



TEST REPORT

Test Report No. : UL-RPT-RP11066287JD06A V2.0

Manufacturer : Flextronics International Sweden AB
Model No. : SR0020-W
FCC ID : 2AIP8I
Technology : *Bluetooth* – Low Energy
Test Standard(s) : FCC Parts 15.207, 15.209(a) & 15.247

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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 2.0 supersedes all previous versions.

Date of Issue: 15 July 2016

Checked by:

Ian Watch
Senior Engineer, Radio Laboratory

Company Signatory:

Steven White
Service Lead, Radio Laboratory,
UL VS LTD



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1. Customer Information

1.1. Customer Information

Company Name:	Sirin Labs AG
Address:	Muhlentalstrasse 2 8200 Schaffhausen Switzerland

1.2. Manufacturer Information








Manufacturer Name:	Flextronics International Sweden AB
Address:	Datalinjen 3A SE – 583 30 Linköping Sweden

2. Summary of Testing

2.1. General Information

Specification Reference:	47CFR15.247
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Intentional Radiators) - Section 15.247
Specification Reference:	47CFR15.207 and 47CFR15.209
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Intentional Radiators) - Sections 15.207 and 15.209
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:	13 April 2016 to 02 June 2016

2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Result
Part 15.207	Transmitter AC Conducted Emissions	
Part 15.247(a)(2)	Transmitter Minimum 6 dB Bandwidth	
Part 15.247(e)	Transmitter Power Spectral Density	Note 1
Part 15.247(b)(3)	Transmitter Maximum Peak Output Power	
Part 15.247(d)/15.209(a)	Transmitter Radiated Emissions	
Part 15.247(d)/15.209(a)	Transmitter Band Edge Radiated Emissions	
Key to Results		
 = Complied  = Did not comply		

Note(s):

1. In accordance with FCC KDB 558074 Section 10.1, PSD is not required if the maximum conducted output power is less than the PSD limit of 8 dBm / 3 kHz. The PSD level is therefore deemed to be equal to the measured total output power.

2.3. Methods and Procedures

Reference:	ANSI C63.10-2013
Title:	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
Reference:	KDB 558074 D01 v03r05 April 8, 2016
Title:	Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247
Reference:	FCC KDB 174176 D01 Line Conducted FAQ v01r01 June 3, 2015
Title:	AC Power-line Conducted Emissions Frequently asked questions.

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:	SOLARIN
Model Name:	SR0020-W
Test Sample Serial Number:	0087 (<i>Radiated sample #1</i>)
Test Sample IMEI:	357232070004146
Hardware Version:	TP1
Software Version:	LRC1TA.1.0.2.3
Handset Cover Material:	Technical leather with titanium coating
FCC ID:	2AIP8I

Brand Name:	SOLARIN
Model Name:	SR0020-W
Test Sample Serial Number:	0013 (<i>Conducted sample #7</i>)
Test Sample IMEI:	357232070003098
Hardware Version:	TP1
Software Version:	LRC1TA.1.0.2.3
Handset Cover Material:	Technical leather with titanium coating
FCC ID:	2AIP8I

3.2. Description of EUT

The equipment under test was a Mobile device supporting Cellular, WLAN, BT, BTLE, RFID & GPS Technologies.

3.3. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.4. Additional Information Related to Testing

Technology Tested:	<i>Bluetooth</i> Low Energy (Digital Transmission System)		
Type of Unit:	Transceiver		
Channel Spacing:	2 MHz		
Modulation:	GFSK		
Data Rate:	1 Mbit/s		
Power Supply Requirement(s):	Nominal	3.9 VDC	
Maximum Conducted Output Power:	3.5 dBm		
Antenna Gain:	-1.66 dBi		
Transmit Frequency Range:	2402 MHz to 2480 MHz		
Transmit Channels Tested:	Channel ID	RF Channel	Channel Frequency (MHz)
	Bottom	0	2402
	Middle	19	2440
	Top	39	2480

3.5. Support Equipment

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

Description:	Laptop PC
Brand Name:	Lenovo
Model Name or Number:	L440
Serial Number:	R9-019EA4

Description:	Test Laptop
Brand Name:	Lenovo
Model Name or Number:	ThinkPad L440
Serial Number:	R9-019EA1

Description:	Laptop PC
Brand Name:	Lenovo
Model Name or Number:	X240
Serial Number:	RC-01J5G1

Description:	USB cable (length 1.2 metres)
Brand Name:	Not stated
Model Name or Number:	Not stated
Serial Number:	Not stated

Description:	USB charger
Brand Name:	SIRIN LABS
Model Name or Number:	SRN15B1200150D6
Serial Number:	Not stated

Description:	Personal Hand-Free (PHF)
Brand Name:	Sirin
Model Name or Number:	Not marked or stated
Serial Number:	Not marked or stated

4. Operation and Monitoring of the EUT during Testing

4.1. Operating Modes

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

- Transmitting in *Bluetooth* LE test mode at maximum power on bottom, middle or top channel as required. Data sequence was Pseudorandom Bit Sequence 9.

4.2. Configuration and Peripherals

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

- Transmit tests: The EUT was placed into BT LE test mode using a laptop PC and running an ADB (Android Debug Bridge) application via USB. The customer supplied a document with test instructions, titled *How to enable Bluetooth test mode and BLE static Tx.pdf*, to configure the EUT into test mode. Once in BT LE test mode, the test channels were set as required using command line text strings.
- For all tests, Aircraft Mode was selected on the EUT to disable unwanted transmissions from radios not under test.
- For conducted tests, the EUT was powered via a laboratory power supply and dummy battery through a 4-wire connection. Charging was disabled using a selection switch on the dummy battery.
- Radiated spurious emissions were performed with the EUT in the worst case position for radiated spurious emissions. Tests were performed with the EUT connected to its AC charger and USB cable. The AC charger was powered by 120 VAC 60 Hz. A pair of headphones were also connected to the EUT. A Nano SIM card was fitted. There were no other ports to terminate.
- AC conducted tests were performed with all active ports terminated.
- The EUT conducted sample with IMEI 357232070003098 was used for 6 dB bandwidth and maximum peak output power.
- The EUT radiated sample with IMEI 357232070004146 was used for all other tests.

5. Measurements, Examinations and Derived Results

5.1. General Comments

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

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

5.2. Test Results

5.2.1. Transmitter AC Conducted Spurious Emissions

Test Summary:

Test Engineer:	Matthew Galbraith	Test Dates:	23 May 2016 & 02 June 2016
Test Sample IMEI:	357232070004146		

FCC Reference:	Part 15.207
Test Method Used:	ANSI C63.10 Section 6.2

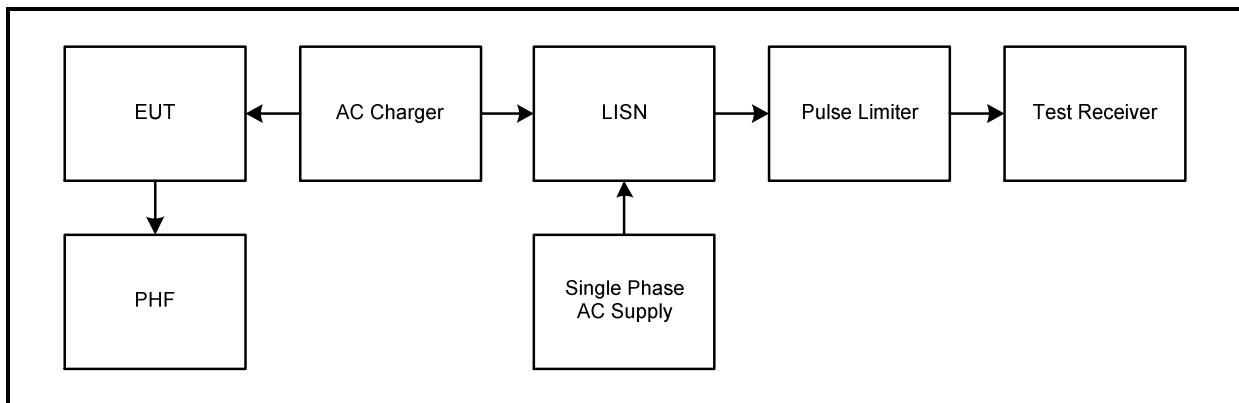
Environmental Conditions:

Temperature (°C):	24
Relative Humidity (%):	31 to 37

Note(s):

1. The EUT was connected to an AC charger via a USB cable. The AC charger was connected to 120 VAC 60 Hz single phase supply via a LISN.
2. In accordance with FCC KDB 174176 Q4, tests were performed with a 240 VAC 60 Hz single phase supply as this was within the voltage range marked on the AC charger.
3. Pre-scans were performed and markers placed on the highest live and neutral measured levels. Final measurements were performed on the marker frequencies and the results entered into the tables below.
4. A pulse limiter was fitted between the LISN and the test receiver.

Test setup:



Transmitter AC Conducted Spurious Emissions (continued)**Results: Live / Quasi Peak / 120 VAC 60 Hz**

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.182	Live	60.6	64.4	3.8	Complied
0.272	Live	56.6	61.1	4.5	Complied
0.389	Live	47.1	58.1	11.0	Complied
0.600	Live	41.8	56.0	14.2	Complied
0.857	Live	29.4	56.0	26.6	Complied

Results: Live / Average / 120 VAC 60 Hz

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.186	Live	29.8	54.2	24.4	Complied
0.551	Live	24.7	46.0	21.3	Complied
1.212	Live	17.0	46.0	29.0	Complied
2.162	Live	14.6	46.0	31.4	Complied
13.560	Live	14.2	50.0	35.8	Complied
25.058	Live	15.7	50.0	34.3	Complied

Results: Neutral / Quasi Peak / 120 VAC 60 Hz

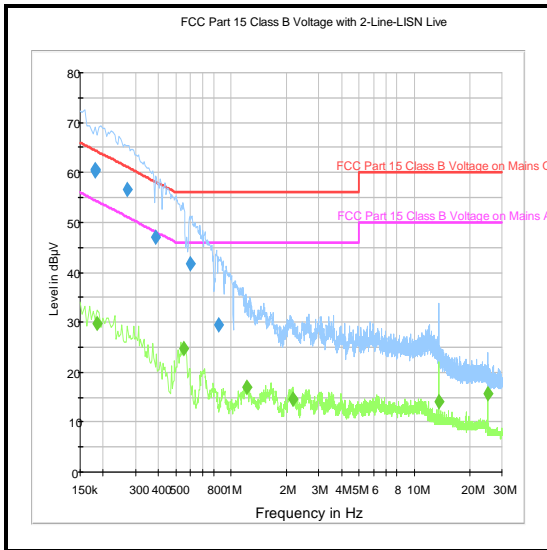
Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.195	Neutral	40.8	63.8	23.0	Complied
0.407	Neutral	36.2	57.7	21.5	Complied
0.533	Neutral	36.5	56.0	19.5	Complied
0.803	Neutral	35.3	56.0	20.7	Complied
1.122	Neutral	33.3	56.0	22.7	Complied
1.293	Neutral	34.5	56.0	21.5	Complied

Results: Neutral / Average / 120 VAC 60 Hz

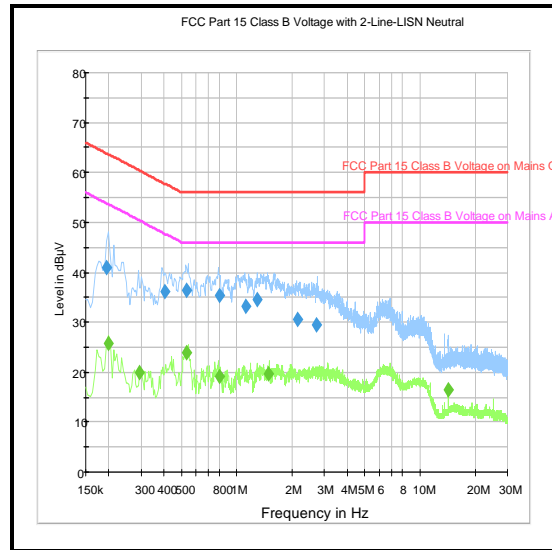
Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.200	Neutral	25.9	53.6	27.7	Complied
0.294	Neutral	19.8	50.4	30.6	Complied
0.533	Neutral	23.8	46.0	22.2	Complied
0.807	Neutral	19.2	46.0	26.8	Complied
1.496	Neutral	19.7	46.0	26.3	Complied
14.267	Neutral	16.6	50.0	33.4	Complied

Transmitter AC Conducted Spurious Emissions (continued)

Results: 120 VAC 60 Hz



Live



Neutral

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

Transmitter AC Conducted Spurious Emissions (continued)**Results: Live / Quasi Peak / 240 VAC 60 Hz**

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.150	Live	55.9	66.0	10.1	Complied
0.154	Live	55.6	65.8	10.2	Complied
0.263	Live	47.5	61.4	13.8	Complied
0.362	Live	42.3	58.7	16.4	Complied
0.726	Live	40.9	56.0	15.1	Complied
0.911	Live	36.4	56.0	19.6	Complied

Results: Live / Average / 240 VAC 60 Hz

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.182	Live	37.6	54.4	16.8	Complied
0.290	Live	31.1	50.5	19.4	Complied
0.366	Live	36.1	48.6	12.5	Complied
0.546	Live	32.0	46.0	14.0	Complied
0.731	Live	35.7	46.0	10.4	Complied
0.911	Live	29.8	46.0	16.2	Complied

Results: Neutral / Quasi Peak / 240 VAC 60 Hz

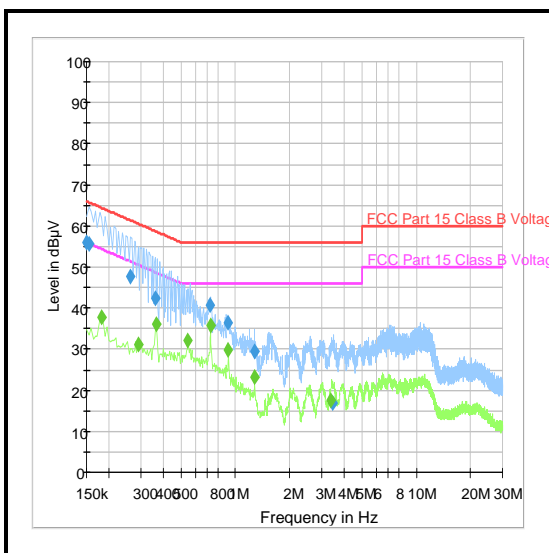
Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.182	Neutral	41.2	64.4	23.3	Complied
0.357	Neutral	38.9	58.8	19.9	Complied
0.551	Neutral	37.2	56.0	18.8	Complied
0.713	Neutral	40.5	56.0	15.5	Complied
0.915	Neutral	36.3	56.0	19.7	Complied
1.235	Neutral	27.2	60.0	28.8	Complied

Results: Neutral / Average / 240 VAC 60 Hz

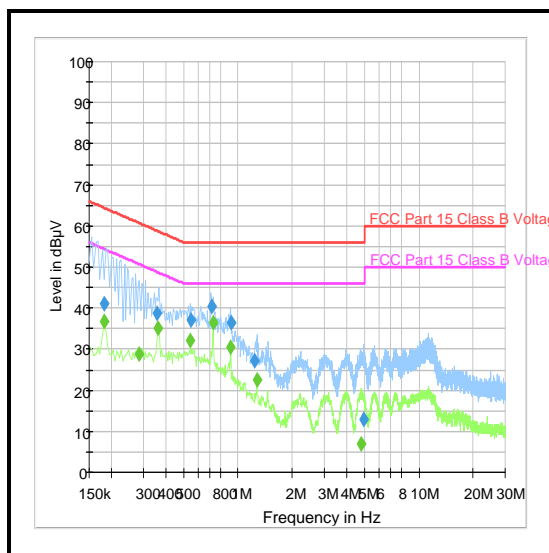
Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.182	Neutral	36.7	54.4	17.7	Complied
0.285	Neutral	28.7	50.7	22.0	Complied
0.362	Neutral	35.2	48.7	13.5	Complied
0.546	Neutral	32.1	46.0	13.9	Complied
0.731	Neutral	36.4	46.0	9.6	Complied
0.911	Neutral	30.3	46.0	15.7	Complied

Transmitter AC Conducted Spurious Emissions (continued)

Results: 240 VAC 60 Hz



Live



Neutral

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

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1623	Thermohygrometer	JM Handelspunkt	30.5015.13	None stated	11 Jan 2017	12
A067	LISN	Rohde & Schwarz	ESH3-Z5	890603/002	27 Aug 2016	12
A1830	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100668	08 Mar 2017	12
M1263	Test Receiver	Rohde & Schwarz	ESIB-7	100265	16 Oct 2016	12
M1273	Test Receiver	Rohde & Schwarz	ESIB-26	100275	11 Apr 2017	12
A1829	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100671	05 May 2017	12
M1625	Thermohygrometer	JM Handelspunkt	30.2015.06	None stated	11 Jan 2017	12
A649	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	825562/008	14 Jul 2016	12

5.2.2. Transmitter Minimum 6 dB Bandwidth**Test Summary:**

Test Engineer:	Georgios Vrezas	Test Date:	16 May 2016
Test Sample IMEI:	357232070003098		

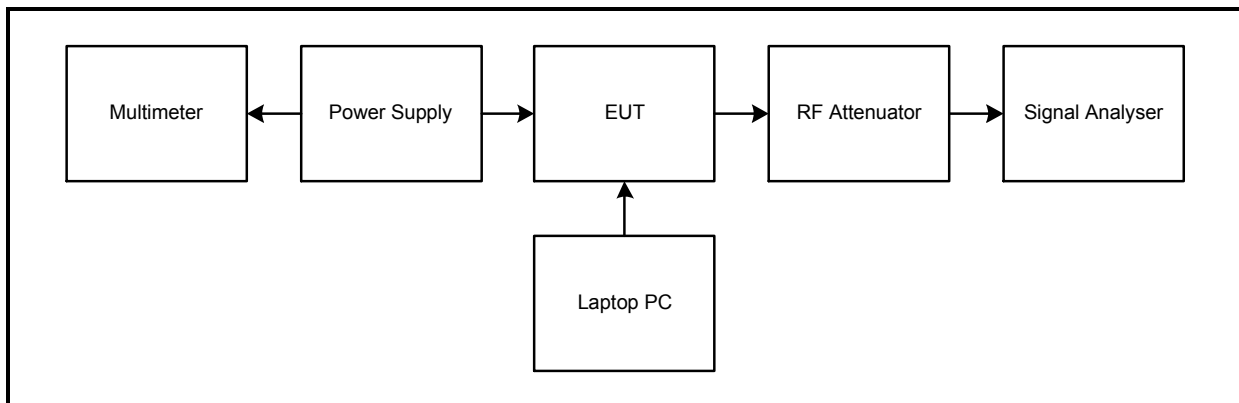
FCC Reference:	Part 15.247(a)(2)
Test Method Used:	FCC KDB 558074 Section 8.1 Option 1

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	31

Note(s):

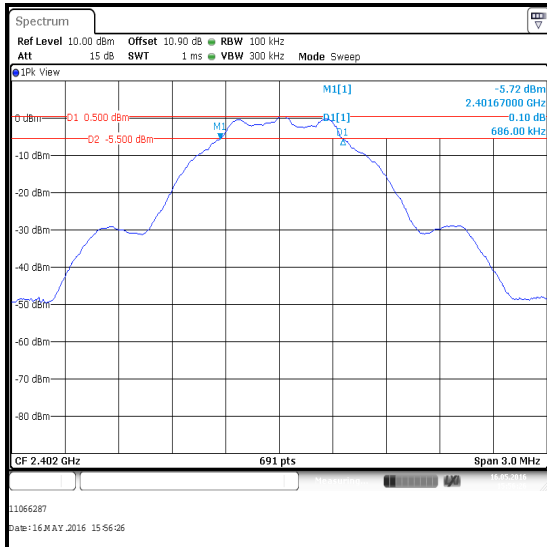
- 6 dB DTS bandwidth tests were performed using a signal analyser in accordance with FCC KDB 558074 Section 8.1 Option 1 measurement procedure. The signal analyser resolution bandwidth was set to 100 kHz and video bandwidth 300 kHz. A peak detector was used, sweep time was set to auto and the trace mode was Max Hold. The DTS bandwidth was measured at 6 dB down from the peak of the signal.
- The signal analyser was connected to the RF port on the EUT using suitable attenuation and RF cable.

Test setup:

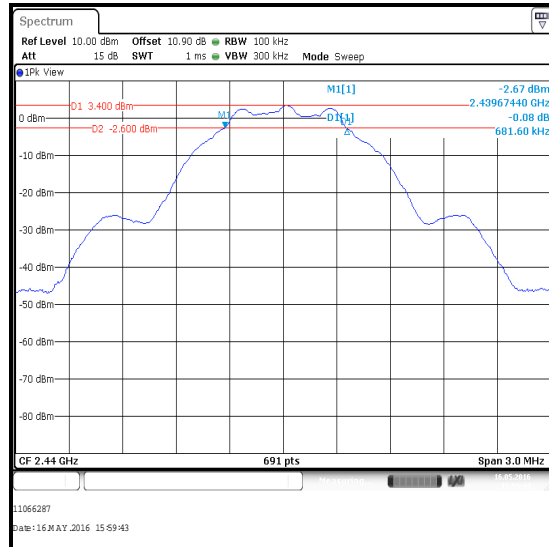
Transmitter Minimum 6 dB Bandwidth (continued)

Results:

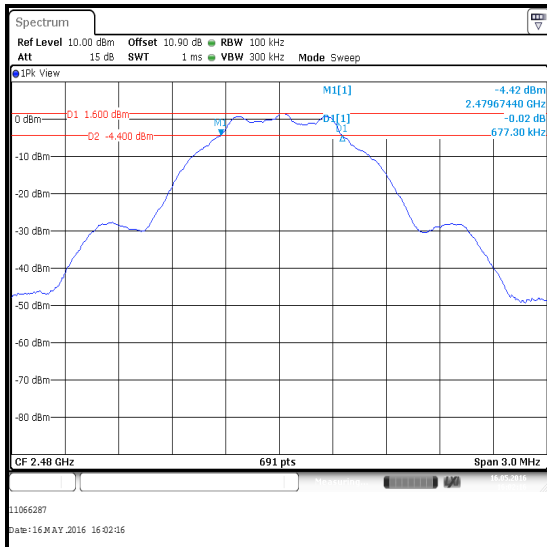
Channel	6 dB Bandwidth (kHz)	Limit (kHz)	Margin (kHz)	Result
Bottom	686.000	≥500	186.000	Complied
Middle	681.600	≥500	181.600	Complied
Top	677.300	≥500	177.300	Complied



Bottom Channel



Middle Channel



Top Channel

Transmitter Minimum 6 dB Bandwidth (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
M1873	Signal Analyser	Rohde & Schwarz	FSV30	103074	03 Jul 2016	12
A1491	Attenuator	M/A	FSC 96341	2082-6173-10	Calibrated before use	-
S0538	DC Power Supply	TTi	PL154	250135	Calibrated before use	-
M1818	Multimeter	Fluke	79 Series II	71811580	27 Apr 2017	12
M260	Signal Generator	Rohde & Schwarz	SMP02	829076/008	09 May 2017	12

5.2.3. Transmitter Maximum Peak Output Power**Test Summary:**

Test Engineer:	Georgios Vrezas	Test Date:	16 May 2016
Test Sample IMEI:	357232070003098		

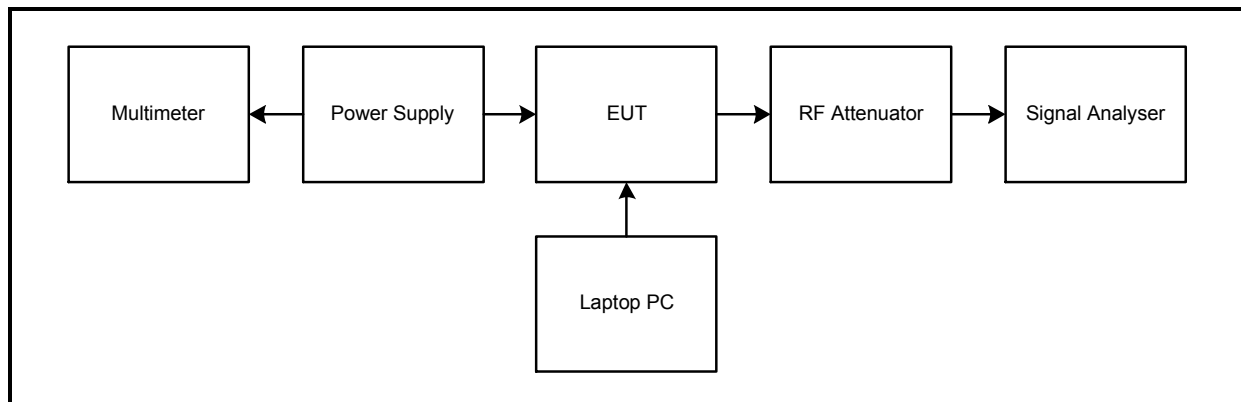
FCC Reference:	Part 15.247(b)(3)
Test Method Used:	FCC KDB 558074 Section 9.1.1

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	31

Note(s):

1. Conducted power tests were performed using a signal analyser in accordance with KDB 558074 Section 9.1.1 with the RBW > *DTS bandwidth* procedure. The resolution bandwidth was set to 3 MHz and video bandwidth 10 MHz. A peak detector was used, sweep time set to auto and trace mode was Max Hold. The span was set to greater than 3 times the resolution bandwidth. A marker was placed at the peak of the signal and the results recorded in the table below.
2. The signal analyser was connected to the RF port on the EUT using suitable attenuation and RF cable. An RF level offset was entered on the signal analyser to compensate for the loss of the attenuator and RF cable.
3. The conducted power was added to the declared antenna gain to obtain the EIRP.

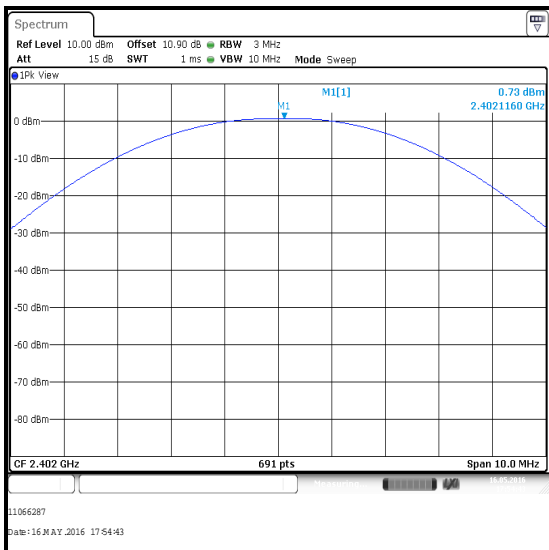
Test setup:

Transmitter Maximum Peak Output Power (continued)**Results:**

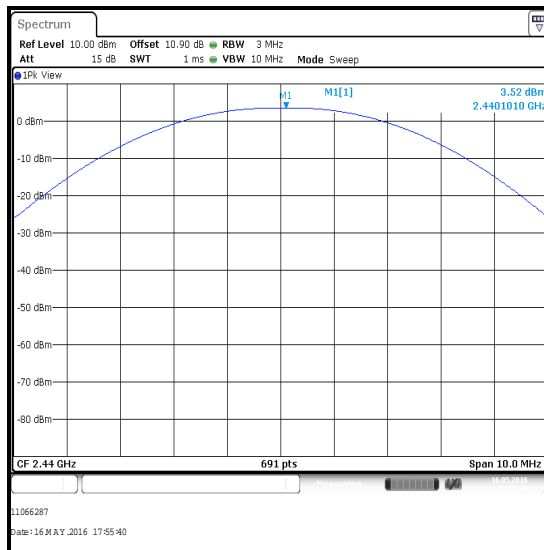
Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	0.7	30.0	29.3	Complied
Middle	3.5	30.0	26.5	Complied
Top	1.8	30.0	28.2	Complied

Channel	Conducted Peak Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	0.7	-1.66	-0.96	36.0	36.96	Complied
Middle	3.5	-1.66	1.84	36.0	34.16	Complied
Top	1.8	-1.66	0.14	36.0	35.86	Complied

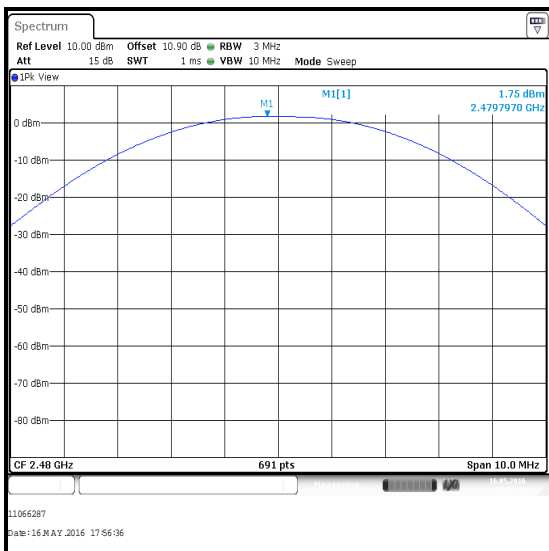
Transmitter Maximum Peak Output Power (continued)



Bottom Channel



Middle Channel



Top Channel

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
M1873	Signal Analyser	Rohde & Schwarz	FSV30	103074	03 Jul 2016	12
A1491	Attenuator	M/A	FSC 96341	2082-6173-10	Calibrated before use	-
S0538	DC Power Supply	TTi	PL154	250135	Calibrated before use	-
M1818	Multimeter	Fluke	79 Series II	71811580	27 Apr 2017	12
M260	Signal Generator	Rohde & Schwarz	SMP02	829076/008	09 May 2017	12

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

Test Engineer:	Ian Watch	Test Date:	27 April 2016
Test Sample IMEI:	357232070004146		

FCC Reference:	Parts 15.247(d) & 15.209(a)
Test Method Used:	ANSI C63.10 Sections 6.3 and 6.5
Frequency Range	30 MHz to 1000 MHz

Environmental Conditions:

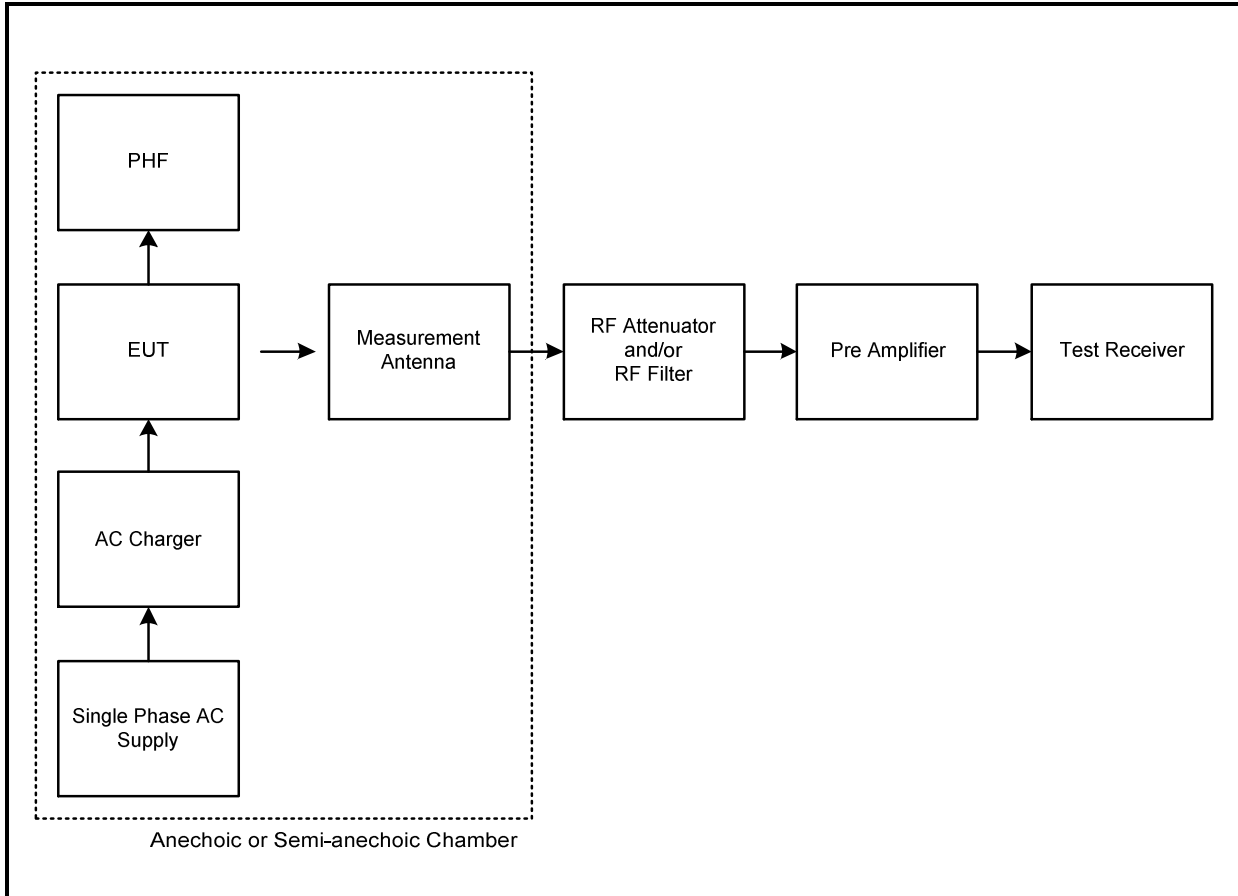
Temperature (°C):	22
Relative Humidity (%):	32

Note(s):

1. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
2. The preliminary scans showed similar emission levels below 1 GHz, for each channel of operation. Therefore final radiated emissions measurements were performed with the EUT set to the middle channel only.
3. All other emissions shown on the pre-scans were investigated and found to be ambient, or > 20 dB below the appropriate limit or below the noise floor of the measurement system.
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 were performed and markers placed on the highest measured levels. The test receiver resolution bandwidth was set to 100 kHz and video bandwidth 300 kHz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold.
6. Final measurements were performed on the marker frequencies and the results entered into the table below. The test receiver resolution bandwidth was set to 120 kHz, using a CISPR quasi-peak detector and span big enough to see the whole emission.

Transmitter Radiated Emissions (continued)

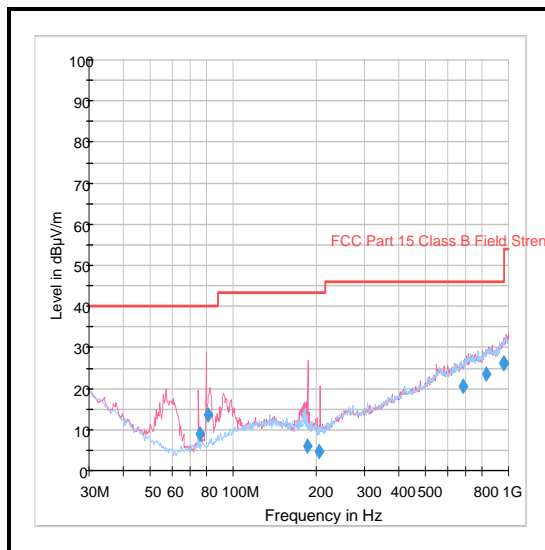
Test setup for radiated measurements:



Transmitter Radiated Emissions (continued)

Results: Middle Channel

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
962.660	Horizontal	26.1	54.0	27.9	Complied



Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying table.

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1625	Thermohygrometer	JM Handelspunkt	30.5015.06	None stated	11 Jan 2017	12
K0001	5m RSE Chamber	Rainford EMC	N/A	N/A	12 Jan 2017	12
A1834	Attenuator	Hewlett Packard	8491B	10444	30 Mar 2017	12
G0543	Amplifier	Sonoma	310N	230801	29 May 2016	3
M1273	Test Receiver	Rohde & Schwarz	ESIB26	100275	11 Apr 2017	12
A259	Antenna	Chase	CBL6111	1513	19 Jul 2016	12

Transmitter Radiated Emissions (continued)**Test Summary:**

Test Engineer:	Andrew Edwards	Test Date:	13 April 2016
Test Sample IMEI:	357232070004146		

FCC Reference:	Parts 15.247(d) & 15.209(a)
Test Method Used:	FCC KDB 558074 Sections 11 & 12 referencing ANSI C63.10 Sections 6.3 and 6.6
Frequency Range	1 GHz to 25 GHz

Environmental Conditions:

Temperature (°C):	24
Relative Humidity (%):	34

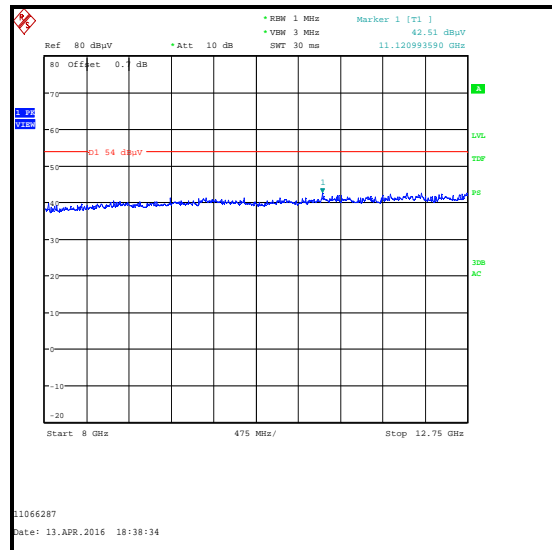
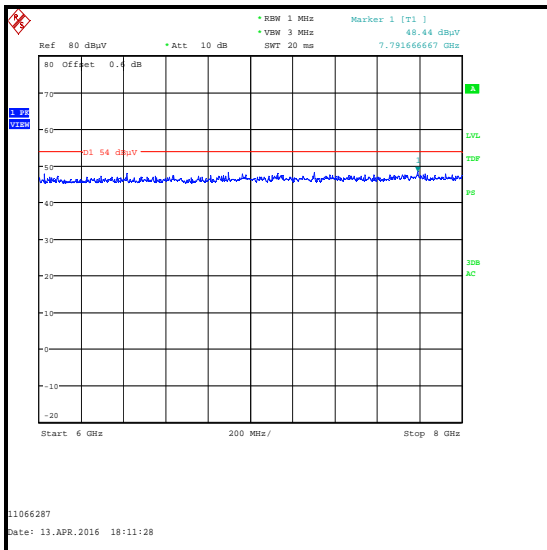
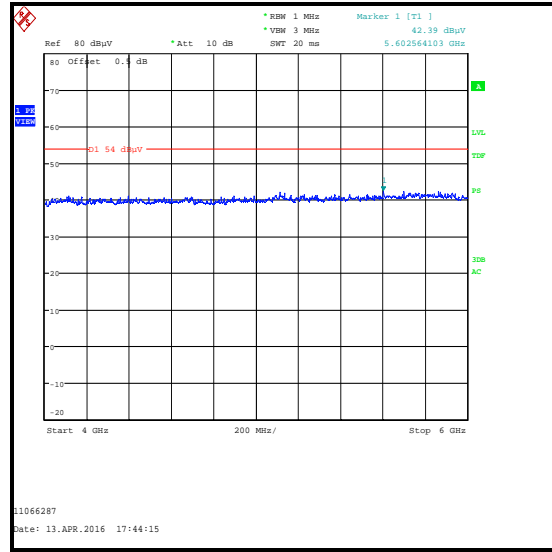
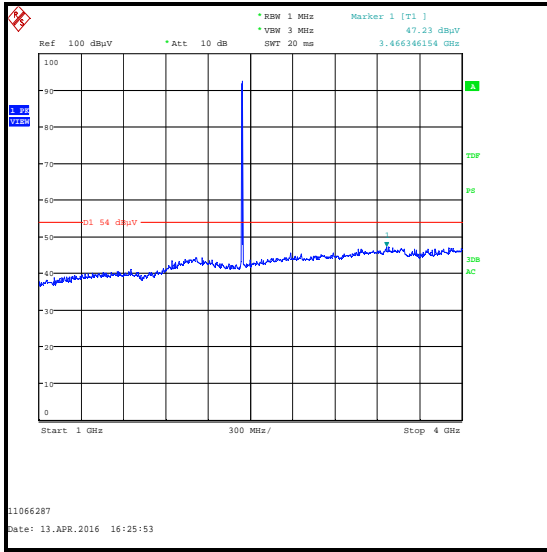
Note(s):

1. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
2. No spurious emissions were detected above the noise floor of the measuring receiver therefore the highest peak noise floor reading of the measuring receiver was recorded as shown in the table below. The peak level was compared to the average limit as opposed to being compared to the peak limit because this is the more onerous limit.
3. The emission shown on the 1 GHz to 4 GHz plot is the EUT fundamental.
4. 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.
5. Pre-scans were performed and a marker placed on the highest measured level of the appropriate plot. The test receiver resolution bandwidth was set to 1 MHz and video bandwidth 3 MHz. The sweep time was set to auto.

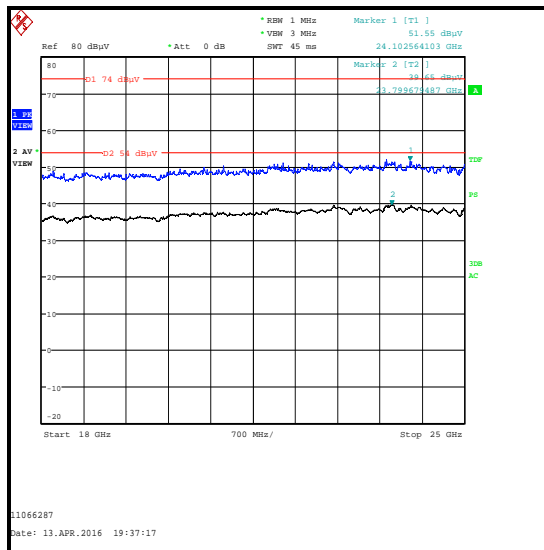
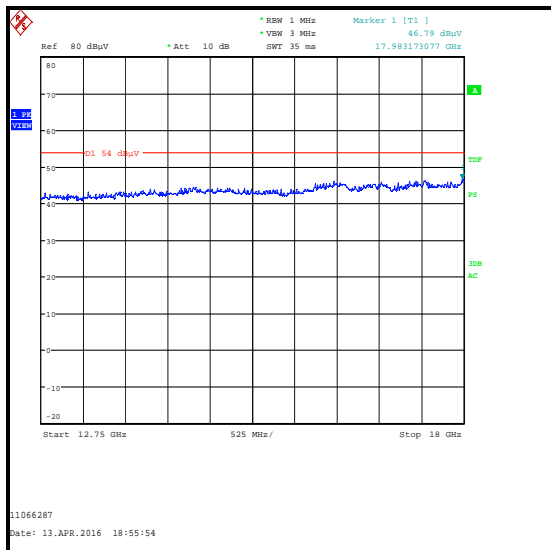
Results:

Frequency (MHz)	Antenna Polarity	Peak Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
24102.564	Vertical	51.6	54.0	2.4	Complied

Transmitter Radiated Emissions (continued)



Transmitter Radiated Emissions (continued)



Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1656	Thermohygrometer	JM Handelspunkt	30.5015.13	Not stated	23 Apr 2016	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	21 Dec 2016	12
M1886	Test Receiver	Rohde & Schwarz	ESU26	100554	21 Mar 2017	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	19 Dec 2016	12
A1818	Antenna	EMCO	3115	00075692	17 Dec 2016	12
A253	Antenna	Flann Microwave	12240-20	128	17 Dec 2016	12
A254	Antenna	Flann Microwave	14240-20	139	17 Dec 2016	12
A255	Antenna	Flann Microwave	16240-20	519	17 Dec 2016	12
A256	Antenna	Flann Microwave	18240-20	400	17 Dec 2016	12
A436	Antenna	Flann Microwave	20240-20	330	19 Dec 2016	12
A1975	High Pass Filter	AtlanTecRF	AFH-03000	090424010	17 Apr 2016	12

5.2.5. Transmitter Band Edge Radiated Emissions**Test Summary:**

Test Engineer:	Keith Tucker	Test Date:	15 May 2016
Test Sample IMEI:	357232070004146		

FCC Reference:	Parts 15.247(d) & 15.209(a)
Test Method Used:	ANSI C63.10 Section 6.10.4, 6.10.5 & KDB 558074 Section 11

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	33

Note(s):

1. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
2. The maximum peak conducted output power was previously measured. In accordance with FCC KDB 558074 Section 11.1(a), the lower band edge measurement was performed with a peak detector and the -20 dBc limit applied.
3. There is a restricted band 10 MHz below the lower band edge. The test receiver was set up as follows: the RBW set to 1 MHz, the VBW set to 3 MHz, with the sweep time set to auto couple. Peak and average measurements were performed with their respective detectors. Markers were placed on the highest point on each trace.
4. The reference level was set to 110 dB μ V in order to achieve sufficient headroom.
5. * -20 dBc limit.

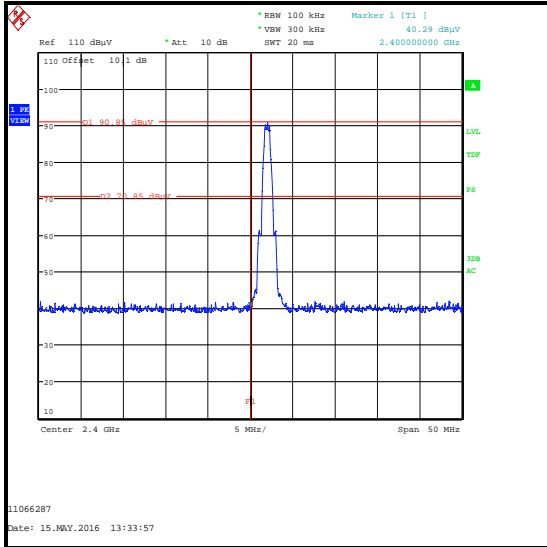
Results: Peak

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2359.359	53.2	74.0	20.8	Complied
2400.0	40.3	70.9*	30.6	Complied
2483.5	54.0	74.0	20.0	Complied

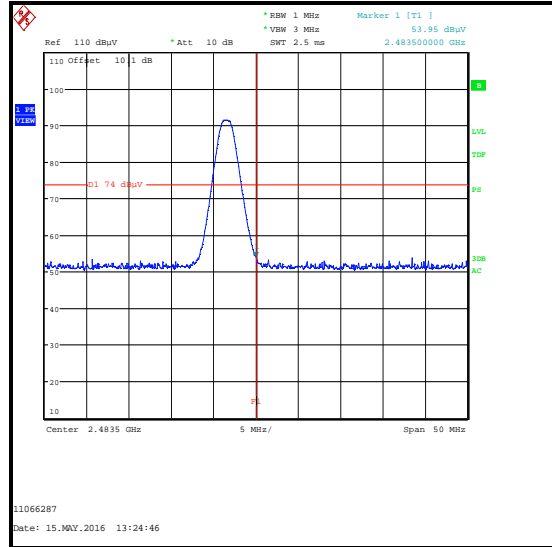
Results: Average

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2372.692	42.9	54.0	11.1	Complied
2483.5	48.0	54.0	6.0	Complied

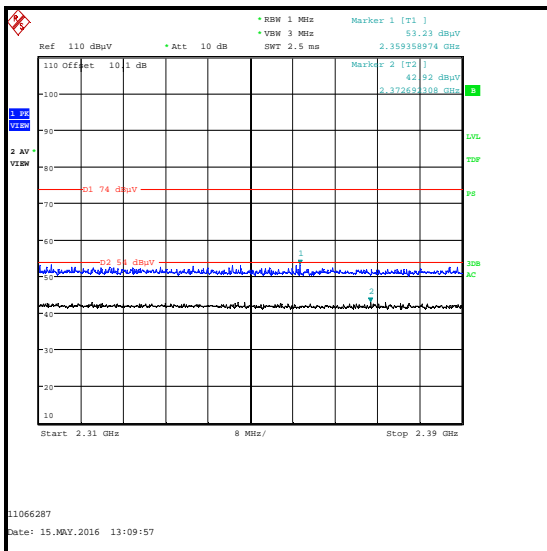
Transmitter Band Edge Radiated Emissions (continued)



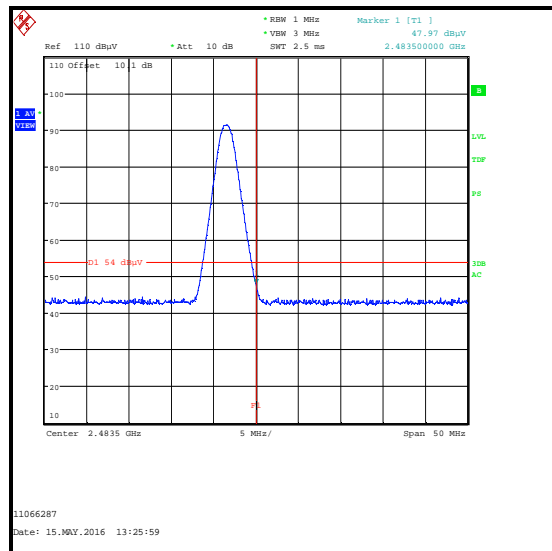
Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement



2310 MHz to 2390 MHz Restricted Band Plot



Upper Band Edge Average Measurement

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1656	Thermohyrometer	JM Handelspunkt	30.5015.13	None Stated	02 Apr 2017	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	21 Dec 2016	12
A1534	Pre-Amplifier	Hewlett Packard	8449B	3008A00405	19 Dec 2016	12
M1886	Test Receiver	Rohde & Schwarz	ESU26	100554	21 Mar 2017	12
A1818	Antenna	EMCO	00075692	3118	17 Dec 2016	12
A1396	Attenuator	Huber & Suhner	6810.17.B	757987	26 Apr 2017	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 measured (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".

Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
AC Conducted Spurious Emissions	0.15 MHz to 30 MHz	95%	±4.69 dB
Conducted Maximum Peak Output Power	2.4 GHz to 2.4835 GHz	95%	±1.13 dB
Minimum 6 dB Bandwidth	2.4 GHz to 2.4835 GHz	95%	±4.59 %
Radiated Spurious Emissions	30 MHz to 1 GHz	95%	±5.65 dB
Radiated Spurious Emissions	1 GHz to 26.5 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	1 & 7	-	Changed FCC ID

--- END OF REPORT ---