TEST REPORT

Test Report No. : UL-RPT-RP11265293JD07AA V3.0

Manufacturer	:	Apple Inc.
Model No.	:	A1785
FCC ID	:	BCG-E3088A
Technology	:	LTE – Band 41
Test Standard(s)	:	FCC Part 27 Subpart C

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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 3.0 supersedes all previous versions.

Date of Issue: 03 August 2016

Checked by:

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Company Signatory:

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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

Company Name:	Apple Inc.
Address:	1 Infinite Loop Cupertino, CA 95014 U.S.A.

2. Summary of Testing

2.1. General Information

Specification Reference:	47CFR27
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 27 Subpart C (Miscellaneous Wireless Communication Services)
Site Registration:	209735
Location of Testing:	UL VS LTD, Unit 3 Horizon, Wade Road, Kingsland Business Park, Basingstoke, Hampshire, RG24 8AH, United Kingdom
Test Dates:	02 June 2016 to 23 July 2016

2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Result
2.1046 / 27.50(h)(2)	Transmitter Output Power (EIRP)	Complied
27.50(d)(5)	Transmitter Peak-to-Average Ratio (PAR)	Complied
2.1049	Transmitter Occupied Bandwidth	Complied
2.1051 / 27.53(m)(4)	Transmitter Conducted Emissions at Band Edges +/- X MHz	Complied
2.1053 / 27.53(m)(4)	Transmitter Radiated Spurious Emissions	Complied
2.1053 / 27.53(m)(4)	Transmitter Radiated Emissions at Band Edges	Complied
2.1055 / 27.54	Transmitter Frequency Stability (Temperature and Voltage Variation)	Complied

2.3. Methods and Procedures

Reference:	ANSI/TIA-603-D-2010
Title:	Land Mobile FM or PM Communications Equipment Measurements and Performance Standards
Reference:	FCC KDB 971168 D01 v02r02, 17 October 2014
Title:	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)

Brand Name:	Apple
Model Name or Number:	A1785
Test Sample Serial Number:	C39RW006HFMH
Test Sample IMEI:	358640070286456 *(Radiated LAT Sample)*
Hardware Version:	REV1.0
Software Version:	iOS: 14A22580n BB FW: 0.16.01-3
FCC ID:	BCG-E3088A

Brand Name:	Apple
Model Name or Number:	A1785
Test Sample Serial Number:	C39RW00HHFMH
Test Sample IMEI:	358640070309175 *(Radiated UAT Sample)*
Hardware Version:	REV1.0
Software Version:	iOS: 14A22580n BB FW: 0.16.01-3
FCC ID:	BCG-E3088A

Brand Name:	Apple
Model Name or Number:	A1785
Test Sample Serial Number:	C39RW013HFML
Test Sample IMEI:	358640070269106 *(Conducted Sample #1)*
Hardware Version:	REV1.0
Software Version:	iOS: 14A22580n BB FW: 0.16.01-3
FCC ID:	BCG-E3088A

Brand Name:	Apple
Model Name or Number:	A1785
Test Sample Serial Number:	C39RP002H940
Test Sample IMEI:	358640070266615 *(Conducted Sample #2)*
Hardware Version:	REV1.0
Software Version:	iOS: 14A273 BB FW: 0.21.02
FCC ID:	BCG-E3088A

Identification of Equipment Under Test (EUT) (continued)

Brand Name:	Apple
Model Name or Number:	A1785
Test Sample Serial Number:	C39RW01FHFML
Test Sample IMEI:	358640070309241 *(Conducted Sample #3)*
Hardware Version:	REV1.0
Software Version:	iOS: 14A273 BB FW: 0.21.02
FCC ID:	BCG-E3088A

3.2. Description of EUT

The Equipment Under Test was a mobile phone with GSM/GPRS/EGPRS/UMTS/LTE/TD-SCDMA and CDMA technologies. It also supports IEEE 802.11a/b/g/n/ac, Bluetooth®, GPS and NFC. The rechargeable battery is not user accessible.

3.3. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.4. Additional Information Related to Testing

Tested Technology:	LTE Band 41		
Type of Equipment	Transceiver		
Channel Bandwidth:	5 MHz, 10 MHz, 15 MHz & 20 MHz		
Modulation Type:	QPSK & 16QAM		
Duty Cycle:	50%		
Antenna Type:	Integral		
Antenna Gain (LAT):	-2.6 dBi		
Antenna Gain (UAT):	0.6 dBi		
Power Supply Requirement:	Nominal	3.8 VDC	
	Minimum	3.5 VDC	
	Maximum	4.4 VDC	
Transmit Frequency Range:	2496 MHz to 2690 MHz		
Channels Tested:	**Channel Bandwidth (MHz)**	**N_{ul}**	**Frequency of Uplink (MHz)**
Bottom Channel	5	39675	2498.5
	10	39700	2501.0
	15	39725	2503.5
	20	39750	2506.0
Middle Channel	All	40620	2593.0
Top Channel	5	41565	2687.5
	10	41540	2685.0
	15	41515	2682.5
	20	41490	2680.0

3.5. Support Equipment

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

Description:	Laptop PC
Brand Name:	Dell
Model Name or Number:	Latitude E5410
Serial Number:	UL Asset No. 00763

Description:	USB diagnostic cable
Brand Name:	Not stated
Model Name or Number:	Kong
Serial Number:	202D5E

Description:	Personal Hands Free (PHF)
Brand Name:	Apple
Model Name or Number:	Apple Ear Plugs
Serial Number:	Not stated

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 placed into a non-ui mode by using the teraterm application on a UL laptop PC. Instructions were provided by the customer to enable the baseband and radio *(Cellular_RSE_setup_V3.0.doc).* This enabled the EUT to connect via a radiated link with the Rohde & Schwarz CMW 500 system simulator operating in transceiver mode. The CMW 500 was used to configure the EUT operating mode.
- The device contains two cellular antennas which do not transmit simultaneously.
    - LAT – Lower Antenna (Primary)
    - UAT – Upper Antenna (Secondary)

  Both antennas have been tested to demonstrate compliance.
- For the LAT conducted measurements, the RF conducted port was connected with an external RF cable, supplied by the customer.
- For the UAT conducted cellular measurements, the RF conducted port was exposed and extended with a short RF cable supplied by the customer.
- Conducted measurements at temperature and voltage extremes were performed using a conducted sample supplied by the customer. Short DC flying leads were connected internally to the device in place of the battery, and exited through a hole in the casing. These leads were then extended to a DC power supply for testing purposes.
- The EUT was placed in three orthogonal orientations X, Y and Z to determine the worst case orientation for radiated spurious emissions. The worst case orientation was Z for LAT and X for UAT.
- Transmitter radiated spurious emissions tests were performed with the EUT set to transmit with a 10 MHz channel bandwidth with QPSK modulation applied and 1 resource block with 0 offset. This was found to be the worst case modulation scheme with regards to emissions after preliminary investigations and therefore it was deemed to be the worst case.
- The worst-case radiated emission among all accessories, is determined by the manufacturer to be with the headset connected. The compliance lab performed final testing only with the headset attached.
- Transmitter radiated spurious emissions tests were performed with the PHF connected to the EUT.

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	
		RB	Offset	RB	Offset	RB	Offset
5	25	1	0	1	24	25	0
10	50	1	0	1	49	50	0
15	75	1	0	1	74	75	0
20	100	1	0	1	99	100	0

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

Transmitter radiated spurious emissions tests were performed with the EUT set to transmit with a 10 MHz channel bandwidth with QPSK modulation applied and 1 resource block with 0 offset. This was found to be the worst case modulation scheme with regards to emissions after preliminary investigations and therefore it was deemed to be the worst case.

Transmitter Radiated Band Edge Emissions was tested with sub tests 1, 2 and 3 on all supported channel bandwidths using QPSK and 16-QAM modulations.

Transmitter Frequency Stability test was carried out with sub test 3, 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 (EIRP) - LAT

Test Summary:

Test Engineer:	Keith Tucker	**Test Date:**	23 July 2016
Test Sample IMEI:	358640070269106		

FCC Reference:	Parts 2.1046 & 27.50(h)(2)
Test Method Used:	KDB 971168 Section 2.2 footnote 1, Section 5.6 & Notes below

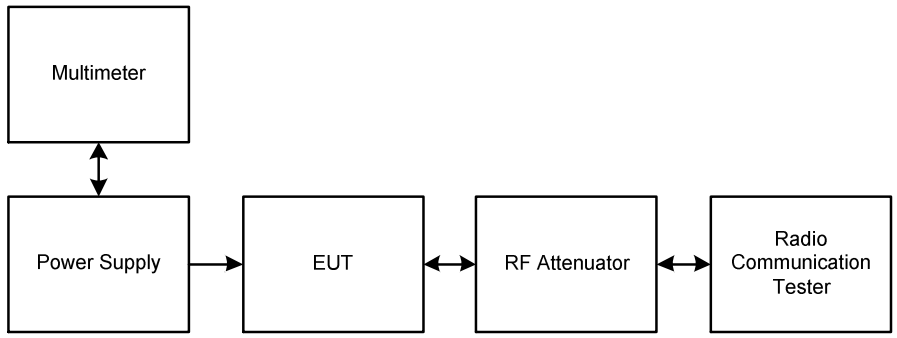
Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	47

Note(s):

1. The customer stated that the antenna gain is -2.63 dBi which has been rounded to a value of 1 decimal place for reporting purposes. The antenna gain was added to the conducted output power to obtain the EIRP.
2. Measurements were performed with the EUT transmitting with QPSK and 16QAM modulation schemes, with resource blocks settings as detailed.
3. Conducted average power was measured using a calibrated Rohde and Schwarz CMW 500 Wideband Radio Communication Tester.
4. The RF port of the EUT was connected to the Communication Tester via an RF cable and suitable attenuation. An RF level offset was entered on the Communication Tester to compensate for the loss of the attenuator and RF cable.

Test setup:



Transmitter Output Power (EIRP) (continued)

Results: 5 MHz Channel Bandwidth / Bottom Channel / QPSK

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2498.5	25	0	21.3	-2.6	18.7	33.0	14.3	Complied
2498.5	12	13	21.4	-2.6	18.8	33.0	14.2	Complied
2498.5	12	0	21.4	-2.6	18.8	33.0	14.2	Complied
2498.5	12	7	21.3	-2.6	18.7	33.0	14.3	Complied
2498.5	1	24	22.3	-2.6	19.7	33.0	13.3	Complied
2498.5	1	0	22.4	-2.6	19.8	33.0	13.2	Complied
2498.5	1	12	22.3	-2.6	19.7	33.0	13.3	Complied

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

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2498.5	25	0	20.3	-2.6	17.7	33.0	15.3	Complied
2498.5	12	13	20.3	-2.6	17.7	33.0	15.3	Complied
2498.5	12	0	20.3	-2.6	17.7	33.0	15.3	Complied
2498.5	12	7	20.3	-2.6	17.7	33.0	15.3	Complied
2498.5	1	24	21.2	-2.6	18.6	33.0	14.4	Complied
2498.5	1	0	21.3	-2.6	18.7	33.0	14.3	Complied
2498.5	1	12	21.2	-2.6	18.6	33.0	14.4	Complied

Results: 5 MHz Channel Bandwidth / Middle Channel / QPSK

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2593.0	25	0	21.2	-2.6	18.6	33.0	14.4	Complied
2593.0	12	13	21.2	-2.6	18.6	33.0	14.4	Complied
2593.0	12	0	21.3	-2.6	18.7	33.0	14.3	Complied
2593.0	12	7	21.2	-2.6	18.6	33.0	14.4	Complied
2593.0	1	24	22.1	-2.6	19.5	33.0	13.5	Complied
2593.0	1	0	22.3	-2.6	19.7	33.0	13.3	Complied
2593.0	1	12	22.2	-2.6	19.6	33.0	13.4	Complied

Transmitter Output Power (EIRP) (continued)

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

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2593.0	25	0	20.2	-2.6	17.6	33.0	15.4	Complied
2593.0	12	13	20.3	-2.6	17.7	33.0	15.3	Complied
2593.0	12	0	20.3	-2.6	17.7	33.0	15.3	Complied
2593.0	12	7	20.2	-2.6	17.6	33.0	15.4	Complied
2593.0	1	24	21.1	-2.6	18.5	33.0	14.5	Complied
2593.0	1	0	21.3	-2.6	18.7	33.0	14.3	Complied
2593.0	1	12	21.2	-2.6	18.6	33.0	14.4	Complied

Results: 5 MHz Channel Bandwidth / Top Channel / QPSK

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2687.5	25	0	21.2	-2.6	18.6	33.0	14.4	Complied
2687.5	12	13	21.2	-2.6	18.6	33.0	14.4	Complied
2687.5	12	0	21.2	-2.6	18.6	33.0	14.4	Complied
2687.5	12	7	21.2	-2.6	18.6	33.0	14.4	Complied
2687.5	1	24	22.2	-2.6	19.6	33.0	13.4	Complied
2687.5	1	0	22.2	-2.6	19.6	33.0	13.4	Complied
2687.5	1	12	22.2	-2.6	19.6	33.0	13.4	Complied

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

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2687.5	25	0	20.2	-2.6	17.6	33.0	15.4	Complied
2687.5	12	13	20.1	-2.6	17.5	33.0	15.5	Complied
2687.5	12	0	20.2	-2.6	17.6	33.0	15.4	Complied
2687.5	12	7	20.2	-2.6	17.6	33.0	15.4	Complied
2687.5	1	24	21.1	-2.6	18.5	33.0	14.5	Complied
2687.5	1	0	21.2	-2.6	18.6	33.0	14.4	Complied
2687.5	1	12	21.1	-2.6	18.5	33.0	14.5	Complied

Transmitter Output Power (EIRP) (continued)

Results: 10 MHz Channel Bandwidth / Bottom Channel / QPSK

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2501.0	50	0	20.4	-2.6	17.8	33.0	15.2	Complied
2501.0	25	24	21.2	-2.6	18.6	33.0	14.4	Complied
2501.0	25	0	20.4	-2.6	17.8	33.0	15.2	Complied
2501.0	25	12	20.4	-2.6	17.8	33.0	15.2	Complied
2501.0	1	49	21.4	-2.6	18.8	33.0	14.2	Complied
2501.0	1	0	21.5	-2.6	18.9	33.0	14.1	Complied
2501.0	1	24	22.3	-2.6	19.7	33.0	13.3	Complied

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

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2501.0	50	0	19.3	-2.6	16.7	33.0	16.3	Complied
2501.0	25	24	20.3	-2.6	17.7	33.0	15.3	Complied
2501.0	25	0	19.3	-2.6	16.7	33.0	16.3	Complied
2501.0	25	12	19.3	-2.6	16.7	33.0	16.3	Complied
2501.0	1	49	20.2	-2.6	17.6	33.0	15.4	Complied
2501.0	1	0	20.3	-2.6	17.7	33.0	15.3	Complied
2501.0	1	24	21.0	-2.6	18.4	33.0	14.6	Complied

Results: 10 MHz Channel Bandwidth / Middle Channel / QPSK

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2593.0	50	0	20.3	-2.6	17.7	33.0	15.3	Complied
2593.0	25	24	21.2	-2.6	18.6	33.0	14.4	Complied
2593.0	25	0	20.4	-2.6	17.8	33.0	15.2	Complied
2593.0	25	12	20.3	-2.6	17.7	33.0	15.3	Complied
2593.0	1	49	21.2	-2.6	18.6	33.0	14.4	Complied
2593.0	1	0	21.4	-2.6	18.8	33.0	14.2	Complied
2593.0	1	24	22.2	-2.6	19.6	33.0	13.4	Complied

Transmitter Output Power (EIRP) (continued)

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

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2593.0	50	0	19.3	-2.6	16.7	33.0	16.3	Complied
2593.0	25	24	20.1	-2.6	17.5	33.0	15.5	Complied
2593.0	25	0	19.3	-2.6	16.7	33.0	16.3	Complied
2593.0	25	12	19.2	-2.6	16.6	33.0	16.4	Complied
2593.0	1	49	20.2	-2.6	17.6	33.0	15.4	Complied
2593.0	1	0	20.5	-2.6	17.9	33.0	15.1	Complied
2593.0	1	24	21.2	-2.6	18.6	33.0	14.4	Complied

Results: 10 MHz Channel Bandwidth / Top Channel / QPSK

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2685.0	50	0	20.3	-2.6	17.7	33.0	15.3	Complied
2685.0	25	24	21.2	-2.6	18.6	33.0	14.4	Complied
2685.0	25	0	20.3	-2.6	17.7	33.0	15.3	Complied
2685.0	25	12	20.2	-2.6	17.6	33.0	15.4	Complied
2685.0	1	49	21.3	-2.6	18.7	33.0	14.3	Complied
2685.0	1	0	21.5	-2.6	18.9	33.0	14.1	Complied
2685.0	1	24	22.1	-2.6	19.5	33.0	13.5	Complied

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

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2685.0	50	0	19.3	-2.6	16.7	33.0	16.3	Complied
2685.0	25	24	20.1	-2.6	17.5	33.0	15.5	Complied
2685.0	25	0	19.2	-2.6	16.6	33.0	16.4	Complied
2685.0	25	12	19.2	-2.6	16.6	33.0	16.4	Complied
2685.0	1	49	19.9	-2.6	17.3	33.0	15.7	Complied
2685.0	1	0	20.3	-2.6	17.7	33.0	15.3	Complied
2685.0	1	24	20.9	-2.6	18.3	33.0	14.7	Complied

Transmitter Output Power (EIRP) (continued)

Results: 15 MHz Channel Bandwidth / Bottom Channel / QPSK

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2503.5	75	0	20.3	-2.6	17.7	33.0	15.3	Complied
2503.5	36	37	21.2	-2.6	18.6	33.0	14.4	Complied
2503.5	36	0	20.4	-2.6	17.8	33.0	15.2	Complied
2503.5	36	18	20.3	-2.6	17.7	33.0	15.3	Complied
2503.5	1	74	21.2	-2.6	18.6	33.0	14.4	Complied
2503.5	1	0	21.9	-2.6	19.3	33.0	13.7	Complied
2503.5	1	36	22.3	-2.6	19.7	33.0	13.3	Complied

Results: 15 MHz Channel Bandwidth / Bottom Channel / 16QAM

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2503.5	75	0	19.3	-2.6	16.7	33.0	16.3	Complied
2503.5	36	37	20.2	-2.6	17.6	33.0	15.4	Complied
2503.5	36	0	19.3	-2.6	16.7	33.0	16.3	Complied
2503.5	36	18	19.2	-2.6	16.6	33.0	16.4	Complied
2503.5	1	74	19.9	-2.6	17.3	33.0	15.7	Complied
2503.5	1	0	20.2	-2.6	17.6	33.0	15.4	Complied
2503.5	1	36	21.0	-2.6	18.4	33.0	14.6	Complied

Results: 15 MHz Channel Bandwidth / Middle Channel / QPSK

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2593.0	75	0	20.3	-2.6	17.7	33.0	15.3	Complied
2593.0	36	37	21.1	-2.6	18.5	33.0	14.5	Complied
2593.0	36	0	20.3	-2.6	17.7	33.0	15.3	Complied
2593.0	36	18	20.3	-2.6	17.7	33.0	15.3	Complied
2593.0	1	74	21.1	-2.6	18.5	33.0	14.5	Complied
2593.0	1	0	21.4	-2.6	18.8	33.0	14.2	Complied
2593.0	1	36	22.2	-2.6	19.6	33.0	13.4	Complied

Transmitter Output Power (EIRP) (continued)

Results: 15 MHz Channel Bandwidth / Middle Channel / 16QAM

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2593.0	75	0	19.2	-2.6	16.6	33.0	16.4	Complied
2593.0	36	37	20.1	-2.6	17.5	33.0	15.5	Complied
2593.0	36	0	19.3	-2.6	16.7	33.0	16.3	Complied
2593.0	36	18	19.2	-2.6	16.6	33.0	16.4	Complied
2593.0	1	74	20.1	-2.6	17.5	33.0	15.5	Complied
2593.0	1	0	20.4	-2.6	17.8	33.0	15.2	Complied
2593.0	1	36	21.2	-2.6	18.6	33.0	14.4	Complied

Results: 15 MHz Channel Bandwidth / Top Channel / QPSK

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2682.5	75	0	20.1	-2.6	17.5	33.0	15.5	Complied
2682.5	36	37	21.1	-2.6	18.5	33.0	14.5	Complied
2682.5	36	0	20.4	-2.6	17.8	33.0	15.2	Complied
2682.5	36	18	20.1	-2.6	17.5	33.0	15.5	Complied
2682.5	1	74	21.3	-2.6	18.7	33.0	14.3	Complied
2682.5	1	0	21.5	-2.6	18.9	33.0	14.1	Complied
2682.5	1	36	22.0	-2.6	19.4	33.0	13.6	Complied

Results: 15 MHz Channel Bandwidth / Top Channel / 16QAM

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2682.5	75	0	19.2	-2.6	16.6	33.0	16.4	Complied
2682.5	36	37	20.0	-2.6	17.4	33.0	15.6	Complied
2682.5	36	0	19.3	-2.6	16.7	33.0	16.3	Complied
2682.5	36	18	19.1	-2.6	16.5	33.0	16.5	Complied
2682.5	1	74	19.8	-2.6	17.2	33.0	15.8	Complied
2682.5	1	0	20.2	-2.6	17.6	33.0	15.4	Complied
2682.5	1	36	20.9	-2.6	18.3	33.0	14.7	Complied

Transmitter Output Power (EIRP) (continued)

Results: 20 MHz Channel Bandwidth / Bottom Channel / QPSK

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2506.0	100	0	20.4	-2.6	17.8	33.0	15.2	Complied
2506.0	50	49	21.2	-2.6	18.6	33.0	14.4	Complied
2506.0	50	0	20.4	-2.6	17.8	33.0	15.2	Complied
2506.0	50	24	20.4	-2.6	17.8	33.0	15.2	Complied
2506.0	1	99	21.3	-2.6	18.7	33.0	14.3	Complied
2506.0	1	0	21.8	-2.6	19.2	33.0	13.8	Complied
2506.0	1	49	22.3	-2.6	19.7	33.0	13.3	Complied

Results: 20 MHz Channel Bandwidth / Bottom Channel / 16QAM

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2506.0	100	0	19.4	-2.6	16.8	33.0	16.2	Complied
2506.0	50	49	20.2	-2.6	17.6	33.0	15.4	Complied
2506.0	50	0	19.4	-2.6	16.8	33.0	16.2	Complied
2506.0	50	24	19.4	-2.6	16.8	33.0	16.2	Complied
2506.0	1	99	20.1	-2.6	17.5	33.0	15.5	Complied
2506.0	1	0	20.3	-2.6	17.7	33.0	15.3	Complied
2506.0	1	49	21.0	-2.6	18.4	33.0	14.6	Complied

Results: 20 MHz Channel Bandwidth / Middle Channel / QPSK

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2593.0	100	0	20.3	-2.6	17.7	33.0	15.3	Complied
2593.0	50	49	21.1	-2.6	18.5	33.0	14.5	Complied
2593.0	50	0	20.4	-2.6	17.8	33.0	15.2	Complied
2593.0	50	24	20.2	-2.6	17.6	33.0	15.4	Complied
2593.0	1	99	21.1	-2.6	18.5	33.0	14.5	Complied
2593.0	1	0	21.6	-2.6	19.0	33.0	14.0	Complied
2593.0	1	49	22.1	-2.6	19.5	33.0	13.5	Complied

Transmitter Output Power (EIRP) (continued)

Results: 20 MHz Channel Bandwidth / Middle Channel / 16QAM

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2593.0	100	0	19.3	-2.6	16.7	33.0	16.3	Complied
2593.0	50	49	20.1	-2.6	17.5	33.0	15.5	Complied
2593.0	50	0	19.4	-2.6	16.8	33.0	16.2	Complied
2593.0	50	24	19.3	-2.6	16.7	33.0	16.3	Complied
2593.0	1	99	20.1	-2.6	17.5	33.0	15.5	Complied
2593.0	1	0	20.5	-2.6	17.9	33.0	15.1	Complied
2593.0	1	49	21.2	-2.6	18.6	33.0	14.4	Complied

Results: 20 MHz Channel Bandwidth / Top Channel / QPSK

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2680.0	100	0	20.1	-2.6	17.5	33.0	15.5	Complied
2680.0	50	49	21.1	-2.6	18.5	33.0	14.5	Complied
2680.0	50	0	20.4	-2.6	17.8	33.0	15.2	Complied
2680.0	50	24	20.3	-2.6	17.7	33.0	15.3	Complied
2680.0	1	99	21.2	-2.6	18.6	33.0	14.4	Complied
2680.0	1	0	21.6	-2.6	19.0	33.0	14.0	Complied
2680.0	1	49	22.2	-2.6	19.6	33.0	13.4	Complied

Results: 20 MHz Channel Bandwidth / Top Channel / 16QAM

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2680.0	100	0	19.2	-2.6	16.6	33.0	16.4	Complied
2680.0	50	49	20.1	-2.6	17.5	33.0	15.5	Complied
2680.0	50	0	19.4	-2.6	16.8	33.0	16.2	Complied
2680.0	50	24	19.3	-2.6	16.7	33.0	16.3	Complied
2680.0	1	99	20.0	-2.6	17.4	33.0	15.6	Complied
2680.0	1	0	20.2	-2.6	17.6	33.0	15.4	Complied
2680.0	1	49	21.0	-2.6	18.4	33.0	14.6	Complied

Transmitter Output Power (EIRP) (continued)

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M2002	Thermohygrometer	Testo	608-H1	45041825	02 Apr 2017	12
M1869	Wideband Radio Comms Tester	Rohde & Schwarz	CMW500	145923	05 Apr 2017	12
A2845	Attenuator	Radiall	R411.806.121	24325927	Calibrated before use	-
A2844	Attenuator	Radiall	R411.803.121	23404066	Calibrated before use	-
S0562	Power Supply	Thurlby Thandar	PL330QMD	054895	Calibrated before use	-
M1269	Multimeter	Fluke	179	90250210	13 May 2017	12
G0628	Signal Generator	Rohde & Schwarz	SMBV100A	261847	25 Jan 2017	12
M1835	Signal Analyser	Rohde & Schwarz	FSV30	103050	26 Feb 2017	12

5.2.2. Transmitter Output Power (EIRP) - UAT

Test Summary:

Test Engineer:	Keith Tucker	**Test Date:**	22 July 2016
Test Sample IMEI:	358640070269106		

FCC Reference:	Parts 2.1046 & 27.50(h)(2)
Test Method Used:	KDB 971168 Section 2.2 footnote 1, Section 5.6 & Notes below

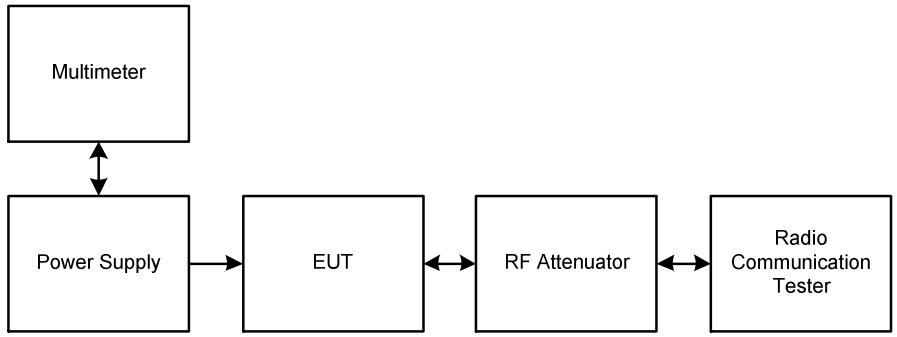
Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	51

Note(s):

1. The customer stated that the antenna gain is 0.64 dBi which has been rounded to a value of 1 decimal place for reporting purposes. The antenna gain was added to the conducted output power to obtain the EIRP.
2. Measurements were performed with the EUT transmitting with QPSK and 16QAM modulation schemes, with resource blocks settings as detailed.
3. Conducted average power was measured using a calibrated Rohde and Schwarz CMW 500 Wideband Radio Communication Tester.
4. The RF port of the EUT was connected to the Communication Tester via an RF cable and suitable attenuation. An RF level offset was entered on the Communication Tester to compensate for the loss of the attenuator and RF cable.

Test setup:



Transmitter Output Power (EIRP) (continued)

Results: 5 MHz Channel Bandwidth / Bottom Channel / QPSK

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2498.5	25	0	18.4	0.6	19.0	33.0	14.0	Complied
2498.5	12	13	18.7	0.6	19.3	33.0	13.7	Complied
2498.5	12	0	18.2	0.6	18.8	33.0	14.2	Complied
2498.5	12	7	18.5	0.6	19.1	33.0	13.9	Complied
2498.5	1	24	19.8	0.6	20.4	33.0	12.6	Complied
2498.5	1	0	18.8	0.6	19.4	33.0	13.6	Complied
2498.5	1	12	19.3	0.6	19.9	33.0	13.1	Complied

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

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2498.5	25	0	17.5	0.6	18.1	33.0	14.9	Complied
2498.5	12	13	17.8	0.6	18.4	33.0	14.6	Complied
2498.5	12	0	17.2	0.6	17.8	33.0	15.2	Complied
2498.5	12	7	17.5	0.6	18.1	33.0	14.9	Complied
2498.5	1	24	18.9	0.6	19.5	33.0	13.5	Complied
2498.5	1	0	17.9	0.6	18.5	33.0	14.5	Complied
2498.5	1	12	18.4	0.6	19.0	33.0	14.0	Complied

Results: 5 MHz Channel Bandwidth / Middle Channel / QPSK

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2593.0	25	0	18.6	0.6	19.2	33.0	13.8	Complied
2593.0	12	13	18.6	0.6	19.2	33.0	13.8	Complied
2593.0	12	0	18.6	0.6	19.2	33.0	13.8	Complied
2593.0	12	7	18.6	0.6	19.2	33.0	13.8	Complied
2593.0	1	24	19.5	0.6	20.1	33.0	12.9	Complied
2593.0	1	0	19.6	0.6	20.2	33.0	12.8	Complied
2593.0	1	12	19.5	0.6	20.1	33.0	12.9	Complied

Transmitter Output Power (EIRP) (continued)

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

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2593.0	25	0	17.6	0.6	18.2	33.0	14.8	Complied
2593.0	12	13	17.7	0.6	18.3	33.0	14.7	Complied
2593.0	12	0	17.7	0.6	18.3	33.0	14.7	Complied
2593.0	12	7	17.8	0.6	18.4	33.0	14.6	Complied
2593.0	1	24	18.8	0.6	19.4	33.0	13.6	Complied
2593.0	1	0	18.8	0.6	19.4	33.0	13.6	Complied
2593.0	1	12	18.8	0.6	19.4	33.0	13.6	Complied

Results: 5 MHz Channel Bandwidth / Top Channel / QPSK

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2687.5	25	0	18.9	0.6	19.5	33.0	13.5	Complied
2687.5	12	13	19.0	0.6	19.6	33.0	13.4	Complied
2687.5	12	0	19.0	0.6	19.6	33.0	13.4	Complied
2687.5	12	7	19.0	0.6	19.6	33.0	13.4	Complied
2687.5	1	24	19.8	0.6	20.4	33.0	12.6	Complied
2687.5	1	0	20.0	0.6	20.6	33.0	12.4	Complied
2687.5	1	12	19.9	0.6	20.5	33.0	12.5	Complied

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

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2687.5	25	0	17.9	0.6	18.5	33.0	14.5	Complied
2687.5	12	13	17.9	0.6	18.5	33.0	14.5	Complied
2687.5	12	0	18.0	0.6	18.6	33.0	14.4	Complied
2687.5	12	7	18.0	0.6	18.6	33.0	14.4	Complied
2687.5	1	24	18.9	0.6	19.5	33.0	13.5	Complied
2687.5	1	0	19.0	0.6	19.6	33.0	13.4	Complied
2687.5	1	12	18.9	0.6	19.5	33.0	13.5	Complied

Transmitter Output Power (EIRP) (continued)

Results: 10 MHz Channel Bandwidth / Bottom Channel / QPSK

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2501.0	50	0	18.7	0.6	19.3	33.0	13.7	Complied
2501.0	25	24	19.3	0.6	19.9	33.0	13.1	Complied
2501.0	25	0	18.6	0.6	19.2	33.0	13.8	Complied
2501.0	25	12	18.8	0.6	19.4	33.0	13.6	Complied
2501.0	1	49	19.9	0.6	20.5	33.0	12.5	Complied
2501.0	1	0	19.0	0.6	19.6	33.0	13.4	Complied
2501.0	1	24	19.9	0.6	20.5	33.0	12.5	Complied

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

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2501.0	50	0	17.7	0.6	18.3	33.0	14.7	Complied
2501.0	25	24	18.3	0.6	18.9	33.0	14.1	Complied
2501.0	25	0	17.6	0.6	18.2	33.0	14.8	Complied
2501.0	25	12	17.7	0.6	18.3	33.0	14.7	Complied
2501.0	1	49	18.6	0.6	19.2	33.0	13.8	Complied
2501.0	1	0	17.8	0.6	18.4	33.0	14.6	Complied
2501.0	1	24	18.8	0.6	19.4	33.0	13.6	Complied

Results: 10 MHz Channel Bandwidth / Middle Channel / QPSK

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2593.0	50	0	17.7	0.6	18.3	33.0	14.7	Complied
2593.0	25	24	18.7	0.6	19.3	33.0	13.7	Complied
2593.0	25	0	17.7	0.6	18.3	33.0	14.7	Complied
2593.0	25	12	17.6	0.6	18.2	33.0	14.8	Complied
2593.0	1	49	18.7	0.6	19.3	33.0	13.7	Complied
2593.0	1	0	18.8	0.6	19.4	33.0	13.6	Complied
2593.0	1	24	19.6	0.6	20.2	33.0	12.8	Complied

Transmitter Output Power (EIRP) (continued)

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

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2593.0	50	0	16.7	0.6	17.3	33.0	15.7	Complied
2593.0	25	24	17.7	0.6	18.3	33.0	14.7	Complied
2593.0	25	0	16.7	0.6	17.3	33.0	15.7	Complied
2593.0	25	12	16.7	0.6	17.3	33.0	15.7	Complied
2593.0	1	49	17.7	0.6	18.3	33.0	14.7	Complied
2593.0	1	0	17.9	0.6	18.5	33.0	14.5	Complied
2593.0	1	24	18.7	0.6	19.3	33.0	13.7	Complied

Results: 10 MHz Channel Bandwidth / Top Channel / QPSK

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2685.0	50	0	18.5	0.6	19.1	33.0	13.9	Complied
2685.0	25	24	19.0	0.6	19.6	33.0	13.4	Complied
2685.0	25	0	18.5	0.6	19.1	33.0	13.9	Complied
2685.0	25	12	18.4	0.6	19.0	33.0	14.0	Complied
2685.0	1	49	19.5	0.6	20.1	33.0	12.9	Complied
2685.0	1	0	19.6	0.6	20.2	33.0	12.8	Complied
2685.0	1	24	20.1	0.6	20.7	33.0	12.3	Complied

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

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2685.0	50	0	17.4	0.6	18.0	33.0	15.0	Complied
2685.0	25	24	17.9	0.6	18.5	33.0	14.5	Complied
2685.0	25	0	17.4	0.6	18.0	33.0	15.0	Complied
2685.0	25	12	17.4	0.6	18.0	33.0	15.0	Complied
2685.0	1	49	18.3	0.6	18.9	33.0	14.1	Complied
2685.0	1	0	18.4	0.6	19.0	33.0	14.0	Complied
2685.0	1	24	18.8	0.6	19.4	33.0	13.6	Complied

Transmitter Output Power (EIRP) (continued)

Results: 15 MHz Channel Bandwidth / Bottom Channel / QPSK

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2503.5	75	0	18.8	0.6	19.4	33.0	13.6	Complied
2503.5	36	37	19.7	0.6	20.3	33.0	12.7	Complied
2503.5	36	0	18.8	0.6	19.4	33.0	13.6	Complied
2503.5	36	18	18.8	0.6	19.4	33.0	13.6	Complied
2503.5	1	74	19.5	0.6	20.1	33.0	12.9	Complied
2503.5	1	0	19.2	0.6	19.8	33.0	13.2	Complied
2503.5	1	36	20.2	0.6	20.8	33.0	12.2	Complied

Results: 15 MHz Channel Bandwidth / Bottom Channel / 16QAM

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2503.5	75	0	17.8	0.6	18.4	33.0	14.6	Complied
2503.5	36	37	18.7	0.6	19.3	33.0	13.7	Complied
2503.5	36	0	17.8	0.6	18.4	33.0	14.6	Complied
2503.5	36	18	17.8	0.6	18.4	33.0	14.6	Complied
2503.5	1	74	18.4	0.6	19.0	33.0	14.0	Complied
2503.5	1	0	18.1	0.6	18.7	33.0	14.3	Complied
2503.5	1	36	19.1	0.6	19.7	33.0	13.3	Complied

Results: 15 MHz Channel Bandwidth / Middle Channel / QPSK

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2593.0	75	0	17.6	0.6	18.2	33.0	14.8	Complied
2593.0	36	37	18.6	0.6	19.2	33.0	13.8	Complied
2593.0	36	0	17.7	0.6	18.3	33.0	14.7	Complied
2593.0	36	18	17.6	0.6	18.2	33.0	14.8	Complied
2593.0	1	74	18.6	0.6	19.2	33.0	13.8	Complied
2593.0	1	0	18.9	0.6	19.5	33.0	13.5	Complied
2593.0	1	36	19.6	0.6	20.2	33.0	12.8	Complied

Transmitter Output Power (EIRP) (continued)

Results: 15 MHz Channel Bandwidth / Middle Channel / 16QAM

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2593.0	75	0	16.7	0.6	17.3	33.0	15.7	Complied
2593.0	36	37	17.6	0.6	18.2	33.0	14.8	Complied
2593.0	36	0	16.8	0.6	17.4	33.0	15.6	Complied
2593.0	36	18	16.7	0.6	17.3	33.0	15.7	Complied
2593.0	1	74	17.6	0.6	18.2	33.0	14.8	Complied
2593.0	1	0	17.9	0.6	18.5	33.0	14.5	Complied
2593.0	1	36	18.8	0.6	19.4	33.0	13.6	Complied

Results: 15 MHz Channel Bandwidth / Top Channel / QPSK

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2682.5	75	0	18.5	0.6	19.1	33.0	13.9	Complied
2682.5	36	37	19.1	0.6	19.7	33.0	13.3	Complied
2682.5	36	0	18.6	0.6	19.2	33.0	13.8	Complied
2682.5	36	18	18.5	0.6	19.1	33.0	13.9	Complied
2682.5	1	74	19.2	0.6	19.8	33.0	13.2	Complied
2682.5	1	0	19.6	0.6	20.2	33.0	12.8	Complied
2682.5	1	36	20.2	0.6	20.8	33.0	12.2	Complied

Results: 15 MHz Channel Bandwidth / Top Channel / 16QAM

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2682.5	75	0	17.4	0.6	18.0	33.0	15.0	Complied
2682.5	36	37	18.0	0.6	18.6	33.0	14.4	Complied
2682.5	36	0	17.4	0.6	18.0	33.0	15.0	Complied
2682.5	36	18	17.3	0.6	17.9	33.0	15.1	Complied
2682.5	1	74	18.1	0.6	18.7	33.0	14.3	Complied
2682.5	1	0	18.5	0.6	19.1	33.0	13.9	Complied
2682.5	1	36	19.0	0.6	19.6	33.0	13.4	Complied

Transmitter Output Power (EIRP) (continued)

Results: 20 MHz Channel Bandwidth / Bottom Channel / QPSK

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2506.0	100	0	18.8	0.6	19.4	33.0	13.6	Complied
2506.0	50	49	19.7	0.6	20.3	33.0	12.7	Complied
2506.0	50	0	18.9	0.6	19.5	33.0	13.5	Complied
2506.0	50	24	18.9	0.6	19.5	33.0	13.5	Complied
2506.0	1	99	19.6	0.6	20.2	33.0	12.8	Complied
2506.0	1	0	19.4	0.6	20.0	33.0	13.0	Complied
2506.0	1	49	20.5	0.6	21.1	33.0	11.9	Complied

Results: 20 MHz Channel Bandwidth / Bottom Channel / 16QAM

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2506.0	100	0	17.7	0.6	18.3	33.0	14.7	Complied
2506.0	50	49	18.7	0.6	19.3	33.0	13.7	Complied
2506.0	50	0	17.9	0.6	18.5	33.0	14.5	Complied
2506.0	50	24	17.9	0.6	18.5	33.0	14.5	Complied
2506.0	1	99	18.4	0.6	19.0	33.0	14.0	Complied
2506.0	1	0	18.2	0.6	18.8	33.0	14.2	Complied
2506.0	1	49	19.4	0.6	20.0	33.0	13.0	Complied

Results: 20 MHz Channel Bandwidth / Middle Channel / QPSK

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2593.0	100	0	17.7	0.6	18.3	33.0	14.7	Complied
2593.0	50	49	18.7	0.6	19.3	33.0	13.7	Complied
2593.0	50	0	17.9	0.6	18.5	33.0	14.5	Complied
2593.0	50	24	17.8	0.6	18.4	33.0	14.6	Complied
2593.0	1	99	18.7	0.6	19.3	33.0	13.7	Complied
2593.0	1	0	19.2	0.6	19.8	33.0	13.2	Complied
2593.0	1	49	19.6	0.6	20.2	33.0	12.8	Complied

Transmitter Output Power (EIRP) (continued)

Results: 20 MHz Channel Bandwidth / Middle Channel / 16QAM

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2593.0	100	0	16.7	0.6	17.3	33.0	15.7	Complied
2593.0	50	49	17.6	0.6	18.2	33.0	14.8	Complied
2593.0	50	0	16.9	0.6	17.5	33.0	15.5	Complied
2593.0	50	24	16.7	0.6	17.3	33.0	15.7	Complied
2593.0	1	99	17.6	0.6	18.2	33.0	14.8	Complied
2593.0	1	0	18.0	0.6	18.6	33.0	14.4	Complied
2593.0	1	49	18.6	0.6	19.2	33.0	13.8	Complied

Results: 20 MHz Channel Bandwidth / Top Channel / QPSK

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2680.0	100	0	18.5	0.6	19.1	33.0	13.9	Complied
2680.0	50	49	19.1	0.6	19.7	33.0	13.3	Complied
2680.0	50	0	18.7	0.6	19.3	33.0	13.7	Complied
2680.0	50	24	18.5	0.6	19.1	33.0	13.9	Complied
2680.0	1	99	19.5	0.6	20.1	33.0	12.9	Complied
2680.0	1	0	20.0	0.6	20.6	33.0	12.4	Complied
2680.0	1	49	20.3	0.6	20.9	33.0	12.1	Complied

Results: 20 MHz Channel Bandwidth / Top Channel / 16QAM

Frequency (MHz)	Resource Block(s)	Resource Block Offset	Conducted RF Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
2680.0	100	0	17.4	0.6	18.0	33.0	15.0	Complied
2680.0	50	49	18.2	0.6	18.8	33.0	14.2	Complied
2680.0	50	0	17.7	0.6	18.3	33.0	14.7	Complied
2680.0	50	24	17.5	0.6	18.1	33.0	14.9	Complied
2680.0	1	99	18.3	0.6	18.9	33.0	14.1	Complied
2680.0	1	0	18.8	0.6	19.4	33.0	13.6	Complied
2680.0	1	49	19.2	0.6	19.8	33.0	13.2	Complied

Transmitter Output Power (EIRP) (continued)

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M2002	Thermohygrometer	Testo	608-H1	45041825	02 Apr 2017	12
M1869	Wideband Radio Comms Tester	Rohde & Schwarz	CMW500	145923	05 Apr 2017	12
A2845	Attenuator	Radiall	R411.806.121	24325927	Calibrated before use	-
A2844	Attenuator	Radiall	R411.803.121	23404066	Calibrated before use	-
S0562	Power Supply	Thurlby Thandar	PL330QMD	054895	Calibrated before use	-
M1269	Multimeter	Fluke	179	90250210	13 May 2017	12
G0628	Signal Generator	Rohde & Schwarz	SMBV100A	261847	25 Jan 2017	12
M1835	Signal Analyser	Rohde & Schwarz	FSV30	103050	26 Feb 2017	12

5.2.3. Transmitter Peak-To-Average Ratio (PAR)

Test Summary:

Test Engineer:	Keith Tucker	**Test Date:**	23 July 2016
Test Sample IMEI:	358640070269106		

FCC Reference:	Part 27.50(d)(5)
Test Method Used:	KDB 971168 Section 5.7.1

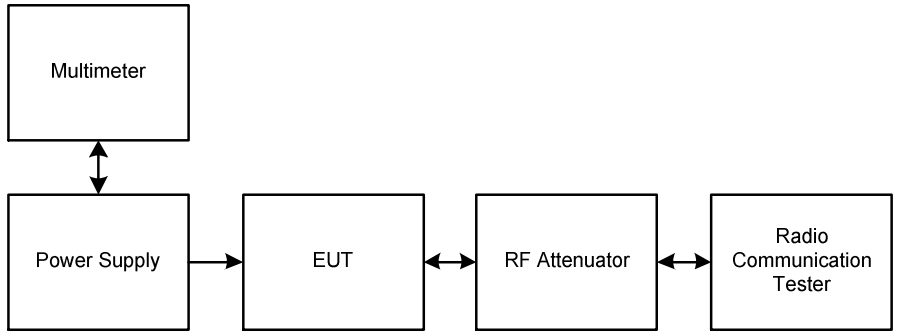
Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	47

Note(s):

1. The CCDF analyser function of a communications test set was used to measure PAPR when the EUT was transmitting with both QPSK and 16QAM modulations, all supported channel bandwidths on bottom, middle and top channels for 1 resource block. Maximum PAPR levels associated with a probability of 0.1% were recorded.

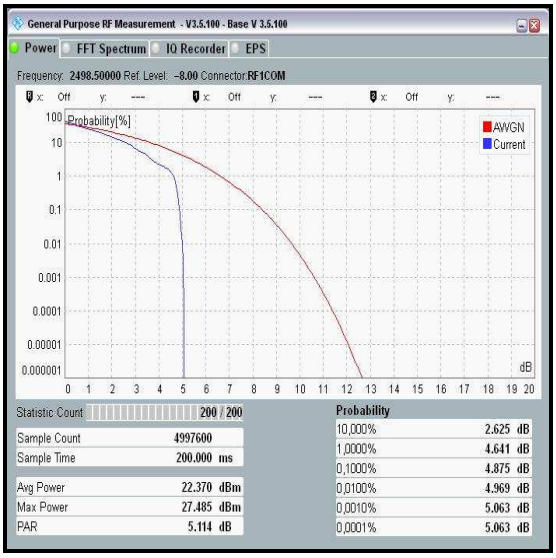
Test setup:



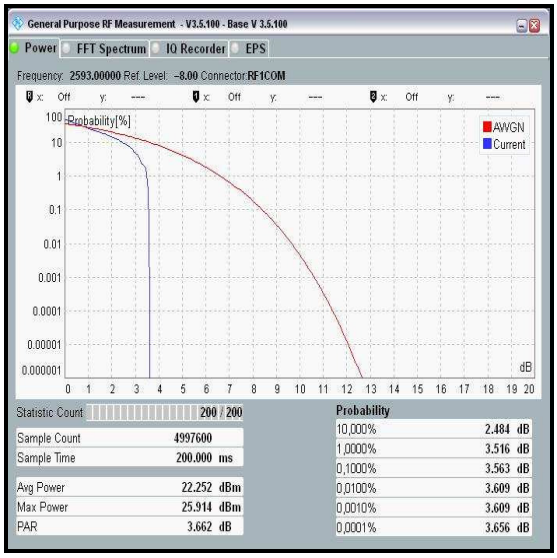
Transmitter Peak-To-Average Ratio (PAR) (continued)

Results: 5 MHz Channel Bandwidth / QPSK

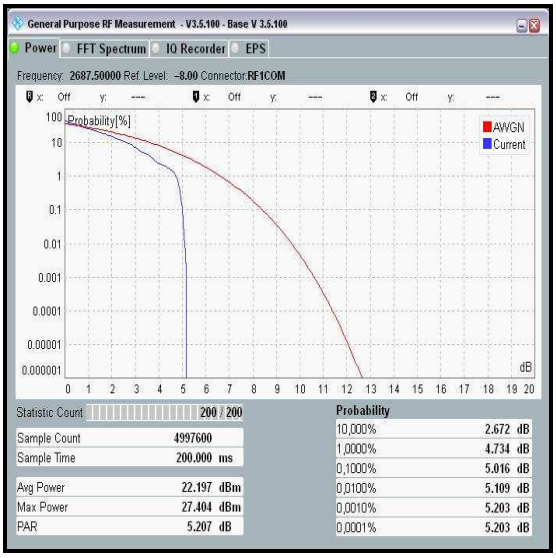
Channel	Resource Block(s)	Resource Block Offset	PAR (dB)	Ratio Limit (dB)	Margin (dB)	Result
Bottom	1	0	4.9	13.0	8.1	Complied
Middle	1	0	3.6	13.0	9.4	Complied
Top	1	0	5.0	13.0	8.0	Complied



Bottom Channel / QPSK



Middle Channel / QPSK

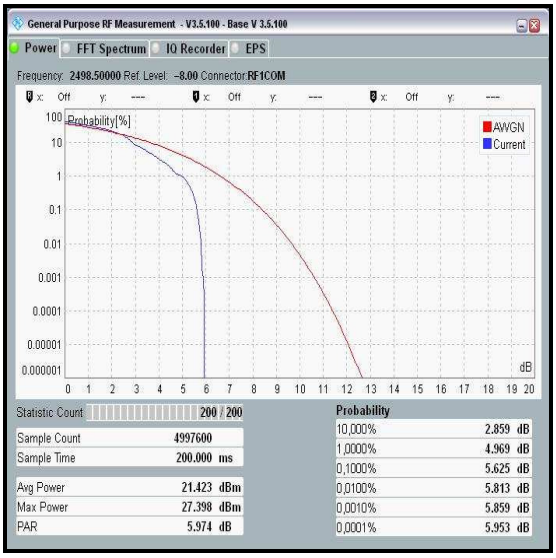


Top Channel / QPSK

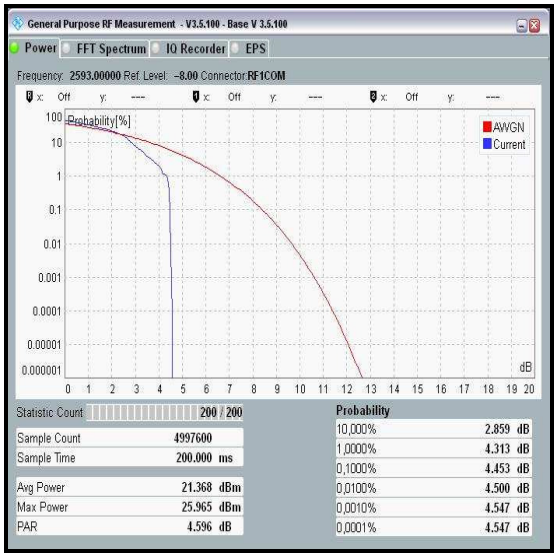
Transmitter Peak-To-Average Ratio (PAR) (continued)

Results: 5 MHz Channel Bandwidth / 16QAM

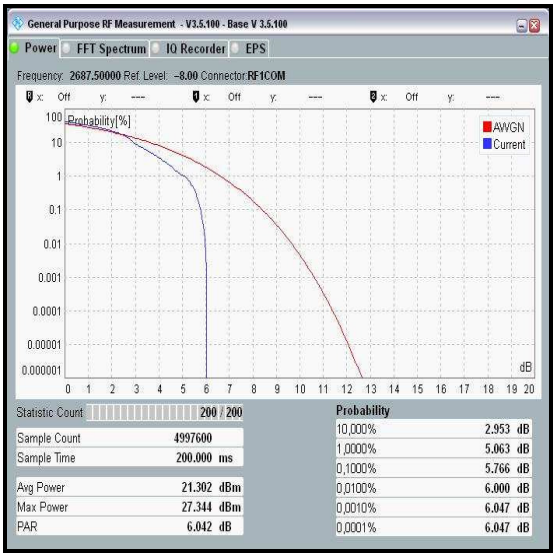
Channel	Resource Block(s)	Resource Block Offset	PAR (dB)	Ratio Limit (dB)	Margin (dB)	Result
Bottom	1	0	5.6	13.0	7.4	Complied
Middle	1	0	4.5	13.0	8.5	Complied
Top	1	0	5.8	13.0	7.2	Complied



Bottom Channel / 16QAM



Middle Channel / 16QAM

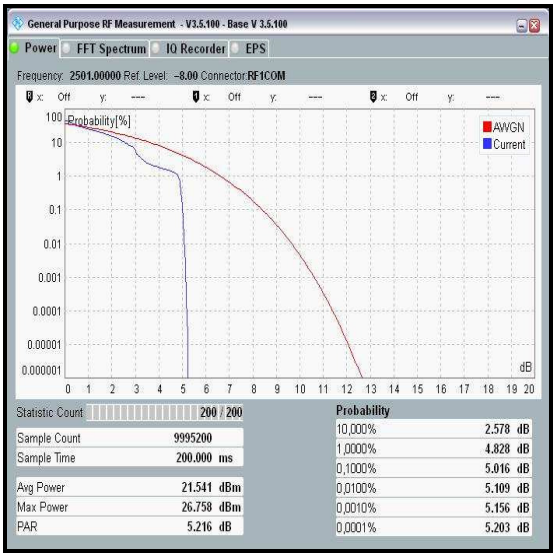


Top Channel / 16QAM

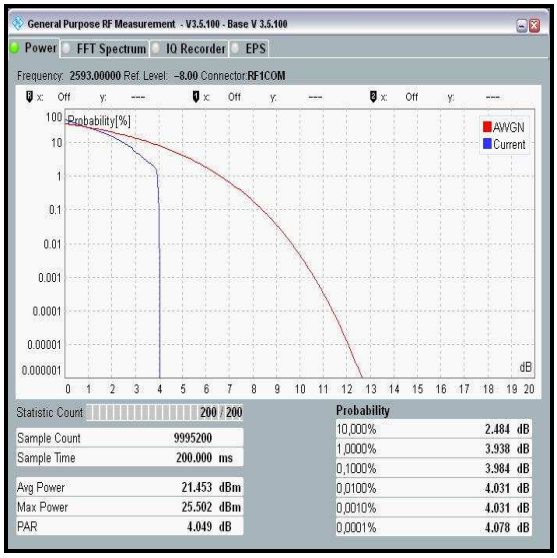
Transmitter Peak-To-Average Ratio (PAR) (continued)

Results: 10 MHz Channel Bandwidth / QPSK

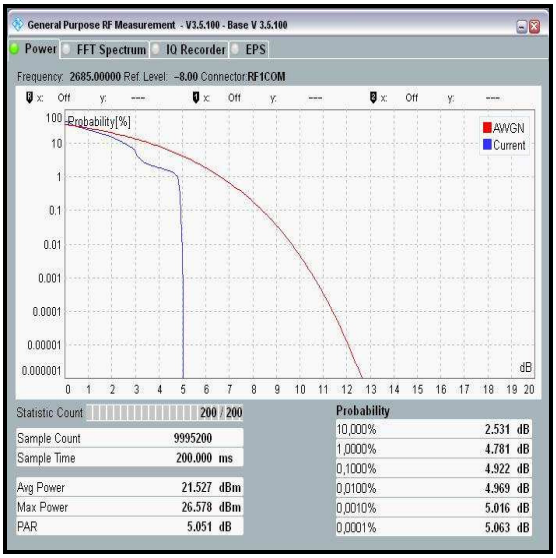
Channel	Resource Block(s)	Resource Block Offset	PAR (dB)	Ratio Limit (dB)	Margin (dB)	Result
Bottom	1	0	5.0	13.0	8.0	Complied
Middle	1	0	4.0	13.0	9.0	Complied
Top	1	0	4.9	13.0	8.1	Complied



Bottom Channel / QPSK



Middle Channel / QPSK

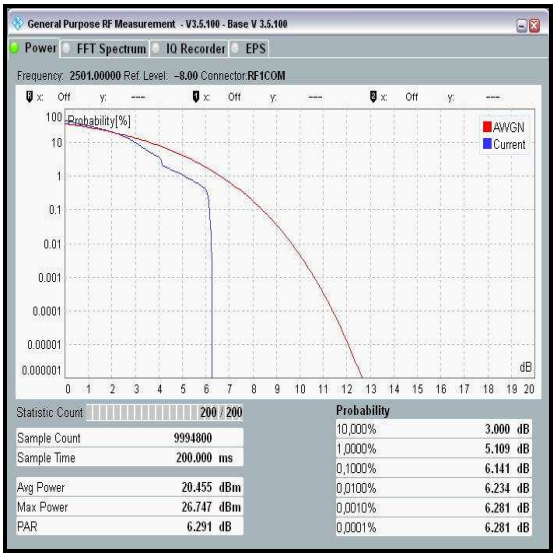


Top Channel / QPSK

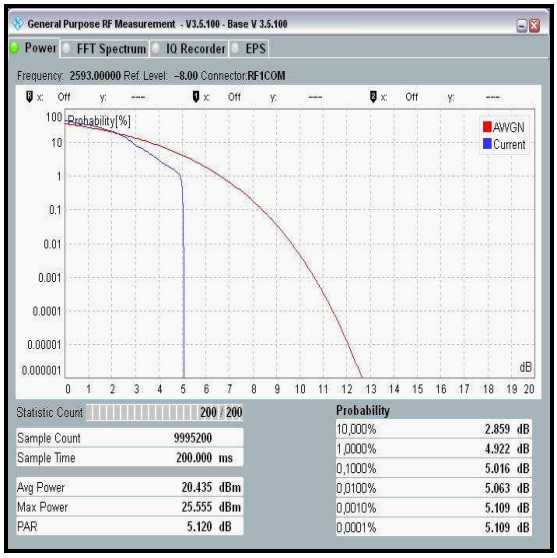
Transmitter Peak-To-Average Ratio (PAR) (continued)

Results: 10 MHz Channel Bandwidth / 16QAM

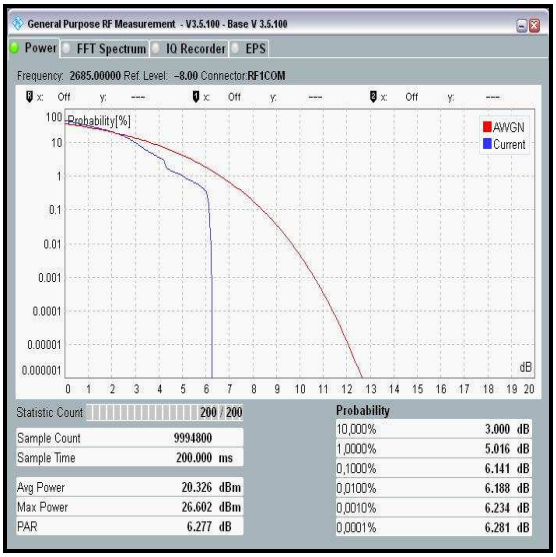
Channel	Resource Block(s)	Resource Block Offset	PAR (dB)	Ratio Limit (dB)	Margin (dB)	Result
Bottom	1	0	6.1	13.0	6.9	Complied
Middle	1	0	5.0	13.0	8.0	Complied
Top	1	0	6.1	13.0	6.9	Complied



Bottom Channel / 16QAM



Middle Channel / 16QAM

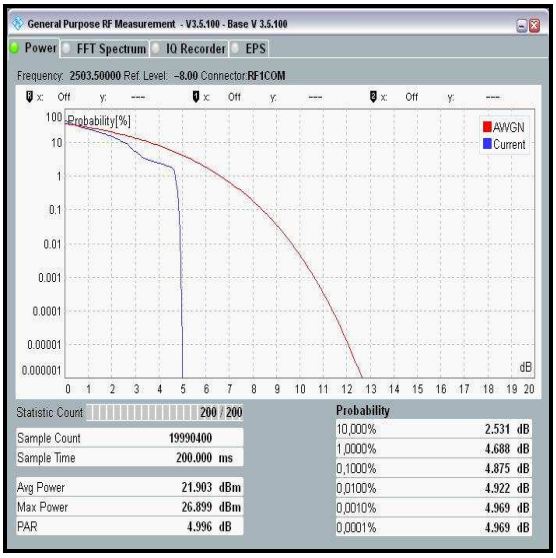


Top Channel / 16QAM

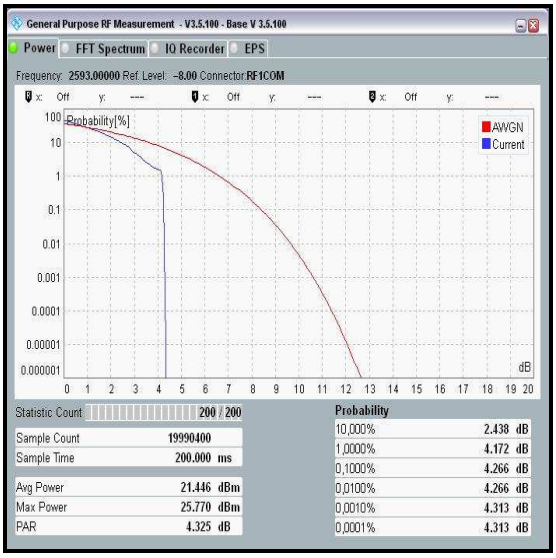
Transmitter Peak-To-Average Ratio (PAR) (continued)

Results: 15 MHz Channel Bandwidth / QPSK

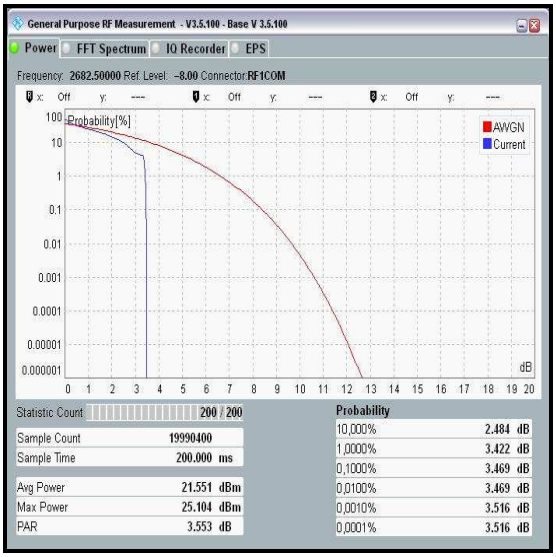
Channel	Resource Block(s)	Resource Block Offset	PAR (dB)	Ratio Limit (dB)	Margin (dB)	Result
Bottom	1	0	4.9	13.0	8.1	Complied
Middle	1	0	4.3	13.0	8.7	Complied
Top	1	0	3.5	13.0	9.5	Complied



Bottom Channel / QPSK



Middle Channel / QPSK

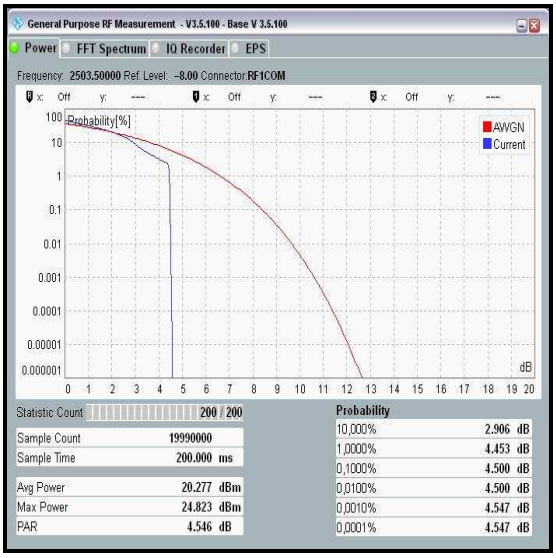


Top Channel / QPSK

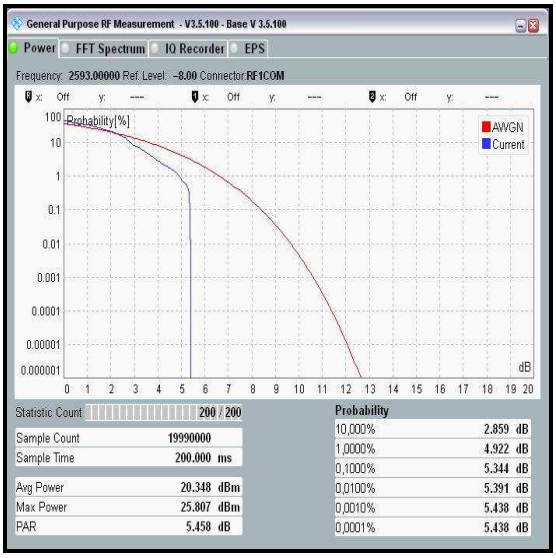
Transmitter Peak-To-Average Ratio (PAR) (continued)

Results: 15 MHz Channel Bandwidth / 16QAM

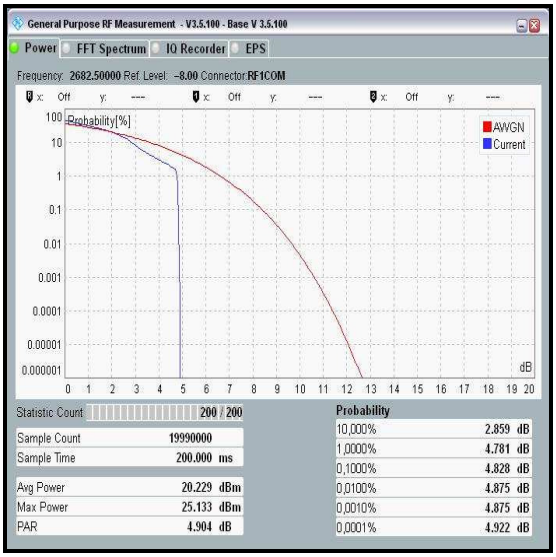
Channel	Resource Block(s)	Resource Block Offset	PAR (dB)	Ratio Limit (dB)	Margin (dB)	Result
Bottom	1	0	4.5	13.0	8.5	Complied
Middle	1	0	5.3	13.0	7.7	Complied
Top	1	0	4.8	13.0	8.2	Complied



Bottom Channel / 16QAM



Middle Channel / 16QAM

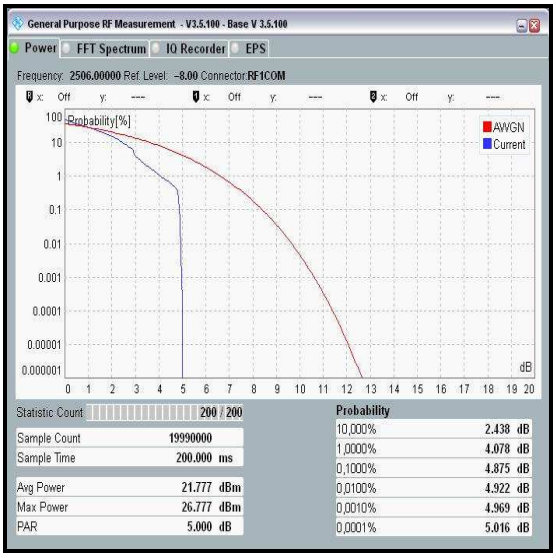


Top Channel / 16QAM

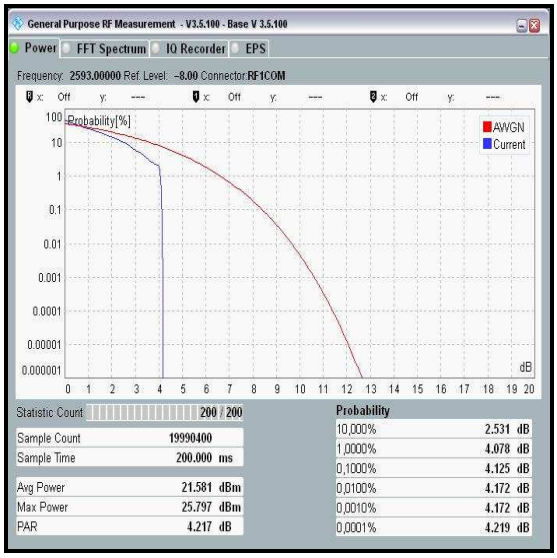
Transmitter Peak-To-Average Ratio (PAR) (continued)

Results: 20 MHz Channel Bandwidth / QPSK

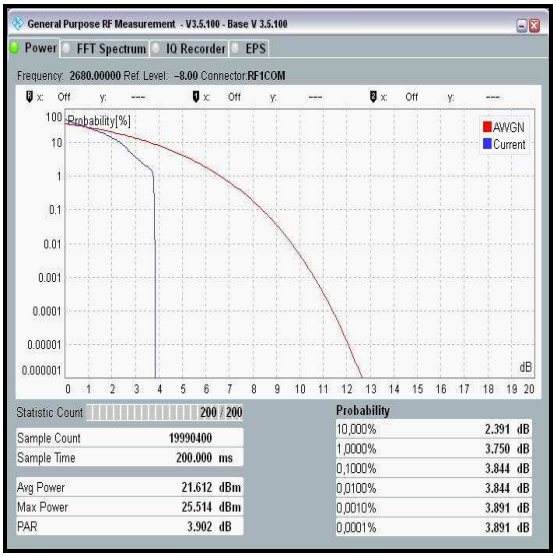
Channel	Resource Block(s)	Resource Block Offset	PAR (dB)	Ratio Limit (dB)	Margin (dB)	Result
Bottom	1	0	4.9	13.0	8.1	Complied
Middle	1	0	4.1	13.0	8.9	Complied
Top	1	0	3.8	13.0	9.2	Complied



Bottom Channel / QPSK



Middle Channel / QPSK

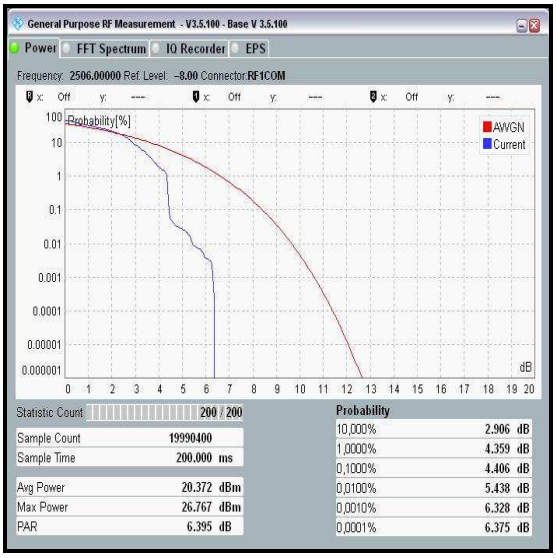


Top Channel / QPSK

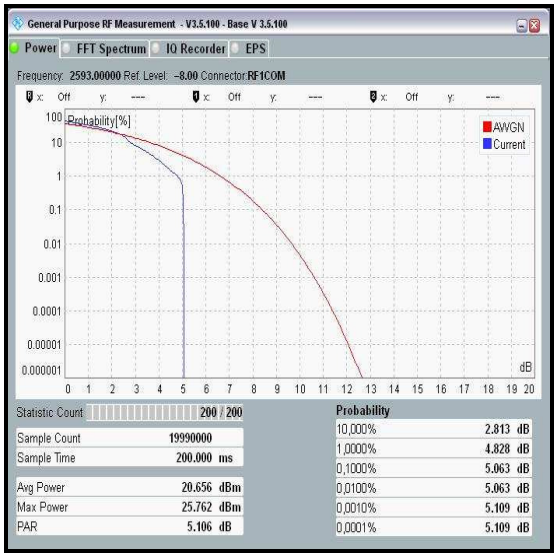
Transmitter Peak-To-Average Ratio (PAR) (continued)

Results: 20 MHz Channel Bandwidth / 16QAM

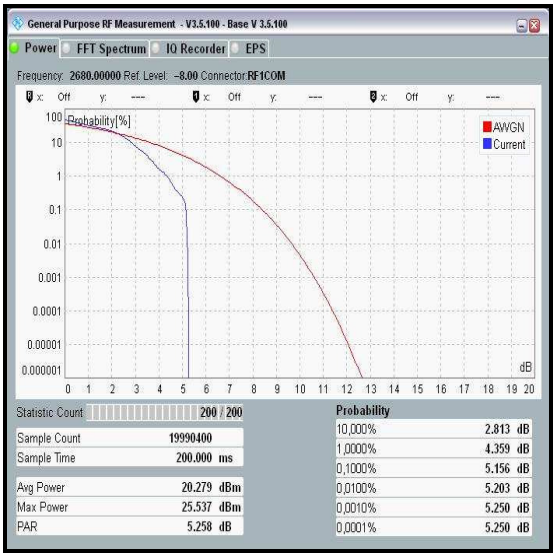
Channel	Resource Block(s)	Resource Block Offset	PAR (dB)	Ratio Limit (dB)	Margin (dB)	Result
Bottom	1	0	4.4	13.0	8.6	Complied
Middle	1	0	5.1	13.0	7.9	Complied
Top	1	0	5.2	13.0	7.8	Complied



Bottom Channel / 16QAM



Middle Channel / 16QAM



Top Channel / 16QAM

Transmitter Peak-To-Average Ratio (PAR) (continued)

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M2002	Thermohygrometer	Testo	608-H1	45041825	02 Apr 2017	12
M1869	Wideband Radio Comms Tester	Rohde & Schwarz	CMW500	145923	05 Apr 2017	12
A2845	Attenuator	Radiall	R411.806.121	24325927	Calibrated before use	-
A2844	Attenuator	Radiall	R411.803.121	23404066	Calibrated before use	-
S0562	Power Supply	Thurlby Thandar	PL330QMD	054895	Calibrated before use	-
M1269	Multimeter	Fluke	179	90250210	13 May 2017	12
G0628	Signal Generator	Rohde & Schwarz	SMBV100A	261847	25 Jan 2017	12
M1835	Signal Analyser	Rohde & Schwarz	FSV30	103050	26 Feb 2017	12

5.2.4. Transmitter Occupied Bandwidth

Test Summary:

Test Engineer:	Keith Tucker	**Test Date:**	04 July 2016
Test Sample IMEI:	358640070269106		

FCC Reference:	Part 2.1049
Test Method Used:	KDB 971168 Section 4.2

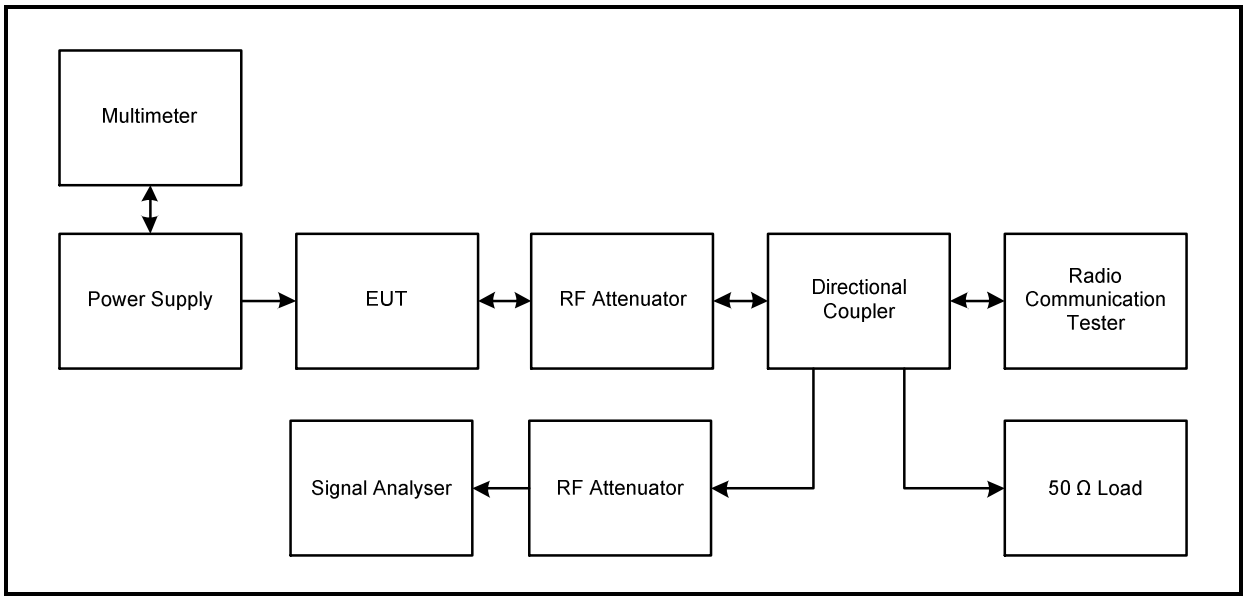
Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	46

Note(s):

1. Occupied bandwidth (99% bandwidth) was measured using a signal analyser 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 signal analyser via RF cables, directional coupler and suitable attenuation.

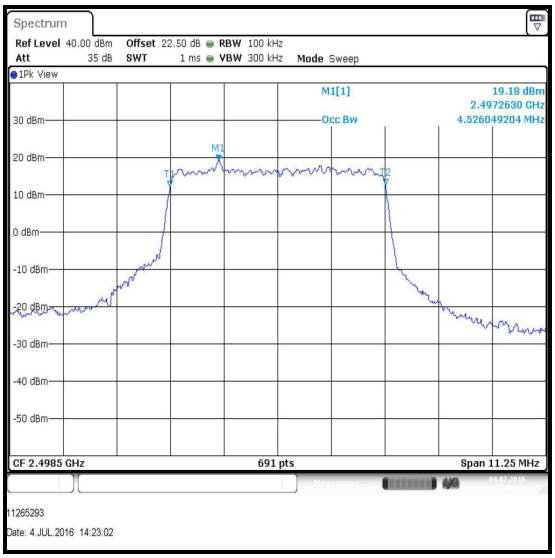
Test setup:



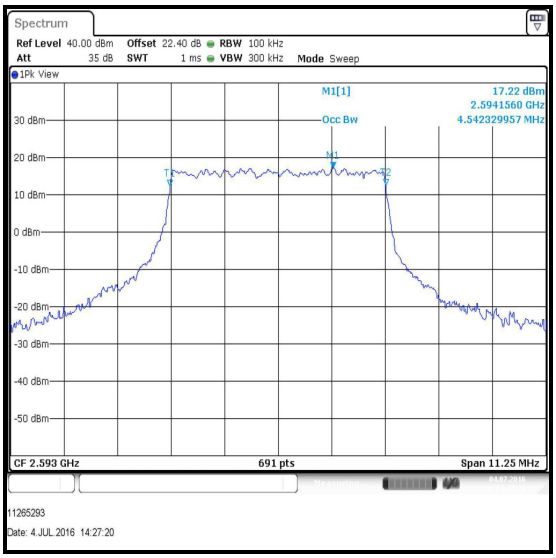
Transmitter Occupied Bandwidth (continued)

Results: 5 MHz Channel Bandwidth / QPSK

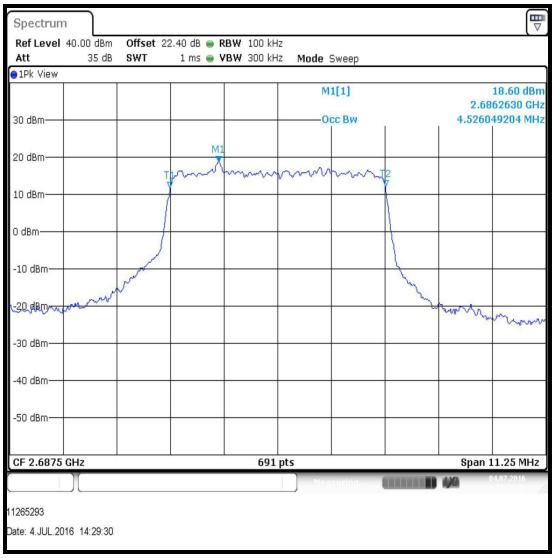
Channel	Resource Block(s)	Resource Block Offset	Resolution Bandwidth (kHz)	Video Bandwidth (kHz)	Occupied Bandwidth (MHz)
Bottom	25	0	100	300	4.526
Middle	25	0	100	300	4.542
Top	25	0	100	300	4.526



Bottom Channel / QPSK



Middle Channel / QPSK

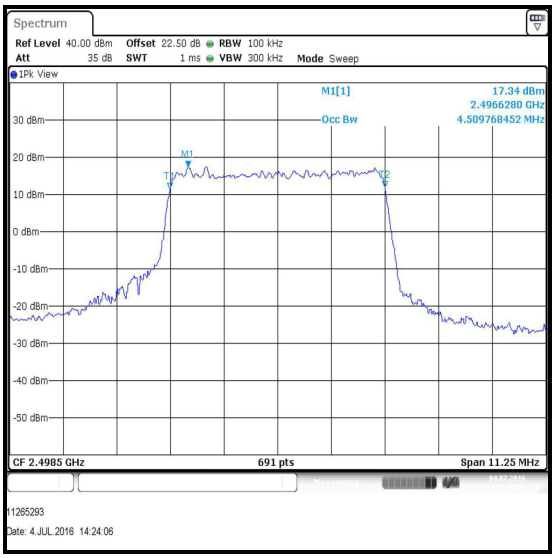


Top Channel / QPSK

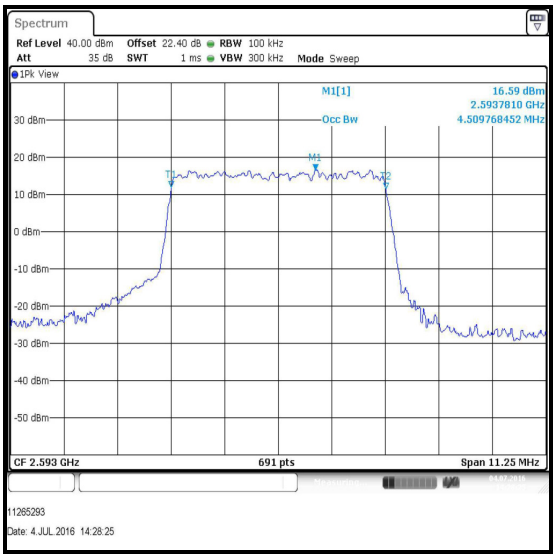
Transmitter Occupied Bandwidth (continued)

Results: 5 MHz Channel Bandwidth / 16QAM

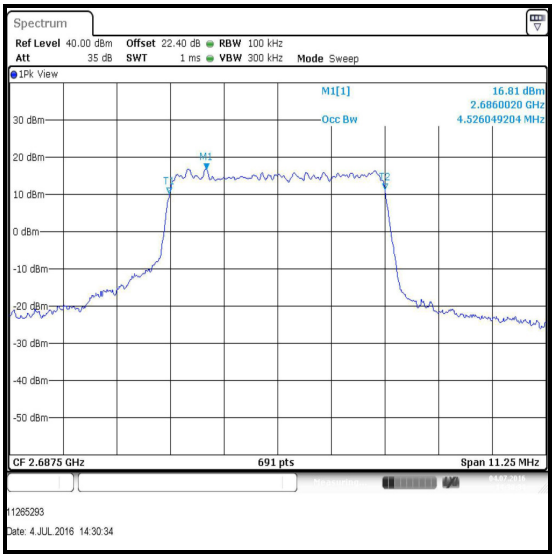
Channel	Resource Block(s)	Resource Block Offset	Resolution Bandwidth (kHz)	Video Bandwidth (kHz)	Occupied Bandwidth (MHz)
Bottom	25	0	100	300	4.510
Middle	25	0	100	300	4.510
Top	25	0	100	300	4.526



Bottom Channel / 16QAM



Middle Channel / 16QAM

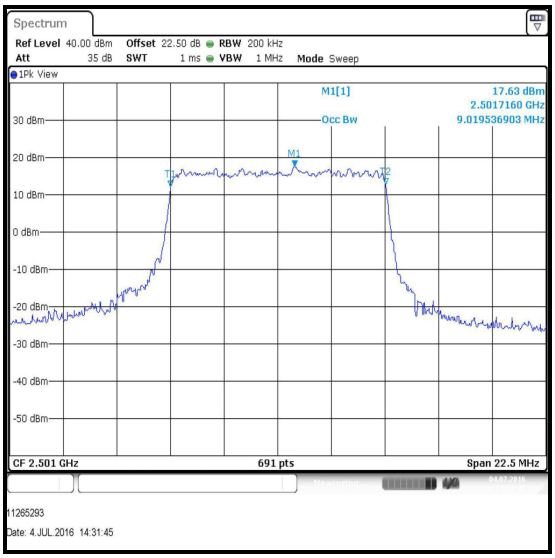


Top Channel / 16QAM

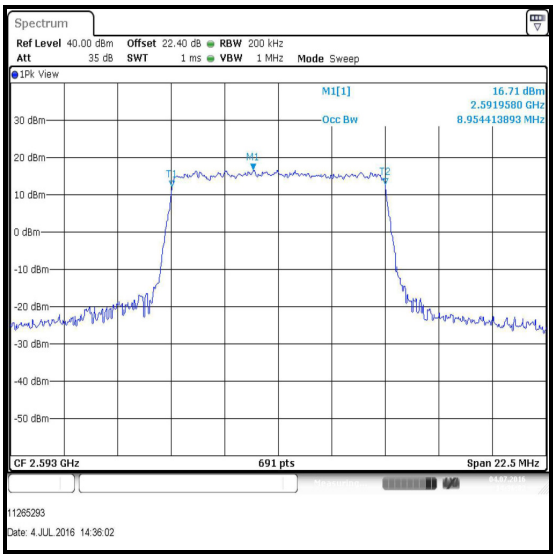
Transmitter Occupied Bandwidth (continued)

Results: 10 MHz Channel Bandwidth / QPSK

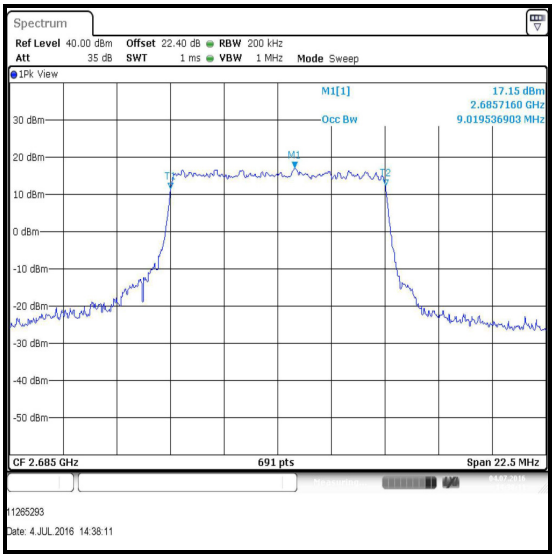
Channel	Resource Block(s)	Resource Block Offset	Resolution Bandwidth (kHz)	Video Bandwidth (kHz)	Occupied Bandwidth (MHz)
Bottom	50	0	200	1000	9.020
Middle	50	0	200	1000	8.954
Top	50	0	200	1000	9.020



Bottom Channel / QPSK



Middle Channel / QPSK

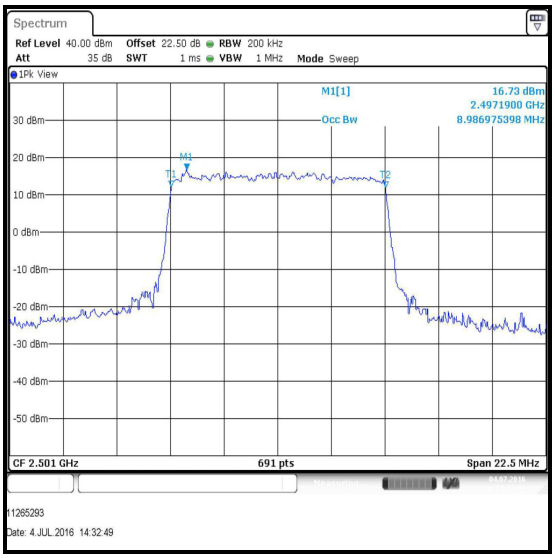


Top Channel / QPSK

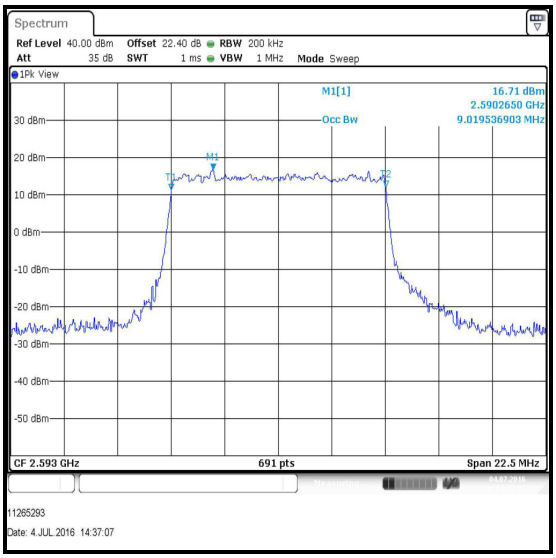
Transmitter Occupied Bandwidth (continued)

Results: 10 MHz Channel Bandwidth / 16QAM

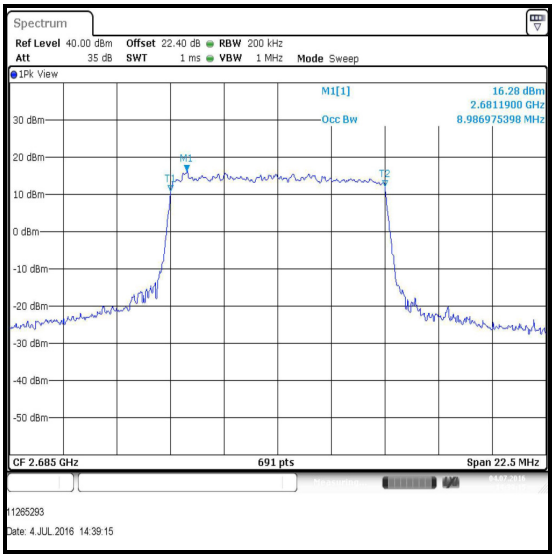
Channel	Resource Block(s)	Resource Block Offset	Resolution Bandwidth (kHz)	Video Bandwidth (kHz)	Occupied Bandwidth (MHz)
Bottom	50	0	200	1000	8.987
Middle	50	0	200	1000	9.020
Top	50	0	200	1000	8.987



Bottom Channel / 16QAM



Middle Channel / 16QAM

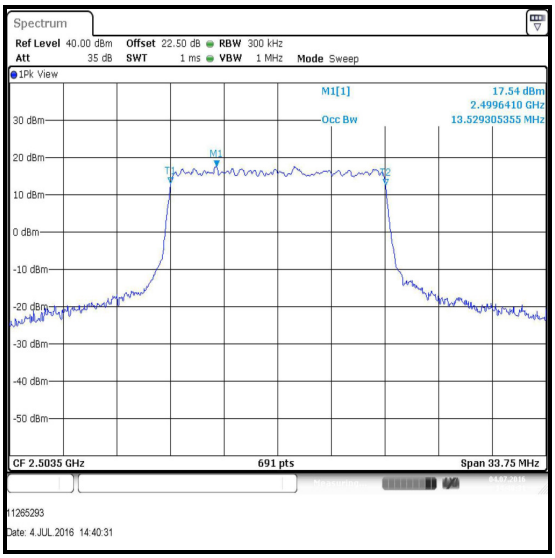


Top Channel / 16QAM

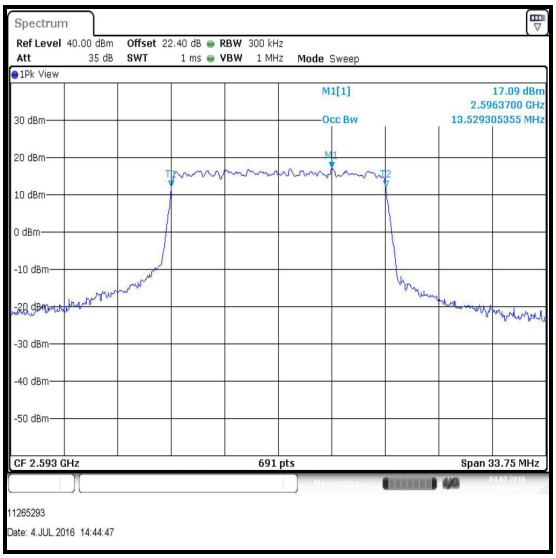
Transmitter Occupied Bandwidth (continued)

Results: 15 MHz Channel Bandwidth / QPSK

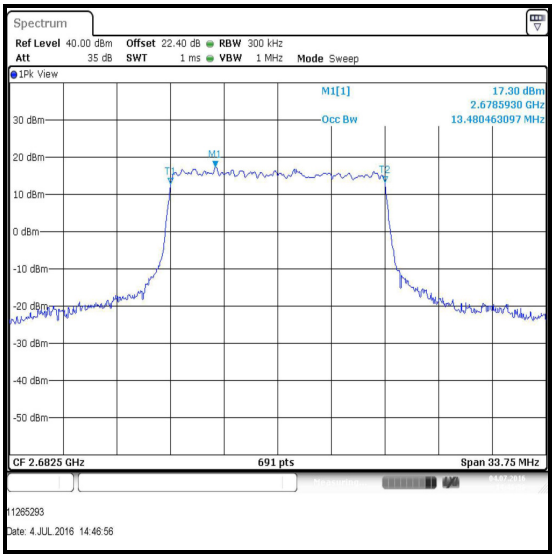
Channel	Resource Block(s)	Resource Block Offset	Resolution Bandwidth (kHz)	Video Bandwidth (kHz)	Occupied Bandwidth (MHz)
Bottom	75	0	300	1000	13.529
Middle	75	0	300	1000	13.529
Top	75	0	300	1000	13.480



Bottom Channel / QPSK



Middle Channel / QPSK

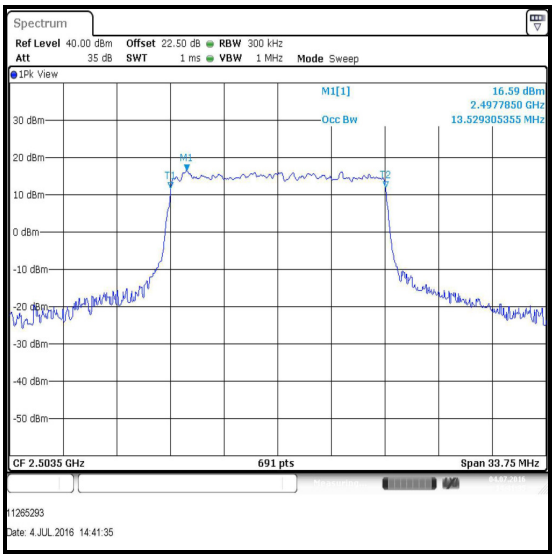


Top Channel / QPSK

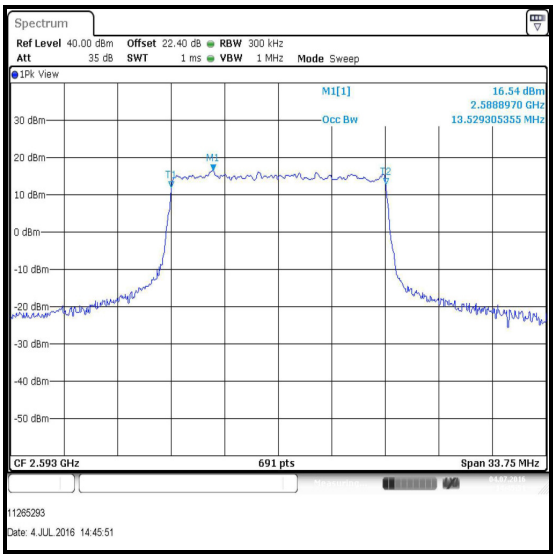
Transmitter Occupied Bandwidth (continued)

Results: 15 MHz Channel Bandwidth / 16QAM

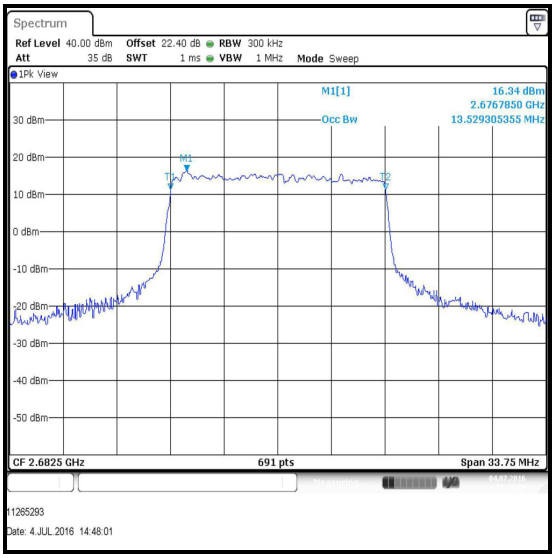
Channel	Resource Block(s)	Resource Block Offset	Resolution Bandwidth (kHz)	Video Bandwidth (kHz)	Occupied Bandwidth (MHz)
Bottom	75	0	300	1000	13.529
Middle	75	0	300	1000	13.529
Top	75	0	300	1000	13.529



Bottom Channel / 16QAM



Middle Channel / 16QAM

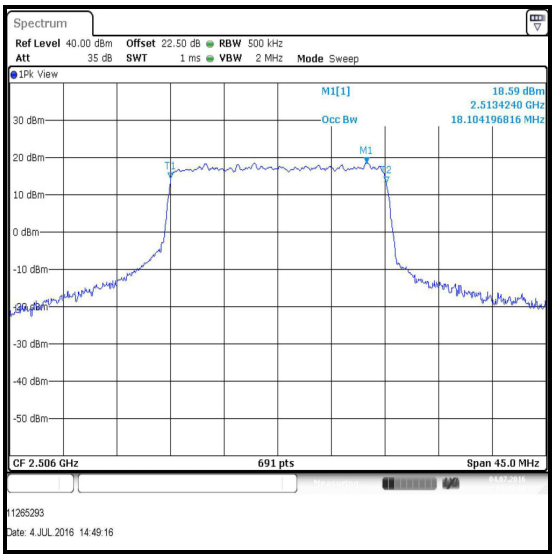


Top Channel / 16QAM

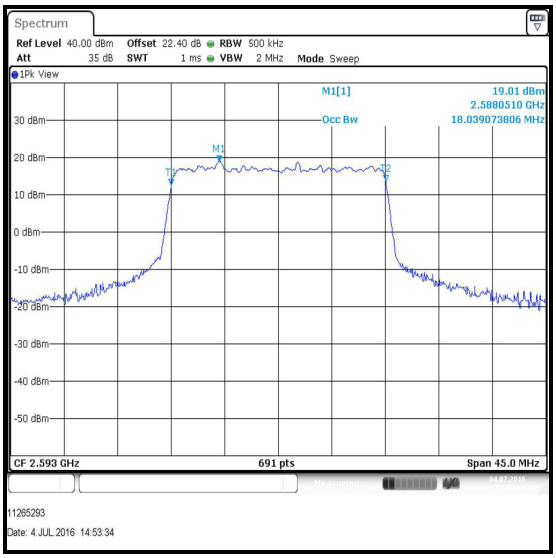
Transmitter Occupied Bandwidth (continued)

Results: 20 MHz Channel Bandwidth / QPSK

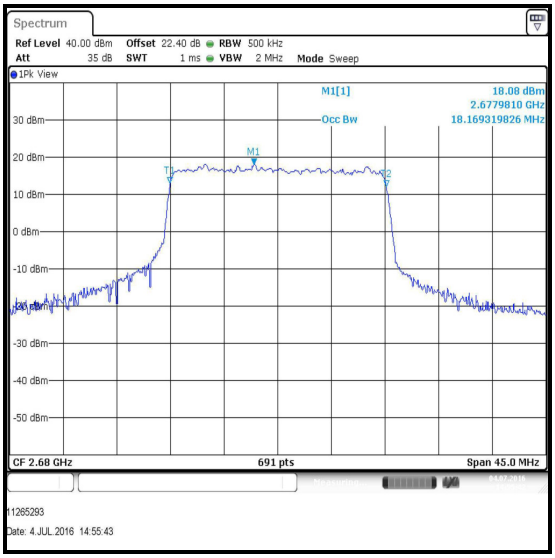
Channel	Resource Block(s)	Resource Block Offset	Resolution Bandwidth (kHz)	Video Bandwidth (kHz)	Occupied Bandwidth (MHz)
Bottom	100	0	500	2000	18.104
Middle	100	0	500	2000	18.039
Top	100	0	500	2000	18.169



Bottom Channel / QPSK



Middle Channel / QPSK



Top Channel / QPSK