



# TEST REPORT

**Test Report No. : UL-RPT-RP10295085JD04G V2.0**

**Manufacturer** : Sony Mobile Communications Inc.  
**FCC ID** : PY7PM-0800  
**Technology** : LTE Band 13  
**Test Standard(s)** : FCC Part 27 Subpart C

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:** 01 August 2014

**Checked by:**   
Sarah Williams  
Engineer, Radio Laboratory

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



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

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## UL VS LTD

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**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	5
2.3. Methods and Procedures	5
2.4. Deviations from the Test Specification	5
<b>3. Equipment Under Test (EUT) .....</b>	<b>6</b>
3.1. Identification of Equipment Under Test (EUT)	6
3.2. Description of EUT	7
3.3. Modifications Incorporated in the EUT	7
3.4. Additional Information Related to Testing	8
3.5. Support Equipment	8
<b>4. Operation and Monitoring of the EUT during Testing .....</b>	<b>9</b>
4.1. Operating Modes	9
4.2. Configuration and Peripherals	9
4.3. Resource Block Allocation	10
<b>5. Measurements, Examinations and Derived Results.....</b>	<b>11</b>
5.1. General Comments	11
5.2. Test Results	12
5.2.1. Transmitter Output Power (ERP)	12
5.2.2. Transmitter Occupied Bandwidth	22
5.2.3. Transmitter Radiated Spurious Emissions	31
5.2.4. Transmitter Radiated Spurious Emissions Limitations	34
5.2.5. Transmitter Radiated Emissions at Band Edges	44
5.2.6. Transmitter Frequency Stability (Temperature Variation)	49
5.2.7. Transmitter Frequency Stability (Voltage Variation)	51
<b>6. Measurement Uncertainty .....</b>	<b>53</b>
<b>7. Report Revision History .....</b>	<b>54</b>

**1. Customer Information**

<b>Company Name:</b>	Sony Mobile Communications Inc.
<b>Address:</b>	Nya Vattentornet Mobilvägen 10 Lund 22188 Sweden

## **2. Summary of Testing**

### **2.1. General Information**

<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>	209735
<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>	03 June 2014 to 07 June 2014

### **2.2. Summary of Test Results**

<b>FCC Reference (47CFR)</b>	<b>Measurement</b>	<b>Result</b>
2.1046 / 27.50(b)(10)	Transmitter Output Power (ERP)	
2.1049	Transmitter Occupied Bandwidth	
2.1053 / 27.53(c)(2)	Transmitter Radiated Spurious Emissions	
2.1053 / 27.53(c)(4) & 27.53(e)	Transmitter Radiated Spurious Emissions Limitations	
2.1053 / 27.53(c)(2)	Transmitter Radiated Emissions at Band Edges	
2.1055 / 27.54	Transmitter Frequency Stability (Temperature and Voltage Variation)	
Key to Results  = Complied  = Did not comply		

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

<b>Reference:</b>	ANSI/TIA-603-C-2004
<b>Title:</b>	Land Mobile Communications Equipment, Measurements and performance Standards
<b>Reference:</b>	FCC KDB 971168 D01 v02r01, 7 June 2013
<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>	Sony
<b>IMEI:</b>	004402452705555 ( <i>Radiated sample #1</i> )
<b>Test Sample Serial Number:</b>	CB5A1YYLUK
<b>Hardware Version Number:</b>	A
<b>Software Version Number:</b>	23.0.A.0.204
<b>FCC ID:</b>	PY7PM-0800

<b>Brand Name:</b>	Sony
<b>IMEI:</b>	004402452705522 ( <i>Radiated sample #2</i> )
<b>Test Sample Serial Number:</b>	CB5A1YYLU6
<b>Hardware Version Number:</b>	A
<b>Software Version Number:</b>	23.0.A.0.204
<b>FCC ID:</b>	PY7PM-0800

<b>Brand Name:</b>	Sony
<b>IMEI:</b>	004402452705639 ( <i>Conducted sample with RF port #1</i> )
<b>Test Sample Serial Number:</b>	CB5A1YYLTX
<b>Hardware Version Number:</b>	A
<b>Software Version Number:</b>	23.0.A.0.204
<b>FCC ID:</b>	PY7PM-0800

<b>Brand Name:</b>	Sony
<b>IMEI:</b>	004402452705654 ( <i>Conducted sample with RF port #2</i> )
<b>Test Sample Serial Number:</b>	CB5A1YYLVS
<b>Hardware Version Number:</b>	A
<b>Software Version Number:</b>	23.0.A.0.204
<b>FCC ID:</b>	PY7PM-0800

<b>Brand Name:</b>	Sony
<b>Description:</b>	AC Charger
<b>Model Name or Number:</b>	EP880

<b>Brand Name:</b>	Generic
<b>Description:</b>	MHL Cable
<b>Model Name or Number:</b>	Not marked

**Identification of Equipment Under Test (EUT) (continue)**

<b>Brand Name:</b>	Sony
<b>Description:</b>	MHL Adaptor
<b>Model Name or Number:</b>	IM750

<b>Brand Name:</b>	Sony
<b>Description:</b>	USB Cable
<b>Model Name or Number:</b>	EC803

<b>Brand Name:</b>	Sony
<b>Description:</b>	Deskstand
<b>Model Name or Number:</b>	DK43

<b>Brand Name:</b>	Sony
<b>Description:</b>	PHF
<b>Model Name or Number:</b>	MH410c

**3.2. Description of EUT**

The equipment under test (EUT) was a GSM/WCDMA/LTE Phone + Bluetooth, DTS/UNII a/b/g/n/ac + NFC & ANT+.

**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>	LTE Band 13		
<b>Type of Equipment</b>	Transceiver		
<b>Channel Bandwidth:</b>	5 MHz & 10 MHz		
<b>Modulation Type:</b>	QPSK & 16QAM		
<b>Duty Cycle:</b>	100%		
<b>Antenna Gain:</b>	-3.75 dBd		
<b>Power Supply Requirement:</b>	Nominal	3.8 V	
	Minimum	3.42 V	
	Maximum	4.18 V	
<b>Transmit Frequency Range:</b>	777 MHz to 787 MHz		
<b>Channels Tested:</b>	<b>Channel Bandwidth</b>	<b>N<sub>ul</sub></b>	<b>Frequency of Uplink (MHz)</b>
<b>Bottom Channel</b>	5	23205	779.5
<b>Middle Channel</b>	5	23230	782.0
	10	23230	782.0
<b>Top Channel</b>	5	23255	784.5

**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>	Logik
<b>Description:</b>	22" High Definition Television
<b>Model Name or Number:</b>	L22FE12A
<b>Serial Number:</b>	1309020661

<b>Description:</b>	Voltage variation jig
<b>Brand Name:</b>	Not marked
<b>Model Name or Number:</b>	Not marked
<b>Serial Number:</b>	Not marked

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

### **4.1. Operating Modes**

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

- Transmit Mode – The EUT was set to transmit with maximum output power using the required channel bandwidth. QPSK and 16QAM modulations were both tested, with Resource Block allocation as detailed in section 4.3.

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

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

- The EUT was connected to a Rohde and Schwarz CMW500 LTE system simulator, operating in a transceiver mode.
- Transmitter radiated spurious emission tests were performed with the following configurations, employing all available accessories:
  - Configuration 1 – Handset with the AC charger, USB Cable, MHL cable (terminated in to a television), MHL adaptor and PHF.
  - Configuration 2 – Handset with the AC charger, USB Cable, Deskstand and PHF.

Pre-scans below 1 GHz were performed in both configurations 1 and 2, with final measurements limited to the configuration which provided worst case results. Pre-scans above 1 GHz were performed in the configuration that employed the most accessories (Configuration 1), with any final measurements being performed in both configurations.

- Transmitter radiated spurious emissions tests were performed with the EUT set to transmit with a 5 MHz channel bandwidth with QPSK modulation applied and 1 resource block with 24 offset. This was found to be the worst case modulation scheme with regards to emissions after preliminary investigations and, as this mode emits the highest transmit output power level, it was deemed to be the worst case.
- The EUT was supplied with an RF conducted port and external RF connector, to allow conducted measurements to be performed where necessary.
- Testing at temperature and voltage extremes was performed using a voltage variation jig and adaptor supplied by the customer. The adaptor plugs onto the handset in place of the battery connector.
- The voltage variation jig and adaptor were used for conducted measurements set at the nominal voltage.
- The conducted sample with IMEI 004402452705654 was used for frequency stability measurements.
- The conducted sample with IMEI 004402452705639 was used for average power and occupied bandwidth measurements.
- The radiated sample with IMEI 004402452705522 was used for transmitter radiated emissions measurements < 1 GHz.
- The radiated sample with IMEI 004402452705555 was used for all other radiated measurements.

### **4.3. Resource Block Allocation**

Channel Bandwidth (MHz)	Maximum No. of Resource Blocks	Resource Block / Offset Number							
		Sub Test 1		Sub Test 2		Sub Test 3		Sub Test 4	
		RB	Offset	RB	Offset	RB	Offset	RB	Offset
5	25	1	0	1	24	12	6	25	0
10	50	1	0	1	49	25	12	50	0

Transmitter Output Power was carried out using sub tests 1, 2, 3 and 4, with both QPSK and 16QAM modulation schemes.

Transmitter Occupied Bandwidth was carried out using sub tests 3 and 4, for both QPSK and 16QAM modulation schemes.

Transmitter Radiated Emissions testing was carried out using sub test 2, with a 5 MHz channel bandwidth and QPSK modulation scheme, as this was found to be the worst case modulation scheme with regards to emissions after preliminary investigations and, as this mode emits the highest transmit output power level, it was deemed to be the worst case.

Transmitter Radiated Band Edge Emissions was tested with sub test 4 on all supported channel bandwidths, using QPSK and 16QAM modulations with the maximum resource blocks settings.

Transmitter Frequency Stability test was carried out with sub test 4, with a channel bandwidth of 5 MHz only.

## **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* for Measurement Uncertainty 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. Transmitter Output Power (ERP)**

#### **Test Summary:**

<b>Test Engineer:</b>	Ben Mercer	<b>Test Date:</b>	03 June 2014
<b>Test Sample IMEI:</b>	004402452705639		

<b>FCC Reference:</b>	Parts 2.1046 & 27.50(b)(10)
<b>Test Method Used:</b>	As detailed in FCC KDB 971168 Section 5.2.1

#### **Environmental Conditions:**

<b>Temperature (°C):</b>	23 to 24
<b>Relative Humidity (%):</b>	40 to 41

#### **Note(s):**

1. The customer stated a maximum antenna gain of -1.6 dBi. As the limit is ERP the gain in dBi has been converted. The dBd has been calculated as follows.

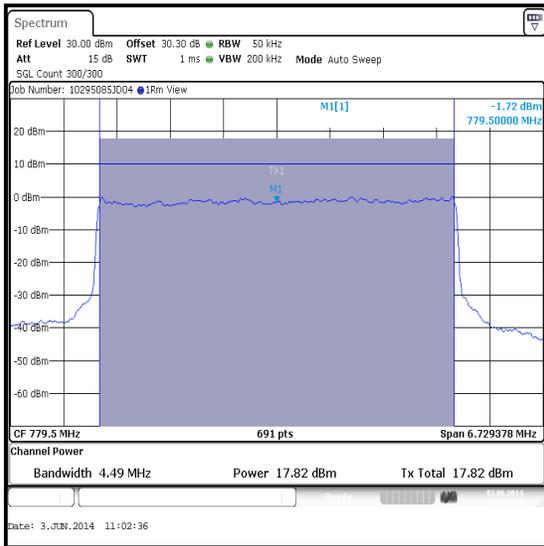
$$-1.6 \text{ dBi} - 2.15 \text{ dB} = -3.75 \text{ dBd}$$

2. Measurements were performed with the EUT transmitting with QPSK and 16QAM modulation schemes, with resource blocks settings as detailed in section 4.3 of this report.
3. The spectrum analyser's channel power function was used to integrate across the occupied bandwidth. The resolution bandwidth was set to between 1-5% of the occupied bandwidth and the video bandwidth was set to at least 3 times the resolution bandwidth. An RMS detector was used, sweep time was set to auto and the trace was averaged over 300 traces. The span was set to at least 1.5 times the occupied bandwidth. The channel power results are recorded in the tables below.
4. The RF port of the EUT was connected to the spectrum analyser via RF cables, directional coupler and suitable attenuation. An RF level offset was entered on the spectrum analyser, to compensate for the signal path losses in these components.

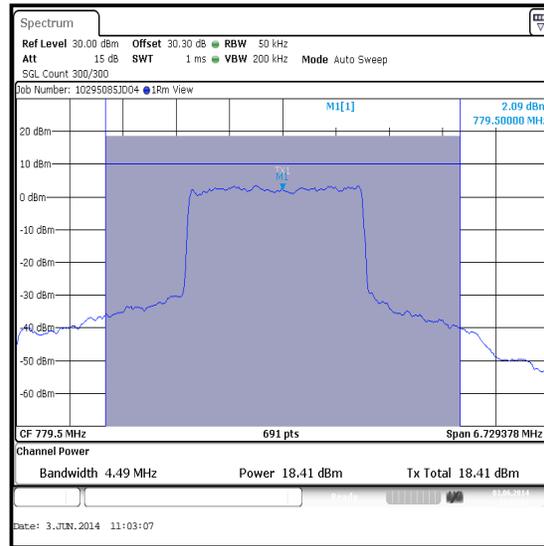
**Transmitter Output Power (ERP) (continued)**

**Results: 5 MHz Channel Bandwidth / Bottom Channel / QPSK**

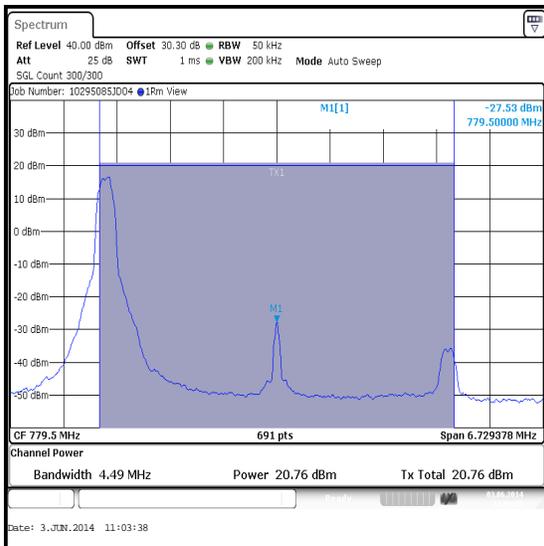
Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBd)	ERP (dBm)	ERP Limit (dBm)	Margin (dB)	Result
779.5	25	0	17.8	-3.75	14.05	34.8	20.75	Complied
779.5	12	6	18.4	-3.75	14.65	34.8	20.15	Complied
779.5	1	0	20.8	-3.75	17.05	34.8	17.75	Complied
779.5	1	24	21.2	-3.75	17.45	34.8	17.35	Complied



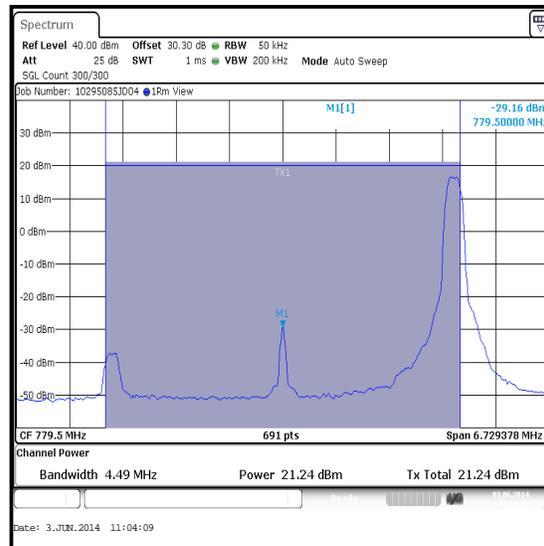
**QPSK / 25 Resource Blocks (0 Offset)**



**QPSK / 12 Resource Blocks (6 Offset)**



**QPSK / 1 Resource Block (0 Offset)**

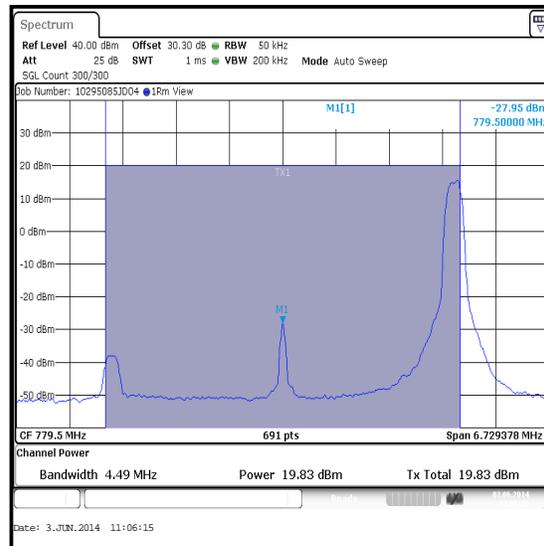
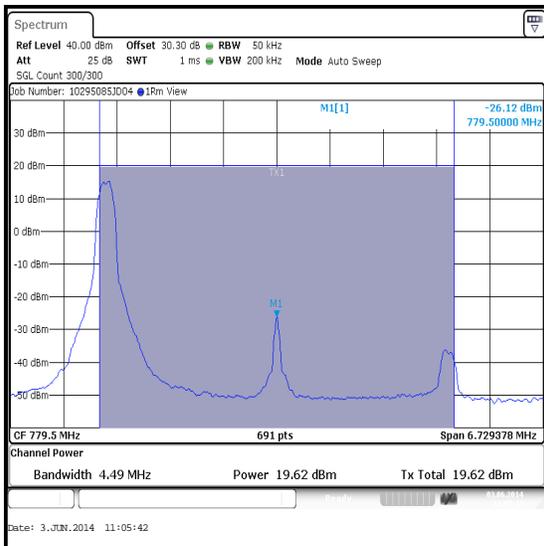
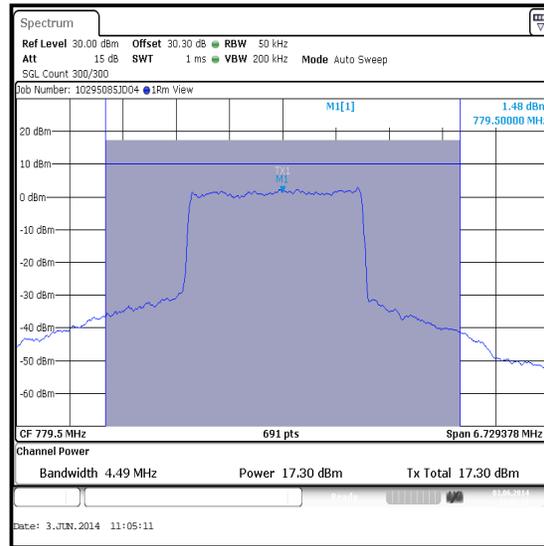
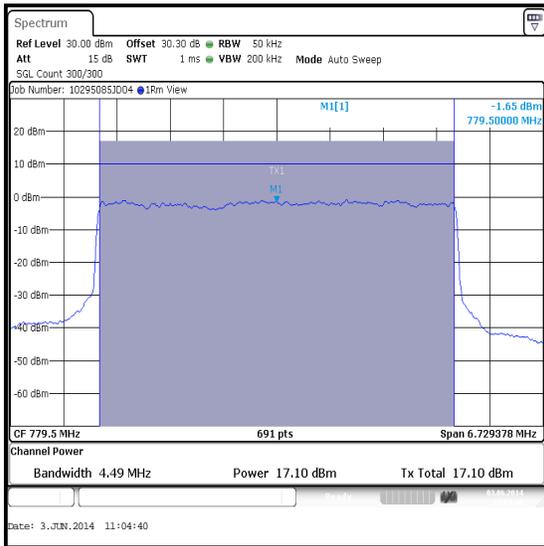


**QPSK / 1 Resource Block (24 Offset)**

**Transmitter Output Power (ERP) (continued)**

**Results: 5 MHz Channel Bandwidth / Bottom Channel / 16QAM**

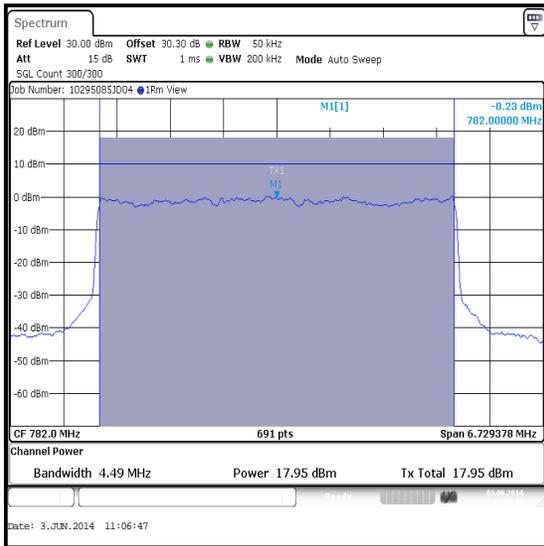
Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBd)	ERP (dBm)	ERP Limit (dBm)	Margin (dB)	Result
779.5	25	0	17.1	-3.75	13.35	34.8	21.45	Complied
779.5	12	6	17.3	-3.75	13.55	34.8	21.25	Complied
779.5	1	0	19.6	-3.75	15.85	34.8	18.95	Complied
779.5	1	24	19.8	-3.75	16.05	34.8	18.75	Complied



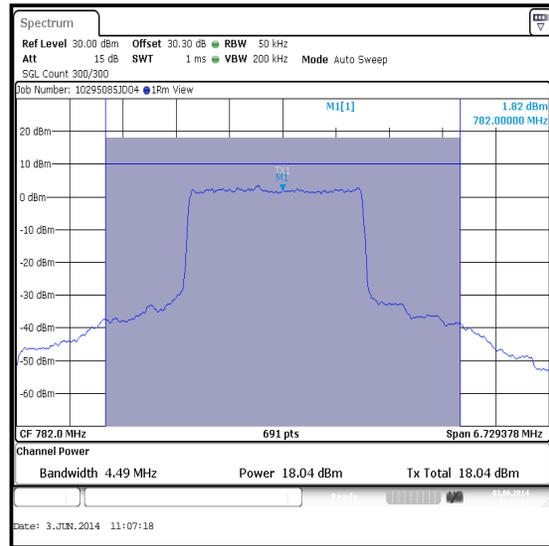
**Transmitter Output Power (ERP) (continued)**

**Results: 5 MHz Channel Bandwidth / Middle Channel / QPSK**

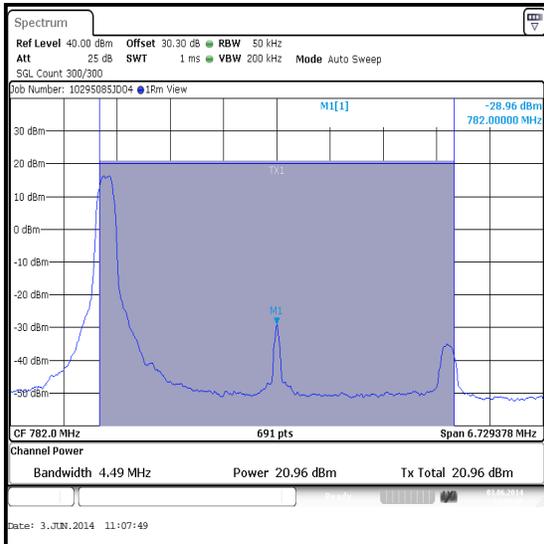
Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBd)	ERP (dBm)	ERP Limit (dBm)	Margin (dB)	Result
782.0	25	0	18.0	-3.75	14.25	34.8	20.55	Complied
782.0	12	6	18.0	-3.75	14.25	34.8	20.55	Complied
782.0	1	0	21.0	-3.75	17.25	34.8	17.55	Complied
782.0	1	24	21.1	-3.75	17.35	34.8	17.45	Complied



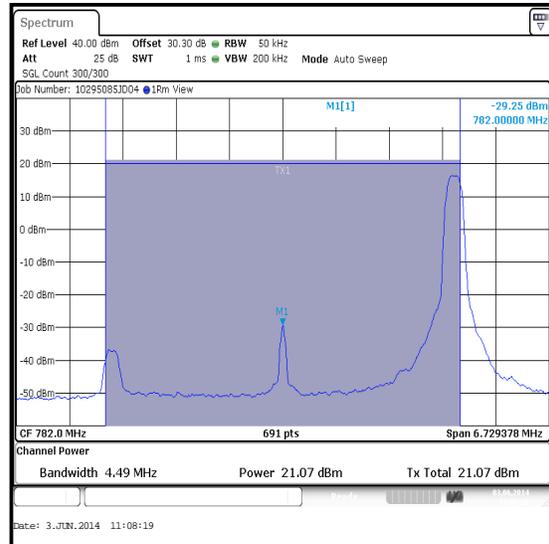
**QPSK / 25 Resource Blocks (0 Offset)**



**QPSK / 12 Resource Blocks (6 Offset)**



**QPSK / 1 Resource Block (0 Offset)**

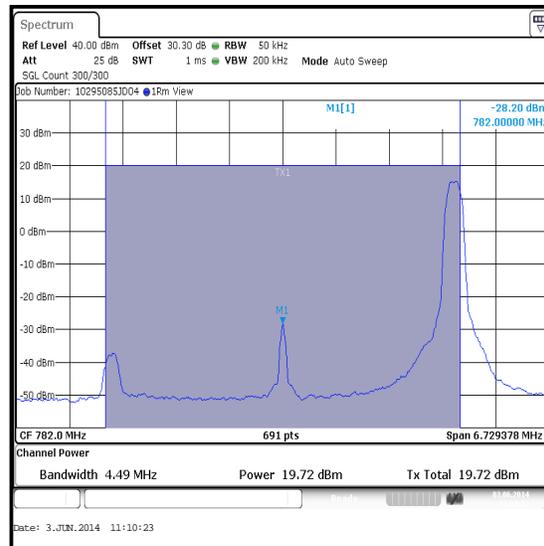
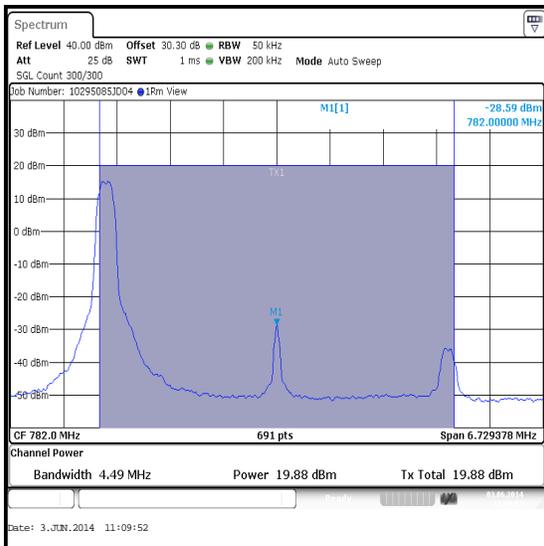
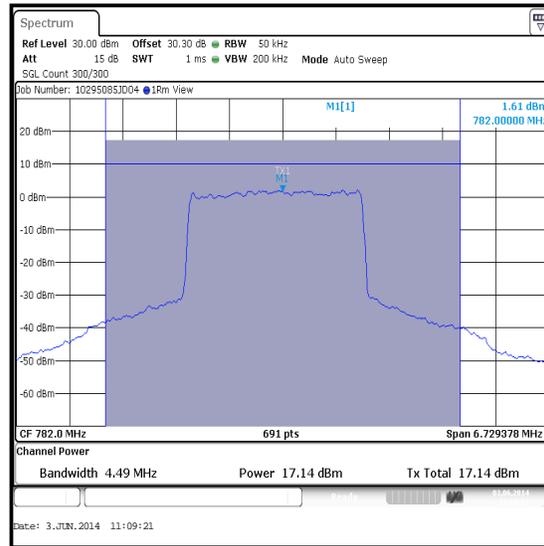
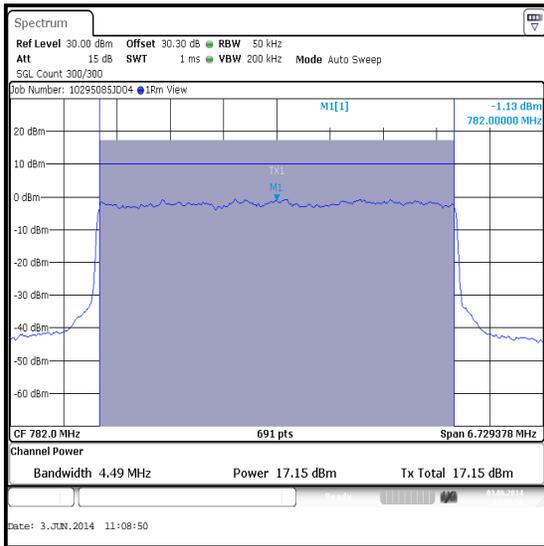


**QPSK / 1 Resource Block (24 Offset)**

**Transmitter Output Power (ERP) (continued)**

**Results: 5 MHz Channel Bandwidth / Middle Channel / 16QAM**

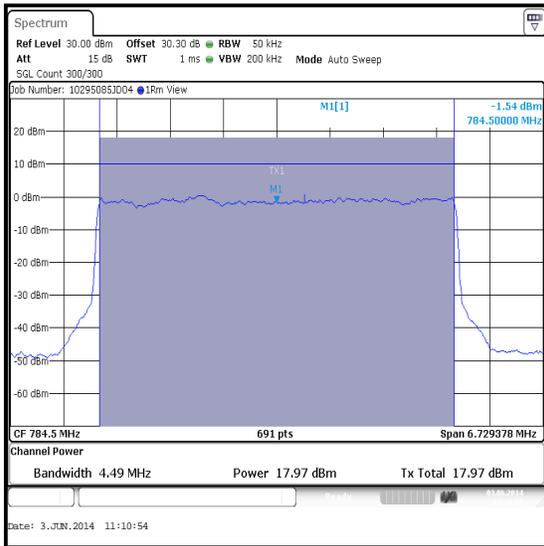
Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBd)	ERP (dBm)	ERP Limit (dBm)	Margin (dB)	Result
782.0	25	0	17.2	-3.75	13.45	34.8	21.35	Complied
782.0	12	6	17.1	-3.75	13.35	34.8	21.45	Complied
782.0	1	0	19.9	-3.75	16.15	34.8	18.65	Complied
782.0	1	24	19.7	-3.75	15.95	34.8	18.85	Complied



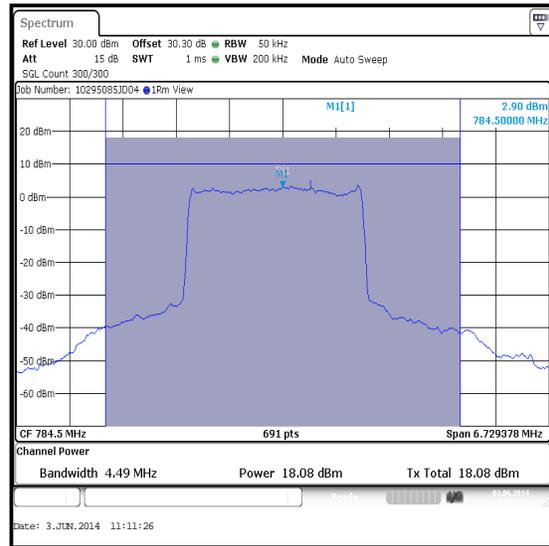
**Transmitter Output Power (ERP) (continued)**

**Results: 5 MHz Channel Bandwidth / Top Channel / QPSK**

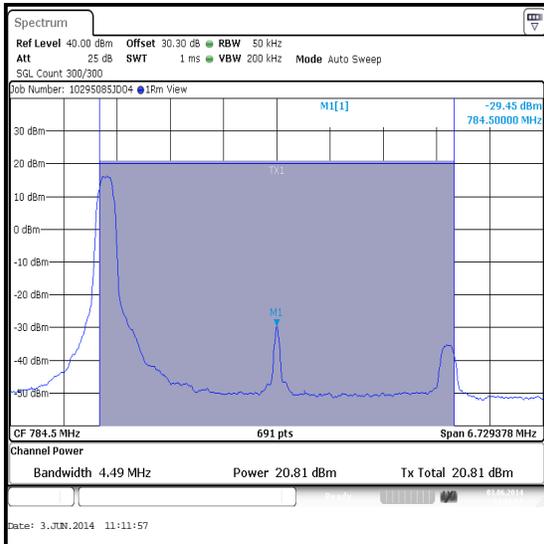
Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBd)	ERP (dBm)	ERP Limit (dBm)	Margin (dB)	Result
784.5	25	0	18.0	-3.75	14.25	34.8	20.55	Complied
784.5	12	6	18.1	-3.75	14.35	34.8	20.45	Complied
784.5	1	0	20.8	-3.75	17.05	34.8	17.75	Complied
784.5	1	24	20.9	-3.75	17.15	34.8	17.65	Complied



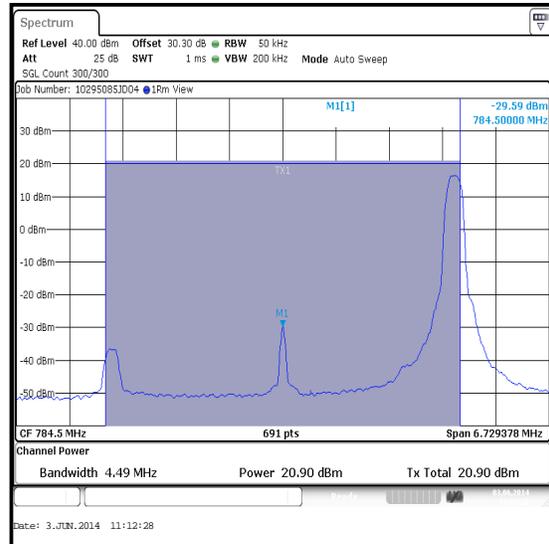
**QPSK / 25 Resource Blocks (0 Offset)**



**QPSK / 12 Resource Blocks (6 Offset)**



**QPSK / 1 Resource Block (0 Offset)**

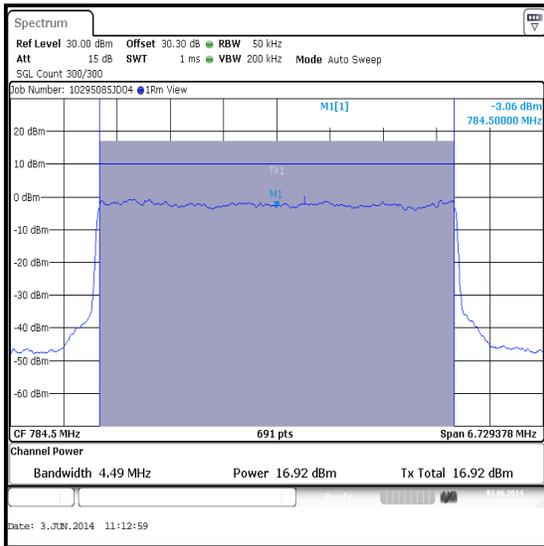


**QPSK / 1 Resource Block (24 Offset)**

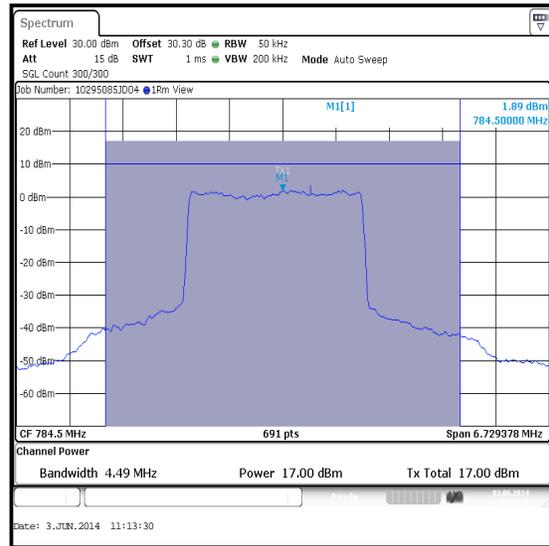
**Transmitter Output Power (ERP) (continued)**

**Results: 5 MHz Channel Bandwidth / Top Channel / 16QAM**

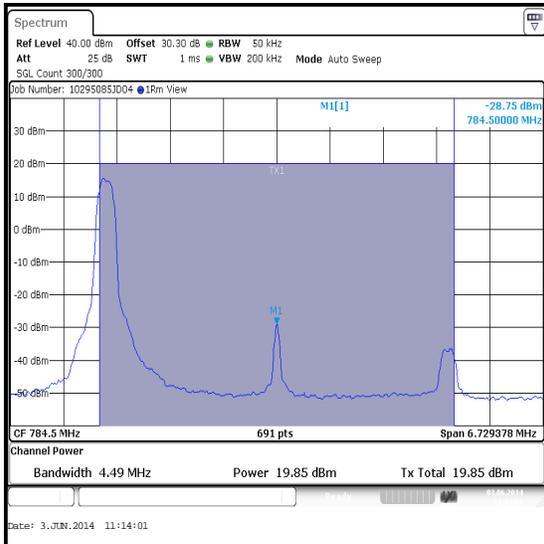
Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBd)	ERP (dBm)	ERP Limit (dBm)	Margin (dB)	Result
784.5	25	0	16.9	-3.75	13.15	34.8	21.65	Complied
784.5	12	6	17.0	-3.75	13.25	34.8	21.55	Complied
784.5	1	0	19.9	-3.75	16.15	34.8	18.65	Complied
784.5	1	24	19.8	-3.75	16.05	34.8	18.75	Complied



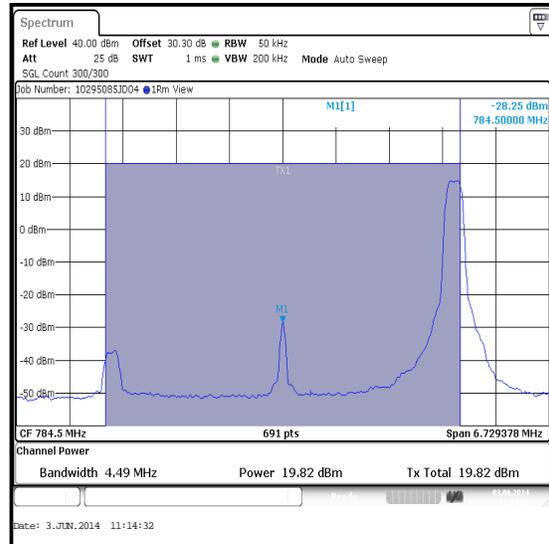
**16QAM / 25 Resource Blocks (0 Offset)**



**16QAM / 12 Resource Blocks (6 Offset)**



**16QAM / 1 Resource Block (0 Offset)**

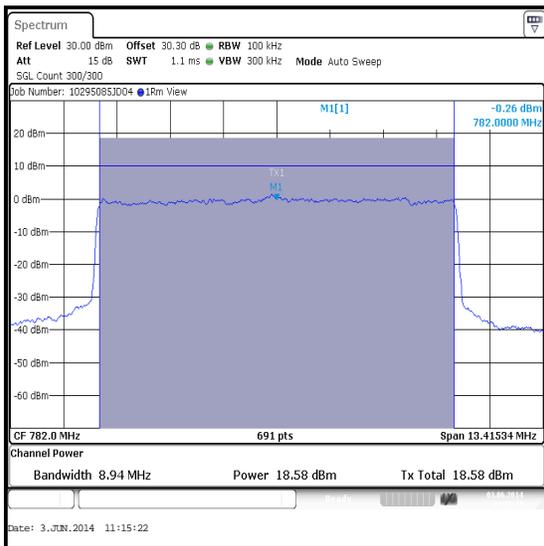


**16QAM / 1 Resource Block (24 Offset)**

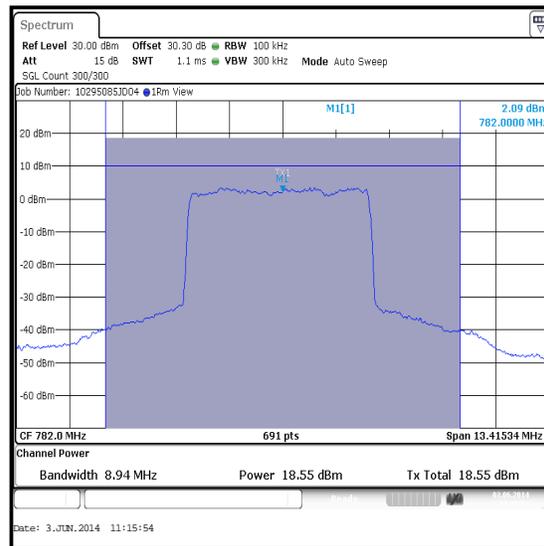
**Transmitter Output Power (ERP) (continued)**

**Results: 10 MHz Channel Bandwidth / Middle Channel / QPSK**

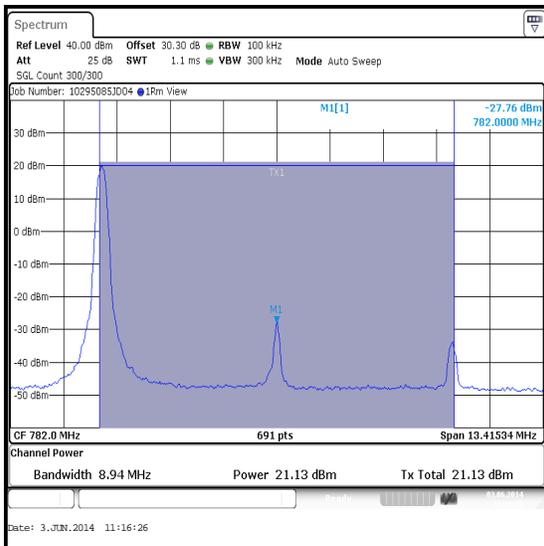
Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBd)	ERP (dBm)	ERP Limit (dBm)	Margin (dB)	Result
782.0	50	0	18.6	-3.75	14.85	34.8	19.95	Complied
782.0	25	12	18.6	-3.75	14.85	34.8	19.95	Complied
782.0	1	0	21.1	-3.75	17.35	34.8	17.45	Complied
782.0	1	49	20.9	-3.75	17.15	34.8	17.65	Complied



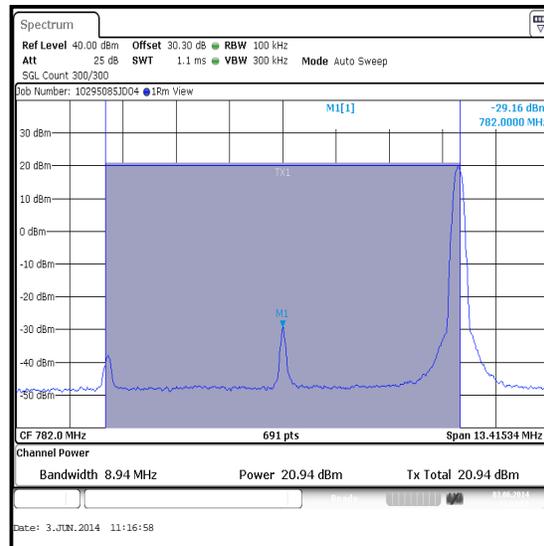
**QPSK / 50 Resource Blocks (0 Offset)**



**QPSK / 25 Resource Blocks (12 Offset)**



**QPSK / 1 Resource Block (0 Offset)**

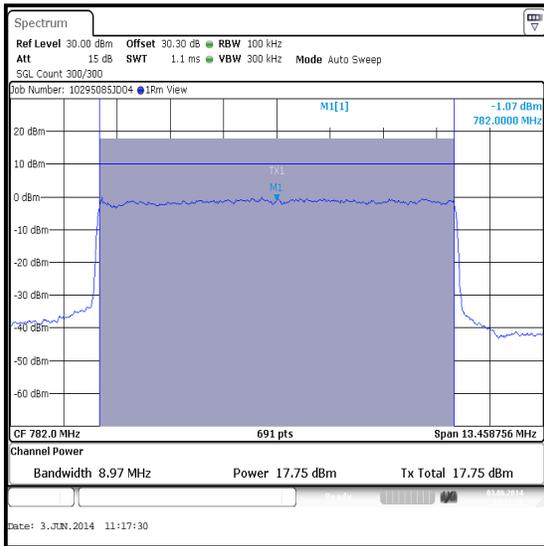


**QPSK / 1 Resource Block (49 Offset)**

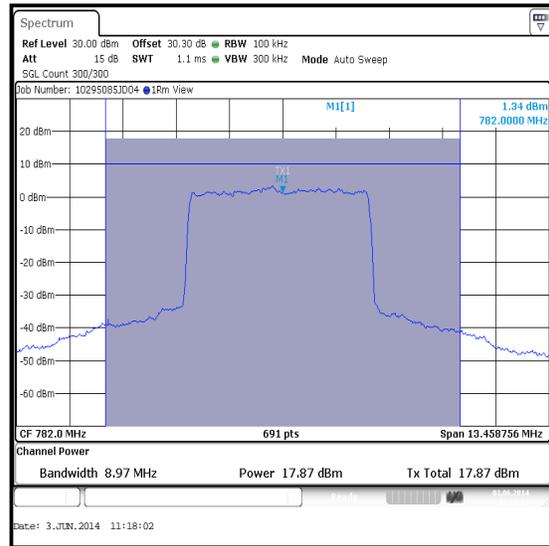
**Transmitter Output Power (ERP) (continued)**

**Results: 10 MHz Channel Bandwidth / Middle Channel / 16QAM**

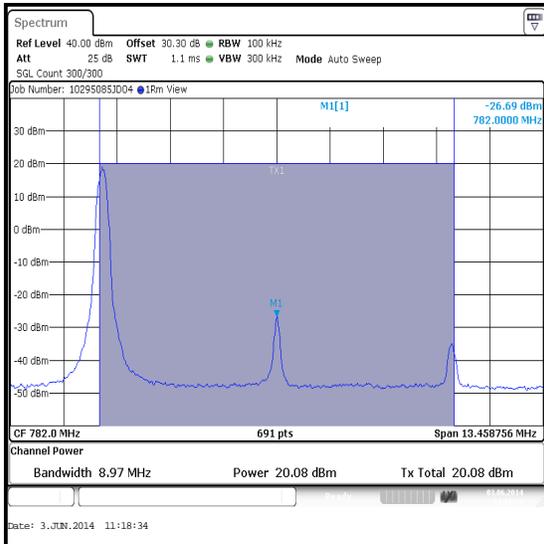
Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBd)	ERP (dBm)	ERP Limit (dBm)	Margin (dB)	Result
782.0	50	0	17.8	-3.75	14.05	34.8	20.75	Complied
782.0	25	12	17.9	-3.75	14.15	34.8	20.65	Complied
782.0	1	0	20.1	-3.75	16.35	34.8	18.45	Complied
782.0	1	49	20.0	-3.75	16.25	34.8	18.55	Complied



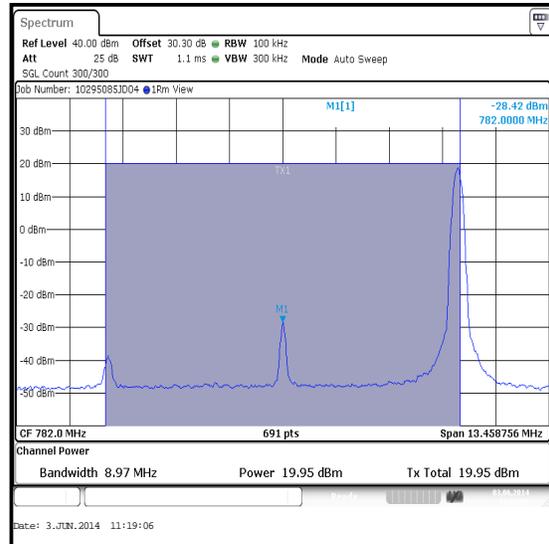
**16QAM / 50 Resource Blocks (0 Offset)**



**16QAM / 25 Resource Blocks (12 Offset)**



**16QAM / 1 Resource Block (0 Offset)**



**16QAM / 1 Resource Block (49 Offset)**

**Transmitter Output Power (ERP) (continued)****Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1659	Thermohygrometer	JM Handelspunkt	30.5015.13	None stated	14 Mar 2015	12
L1128	Signal Analyser	Rohde & Schwarz	FSV13	101835	25 April 2015	12
A2535	Directional Coupler	AtlanTecRF	CDC-003060-20	14041701719	Calibrated before use	-
A2508	Attenuator	AtlanTecRF	AN18-10	821846#3	Calibrated before use	-
S0537	DC Power Supply	Tti	EL302D	249928	Calibrated before use	-
M1251	Digital Multimeter	Fluke	175	8717019	19 May 2015	12
M1009	Power Meter	Hewlett Packard	437B	3125U13706	04 Feb 2015	12
M1592	Power Sensor	Hewlett Packard	8487A	3318A02094	28 Aug 2014	12
G0608	Signal Generator	Rohde & Schwarz	SMIQ 06B	838341/033	14 Feb 2015	12

**5.2.2. Transmitter Occupied Bandwidth****Test Summary:**

<b>Test Engineer:</b>	Ben Mercer	<b>Test Date:</b>	03 June 2014
<b>Test Sample IMEI:</b>	004402452705639		

<b>FCC Reference:</b>	Part 2.1049
<b>Test Method Used:</b>	As detailed in KDB 971168 Section 4.2

**Environmental Conditions:**

<b>Temperature (°C):</b>	23 to 24
<b>Relative Humidity (%):</b>	40 to 41

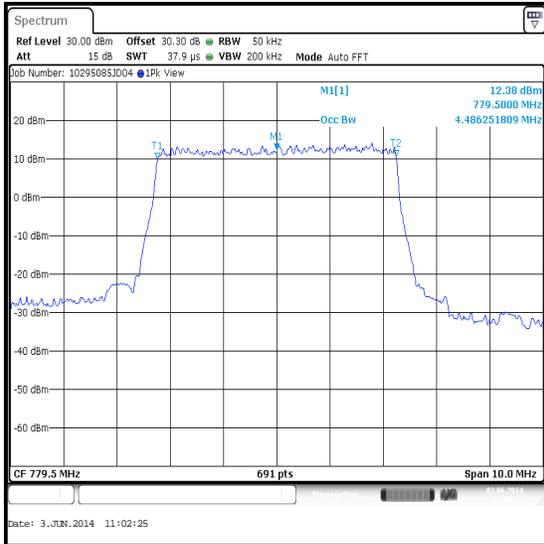
**Note(s):**

1. Occupied bandwidth (99% bandwidth) was measured using a test receiver occupied bandwidth function.
2. Measurements were performed with the EUT transmitting with QPSK and 16QAM modulation schemes, with resource blocks settings as detailed in section 4.3 of this report.
3. The RF port of the EUT was connected to the spectrum analyser via RF cables, directional coupler and suitable attenuation.

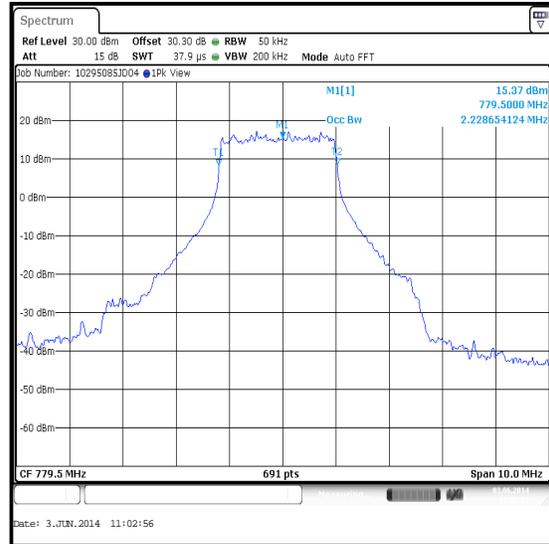
**Transmitter Occupied Bandwidth (continued)**

**Results: 5 MHz Channel Bandwidth / Bottom Channel / QPSK**

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Resolution Bandwidth (kHz)	Video Bandwidth (kHz)	Occupied Bandwidth (MHz)
779.5	25	0	50	200	4.486
779.5	12	6	50	200	2.229



**QPSK / 25 Resource Blocks (0 Offset)**

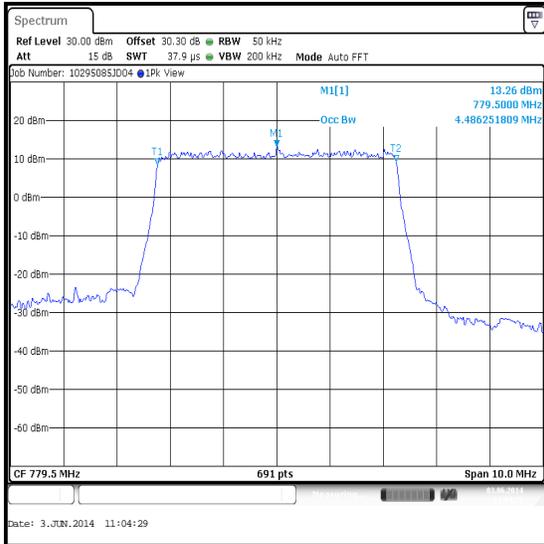


**QPSK / 12 Resource Blocks (6 Offset)**

**Transmitter Occupied Bandwidth (continued)**

**Results: 5 MHz Channel Bandwidth / Bottom Channel / 16QAM**

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Resolution Bandwidth (kHz)	Video Bandwidth (kHz)	Occupied Bandwidth (MHz)
779.5	25	0	50	200	4.486
779.5	12	6	50	200	2.229



**16QAM / 25 Resource Blocks (0 Offset)**

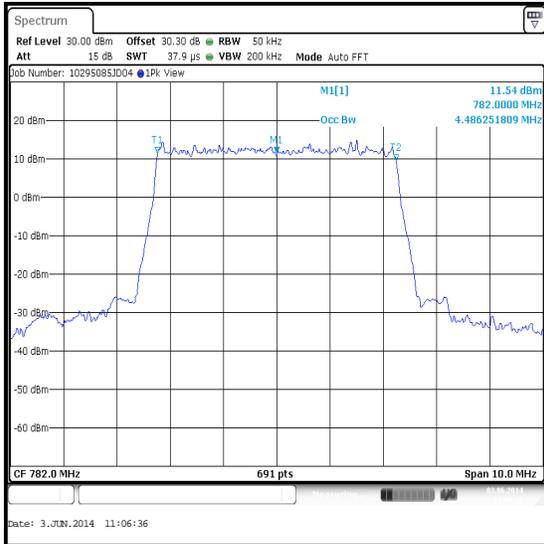


**16QAM / 12 Resource Blocks (6 Offset)**

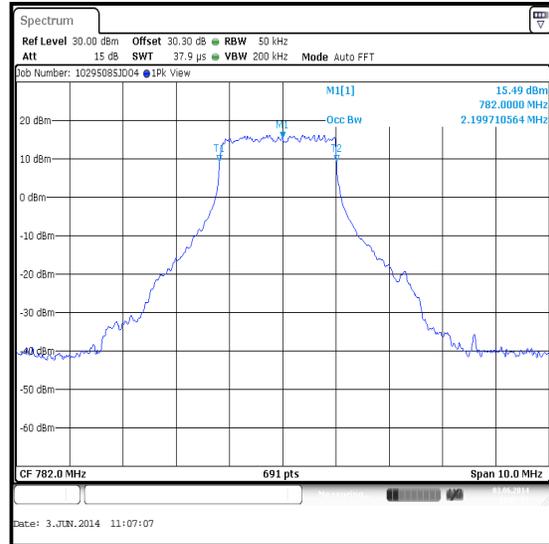
**Transmitter Occupied Bandwidth (continued)**

**Results: 5 MHz Channel Bandwidth / Middle Channel / QPSK**

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Resolution Bandwidth (kHz)	Video Bandwidth (kHz)	Occupied Bandwidth (MHz)
782.0	25	0	50	200	4.486
782.0	12	6	50	200	2.200



**QPSK / 25 Resource Blocks (0 Offset)**

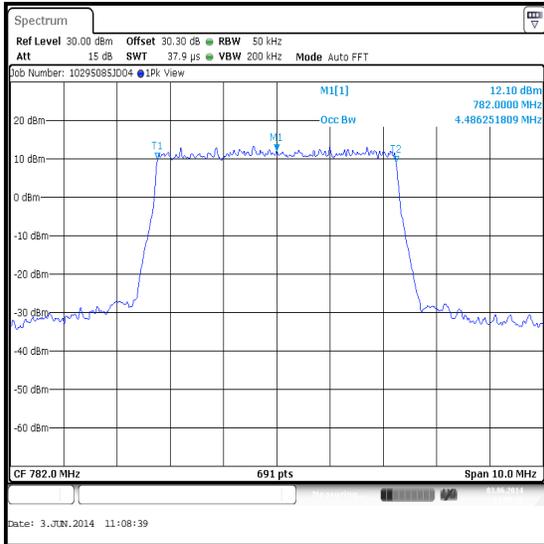


**QPSK / 12 Resource Blocks (6 Offset)**

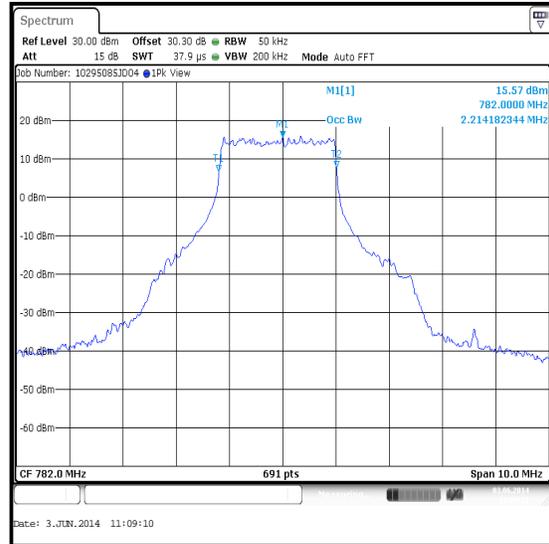
**Transmitter Occupied Bandwidth (continued)**

**Results: 5 MHz Channel Bandwidth / Middle Channel / 16QAM**

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Resolution Bandwidth (kHz)	Video Bandwidth (kHz)	Occupied Bandwidth (MHz)
782.0	25	0	50	200	4.486
782.0	12	6	50	200	2.214



**16QAM / 25 Resource Blocks (0 Offset)**

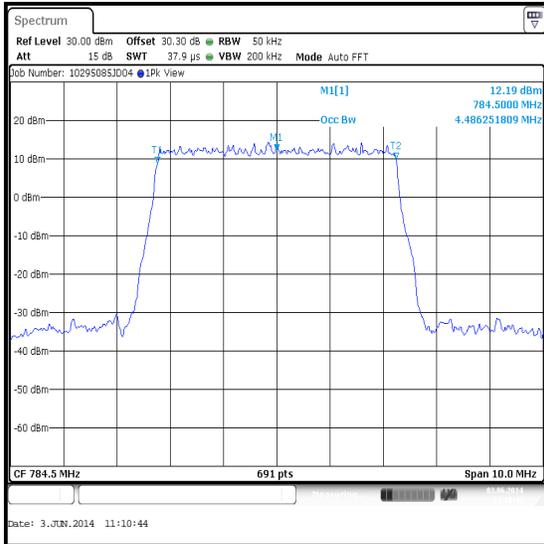


**16QAM / 12 Resource Blocks (6 Offset)**

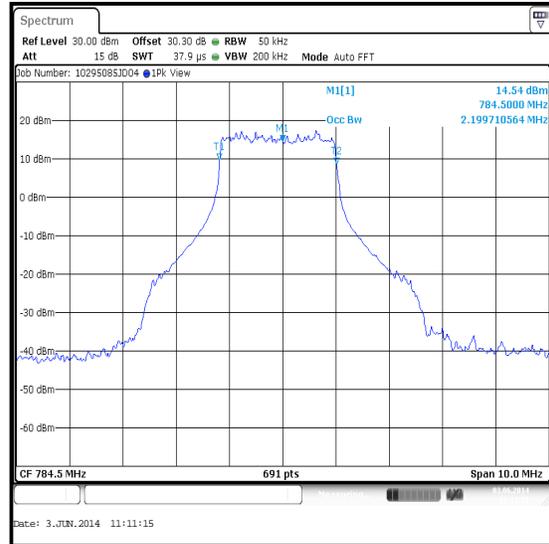
**Transmitter Occupied Bandwidth (continued)**

**Results: 5 MHz Channel Bandwidth / Top Channel / QPSK**

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Resolution Bandwidth (kHz)	Video Bandwidth (kHz)	Occupied Bandwidth (MHz)
784.5	25	0	50	200	4.486
784.5	12	6	50	200	2.200



**QPSK / 25 Resource Blocks (0 Offset)**

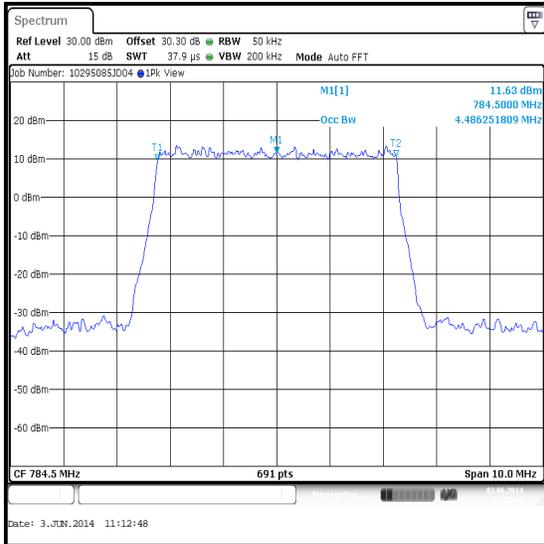


**QPSK / 12 Resource Blocks (6 Offset)**

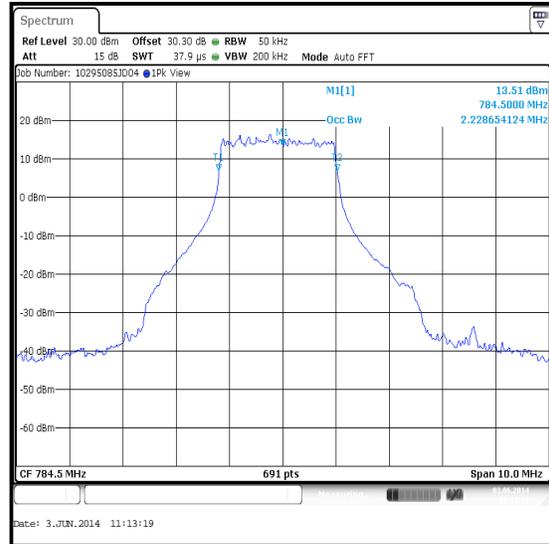
**Transmitter Occupied Bandwidth (continued)**

**Results: 5 MHz Channel Bandwidth / Top Channel / 16QAM**

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Resolution Bandwidth (kHz)	Video Bandwidth (kHz)	Occupied Bandwidth (MHz)
784.5	25	0	50	200	4.486
784.5	12	6	50	200	2.229



**16QAM / 25 Resource Blocks (0 Offset)**

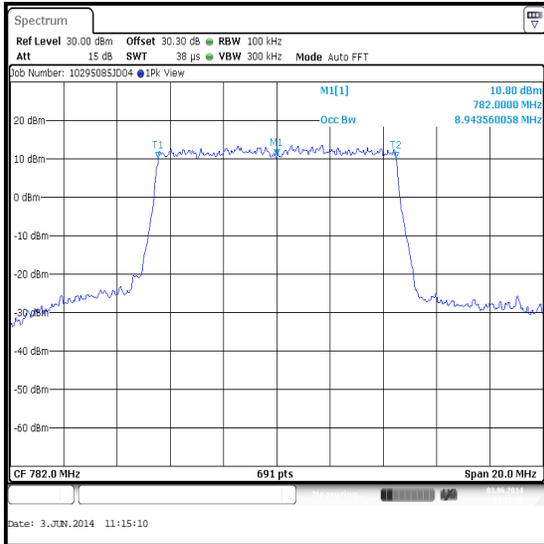


**16QAM / 12 Resource Blocks (6 Offset)**

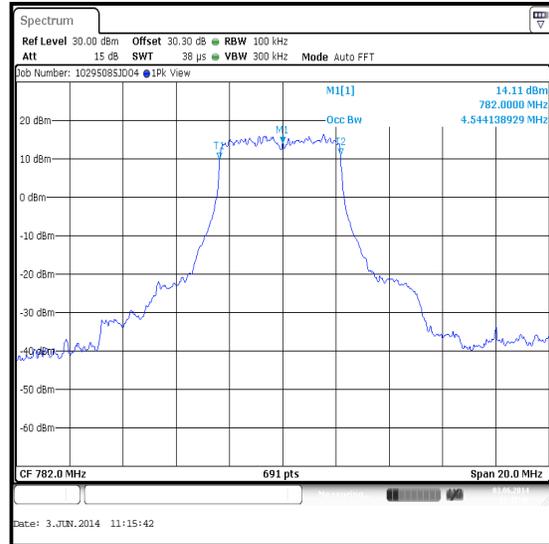
**Transmitter Occupied Bandwidth (continued)**

**Results: 10 MHz Channel Bandwidth / Middle Channel / QPSK**

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Resolution Bandwidth (kHz)	Video Bandwidth (kHz)	Occupied Bandwidth (MHz)
782.0	50	0	100	300	8.944
782.0	25	12	100	300	4.544



**QPSK / 50 Resource Blocks (0 Offset)**

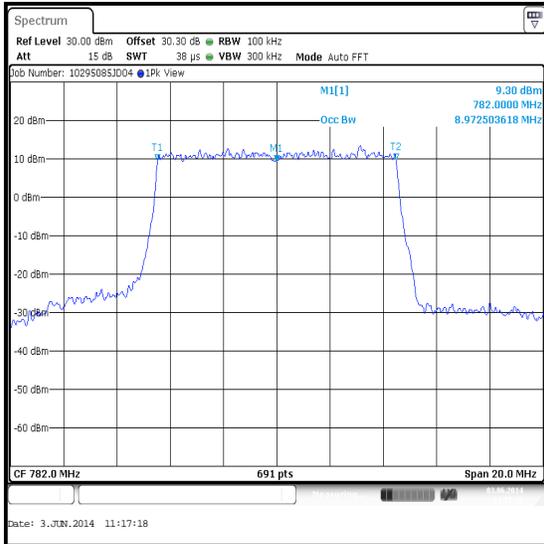


**QPSK / 25 Resource Blocks (12 Offset)**

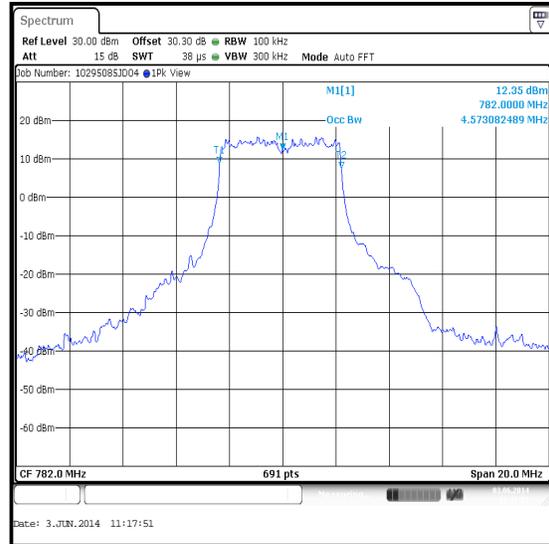
**Transmitter Occupied Bandwidth (continued)**

**Results: 10 MHz Channel Bandwidth / Middle Channel / 16QAM**

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Resolution Bandwidth (kHz)	Video Bandwidth (kHz)	Occupied Bandwidth (MHz)
782.0	50	0	100	300	8.973
782.0	25	12	100	300	4.573



**16QAM / 50 Resource Blocks (0 Offset)**



**16QAM / 25 Resource Blocks (12 Offset)**

**Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1659	Thermohygrometer	JM Handelpunkt	30.5015.13	None stated	14 Mar 2015	12
L1128	Signal Analyser	Rohde & Schwarz	FSV13	101835	25 April 2015	12
A2535	Directional Coupler	AtlanTecRF	CDC-003060-20	1404170171 9	Calibrated before use	-
A2508	Attenuator	AtlanTecRF	AN18-10	821846#3	Calibrated before use	-
S0537	DC Power Supply	Tti	EL302D	249928	Calibrated before use	-
M1251	Digital Multimeter	Fluke	175	8717019	19 May 2015	12
G0608	Signal Generator	Rohde & Schwarz	SMIQ 06B	838341/033	14 Feb 2015	12
M1009	Power Meter	Hewlett Packard	437B	3125U13706	04 Feb 2015	12
M1592	Power Sensor	Hewlett Packard	8487A	3318A02094	28 Aug 2014	12

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

<b>Test Engineers:</b>	Nick Steele & Andrew Edwards	<b>Test Date:</b>	07 June 2014
<b>Test Sample IMEIs:</b>	004402452705555 & 004402452705522		

<b>FCC Reference:</b>	Parts 2.1053 & 27.53(c)(2)
<b>Test Method Used:</b>	As detailed in KDB 971168 Section 6.1 referencing FCC Part 2.1053
<b>Frequency Range:</b>	30 MHz to 8 GHz
<b>Configuration:</b>	5 MHz, QPSK, 1RB, 24 Offset

**Environmental Conditions:**

<b>Temperature (°C):</b>	23 to 24
<b>Relative Humidity (%):</b>	32 to 47

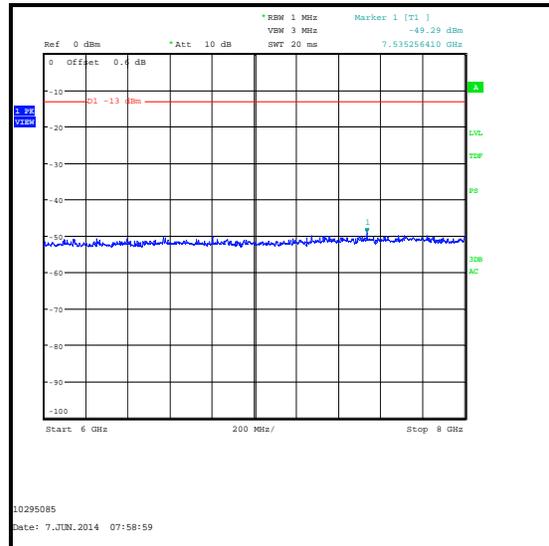
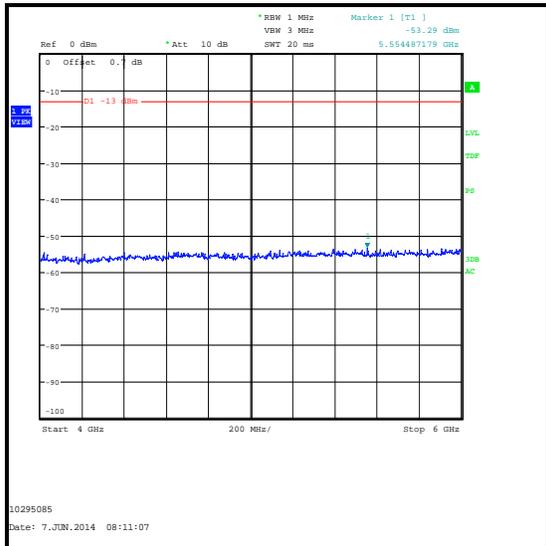
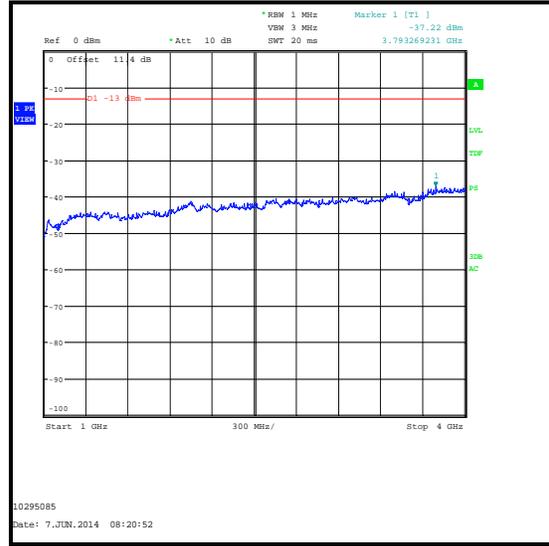
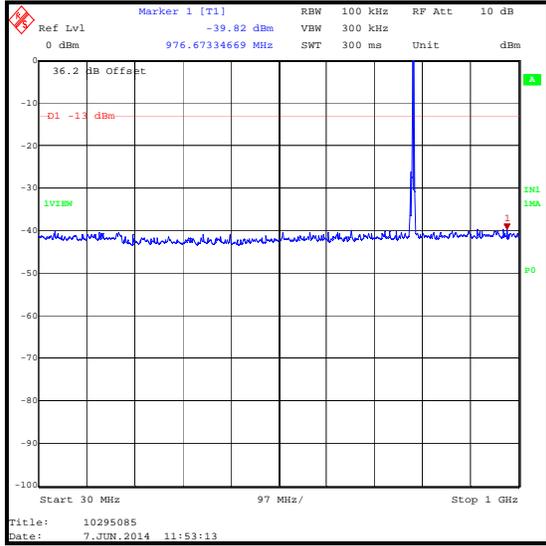
**Note(s):**

1. The EUT was set to transmit with a 5 MHz channel bandwidth with QPSK modulation applied and 1 resource block with 24 offset, as this was found to be the worst case modulation scheme with regards to emissions after preliminary investigations and, as this mode emits the highest transmit output power level, it was deemed to be the worst case.
2. The emission seen on the 30 MHz to 1 GHz plot at approximately 784.5 MHz is the EUT carrier.
3. No spurious emissions were detected above the measurement system noise floor therefore the highest peak noise floor reading of the measuring receiver was recorded in the table below.
4. Measurements below 1 GHz were performed in a semi-anechoic chamber (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.
5. Pre-scans above 1 GHz were performed in a fully anechoic chamber (Asset Number K0002) at a distance of 3 metres. The EUT was placed at a height of 1.5 metres above the test chamber floor in the centre of the chamber turntable. All measurement antennas were placed at a fixed height of 1.5 metres above the test chamber floor, in line with the EUT. Final measurements above 1 GHz were performed in a semi-anechoic chamber (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.
6. The radiated sample with IMEI 004402452705522 was used for measurements < 1 GHz and radiated sample with IMEI 004402452705555 was used for measurements >1 GHz.

**Results: Top Channel**

<b>Frequency (MHz)</b>	<b>Peak Level (dBm)</b>	<b>Limit (dBm)</b>	<b>Margin (dB)</b>	<b>Result</b>
3793.269	-37.2	-13.0	24.2	Complied

### Transmitter Radiated Spurious Emissions (continued)



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

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1622	Thermohygrometer	JM Handelspunkt	30.5015.06	None stated	31 Dec 2014	12
K0001	5m RSE Chamber	Rainford EMC	N/A	N/A	26 Nov 2014	12
A1834	Attenuator	Hewlett Packard	8491B	10444	15 Nov 2014	12
G0543	Amplifier	Sonoma	310N	230801	19 Aug 2014	3
M1273	Test Receiver	Rohde & Schwarz	ESIB 26	100275	15 Feb 2015	12
A490	Antenna	Chase	CBL6111A	1590	29 Apr 2015	12
A2142	Attenuator	AtlanTecRF	AN18-20	081120-23	25 Apr 2015	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	14 Nov 2014	12
M1874	Test Receiver	Rohde & Schwarz	ESU26	100553	15 May 2015	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	18 May 2015	12
A1396	Attenuator	Huber & Suhner	6810.17.B	757987	02 May 2015	12
A148	High Pass Filter	AtlanTechRF	5H036	32218	17 May 2015	12
A1818	Antenna	EMCO	3115	00075692	14 Nov 2014	12
A253	Antenna	Flann Microwave	12240-20	128	14 Nov 2014	12
A254	Antenna	Flann Microwave	14240-20	139	14 Nov 2014	12
M1656	Thermohygrometer	JM Handelspunkt	30.5015.13	None stated	14 Mar 2015	12

**5.2.4. Transmitter Radiated Spurious Emissions Limitations****Test Summary:**

<b>Test Engineer:</b>	Nick Steele	<b>Test Date:</b>	07 June 2014
<b>Test Sample Serial Number:</b>	004402452705555		

<b>FCC Reference:</b>	Parts 27.53(c)(4), 27.53(e) and 2.1053
<b>Test Method Used:</b>	As detailed in KDB 971168 Section 6.1 referencing FCC Part 2.1053
<b>Frequency Ranges:</b>	763 to 775 MHz 793 to 805 MHz 1559 to 1610 MHz

**Environmental Conditions:**

<b>Temperature (°C):</b>	23
<b>Relative Humidity (%):</b>	48

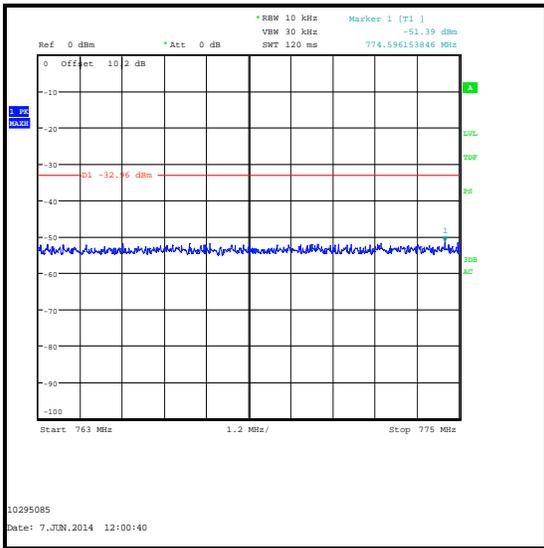
**Note(s):**

- Measurements were performed with the EUT transmitting with QPSK and 16QAM modulation schemes, with resource blocks of 1 and 25. For single resource blocks, measurements were performed with the block starting of blocks 1 and 24.
- Pre-scans were performed on top channel. For the 1559 to 1610 MHz band wideband emissions were observed. Final measurements were also performed on bottom and middle channels. No discrete emissions of less than 700 Hz were observed.
- All other emissions were >20 dB below the applicable limit or below the level of the noise floor of the measuring receiver.
- The limit for 27.53(c)(4) is  $65 + 10\log_{10}(P) = -35$  dBm in a 6.25 kHz bandwidth. As it was not possible to set the resolution bandwidth on the test equipment, the bandwidth was set to 10 kHz. The limit was adjusted by  $10 \log_{10}(10 \text{ kHz} / 6.25 \text{ kHz}) = 2.04$  dB. The limit shown in the plots for the 763 MHz to 775 MHz and 793 MHz to 805 MHz bands was set to  $-35 \text{ dBm} + 2.04 \text{ dB} = -32.96 \text{ dBm}$ .
- The limit for 27.53(e) states emissions in the band 1559 MHz to 1610 MHz shall be limited to -70 dBW/MHz (-40 dBm) equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP (-50 dBm) for discrete emissions of less than 700 Hz bandwidth.
- Measurements below 1 GHz were performed in a semi-anechoic chamber (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.
- Pre-scans above 1 GHz were performed in a fully anechoic chamber (Asset Number K0002) at a distance of 3 metres. The EUT was placed at a height of 1.5 metres above the test chamber floor in the centre of the chamber turntable. All measurement antennas were placed at a fixed height of 1.5 metres above the test chamber floor, in line with the EUT. Final measurements above 1 GHz were performed in a semi-anechoic chamber (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.

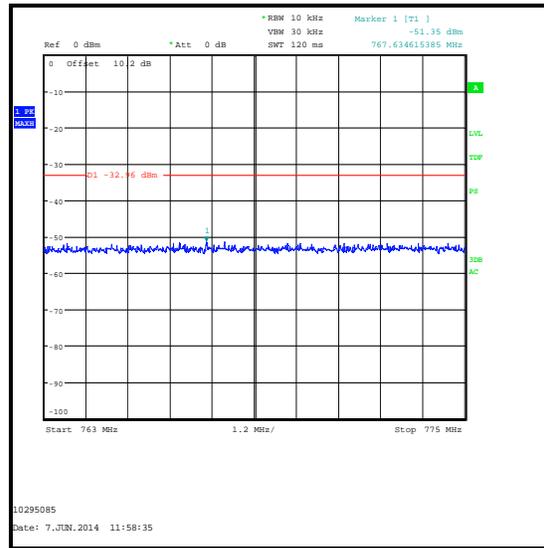
**Transmitter Radiated Spurious Emissions Limitations (continued)**

**Results: 763 MHz to 775 MHz / QPSK / Top channel**

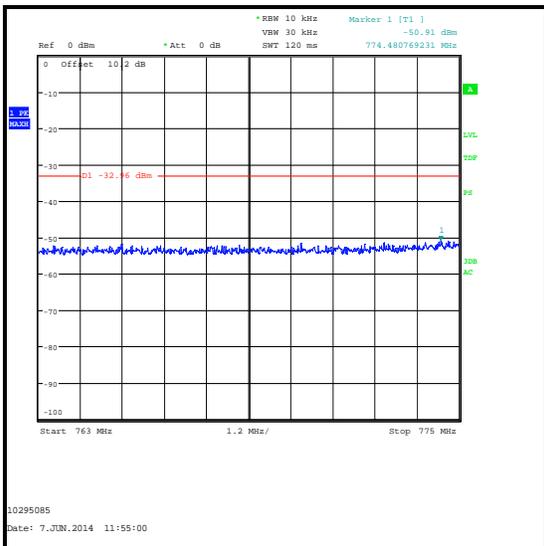
Frequency (MHz)	Resource Block(s)	Resource Block Offset	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
774.596	1	0	-51.39	-32.96	18.43	Complied
767.635	1	24	-51.35	-32.96	18.39	Complied
774.481	25	0	-50.91	-32.96	17.95	Complied



**QPSK / 1 Resource Block (0 Offset)**



**QPSK / 1 Resource Block (24 Offset)**

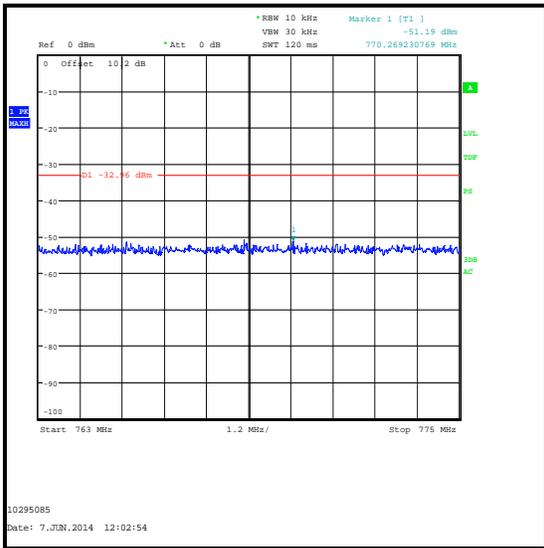


**QPSK / 25 Resource Blocks**

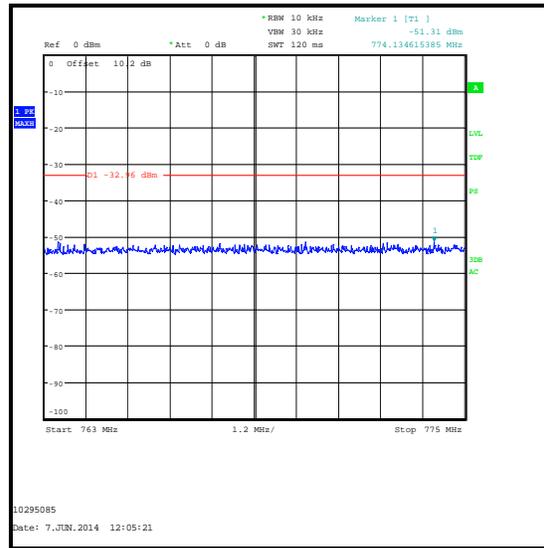
**Transmitter Radiated Spurious Emissions Limitations (continued)**

**Results: 763 MHz to 775 MHz / 16QAM / Top channel**

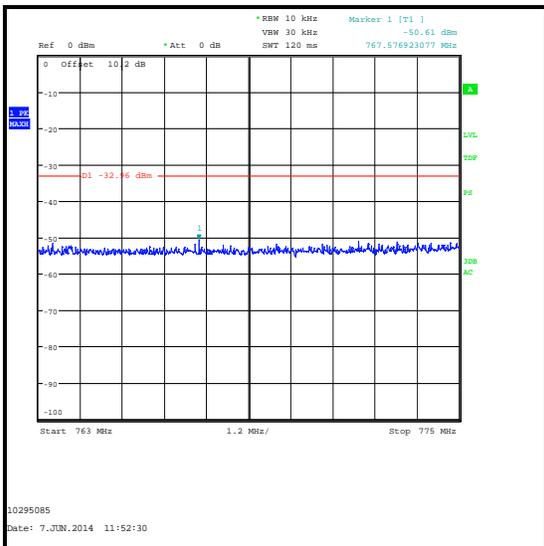
Frequency (MHz)	Resource Block(s)	Resource Block Offset	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
770.269	1	0	-51.19	-32.96	18.23	Complied
774.135	1	24	-51.31	-32.96	18.35	Complied
767.577	25	0	-50.61	-32.96	17.65	Complied



**16QAM / 1 Resource Block (0 Offset)**



**16QAM / 1 Resource Block (24 Offset)**

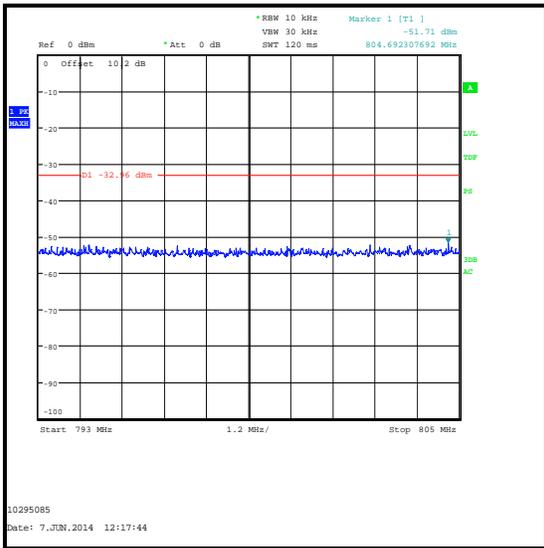


**16QAM / 25 Resource Blocks**

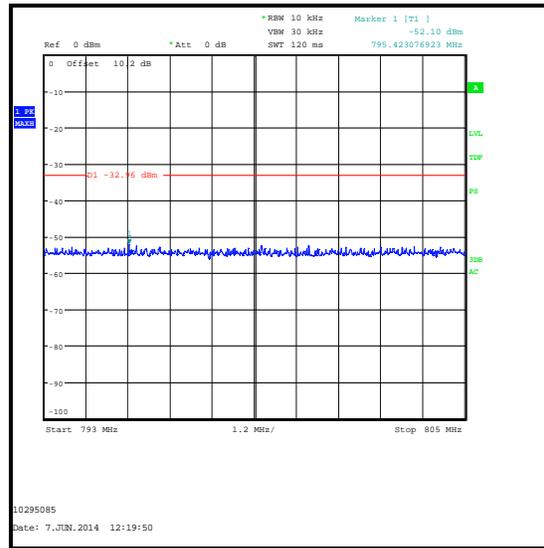
**Transmitter Radiated Spurious Emissions Limitations (continued)**

**Results: 793 MHz to 805 MHz / QPSK / Top channel**

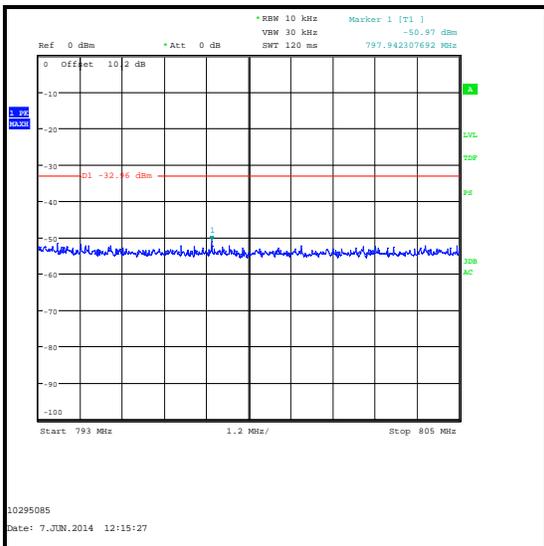
Frequency (MHz)	Resource Block(s)	Resource Block Offset	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
804.692	1	0	-51.71	-32.96	18.75	Complied
795.423	1	24	-52.10	-32.96	19.14	Complied
797.942	25	0	-50.97	-32.96	18.01	Complied



**QPSK / 1 Resource Block (0 Offset)**



**QPSK / 1 Resource Block 2450 Offset)**

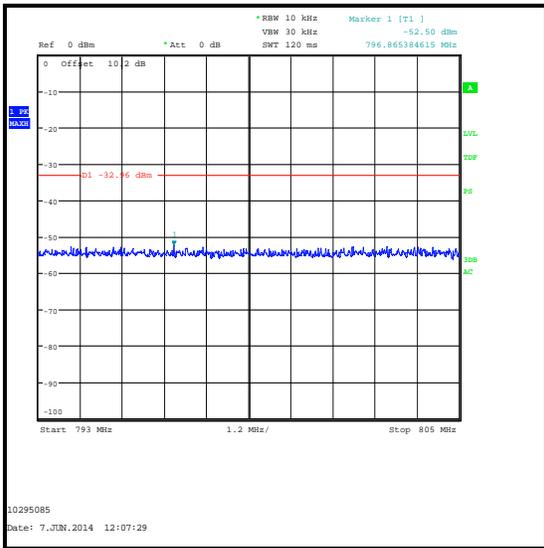


**QPSK / 25 Resource Blocks**

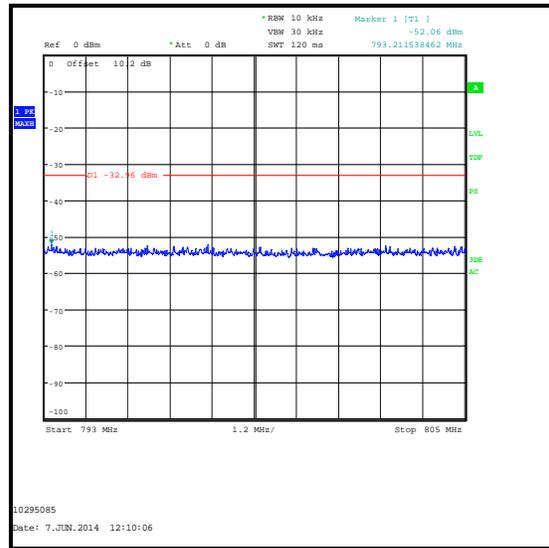
**Transmitter Radiated Spurious Emissions Limitations (continued)**

**Results: 793 MHz to 805 MHz / 16QAM / Top channel**

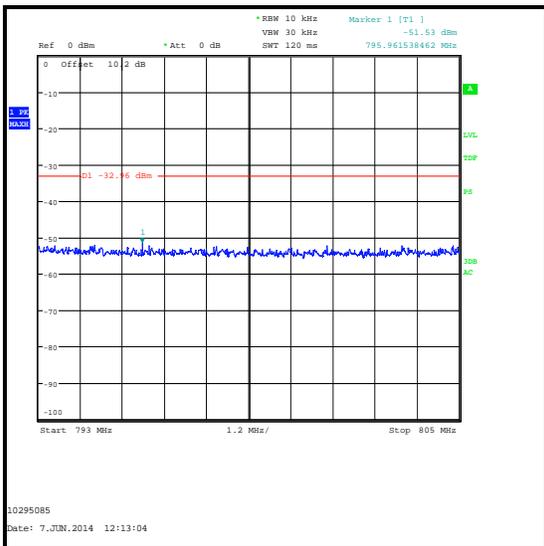
Frequency (MHz)	Resource Block(s)	Resource Block Offset	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
796.865	1	0	-52.50	-32.96	19.54	Complied
793.212	1	24	-52.06	-32.96	19.10	Complied
795.962	25	0	-51.53	-32.96	18.57	Complied



**16QAM / 1 Resource Block (0 Offset)**



**16QAM / 1 Resource Block (24 Offset)**



**16QAM / 25 Resource Blocks**

**Transmitter Radiated Spurious Emissions Limitations (continued)****Results: 1559 MHz to 1610 MHz / QPSK / Bottom channel**

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
1599.375	1	0	-64.1	-40.0	24.1	Complied
1563.168	1	24	-49.5	-40.0	9.5	Complied
1561.452	25	0	-59.7	-40.0	19.7	Complied

**Results: 1559 MHz to 1610 MHz / QPSK / Middle channel**

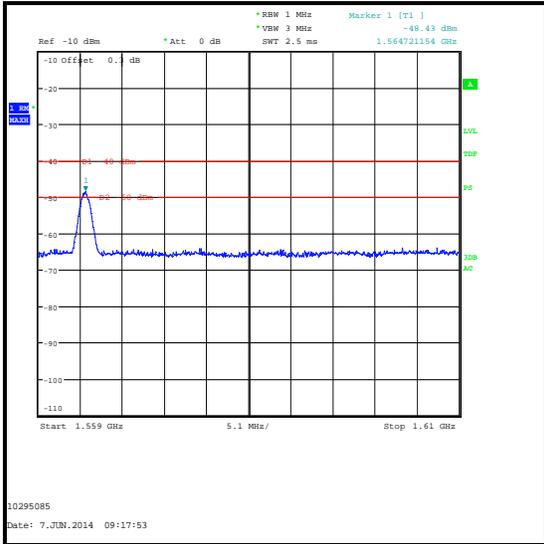
Frequency (MHz)	Resource Block(s)	Resource Block Offset	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
1559.653	1	0	-55.2	-40.0	15.2	Complied
1568.399	1	24	-48.0	-40.0	8.0	Complied
1563.822	25	0	-57.2	-40.0	17.2	Complied

**Results: 1559 MHz to 1610 MHz / QPSK / Top channel**

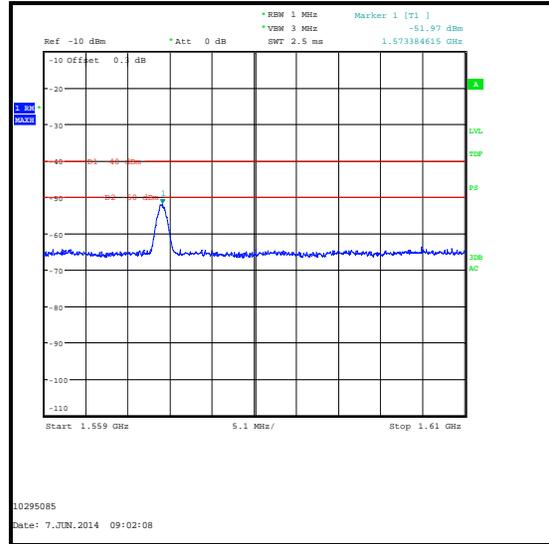
Frequency (MHz)	Resource Block(s)	Resource Block Offset	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
1564.721	1	0	-48.4	-40.0	8.4	Complied
1573.385	1	24	-52.0	-40.0	12.0	Complied
1569.053	25	0	-56.4	-40.0	16.4	Complied

**Transmitter Radiated Spurious Emissions Limitations (continued)**

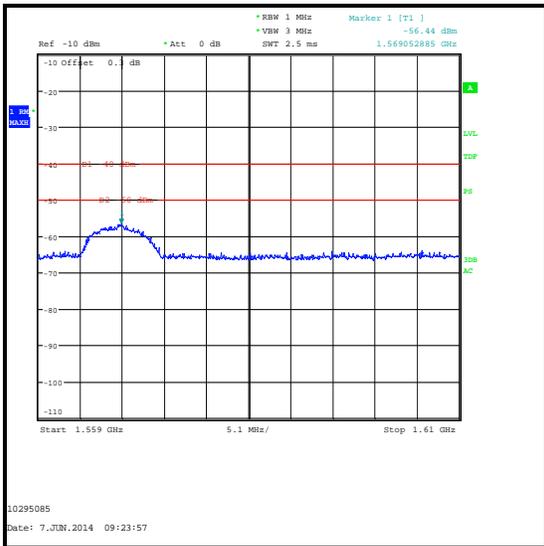
**Results: 1559 MHz to 1610 MHz / QPSK / Top channel**



**QPSK / 1 Resource Block (0 Offset)**



**QPSK / 1 Resource Block (24 Offset)**



**QPSK / 25 Resource Blocks**

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

**Transmitter Radiated Spurious Emissions Limitations (continued)****Results: 1559 MHz to 1610 MHz / 16QAM / Bottom channel**

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
1605.505	1	0	-63.9	-40.0	23.9	Complied
1563.168	1	24	-49.0	-40.0	9.0	Complied
1561.207	25	0	-60.1	-40.0	20.1	Complied

**Results: 1559 MHz to 1610 MHz / 16QAM / Middle channel**

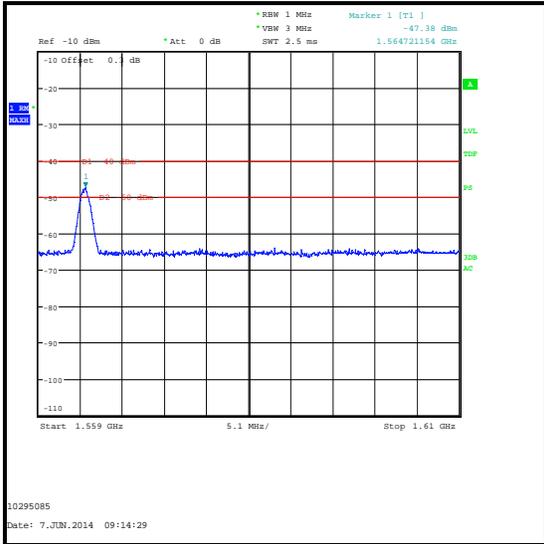
Frequency (MHz)	Resource Block(s)	Resource Block Offset	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
1559.899	1	0	-54.3	-40.0	14.3	Complied
1568.399	1	24	-48.0	-40.0	8.0	Complied
1565.702	25	0	-58.0	-40.0	18.0	Complied

**Results: 1559 MHz to 1610 MHz / 16QAM / Top channel**

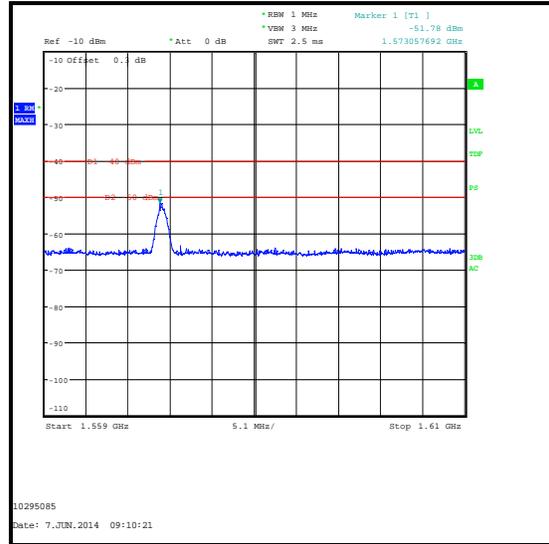
Frequency (MHz)	Resource Block(s)	Resource Block Offset	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
1564.721	1	0	-47.4	-40.0	7.4	Complied
1573.058	1	24	-51.8	-40.0	11.8	Complied
1569.053	25	0	-57.0	-40.0	17.0	Complied

**Transmitter Radiated Spurious Emissions Limitations (continued)**

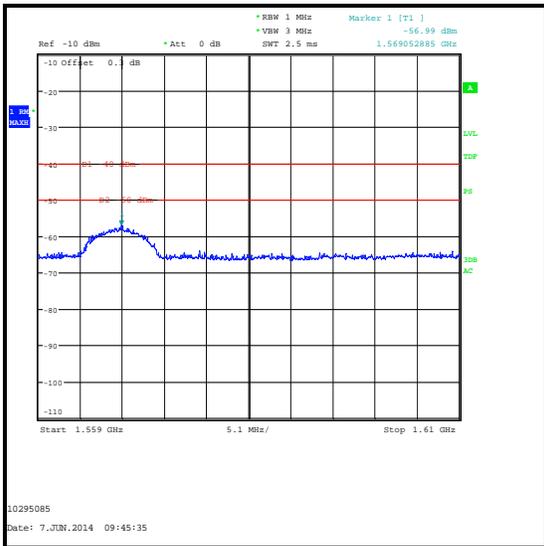
**Results: 1559 MHz to 1610 MHz / 16QAM / Top channel**



**16QAM / 1 Resource Block (0 Offset)**



**16QAM / 1 Resource Block (24 Offset)**



**16QAM / 25 Resource Blocks**

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

**Transmitter Radiated Spurious Emissions Limitations (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	None stated	14 Mar 2015	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	14 Nov 2014	12
M1874	Test Receiver	Rohde & Schwarz	ESU26	100553	15 May 2015	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	18 May 2015	12
A1396	Attenuator	Huber & Suhner	6810.17.B	757987	02 May 2015	12
A288	Antenna	Chase	CBL6111A	1589	20 Aug 2014	12
A1818	Antenna	EMCO	3115	00075692	14 Nov 2014	12
A490	Antenna	Chase	CBL6111A	1590	29 Apr 2015	12
A1834	Attenuator	Hewlett Packard	8491B	10444	15 Nov 2014	12
K0001	5m RSE Chamber	Rainford EMC	N/A	N/A	26 Nov 2014	12
G0543	Amplifier	Sonoma	310N	230801	19 Aug 2014	3
M1273	Test Receiver	Rohde & Schwarz	ESIB 26	100275	15 Feb 2015	12
M1622	Thermohygrometer	JM Handelspunkt	30.5015.06	None stated	31 Dec 2014	12

**5.2.5. Transmitter Radiated Emissions at Band Edges****Test Summary:**

<b>Test Engineer:</b>	Nick Steele	<b>Test Date:</b>	07 June 2014
<b>Test Sample IMEI:</b>	004402452705555		

<b>FCC Reference:</b>	Parts 2.1053 & 27.53(c)(2)
<b>Test Method Used:</b>	As detailed in KDB 971168 Section 6.1 referencing FCC Part 27.53

**Environmental Conditions:**

<b>Temperature (°C):</b>	22
<b>Relative Humidity (%):</b>	48

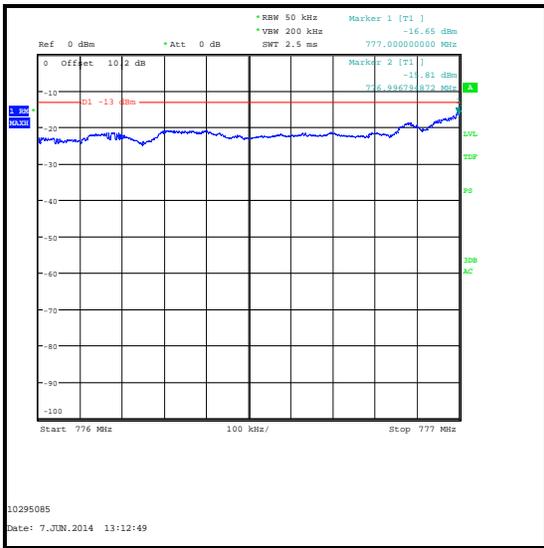
**Note(s):**

1. Measurements were performed with the EUT transmitting QPSK and 16QAM modulation schemes, with the maximum resource blocks settings as detailed in section 4.3 of this report.

**Transmitter Radiated Emissions at Band Edges (continued)**

**Results: 5 MHz Channel Bandwidth / QPSK**

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
776.997	25	0	-15.8	-13.0	2.8	Complied
777	25	0	-16.7	-13.0	3.7	Complied
787	25	0	-16.3	-13.0	3.3	Complied
787.003	25	0	-15.4	-13.0	2.4	Complied



**QPSK / Lower Band Edge**

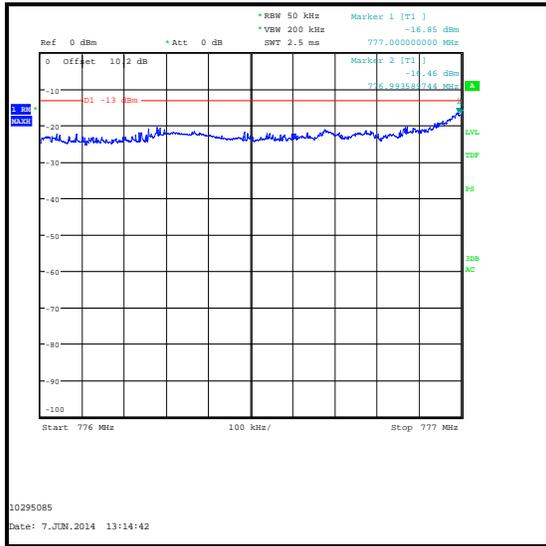


**QPSK / Upper Band Edge**

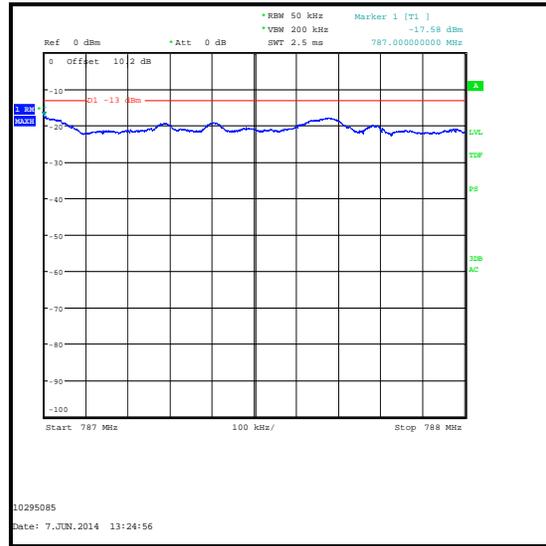
**Transmitter Radiated Emissions at Band Edges (continued)**

**Results: 5 MHz Channel Bandwidth / 16QAM**

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
776.994	25	0	-16.5	-13.0	3.5	Complied
777	25	0	-16.9	-13.0	3.9	Complied
787	25	0	-17.6	-13.0	4.6	Complied



**16QAM / Lower Band Edge**

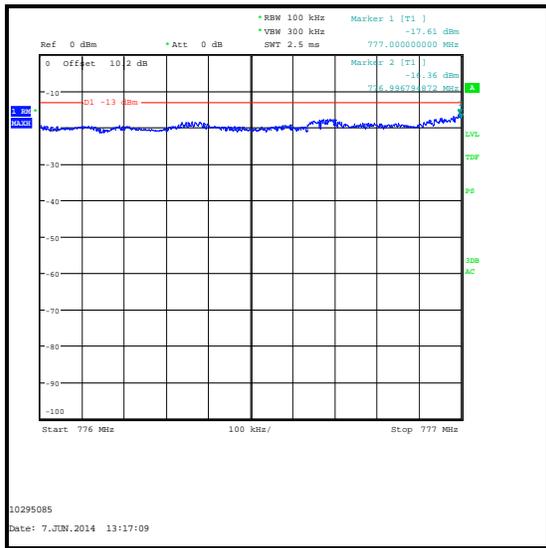


**16QAM / Upper Band Edge**

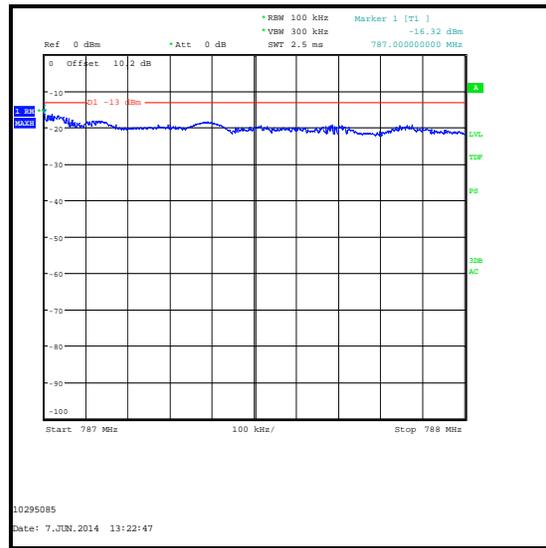
**Transmitter Radiated Emissions at Band Edges (continued)**

**Results: 10 MHz Channel Bandwidth / QPSK**

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
776.997	50	0	-16.4	-13.0	3.4	Complied
777	50	0	-17.6	-13.0	4.6	Complied
787	50	0	-16.3	-13.0	3.3	Complied



**QPSK / Lower Band Edge**

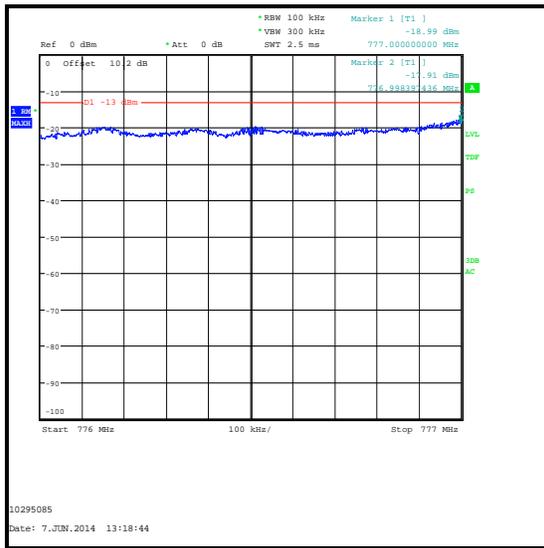


**QPSK / Upper Band Edge**

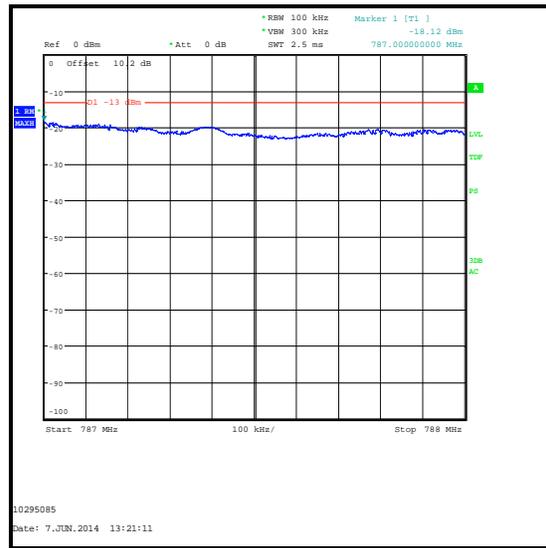
**Transmitter Radiated Emissions at Band Edges (continued)**

**Results: 10 MHz Channel Bandwidth / 16QAM**

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
776.998	50	0	-17.9	-13.0	4.9	Complied
777	50	0	-19.0	-13.0	6.0	Complied
787	50	0	-18.1	-13.0	5.1	Complied



16QAM / Lower Band Edge



16QAM / Upper Band Edge

**Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1656	Thermohyrometer	JM Handelpunkt	30.5015.13	None stated	14 Mar 2015	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	14 Nov 2014	12
M1874	Test Receiver	Rohde & Schwarz	ESU26	100553	15 May 2015	12
A288	Antenna	Chase	CBL6111A	1589	20 Aug 2014	12
A1396	Attenuator	Huber & Suhner	6810.17.B	757987	02 May 2015	12

**5.2.6. Transmitter Frequency Stability (Temperature Variation)****Test Summary:**

<b>Test Engineer:</b>	Keith Tucker	<b>Test Date:</b>	05 June 2014
<b>Test Sample IMEI:</b>	004402452705654		

<b>FCC Reference:</b>	Parts 2.1055 & 27.54
<b>Test Method Used:</b>	As detailed in KDB 971168 Section 9.0 referencing ANSI TIA-603-C-2004 Section 2.2.2 and FCC Part 2.1055

**Environmental Conditions:**

<b>Temperature (°C):</b>	26
<b>Relative Humidity (%):</b>	30

**Note(s):**

1. A voltage variation jig was connected to the EUT which was powered via a bench power supply at the nominal voltage of 3.8V.
2. Frequency error was measured using a calibrated Rohde and Schwarz CMW 500 Universal Radio Communications Tester in accordance with current Rohde and Schwarz application notes. The EUT was connected by suitable RF cables to the CMW 500. A bi-directional communications link was established between the EUT and CMW 500. The frequency meter value was recorded.
3. Temperature was monitored throughout the test with a calibrated digital thermometer.

**Transmitter Frequency Stability (Temperature Variation) (continued)****Results: Bottom Channel (779.5 MHz)**

Temperature (°C)	Frequency Error (Hz)	Measured Frequency (MHz)	Lower Band Edge Limit (MHz)	Margin (MHz)	Result
-30	11	779.499989	777	2.499989	Complied
-20	7	779.500007	777	2.500007	Complied
-10	4	779.500004	777	2.500004	Complied
0	5	779.500005	777	2.500005	Complied
10	5	779.500005	777	2.500005	Complied
20	6	779.500006	777	2.500006	Complied
30	4	779.500004	777	2.500004	Complied
40	5	779.499995	777	2.499995	Complied
50	5	779.499995	777	2.499995	Complied

**Results: Top Channel (784.5 MHz)**

Temperature (°C)	Frequency Error (Hz)	Measured Frequency (MHz)	Upper Band Edge Limit (MHz)	Margin (MHz)	Result
-30	7	784.500007	787	2.499993	Complied
-20	6	784.500006	787	2.499994	Complied
-10	8	784.500008	787	2.499992	Complied
0	5	784.500005	787	2.499995	Complied
10	7	784.500007	787	2.499993	Complied
20	6	784.500006	787	2.499994	Complied
30	5	784.500005	787	2.499995	Complied
40	6	784.500006	787	2.499994	Complied
50	5	784.500005	787	2.499995	Complied

**Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1659	Thermohyrometer	JM Handelpunkt	30.5015.13	None stated	14 Mar 2015	12
M1870	Wideband Radio Comms Tester	Rohde & Schwarz	CMW500	145919	05 May 2015	12
E0513	Environmental Chamber	TAS	LT600 Series 3	23900506	Calibrated before use	-
M1249	Thermometer	Fluke	52II	88800049	02 May 2015	12
S021	Dual DC power supply	Tti	CPX200	061034	Calibrated before use	-
M1251	Multimeter	Fluke	175	89170179	19 May 2015	12

**5.2.7. Transmitter Frequency Stability (Voltage Variation)****Test Summary:**

<b>Test Engineer:</b>	Keith Tucker	<b>Test Date:</b>	05 June 2014
<b>Test Sample IMEI:</b>	004402452705654		

<b>FCC Reference:</b>	Parts 2.1055 & 27.54
<b>Test Method Used:</b>	As detailed in KDB 971168 Section 9.0 referencing ANSI TIA-603-C-2004 Section 2.2.2 and FCC Part 2.1055

**Environmental Conditions:**

<b>Temperature (°C):</b>	26
<b>Relative Humidity (%):</b>	30

**Note(s):**

1. A voltage variation jig was connected to the EUT which was powered via a bench power supply.
2. Frequency error was measured using a calibrated Rohde and Schwarz CMW 500 Universal Radio Communications Tester in accordance with current Rohde and Schwarz application notes. The EUT was connected by suitable RF cables to the CMW 500. A bi-directional communications link was established between the EUT and CMW 500. The frequency meter value was recorded.
3. Voltage was monitored throughout the test with a calibrated digital voltmeter.

**Results: Bottom Channel (779.5 MHz)**

Supply Voltage (V)	Frequency Error (Hz)	Measured Frequency (MHz)	Lower Band Edge Limit (MHz)	Margin (MHz)	Result
3.42	5	779.500005	777	2.500005	Complied
4.18	6	779.500006	777	2.500006	Complied

**Results: Top Channel (784.5 MHz)**

Supply Voltage (V)	Frequency Error (Hz)	Measured Frequency (MHz)	Upper Band Edge Limit (MHz)	Margin (MHz)	Result
3.42	7	784.500007	787	2.499993	Complied
4.18	6	784.500006	787	2.499994	Complied

**Transmitter Frequency Stability (Voltage Variation) (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>
M1659	Thermohygrometer	JM Handelpunkt	30.5015.13	None stated	14 Mar 2015	12
M1870	Wideband Radio Comms Tester	Rohde & Schwarz	CMW500	145919	05 May 2015	12
S021	Dual DC power supply	Tti	CPX200	061034	Calibrated before use	-
M1251	Multimeter	Fluke	175	89170179	19 May 2015	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>
Conducted Output Power	777 MHz to 787 MHz	95%	±1.13 dB
Frequency Stability	777 MHz to 787 MHz	95%	±23 Hz
Occupied Bandwidth	777 MHz to 787 MHz	95%	±3.92 %
Radiated Spurious Emissions	30 MHz to 1 GHz	95%	±5.65 dB
Radiated Spurious Emissions	1 GHz to 8 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.

## **7. Report Revision History**

Version Number	Revision Details		
	Page No(s)	Clause	Details
1.0	-	-	Initial Version
2.0	-	-	EUT Description update

--- END OF REPORT ---