TEST REPORT

Test Report No. : UL-RPT-RP10363939JD08A

Manufacturer	:	Panasonic Mobile Communications Development of Europe Ltd
Model No.	:	NTT docomo P-01G/EB-4068
FCC ID	:	UCE114061A
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 1.0.

Date of Issue: 02 September 2014

Checked by:

Ian Watch
Senior Engineer, Radio Laboratory

Issued by :

pp

John Newell
Quality Manager,
UL VS LTD

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1. Customer Information

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

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:	08 August 2014 to 01 September 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:	NTT docomo
Model Name or Number:	P-01G/EB-4068
IMEI:	353758060006562 *(Radiated sample #1)*
Hardware Version:	Rev C
Software Version:	ACPU: B-D42CS1-02.01.001 CCPU: D42CS1_Cv18122202
FCC ID:	UCE114061A

Brand Name:	NTT docomo
Model Name or Number:	P-01G/EB-4068
IMEI:	353758060006554 *(Radiated sample #2)*
Hardware Version:	Rev C
Software Version:	ACPU: B-D42CS1-02.01.001 CCPU: D42CS1_Cv18122202
FCC ID:	UCE114061A

Brand Name:	NTT docomo
Model Name or Number:	P-01G/EB-4068
IMEI:	353758060006596 *(Conducted sample with RF port)*
Hardware Version:	Rev C
Software Version:	ACPU: B-D42CS1-02.01.001 CCPU: D42CS1_Cv18122202
FCC ID:	UCE114061A

Brand Name:	NTT docomo
Description:	AC Adapter
Model Name or Number:	AC 01 (Part Number MAS-BH0008-A 002)
Serial Number:	Not marked or stated

Brand Name:	NTT docomo
Description:	USB Cable with Charger Function
Model Name or Number:	02
Serial Number:	#62

Identification of Equipment Under Test (continued)

Brand Name:	NTT docomo
Description:	Stereo Earphone Set
Model Name or Number:	01
Serial Number:	#26

Brand Name:	NTT docomo
Description:	Battery
Model Name or Number:	P31

3.2. Description of EUT

The Equipment Under Test was a single mode UTRA mobile phone with *Bluetooth*® (V2.0 + EDR) and RFID.

3.3. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.4. Additional Information Related to Testing

Tested Technology:	*Bluetooth*		
Power Supply Requirement:	Nominal	3.7 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:	0.8 dBm		
Antenna Gain:	0.0 dBi		
Transmit Frequency Range:	2400 MHz to 2483.5 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:

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

Description:	Laptop PC
Brand Name:	Panasonic
Model Name or Number:	CF74
Serial Number:	7407

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 placed into *Bluetooth* test mode using a laptop PC and application supplied by the customer. Once in *Bluetooth* mode test mode, a link was established to a *Bluetooth* tester which was then used to control the EUT.
- 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 AC Charger connected to the EUT as this was found to be the worst case during pre-scans. All the accessories were individually connected and measurements made during the pre-scans to determine the worst case combination.
- Transmitter radiated spurious emissions tests were performed with the EUT transmitting in DH5 mode as this mode was found to transmit the highest power.
- The sample with IMEI 353758060006554 was used for AC conducted emissions tests.
- The sample with IMEI 353758060006596 was used for 20 dB bandwidth, carrier frequency separation, average time of occupancy tests and conducted output power tests.
- The sample with IMEI 353758060006562 was used for 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:	Keith Tucker	**Test Date:**	01 September 2014
Test Sample IMEI:	353758060006554		

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

Environmental Conditions:

Temperature (℃):	23
Relative Humidity (%):	42

Note(s):

1. The EUT was transmitting DH5 packets during the test. This mode was found to have highest transmit power.

Results: Live / Quasi Peak

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.155	Neutral	43.8	65.8	22.0	Complied
0.299	Neutral	29.2	60.3	31.1	Complied
0.686	Neutral	30.8	56.0	25.2	Complied
1.460	Neutral	35.6	56.0	20.4	Complied
1.775	Neutral	33.8	56.0	22.2	Complied
3.678	Neutral	33.1	56.0	22.9	Complied

Results: Live / Average

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.159	Live	35.9	55.5	19.6	Complied
0.240	Live	20.2	52.1	31.9	Complied
0.735	Live	16.4	46.0	29.6	Complied
1.149	Live	21.0	46.0	25.0	Complied
1.590	Live	28.7	46.0	17.3	Complied
3.638	Live	26.0	46.0	20.0	Complied

Transmitter AC Conducted Spurious Emissions (continued)

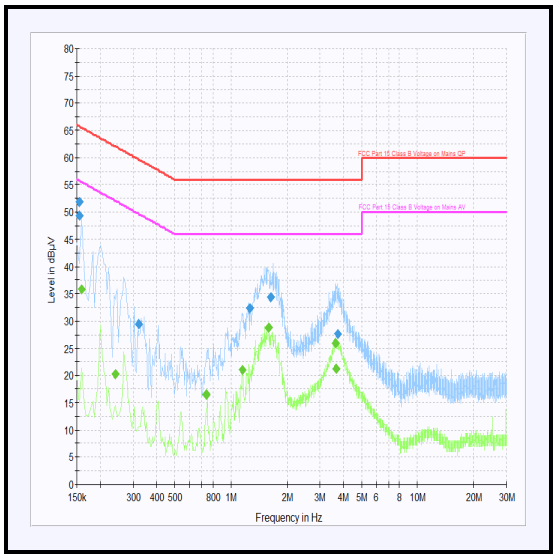
Results: Neutral / Quasi Peak

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.155	Neutral	43.8	65.8	22.0	Complied
0.299	Neutral	29.2	60.3	31.1	Complied
0.686	Neutral	30.8	56.0	25.2	Complied
1.460	Neutral	35.6	56.0	20.4	Complied
1.775	Neutral	33.8	56.0	22.2	Complied
3.678	Neutral	33.1	56.0	22.9	Complied

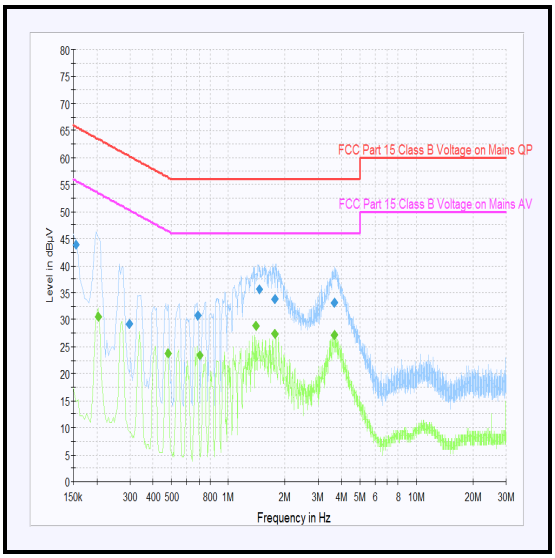
Results: Neutral / Average

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.204	Neutral	30.5	53.4	22.9	Complied
0.479	Neutral	23.9	46.4	22.5	Complied
0.704	Neutral	23.5	46.0	22.5	Complied
1.406	Neutral	28.8	46.0	17.2	Complied
1.766	Neutral	27.4	46.0	18.6	Complied
3.651	Neutral	27.2	46.0	18.8	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:	Sandeep Bharat	**Test Date:**	08 August 2014
Test Sample IMEI:	353758060006596		

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

Environmental Conditions:

Temperature (℃):	23
Relative Humidity (%):	44

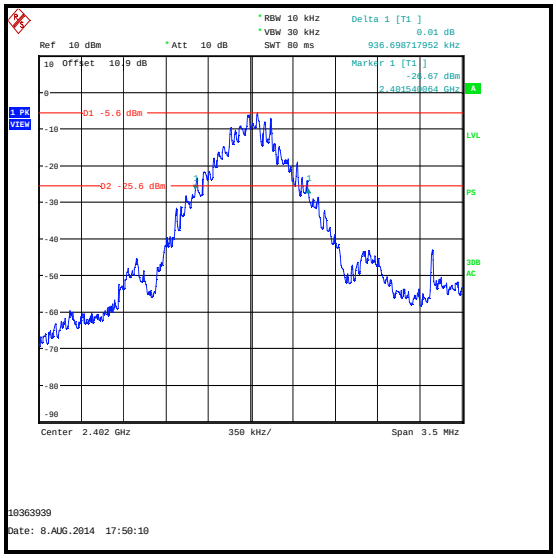
Note(s):

1. The test receiver resolution bandwidth was set to 10 kHz and video bandwidth 30 kHz. A peak detector was used, sweep time was set to auto and the trace mode was Max Hold. The span was set to 3.5 MHz. Normal and delta markers were placed 20 dB down from the peak of the carrier. These results are documented in the tables below.
2. The test receiver was connected to the RF port on the EUT using suitable attenuation and RF cable.

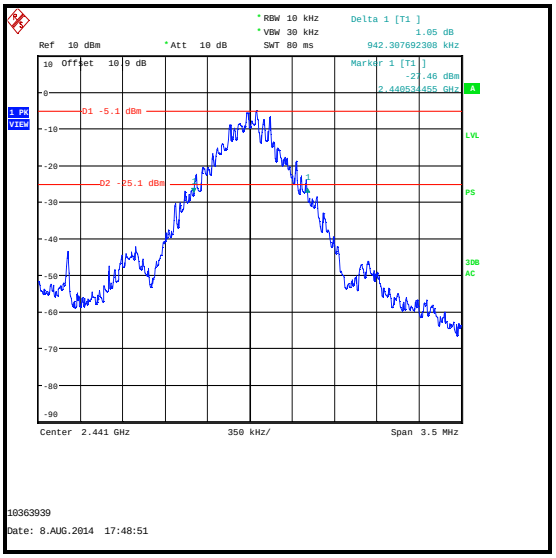
Transmitter 20 dB Bandwidth (continued)

Results: DH5

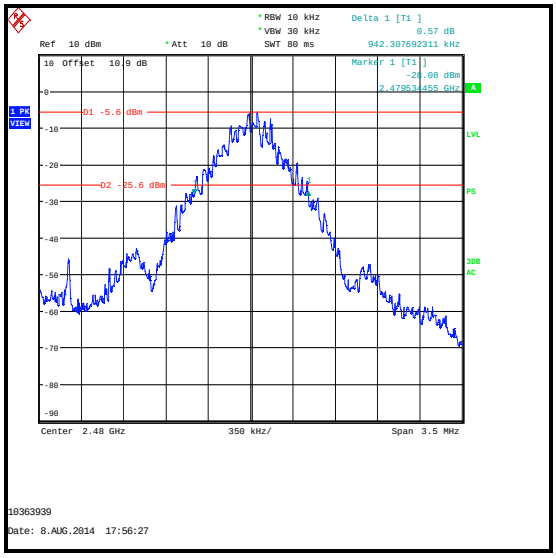
Channel	20 dB Bandwidth (kHz)
Bottom	936.699
Middle	942.308
Top	942.308



Bottom Channel



Middle Channel

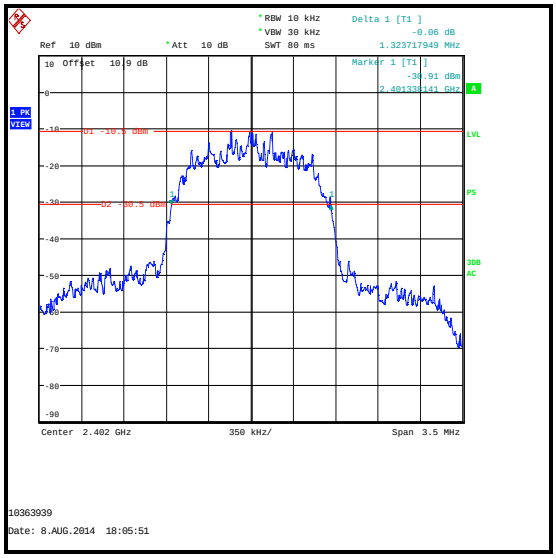


Top Channel

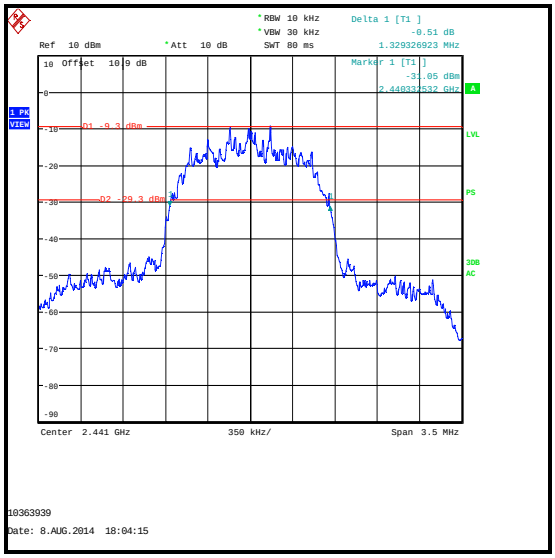
Transmitter 20 dB Bandwidth (continued)

Results: 2DH5

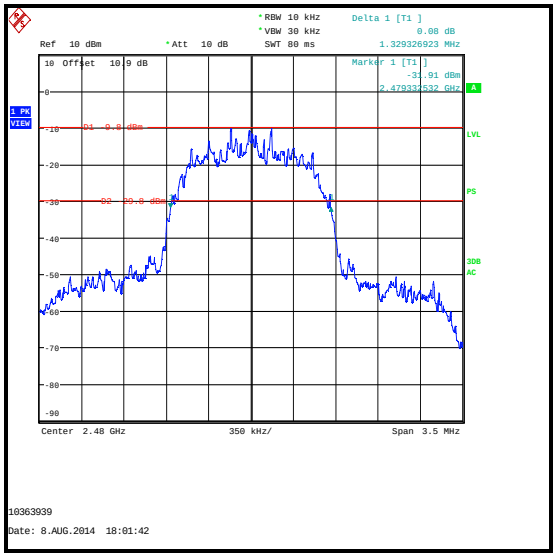
Channel	20 dB Bandwidth (kHz)
Bottom	1323.718
Middle	1329.327
Top	1329.327



Bottom Channel



Middle Channel

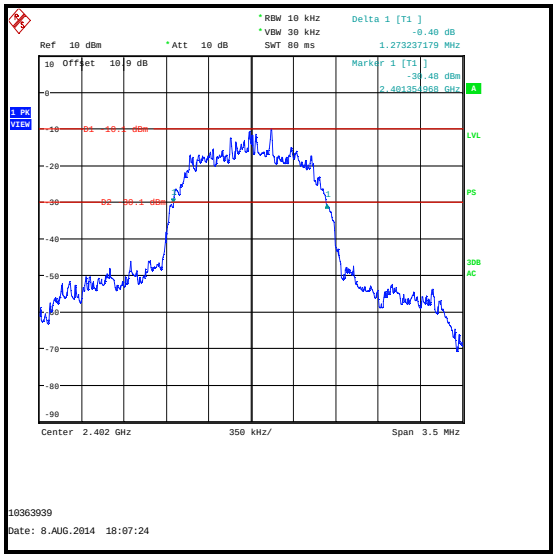


Top Channel

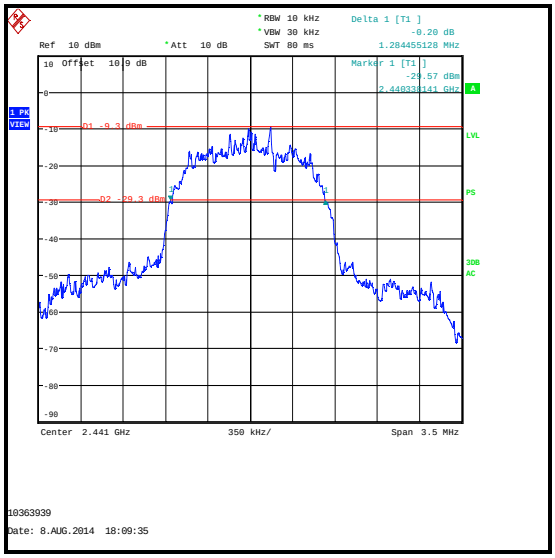
Transmitter 20 dB Bandwidth (continued)

Results: 3DH5

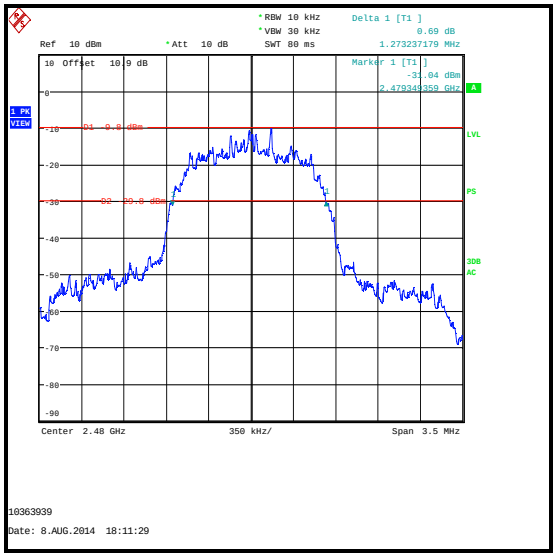
Channel	20 dB Bandwidth (kHz)
Bottom	1273.237
Middle	1284.455
Top	1273.237



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)
M1659	Thermohygrometer	JM Handelspunkt	30.5015.13	None stated	14 Mar 2015	12
M1630	Test Receiver	Rohde & Schwarz	ESU40	100233	13 Mar 2015	12
A2032	Directional Coupler	Narda	4243B	03547	Calibrated before use	12

5.2.3. Transmitter Carrier Frequency Separation

Test Summary:

Test Engineer:	Sandeep Bharat	**Test Date:**	08 August 2014
Test Sample IMEI:	353758060006596		

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

Environmental Conditions:

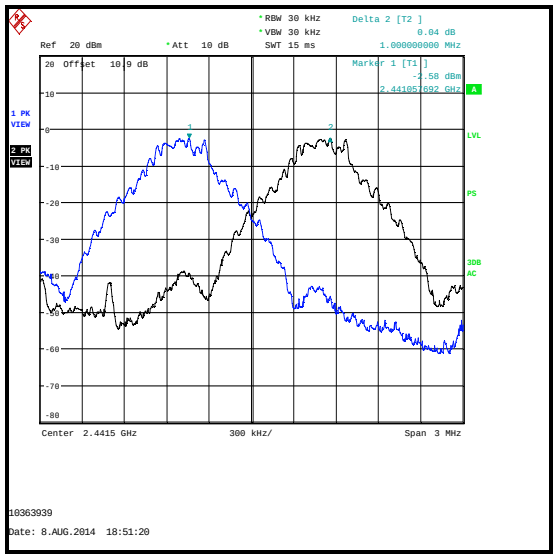
Temperature (℃):	23
Relative Humidity (%):	44

Note(s):

1. The 20 dB bandwidth measured for the middle channel operating at 2441 MHz was used to calculate the limit.
2. The test receiver measurement bandwidths were set to 30 kHz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold. The span was set to 3 MHz. A marker was placed at the peak of one channel and then a delta marker was placed in the peak of the adjacent hopping channel, the results are recorded in the table below.

Results: DH5

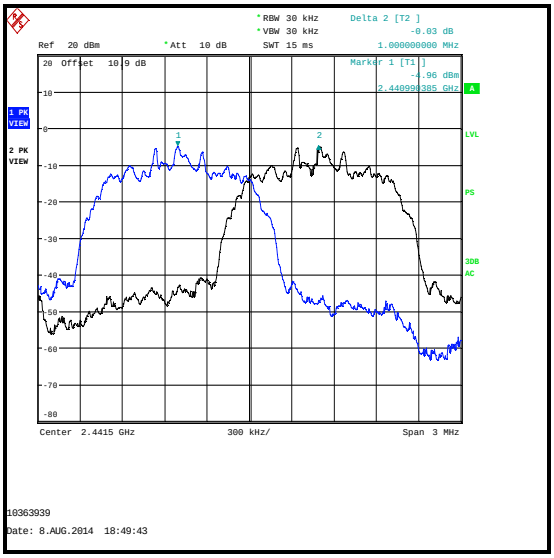
Carrier Frequency Separation (kHz)	Limit ($^2/_3$ of 20 dB BW) (kHz)	Margin (kHz)	Result
1000.000	628.205	371.795	Complied



Transmitter Carrier Frequency Separation (continued)

Results: 2DH5

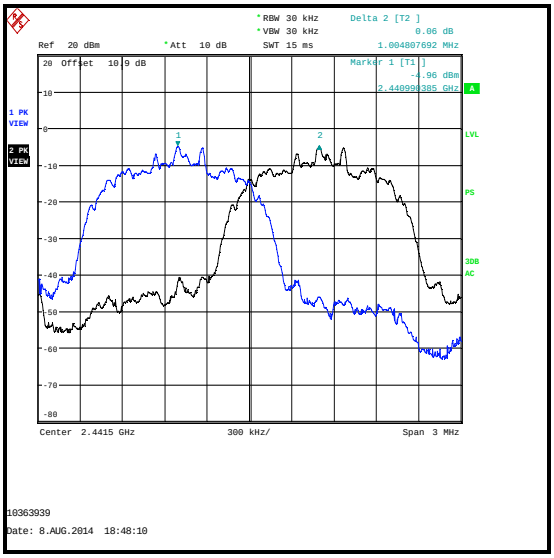
Carrier Frequency Separation (kHz)	Limit ($^2/_3$ of 20 dB BW) (kHz)	Margin (kHz)	Result
1000.000	886.218	113.782	Complied



Transmitter Carrier Frequency Separation (continued)

Results: 3DH5

Carrier Frequency Separation (kHz)	Limit ($^2/_3$ of 20 dB BW) (kHz)	Margin (kHz)	Result
1004.808	856.303	148.505	Complied



Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1659	Thermohygrometer	JM Handelspunkt	30.5015.13	None stated	14 Mar 2015	12
M1630	Test Receiver	Rohde & Schwarz	ESU40	100233	13 Mar 2015	12
A2032	Directional Coupler	Narda	4243B	03547	Calibrated before use	12

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

Test Summary:

Test Engineer:	Sandeep Bharat	**Test Date:**	08 August 2014
Test Sample IMEI:	353758060006596		

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 (℃):	23
Relative Humidity (%):	44

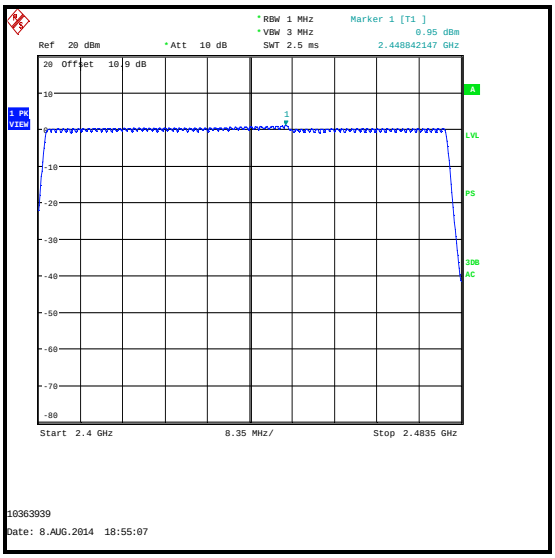
Note(s):

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.
2. The test receiver was set up for the Number of Hopping Frequencies measurement as follows: the resolution bandwidth was set to 1 MHz and video bandwidth of 3 MHz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold. The span was set to 83.5 MHz.
3. The test receiver was set up for the Pulse Length measurement as follows: the resolution bandwidth was set to 1 MHz and video bandwidth of 3 MHz. A peak detector was used and sweep time was set to auto with a span of zero Hz. The test receiver was set to trigger at 1 ms, with a marker placed at the start of the emission and a delta marked place at the end of the emission. The emission width is recorded in the table below.
4. The test receiver was set up for the Number of Hopping Frequencies in 32 seconds measurement as follows: the resolution bandwidth was set to 1 MHz and video bandwidth of 3 MHz. A peak detector was used and sweep time was set to 32 seconds. The EUT was set to transmit in a hopping frequency mode with zero span. The total number of hopping frequencies was recorded in the table below.
5. The test receiver was connected to the RF port on the EUT using suitable attenuation and RF cable.

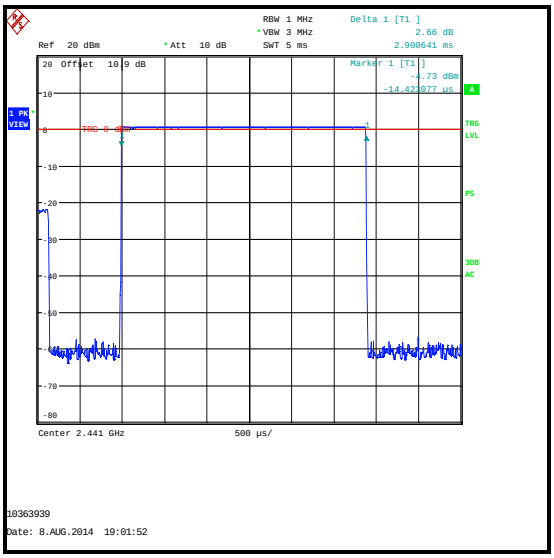
Results:

Pulse Length (µs)	Number of Hops in 31.6 Seconds	Average Time of Occupancy (s)	Limit (s)	Margin (s)	Result
2900.641	97	0.281	0.4	0.119	Complied

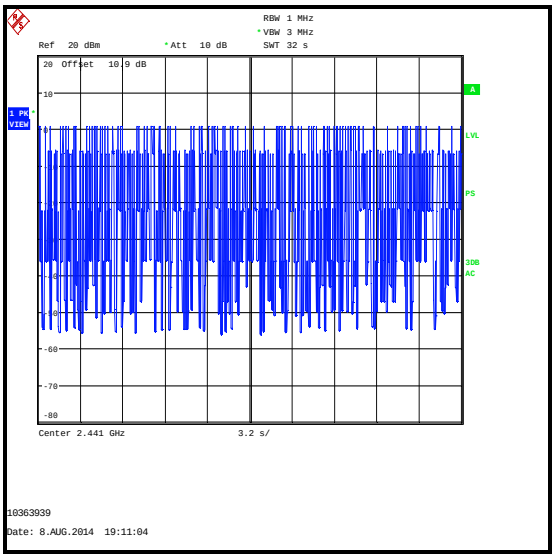
Transmitter Number of Hopping Frequencies and Average Time of Occupancy (continued)



Number of Hopping Frequencies



Emission Width



Number of Hopping Frequencies in 32 s

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1659	Thermohygrometer	JM Handelspunkt	30.5015.13	None stated	14 Mar 2015	12
M1630	Test Receiver	Rohde & Schwarz	ESU40	100233	13 Mar 2015	12
A2032	Directional Coupler	Narda	4243B	03547	Calibrated before use	12

5.2.5. Transmitter Maximum Peak Output Power

Test Summary:

Test Engineer:	Sandeep Bharat	**Test Date:**	08 August 2014
Test Sample IMEI:	353758060006596		

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

Environmental Conditions:

Temperature (℃):	23
Relative Humidity (%):	44

Note(s):

1. The test receiver resolution bandwidth was set to greater than the 20 dB bandwidth of the signal and the video bandwidth was set to greater than the resolution bandwidth. A peak detector was used, sweep time was set to auto and trace mode was Max Hold. The span was set to approximately 5 times the 20 dB bandwidth of the signal. A marker was placed at the peak of the signal and the results recorded in the tables below.
2. The test receiver was connected to the RF port on the EUT using suitable attenuation and RF cable. An RF offset level was entered on the test receiver to compensate for the loss of the attenuator and RF cable.

Transmitter Maximum Peak Output Power (continued)

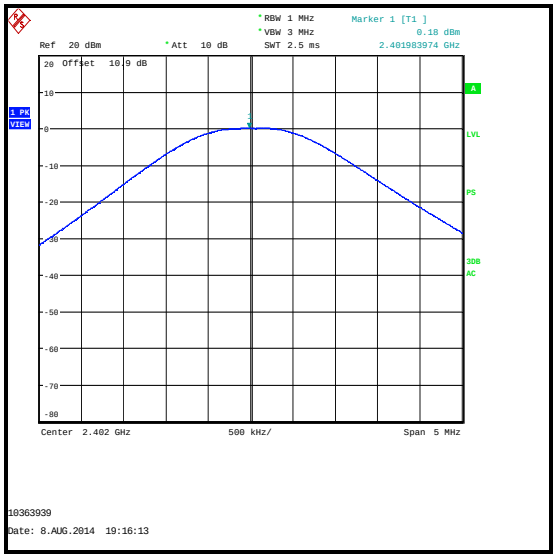
Results: DH5

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	0.2	30.0	29.8	Complied
Middle	0.8	30.0	29.2	Complied
Top	0.3	30.0	29.7	Complied

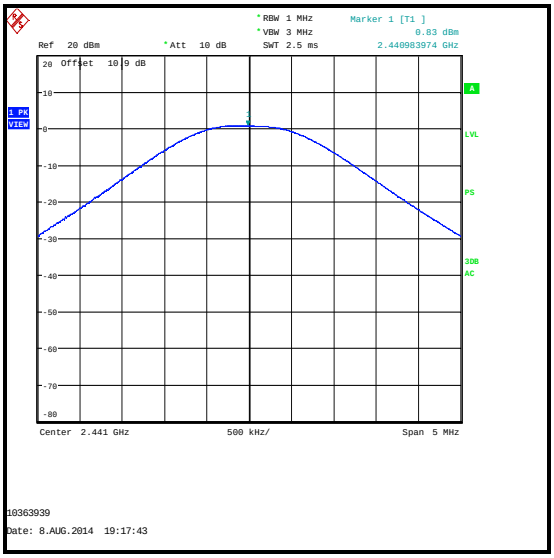
Channel	Conducted Peak Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	0.2	0.0	0.2	36.0	35.8	Complied
Middle	0.8	0.0	0.8	36.0	35.2	Complied
Top	0.3	0.0	0.3	36.0	35.7	Complied

Transmitter Maximum Peak Output Power (continued)

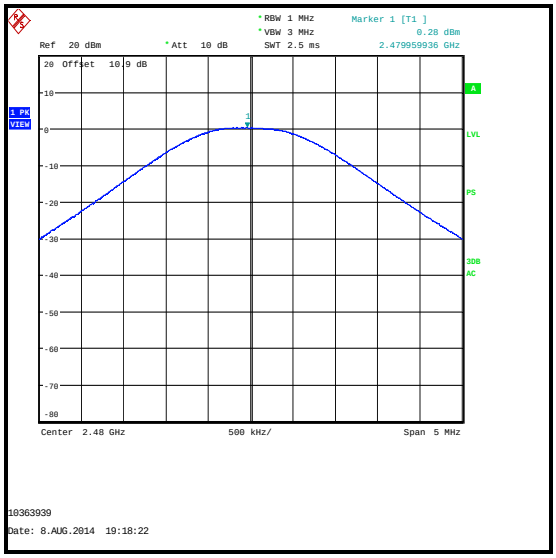
Results: DH5



Bottom Channel



Middle Channel



Top Channel

Transmitter Maximum Peak Output Power (continued)

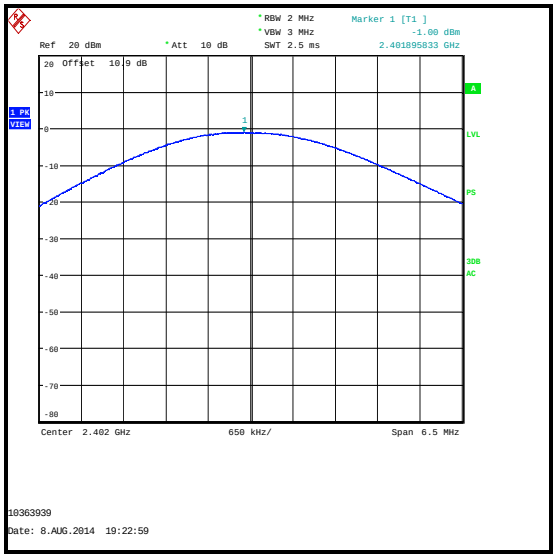
Results: 2DH5

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	-1.0	21.0	22.0	Complied
Middle	-0.3	21.0	21.3	Complied
Top	-0.8	21.0	21.8	Complied

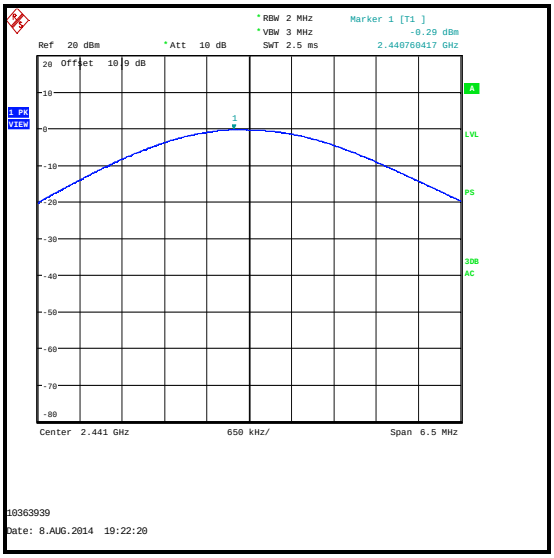
Channel	Conducted Peak Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	-1.0	0.0	-1.0	27.0	28.0	Complied
Middle	-0.3	0.0	-0.3	27.0	27.3	Complied
Top	-0.8	0.0	-0.8	27.0	27.8	Complied

Transmitter Maximum Peak Output Power (continued)

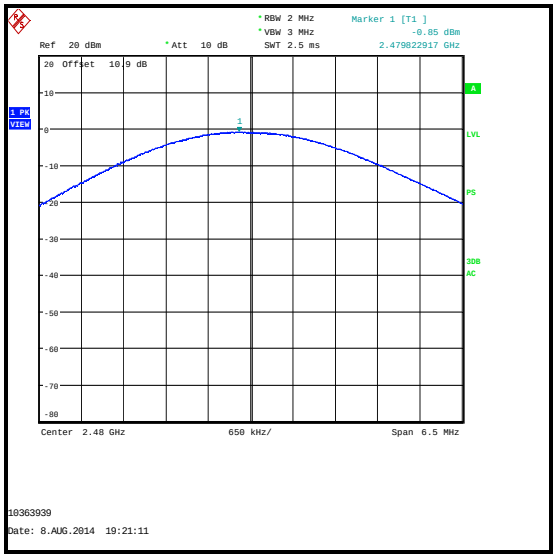
Results: 2DH5



Bottom Channel



Middle Channel



Top Channel

Transmitter Maximum Peak Output Power (continued)

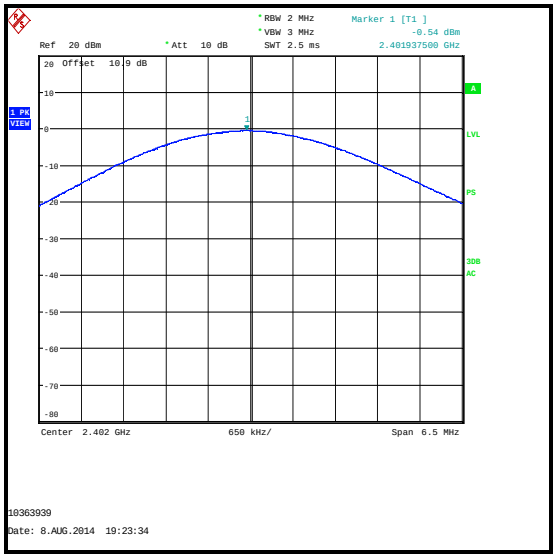
Results: 3DH5

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	-0.5	21.0	21.5	Complied
Middle	0.1	21.0	20.9	Complied
Top	-0.4	21.0	21.4	Complied

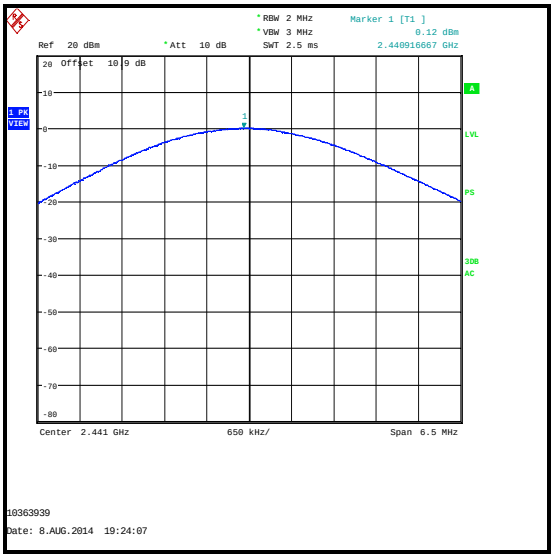
Channel	Conducted Peak Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	-0.5	0.0	-0.5	27.0	27.5	Complied
Middle	0.1	0.0	0.1	27.0	26.9	Complied
Top	-0.4	0.0	-0.4	27.0	27.4	Complied

Transmitter Maximum Peak Output Power (continued)

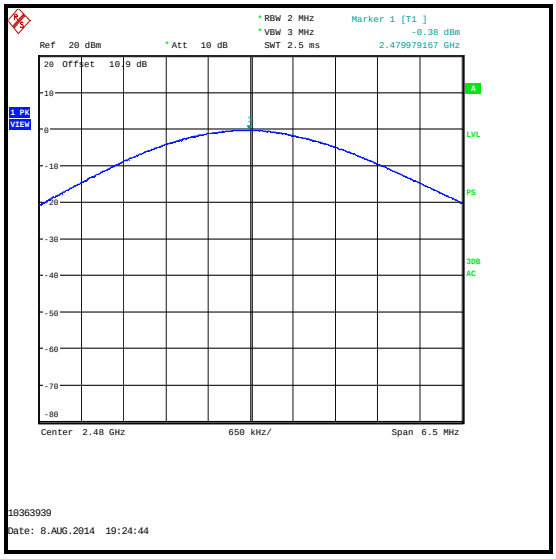
Results: 3DH5



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)
M1659	Thermohygrometer	JM Handelspunkt	30.5015.13	None stated	14 Mar 2015	12
M1630	Test Receiver	Rohde & Schwarz	ESU40	100233	13 Mar 2015	12
G0606	Signal Generator	Rohde & Schwarz	SMIQ 03B	832870/054	15 Jan 2015	12
A2032	Directional Coupler	Narda	4243B	03547	Calibrated before use	12

5.2.6. Transmitter Radiated Emissions

Test Summary:

Test Engineer:	Sandeep Bharat	**Test Date:**	15 August 2014
Test Sample IMEI:	353758060006562		

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:	30 MHz to 1000 MHz

Environmental Conditions:

Temperature (℃):	23
Relative Humidity (%):	41

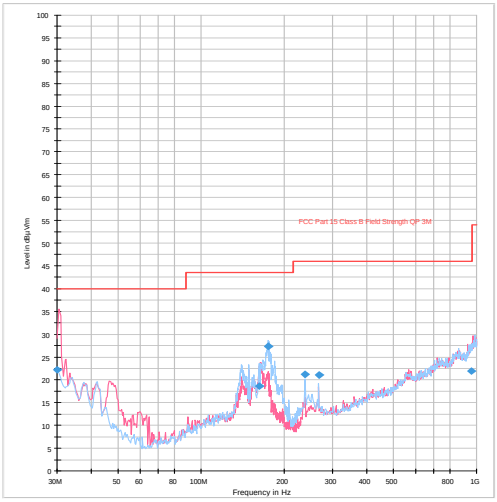
Note(s):

1. Transmitter radiated spurious emissions tests were performed with the EUT transmitting DH5 packets 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. 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 noise floor reading of the measuring receiver was recorded in the table below.
5. 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
175.085	Horizontal	27.3	43.5	16.2	Complied

Transmitter Radiated Emissions (continued)



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)
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:	Sandeep Bharat	**Test Date:**	15 August 2014
Test Sample IMEI:	353758060006562		

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 (℃):	22
Relative Humidity (%):	46

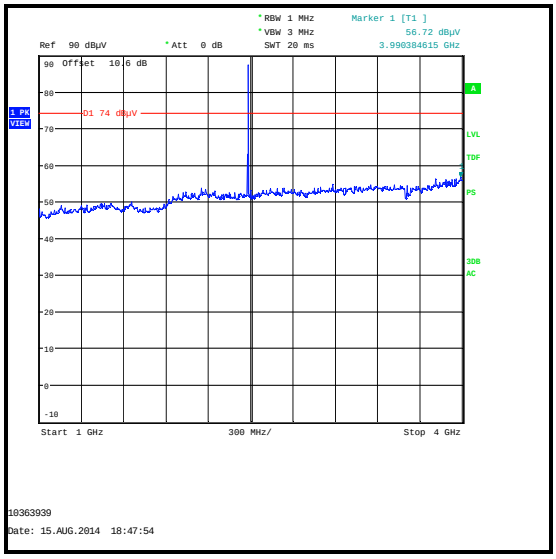
Note(s):

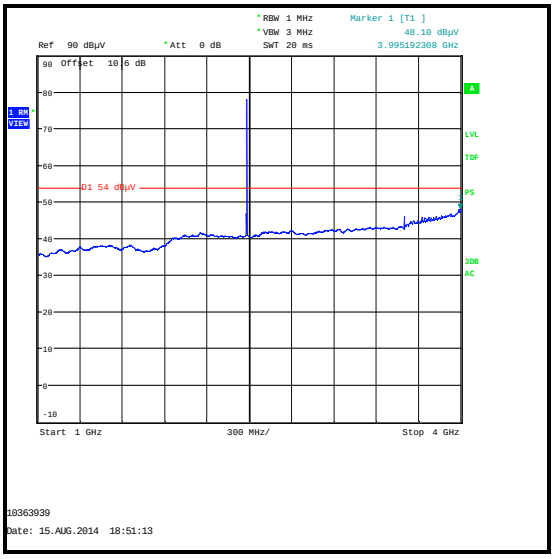
1. Transmitter radiated spurious emissions tests were performed with the EUT transmitting DH5 packets as this was found to transmit the highest power and therefore deemed worst case.
2. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
3. 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.
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. 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.

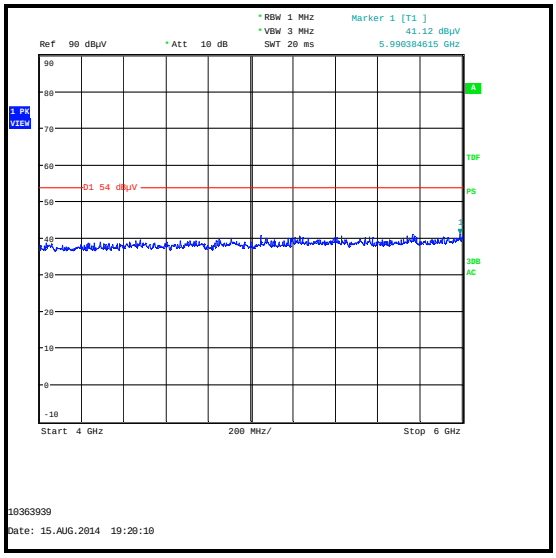
Results: Peak / DH5

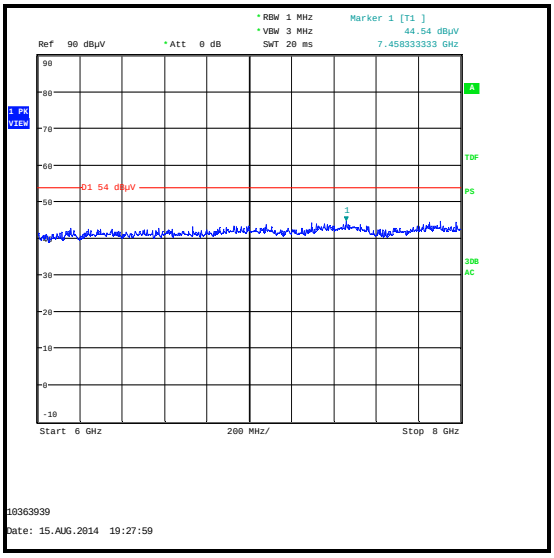
Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
3990.385	Horizontal	56.7	74.0	17.3	Complied

Transmitter Radiated Emissions (continued)

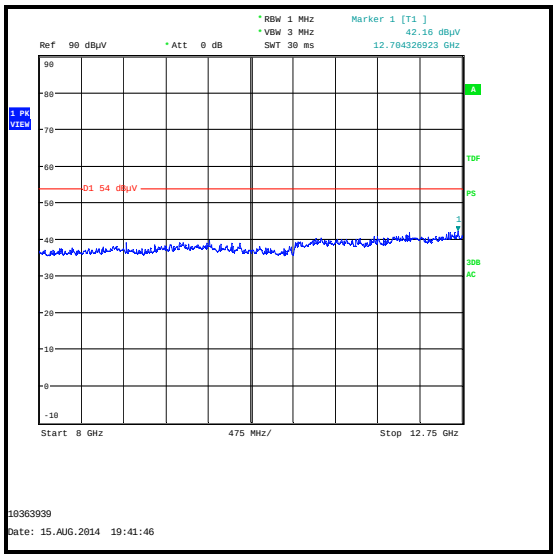


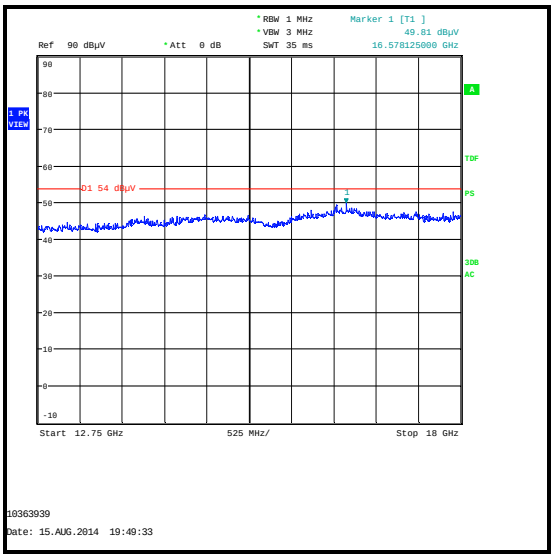


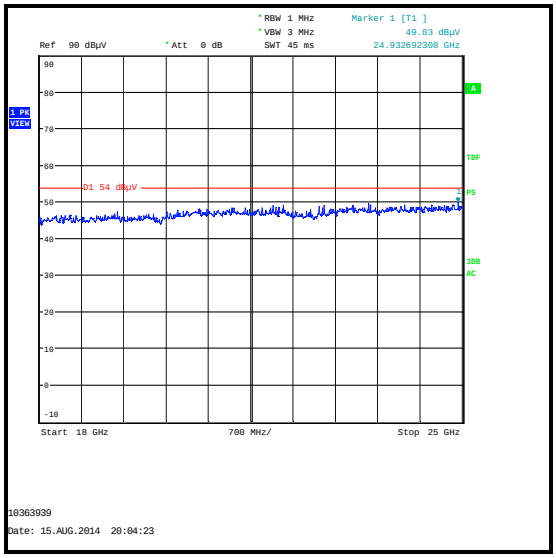




Transmitter Radiated Emissions (continued)







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	None stated	14 Mar 2015	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	14 Nov 2014	12
M1874	Test Receiver	Rohde & Schwarz	ESU26	100553	13 May 2015	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	18 May 2015	12
A1818	Antenna	EMCO	3115	00075692	14 Nov 2014	12
A253	Antenna	Flann Microwave	12240-20	128	14 Nov 2014	12
A254	Antenna	Flann Microwave	14240-20	139	14 Nov 2014	12
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
A1396	Attenuator	Huber & Suhner	6810.17.B	757987	02 May 2015	12

5.2.7. Transmitter Band Edge Radiated Emissions

Test Summary:

Test Engineer:	Sandeep Bharat	**Test Date:**	29 August 2014
Test Sample IMEI:	353758060006562		

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

Environmental Conditions:

Temperature (℃):	24
Relative Humidity (%):	46

Note(s):

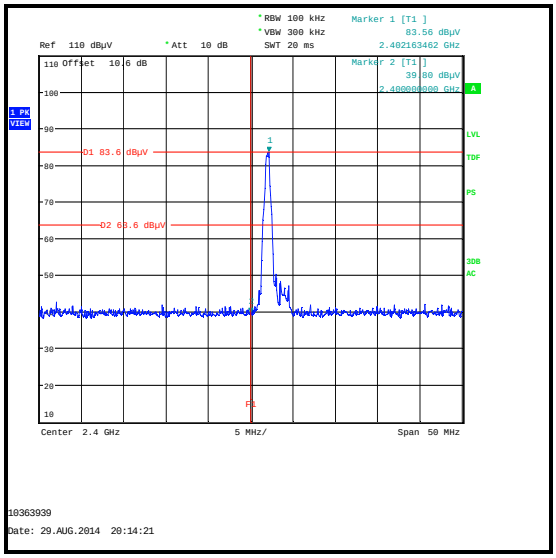
1. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
2. For the lower band edge measurements: As the lower band edge falls within the non-restricted band only peak measurements are required. The test receiver resolution bandwidth 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. The test receiver was left to sweep for a sufficient length of time in order to maximise the carrier level and out-of-band emissions. A marker and corresponding reference level line were placed on the peak of the carrier. A marker was placed on the band edge spot frequencies and a second marker placed on the highest emission level in the adjacent band (where a higher level emission was present). Marker frequencies and levels were recorded.
3. For the upper band edge measurements: As the upper band edge falls within restricted band both peak and average measurements were recorded by placing a marker at the edge of the band (2483.5 MHz). For peak measurements the test receiver resolution bandwidth was set to 1 MHz and video bandwidth 3 MHz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold. For average measurements the test receiver resolution bandwidth was set to 1 MHz and video bandwidth 10 Hz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold. The test receiver was left to sweep for a sufficient length of time in order to maximise the carrier level and out-of-band emissions. A marker was placed on the band edge spot frequencies and a second marker placed on the highest emission level in the adjacent band (where a higher level emission was present). Marker frequencies and levels were recorded.
4. * -20 dBc limit.

Transmitter Band Edge Radiated Emissions (continued)

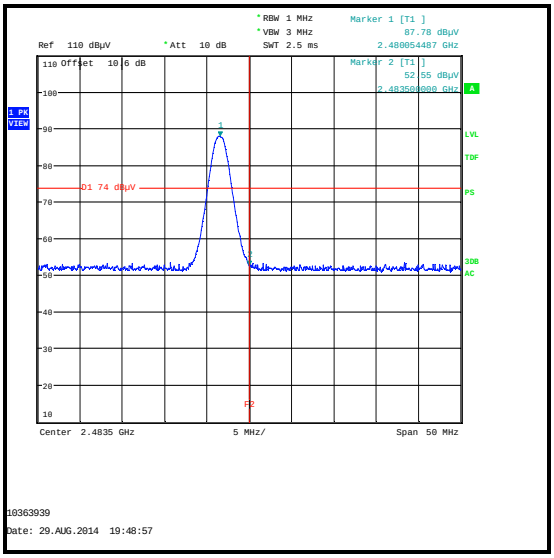
Results: Static Mode / DH5

Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2400.0	Horizontal	39.8	63.6*	23.8	Complied
2483.5	Horizontal	52.6	74.0	21.4	Complied

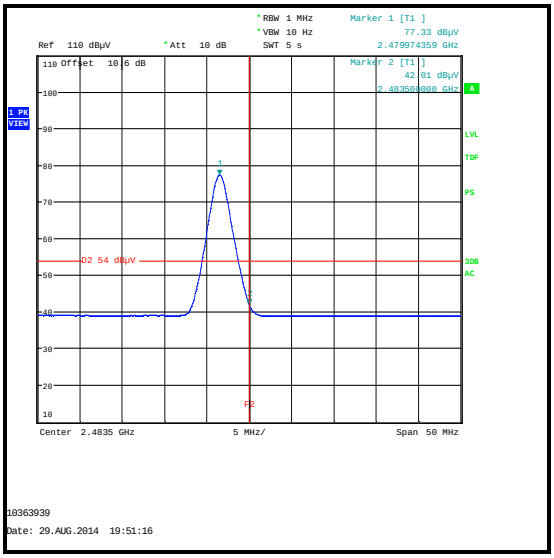
Frequency (MHz)	Antenna Polarity	Average Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2483.5	Horizontal	42.0	54.0	12.0	Complied



Lower Band Edge Peak Static



Upper Band Edge Peak Static



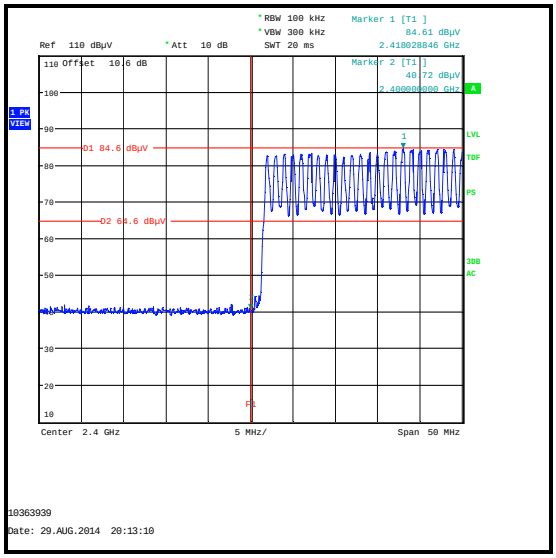
Upper Band Edge Average Static

Transmitter Band Edge Radiated Emissions (continued)

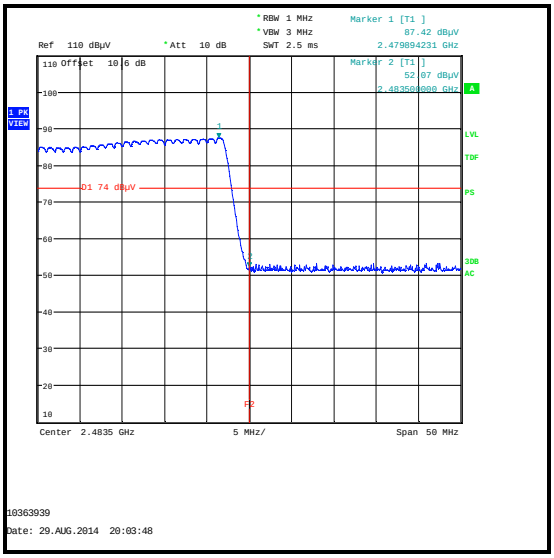
Results: Hopping Mode / DH5

Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2400.0	Horizontal	40.7	64.6*	23.9	Complied
2483.5	Horizontal	52.1	74.0	21.9	Complied

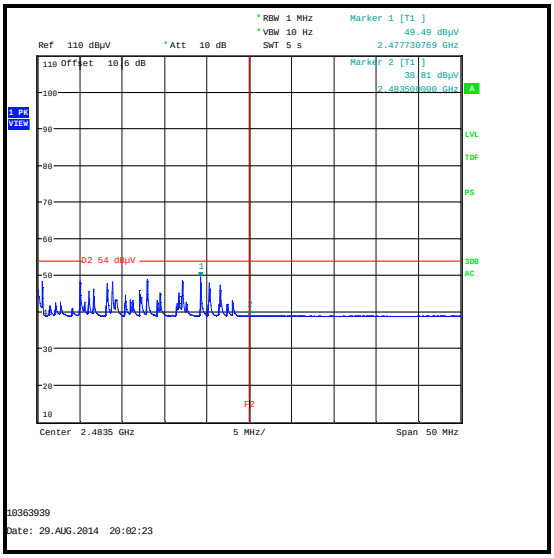
Frequency (MHz)	Antenna Polarity	Average Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2483.5	Horizontal	38.8	54.0	15.2	Complied



Lower Band Edge Peak Hopping



Upper Band Edge Peak Hopping



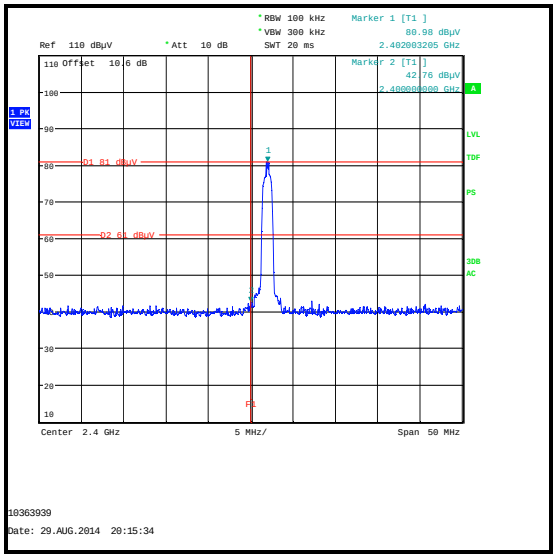
Upper Band Edge Average Hopping

Transmitter Band Edge Radiated Emissions (continued)

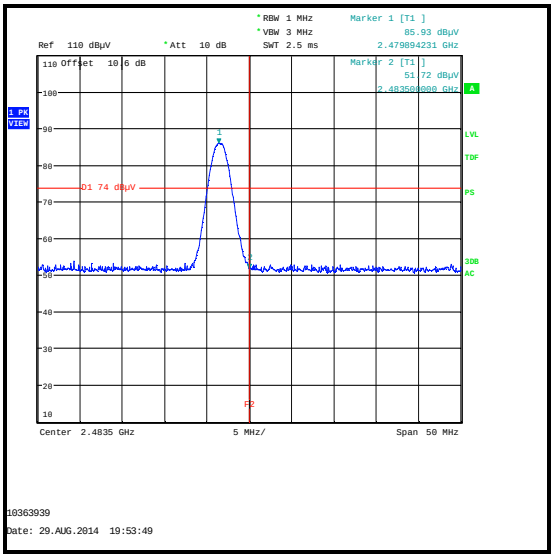
Results: Static Mode / 2DH5

Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2400.0	Horizontal	42.8	61.0*	18.2	Complied
2483.5	Horizontal	51.7	74.0	22.3	Complied

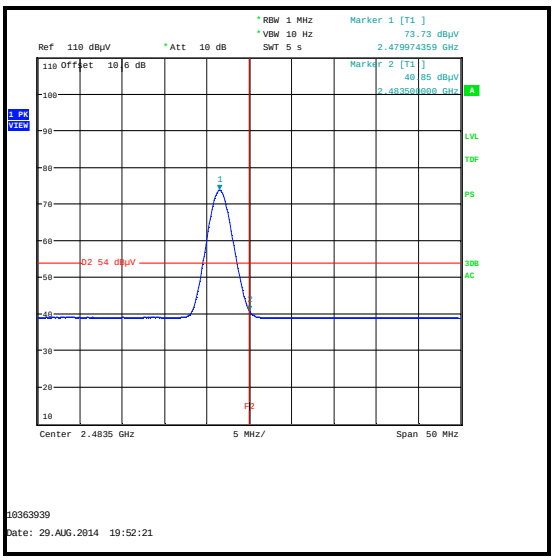
Frequency (MHz)	Antenna Polarity	Average Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2483.5	Horizontal	40.9	54.0	13.1	Complied



Lower Band Edge Peak Static



Upper Band Edge Peak Static



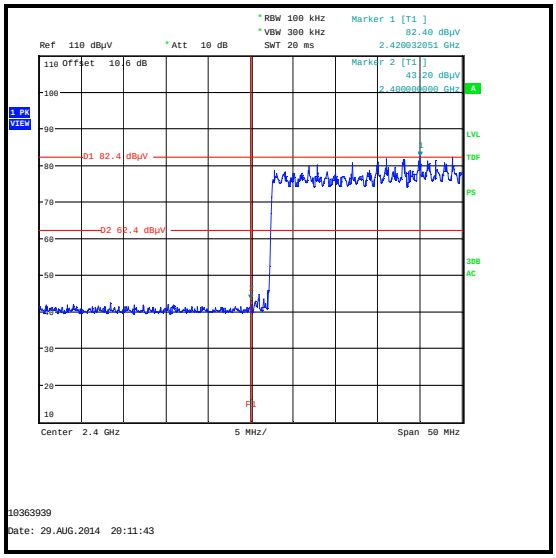
Upper Band Edge Average Static

Transmitter Band Edge Radiated Emissions (continued)

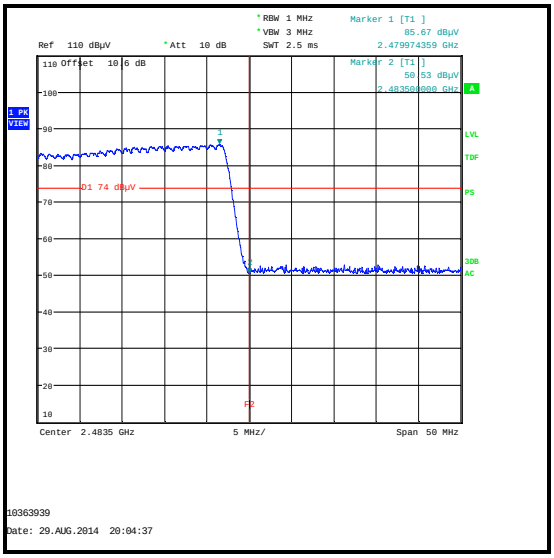
Results: Hopping Mode / 2DH5

Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2400.0	Horizontal	43.2	62.4*	19.2	Complied
2483.5	Horizontal	50.5	74.0	23.5	Complied

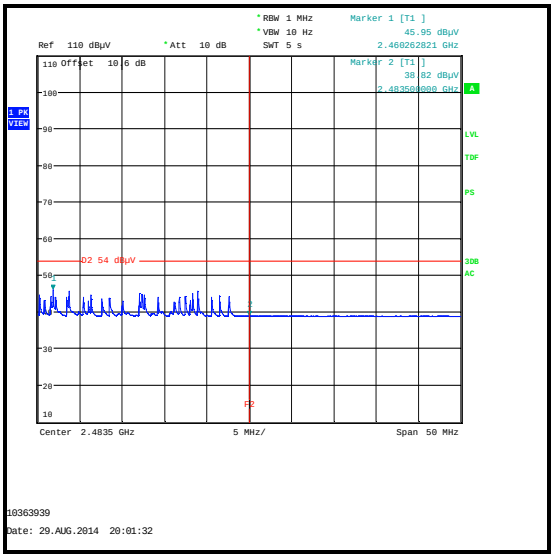
Frequency (MHz)	Antenna Polarity	Average Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2483.5	Horizontal	38.8	54.0	15.2	Complied



Lower Band Edge Peak Hopping



Upper Band Edge Peak Hopping



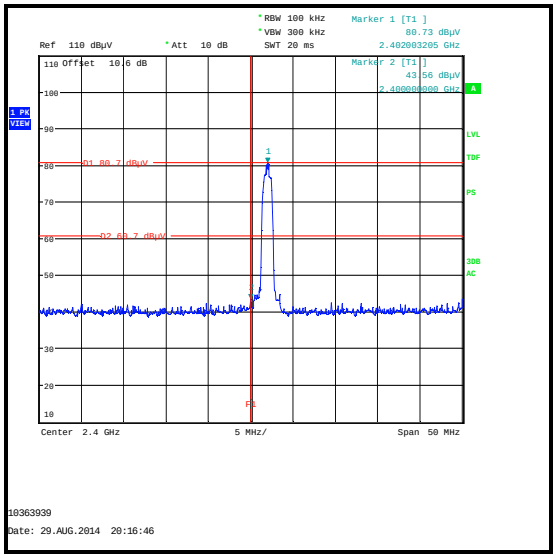
Upper Band Edge Average Hopping

Transmitter Band Edge Radiated Emissions (continued)

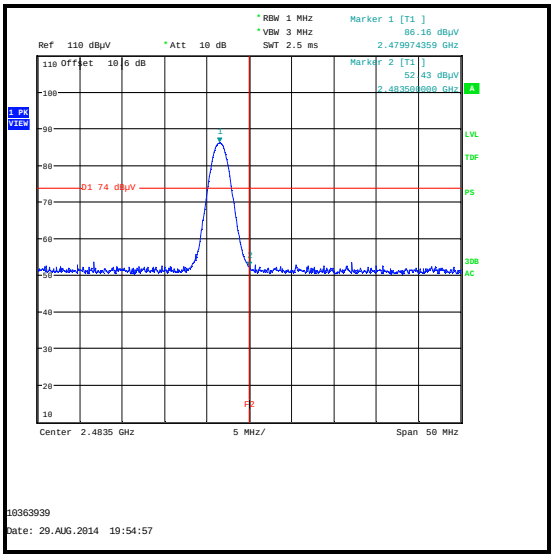
Results: Static Mode / 3DH5

Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2400.0	Horizontal	43.6	60.7*	17.1	Complied
2483.5	Horizontal	52.4	74.0	21.6	Complied

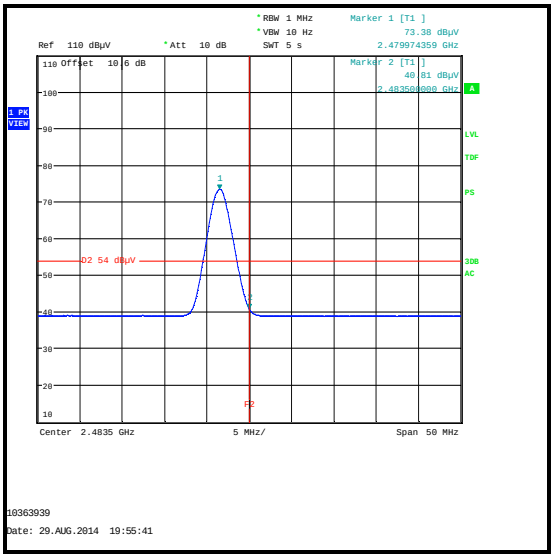
Frequency (MHz)	Antenna Polarity	Average Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2483.5	Horizontal	40.8	54.0	13.2	Complied



Lower Band Edge Peak Static



Upper Band Edge Peak Static



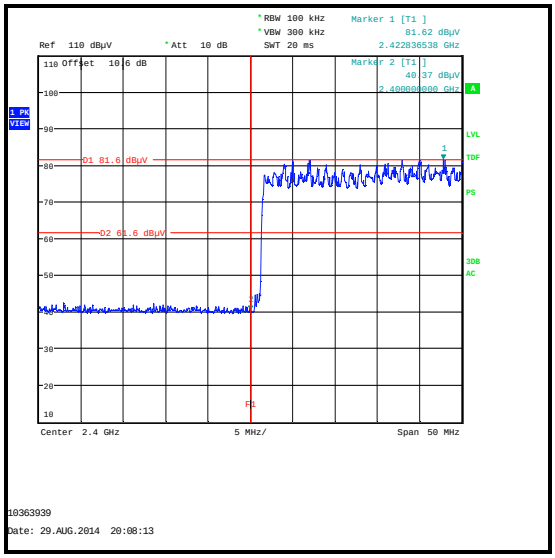
Upper Band Edge Average Static

Transmitter Band Edge Radiated Emissions (continued)

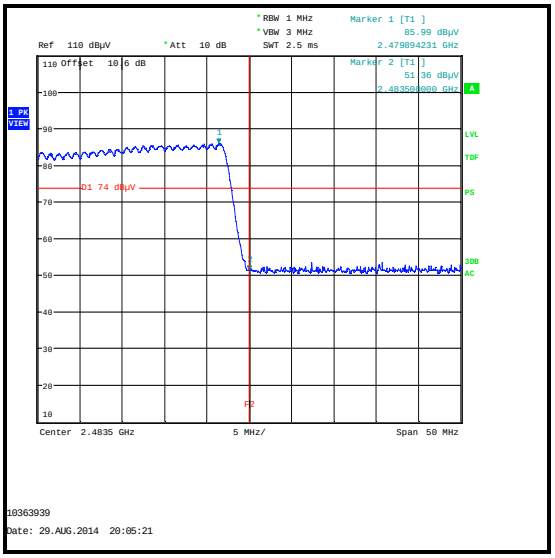
Results: Hopping Mode / 3DH5

Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2400.0	Horizontal	40.4	61.6*	21.2	Complied
2483.5	Horizontal	51.4	74.0	22.6	Complied

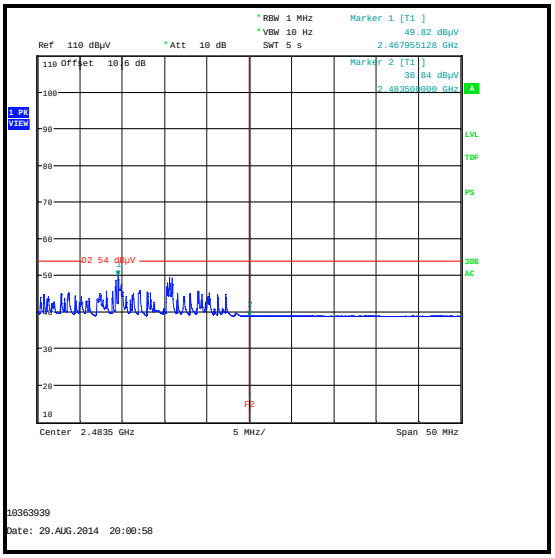
Frequency (MHz)	Antenna Polarity	Average Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2483.5	Horizontal	38.8	54.0	15.2	Complied



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
M1874	Test Receiver	Rohde & Schwarz	ESU26	100553	13 May 2015	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	18 May 2015	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
Conducted 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%	±3.92%
Average Time of Occupancy	2.4 GHz to 2.4835 GHz	95%	±3.53 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 25 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

---END OF REPORT---