmitter Radiated Emissions	
<b>2.4 GHz WLAN &amp; LTE Band 17</b>		
47CFR15.247 / RSS 247 / 47CFR27 / RSS 130	Transmitter Radiated Emissions	
<b>Key to Results</b>		
 = Complied  = Did not comply		

Reference	Measurement	Result
<b>5.0 GHz WLAN &amp; GSM 850</b>		
47CFR15.407 / RSS 247 / 47CFR22 / RSS 132	Transmitter Radiated Emissions	
<b>5.0 GHz WLAN &amp; UMTS 1700</b>		
47CFR15.407 / RSS 247 / 47CFR27 / RSS139	Transmitter Radiated Emissions	
<b>5.0 GHz WLAN &amp; PCS 1900</b>		
47CFR15.407 / RSS 247 / 47CFR24 / RSS 133	Transmitter Radiated Emissions	
<b>5.0 GHz WLAN &amp; LTE Band 13</b>		
47CFR15.407 / RSS 247 / 47CFR27 / RSS 130	Transmitter Radiated Emissions	
<b>5.0 GHz WLAN &amp; LTE Band 17</b>		
47CFR15.407 / RSS 247 / 47CFR27 / RSS 130	Transmitter Radiated Emissions	
<b>Key to Results</b>		
 = Complied  = Did not comply		

### **2.3. Methods and Procedures**

<b>Reference:</b>	ANSI C63.10 (2014)
<b>Title:</b>	American National Standard for Testing Unlicensed Wireless Devices
<b>Reference:</b>	ANSI C63.4 (2014)
<b>Title:</b>	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
<b>Reference:</b>	KDB 558074 D01 DTS Meas Guidance v03r03 June 9, 2015
<b>Title:</b>	Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247
<b>Reference:</b>	KDB 789033 D02 General UNII Test procedures
<b>Title:</b>	Guidance for Performing Compliance Measurements on UNII devices, Part 15, Subpart E
<b>Reference:</b>	FCC KDB 971168 D01 v02r02, October 17 2014
<b>Title:</b>	Measurement Guidance for Certification of Licensed Digital Transmitters

### **2.4. Deviations from the Test Specification**

For the measurements contained within this test report, there were no deviations from, additions to, or exclusions from the test specification identified above.

### **3. Equipment Under Test (EUT)**

#### **3.1. Identification of Equipment Under Test (EUT)**

<b>Brand Name:</b>	Aava Mobile Oy
<b>Model Number:</b>	INARI10-LTDN-2
<b>IMEI:</b>	356196050942651 ( <i>Radiated sample</i> )
<b>Serial Number:</b>	BB44102198
<b>Hardware Version Number:</b>	Tablet PC: RU Wireless Module: 1.0, 1.1
<b>Software Version Number:</b>	Tablet PC :Windows Embedded 8.1 Industry Pro Build 9600(SW19X15C_05.05.58.00) Wireless Module: SW19X15C_05.05.58.00

#### **3.2. Description of EUT**

The equipment under test (EUT) is a 10.1 inch tablet PC with cellular, WiFi, Bluetooth , NFC and GPS connectivity

#### **3.3. Modifications Incorporated in the EUT**

No modifications were applied to the EUT during testing.



**3.4. Additional Information Related to Testing**

<b>Technology Tested:</b>	GSM 850		
<b>Modulation Type:</b>	GMSK		
<b>Technology Tested:</b>	GSM850		
<b>Transmit Frequency Range:</b>	824 to 849 MHz		
<b>Transmit Channels Tested:</b>	<b>Channel ID</b>	<b>Channel Number</b>	<b>Channel Frequency (MHz)</b>
	Mid	190	836.6

<b>Technology Tested:</b>	UMTS 1700		
<b>Type of Radio Device:</b>	Transceiver		
<b>Modulation Type:</b>	QPSK		
<b>Transmit Frequency Range:</b>	1710 – 1755 MHz		
<b>Transmit Channels Tested:</b>	<b>Channel ID</b>	<b>Channel Number</b>	<b>Channel Frequency (MHz)</b>
	Mid	1413	1732.6

<b>Technology Tested:</b>	GSM 1900		
<b>Modulation Type:</b>	GMSK		
<b>Technology Tested:</b>	EGPRS		
<b>Transmit Frequency Range:</b>	1850 to 1910		
<b>Transmit Channels Tested:</b>	<b>Channel ID</b>	<b>Channel Number</b>	<b>Channel Frequency (MHz)</b>
	Mid	660	1879.8

<b>Band:</b>	E-UTRA Band 13			
<b>Uplink Frequency Range:</b>	777 MHz to 787 MHz			
<b>Uplink Channels Tested:</b>	<b>Channel Bandwidth (MHz)</b>	<b>Channel Frequency (MHz)</b>		
		<b>Single</b>		
	10.0	782		
<b>Band:</b>	E-UTRA Band 17			
<b>Uplink Frequency Range:</b>	704 MHz to 716 MHz			
<b>Uplink Channels Tested:</b>	<b>Channel Bandwidth (MHz)</b>	<b>Channel ID</b>	<b>Channel Number</b>	<b>Channel Frequency (MHz)</b>
	10.0	Mid	23790	710

**Additional Information Related to Testing (continued)**

<b>Technology Tested:</b>	Digital Transmission System IEEE 802.11 b/g/n		
<b>Type of Radio Device:</b>	Transceiver		
<b>Modulation:</b>	64-QAM		
<b>Data Rate:</b>	802.11n MIMO 40 MHz MCS15		
<b>Transmit Frequency Range:</b>	2412 MHz to 2462 MHz		
<b>Transmit Channels Tested:</b>	<b>Channel ID</b>	<b>Channel Number</b>	<b>Channel Frequency (MHz)</b>
	Mid	6	2437

<b>Technology Tested:</b>	WLAN (IEEE 802.11a,n) / U-NII		
<b>Type of Radio Device:</b>	Transceiver		
<b>Modulation:</b>	BPSK		
<b>Data Rate:</b>	802.11a 20 MHz 6 Mbps		
<b>Transmit Frequency Range:</b>	5250 MHz to 5350 MHz		
<b>Transmit Channels Tested:</b>	<b>Channel ID</b>	<b>Channel Number</b>	<b>Channel Frequency (MHz)</b>
	Mid	56	5280

### **3.5. Support Equipment**

The following support equipment was used to exercise the EUT during testing:

<b>Description:</b>	2 GB Micro SD Card
<b>Brand Name:</b>	Generic
<b>Model Name or Number:</b>	Not marked

<b>Brand Name:</b>	Delta Electronics Inc
<b>Description:</b>	AC/DC Adapter
<b>Model Name or Number:</b>	ADP-10BW B
<b>Serial Number:</b>	05GW441000K

<b>Description:</b>	USB Cable
<b>Brand Name:</b>	None stated
<b>Model Name or Number:</b>	None stated
<b>Serial Number:</b>	None stated

<b>Description:</b>	PHF
<b>Brand Name:</b>	None stated
<b>Model Name or Number:</b>	None stated
<b>Serial Number:</b>	None stated

## **4. Operation and Monitoring of the EUT during Testing**

### **4.1. Operating Modes**

The EUT was tested in the following operating mode(s):

- The EUT was configured to transmit at full power, in a combination of GSM, UMTS or LTE and 2.4 GHz or 5.0GHz WLAN.
- The licensed / unlicensed technologies and there modes for testing, across the bands supported by the device, were selected on the basis of highest output power. These modes have been selected, as they are considered to be worst case with respect to emissions.

Middle channel was used, for the both the licenced and unlicensed technologies for ease of testing. On the basis that there is minimal deviation between the output power of the device across its channels of operations, for these technologies/modes.

### **4.2. Configuration and Peripherals**

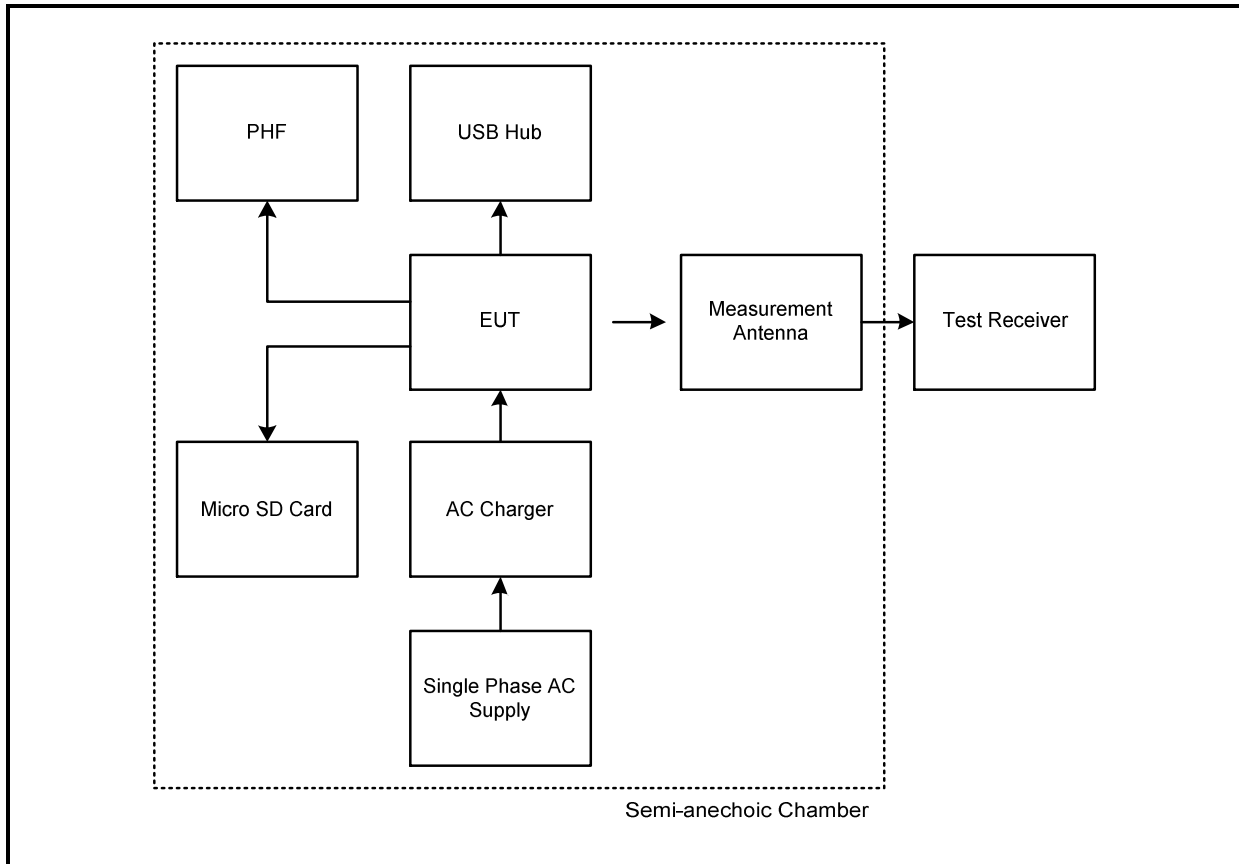
The EUT was tested in the following configuration(s):

- *GSM 850 and 802.11n 300 Mbps.* The EUT was configured to simultaneously transmit two signals transmitting at maximum output power (one GSM850 circuit switched carrier on the middle channel 190 / 836.6 MHz and one 802.11n 300 Mbps carrier on Channel 6 / 2437 MHz).
- *UMTS 1700 and 802.11n 300 Mbps.* The EUT was configured to simultaneously transmit two signals transmitting at maximum output power (one UMTS 1700 packet switched carrier on the middle channel 1413 / 1732.6 MHz and one 802.11n 300 Mbps carrier on Channel 6 / 2437 MHz).
- *PCS 1900 and 802.11n 300 Mbps.* The EUT was configured to simultaneously transmit two signals transmitting at maximum output power (one PCS 1900 carrier on the middle channel 660 / 1879.8 MHz and one 802.11n 300 Mbps carrier on Channel 6 / 2437 MHz).
- *LTE Band 13 and 802.11n 300 Mbps.* The EUT was configured to simultaneously transmit two signals transmitting at maximum output power (one LTE Band 13 carrier on the middle channel 782 MHz and one 802.11n 300 Mbps carrier on Channel 6 / 2437 MHz).
- *LTE Band 17 and 802.11n 300 Mbps.* The EUT was configured to simultaneously transmit two signals transmitting at maximum output power (one LTE Band 17 carrier on the middle channel 23790 / 710 MHz and one 802.11n 300 Mbps carrier on Channel 6 / 2437 MHz).
- *GSM 850 and 802.11a 6 Mbps.* The EUT was configured to simultaneously transmit two signals transmitting at maximum output power (one GSM850 circuit switched carrier on the middle channel 190 / 836.6 MHz one 802.11a 6 Mbps carrier on Channel 56 / 5280 MHz).
- *UMTS 1700 and 802.11a 6 Mbps.* The EUT was configured to simultaneously transmit two signals transmitting at maximum output power (one UMTS 1700 packet switched carrier on the middle channel 1413 / 1732.6 MHz and one 802.11a 6 Mbps carrier on Channel 56 / 5280 MHz).
- *PCS 1900 and 802.11a 6 Mbps.* The EUT was configured to simultaneously transmit two signals transmitting at maximum output power (one PCS 1900 carrier on the middle channel 660 / 1879.8 MHz and one 802.11a 6 Mbps carrier on Channel 56 / 5280 MHz).
- *LTE Band 13 and 802.11a 6 Mbps.* The EUT was configured to simultaneously transmit two signals transmitting at maximum output power (one LTE Band 13 carrier on the middle channel 782 MHz and one 802.11a 6 Mbps carrier on Channel 56 / 5280 MHz).
- *LTE Band 17 and 802.11a 6 Mbps.* The EUT was configured to simultaneously transmit two signals transmitting at maximum output power (one LTE Band 17 carrier on the middle channel 23790 / 710 MHz and one 802.11a 6 Mbps carrier on Channel 56 / 5280 MHz).
- For out of band radiated spurious emissions tests the EUT was placed in three orthogonal orientations X, Y and Z to determine the worst case orientation and all final measurements were

performed in this orientation. In addition the turntable speed was set to a sufficiently slow speed to ensure that all emissions were captured over the complete frequency range.

- A link was established to a Rhode & Schwarz CMW 500 GSM / UMTS / LTE System Simulator and the EUT mode, power and frequency were controlled by the System Simulator.
- 802.11 modes were configured using a bespoke application on the EUT
- The EUT was powered by the supplied battery. The micro USB cable was connected between the EUT and AC to DC switching power supply, which was connected to 120V 60Hz supply.

### 4.3. Test setup for Radiated Emissions test



*Note: The above set up was employed for all of the testing covered within this report.*

**4.4. Test Results****4.4.1. WLAN 2.4G and GSM 850 Transmitter Radiated Emissions****Test Summary:**

<b>Test Engineer:</b>	David Doyle	<b>Test Dates:</b>	06 August 2015 & 07 August 2015
<b>Test Sample IMEI:</b>	356196050942651		

<b>FCC Reference:</b>	15.209(a), 15.247(d) , Parts 2.1053 & 22.917
<b>Industry Canada Reference</b>	RSS Gen 6.13 & 8.9, RSS 247 5.5, RSS 132 5.5
<b>Test Method Used</b>	As detailed in KDB 971168 Section 6.1 referencing FCC Part 2.1053 and ANSI C63.10 Sections 6.3 and 6.5
<b>Frequency Range:</b>	30 MHz to 25 GHz
<b>Configuration:</b>	GSM 850 Circuit Switched / 802.11n 300 Mbps

**Environmental Conditions:**

<b>Temperature (°C):</b>	25
<b>Relative Humidity (%):</b>	39 to 41

**Results:**

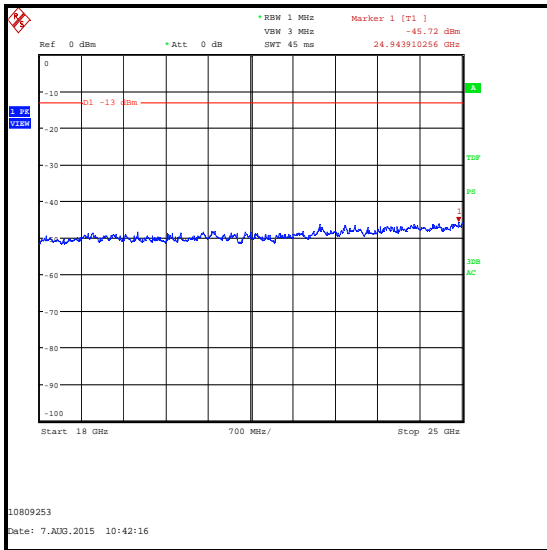
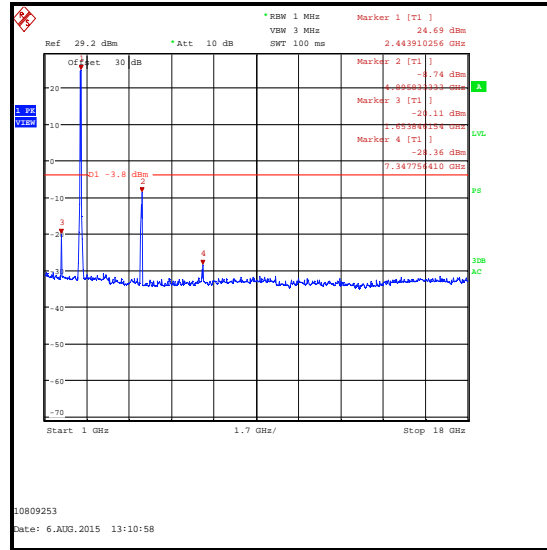
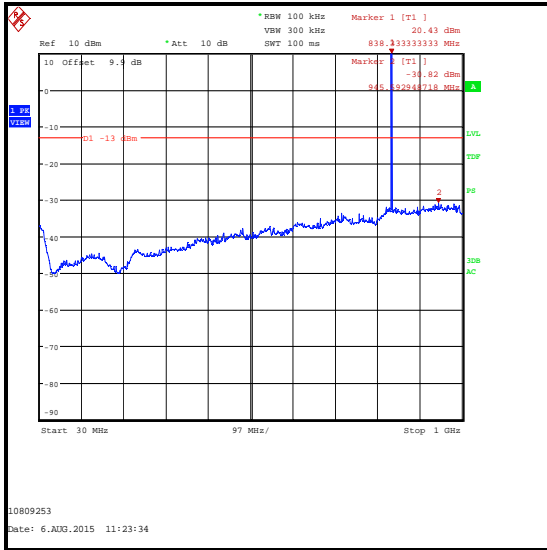
<b>Emission Frequency (MHz)</b>	<b>Emission Level</b>	<b>Applicable Limit</b>	<b>Margin (dB)</b>	<b>Result</b>
See Note 1				

**Note(s):**

1. All intermodulation products were below the noise floor level or greater than 20 dB of the specification limit.
2. Pre-scans below 1GHz were performed and markers placed on the highest measured levels. The test receiver resolution bandwidth was set to 100 kHz and video bandwidth 300 kHz. The sweep time was set to auto. A peak detector was used, sweep time was set to auto and trace mode was Max Hold.
3. Pre-scans above 1GHz were performed and a marker placed on the highest measured level of the appropriate plot. The test receiver resolution bandwidth was set to 1 MHz and video bandwidth 3 MHz. The sweep time was set to auto. A peak detector was used, sweep time was set to auto and trace mode was Max Hold.
4. All measurements were performed in a anechoic chamber (Asset Number K0002). The EUT was placed at a height of 150 cm above the reference ground plane in the centre of the chamber turntable.
5. The emission at 838.233 is the GSM 850 traffic channel
6. The emission at 2443.910 MHz is the fundamental of the WLAN
7. The emission at 1653.846 MHz is the second harmonic of the GSM 850 signal and was therefore not measured.
8. The emission at 4895.833 MHz is the second harmonic of the WLAN signal and was therefore not measured.
9. The emission at 7347.756 MHz is the third harmonic of the WLAN signal and was therefore not measured.
10. Final measurements were made using appropriate RF attenuators and filters where required.



### Transmitter Radiated Emissions (continued)



**Transmitter Radiated Emissions (continued)****Test Equipment Used:**

<b>Asset No.</b>	<b>Instrument</b>	<b>Manufacturer</b>	<b>Type No.</b>	<b>Serial No.</b>	<b>Date Calibration Due</b>	<b>Cal. Interval (Months)</b>
M1656	Thermohygrometer	JM Handelspunkt	30.5015.13	Not stated	23 Apr 2016	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	01 May 2016	12
M1874	Test Receiver	Rohde & Schwarz	ESU26	100553	12 Jun 2016	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	21 Dec 2015	12
A1396	Attenuator	Huber & Suhner	6810.17.B	757987	05 May 2016	12
A2468	High Pass Filter	Wainwright Instruments GmbH	WHKX12-935-1000-15000-40SS	2	13 Feb 2016	12
A288	Antenna	Chase	CBL6111A	1589	21 Aug 2015	12
A1818	Antenna	EMCO	3115	00075692	20 Dec 2015	12
A253	Antenna	Flann Microwave	12240-20	128	20 Dec 2015	12
A254	Antenna	Flann Microwave	14240-20	139	20 Dec 2015	12
A255	Antenna	Flann Microwave	16240-20	519	20 Dec 2015	12
A256	Antenna	Flann Microwave	18240-20	400	20 Dec 2015	12
A436	Antenna	Flann Microwave	20240-20	330	21 Dec 2015	12

**4.4.2. WLAN 2.4G and UMTS 1700 Transmitter Radiated Emissions****Test Summary:**

<b>Test Engineer:</b>	David Doyle	<b>Test Dates:</b>	06 August 2015 & 07 August 2015
<b>Test Sample IMEI:</b>	356196050942651		

<b>FCC Reference:</b>	15.209(a), 15.247(d) , Parts 2.1053 & 27.53(h)(1)
<b>Industry Canada Reference</b>	RSS Gen 6.13 & 8.9, RSS 247 5.5, RSS 139 6.6
<b>Test Method Used</b>	As detailed in KDB 971168 Section 6.1 referencing FCC Part 2.1053 and ANSI C63.10 Sections 6.3 and 6.5
<b>Frequency Range:</b>	30 MHz to 25 GHz
<b>Configuration:</b>	UMTS 1700 Packet Switched / 802.11n 300 Mbps

**Environmental Conditions:**

<b>Temperature (°C):</b>	25
<b>Relative Humidity (%):</b>	39 to 41

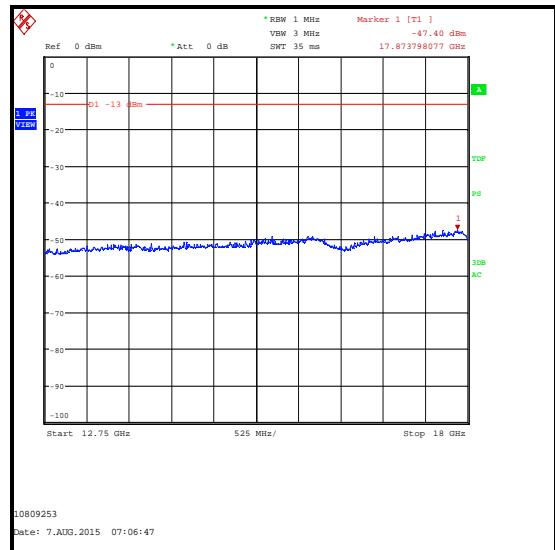
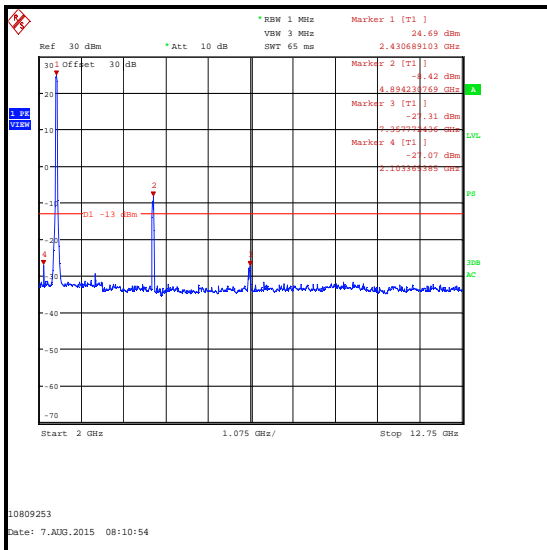
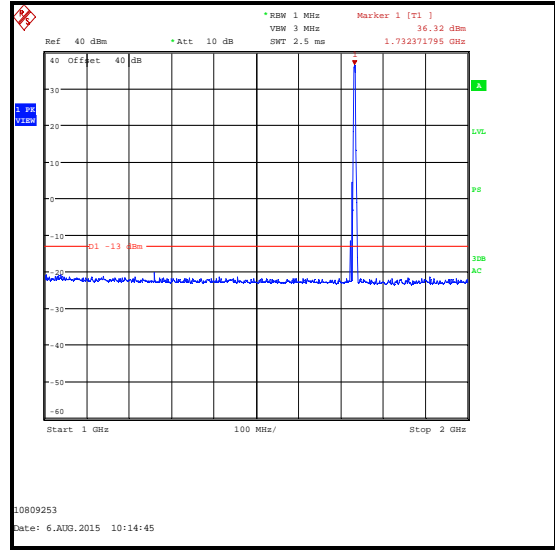
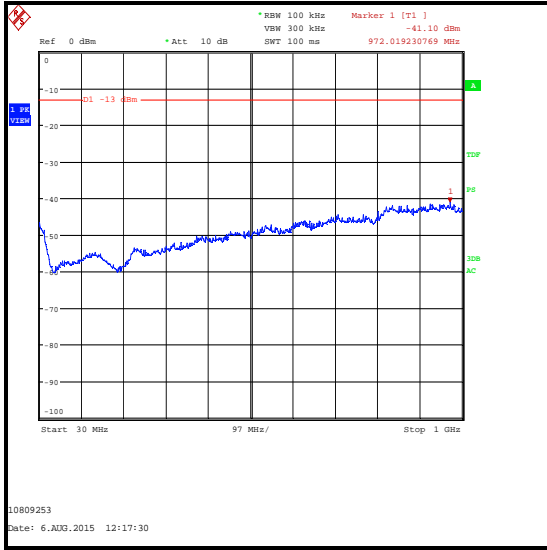
**Results:**

<b>Emission Frequency (MHz)</b>	<b>Emission Level</b>	<b>Applicable Limit</b>	<b>Margin (dB)</b>	<b>Result</b>
See Note 1				

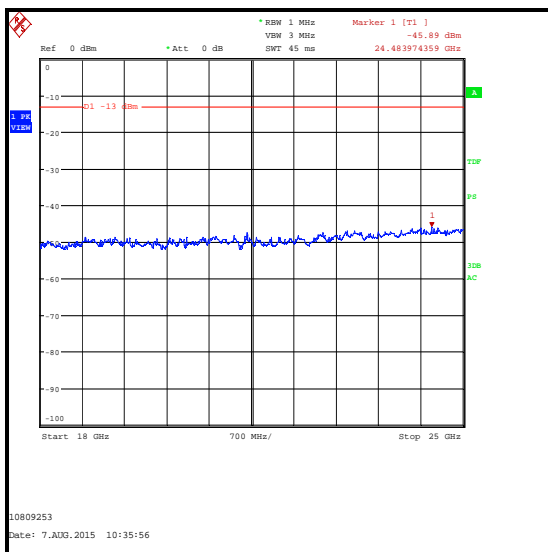
**Transmitter Radiated Emissions (continued)****Note(s):**

1. All intermodulation products were below the noise floor level or greater than 20 dB of the specification limit.
2. Pre-scans below 1GHz were performed and markers placed on the highest measured levels. The test receiver resolution bandwidth was set to 100 kHz and video bandwidth 300 kHz. The sweep time was set to auto. A peak detector was used, sweep time was set to auto and trace mode was Max Hold.
3. Pre-scans above 1GHz were performed and a marker placed on the highest measured level of the appropriate plot. The test receiver resolution bandwidth was set to 1 MHz and video bandwidth 3 MHz. The sweep time was set to auto A peak detector was used, sweep time was set to auto and trace mode was Max Hold..
4. All measurements were performed in a anechoic chamber (Asset Number K0002). The EUT was placed at a height of 150 cm above the reference ground plane in the centre of the chamber turntable.
5. The emission at 1732.371 MHz is the UMTS 1700 traffic
6. The emission at 2420.689 MHz is the fundamental of the WLAN
7. The emission at 2103.365 MHz is the downlink traffic channel of the UMTS 1700 signal and was therefore not measured.
8. The emission at 3412.660 MHz is the second harmonic of the UMTS 1700 signal and was therefore not measured.
9. The emission at 4894.231 MHz is the second harmonic of the WLAN signal and was therefore not measured.
10. The emission at 7357.772 MHz is the third harmonic of the WLAN signal and was therefore not measured.
11. Final measurements were made using appropriate RF attenuators and filters where required.

Transmitter Radiated Emissions (continued)



**Transmitter Out of Band Radiated Emissions (continued)**



**Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1656	Thermohygrometer	JM Handelpunkt	30.5015.13	Not stated	23 Apr 2016	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	01 May 2016	12
M1874	Test Receiver	Rohde & Schwarz	ESU26	100553	12 Jun 2016	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	21 Dec 2015	12
A1396	Attenuator	Huber & Suhner	6810.17.B	757987	05 May 2016	12
A1393	Attenuator	Huber & Suhner	6820.17.B	757456	05 May 2016	12
A2407	High Pass Filter	AtlanTecRF	AFH-02000	02357	17 Apr 2016	12
A288	Antenna	Chase	CBL6111A	1589	21 Aug 2015	12
A1818	Antenna	EMCO	3115	00075692	20 Dec 2015	12
A253	Antenna	Flann Microwave	12240-20	128	20 Dec 2015	12
A254	Antenna	Flann Microwave	14240-20	139	20 Dec 2015	12
A255	Antenna	Flann Microwave	16240-20	519	20 Dec 2015	12
A256	Antenna	Flann Microwave	18240-20	400	20 Dec 2015	12
A436	Antenna	Flann Microwave	20240-20	330	21 Dec 2015	12

**4.4.3. WLAN 2.4G and PCS 1900 Transmitter Radiated Emissions****Test Summary:**

<b>Test Engineer:</b>	David Doyle	<b>Test Dates:</b>	13 August 2015
<b>Test Sample IMEI:</b>	356196050942651		

<b>FCC Reference:</b>	15.209(a), 15.247(d) , Parts 2.1053 & 24.238(a)
<b>Industry Canada Reference</b>	RSS Gen 6.13 & 8.9, RSS 247 5.5, RSS 133 6.5
<b>Test Method Used</b>	As detailed in KDB 971168 Section 6.1 referencing FCC Part 2.1053 and ANSI C63.10 Sections 6.3 and 6.5
<b>Frequency Range:</b>	30 MHz to 25 GHz
<b>Configuration:</b>	PCS 1900 / 802.11n 300 Mbps

**Environmental Conditions:**

<b>Temperature (°C):</b>	23
<b>Relative Humidity (%):</b>	45

**Results:**

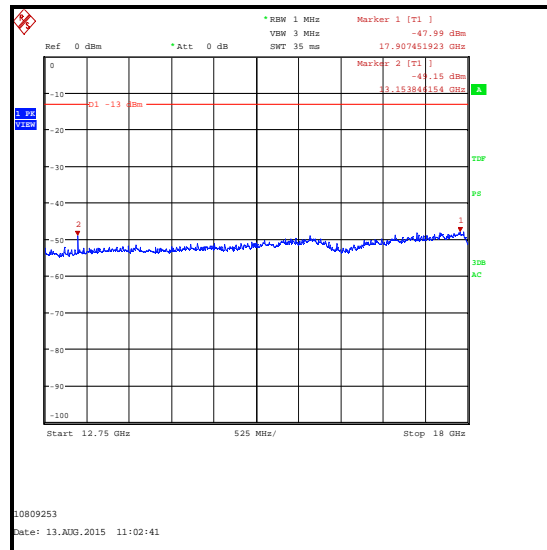
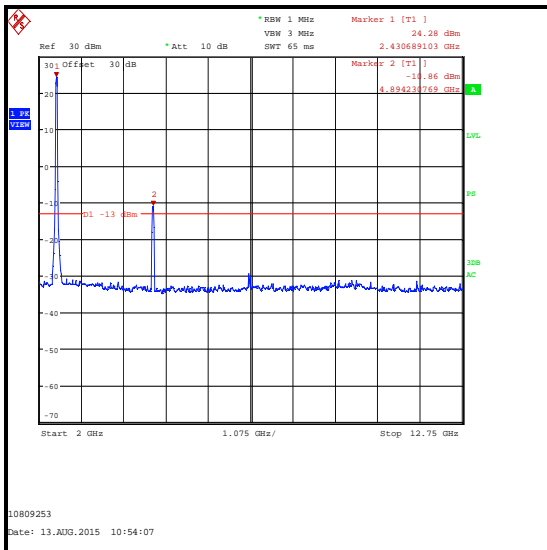
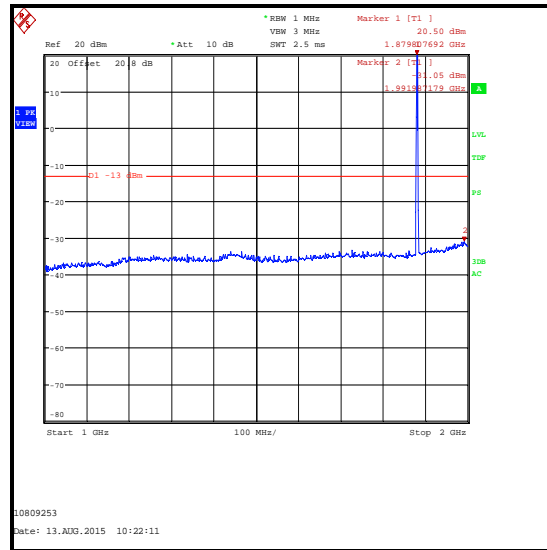
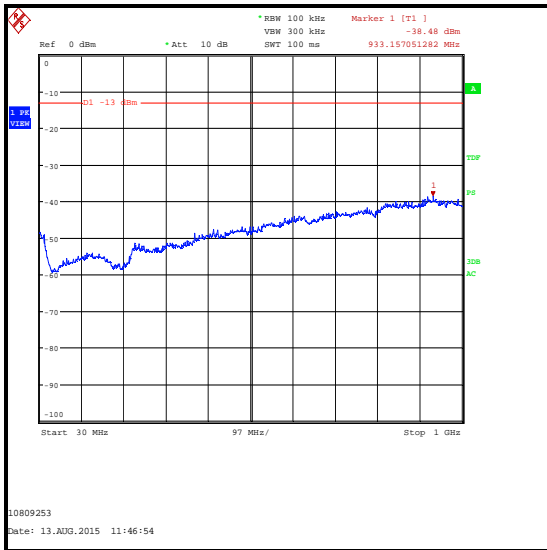
<b>Emission Frequency (MHz)</b>	<b>Emission Level</b>	<b>Applicable Limit</b>	<b>Margin (dB)</b>	<b>Result</b>
See Note 1				

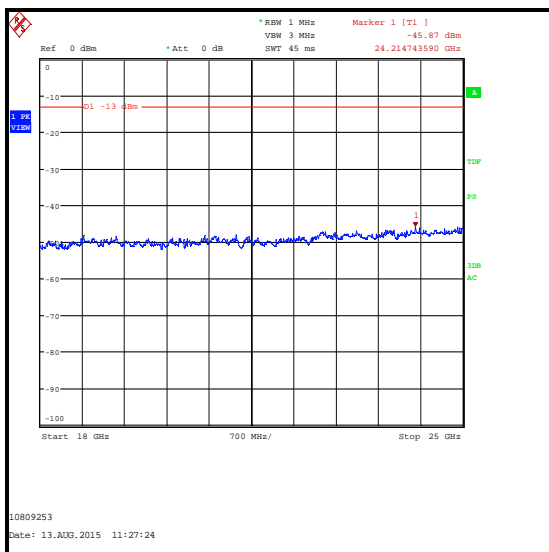
**Transmitter Radiated Emissions (continued)****Note(s):**

1. All intermodulation products were below the noise floor level or greater than 20 dB of the specification limit.
2. Pre-scans below 1GHz were performed and markers placed on the highest measured levels. The test receiver resolution bandwidth was set to 100 kHz and video bandwidth 300 kHz. The sweep time was set to auto. A peak detector was used, sweep time was set to auto and trace mode was Max Hold.
3. Pre-scans above 1GHz were performed and a marker placed on the highest measured level of the appropriate plot. The test receiver resolution bandwidth was set to 1 MHz and video bandwidth 3 MHz. The sweep time was set to auto. A peak detector was used, sweep time was set to auto and trace mode was Max Hold.
4. All measurements were performed in a anechoic chamber (Asset Number K0002). The EUT was placed at a height of 150 cm above the reference ground plane in the centre of the chamber turntable.
5. The emission at 1879.807MHz is the PCS 1900 traffic channel.
6. The emission at 2430.689 MHz is the fundamental of the WLAN
7. The emission at 4894.231 MHz is the second harmonic of the WLAN signal and was therefore not measured.
8. Final measurements were made using appropriate RF attenuators and filters where required.



### Transmitter Radiated Emissions (continued)



**Transmitter Out of Band Radiated Emissions (continued)****Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1656	Thermohygrometer	JM Handelspunkt	30.5015.13	Not stated	23 Apr 2016	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	01 May 2016	12
M1874	Test Receiver	Rohde & Schwarz	ESU26	100553	12 Jun 2016	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	21 Dec 2015	12
A1396	Attenuator	Huber & Suhner	6810.17.B	757987	05 May 2016	12
A1393	Attenuator	Huber & Suhner	6820.17.B	757456	05 May 2016	12
A1552	Notch Filter	Wainright Instruments GMBH	WRCD187 9.8-0.0/40-5EE	3	Calibrated before use	-
A288	Antenna	Chase	CBL6111A	1589	21 Aug 2015	12
A1818	Antenna	EMCO	3115	00075692	20 Dec 2015	12
A253	Antenna	Flann Microwave	12240-20	128	20 Dec 2015	12
A254	Antenna	Flann Microwave	14240-20	139	20 Dec 2015	12
A255	Antenna	Flann Microwave	16240-20	519	20 Dec 2015	12
A256	Antenna	Flann Microwave	18240-20	400	20 Dec 2015	12
A436	Antenna	Flann Microwave	20240-20	330	21 Dec 2015	12
M260	Signal Generator	Rohde & Schwarz	SMP02	829076/008	27 Apr 2016	12
M199	Power Meter	Rohde & Schwarz	NRVS	827023/075	08 Apr 2016	24
M1267	Power Sensor	Rohde & Schwarz	NRV-Z52	100155	23 Apr 2016	24

**4.4.4. WLAN 2.4G and LTE Band 13 Transmitter Radiated Emissions****Test Summary:**

<b>Test Engineer:</b>	David Doyle	<b>Test Dates:</b>	06 August 2015 & 07 August 2015
<b>Test Sample IMEI:</b>	356196050942651		

<b>FCC Reference:</b>	15.209(a), 15.247(d) , Parts 2.1053 & 27.53(c)(2)
<b>Industry Canada Reference</b>	RSS Gen 6.13 & 8.9, RSS 247 5.5, RSS 130 4.6
<b>Test Method Used</b>	As detailed in KDB 971168 Section 6.1 referencing FCC Part 2.1053 and ANSI C63.10 Sections 6.3 and 6.5
<b>Frequency Range:</b>	30 MHz to 25 GHz
<b>Configuration:</b>	LTE Band 13 / 802.11n 300 Mbps

**Environmental Conditions:**

<b>Temperature (°C):</b>	25
<b>Relative Humidity (%):</b>	39 to 41

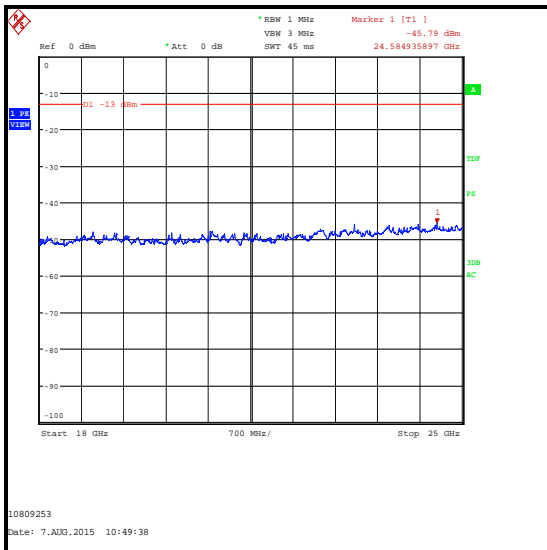
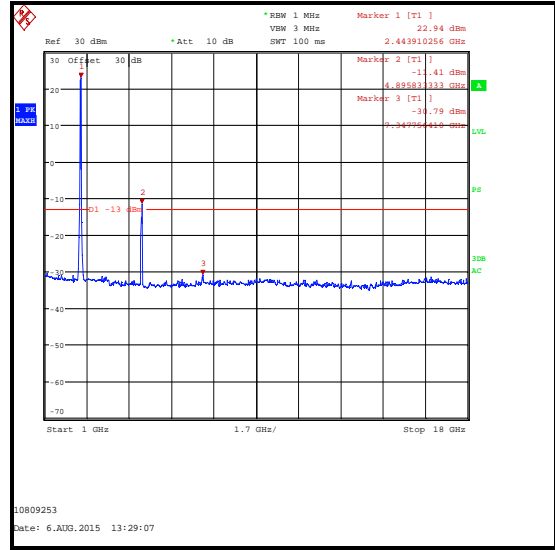
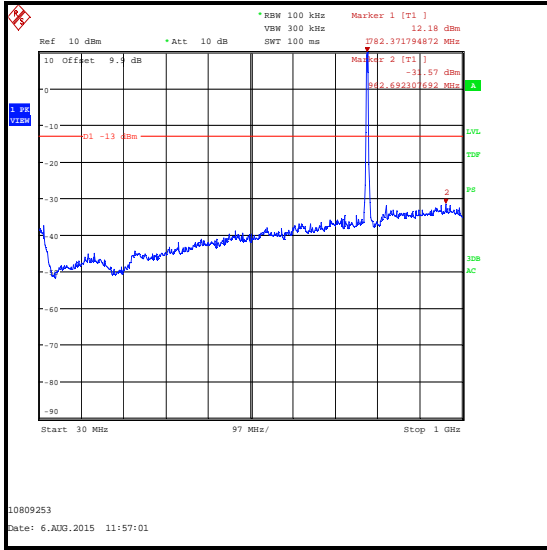
**Results:**

<b>Emission Frequency (MHz)</b>	<b>Emission Level</b>	<b>Applicable Limit</b>	<b>Margin (dB)</b>	<b>Result</b>
See Note 1				

**Note(s):**

- All intermodulation products were below the noise floor level or greater than 20 dB of the specification limit.
- Pre-scans below 1GHz were performed and markers placed on the highest measured levels. The test receiver resolution bandwidth was set to 100 kHz and video bandwidth 300 kHz. The sweep time was set to auto. A peak detector was used, sweep time was set to auto and trace mode was Max Hold.
- Pre-scans above 1GHz were performed and a marker placed on the highest measured level of the appropriate plot. The test receiver resolution bandwidth was set to 1 MHz and video bandwidth 3 MHz. The sweep time was set to auto. A peak detector was used, sweep time was set to auto and trace mode was Max Hold.
- All measurements were performed in a anechoic chamber (Asset Number K0002). The EUT was placed at a height of 150 cm above the reference ground plane in the centre of the chamber turntable.
- The emission at 782.371 MHz is the uplink LTE Band 13 traffic channel.
- The emission at 2443.910 MHz is the WLAN Fundamental
- The emission at 4895.833 MHz is the second harmonic of the WLAN signal and was therefore not measured.
- The emission at 7347.756 MHz is the third harmonic of the WLAN signal and was therefore not measured.
- Final measurements were made using appropriate RF attenuators and filters where required.

### Transmitter Radiated Emissions (continued)



**Transmitter Radiated Emissions (continued)****Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1656	Thermohygrometer	JM Handelspunkt	30.5015.13	Not stated	23 Apr 2016	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	01 May 2016	12
M1874	Test Receiver	Rohde & Schwarz	ESU26	100553	12 Jun 2016	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	21 Dec 2015	12
A1396	Attenuator	Huber & Suhner	6810.17.B	757987	05 May 2016	12
A2468	High Pass Filter	Wainwright Instruments GmbH	WHKX12-935-1000-15000-40SS	2	13 Feb 2016	12
A288	Antenna	Chase	CBL6111A	1589	21 Aug 2015	12
A1818	Antenna	EMCO	3115	00075692	20 Dec 2015	12
A253	Antenna	Flann Microwave	12240-20	128	20 Dec 2015	12
A254	Antenna	Flann Microwave	14240-20	139	20 Dec 2015	12
A255	Antenna	Flann Microwave	16240-20	519	20 Dec 2015	12
A256	Antenna	Flann Microwave	18240-20	400	20 Dec 2015	12
A436	Antenna	Flann Microwave	20240-20	330	21 Dec 2015	12

**4.4.5. WLAN 2.4G and LTE Band 17 Transmitter Radiated Emissions****Test Summary:**

<b>Test Engineer:</b>	David Doyle	<b>Test Dates:</b>	06 August 2015 & 07 August 2015
<b>Test Sample IMEI:</b>	356196050942651		

<b>FCC Reference:</b>	15.209(a), 15.247(d) , Parts 2.1053 & 27.53(g)
<b>Industry Canada Reference</b>	RSS Gen 6.13 & 8.9, RSS 247 5.5, RSS 130 4.6
<b>Test Method Used</b>	As detailed in KDB 971168 Section 6.1 referencing FCC Part 2.1053 and ANSI C63.10 Sections 6.3 and 6.5
<b>Frequency Range:</b>	30 MHz to 25 GHz
<b>Configuration:</b>	LTE Band 17 / 802.11n 300 Mbps

**Environmental Conditions:**

<b>Temperature (°C):</b>	25
<b>Relative Humidity (%):</b>	39 to 41

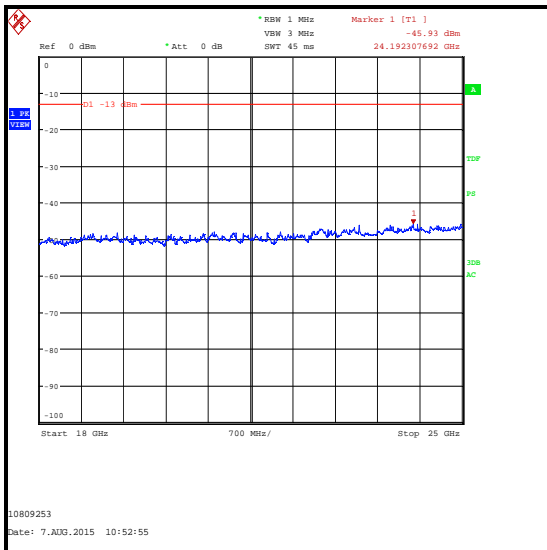
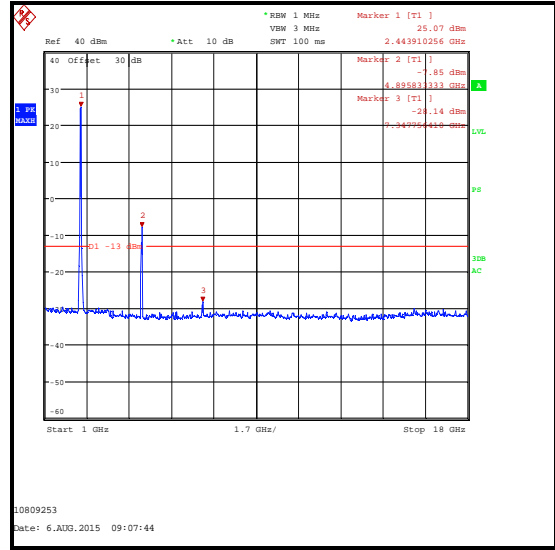
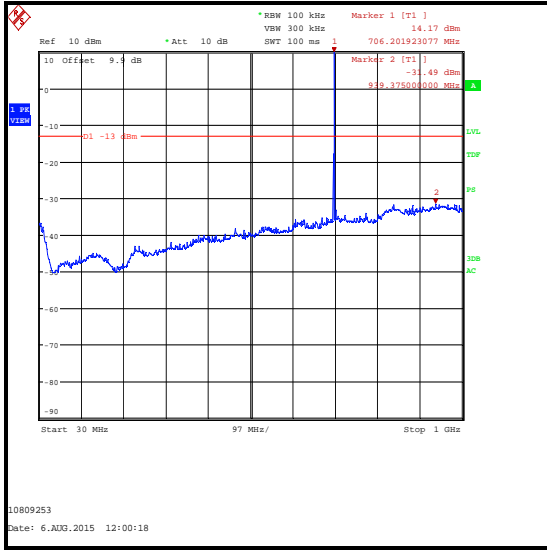
**Results:**

<b>Emission Frequency (MHz)</b>	<b>Emission Level</b>	<b>Applicable Limit</b>	<b>Margin (dB)</b>	<b>Result</b>
See Note 1				

**Note(s):**

- All intermodulation products were below the noise floor level or greater than 20 dB of the specification limit.
- Pre-scans below 1GHz were performed and markers placed on the highest measured levels. The test receiver resolution bandwidth was set to 100 kHz and video bandwidth 300 kHz. The sweep time was set to auto. A peak detector was used, sweep time was set to auto and trace mode was Max Hold.
- Pre-scans above 1GHz were performed and a marker placed on the highest measured level of the appropriate plot. The test receiver resolution bandwidth was set to 1 MHz and video bandwidth 3 MHz. The sweep time was set to auto A peak detector was used, sweep time was set to auto and trace mode was Max Hold.
- All measurements were performed in a anechoic chamber (Asset Number K0002). The EUT was placed at a height of 150 cm above the reference ground plane in the centre of the chamber turntable.
- The emission at 706.201 MHz is uplink LTE Band 17 traffic channel
- The emission at 2443.910 MHz is the WLAN Fundamental.
- The emission at 4895.833 MHz is the second harmonic of the WLAN signal and was therefore not measured.
- The emission at 7347.756 MHz is the third harmonic of the WLAN signal and was therefore not measured.
- Final measurements were made using appropriate RF attenuators and filters where required.

**Transmitter Radiated Emissions (continued)**



**Transmitter Radiated Emissions (continued)****Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1656	Thermohygrometer	JM Handelspunkt	30.5015.13	Not stated	23 Apr 2016	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	01 May 2016	12
M1874	Test Receiver	Rohde & Schwarz	ESU26	100553	12 Jun 2016	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	21 Dec 2015	12
A1396	Attenuator	Huber & Suhner	6810.17.B	757987	05 May 2016	12
A2468	High Pass Filter	Wainwright Instruments GmbH	WHKX12-935-1000-15000-40SS	2	13 Feb 2016	12
A288	Antenna	Chase	CBL6111A	1589	21 Aug 2015	12
A1818	Antenna	EMCO	3115	00075692	20 Dec 2015	12
A253	Antenna	Flann Microwave	12240-20	128	20 Dec 2015	12
A254	Antenna	Flann Microwave	14240-20	139	20 Dec 2015	12
A255	Antenna	Flann Microwave	16240-20	519	20 Dec 2015	12
A256	Antenna	Flann Microwave	18240-20	400	20 Dec 2015	12
A436	Antenna	Flann Microwave	20240-20	330	21 Dec 2015	12



**4.4.6. WLAN 5G and GSM 850 Transmitter Radiated Emissions****Test Summary:**

<b>Test Engineer:</b>	David Doyle	<b>Test Dates:</b>	06 August 2015 & 07 August 2015
<b>Test Sample IMEI:</b>	356196050942651		

<b>FCC Part:</b>	15.209(a), Parts 15.407(b), Parts 2.1053 & 22.917
<b>Industry Canada Reference:</b>	RSS Gen 6.13 & 8.9, RSS 247 5.5, RSS 132 5.5
<b>Test Method Used:</b>	As detailed in KDB 971168 Section 6.1 referencing FCC Part 2.1053 and ANSI C63.10 Sections 6.3 and 6.5
<b>Frequency Range:</b>	30 MHz to 40 GHz
<b>Configuration:</b>	GSM 850 Circuit Switched / 802.11a 6 Mbps

**Environmental Conditions:**

<b>Temperature (°C):</b>	25
<b>Relative Humidity (%):</b>	39 to 41

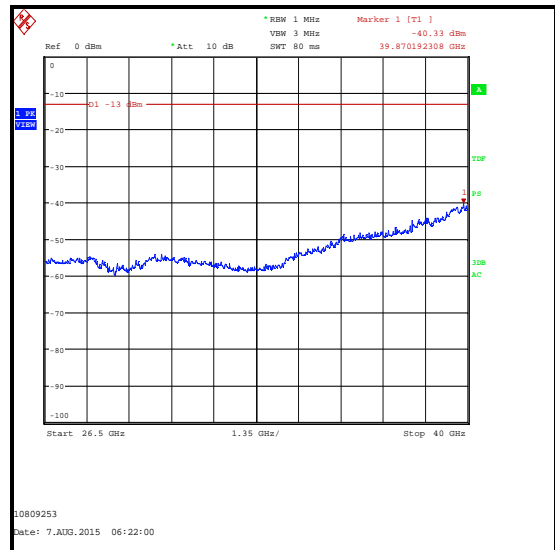
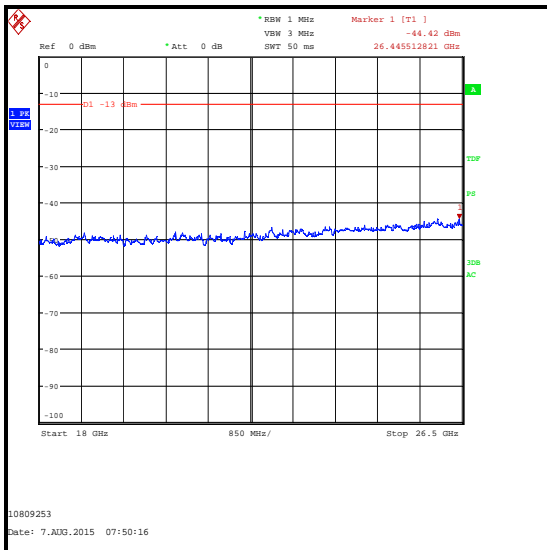
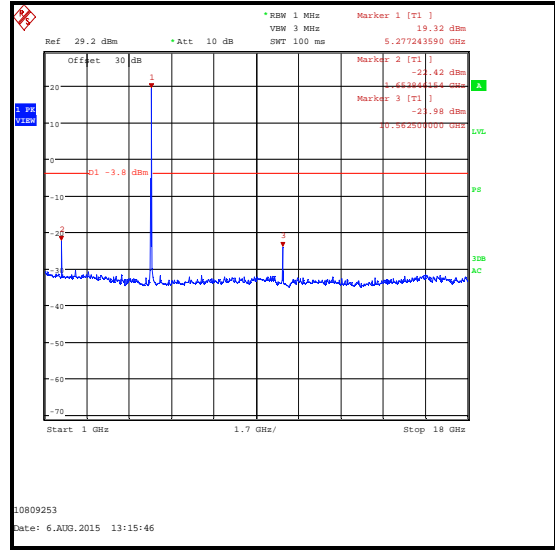
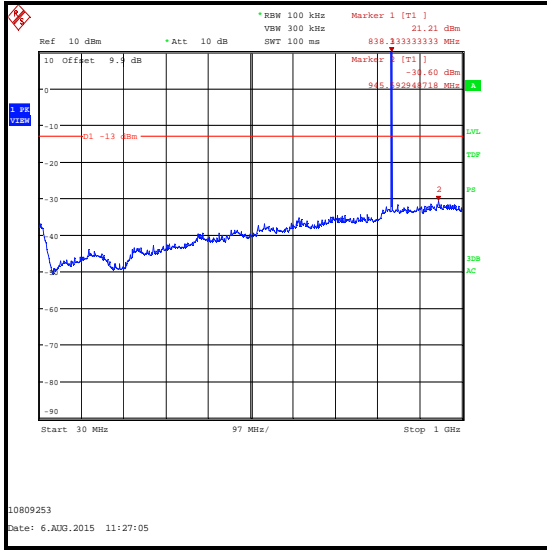
**Results:**

<b>Emission Frequency (MHz)</b>	<b>Emission Level</b>	<b>Applicable Limit</b>	<b>Margin (dB)</b>	<b>Result</b>
See Note 1				

**Note(s):**

- All intermodulation products were below the noise floor level or greater than 20 dB of the specification limit.
- Pre-scans below 1GHz were performed and markers placed on the highest measured levels. The test receiver resolution bandwidth was set to 100 kHz and video bandwidth 300 kHz. The sweep time was set to auto. A peak detector was used, sweep time was set to auto and trace mode was Max Hold.
- Pre-scans above 1GHz were performed and a marker placed on the highest measured level of the appropriate plot. The test receiver resolution bandwidth was set to 1 MHz and video bandwidth 3 MHz. The sweep time was set to auto. A peak detector was used, sweep time was set to auto and trace mode was Max Hold.
- All measurements were performed in a anechoic chamber (Asset Number K0002). The EUT was placed at a height of 150 cm above the reference ground plane in the centre of the chamber turntable.
- The emission at 838.333 MHz is the GSM 850 traffic channel
- The emission at 5277.243 MHz is the WLAN Fundamental
- The emission at 1653.846 MHz is the second harmonic of the GSM 850 signal and was therefore not measured.
- The emission at 10562.500 MHz is the second harmonic of the WLAN signal and was therefore not measured.
- Final measurements were made using appropriate RF attenuators and filters where required.

**Transmitter Radiated Emissions (continued)**



**Transmitter Radiated Emissions (continued)****Test Equipment Used:**

<b>Asset No.</b>	<b>Instrument</b>	<b>Manufacturer</b>	<b>Type No.</b>	<b>Serial No.</b>	<b>Date Calibration Due</b>	<b>Cal. Interval (Months)</b>
M1656	Thermohygrometer	JM Handelspunkt	30.5015.13	Not stated	23 Apr 2016	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	01 May 2016	12
M1874	Test Receiver	Rohde & Schwarz	ESU26	100553	12 Jun 2016	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	21 Dec 2015	12
A1396	Attenuator	Huber & Suhner	6810.17.B	757987	05 May 2016	12
A2468	High Pass Filter	Wainwright Instruments GmbH	WHKX12-935-1000-15000-40SS	2	13 Feb 2016	12
A288	Antenna	Chase	CBL6111A	1589	21 Aug 2015	12
A1818	Antenna	EMCO	3115	00075692	20 Dec 2015	12
A253	Antenna	Flann Microwave	12240-20	128	20 Dec 2015	12
A254	Antenna	Flann Microwave	14240-20	139	20 Dec 2015	12
A255	Antenna	Flann Microwave	16240-20	519	20 Dec 2015	12
A256	Antenna	Flann Microwave	18240-20	400	20 Dec 2015	12
A436	Antenna	Flann Microwave	20240-20	330	21 Dec 2015	12
A203	WG 22 Microwave Horn	Flann Microwave	22240-20	343	19 May 2016	36
A1785	26.5 GHz to 40 GHz Pre-amplifier	Farran Technology	FLNA-28-30	FTL 6483	09 Jan 2016	12
A1878	WG22 Adaptor	Quasar	QRA22PQB 402BKF	N/A	Calibrated before use	N/A
M1630	Spectrum Analyser	Rohde & Schwarz	ESU 40	100233	20 Feb 2016	12
M1229	Digital Multimeter	Fluke	179	87640015	23 Apr 2016	12
S0537	DC Power Supply	TTI	EL302D	249928	Calibrated before use	N/A

**4.4.7. WLAN 5G and UMTS 1700 Transmitter Radiated Emissions****Test Summary:**

<b>Test Engineer:</b>	David Doyle	<b>Test Dates:</b>	06 August 2015 & 07 August 2015
<b>Test Sample IMEI:</b>	356196050942651		

<b>FCC Reference:</b>	15.209(a), Parts 15.407(b), Parts 2.1053 & 27.53(h)(1)
<b>Industry Canada Reference</b>	RSS Gen 6.13 & 8.9, RSS 247 5.5, RSS 139 6.6
<b>Test Method Used</b>	As detailed in KDB 971168 Section 6.1 referencing FCC Part 2.1053 and ANSI C63.10 Sections 6.3 and 6.5
<b>Frequency Range:</b>	30 MHz to 40 GHz
<b>Configuration:</b>	UMTS 1700 Packet Switched / 802.11a 6 Mbps

**Environmental Conditions:**

<b>Temperature (°C):</b>	25
<b>Relative Humidity (%):</b>	39 to 41

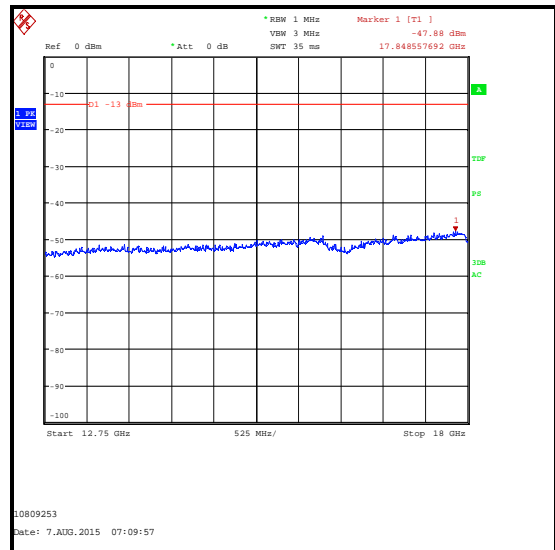
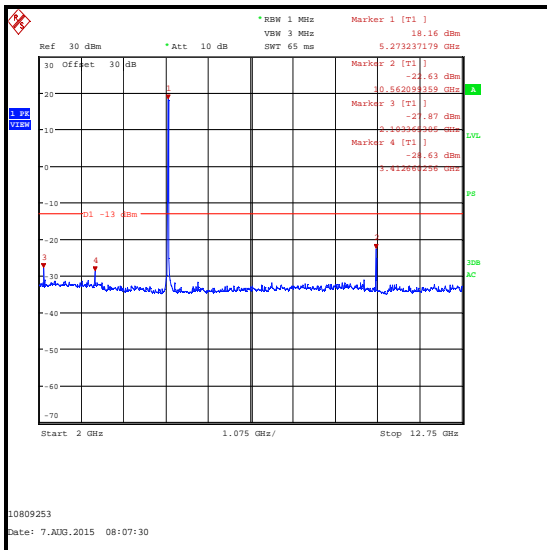
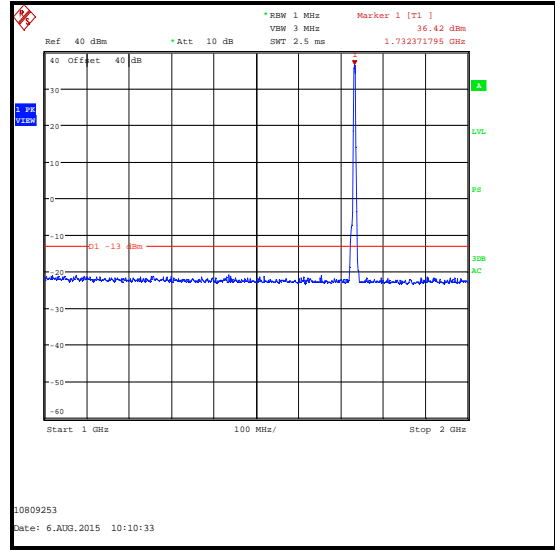
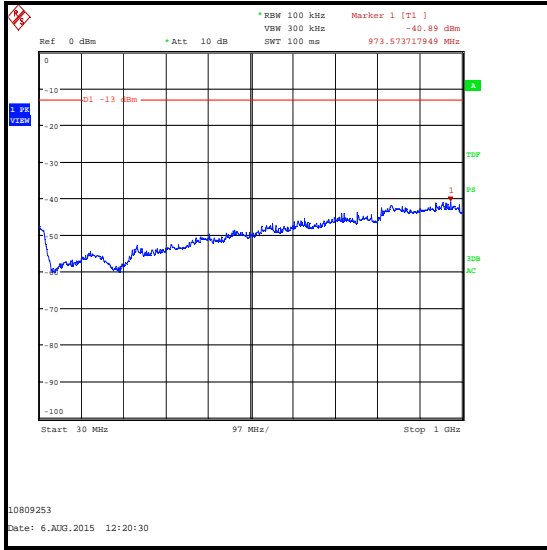
**Results:**

<b>Emission Frequency (MHz)</b>	<b>Emission Level</b>	<b>Applicable Limit</b>	<b>Margin (dB)</b>	<b>Result</b>
See Note 1				

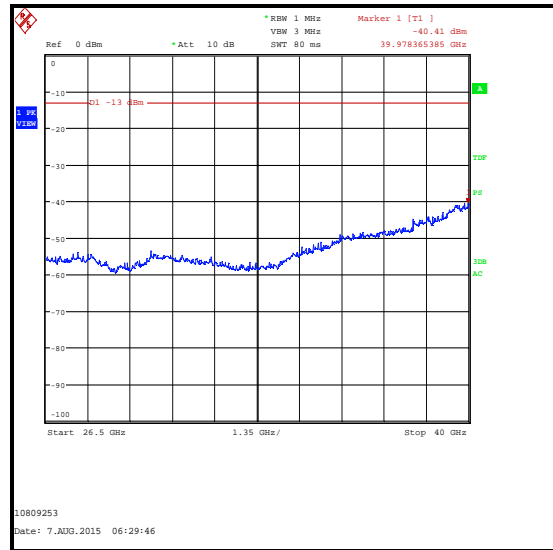
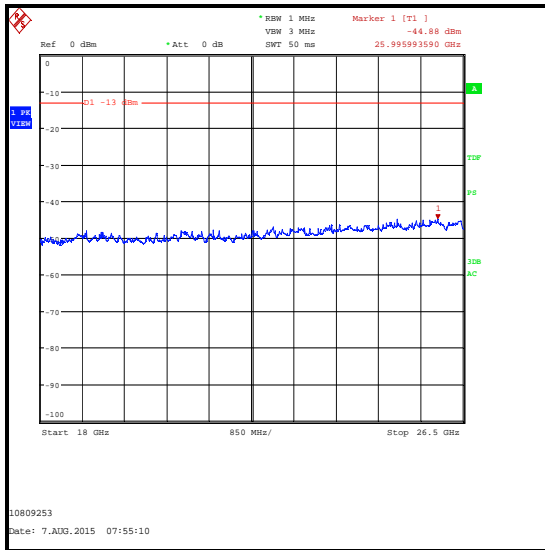
**Note(s):**

- All intermodulation products were below the noise floor level or greater than 20 dB of the specification limit.
- Pre-scans below 1GHz were performed and markers placed on the highest measured levels. The test receiver resolution bandwidth was set to 100 kHz and video bandwidth 300 kHz. The sweep time was set to auto. A peak detector was used, sweep time was set to auto and trace mode was Max Hold.
- Pre-scans above 1GHz were performed and a marker placed on the highest measured level of the appropriate plot. The test receiver resolution bandwidth was set to 1 MHz and video bandwidth 3 MHz. The sweep time was set to auto A peak detector was used, sweep time was set to auto and trace mode was Max Hold.
- All measurements were performed in a anechoic chamber (Asset Number K0002). The EUT was placed at a height of 150 cm above the reference ground plane in the centre of the chamber turntable.
- The emission at 1732.371 MHz is the uplink UMTS 1700 traffic channel
- The emission at 5273.237 MHz is the WLAN fundamental
- The emission at 2103.365 MHz is the downlink traffic channel of the UMTS 1700 signal and was therefore not measured.
- The emission at 3412.660 MHz is the second harmonic of the UMTS 1700 signal and was therefore not measured.
- The emission at 10562.099 MHz is the second harmonic of the WLAN signal and was therefore not measured.
- Final measurements were made using appropriate RF attenuators and filters where required.

### Transmitter Radiated Emissions (continued)



**Transmitter Radiated Emissions (continued)**



**Transmitter Radiated Emissions (continued)****Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1656	Thermohygrometer	JM Handelspunkt	30.5015.13	Not stated	23 Apr 2016	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	01 May 2016	12
M1874	Test Receiver	Rohde & Schwarz	ESU26	100553	12 Jun 2016	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	21 Dec 2015	12
A1396	Attenuator	Huber & Suhner	6810.17.B	757987	05 May 2016	12
A1393	Attenuator	Huber & Suhner	6820.17.B	757456	05 May 2016	12
A2407	High Pass Filter	AtlanTecRF	AFH-02000	02357	17 Apr 2016	12
A288	Antenna	Chase	CBL6111A	1589	21 Aug 2015	12
A1818	Antenna	EMCO	3115	00075692	20 Dec 2015	12
A253	Antenna	Flann Microwave	12240-20	128	20 Dec 2015	12
A254	Antenna	Flann Microwave	14240-20	139	20 Dec 2015	12
A255	Antenna	Flann Microwave	16240-20	519	20 Dec 2015	12
A256	Antenna	Flann Microwave	18240-20	400	20 Dec 2015	12
A436	Antenna	Flann Microwave	20240-20	330	21 Dec 2015	12
A203	WG 22 Microwave Horn	Flann Microwave	22240-20	343	19 May 2016	36
A1785	26.5 GHz to 40 GHz Pre-amplifier	Farran Technology	FLNA-28-30	FTL 6483	09 Jan 2016	12
A1878	WG22 Adaptor	Quasar	QRA22PQ B402BKF	N/A	Calibrated before use	N/A
M1630	Spectrum Analyser	Rohde & Schwarz	ESU 40	100233	20 Feb 2016	12
M1229	Digital Multimeter	Fluke	179	87640015	23 Apr 2016	12
S0537	DC Power Supply	TTI	EL302D	249928	Calibrated before use	N/A

**4.4.8. WLAN 5G and PCS 1900 Transmitter Radiated Emissions****Test Summary:**

<b>Test Engineer:</b>	David Doyle	<b>Test Dates:</b>	13 August 2015
<b>Test Sample IMEI:</b>	356196050942651		

<b>FCC Reference:</b>	15.209(a), Parts 15.407(b), Parts 2.1053 & 24.238(a)
<b>Industry Canada Reference</b>	RSS Gen 6.13 & 8.9, RSS 247 5.5, RSS 133 6.5
<b>Test Method Used</b>	As detailed in KDB 971168 Section 6.1 referencing FCC Part 2.1053 and ANSI C63.10 Sections 6.3 and 6.5
<b>Frequency Range:</b>	30 MHz to 40 GHz
<b>Configuration:</b>	PCS 1900 / 802.11a 6 Mbps

**Environmental Conditions:**

<b>Temperature (°C):</b>	23
<b>Relative Humidity (%):</b>	45

**Results:**

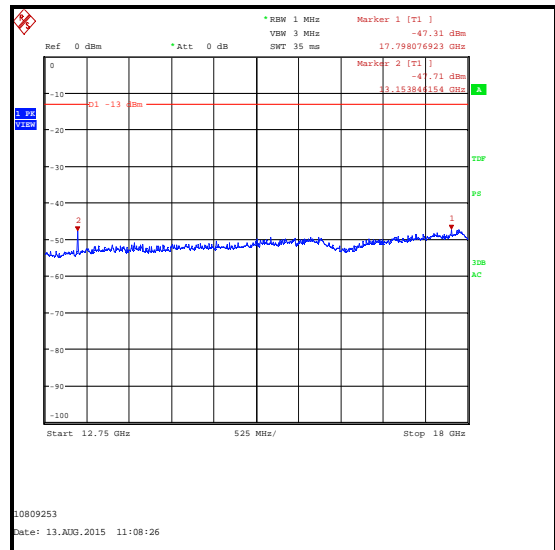
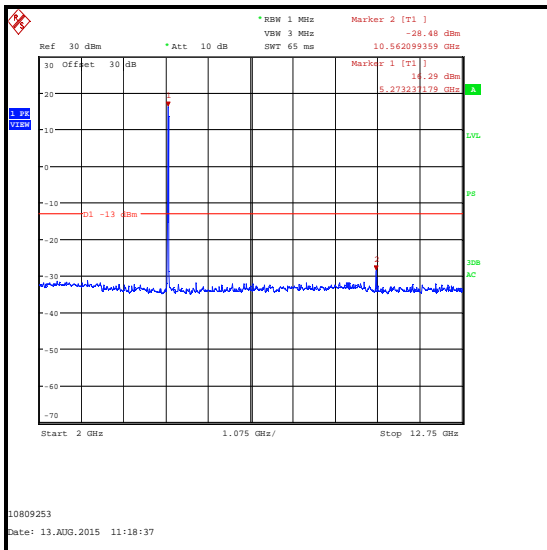
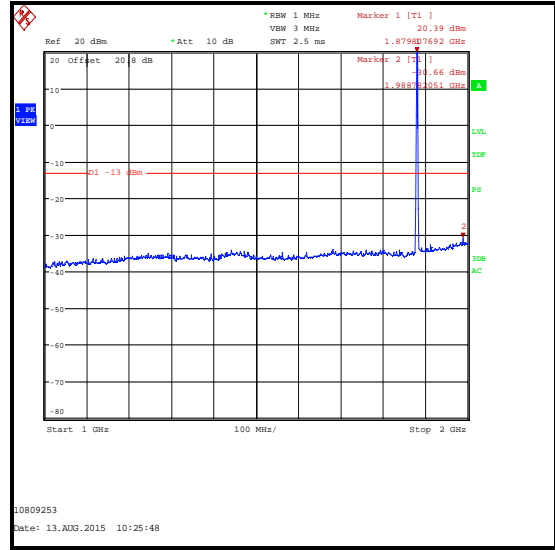
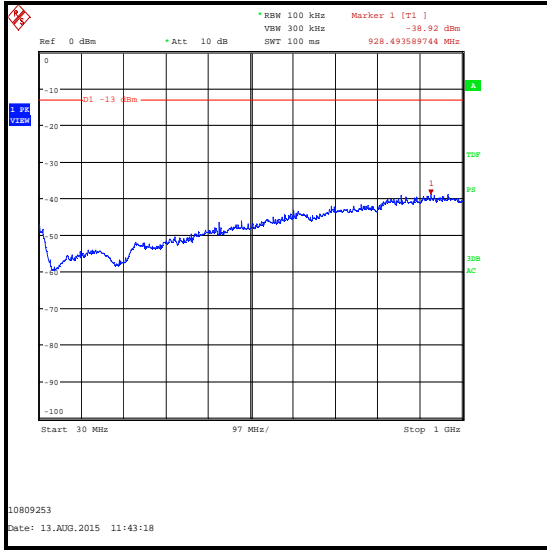
<b>Emission Frequency (MHz)</b>	<b>Emission Level</b>	<b>Applicable Limit</b>	<b>Margin (dB)</b>	<b>Result</b>
See Note 1				



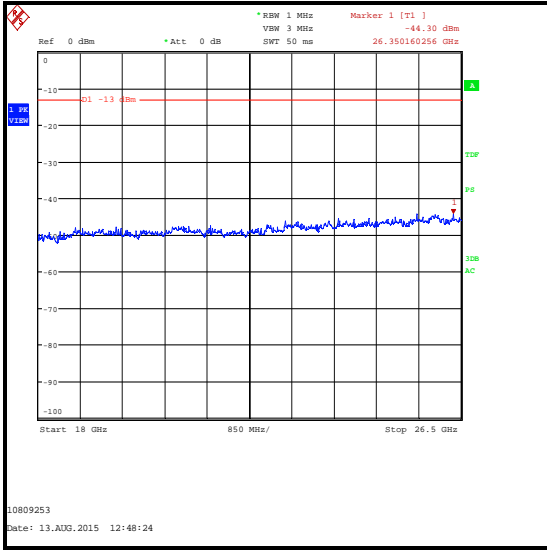
**Transmitter Radiated Emissions (continued)****Note(s):**

1. All intermodulation products were below the noise floor level or greater than 20 dB from the specification limit.
2. Pre-scans below 1GHz were performed and markers placed on the highest measured levels. The test receiver resolution bandwidth was set to 100 kHz and video bandwidth 300 kHz. The sweep time was set to auto. A peak detector was used, sweep time was set to auto and trace mode was Max Hold.
3. Pre-scans above 1GHz were performed and a marker placed on the highest measured level of the appropriate plot. The test receiver resolution bandwidth was set to 1 MHz and video bandwidth 3 MHz. The sweep time was set to auto. A peak detector was used, sweep time was set to auto and trace mode was Max Hold.
4. All measurements were performed in a anechoic chamber (Asset Number K0002). The EUT was placed at a height of 150 cm above the reference ground plane in the centre of the chamber turntable.
5. The emission at 1879.807 MHz is the PCS 1900 traffic channel.
6. The emission at 5273.231 MHz is the WLAN Fundamental
7. The emission at 10562.099 MHz is the second harmonic of the WLAN signal and was therefore not measured.
8. The emission at 13153.846 MHz is the seventh harmonic of the PCS 1900 signal and was therefore not measured.
9. The emission at 17798.077 MHz was an intermodulation product of the PCS 1900 signal plus five times the WLAN signal. (See Note 1)
10. The emission at 16881.010 MHz is the ninth harmonic of the LTE Band 2 signal and was therefore not measured.
11. The emission at 18749.199 MHz is the tenth harmonic of the LTE Band 2 signal and was therefore not measured.
12. Final measurements were made using appropriate RF attenuators and filters where required.

### Transmitter Radiated Emissions (continued)



**Transmitter Radiated Emissions (continued)**



**Transmitter Radiated Emissions (continued)****Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1656	Thermohygrometer	JM Handelspunkt	30.5015.13	Not stated	23 Apr 2016	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	01 May 2016	12
M1874	Test Receiver	Rohde & Schwarz	ESU26	100553	12 Jun 2016	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	21 Dec 2015	12
A1396	Attenuator	Huber & Suhner	6810.17.B	757987	05 May 2016	12
A1393	Attenuator	Huber & Suhner	6820.17.B	757456	05 May 2016	12
A1552	Notch Filter	Wainright Instruments GMBH	WRCD187 9.8-0.0/40-5EE	3	Calibrated before use	-
A288	Antenna	Chase	CBL6111A	1589	21 Aug 2015	12
A1818	Antenna	EMCO	3115	00075692	20 Dec 2015	12
A253	Antenna	Flann Microwave	12240-20	128	20 Dec 2015	12
A254	Antenna	Flann Microwave	14240-20	139	20 Dec 2015	12
A255	Antenna	Flann Microwave	16240-20	519	20 Dec 2015	12
A256	Antenna	Flann Microwave	18240-20	400	20 Dec 2015	12
A436	Antenna	Flann Microwave	20240-20	330	21 Dec 2015	12
M260	Signal Generator	Rohde & Schwarz	SMP02	829076/008	27 Apr 2016	12
M199	Power Meter	Rohde & Schwarz	NRVS	827023/075	08 Apr 2016	24
M1267	Power Sensor	Rohde & Schwarz	NRV-Z52	100155	23 Apr 2016	24
A203	WG 22 Microwave Horn	Flann Microwave	22240-20	343	19 May 2016	36
A1785	26.5 GHz to 40 GHz Pre-amplifier	Farran Technology	FLNA-28-30	FTL 6483	09 Jan 2016	12
A1878	WG22 Adaptor	Quasar	QRA22PQ B402BKF	N/A	Calibrated before use	N/A
M1630	Spectrum Analyser	Rohde & Schwarz	ESU 40	100233	20 Feb 2016	12
M1229	Digital Multimeter	Fluke	179	87640015	23 Apr 2016	12
S0537	DC Power Supply	TTI	EL302D	249928	Calibrated before use	N/A

**4.4.9. WLAN 5G and LTE Band 13 Transmitter Radiated Emissions****Test Summary:**

<b>Test Engineer:</b>	David Doyle	<b>Test Dates:</b>	06 August 2015 & 07 August 2015
<b>Test Sample IMEI:</b>	356196050942651		

<b>FCC Reference:</b>	15.209(a), 15.407(b) , Parts 2.1053 & 27.53(c)(2)
<b>Industry Canada Reference</b>	RSS Gen 6.13 & 8.9, RSS 247 5.5, RSS 130 4.6
<b>Test Method Used</b>	As detailed in KDB 971168 Section 6.1 referencing FCC Part 2.1053 and ANSI C63.10 Sections 6.3 and 6.5
<b>Frequency Range:</b>	30 MHz to 40 GHz
<b>Configuration:</b>	LTE Band 13 / 802.11a 6 Mbps

**Environmental Conditions:**

<b>Temperature (°C):</b>	25
<b>Relative Humidity (%):</b>	39 to 41

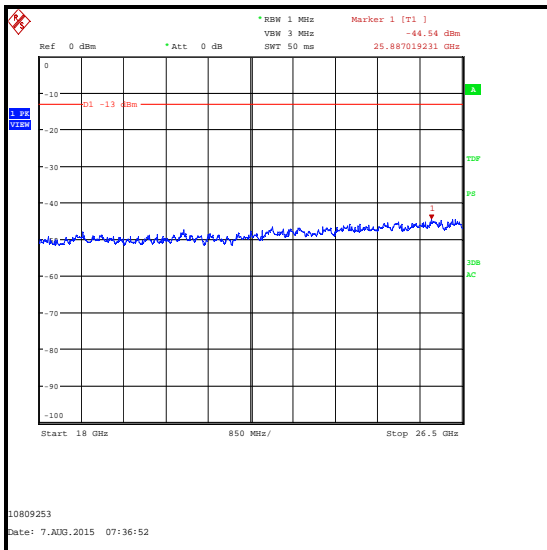
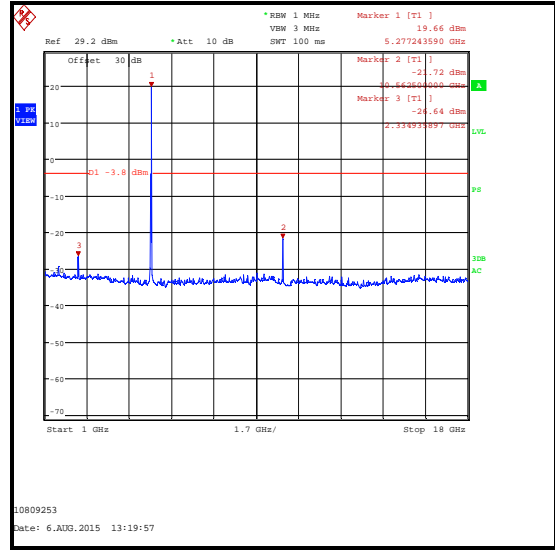
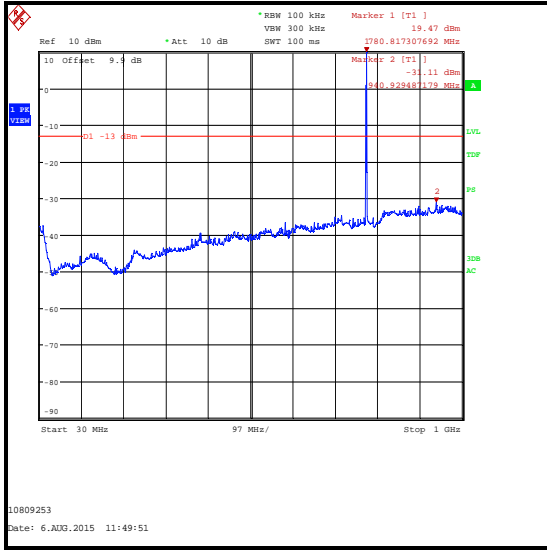
**Results:**

<b>Emission Frequency (MHz)</b>	<b>Emission Level</b>	<b>Applicable Limit</b>	<b>Margin (dB)</b>	<b>Result</b>
See Note 1				

**Note(s):**

- All intermodulation products were below the noise floor level or greater than 20 dB of the specification limit.
- Pre-scans below 1GHz were performed and markers placed on the highest measured levels. The test receiver resolution bandwidth was set to 100 kHz and video bandwidth 300 kHz. The sweep time was set to auto. A peak detector was used, sweep time was set to auto and trace mode was Max Hold.
- Pre-scans above 1GHz were performed and a marker placed on the highest measured level of the appropriate plot. The test receiver resolution bandwidth was set to 1 MHz and video bandwidth 3 MHz. The sweep time was set to auto. A peak detector was used, sweep time was set to auto and trace mode was Max Hold.
- All measurements were performed in a anechoic chamber (Asset Number K0002). The EUT was placed at a height of 150 cm above the reference ground plane in the centre of the chamber turntable.
- The emission 780.817 MHz is the uplink LTE Band 13 traffic channel.
- The emission at 5277.543 MHz is the fundamental of the WLAN
- The emission at 2334.936 MHz is the third harmonic of the LTE Band 13 signal and was therefore not measured.
- The emission at 10562.500 MHz is the second harmonic of the WLAN signal and was therefore not measured.
- Final measurements were made using appropriate RF attenuators and filters where required.

**Transmitter Radiated Emissions (continued)**



**Transmitter Radiated Emissions (continued)****Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1656	Thermohygrometer	JM Handelspunkt	30.5015.13	Not stated	23 Apr 2016	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	01 May 2016	12
M1874	Test Receiver	Rohde & Schwarz	ESU26	100553	12 Jun 2016	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	21 Dec 2015	12
A1396	Attenuator	Huber & Suhner	6810.17.B	757987	05 May 2016	12
A2468	High Pass Filter	Wainwright Instruments GmbH	WHKX12-935-1000-15000-40SS	2	13 Feb 2016	12
A288	Antenna	Chase	CBL6111A	1589	21 Aug 2015	12
A1818	Antenna	EMCO	3115	00075692	20 Dec 2015	12
A253	Antenna	Flann Microwave	12240-20	128	20 Dec 2015	12
A254	Antenna	Flann Microwave	14240-20	139	20 Dec 2015	12
A255	Antenna	Flann Microwave	16240-20	519	20 Dec 2015	12
A256	Antenna	Flann Microwave	18240-20	400	20 Dec 2015	12
A436	Antenna	Flann Microwave	20240-20	330	21 Dec 2015	12
A203	WG 22 Microwave Horn	Flann Microwave	22240-20	343	19 May 2016	36
A1785	26.5 GHz to 40 GHz Pre-amplifier	Farran Technology	FLNA-28-30	FTL 6483	09 Jan 2016	12
A1878	WG22 Adaptor	Quasar	QRA22PQB 402BKF	N/A	Calibrated before use	N/A
M1630	Spectrum Analyser	Rohde & Schwarz	ESU 40	100233	20 Feb 2016	12
M1229	Digital Multimeter	Fluke	179	87640015	23 Apr 2016	12
S0537	DC Power Supply	TTI	EL302D	249928	Calibrated before use	N/A

**4.4.10. WLAN 5G and LTE Band 17 Transmitter Radiated Emissions****Test Summary:**

<b>Test Engineer:</b>	David Doyle	<b>Test Dates:</b>	06 August 2015 & 07 August 2015
<b>Test Sample IMEI:</b>	356196050942651		

<b>FCC Reference:</b>	15.209(a), 15.407(b) , Parts 2.1053 & 27.53(g)
<b>Industry Canada Reference</b>	RSS Gen 6.13 & 8.9, RSS 247 5.5, RSS 130 4.6
<b>Test Method Used</b>	As detailed in KDB 971168 Section 6.1 referencing FCC Part 2.1053 and ANSI C63.10 Sections 6.3 and 6.5
<b>Frequency Range:</b>	30 MHz to 40 GHz
<b>Configuration:</b>	LTE Band 17 / 802.11a 6 Mbps

**Environmental Conditions:**

<b>Temperature (°C):</b>	25
<b>Relative Humidity (%):</b>	39 to 41

**Results:**

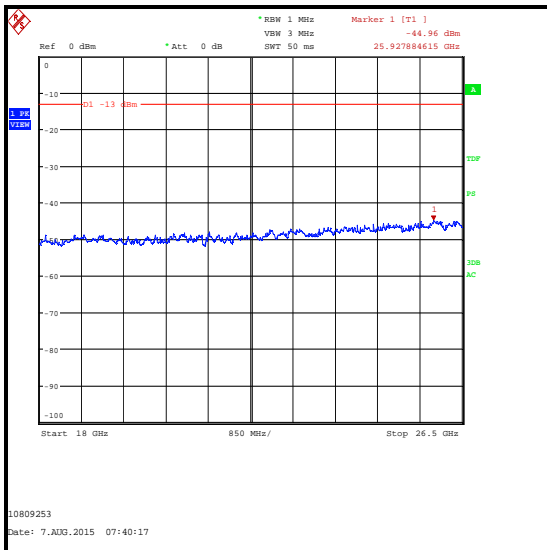
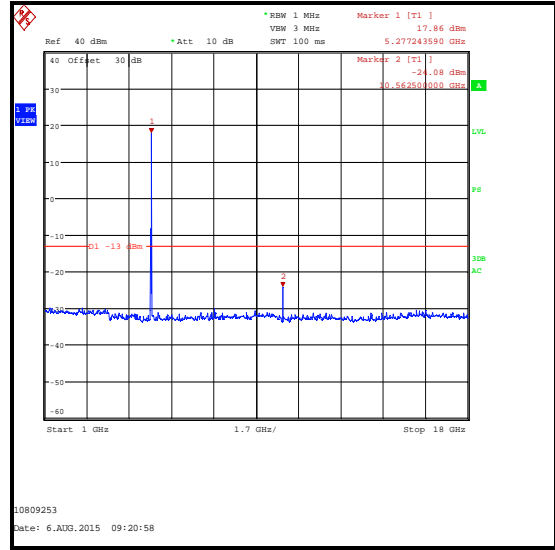
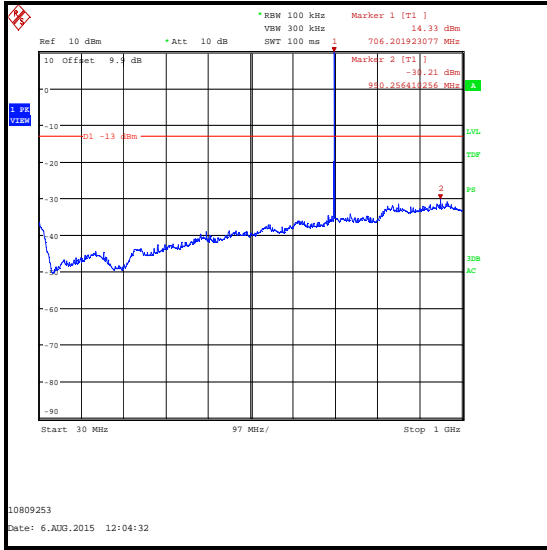
<b>Emission Frequency (MHz)</b>	<b>Emission Level</b>	<b>Applicable Limit</b>	<b>Margin (dB)</b>	<b>Result</b>
See Note 1				

**Note(s):**

- All intermodulation products were below the noise floor level or greater than 20 dB of the specification limit.
- Pre-scans below 1GHz were performed and markers placed on the highest measured levels. The test receiver resolution bandwidth was set to 100 kHz and video bandwidth 300 kHz. The sweep time was set to auto. A peak detector was used, sweep time was set to auto and trace mode was Max Hold.
- Pre-scans above 1GHz were performed and a marker placed on the highest measured level of the appropriate plot. The test receiver resolution bandwidth was set to 1 MHz and video bandwidth 3 MHz. The sweep time was set to auto A peak detector was used, sweep time was set to auto and trace mode was Max Hold.
- All measurements were performed in a anechoic chamber (Asset Number K0002). The EUT was placed at a height of 150 cm above the reference ground plane in the centre of the chamber turntable.
- The emission at 706.201 MHz is the uplink LTE Band 17 traffic channel
- The emission at is the 5277.243 MHz is the WLAN fundamental.
- The emission at 10562.500 MHz is the second harmonic of the WLAN signal and was therefore not measured.
- Final measurements were made using appropriate RF attenuators and filters where required.



**Transmitter Radiated Emissions (continued)**



**Transmitter Radiated Emissions (continued)****Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1656	Thermohygrometer	JM Handelspunkt	30.5015.13	Not stated	23 Apr 2016	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	01 May 2016	12
M1874	Test Receiver	Rohde & Schwarz	ESU26	100553	12 Jun 2016	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	21 Dec 2015	12
A1396	Attenuator	Huber & Suhner	6810.17.B	757987	05 May 2016	12
A2468	High Pass Filter	Wainwright Instruments GmbH	WHKX12-935-1000-15000-40SS	2	13 Feb 2016	12
A288	Antenna	Chase	CBL6111A	1589	21 Aug 2015	12
A1818	Antenna	EMCO	3115	00075692	20 Dec 2015	12
A253	Antenna	Flann Microwave	12240-20	128	20 Dec 2015	12
A254	Antenna	Flann Microwave	14240-20	139	20 Dec 2015	12
A255	Antenna	Flann Microwave	16240-20	519	20 Dec 2015	12
A256	Antenna	Flann Microwave	18240-20	400	20 Dec 2015	12
A436	Antenna	Flann Microwave	20240-20	330	21 Dec 2015	12
A203	WG 22 Microwave Horn	Flann Microwave	22240-20	343	19 May 2016	36
A1785	26.5 GHz to 40 GHz Pre-amplifier	Farran Technology	FLNA-28-30	FTL 6483	09 Jan 2016	12
A1878	WG22 Adaptor	Quasar	QRA22PQB 402BKF	N/A	Calibrated before use	N/A
M1630	Spectrum Analyser	Rohde & Schwarz	ESU 40	100233	20 Feb 2016	12
M1229	Digital Multimeter	Fluke	179	87640015	23 Apr 2016	12
S0537	DC Power Supply	TTI	EL302D	249928	Calibrated before use	N/A

## **5. Measurement Uncertainty**

No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

The uncertainty of the result may need to be taken into account when interpreting the measurement results.

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor such that a confidence level of approximately 95% is maintained. For the purposes of this document “approximately” is interpreted as meaning “effectively” or “for most practical purposes”.

<b>Measurement Type</b>	<b>Range</b>	<b>Confidence Level (%)</b>	<b>Calculated Uncertainty</b>
Radiated Spurious Emissions	30 MHz to 40 GHz	95%	±2.94 dB

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty the published guidance of the appropriate accreditation body is followed.

## **6. Report Revision History**

Version Number	Revision Details		
	Page No(s)	Clause	Details
1.0	-	-	Initial Version
2.0	-	-	Amended model number and added further standard references and test configuration details.