



# TEST REPORT

**Test Report No. : UL-RPT-RP90385JD12A**

**Manufacturer** : Panasonic Mobile Communications Development of Europe Ltd  
**Model No.** : NTT docomo EB-4063  
**FCC ID** : UCE312057A  
**Technology** : RFID – 13.56 MHz  
**Test Standard(s)** : FCC Parts 15.107(a), 15.109, 15.207, 15.209(a) & 15.225

1. This test report shall not be reproduced in full or partial, without the written approval of RFI Global Services Ltd trading as UL.
2. The results in this report apply only to the sample(s) tested.
3. This 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 1.0

**Date of Issue:** 30 November 2012

**Checked by:**

Ian Watch  
WiSE Senior Engineer

**Issued by :**

pp  
John Newell  
Group Quality Manager, WiSE  
Basingstoke,  
UL Verification Services



This laboratory is accredited by UKAS. The tests reported herein have been performed in accordance with its' terms of accreditation.

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## **1. Customer Information**











<b>Company Name:</b>	Panasonic Mobile Communications Development of Europe Ltd
<b>Address:</b>	Panasonic House Willoughby Road Bracknell Berkshire RG12 8FP United Kingdom

## 2. Summary of Testing

### 2.1. General Information

<b>Specification Reference:</b>	47CFR15.225
<b>Specification Title:</b>	Code of Federal Regulations Volume 47 (Telecommunications) 2012: Part 15 Subpart C (Radio Frequency Devices) - Section 15.225
<b>Specification Reference:</b>	47CFR15.107 and 47CFR15.109
<b>Specification Title:</b>	Code of Federal Regulations Volume 47 (Telecommunications) 2012: Part 15 Subpart B (Radio Frequency Devices) - Sections 15.107 and 15.109
<b>Specification Reference:</b>	47CFR15.207 and 47CFR15.209
<b>Specification Title:</b>	Code of Federal Regulations Volume 47 (Telecommunications) 2012: Part 15 Subpart C (Intentional Radiators) - Sections 15.207 and 15.209
<b>Site Registration:</b>	209735
<b>Location of Testing:</b>	RFI Global Services Ltd trading as UL, Wade Road, Basingstoke, Hampshire, RG24 8AH.
<b>Test Dates:</b>	11 November 2012 to 28 November 2012

### 2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Result
Part 15.107(a)	Receiver/Idle Mode AC Conducted Spurious Emissions	
Part 15.109	Receiver/Idle Mode Radiated Spurious Emissions	
Part 15.207	Transmitter AC Conducted Emissions	
Part 15.225(a)(b)(c)(d)	Transmitter Fundamental Field Strength	
Part 15.209(a), 15.225(d)	Transmitter Radiated Spurious Emissions	
Part 15.209(a), 15.225(c)(d)	Transmitter Band Edge Radiated Emissions	
Part 2.1049	Transmitter 20 dB Bandwidth	
Part 15.225(e)	Transmitter Frequency Stability (Temperature & Voltage Variation)	
<b>Key to Results</b>		
 = Complied  = Did not comply		

**2.3. Methods and Procedures**

<b>Reference:</b>	ANSI C63.4 (2009)
<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>	ANSI C63.10 (2009)
<b>Title:</b>	American National Standard for Testing Unlicensed Wireless Devices

**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>	NTT docomo
<b>Model Name or Number:</b>	EB-4063
<b>IMEI:</b>	353740050011927
<b>Hardware Version Number:</b>	Rev B-2
<b>Software Version Number:</b>	ACPU: rupy-jb-10-0336 CCPU: 101033_DCM_00.12
<b>FCC ID:</b>	UCE312057A

<b>Brand Name:</b>	NTT docomo
<b>Description:</b>	Battery
<b>Model Name or Number:</b>	P29

<b>Brand Name:</b>	NTT docomo
<b>Description:</b>	AC Charger
<b>Model Name or Number:</b>	AC 04

<b>Brand Name:</b>	NTT docomo
<b>Description:</b>	Charge/USB Data cable
<b>Model Name or Number:</b>	Type 01

<b>Brand Name:</b>	NTT docomo
<b>Description:</b>	Personal Hands-Free
<b>Model Name or Number:</b>	Type 02

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

The equipment under test was a Multi-Mode LTE/UMTS/GSM Mobile Phone with WLAN, Bluetooth and RFID.

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

No modifications were applied to the EUT during testing.

**3.4. Additional Information Related to Testing**

<b>Tested Technology:</b>	RFID	
<b>Category of Equipment:</b>	Transceiver	
<b>Channel Spacing:</b>	Single channel device	
<b>Transmit Frequency Range:</b>	13.56 MHz	
<b>Receive Frequency Range:</b>	13.56 MHz	
<b>Power Supply Requirement:</b>	Nominal	3.8 V
	Minimum	3.4 V
	Maximum	4.35 V
<b>Tested Temperature Range:</b>	Minimum	-20°C
	Maximum	50°C

**3.5. Support Equipment**

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

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

<b>Brand Name:</b>	Not stated
<b>Description:</b>	Dummy Battery
<b>Model Name or Number:</b>	Not stated

<b>Brand Name:</b>	Hewlett Packard
<b>Description:</b>	Laptop PC
<b>Model Name or Number:</b>	HP Mini 200-4200
<b>Serial Number:</b>	5CD2251C1Y



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

### **4.1. Operating Modes**

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

- Receiver/Idle mode.
- Constantly transmitting at full power with a modulated carrier in RFID test mode.

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

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

- The RFID transmitter test mode was enabled by means of bespoke software provided by the Customer.
- Receiver idle/standby mode radiated spurious emission tests were performed with the AC Charger and PHF connected to the EUT as this was found to be the worst case during pre-scans. All accessories were individually connected and measurements made during pre-scans to determine the worst case combination.
- Transmitter radiated spurious emission tests were performed with the AC Charger and PHF connected to the EUT as this was found to be the worst case during pre-scans. All appropriate accessories were individually connected and measurements made during pre-scans to determine the worst case combination.
- Testing at voltage extremes was performed using a dummy battery supplied by the Customer.
- AC conducted emissions tests were performed with the EUT connected to the AC charger. The AC charger was connected to a 120 VAC 60 Hz single phase supply via a LISN.

## **5. Measurements, Examinations and Derived Results**

### **5.1. General Comments**

Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to *Section 6: Measurement Uncertainties* for details.

In accordance with UKAS requirements all the measurement equipment is on a calibration schedule. All equipment was within the calibration period on the date of testing.

**5.2. Test Results****5.2.1. Receiver/Idle Mode AC Conducted Spurious Emissions****Test Summary:**

<b>Test Engineer:</b>	David Doyle	<b>Test Date:</b>	15 November 2012
<b>Test Sample IMEI:</b>	353740050011927		

<b>FCC Reference:</b>	Part 15.107(a)
<b>Test Method Used:</b>	As detailed in ANSI C63.10 Section 6.2 referencing ANSI C63.4

**Environmental Conditions:**

<b>Temperature (°C):</b>	21
<b>Relative Humidity (%):</b>	41

**Results: Live / Quasi Peak**

Frequency (MHz)	Line	Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.479	Live	42.3	56.4	14.1	Complied
2.558	Live	34.6	56.0	21.4	Complied
4.259	Live	36.0	56.0	20.0	Complied
4.493	Live	37.9	56.0	18.1	Complied
5.325	Live	36.5	60.0	23.5	Complied
5.694	Live	36.2	60.0	23.8	Complied

**Results: Live / Average**

Frequency (MHz)	Line	Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.474	Live	35.9	46.4	10.5	Complied
2.832	Live	33.4	46.0	12.6	Complied
4.335	Live	28.8	46.0	17.2	Complied
4.515	Live	30.6	46.0	15.4	Complied
5.357	Live	29.4	50.0	20.6	Complied
5.681	Live	29.9	50.0	20.1	Complied

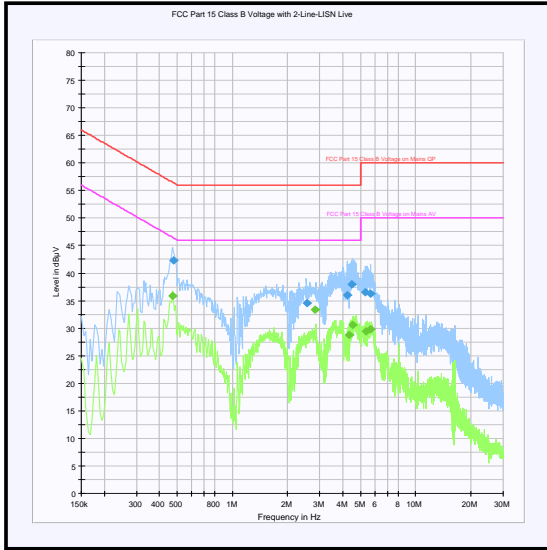
**Receiver/Idle Mode AC Conducted Spurious Emissions (continued)****Results: Neutral / Quasi Peak**

Frequency (MHz)	Line	Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.209	Neutral	34.6	63.3	28.7	Complied
2.004	Neutral	22.1	56.0	33.9	Complied
2.526	Neutral	23.7	56.0	32.3	Complied
3.539	Neutral	28.8	56.0	27.2	Complied
4.812	Neutral	36.7	56.0	19.3	Complied
5.240	Neutral	36.4	60.0	23.6	Complied
5.645	Neutral	36.2	60.0	23.8	Complied

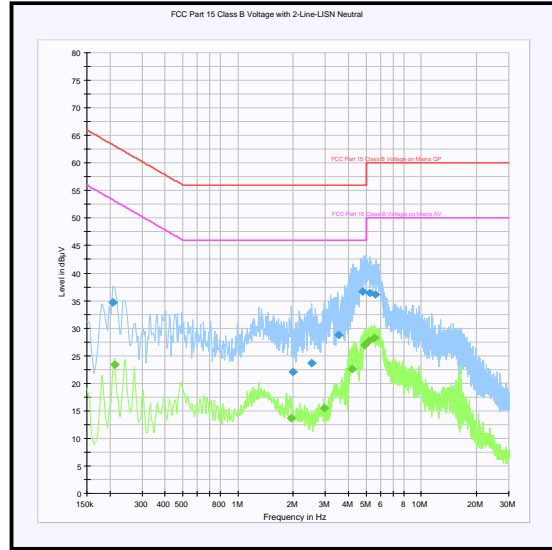
**Results: Neutral / Average**

Frequency (MHz)	Line	Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.213	Neutral	23.4	53.1	29.7	Complied
1.950	Neutral	13.6	46.0	32.4	Complied
2.949	Neutral	15.6	46.0	30.4	Complied
4.205	Neutral	22.6	46.0	23.4	Complied
4.920	Neutral	26.9	46.0	19.1	Complied
5.177	Neutral	27.7	50.0	22.3	Complied
5.573	Neutral	28.3	50.0	21.7	Complied

**Receiver/Idle Mode AC Conducted Spurious Emissions (continued)**



**Live**



**Neutral**

*Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.*

**Test Equipment Used:**

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
A649	LISN	Rohde & Schwarz	ESH3-Z5	825562/008	19 Feb 2013	12
A1830	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100668	25 Feb 2013	12
M1263	Test Receiver	Rohde & Schwarz	ESIB7	100265	09 Aug 2013	12

**5.2.2. Receiver/Idle Mode Radiated Spurious Emissions****Test Summary:**

<b>Test Engineer:</b>	Nick Steele	<b>Test Dates:</b>	11 November 2012 & 17 November 2012
<b>Test Sample IMEI:</b>	353740050011927		

<b>FCC Reference:</b>	Part 15.109
<b>Test Method Used:</b>	As detailed in ANSI C63.10 Sections 6.3, 6.4 and 6.5 referencing ANSI C63.4
<b>Frequency Range:</b>	9 kHz to 1000 MHz

**Environmental Conditions:**

<b>Temperature (°C):</b>	23 to 26
<b>Relative Humidity (%):</b>	33 to 34

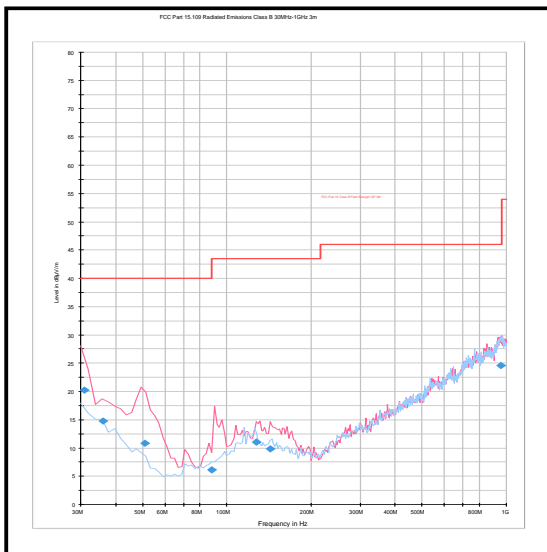
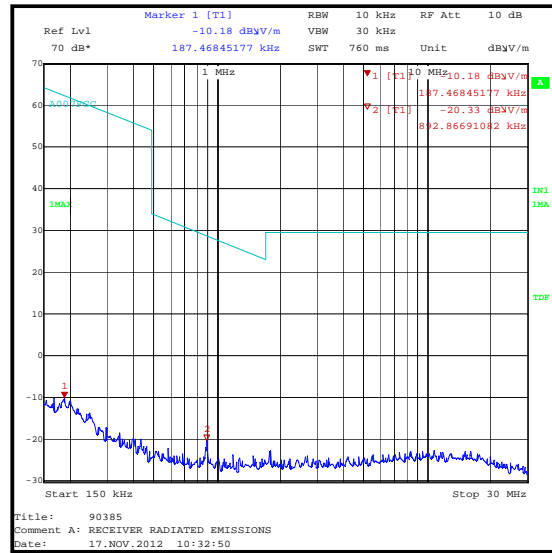
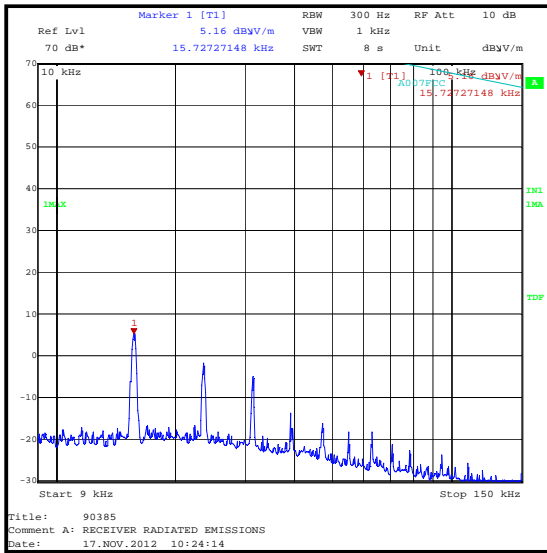
**Note(s):**

- Limits below 30 MHz are specified at a test distance of 30 metres, whilst below 0.49 MHz they are specified at a test distance of 300 metres. However, as specified by FCC Section 15.31 (f)(2), measurements may be performed at a closer distance and the measured level corrected to the specified measurement distance by using the square of an inverse linear distance extrapolation factor (40dB/decade).
- A transducer factor on the measuring instrument was used to extrapolate the results at 3 metres to a distance of 30 metres where required. A distance extrapolation factor of 40 dB was used.
- Final measurement values include corrections for antenna factor and cable losses.
- All emissions on the 9 kHz to 150 kHz plot were investigated and found to be radiating from the test site turntable.
- All other emissions shown on the pre-scan plots were investigated and found to be >20 dB below the applicable limit or below the measurement system noise floor.
- Measurements in the range 30 MHz to 1 GHz were performed in a semi-anechoic chamber (RFI Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres

**Results: Quasi Peak**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
30.986	Vertical	20.2	40.0	19.8	Complied
36.115	Vertical	14.8	40.0	25.2	Complied
50.848	Vertical	10.9	40.0	29.1	Complied
127.430	Vertical	11.1	43.5	32.4	Complied
142.693	Vertical	9.9	43.5	33.6	Complied
956.932	Vertical	24.6	46.0	21.4	Complied

### Receiver/Idle Mode Radiated Spurious Emissions (continued)



Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying table.

**Receiver/Idle Mode Radiated Spurious Emissions (continued)****Test Equipment Used:**

<b>RFI 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>
A1834	Attenuator	Hewlett Packard	8491B	10444	29 Jan 2013	12
A553	Antenna	Chase	CBL6111A	1593	15 Feb 2013	12
G0543	Amplifier	Sonoma	310N	230801	02 Jan 2013	3
K0001	5m RSE Chamber	Rainford EMC	N/A	N/A	24 Oct 2013	12
M1273	Test Receiver	Rohde & Schwarz	ESIB 26	100275	03 Feb 2013	12
A007	Mag Loop Antenna	Rohde & Schwarz	HFH2-Z2	880 458/020	20 Apr 2013	12



**5.2.3. Transmitter AC Conducted Spurious Emissions****Test Summary:**

<b>Test Engineer:</b>	Nick Steele	<b>Test Date:</b>	21 November 2012
<b>Test Sample IMEI:</b>	353740050011927		

<b>FCC Reference:</b>	Part 15.207
<b>Test Method Used:</b>	As detailed in ANSI C63.10 Section 6.2 referencing ANSI C63.4

**Environmental Conditions:**

<b>Temperature (°C):</b>	19
<b>Relative Humidity (%):</b>	46

**Results: Live / Quasi Peak**

Frequency (MHz)	Line	Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.150	Live	58.2	66.0	7.8	Complied
0.213	Live	54.6	63.1	8.5	Complied
0.227	Live	53.9	62.6	8.7	Complied
0.245	Live	53.3	61.9	8.6	Complied
0.254	Live	52.7	61.6	8.9	Complied
0.267	Live	52.2	61.2	9.0	Complied
0.290	Live	50.9	60.5	9.6	Complied
0.303	Live	50.6	60.2	9.6	Complied
0.330	Live	49.4	59.5	10.1	Complied
0.425	Live	46.8	57.4	10.6	Complied
13.560	Live	48.5	60.0	11.5	Complied

**Results: Live / Average**

Frequency (MHz)	Line	Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.204	Live	30.6	53.4	22.8	Complied
0.254	Live	28.9	51.6	22.7	Complied
0.308	Live	28.6	50.0	21.4	Complied
0.465	Live	28.4	46.6	18.2	Complied
4.578	Live	28.2	46.0	17.8	Complied
13.560	Live	47.1	50.0	2.9	Complied

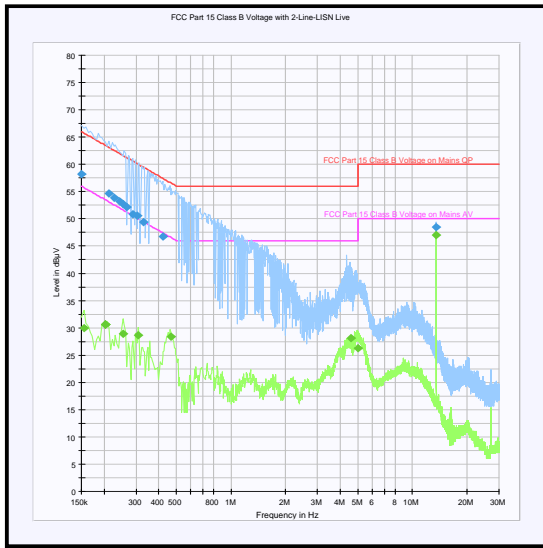
**Transmitter AC Conducted Spurious Emissions (continued)****Results: Neutral / Quasi Peak**

Frequency (MHz)	Line	Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.159	Neutral	55.5	65.5	10.0	Complied
0.245	Neutral	51.5	61.9	10.4	Complied
0.416	Neutral	45.1	57.5	12.4	Complied
0.731	Neutral	38.5	56.0	17.5	Complied
1.275	Neutral	33.6	56.0	22.4	Complied
4.673	Neutral	33.4	56.0	22.6	Complied
4.920	Neutral	34.7	56.0	21.3	Complied
13.560	Neutral	48.9	60.0	11.1	Complied

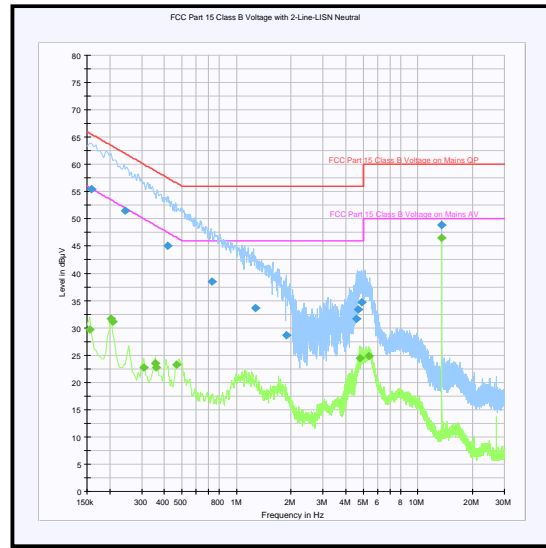
**Results: Neutral / Average**

Frequency (MHz)	Line	Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.204	Neutral	31.6	53.4	21.8	Complied
0.209	Neutral	31.1	53.3	22.2	Complied
0.470	Neutral	23.2	46.5	23.3	Complied
4.821	Neutral	24.4	46.0	21.6	Complied
5.361	Neutral	24.9	50.0	25.1	Complied
13.560	Neutral	46.5	50.0	3.5	Complied

**Transmitter AC Conducted Spurious Emissions (continued)**



**Live**



**Neutral**

*Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.*

**Test Equipment Used:**

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
A649	LISN	Rohde & Schwarz	ESH3-Z5	825562/008	19 Feb 2013	12
A1830	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100668	25 Feb 2013	12
M1263	Test Receiver	Rohde & Schwarz	ESIB7	100265	09 Aug 2013	12

**5.2.4. Transmitter Fundamental Field Strength**

**Test Summary:**

<b>Test Engineer:</b>	Nick Steele	<b>Test Date:</b>	17 November 2012
<b>Test Sample IMEI:</b>	353740050011927		

<b>FCC Reference:</b>	Part 15.225(a)(b)(c)(d)
<b>Test Method Used:</b>	ANSI C63.10 Section 6.4

**Environmental Conditions:**

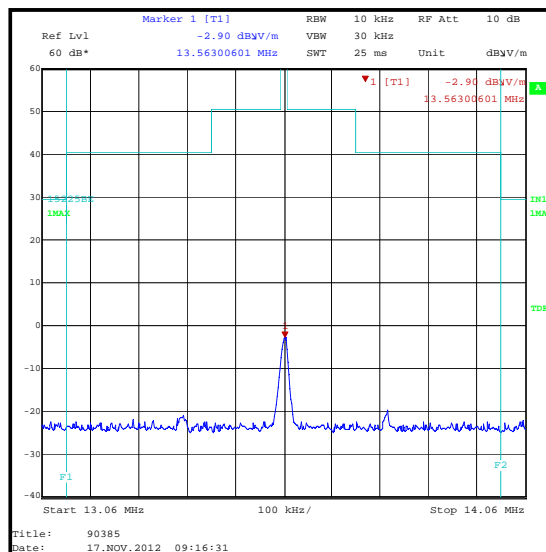
<b>Temperature (°C):</b>	26
<b>Relative Humidity (%):</b>	34

**Note(s):**

1. The limit is specified at a test distance of 30 metres. However, as specified by FCC Section 15.31 (f)(2), measurements may be performed at a closer distance and the measured level corrected to the specified measurement distance by using the square of an inverse linear distance extrapolation factor (40dB/decade).
2. A transducer factor on the measuring instrument was used to extrapolate the results at 3 metres to a distance of 30 metres. A distance extrapolation factor of 40 dB was used.
3. Pre-scans were performed with a peak detector. Final measurements were performed with a quasi-peak detector.

**Results: Quasi Peak**

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit at 30 m (dBµV/m)	Margin (dB)	Result
13.56	90° to EUT	-2.9	84.0	86.9	Complied



**Transmitter Fundamental Field Strength (continued)****Test Equipment Used:**

<b>RFI 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>
K0001	5m RSE Chamber	Rainford	N/A	N/A	24 Oct 2013	12
A007	Mag Loop Antenna	Rohde & Schwarz	HFH2-Z2	880 458/020	20 Apr 2013	12
M1273	Test Receiver	Rohde & Schwarz	ESIB 26	1000275	03 Feb 2013	12

**5.2.5. Transmitter Radiated Spurious Emissions****Test Summary:**

<b>Test Engineer:</b>	Nick Steele	<b>Test Date:</b>	17 November 2012
<b>Test Sample IMEI:</b>	353740050011927		

<b>FCC Reference:</b>	Parts 15.225(d) & 15.209(a)
<b>Test Method Used:</b>	As detailed in ANSI C63.10 Sections 6.3, 6.4 and 6.5 referencing ANSI C63.4
<b>Frequency Range:</b>	9 kHz to 1000 MHz

**Environmental Conditions:**

<b>Temperature (°C):</b>	26
<b>Relative Humidity (%):</b>	34

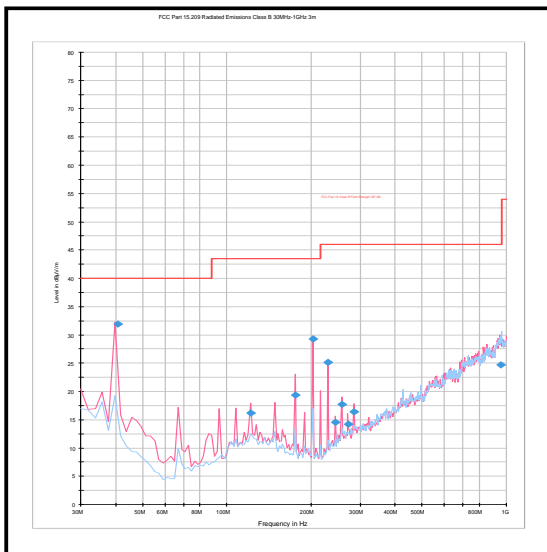
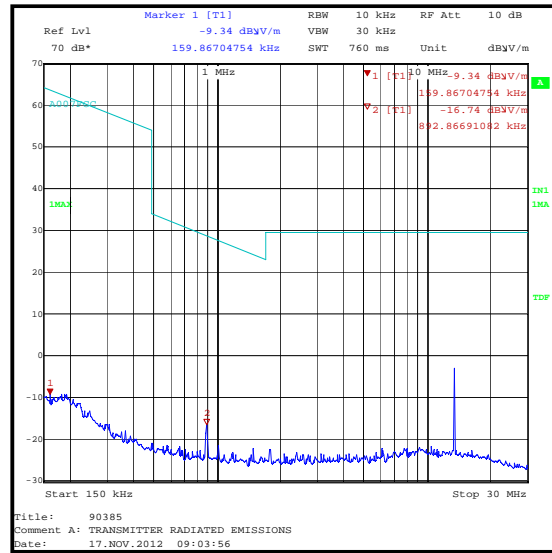
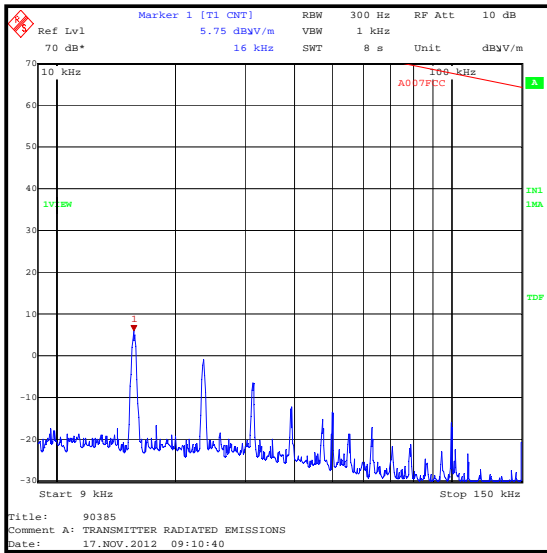
**Note(s):**

- Limits below 30 MHz are specified at a test distance of 30 metres, whilst below 0.49 MHz they are specified at a test distance of 300 metres. However, as specified by FCC Section 15.31 (f)(2), measurements may be performed at a closer distance and the measured level corrected to the specified measurement distance by using the square of an inverse linear distance extrapolation factor (40dB/decade).
- A transducer factor on the measuring instrument was used to extrapolate the results at 3 metres to a distance of 30 metres where required. A distance extrapolation factor of 40 dB was used.
- Final measurement values include corrections for antenna factor and cable losses.
- The emission shown at approximately 13.56 MHz is the fundamental.
- All emissions on the 9 kHz to 150 kHz plot were investigated and found to be radiating from the test site turntable.
- All other emissions shown on the pre-scan plots were investigated and found to be >20 dB below the applicable limit or below the measurement system noise floor.
- Measurements in the range 30 MHz to 1 GHz were performed in a semi-anechoic chamber (RFI Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.

**Results: Quasi Peak**

Frequency (MHz)	Antenna Polarity	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
244.092	Vertical	14.5	46.0	31.5	Complied
257.622	Vertical	17.7	46.0	28.3	Complied
271.210	Vertical	14.2	46.0	31.8	Complied
284.741	Vertical	16.4	46.0	29.6	Complied

**Transmitter Radiated Spurious Emissions (continued)**



Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying table.

**Test Equipment Used:**

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
K0001	5m RSE Chamber	Rainford	N/A	N/A	24 Oct 2013	12
A007	Mag Loop Antenna	Rohde & Schwarz	HFH2-Z2	880 458/020	20 Apr 2013	12
M1273	Test Receiver	Rohde & Schwarz	ESIB 26	1000275	03 Feb 2013	12
A1834	Attenuator	Hewlett Packard	8491B	10444	29 Jan 2013	12
A553	Antenna	Chase	CBL6111A	1593	15 Feb 2013	12
G0543	Amplifier	Sonoma	310N	230801	02 Jan 2013	3

**5.2.6. Transmitter Band Edge Radiated Emissions**

**Test Summary:**

<b>Test Engineer:</b>	Nick Steele	<b>Test Date:</b>	17 November 2012
<b>Test Sample IMEI:</b>	353740050011927		

<b>FCC Reference:</b>	Parts 15.225(c)(d) & 15.209(a)
<b>Test Method Used:</b>	As detailed in ANSI C63.10 Section 6.9.2

**Environmental Conditions:**

<b>Temperature (°C):</b>	26
<b>Relative Humidity (%):</b>	34

**Note(s):**

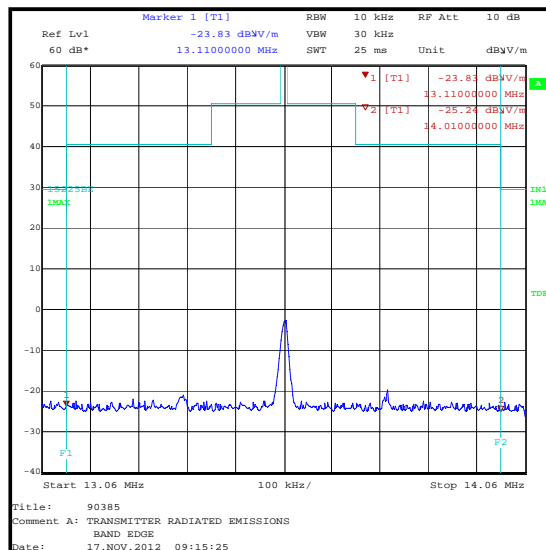
1. A transducer factor on the measuring instrument was used to extrapolate the results at 3 metres to a distance of 30 metres where required. A distance extrapolation factor of 40 dB was used.

**Results: Quasi Peak / Lower Band Edge**

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
13.11	-23.8	29.5	53.3	Complied

**Results: Quasi Peak / Upper Band Edge**

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
14.01	-25.2	29.5	54.7	Complied





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

<b>RFI 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>
K0001	5m RSE Chamber	Rainford	N/A	N/A	24 Oct 2013	12
A007	Mag Loop Antenna	Rohde & Schwarz	HFH2-Z2	880 458/020	20 Apr 2013	12
M1273	Test Receiver	Rohde & Schwarz	ESIB 26	1000275	03 Feb 2013	12

**5.2.7. Transmitter 20 dB Bandwidth**

**Test Summary:**

<b>Test Engineer:</b>	Andrew Edwards	<b>Test Date:</b>	27 November 2012
<b>Test Sample IMEI:</b>	353740050011927		

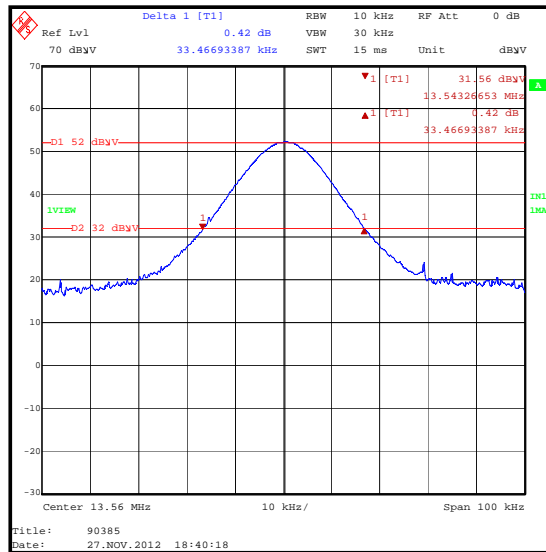
<b>FCC Reference:</b>	Part 2.1049
<b>Test Method Used:</b>	As detailed in ANSI C63.10 Section 6.9.1

**Environmental Conditions:**

<b>Temperature (°C):</b>	23
<b>Relative Humidity (%):</b>	34

**Results:**

<b>20 dB Bandwidth (kHz)</b>
33.467



**Test Equipment Used:**

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1124	Test Receiver	Rohde & Schwarz	ESIB 26	100046K	14 Aug 2013	12

**5.2.8. Transmitter Frequency Stability (Temperature & Voltage Variation)****Test Summary:**

<b>Test Engineer:</b>	Andrew Edwards	<b>Test Date:</b>	28 November 2012
<b>Test Sample IMEI:</b>	353740050011927		

<b>FCC Reference:</b>	Part 15.225(e)
<b>Test Method Used:</b>	As detailed in ANSI C63.10 Section 6.8.1 and 6.8.2

**Environmental Conditions:**

<b>Temperature (°C):</b>	23
<b>Relative Humidity (%):</b>	32

**Results: Maximum frequency error of the EUT with variations in ambient temperature**

Temperature (°C)	Time after Start-up			
	0 minutes	2 minutes	5 minutes	10 minutes
-20	13.560249 MHz	13.560251 MHz	13.560251 MHz	13.560250 MHz
20	13.560126 MHz	13.560121 MHz	13.560119 MHz	13.560118 MHz
50	13.559980 MHz	13.559974 MHz	13.559971 MHz	13.559970 MHz

Frequency with Worst Case Deviation (MHz)	Frequency Error (Hz)	Frequency Error (%)	Limit (%)	Margin (%)	Result
13.560251	251	0.001851	0.01	0.008149	Complied

**Results: Maximum frequency error of the EUT with variations in nominal operating voltage at an ambient temperature of 20°C**

Supply Voltage (VDC)	Nominal Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (%)	Limit (%)	Margin (%)	Result
3.4	13.56	13.560111	111	0.000819	0.01	0.009181	Complied
3.7	13.56	13.560126	126	0.000929	0.01	0.009071	Complied
4.2	13.56	13.560117	117	0.000863	0.01	0.009137	Complied

**Transmitter Frequency Stability (Temperature & Voltage Variation) (continued)****Test Equipment Used:**

<b>RFI 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>
E013	Environmental Chamber	Sanyo	MTH-4200PR	N/A	Calibrated before use	-
G088	DC power supply	Thurlby Thandar	CPX200	100700	Calibrated before use	-
M1269	Multimeter	Fluke	179	90250210	30 Jul 2013	12
M1379	Test Receiver	Rohde & Schwarz	ESIB7	100330	15 Oct 2013	12
M1642	Thermometer	Fluke	52II	18890119	21 Feb 2013	12

## **6. 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>
AC Conducted Spurious Emissions	0.15 MHz to 30 MHz	95%	±3.25 dB
20 dB Bandwidth	13 MHz to 14 MHz	95%	±0.92 ppm
Frequency Stability	13 MHz to 14 MHz	95%	±0.92 ppm
Radiated Spurious Emissions	9 kHz to 30 MHz	95%	±3.53 dB
Radiated Spurious Emissions	30 MHz to 1000 MHz	95%	±2.94 dB
Transmitter Fundamental Field Strength	13 MHz to 14 MHz	95%	±3.53 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.

## **7. Report Revision History**

Version Number	Revision Details		
	Page No(s)	Clause	Details
1.0	-	-	Initial Version