TEST REPORT

Test Report No. : UL-RPT-RP10295122JD01A V3.0

Manufacturer	:	Sony Mobile Communications Inc.
FCC ID	:	PY7PM-0801
Technology	:	*Bluetooth* – Basic Rate & EDR
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 3.0 supersedes all previous versions.

Date of Issue: 31 July 2014

Checked by:

Sarah Williams
Engineer, Radio Laboratory

Issued by :

pp
John Newell
Group Quality Manager,
Basingstoke,
UL VS LTD

0644

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

UL VS LTD

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1. Customer Information

Company Name:	Sony Mobile Communications Inc.
Address:	Nya Vattentornet Mobilvägen 10 Lund 22188 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:	27 May 2014 to 03 June 2014

2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Result
Part 15.207	Transmitter AC Conducted Emissions	✓
Part 15.247(a)(1)	Transmitter 20 dB Bandwidth	✓
Part 15.247(a)(1)	Transmitter Carrier Frequency Separation	✓
Part 15.247(a)(1)(iii)	Transmitter Number of Hopping Frequencies and Average Time of Occupancy	✓
Part 15.247(b)(1)	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		

2.3. Methods and Procedures

Reference:	ANSI C63.4 (2009)
Title:	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
Reference:	ANSI C63.10 (2009)
Title:	American National Standard for Testing Unlicensed Wireless Devices

2.4. Deviations from the Test Specification

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

3. Equipment Under Test (EUT)

3.1. Identification of Equipment Under Test (EUT)

Brand Name:	Sony
IMEI:	004402452750619 *(Radiated sample)*
Test Sample Serial Number:	CB5A1Z13WA
Hardware Version Number:	A
Software Version Number:	ATPV: 1283-9868, 0_25_3_16_A
FCC ID:	PY7PM-0801

Brand Name:	Sony
IMEI:	004402452751278 *(Conducted sample with RF port)*
Test Sample Serial Number:	CB5A1Z1RYT
Hardware Version Number:	A
Software Version Number:	ATPV: 1283-9868, 0_25_3_16_A
FCC ID:	PY7PM-0801

Brand Name:	Sony
Description:	AC Charger
Model Name or Number:	EP880

Brand Name:	Monoprice
Description:	MHL Cable
Model Name or Number:	Not marked

Brand Name:	Sony
Description:	MHL Adaptor
Model Name or Number:	IM750

Brand Name:	Sony
Description:	USB Cable
Model Name or Number:	EC803

Brand Name:	Sony
Description:	Deskstand
Model Name or Number:	DK43

Identification of Equipment Under Test (EUT) (continued)

Brand Name:	Sony
Description:	PHF
Model Name or Number:	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

Tested Technology:	*Bluetooth*		
Power Supply Requirement:	Nominal	3.8 VDC	
Type of Unit:	Transceiver		
Channel Spacing:	1 MHz		
Mode:	Basic Rate	Enhanced Data Rate	
Modulation:	GFSK	π/4-DQPSK	8DQPSK
Packet Type: (Maximum Payload)	DH5	2DH5	3DH5
Data Rate (Mbit/s):	1	2	3
Maximum Conducted Output Power:	10.2 dBm		
Antenna Gain:	-3.5 dBi		
Transmit Frequency Range:	2402 MHz to 2480 MHz		
Transmit Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**
	Bottom	0	2402
	Middle	39	2441
	Top	78	2480

3.5. Support Equipment

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

Description:	2 GB Micro SD Card
Brand Name:	Generic
Model Name or Number:	Not marked

Description:	Logik
Brand Name:	22” High Definition Television
Model Name or Number:	L22FE12A
Serial Number:	1309020661

Description:	Test jig
Brand Name:	Not marked
Model Name or Number:	Not marked
Serial Number:	Not marked

Description:	Laptop
Brand Name:	Dell
Model Name or Number:	E5410
Serial Number:	UL Number 00763

4. Operation and Monitoring of the EUT during Testing

4.1. Operating Modes

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

- Continuously transmitting at maximum power on bottom, middle and top channels in Basic Rate (DH5 packets) or EDR (2DH5 or 3DH5 packets) as required.

4.2. Configuration and Peripherals

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

- Controlled using a software application on the laptop PC supplied by the customer. The application was used to enable continuous transmission and to select the test channels as required.
- Both EDR/Basic rate modes were compared and tests were performed with the mode that presented the worst case result. For output power, bandwidth, band edge and channel separation, all modes were tested.
- Transmitter radiated spurious emissions tests were performed with the EUT transmitting in DH5 mode as this mode was found to transmit the highest power.
- 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.
- AC conducted emissions was tested with the EUT transmitting on the middle channel using DH5 packet type, as this mode was found to transmit the highest power. Both configurations were tested and configuration 1 was found to be the worst case.
- The conducted sample with IMEI 004402452751278 was used for 20 Db bandwidth, carrier frequency separation, average time of occupancy tests and conducted output power tests.
- The radiated sample with IMEI 004402452750619 was used for AC conducted emissions and radiated spurious emissions 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:	Georgios Vrezas	**Test Date:**	03 June 2014
Test Sample IMEI:	004402452750619		

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

Environmental Conditions:

Temperature (℃):	22
Relative Humidity (%):	56

Results: Live / Quasi Peak

Frequency (MHz)	Line	Level (DbµV)	Limit (DbµV)	Margin (Db)	Result
0.240	Live	19.5	62.1	42.6	Complied
0.267	Live	19.1	61.2	42.1	Complied
0.479	Live	16.7	56.4	39.7	Complied
4.560	Live	10.8	56.0	45.2	Complied
12.849	Live	11.6	60.0	48.4	Complied

Results: Live / Average

Frequency (MHz)	Line	Level (DbµV)	Limit (DbµV)	Margin (Db)	Result
0.249	Live	12.3	51.8	39.5	Complied
0.299	Live	11.1	50.3	39.2	Complied
0.749	Live	6.2	46.0	39.8	Complied
7.589	Live	7.9	50.0	42.1	Complied

Transmitter AC Conducted Spurious Emissions (continued)

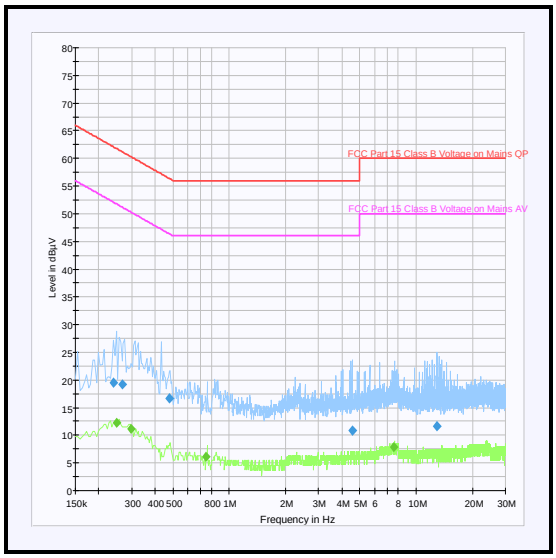
Results: Neutral / Quasi Peak

Frequency (MHz)	Line	Level (DbµV)	Limit (DbµV)	Margin (Db)	Result
0.254	Neutral	28.9	61.6	32.7	Complied
0.444	Neutral	20.1	57.0	36.9	Complied
0.452	Neutral	20.6	56.8	36.2	Complied
4.677	Neutral	15.6	56.0	40.4	Complied
12.206	Neutral	14.5	60.0	45.5	Complied

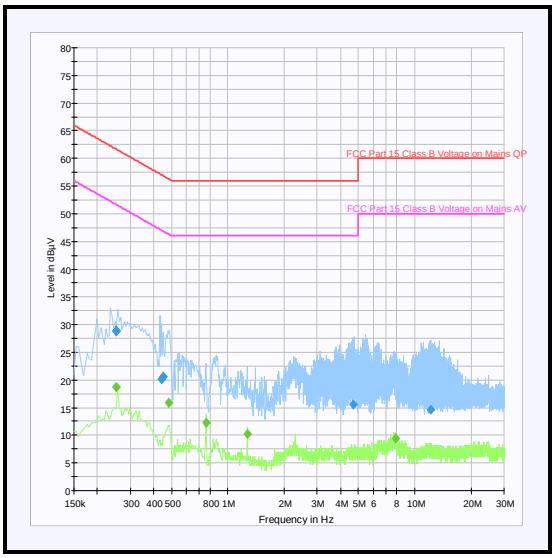
Results: Neutral / Average

Frequency (MHz)	Line	Level (DbµV)	Limit (DbµV)	Margin (Db)	Result
0.254	Neutral	18.8	51.6	32.8	Complied
0.483	Neutral	16.0	46.3	30.3	Complied
0.762	Neutral	12.2	46.0	33.8	Complied
1.275	Neutral	10.2	46.0	35.8	Complied
7.899	Neutral	9.5	50.0	40.5	Complied

Transmitter AC Conducted Spurious Emissions (continued)



Live



Neutral

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

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1625	Thermohygrometer	JM Handelspunkt	30.5015.06	None stated	31 Dec 2014	12
A004	LISN	Rohde & Schwarz	ESH3-Z5	890604/027	18 Nov 2014	12
A1830	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100668	27 Feb 2015	12
M1263	Test Receiver	Rohde & Schwarz	ESIB 7	100265	14 Oct 2014	12

5.2.2. Transmitter 20 Db Bandwidth

Test Summary:

Test Engineer:	Nick Steele	**Test Date:**	27 May 2014
Test Sample IMEI:	004402452751278		

FCC Reference:	Part 15.247(a)(1)
Test Method Used:	As detailed in ANSI C63.10 Section 6.9.1

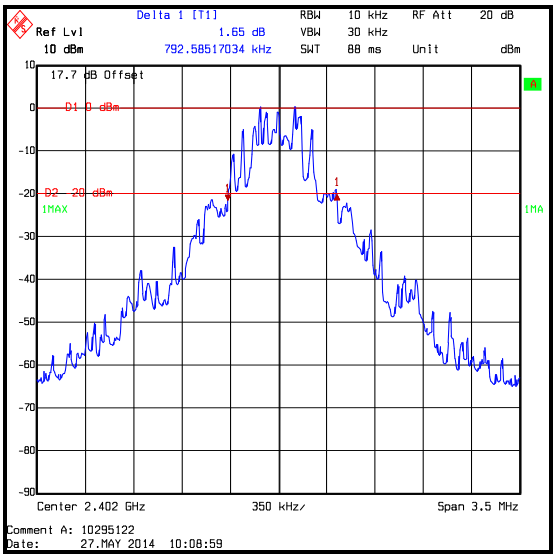
Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	40

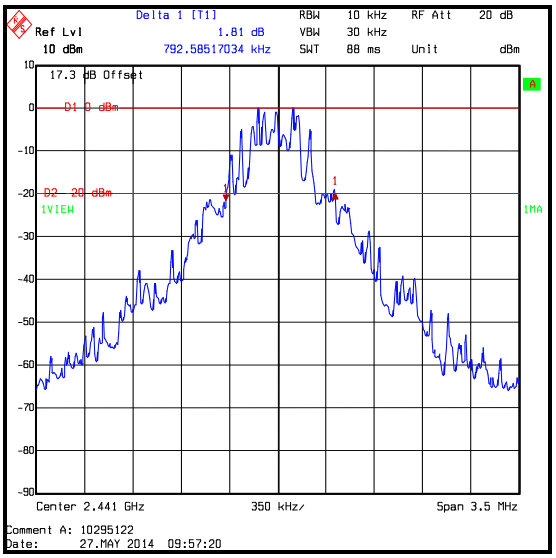
Transmitter 20 Db Bandwidth (continued)

Results DH5:

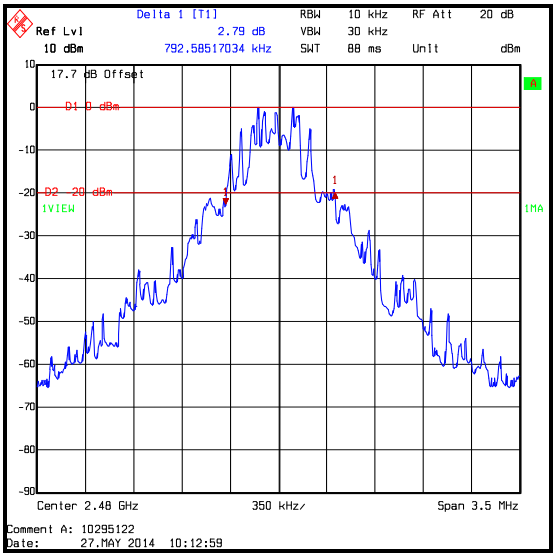
Channel	20 Db Bandwidth (kHz)
Bottom	792.585
Middle	792.585
Top	792.585



Bottom Channel



Middle Channel

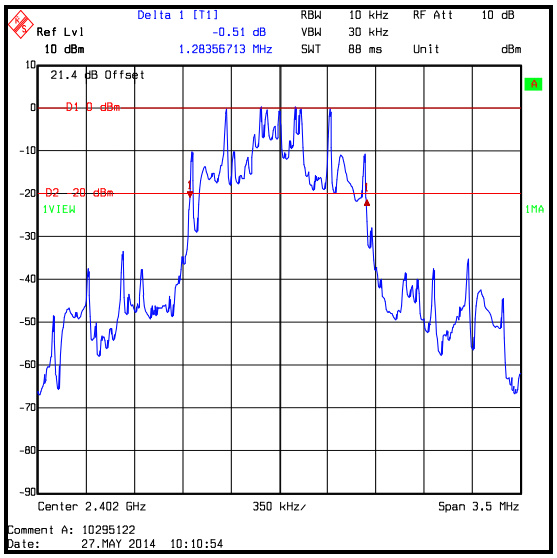


Top Channel

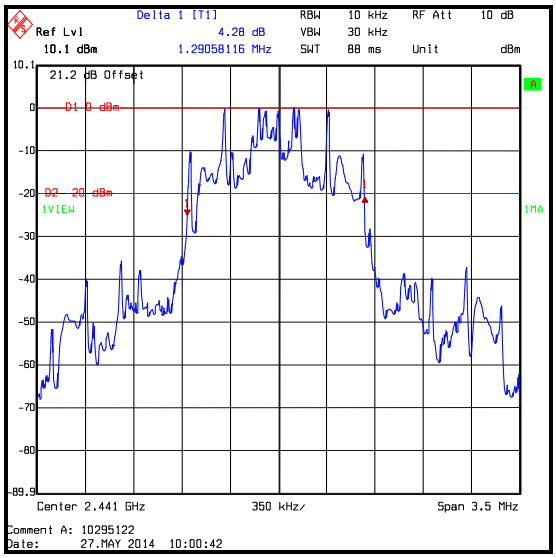
Transmitter 20 Db Bandwidth (continued)

Results 2DH5:

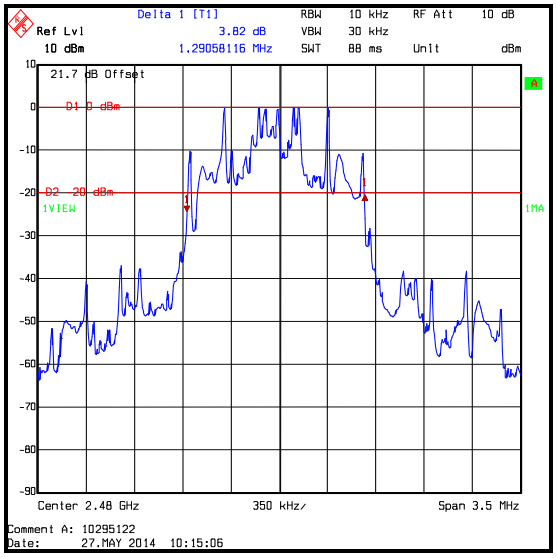
Channel	20 Db Bandwidth (kHz)
Bottom	1283.567
Middle	1290.581
Top	1290.581



Bottom Channel



Middle Channel

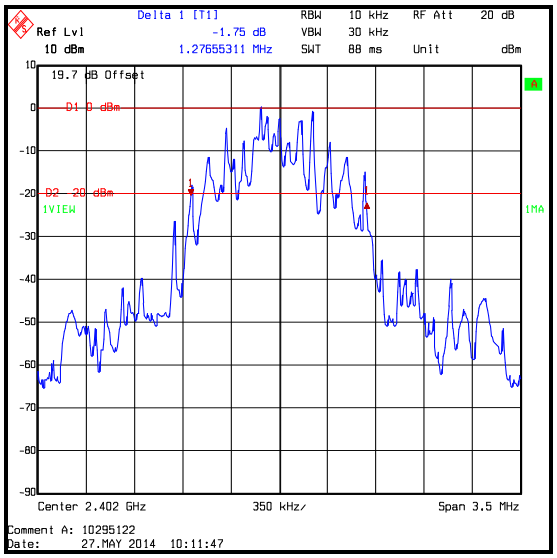


Top Channel

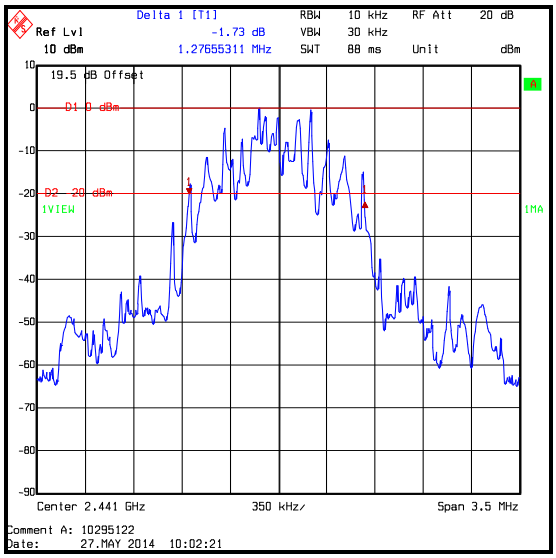
Transmitter 20 Db Bandwidth (continued)

Results 3DH5:

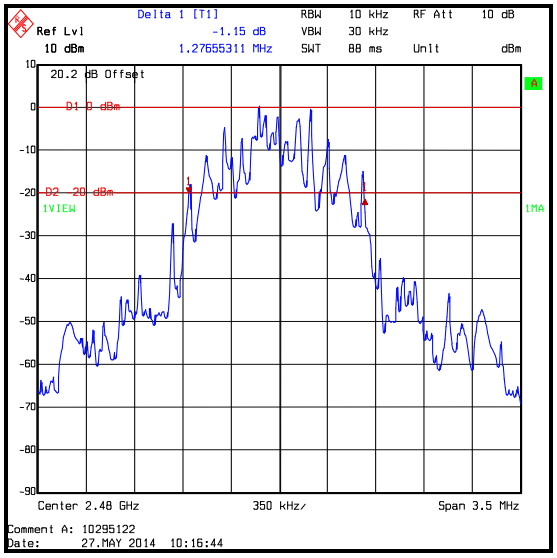
Channel	20 Db Bandwidth (kHz)
Bottom	1276.553
Middle	1276.553
Top	1276.553



Bottom Channel



Middle Channel



Top Channel

Transmitter 20 Db Bandwidth (continued)

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1657	Thermohygrometer	JM Handelspunkt	30.5015.13	Not stated	14 Mar 2015	12
M127	Spectrum Analyser	Rohde & Schwarz	FSEB 30	842 659/016	19 Aug 2014	12
A1998	Attenuator	Huber & Suhner	6820.17.B	07101	Calibrated before use	-
G0608	Signal Generator	Rohde & Schwarz	SMIQ 06B	838341/033	14 Feb 2015	12
M199	Power Meter	Rohde & Schwarz	NRVS	827023/075	08 Apr 2016	24
M1267	Power Sensor	Rohde & Schwarz	NRV-Z52	100155	23 Apr 2016	24
A1256	Power Supply Unit	Farnell	11E30/1B	000378	Calibrated before use	-
M1229	Multimeter	Fluke	179	87640015	24 Apr 2015	12

5.2.3. Transmitter Carrier Frequency Separation

Test Summary:

Test Engineer:	Nick Steele	**Test Date:**	27 May 2014
Test Sample IMEI:	004402452751278		

FCC Reference:	Part 15.247(a)(1)
Test Method Used:	As detailed in ANSI C63.10 Section 7.7.2

Environmental Conditions:

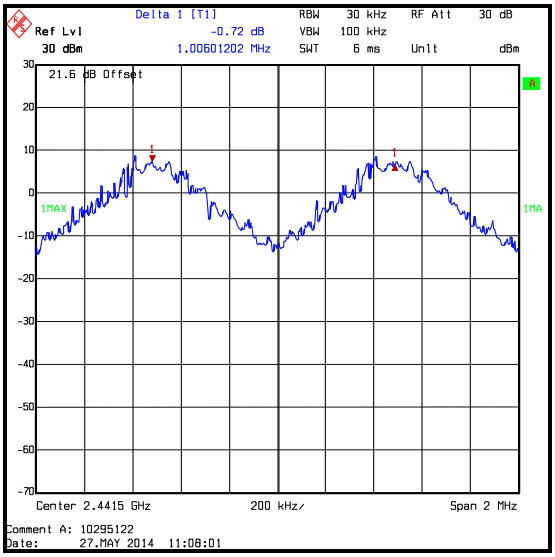
Temperature (°C):	25
Relative Humidity (%):	40

Note(s):

1. The 20 Db bandwidth measured for the middle channel operating at 2441 MHz was used to calculate the limit.

Results: DH5

Carrier Frequency Separation (kHz)	Limit ($^2/_3$ of 20 Db BW) (kHz)	Margin (kHz)	Result
1006.012	528.390	477.622	Complied



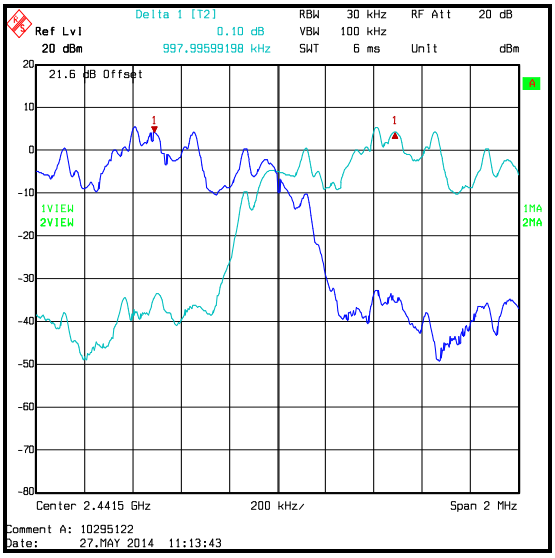
Transmitter Carrier Frequency Separation (continued)

Note(s):

1. The 20 Db bandwidth measured for the middle channel operating at 2441 MHz was used to calculate the limit.

Results: 2DH5

Carrier Frequency Separation (kHz)	Limit ($^2/_3$ of 20 Db BW) (kHz)	Margin (kHz)	Result
997.996	860.387	137.609	Complied



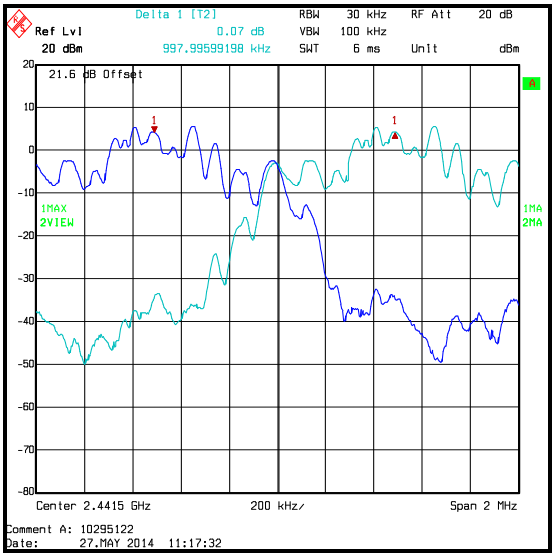
Transmitter Carrier Frequency Separation (continued)

Note(s):

1. The 20 Db bandwidth measured for the middle channel operating at 2441 MHz was used to calculate the limit.

Results: 3DH5

Carrier Frequency Separation (kHz)	Limit ($^2/_3$ of 20 Db BW) (kHz)	Margin (kHz)	Result
997.996	851.035	146.961	Complied



Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1657	Thermohygrometer	JM Handelspunkt	30.5015.13	Not stated	14 Mar 2015	12
M127	Spectrum Analyser	Rohde & Schwarz	FSEB 30	842 659/016	19 Aug 2014	12
A1998	Attenuator	Huber & Suhner	6820.17.B	07101	Calibrated before use	-
G0608	Signal Generator	Rohde & Schwarz	SMIQ 06B	838341/033	14 Feb 2015	12
M199	Power Meter	Rohde & Schwarz	NRVS	827023/075	08 Apr 2016	24
M1267	Power Sensor	Rohde & Schwarz	NRV-Z52	100155	23 Apr 2016	24
A1256	Power Supply Unit	Farnell	11E30/1B	000378	Calibrated before use	-
M1229	Multimeter	Fluke	179	87640015	24 Apr 2015	12

5.2.4. Transmitter Number of Hopping Frequencies and Average Time of Occupancy

Test Summary:

Test Engineer:	Nick Steele	**Test Date:**	27 May 2014
Test Sample IMEI:	004402452751278		

FCC Reference:	Part 15.247(a)(1)(iii)
Test Method Used:	As detailed in ANSI C63.10 Section 7.7.3 & 7.7.4

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	40

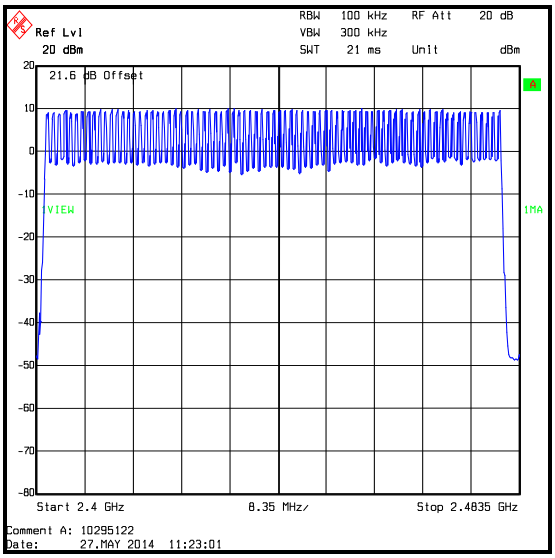
Note(s):

1. Tests were performed to identify the average time of occupancy in number of channels (79) x 0.4 seconds. The calculated period is 31.6 seconds.

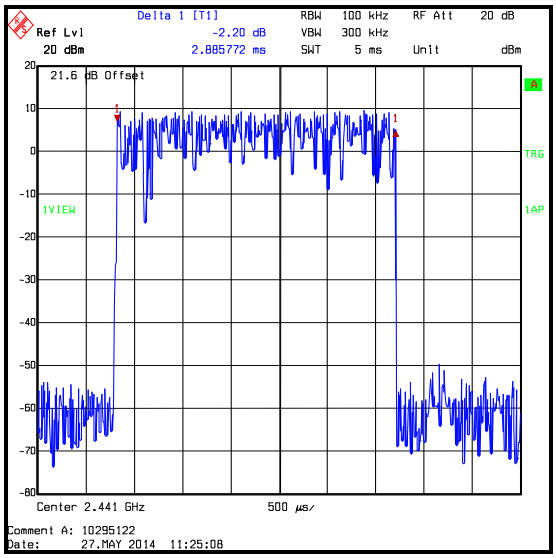
Results:

Emission Width (µs)	Number of Hops in 31.6 Seconds	Average Time of Occupancy (s)	Limit (s)	Margin (s)	Result
2885.772	97	0.280	0.4	0.120	Complied

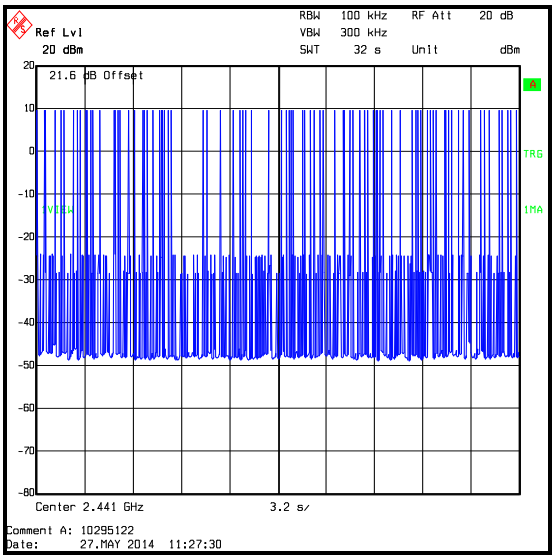
Transmitter Number of Hopping Frequencies and Average Time of Occupancy (continued)



Number of Hopping Frequencies



Emission Width



Number of Hopping Frequencies in 32 s

Transmitter Number of Hopping Frequencies and Average Time of Occupancy (continued)

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1657	Thermohygrometer	JM Handelspunkt	30.5015.13	Not stated	14 Mar 2015	12
M127	Spectrum Analyser	Rohde & Schwarz	FSEB 30	842 659/016	19 Aug 2014	12
A1998	Attenuator	Huber & Suhner	6820.17.B	07101	Calibrated before use	-
G0608	Signal Generator	Rohde & Schwarz	SMIQ 06B	838341/033	14 Feb 2015	12
M199	Power Meter	Rohde & Schwarz	NRVS	827023/075	08 Apr 2016	24
M1267	Power Sensor	Rohde & Schwarz	NRV-Z52	100155	23 Apr 2016	24
A1256	Power Supply Unit	Farnell	11E30/1B	000378	Calibrated before use	-
M1229	Multimeter	Fluke	179	87640015	24 Apr 2015	12

5.2.5. Transmitter Maximum Peak Output Power

Test Summary:

Test Engineer:	Nick Steele	**Test Date:**	27 May 2014
Test Sample IMEI:	004402452751278		

FCC Reference:	Part 15.247(b)(1)
Test Method Used:	As detailed in ANSI C63.10 Section 6.10.1

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	40

Transmitter Maximum Peak Output Power (continued)

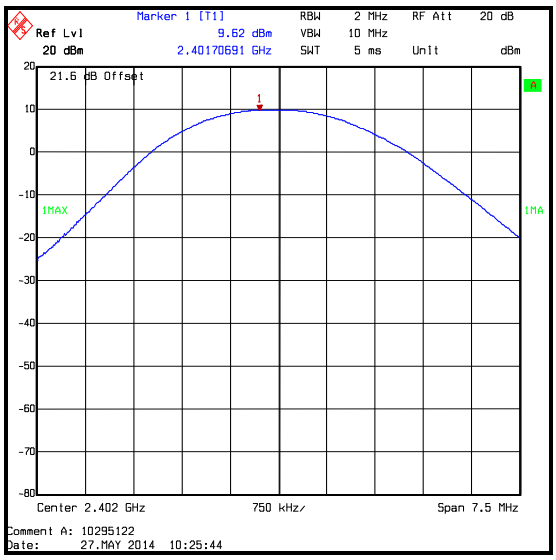
Results: DH5

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (Db)	Result
Bottom	9.6	30.0	20.4	Complied
Middle	10.2	30.0	19.8	Complied
Top	9.6	30.0	20.4	Complied

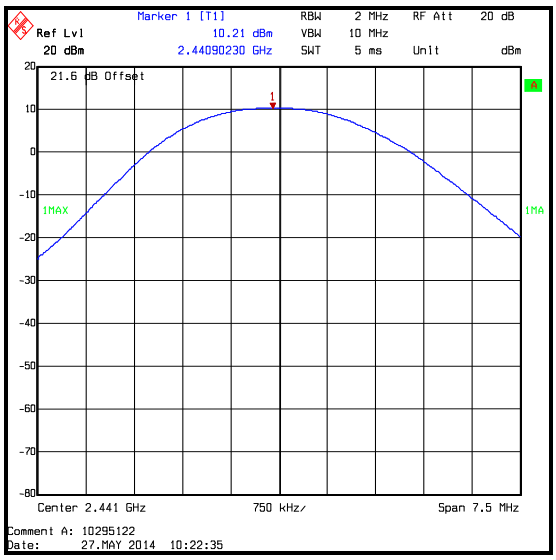
Channel	Conducted Peak Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (Db)	Result
Bottom	9.6	-3.5	6.1	36.0	29.9	Complied
Middle	10.2	-3.5	6.7	36.0	29.3	Complied
Top	9.6	-3.5	6.1	36.0	29.9	Complied

Transmitter Maximum Peak Output Power (continued)

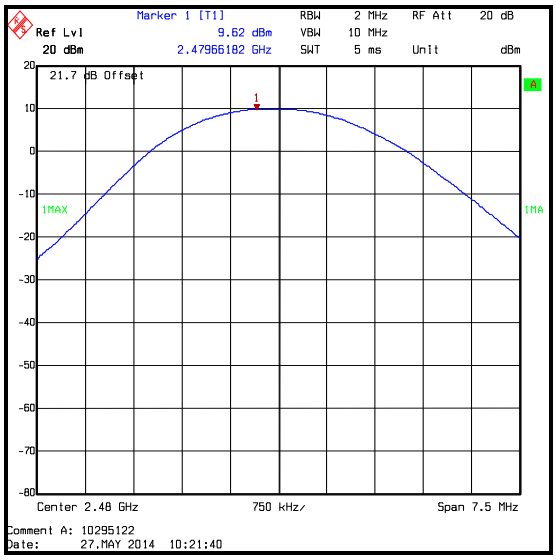
Results: DH5



Bottom Channel



Middle Channel



Top Channel

Transmitter Maximum Peak Output Power (continued)

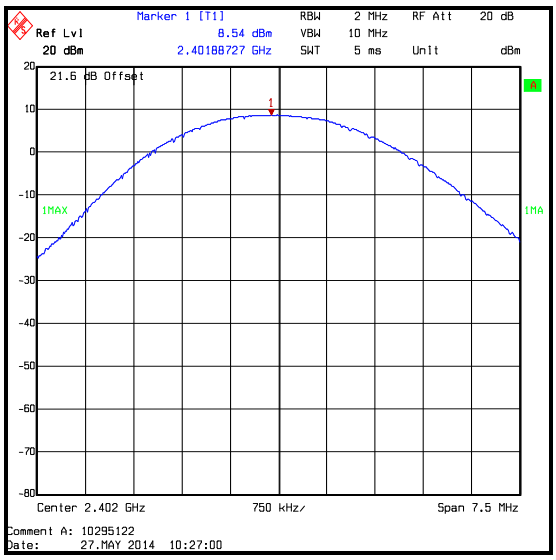
Results: 2DH5

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (Db)	Result
Bottom	8.5	21.0	12.5	Complied
Middle	8.8	21.0	12.2	Complied
Top	8.3	21.0	12.7	Complied

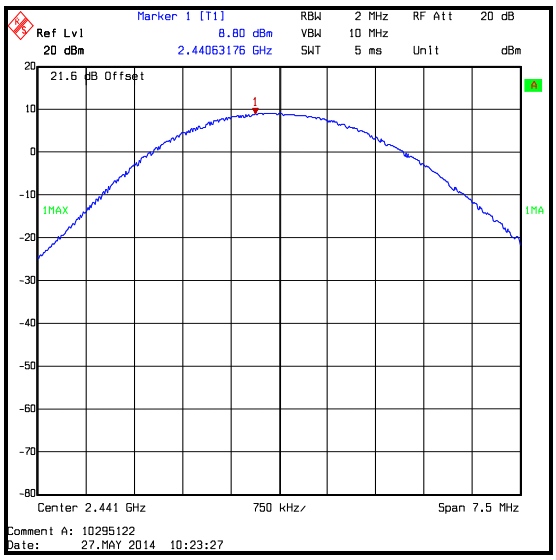
Channel	Conducted Peak Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (Db)	Result
Bottom	8.5	-3.5	5.0	27.0	22.0	Complied
Middle	8.8	-3.5	5.3	27.0	21.7	Complied
Top	8.3	-3.5	4.8	27.0	22.2	Complied

Transmitter Maximum Peak Output Power (continued)

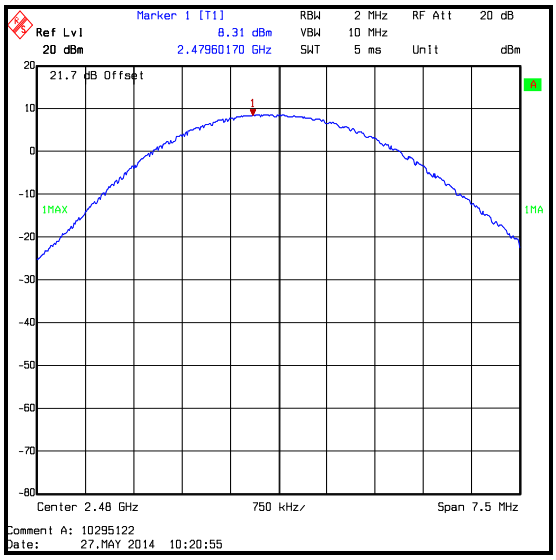
Results: 2DH5



Bottom Channel



Middle Channel



Top Channel

Transmitter Maximum Peak Output Power (continued)

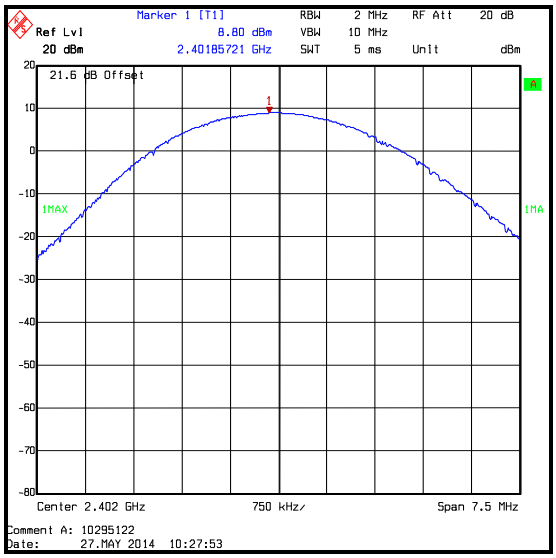
Results: 3DH5

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (Db)	Result
Bottom	8.8	21.0	12.2	Complied
Middle	9.0	21.0	12.0	Complied
Top	8.5	21.0	12.5	Complied

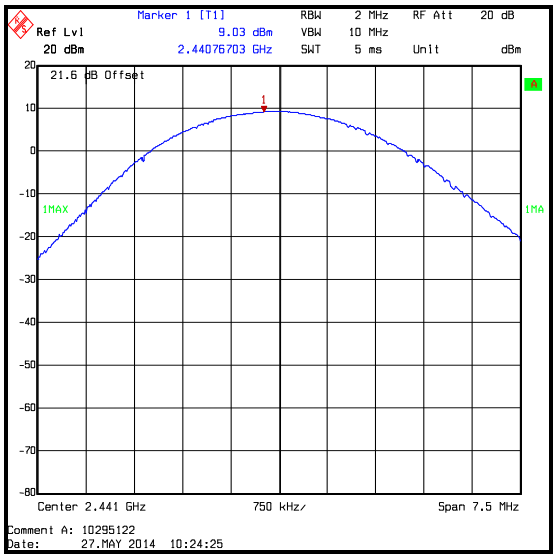
Channel	Conducted Peak Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (Db)	Result
Bottom	8.8	-3.5	5.3	27.0	21.7	Complied
Middle	9.0	-3.5	5.5	27.0	21.5	Complied
Top	8.5	-3.5	5.0	27.0	22.0	Complied

Transmitter Maximum Peak Output Power (continued)

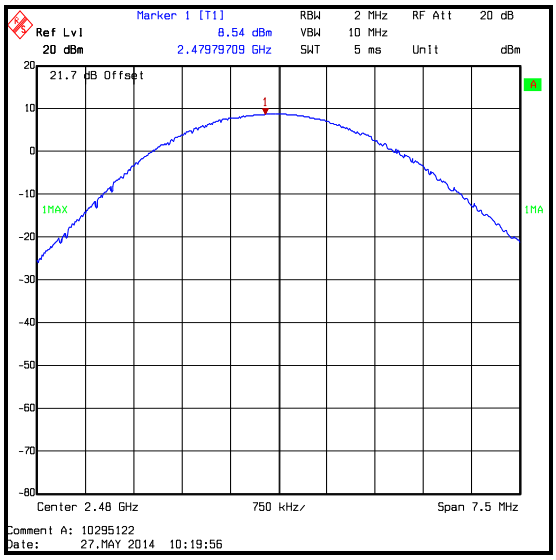
Results: 3DH5



Bottom Channel



Middle Channel



Top Channel

Transmitter Maximum Peak Output Power (continued)

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1657	Thermohygrometer	JM Handelspunkt	30.5015.13	Not stated	14 Mar 2015	12
M127	Spectrum Analyser	Rohde & Schwarz	FSEB 30	842 659/016	19 Aug 2014	12
A1998	Attenuator	Huber & Suhner	6820.17.B	07101	Calibrated before use	-
G0608	Signal Generator	Rohde & Schwarz	SMIQ 06B	838341/033	14 Feb 2015	12
M199	Power Meter	Rohde & Schwarz	NRVS	827023/075	08 Apr 2016	24
M1267	Power Sensor	Rohde & Schwarz	NRV-Z52	100155	23 Apr 2016	24
A1256	Power Supply Unit	Farnell	11E30/1B	000378	Calibrated before use	-
M1229	Multimeter	Fluke	179	87640015	24 Apr 2015	12

5.2.6. Transmitter Radiated Emissions

Test Summary:

Test Engineer:	Georgios Vrezas	**Test Date:**	30 May 2014
Test Sample IMEI:	004402452750619		

FCC Reference:	Parts 15.247(d) & 15.209(a)
Test Method Used:	As detailed in ANSI C63.10 Sections 6.3 and 6.5 referencing ANSI C63.4
Frequency Range	9 kHz to 1000 MHz

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	34

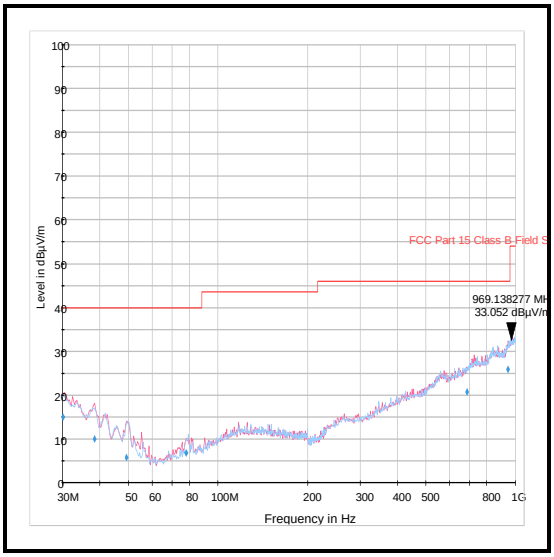
Note(s):

1. Transmitter radiated spurious emissions tests were performed with the EUT transmitting in DH5 mode as this was found to transmit the highest power and therefore deemed worst case.
2. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
3. 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 top channel only.
4. In accordance with FCC part 15.33, pre-scans were performed from 9 kHz to 30 MHz. As there were no emissions observed within 20 Db of the limit, in accordance with 15.31(o), no pre-scans are included in this test report. The pre-scans are kept on file and available upon request.
5. All emissions shown on the pre-scan plot were investigated and found to be ambient or >20 Db below the applicable limit or below the measurement system noise floor. Therefore the highest peak noise floor reading of the measuring receiver was recorded in the table below.
6. 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.

Results: Quasi-Peak / DH5

Frequency (MHz)	Antenna Polarity	Level (DbµV/m)	Limit (DbµV/m)	Margin (Db)	Result
969.138	Vertical	33.1	54.0	20.9	Complied

Transmitter Radiated 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

Transmitter Radiated Emissions (continued)

Test Summary:

Test Engineer:	Andrew Edwards	**Test Dates:**	27 May 2014 & 28 May 2014
Test Sample IMEI:	004402452750619		

FCC Reference:	Parts 15.247(d) & 15.209(a)
Test Method Used:	As detailed in ANSI C63.10 Sections 6.3 and 6.6 referencing ANSI C63.4
Frequency Range	1 GHz to 25 GHz

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	40 to 42

Note(s):

1. Transmitter radiated spurious emissions tests were performed with the EUT transmitting in DH5 mode as this was found to transmit the highest power and therefore deemed worst case.
2. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
3. All other emissions shown in the pre-scan plot were investigated and found to be ambient or > 20 Db below the application limit or below the measurement noise floor.
4. The emission shown on the 1 GHz to 4 GHz plot is the EUT fundamental at 2480 MHz.
5. In accordance with ANSI C63.10 Section 6.6.4.2, if the peak measured value complies with the average limit, it is unnecessary to perform an average measurement.
6. 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 Emissions (continued)

Results: Peak / Bottom Channel / DH5

Frequency (MHz)	Antenna Polarity	Peak Level (DbµV/m)	Average Limit (DbµV/m)	Margin (Db)	Result
4803.832	Horizontal	40.6	54.0	13.4	Complied

Results: Peak / Middle Channel / DH5

Frequency (MHz)	Antenna Polarity	Peak Level (DbµV/m)	Average Limit (DbµV/m)	Margin (Db)	Result
4881.798	Horizontal	40.8	54.0	13.2	Complied

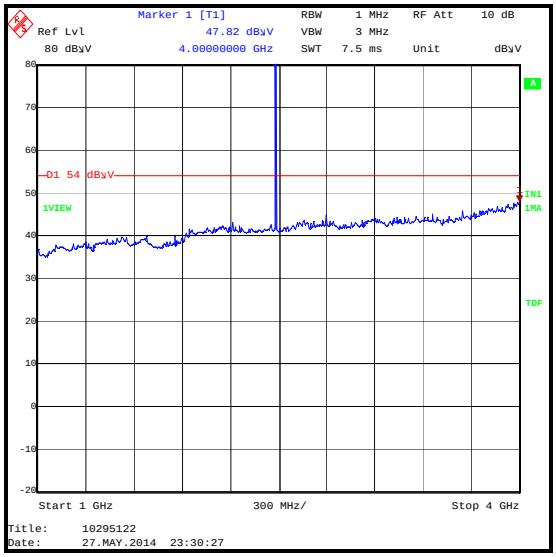
Results: Peak / Top Channel / DH5

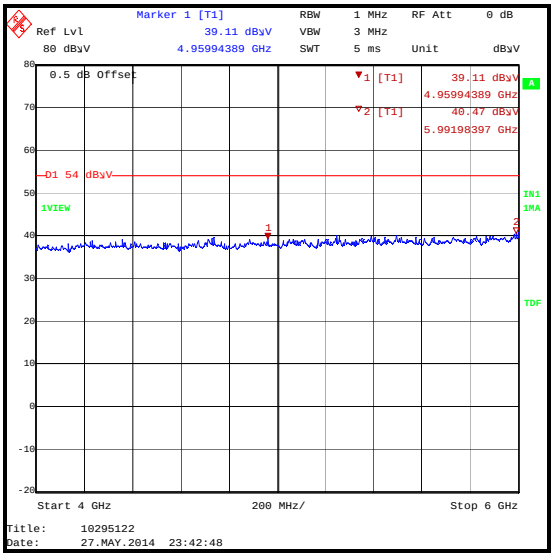
Frequency (MHz)	Antenna Polarity	Peak Level (DbµV/m)	Average Limit (DbµV/m)	Margin (Db)	Result
4959.389	Horizontal	40.6	54.0	13.4	Compiled

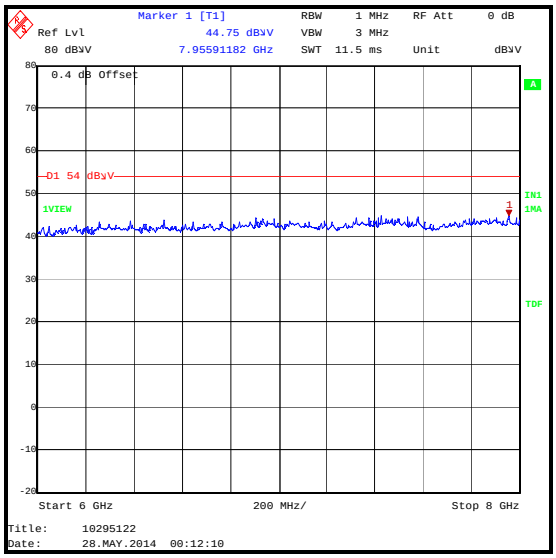
Results: Peak / Hopping Mode / DH5

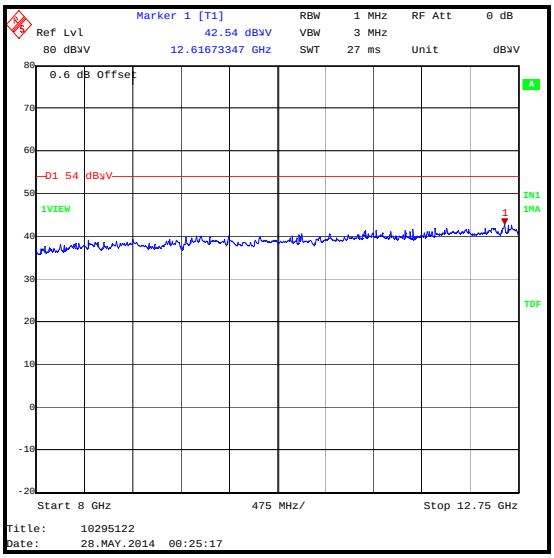
Frequency (MHz)	Antenna Polarity	Peak Level (DbµV/m)	Average Limit (DbµV/m)	Margin (Db)	Result
4818.032	Horizontal	40.4	54.0	13.6	Compiled

Transmitter Radiated Emissions (continued)

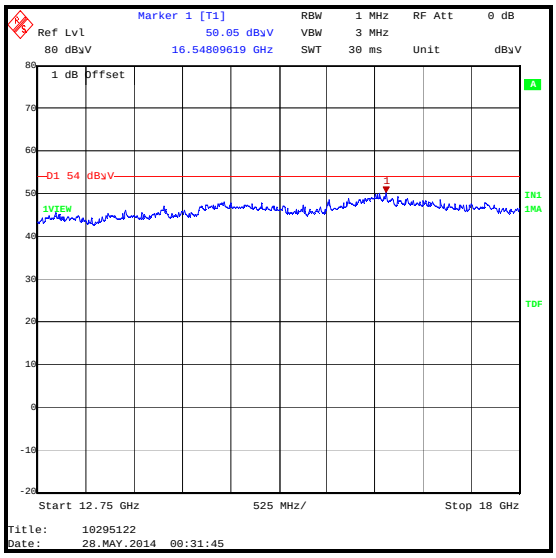


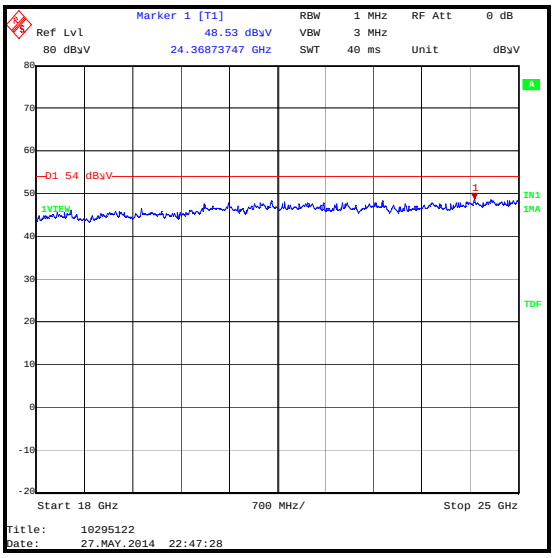






Transmitter Radiated Emissions (continued)





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)
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
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	10 May 2015	12
M1124	Test Receiver	Rohde & Schwarz	ESIB 26	100046K	01 Oct 2014	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
A255	Antenna	Flann Microwave	16240-20	519	14 Nov 2014	12
A256	Antenna	Flann Microwave	18240-20	400	14 Nov 2014	12
A436	Antenna	Flann Microwave	20240-20	330	14 Nov 2014	12
A1974	High Pass Filter	AtlanTecRF	AFH-03000	090424010	12 Apr 2015	12
A2176	High Pass Filter	AtlanTecRF	AFH-07000	800980	12 Apr 2015	12

5.2.7. Transmitter Band Edge Radiated Emissions

Test Summary:

Test Engineer:	Andrew Edwards	**Test Date:**	28 Month 2014
Test Sample IMEI:	004402452750619		

FCC Reference:	Parts 15.247(d) & 15.209(a)
Test Method Used:	As detailed in ANSI C63.10 Sections 6.9.2

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	40

Note(s):

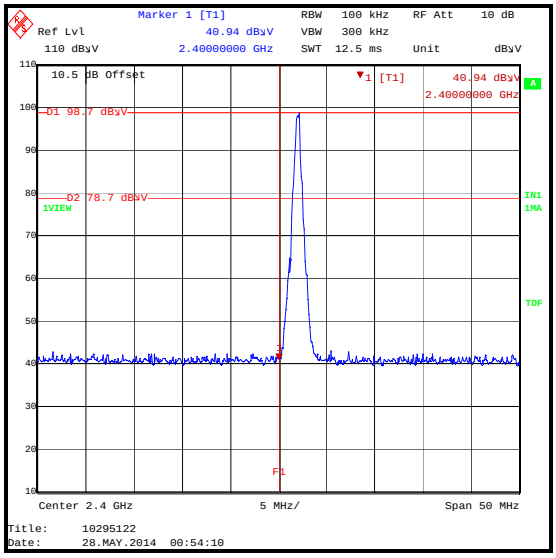
1. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
2. * -20 dBc limit.

Transmitter Band Edge Radiated Emissions (continued)

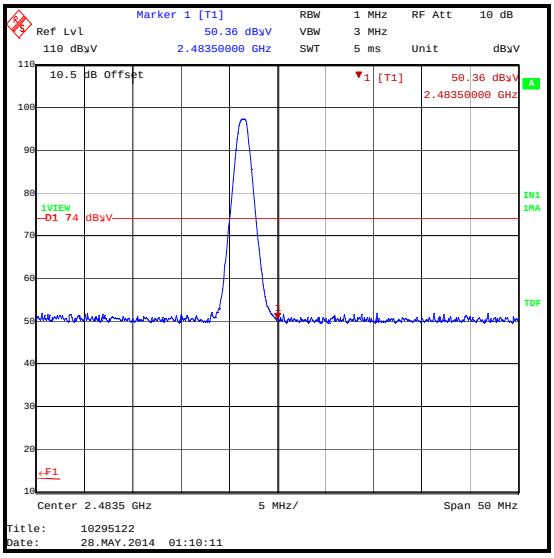
Results: Static Mode / DH5

Frequency (MHz)	Antenna Polarity	Peak Level (DbµV/m)	Limit (DbµV/m)	Margin (Db)	Result
2400.0	Horizontal	40.9	78.7*	37.8	Complied
2483.5	Horizontal	50.4	74.0	23.6	Complied

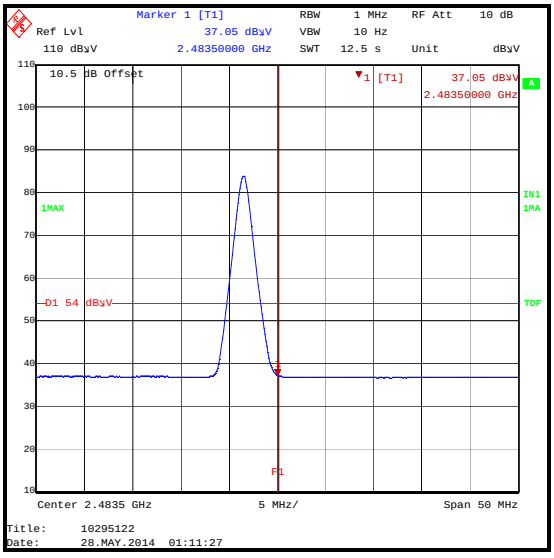
Frequency (MHz)	Antenna Polarity	Average Level (DbµV/m)	Limit (DbµV/m)	Margin (Db)	Result
2483.5	Horizontal	37.1	54.0	16.9	Complied



Lower Band Edge Peak Static



Upper Band Edge Peak Static



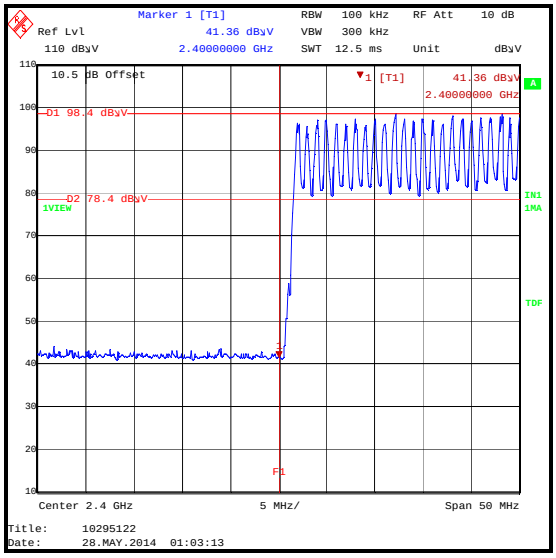
Upper Band Edge Average Static

Transmitter Band Edge Radiated Emissions (continued)

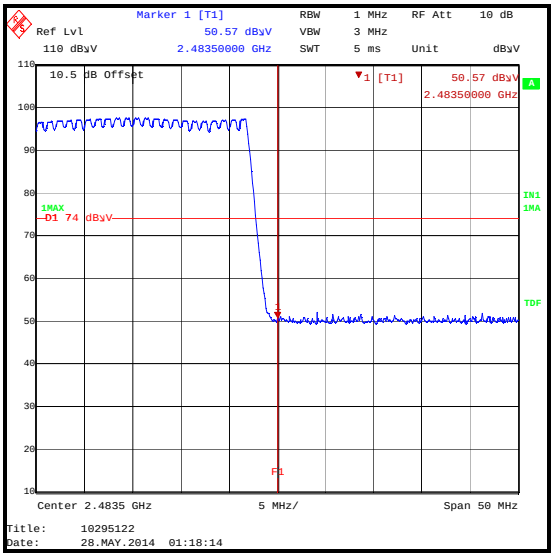
Results: Hopping Mode / DH5

Frequency (MHz)	Antenna Polarity	Peak Level (DbµV/m)	Limit (DbµV/m)	Margin (Db)	Result
2400.0	Horizontal	41.4	78.4*	37.0	Complied
2483.5	Horizontal	50.6	74.0	23.4	Complied

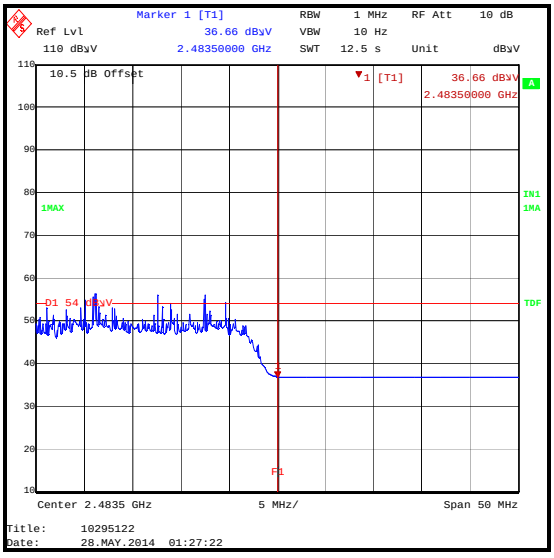
Frequency (MHz)	Antenna Polarity	Average Level (DbµV/m)	Limit (DbµV/m)	Margin (Db)	Result
2483.5	Horizontal	36.7	54.0	17.3	Complied



Lower Band Edge Peak Hopping



Upper Band Edge Peak Hopping



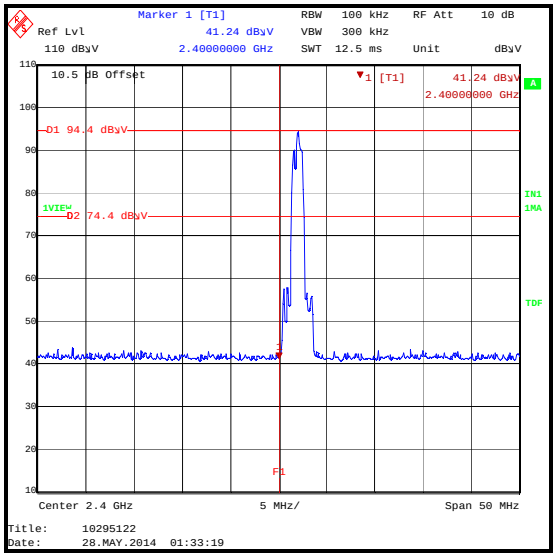
Upper Band Edge Average Hopping

Transmitter Band Edge Radiated Emissions (continued)

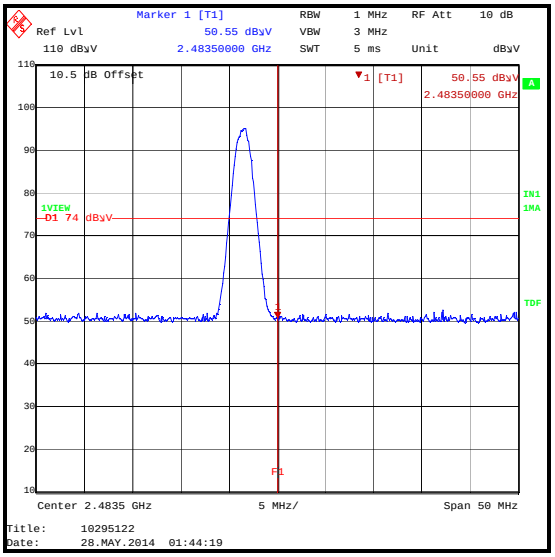
Results: Static Mode / 2DH5

Frequency (MHz)	Antenna Polarity	Peak Level (DbµV/m)	Limit (DbµV/m)	Margin (Db)	Result
2400.0	Horizontal	41.2	74.4*	33.2	Complied
2483.5	Horizontal	50.6	74.0	23.4	Complied

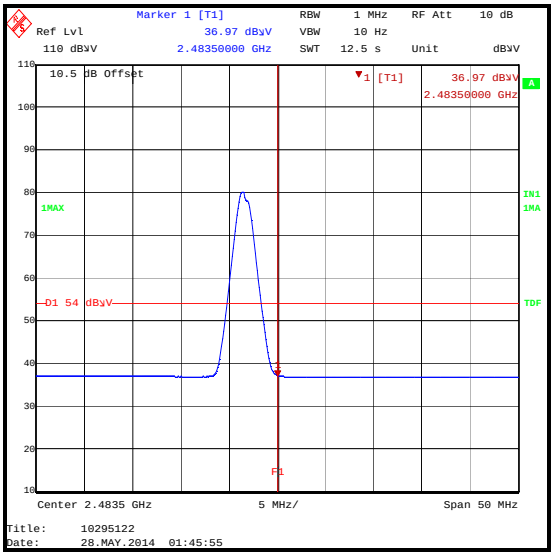
Frequency (MHz)	Antenna Polarity	Average Level (DbµV/m)	Limit (DbµV/m)	Margin (Db)	Result
2483.5	Horizontal	37.0	54.0	17.0	Complied



Lower Band Edge Peak Static



Upper Band Edge Peak Static



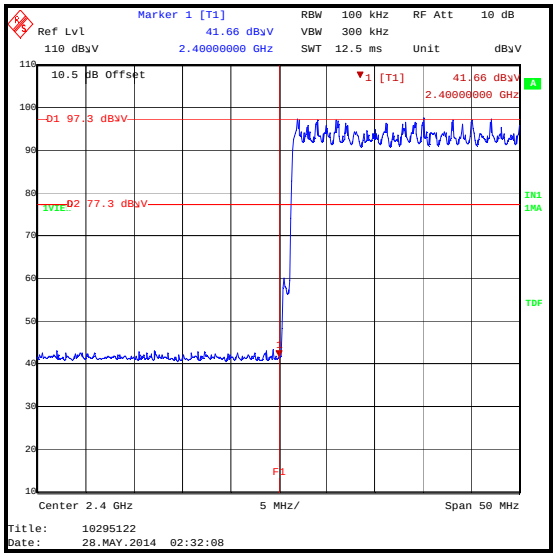
Upper Band Edge Average Static

Transmitter Band Edge Radiated Emissions (continued)

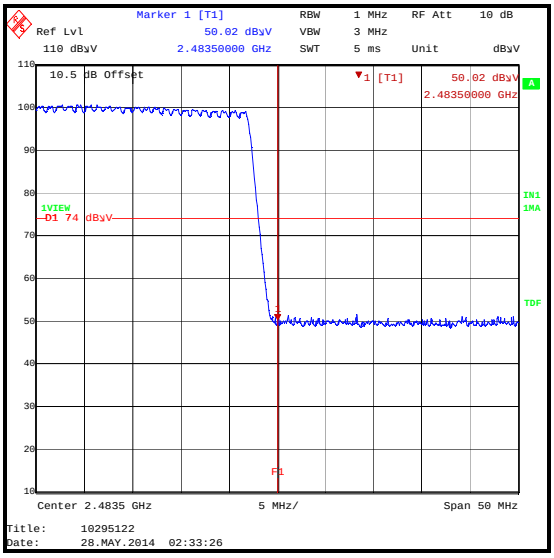
Results: Hopping Mode / 2DH5

Frequency (MHz)	Antenna Polarity	Peak Level (DbµV/m)	Limit (DbµV/m)	Margin (Db)	Result
2400.0	Horizontal	41.7	77.3*	35.6	Complied
2483.5	Horizontal	50.0	74.0	24.0	Complied

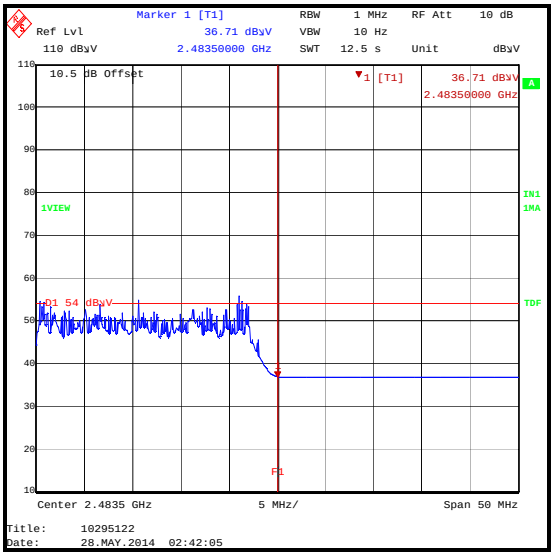
Frequency (MHz)	Antenna Polarity	Average Level (DbµV/m)	Limit (DbµV/m)	Margin (Db)	Result
2483.5	Horizontal	36.7	54.0	17.3	Complied



Lower Band Edge Peak Hopping



Upper Band Edge Peak Hopping



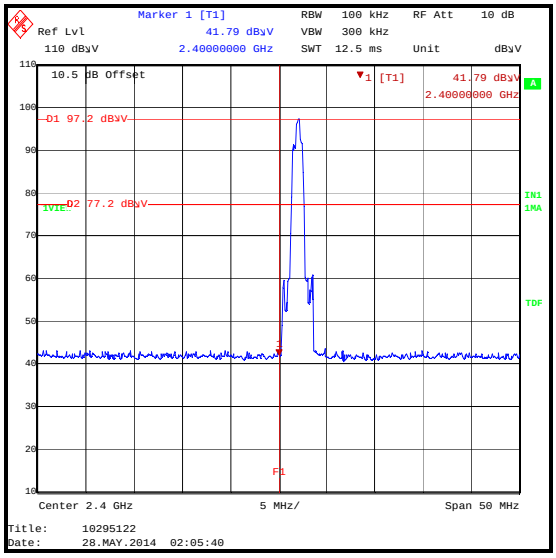
Upper Band Edge Average Hopping

Transmitter Band Edge Radiated Emissions (continued)

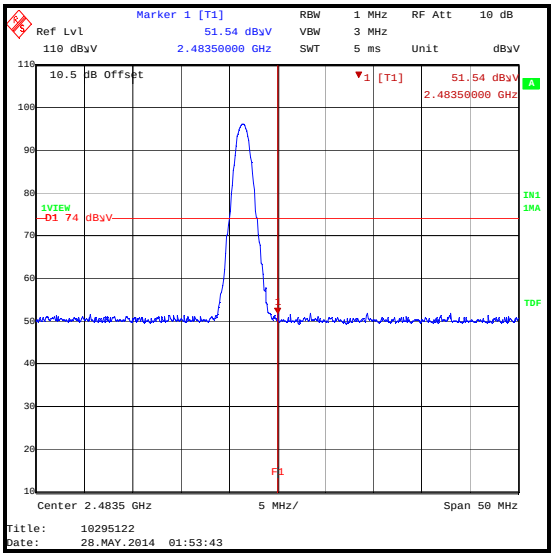
Results: Static Mode / 3DH5

Frequency (MHz)	Antenna Polarity	Peak Level (DbµV/m)	Limit (DbµV/m)	Margin (Db)	Result
2400.0	Horizontal	41.8	77.2*	35.4	Complied
2483.5	Horizontal	51.5	74.0	22.5	Complied

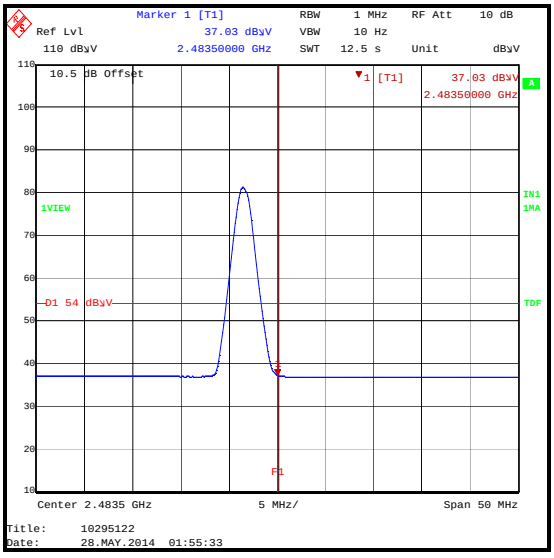
Frequency (MHz)	Antenna Polarity	Average Level (DbµV/m)	Limit (DbµV/m)	Margin (Db)	Result
2483.5	Horizontal	37.0	54.0	17.0	Complied



Lower Band Edge Peak Static



Upper Band Edge Peak Static



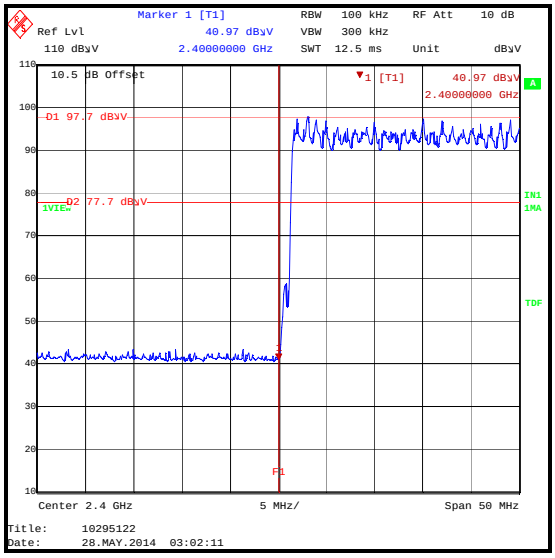
Upper Band Edge Average Static

Transmitter Band Edge Radiated Emissions (continued)

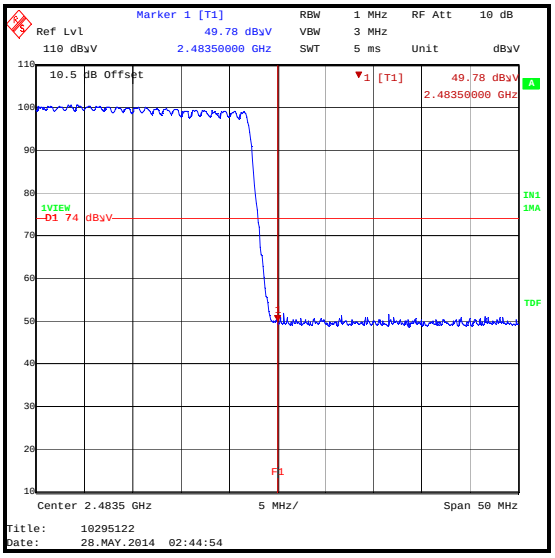
Results: Hopping Mode / 3DH5

Frequency (MHz)	Antenna Polarity	Peak Level (DbµV/m)	Limit (DbµV/m)	Margin (Db)	Result
2400.0	Horizontal	41.0	77.7*	36.7	Complied
2483.5	Horizontal	49.8	74.0	24.2	Complied

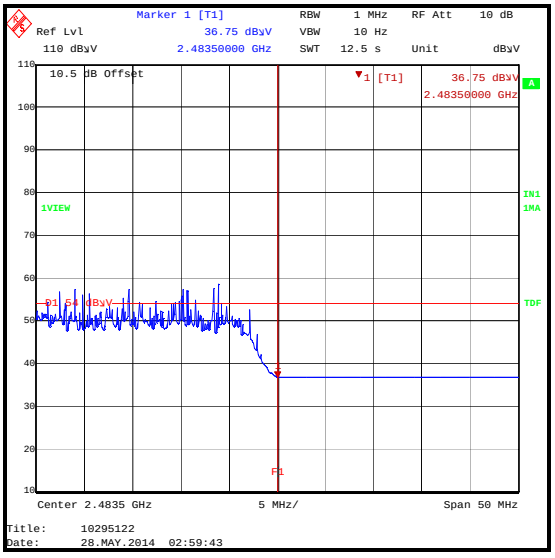
Frequency (MHz)	Antenna Polarity	Average Level (DbµV/m)	Limit (DbµV/m)	Margin (Db)	Result
2483.5	Horizontal	36.8	54.0	17.2	Complied



Lower Band Edge Peak Hopping



Upper Band Edge Peak Hopping



Upper Band Edge Average Hopping

Transmitter Band Edge 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	None stated	14 Mar 2015	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	14 Nov 2014	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	10 May 2015	12
M1124	Test Receiver	Rohde & Schwarz	ESIB 26	100046K	01 Oct 2014	12
A1818	Antenna	EMCO	3115	00075692	14 Nov 2014	12
A1396	Attenuator	Huber & Suhner	6810.17.B	757987	02 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”.

Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
AC Conducted Spurious Emissions	0.15 MHz to 30 MHz	95%	±4.69 Db
Maximum Peak Output Power	2.4 GHz to 2.4835 GHz	95%	±1.13 Db
Carrier Frequency Separation	2.4 GHz to 2.4835 GHz	95%	±0.92 ppm
Average Time of Occupancy	2.4 GHz to 2.4835 GHz	95%	±0.3 ns
20 Db Bandwidth	2.4 GHz to 2.4835 GHz	95%	±3.92 %
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	-	-	Admin update
3.0	-	-	EUT Description update

--- END OF REPORT ---