

Produkte
Products

Prüfbericht - Nr.: <i>Test Report No.:</i>		12607476 001	Seite 1 von 60 <i>Page 1 of 60</i>		
Auftraggeber: Hosiden Corporation <i>Client:</i> 1-4-33 Kita-Kyuhoji Yao-shi, 581-0071 Japan					
Gegenstand der Prüfung: WRIG <i>Test item:</i>					
Bezeichnung: RVL-036 <i>Identification:</i>		Serien-Nr.: B-75, B-121 <i>Serial No.:</i>			
Wareneingangs-Nr.: PT0213102278-1 <i>Receipt No.:</i>		Eingangsdatum: 2010-05-11 <i>Date of receipt:</i>			
Prüfort: TÜV Rheinland Japan Ltd. - Global Technology Assessment Center <i>Testing location:</i> 4-25-2 Kita-Yamata, Tsuzuki-ku, Yokohama 224-0021, Japan					
Prüfgrundlage: 47 CFR Part 15.247 (Subpart: C), 2009-10 <i>Test specification:</i> 47 CFR Part 15.109 (Subpart: B), 2009-10 ANSI C63.4-2003 FCC Public Notice DA 00-705, Released March 30, 2000					
RSS-210 (Issue 7): 2007 RSS-Gen (Issue 2): 2007					
Prüfergebnis: Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n). <i>Test Result:</i> The test item passed the test specification(s).					
Prüflaboratorium: TÜV Rheinland Japan Ltd. - Global Technology Assessment Center <i>Testing Laboratory:</i> 4-25-2 Kita-Yamata, Tsuzuki-ku, Yokohama 224-0021, Japan					
geprüft/ tested by:		kontrolliert/ reviewed by:			
2010-07-27	Y. Sasaki / Inspector	2010-07-27	T. Cheung / Reviewer		
Datum Date	Name/Stellung Name/Position	Unterschrift Signature	Datum Date	Name/Stellung Name/Position	Unterschrift Signature
Sonstiges / Other Aspects: Details refer to Section 1: "General Remarks"					
Abkürzungen: P(ass) = entspricht Prüfgrundlage F(all) = entspricht nicht Prüfgrundlage N/A = nicht anwendbar N/T = nicht getestet			Abbreviations: P(ass) = passed F(all) = failed N/A = not applicable N/T = not tested		
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.</i>					

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TEST SUMMARY

3.2.1 VOLTAGE REQUIREMENTS, FCC 15.31(E)

RESULT: PASS

3.2.2 ANTENNA REQUIREMENTS, FCC 15.203, FCC 15.204 AND RSS-GEN 7.1.4

RESULT: PASS

5.1.1 CONDUCTED OUTPUT POWER AT ANTENNA TERMINALS, FCC 15.247(B)(1) AND RSS-210 A8.4(2)

RESULT: PASS

5.1.2 CARRIER FREQUENCY SEPARATION, FCC 15.247(A)(1) AND RSS-210 A8.1(B)

RESULT: PASS

5.1.3 20dB BANDWIDTH, FCC 15.247(A)(1)(II) AND RSS-210 A8.1(A)

RESULT: PASS

5.1.4 99% BANDWIDTH, RSS-GEN 4.6.1

RESULT: PASS

5.1.5 HOPPING CHARACTERISTICS NUMBER OF HOPPING FREQUENCIES, FCC 15.247(A)(1)(III) AND RSS-210 A8.1(D)

RESULT: PASS

5.1.6 HOPPING CHARACTERISTICS AVERAGE TIME OF OCCUPANCY, FCC 15.247(A)(1)(III) AND RSS-210 A8.1(D)

RESULT: PASS

5.1.7 CONDUCTED SPURIOUS EMISSION, FCC 15.247(D) AND RSS-210 A8.5

RESULT: PASS

6.1.1 MAINS TERMINAL CONTINUOUS DISTURBANCE VOLTAGE OF TRANSMITTER, FCC 15.207 AND RSS-GEN 7.2.2

RESULT: N/A

6.2.1 AC POWER LINE CONDUCTED EMISSION OF RECEIVER, FCC 15.107 AND RSS-GEN 7.2.2

RESULT: N/A

7.1.1 BAND EDGE RADIATED EMISSION, FCC 15.247(D) AND RSS-210 2.2

RESULT: PASS

7.1.2 RADIATED EMISSION, OUT-OF-BAND AND SPURIOUS EMISSION, FCC 15.247(D), FCC 15.205, FCC 15.209, RSS-210 2.2, RSS-210 A8.5 AND RSS-GEN 7.2.1

RESULT: PASS

7.2.1 RADIATED EMISSION OF RECEIVER, FCC 15.109, RSS-210 2.2, RSS-210 2.6, RSS-210 A8.5, RSS-GEN 7.2.3.2

RESULT: PASS

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1. General Remarks

The EUT was tested with the representative components, details refer to the Part list.
By customer's declaration, there is no difference in the alternative components except different manufacturer.

1.1 Complementary Materials

All attachment is integral part of this test report.
This applies especially to the following document:

- (1) Photographs of test setup

2. Test Sites

2.1 Test Facilities

TÜV Rheinland Japan Ltd. - Global Technology Assessment Center
4-25-2 Kita-Yamata, Tsuzuki-ku, Yokohama 224-0021, Japan

The used test equipment is in accordance with CISPR 16 for measurement of radio interference.

The Federal Communication Commission has reviewed the technical characteristics of the radiated and conducted emission facility, and has found these test facilities to be in compliance with the requirements of section 2.948 of the FCC rules.

The description of the test facility is listed under FCC registration number 299054.

The Industry Canada has reviewed the technical characteristics of the radiated and conducted emission facility, and has found these test facilities to be in compliance.
The description of the test facility is listed under O.A.T.S filing number 3466B.

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2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Kind of Equipment	Manufacturer	Model Name	Serial Number	Equipment ID	Calibrated until
For Antenna Port Conducted Emission					
Receiver	Rohde & Schwarz	ESU 40	100029	RF-0021	2010-12
RF Power Meter	Agilent	N1911A	MY451017 37	BT-8226	2010-11
RF Peak Power Sensor	Agilent	N1921A	MY452422 28	BT-8227	2010-11
DC Power Supply	Agilent	E3646A	MY400046 42	BT-8153	N/A
For Radiated Emission					
Receiver	Rohde & Schwarz	ESU 40	100029	RF-0021	2010-12
RF Selector (10m)	Toyo Corporation	NS4900	0703-182	RF-0029	2011-05
3dB Attenuator 50Ohm	Tamagawa Electronics Co., Ltd.	CFA-01	-	RF-0265	2011-05
Low Noise Pre-Amplifier	TSJ	MLA-10K01-B01-35	1370750	RF-0253	2010-11
Microwave Pre-Amplifier, 1-8GHz	Toyo Corporation	TPA0108-40	0634	RF-0052	2010-11
Band Reject Filter	Nitsuki	NF-49BT	027	RF-0131	2010-11
Trilog Antenna, 30-1000MHz	Schwarzbeck	VULB9168	0245	RF-0019	2011-05
Horn Antenna, 1-10GHz	Schwarzbeck	BBHA9120B	419	RF-0050	2011-05
Horn Antenna with Pre-Amplifier, 2-18GHz	Toyo Corporation	HAP06-18W	00000025	RF-0065	2011-05
Horn Antenna with Pre-Amplifier, 18-26.5GHz	Toyo Corporation	HAP18-26N	00000010	RF-0070	2011-05
Band pass Filter	Micro-Tronics	HPM50107	006	RF-0334	2011-05

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2.3 Measurement Uncertainty

Table 2: Emission Measurement Uncertainty

Measurement Type	Frequency	Uncertainty
Antenna Port Conducted Emissions	< 1GHz	±0.39dB
	> 1GHz	±0.68dB
Radiated Emission (Horizontal Orientation)	30MHz - 1GHz	±4.8dB
	> 1GHz	±5.2dB
Radiated Emission (Vertical Orientation)	30MHz - 1GHz	±4.2dB
	> 1GHz	±5.2dB

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3. General Product Information

3.1 Product Function and Intended Use

The **EUT** (Equipment Under Test) is a Game Controller and to be connected to Game machine main unit for amusement purpose. It is powered by 2 AA type of dry batteries, and offering wireless communication connection transferring data between Game machine main unit and remote controller.

3.2 System Details

Bluetooth core spec.:	Version 2.0 class 2
Power output:	2.02dBm (Conducted, peak)
Antenna gain:	+1.95dBi
Antenna type:	Inverted F antenna
Mounting type:	Printed on PCB
Frequency range:	2402 – 2480 MHz
Date rate:	1Mbps
Number of channel:	79
Channel spacing:	1 MHz
Modulation type:	FHSS, GFSK
System Input Voltage:	DC 3.0V, Battery operated
Protection Class:	III
FCC Classification:	DSS – Part 15 Frequency Hopping Sequence
IC Type of Device:	Bluetooth Device
Emission designator:	FXD

Table 3: Interfaces present on the EUT

No.	Interface	Cable Length for Testing, Shielding	Interface Classification
1.	Signal DC cable [EUT -> Accessory A]	0.95m, shielded	DC Power and signal port

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3.2.1 Voltage Requirements, FCC 15.31(e)

RESULT:

PASS

The EUT has an internal voltage regulator to supply the RF circuit. Hence it complies with the power supply requirements.

3.2.2 Antenna Requirements, FCC 15.203, FCC 15.204 and RSS-Gen 7.1.4

RESULT:

PASS

The EUT has an inverted-F antenna printed on the PCB, details refer to the internal photos.

3.3 Clock Frequencies

The EUT generates internally the following clock frequency:

Frequency	Source
24 MHz	Crystal of IC Bluetooth Module

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3.4 Independent Operation Modes

The system was configured for testing in a typical fashion (as a customer would normally use it).

The justification and manipulation of cables and equipment in order to simulate a worst-case behavior of the test setup has been carried out as prescribed in ANSI C63.4:2003. Testing was performed at the lowest operating frequency (2402 MHz), the operating frequency in the middle of the specified frequency band (2441 MHz) and the highest operating frequency (2480 MHz).

The basic operation modes are:

- A. EUT continuously transmits at lowest Channel (2402 MHz) (hopping function is disable)
- B. EUT continuously transmits at middle Channel (2441 MHz) (hopping function is disable)
- C. EUT continuously transmits at highest Channel (2480 MHz) (hopping function is disable)
- D. EUT continuously transmits on pseudo-random sequence on the 79 channels
- E. EUT continuously receives packets (hopping function is disable)
- F. Combined operation mode: (All functions shall operate simultaneously)
 - i. EUT communicates with the Game machine main unit with pseudo-random sequence on the 79 channels &
 - ii. Normal Operation mode: to simulate the data processing on EUT. Data transfer through signal cable (EUT <-> Accessory A), motor, speaker and all other functions activate.

Remark:

The sample shall be capable switching on/off the hopping function manually, selecting 3 individual channels (ch0: 2402 MHz, ch39: 2441 MHz, ch78: 2480 MHz) then sending the desired DH packets manually and continuously.

Mode D was set by Bluetooth tester; modes A-C were set by laptop.

Type of packet type: DH1 only

Details refer to the test plan 12607476 B.

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4. Test Set-up and Operation Modes

4.1 Test Methodology

The test methodology used is based on the requirements of 47 CFR Part 15, sections 15.31, 15.33, 15.35, 15.205, 15.209, FCC Public Notice DA 00-705. Released March 30, 2000

The test methods, which have been used, are based on ANSI C63.4:2003 and RSS-Gen.

For details, see under each test item.

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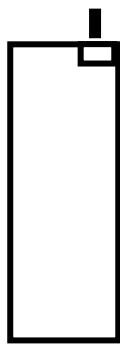
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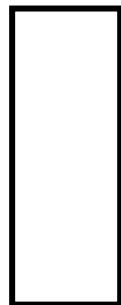
4.2 Physical Configuration for Testing

Figure 1: EUT Configurations

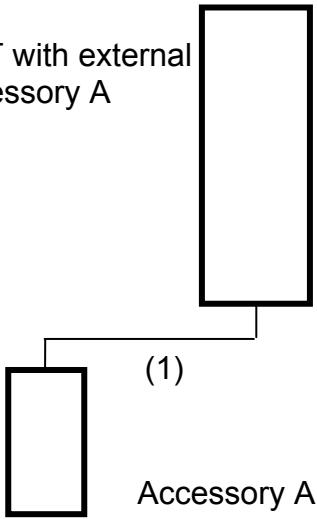
a) EUT w/ external
Ant. connector



b) EUT



c) EUT with external
Accessory A



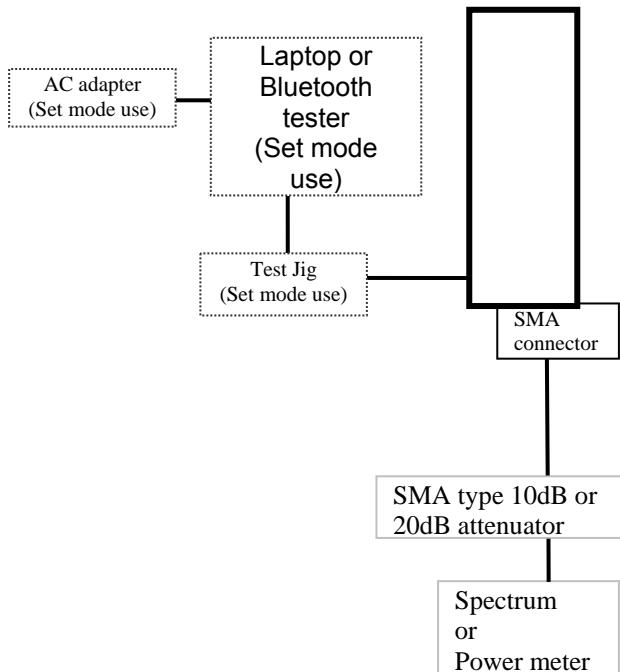
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Figure 2: Test setup of Conducted radio testing

 : Equipment Under Test (EUT)
 : Accessory



Remark: All AC input power ports of accessories are not shown.

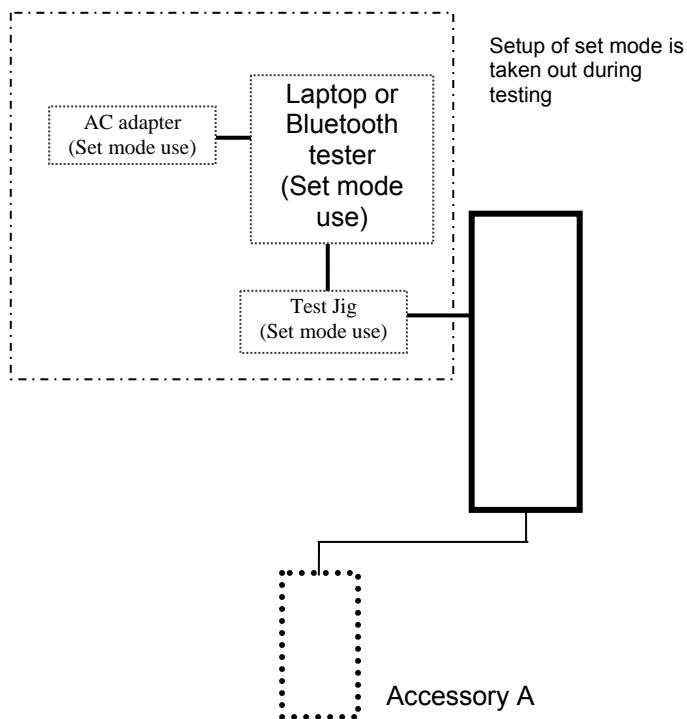
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Figure 3: Test setup of Radiated testing except mode E

 : Equipment Under Test (EUT)
 : Accessory



Remark: All AC input power ports of accessories are not shown.

For more details, refer to section: Photographs of the Test Set-Up.

4.3 Test Operation and Test Software

Mplus, (Evaluation software in Game machine main unit)

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4.4 Special Accessories and Auxiliary Equipment

The product has been set up or tested with the following additional accessories:

1. Product: Accessory A
Manufacturer: Nintendo
Model: RVL-004
Rated voltage: un-specified (via WRIG)
Input current: un-specified
Serial number: un-specified
2. Product: Game machine main unit
Manufacturer: Nintendo
Model: RVL-001(JPN)
Rated voltage: DC12V
Rated power: 45W
Protection class:III
Serial number: LJF11169216
3. Product: AC adaptor
Manufacturer: Nintendo
Model: RVL-002(JPN)
Rated voltage: AC100V (input) / DC12V (output)
Rated power: 94VA (input) / 3.7A (output)
Frequency: 50/60Hz
Protection class:II
Serial number: Z8UKX01
4. Product: Sensor Bar
Manufacturer: Nintendo
Model: RVL-014
Rated voltage: un-specified (via Game machine main unit)
Input current: un-specified
Serial number: un-specified
5. Product: Bluetooth Test Set
Manufacturer: Anritsu
Model: MT8852B
Rated voltage: AC85-264V
Rated power: 150VA
Frequency: 47-63Hz
Protection class:I
Serial number: 0908001

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6. Product: Step Attenuator
Manufacturer: Agilent
Model: 8494B
Serial number: 3308A40370
7. Product: Step Attenuator
Manufacturer: Agilent
Model: 8495B
Serial number: 3308A22036
8. Product: 2 way power divider
Manufacturer: un-specified
Serial number: 981161
9. Product: Interface board
Manufacturer: Hosiden
Model: Interface board
Rated voltage: un-specified
Input current: un-specified
Serial number: N/A
10. Product: Test jig
Manufacturer: Hosiden
Model: Test jig
Rated voltage: un-specified
Input current: un-specified
Serial number: N/A

4.5 Countermeasures to achieve EMC Compliance

No additional measures were employed to achieve compliance.

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5. Test Results Conducted Testing at Antenna Port

For conducted tests, the antenna was replaced by a 50Ω antenna connector.

5.1.1 Conducted Output Power at Antenna Terminals, FCC 15.247(b)(1) and RSS-210 A8.4(2)

RESULT:

PASS

Date of testing: 2010-07-01

Ambient tempearature: 20°C

Relative humidity: 49%

Atmospheric pressure: 1000hPa

Requirements:

For systems using frequency hopping systems in the 2400-2483.5MHz band, the maximum peak output power is 1W (30dBm).

Test procedure:

ANSI C63.4-2003, RSS-Gen 4.8 and FCC Public Notice DA 00-705, Released March 30, 2000.

The maximum peak output power (conducted) was measured directly at the antenna connector with the power meter. The final measurement takes into account the loss generated by the short cable provided by the EUT manufacturer to support the antenna connector.

Peak EIRP was performed at ambient temperature and normal voltage at all the available modulations (data rates)/ Modulation and packet type in order to identify the one producing the highest peak output power. The worst case output power was shading in grey in the following table.

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Table 4: Conducted Output Power, Mode A(2402MHz)

Data Rate [Mbps]	Reading [dBm]	Correction Factor [dB]	Output Power [dBm]	Output Power [mW]	Limit [dBm]	Limit [mW]	Margin [dB]
1	-0.82	1.65	0.83	1.21	30.00	1000	29.17

Notes: Output power = Reading + Correction factor
Correction factor = Total cable loss
 $mW = 10 ^ {(dBm/10)}$
 $dBm = 10 \times \log(mW)$

Table 5: Conducted Output Power, Mode B(2441MHz)

Data Rate [Mbps]	Reading [dBm]	Correction Factor [dB]	Output Power [dBm]	Output Power [mW]	Limit [dBm]	Limit [mW]	Margin [dB]
1	-0.31	1.68	1.37	1.37	30.00	1000	28.63

Notes: Output power = Reading + Correction factor
Correction factor = Total cable loss
 $mW = 10 ^ {(dBm/10)}$
 $dBm = 10 \times \log(mW)$

Table 6: Conducted Output Power, Mode C(2480MHz)

Data Rate [Mbps]	Reading [dBm]	Correction Factor [dB]	Output Power [dBm]	Output Power [mW]	Limit [dBm]	Limit [mW]	Margin [dB]
1	0.33	1.69	2.02	1.59	30.00	1000	27.98

Notes: Output power = Reading + Correction factor
Correction factor = Total cable loss
 $mW = 10 ^ {(dBm/10)}$
 $dBm = 10 \times \log(mW)$

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5.1.2 Carrier Frequency Separation, FCC 15.247(a)(1) and RSS-210 A8.1(b)

RESULT:

PASS

Date of testing: 2010-07-01

Ambient tempearature: 20°C

Relative humidity: 49%

Atmospheric pressure: 1000hPa

Requirements:

Frequency hopping systems operating in the 2400-2483.5MHz band shall have hopping channel carrier frequencies separated by a minimum of 25kHz or the 20dB bandwidth of the hopping channel, whichever is greater. In case of an output power less than 125mW, the frequency hopping system may have channels separated by a minimum of 25kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater.

Test procedure:

ANSI C63.4-2003, RSS-Gen 4.8 and FCC Public Notice DA 00-705, Released March 30, 2000.

A spectrum analyzer was connected to the antenna port of the EUT. The analyzer resolution bandwidth was set to 100kHz and the video bandwidth to 300kHz. The Delta Marker function was used to determine the separation between the peaks of two adjacent channels.

Table 7: Carrier Frequency Separation, DH1

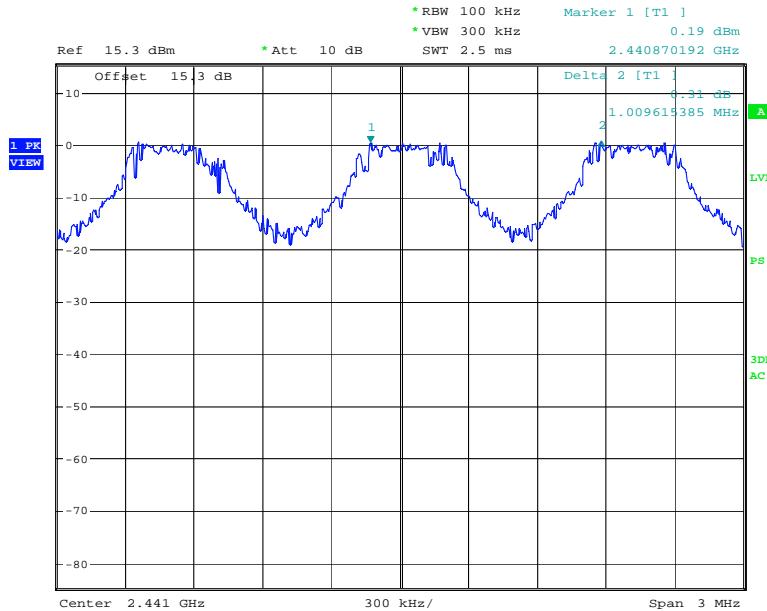
Channel Separation [MHz]	Limit
1.0096	25kHz or the 20dB bandwidth of the hopping channel (0.9999MHz, details refer to section 5.1.3) which is greater.

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Figure 4: Carrier Frequency Separation, DH1



Mode A, NT, NV
Date: 1.JUL.2010 18:30:29

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5.1.3 20dB Bandwidth, FCC 15.247(a)(1)(ii) and RSS-210 A8.1(a)

RESULT:

PASS

Date of testing: 2010-07-01

Ambient tempearature: 20°C

Relative humidity: 49%

Atmospheric pressure: 1000hPa

Requirements:

For systems using frequency hopping systems in the 2400-2483.5MHz band, the limit is not specified. The test data was taken as reference.

Test procedure:

ANSI C63.4-2003, RSS-Gen 4.6.2 and FCC Public Notice DA 00-705, Released March 30, 2000.

A spectrum analyzer was connected to the antenna port of the EUT. The spectrum analyzer resolution bandwidth was set to 30kHz, the video bandwidth to 100kHz and the span to 3MHz.

Table 8: 20dB Bandwidth, DH1

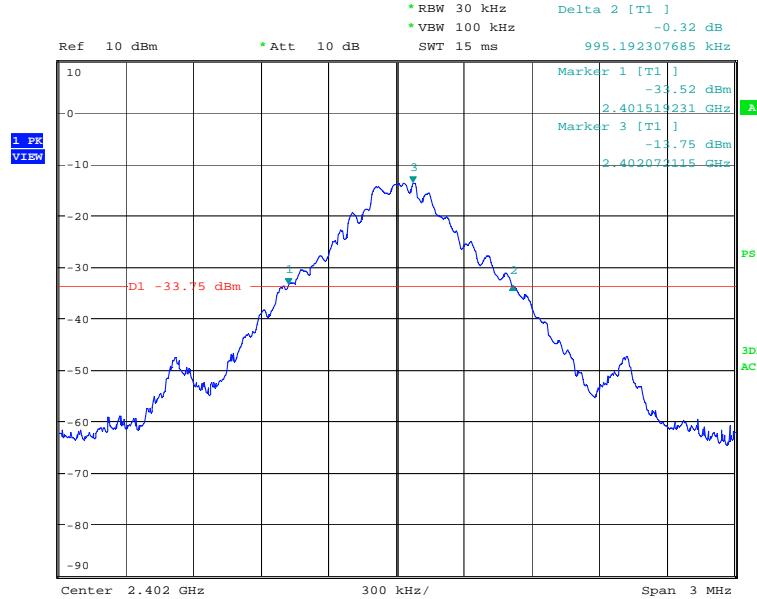
Frequency [MHz]	20dB Bandwidth [MHz]	Minimum Limit [kHz]
2402	0.9952	N/A
2441	0.9999	N/A
2480	0.9999	N/A

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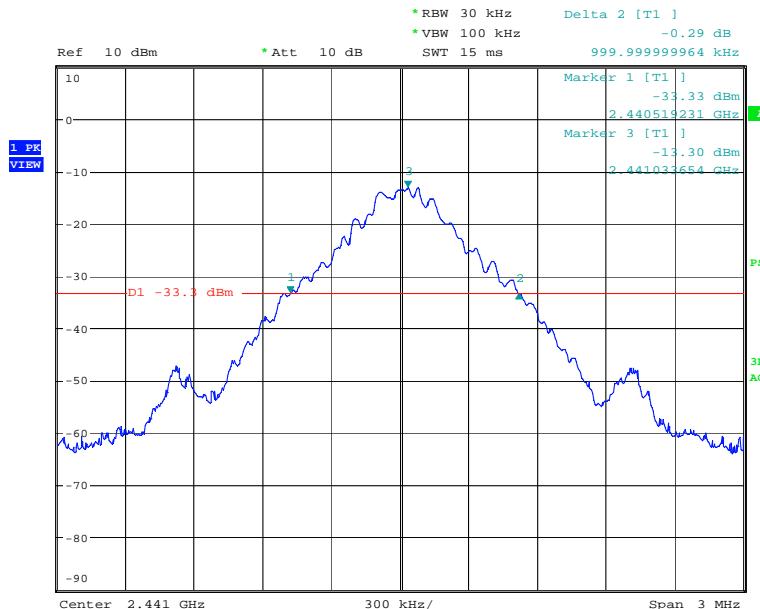
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Figure 5: 20dB Bandwidth, Mode A (2402MHz)



Mode A, NT, NV
Date: 1.JUL.2010 15:21:12

Figure 6: 20dB Bandwidth, Mode B (2441MHz)



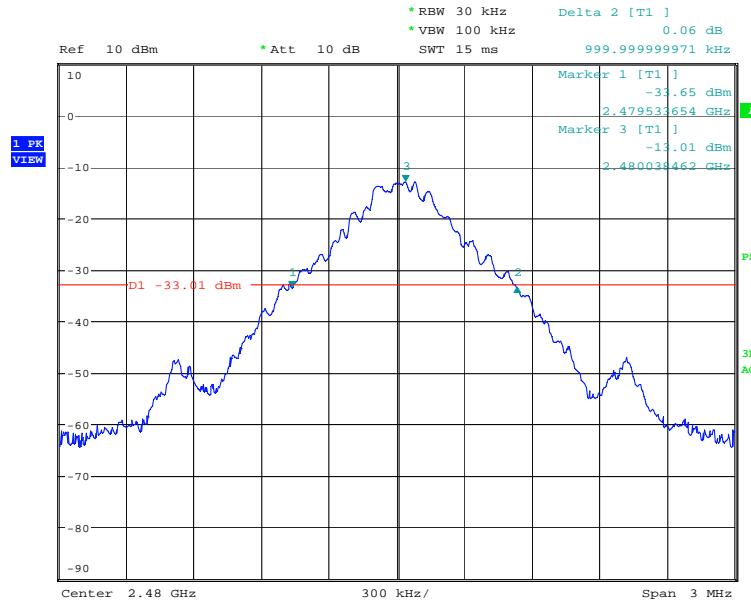
Mode B, NT, NV
Date: 1.JUL.2010 15:25:52

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Figure 7: 20dB Bandwidth, Mode C (2480MHz)



Mode C, NT, NV
Date: 1.JUL.2010 15:29:54

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5.1.4 99% Bandwidth, RSS-Gen 4.6.1

RESULT:

PASS

Date of testing: 2010-07-01

Ambient tempearature: 20°C

Relative humidity: 49%

Atmospheric pressure: 1000hPa

Requirements:

The 99% bandwidth shall be reported according to RSS-Gen 4.6.1.

Test procedure:

RSS-Gen 4.6.1

A spectrum analyzer was connected to the antenna port of the EUT. The spectrum analyzer resolution bandwidth was set to 1% of the span 3MHz. The 99% bandwidth was measured by using the OBW function of the analyzer with a 99% coverage setting.

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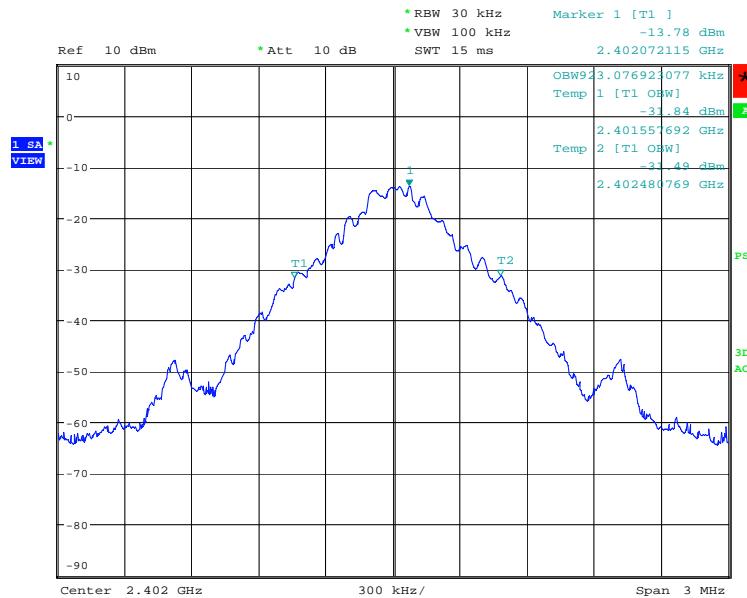
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Table 9: 99% Bandwidth, DH1

Operating Frequency [MHz]	99% Bandwidth [MHz]	Minimum Limit [kHz]
2402	0.923	N/A
2441	0.913	N/A
2480	0.923	N/A

Figure 8: 99% Bandwidth, Mode A (2402MHz)



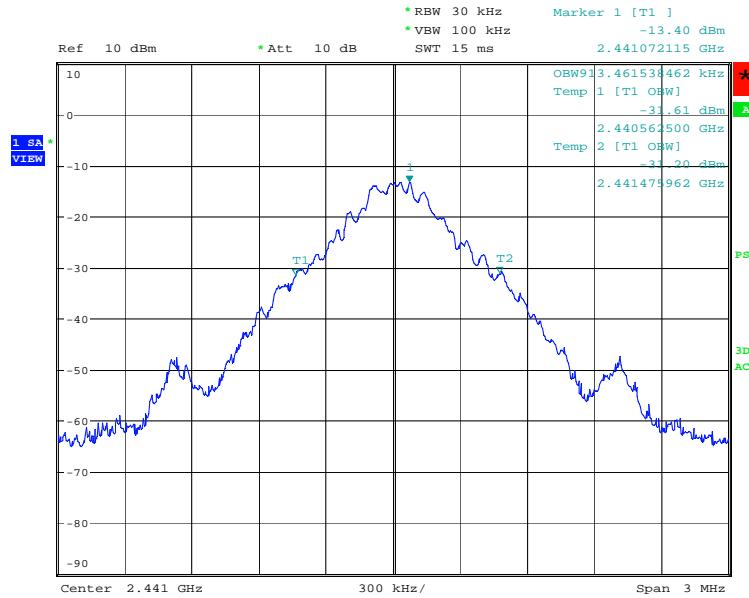
Mode A, NT, NV
Date: 1.JUL.2010 15:43:13

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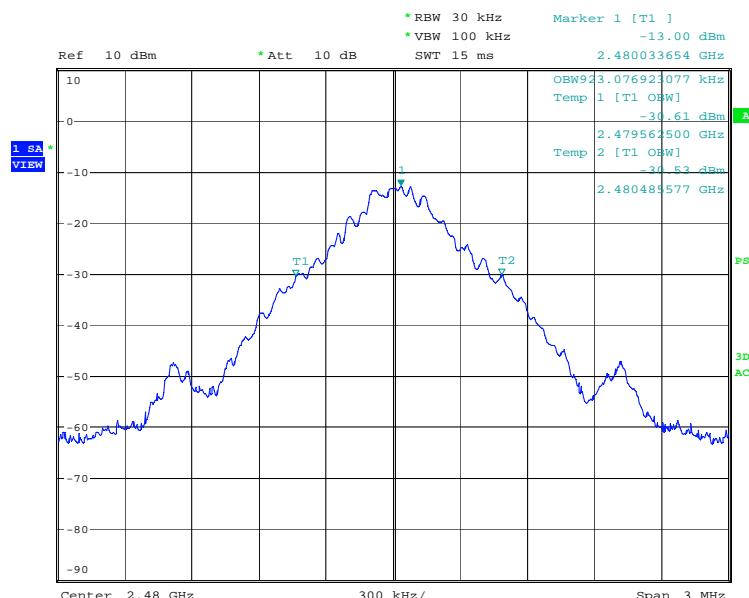
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Figure 9: 99% Bandwidth, Mode B (2441MHz)



Mode B, NT, NV
Date: 1.JUL.2010 15:39:31

Figure 10: 99% Bandwidth, Mode C (2480MHz)



Mode C, NT, NV
Date: 1.JUL.2010 15:36:44

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5.1.5 Hopping Characteristics Number of Hopping Frequencies, FCC 15.247(a)(1)(iii) and RSS-210 A8.1(d)

RESULT:

PASS

Date of testing: 2010-07-01

Ambient tempearature: 20°C

Relative humidity: 49%

Atmospheric pressure: 1000hPa

Requirements:

For systems using frequency hopping systems in the 2400-2483.5MHz band, the number of hopping frequency is at least 15 channels.

Test procedure:

ANSI C63.4-2003, RSS-Gen 4.8 and FCC Public Notice DA 00-705, Released March 30, 2000.

A spectrum analyzer was connected to the antenna port of the EUT. The analyzer resolution bandwidth and video bandwidth were set to 1MHz. The spectrum was broken in two plots having each a 45MHz span to show all the hopping frequencies.

Table 10: Carrier Frequency Separation, DH1

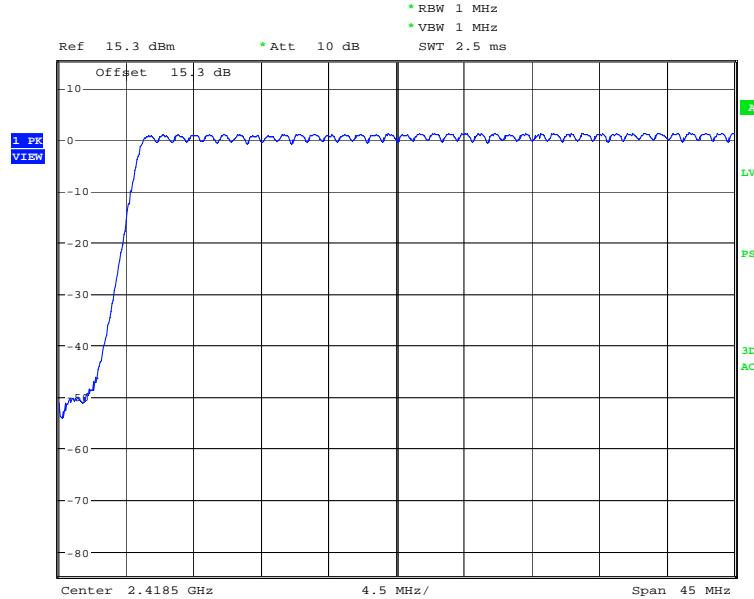
Hopping Channel	Limit
79	15

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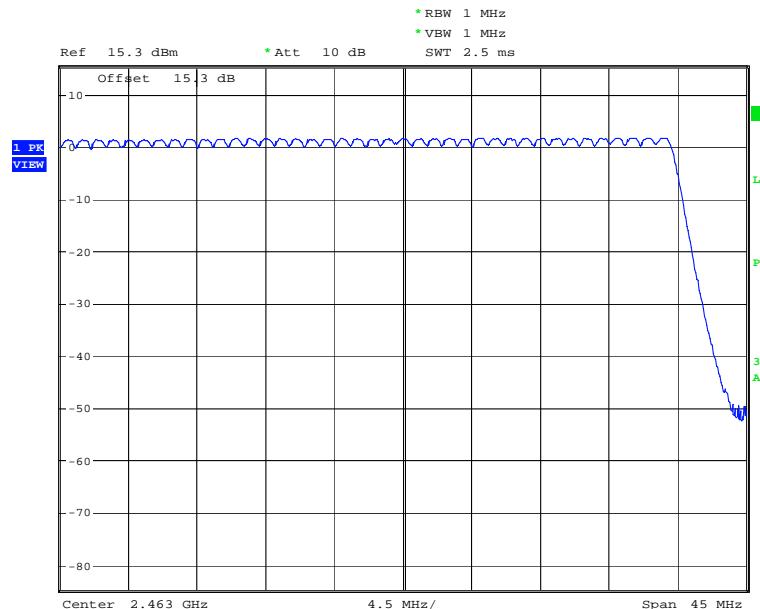
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Figure 11: Hopping frequencies up to 2440MHz , Mode D



Mode A, NT, NV, lower
Date: 1.JUL.2010 18:43:51

Figure 12: Hopping frequencies above 2440MHz, Mode D



Mode A, NT, NV, upper
Date: 1.JUL.2010 18:48:53

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5.1.6 Hopping Characteristics Average time of Occupancy, FCC 15.247(a)(1)(iii) and RSS-210 A8.1(d)

RESULT:

PASS

Date of testing: 2010-07-01

Ambient tempearature: 20°C

Relative humidity: 49%

Atmospheric pressure: 1000hPa

Requirements:

For systems using frequency hopping systems in the 2400-2483.5MHz band, the average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

Test procedure:

ANSI C63.4-2003, RSS-Gen 4.8 and FCC Public Notice DA 00-705, Released March 30, 2000.

A spectrum analyzer was connected to the antenna port of the EUT. The analyzer resolution bandwidth and video bandwidth were set to 1MHz. The average time of occupancy was obtained by measuring first the dwell time of a single packet with the Delta Marker function using a zero span centered on a hopping channel and by counting then the number of hops per channel in a 31.6s period (0.4s times the number of hopping channels).

Table 11: Average time of Occupancy

Packet Type	Packet Duration [ms]	Number of Hops per Channel in a 31.6s Period	Average Time of Occupancy [ms]	Limit [ms]
DH1	0.377	320	120.6	400

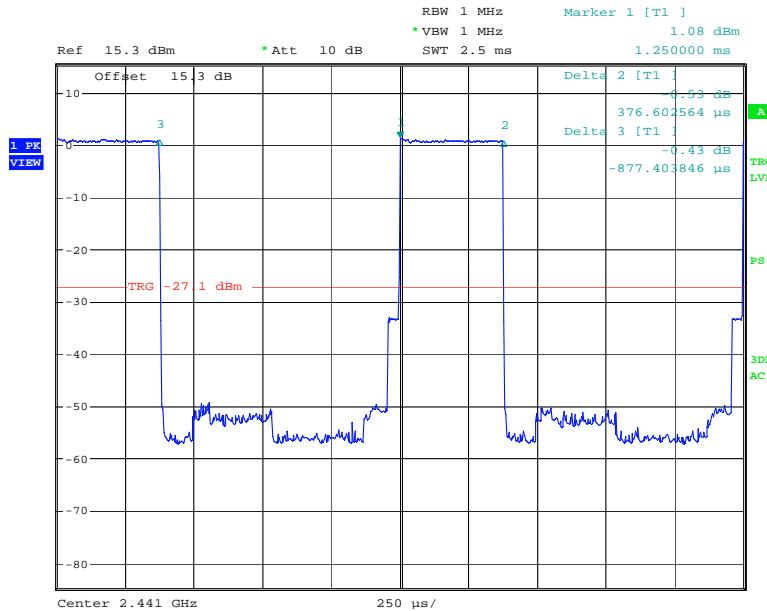
Notes: Average time of occupancy = Packet duration * Number of hops per channel in a 31.6s period

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Figure 13: Average time of occupancy, Mode D, DH1



Mode A, NT, NV
Date: 1.JUL.2010 18:03:18

DH1 packet:

DH1 Packet type permits maximum $1600 / 79 / 2 = 10.13$ hops per second in each channel (1 time slot for Tx and 1 time slot for Rx).

The number of hops within 31.6 sec.

$$= 10.13 \times 31.6$$

$$= 320 \text{ hops in each channel}$$

As the time duration of one pulse is 0.377ms,

the dwell time (the time duration of the pulses) within 31.6 sec.

$$= 0.377 \times 320$$

$$= 120.6\text{ms}$$

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5.1.7 Conducted Spurious Emission, FCC 15.247(d) and RSS-210 A8.5

RESULT:

PASS

Date of testing: 2010-07-01

Ambient tempearature: 20°C

Relative humidity: 49%

Atmospheric pressure: 1000hPa

Requirements:

In any 100 kHz bandwidth outside the frequency band, the RF power shall be at least 20 dBc below that of the maximum in-band 100 kHz emission.

Test procedure:

ANSI C63.4-2003, RSS-Gen 4.9 and FCC Public Notice DA 00-705, Released March 30, 2000.

A spectrum analyzer was connected to the antenna port of the transmitter. Analyzer Resolution Bandwidth was set to 100 kHz. For each channel investigated, the in-band and out-of-band emission measurements were performed. The out-of-band emissions were measured from 30 MHz to 25 GHz (10th harmonics).

The final measurement takes into account the loss generated by all the involved cables. The final measurement takes into account the loss generated by the short cable provided by the EUT manufacturer to support the antenna connector.

Table 12: Conducted Spurious Emission, Mode A (2402MHz), DH1

Frequency [MHz]	Reading [dBm]	Correction Factor [dB]	Emission Level [dBm]	Limit [dBm]	Margin [dB]
Fundamental	-11.32	1.65	-9.67	N/A	N/A
4803.90	-63.15	2.25	-60.90	-29.67	31.23

Notes: Limit = Reading of fundamental + Correction factor – 20dB

Emission level = Reading + Correction factor

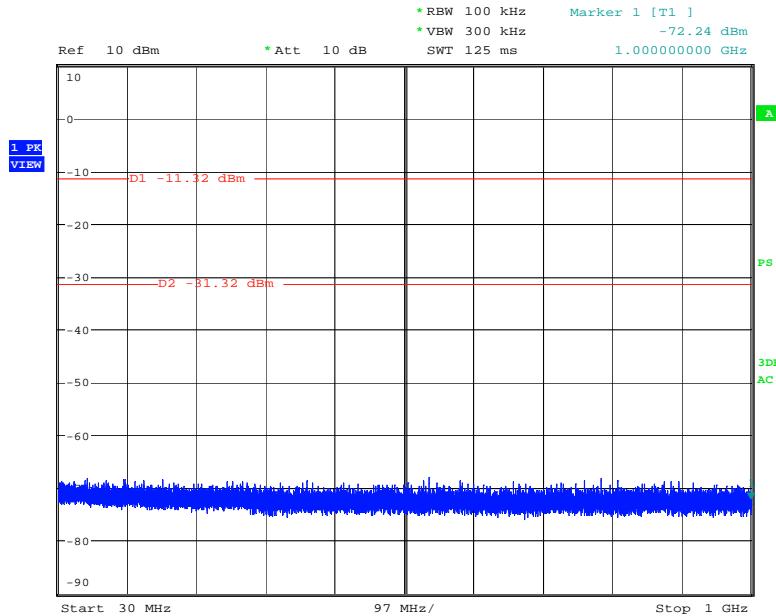
Correction factor = Total cable loss

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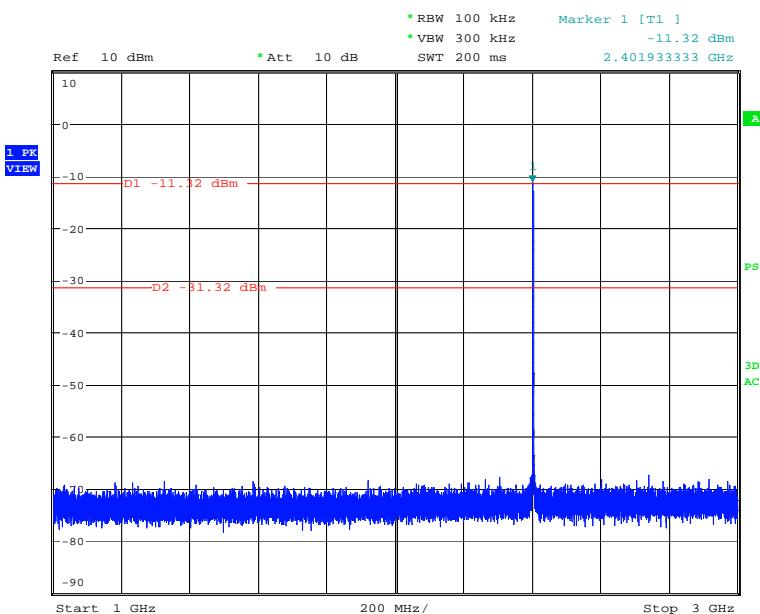
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Figure 14: Spurious Emission from 30MHz to 1GHz, Mode A (2402MHz), DH1



Mode A, NT, NV, 10-1000MHz
Date: 1.JUL.2010 16:28:56

Figure 15: Spurious Emission from 1 to 3GHz, Mode A (2402MHz), DH1



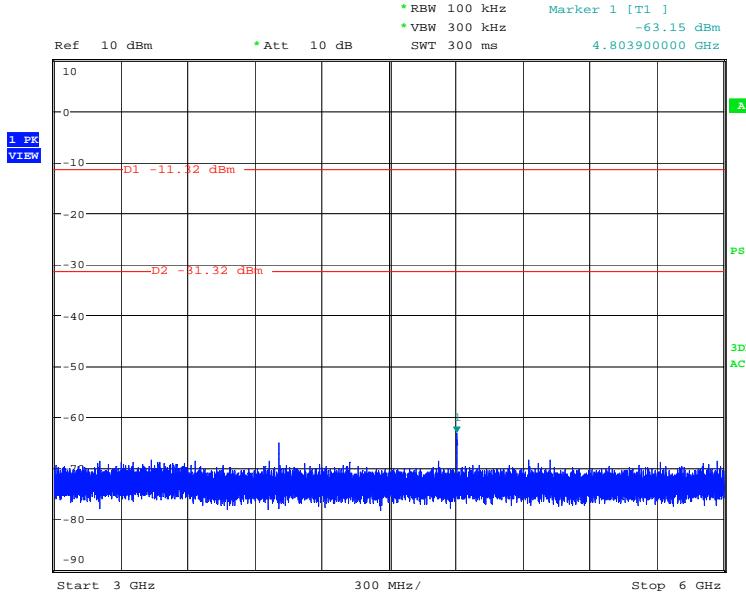
Mode A, NT, NV, 1-3GHz
Date: 1.JUL.2010 16:26:19

Prüfbericht - Nr.:
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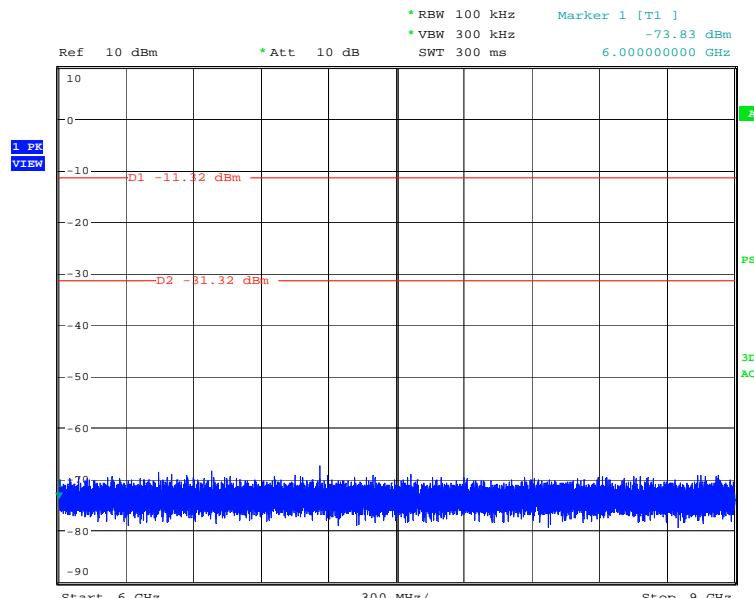
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Figure 16: Spurious Emission from 3 to 6GHz, Mode A (2402MHz), DH1



Mode A, NT, NV, 3-6GHz
Date: 1.JUL.2010 16:30:42

Figure 17: Spurious Emission from 6 to 9GHz, Mode A (2402MHz), DH1



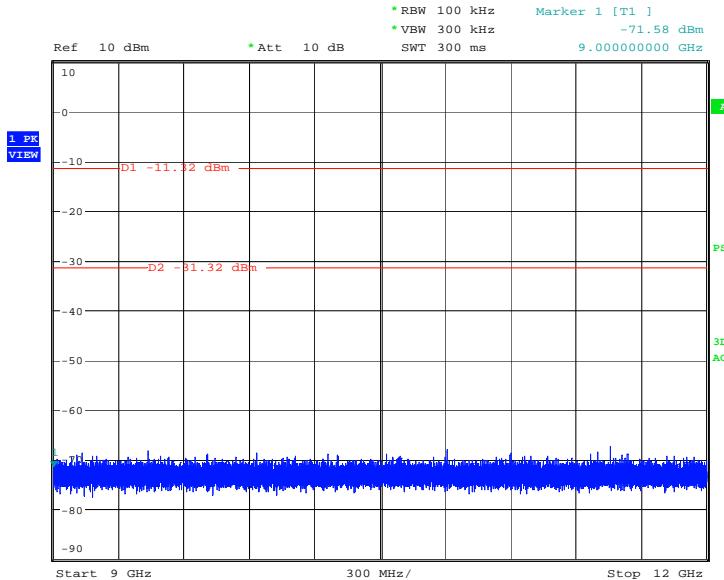
Mode A, NT, NV, 6-9GHz
Date: 1.JUL.2010 16:31:56

Prüfbericht - Nr.:
Test Report No.:

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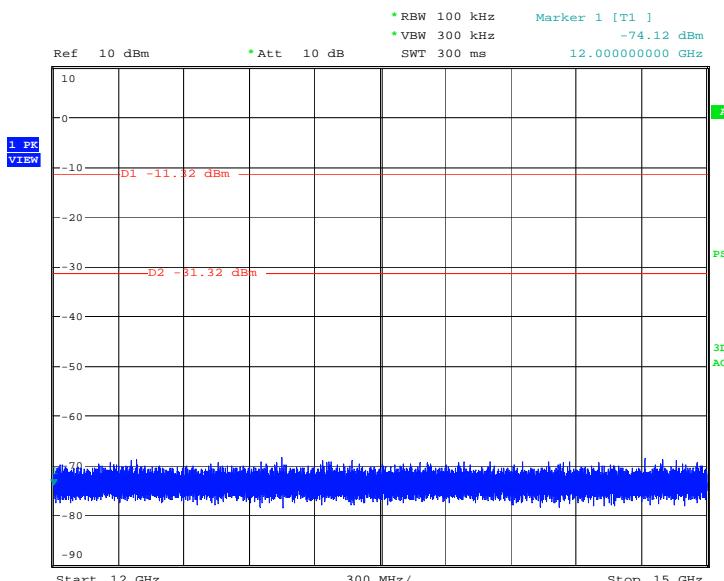
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Figure 18: Spurious Emission from 9 to 12GHz, Mode A (2402MHz), DH1



Mode A, NT, NV, 9-12GHz
Date: 1.JUL.2010 16:33:02

Figure 19: Spurious Emission from 12 to 15GHz, Mode A (2402MHz), DH1



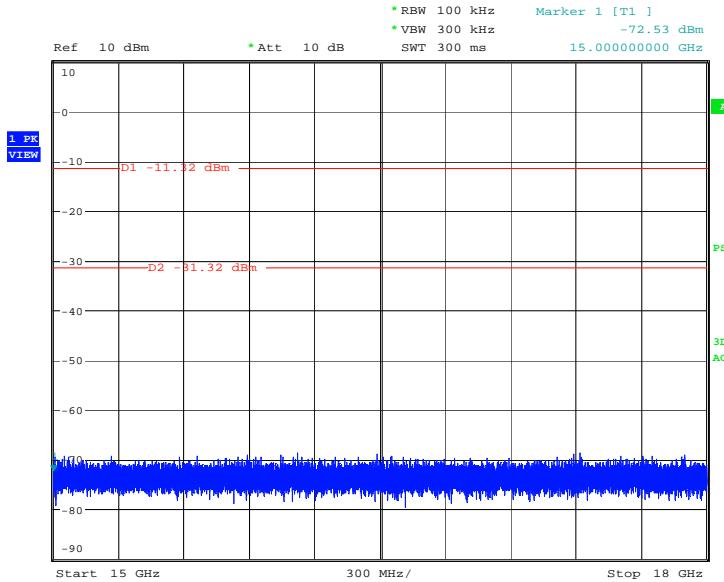
Mode A, NT, NV, 12-15GHz
Date: 1.JUL.2010 16:34:01

Prüfbericht - Nr.:
Test Report No.:

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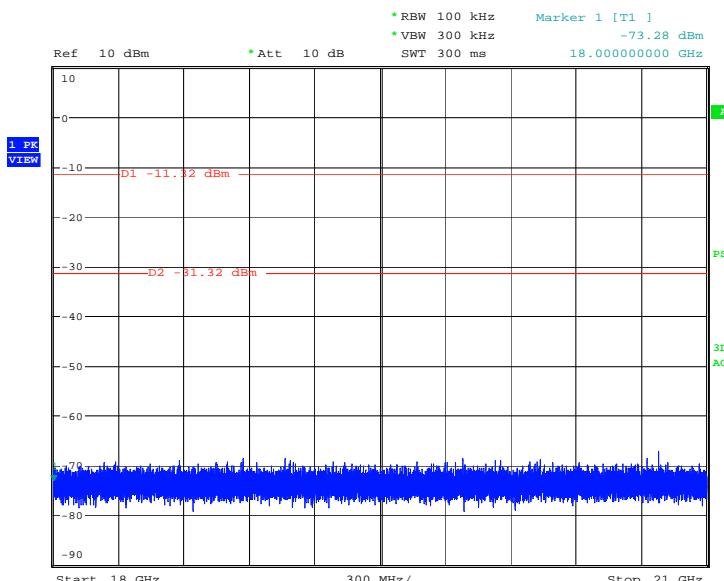
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Figure 20: Spurious Emission from 15 to 18GHz, Mode A (2402MHz), DH1



Mode A, NT, NV, 15-18GHz
Date: 1.JUL.2010 16:34:59

Figure 21: Spurious Emission from 18 to 21GHz, Mode A (2402MHz), DH1



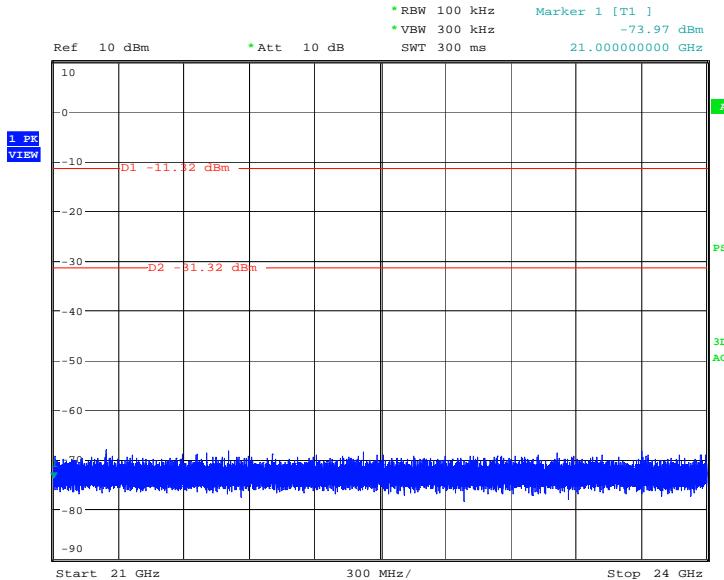
Mode A, NT, NV, 18-21GHz
Date: 1.JUL.2010 16:36:05

Prüfbericht - Nr.:
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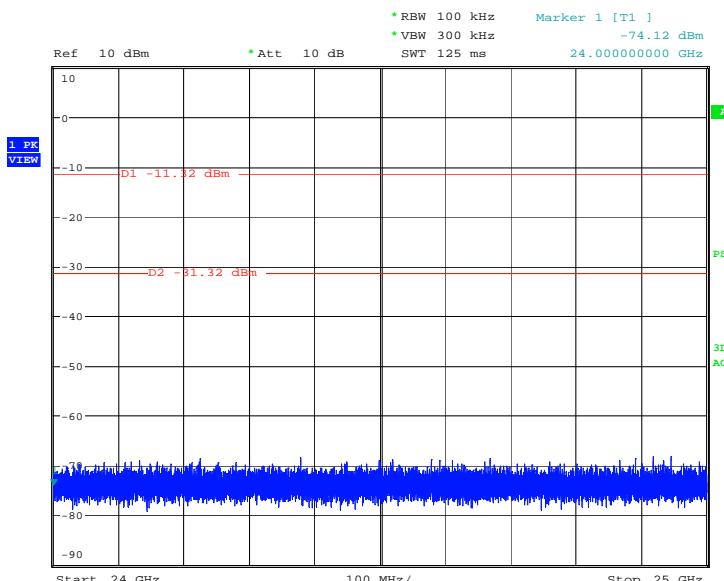
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Figure 22: Spurious Emission from 21 to 24GHz, Mode A (2402MHz), DH1



Mode A, NT, NV, 21-24GHz
Date: 1.JUL.2010 16:37:10

Figure 23: Spurious Emission from 24 to 25GHz, Mode A (2402MHz), DH1



Mode A, NT, NV, 24-25GHz
Date: 1.JUL.2010 16:38:06

Prüfbericht - Nr.:
Test Report No.:

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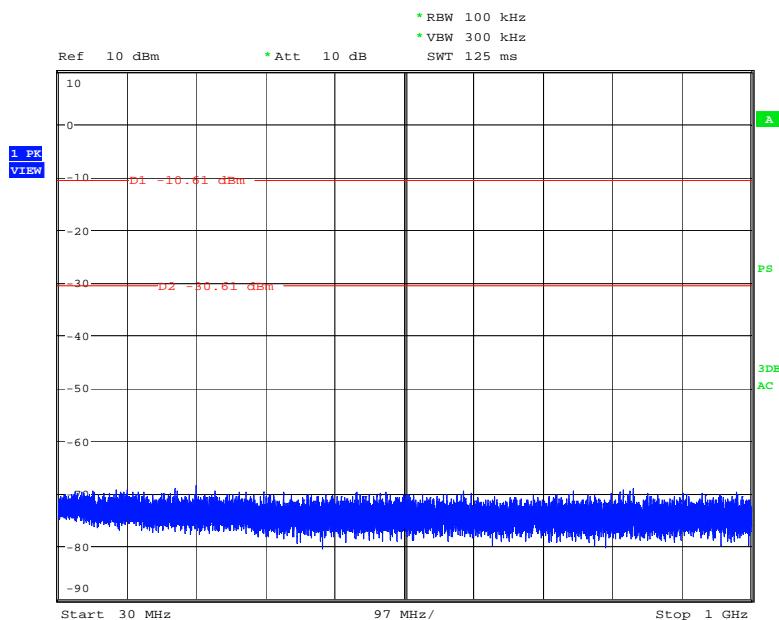
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Table 13: Conducted Spurious Emission, Mode B (2441MHz), DH1

Frequency [MHz]	Reading [dBm]	Correction Factor [dB]	Emission Level [dBm]	Limit [dBm]	Margin [dB]
Fundamental	-10.61	1.68	-8.93	N/A	N/A
4882.10	-62.63	2.30	-60.33	-28.93	31.40

Notes: Limit = Reading of fundamental + Correction factor – 20dB
Emission level = Reading + Correction factor
Correction factor = Total cable loss

Figure 24: Spurious Emission from 30MHz to 1GHz, Mode B (2441MHz), DH1



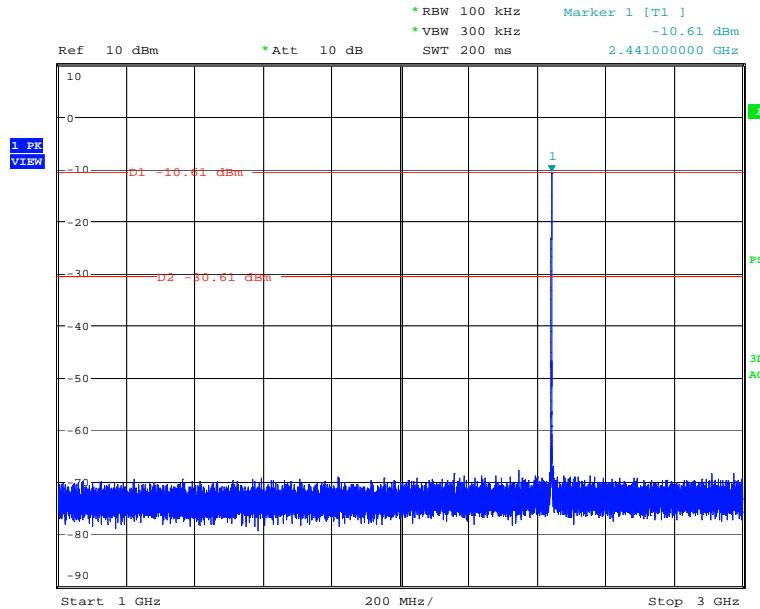
Mode B, NT, NV, 30-1000MHz
Date: 1.JUL.2010 16:41:53

Prüfbericht - Nr.:
Test Report No.:

12607476 001

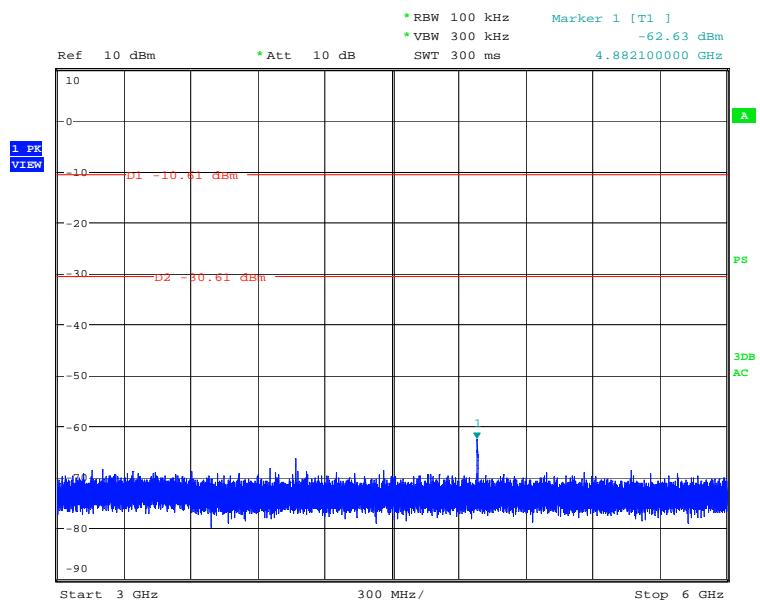
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Figure 25: Spurious Emission from 1 to 3GHz, Mode B (2441MHz), DH1



Mode B, NT, NV, 1-3GHz
Date: 1.JUL.2010 16:40:13

Figure 26: Spurious Emission from 3 to 6GHz, Mode B (2441MHz), DH1



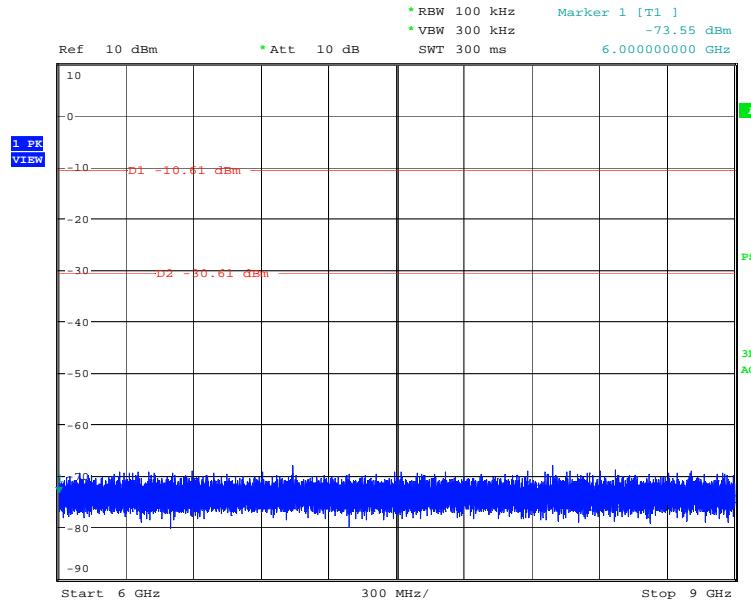
Mode B, NT, NV, 3-6GHz
Date: 1.JUL.2010 16:44:09

Prüfbericht - Nr.:
Test Report No.:

12607476 001

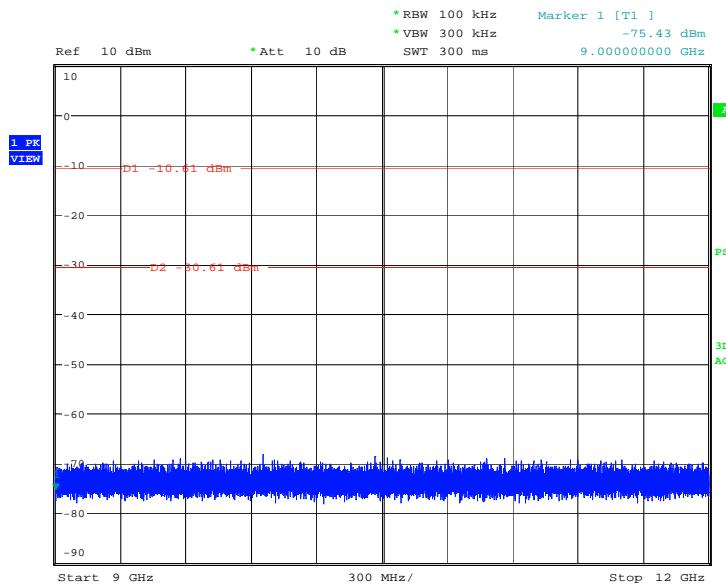
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Figure 27: Spurious Emission from 6 to 9GHz, Mode B (2441MHz), DH1



Mode B, NT, NV, 6-9GHz
Date: 1.JUL.2010 16:45:03

Figure 28: Spurious Emission from 9 to 12GHz, Mode B (2441MHz), DH1



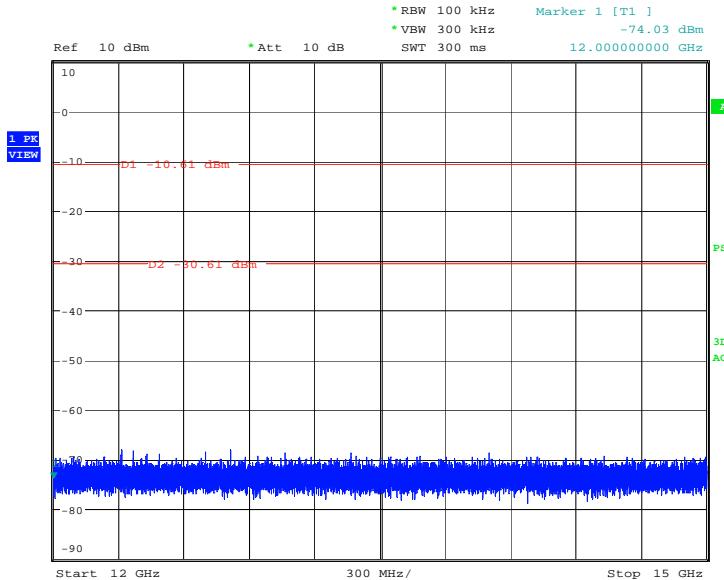
Mode B, NT, NV, 9-12GHz
Date: 1.JUL.2010 16:45:59

Prüfbericht - Nr.:
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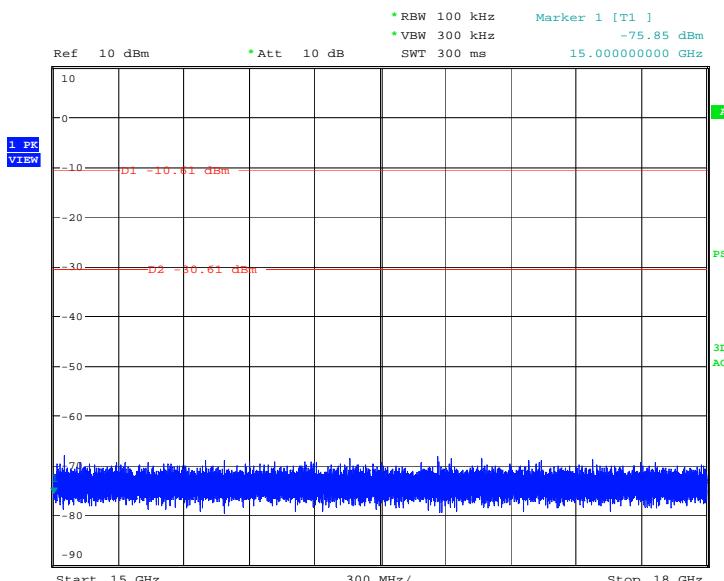
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Figure 29: Spurious Emission from 12 to 15GHz, Mode B (2441MHz), DH1



Mode B, NT, NV, 12-15GHz
Date: 1.JUL.2010 16:46:57

Figure 30: Spurious Emission from 15 to 18GHz, Mode B (2441MHz), DH1



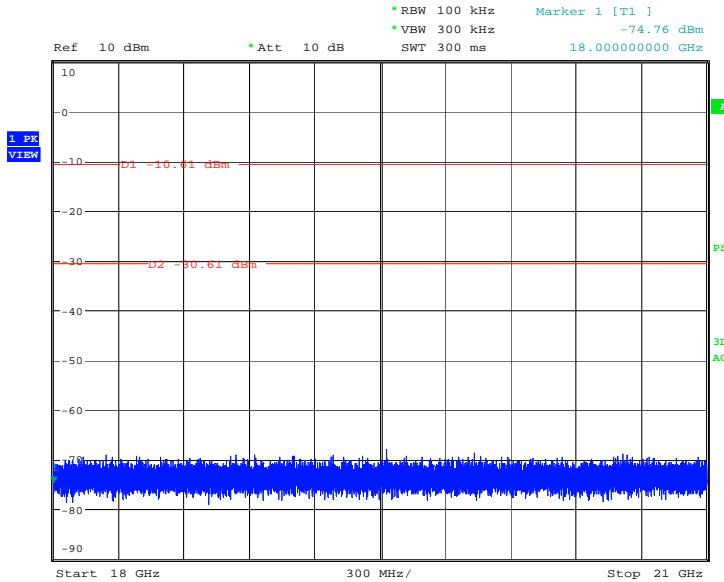
Mode B, NT, NV, 15-18GHz
Date: 1.JUL.2010 16:47:54

Prüfbericht - Nr.:
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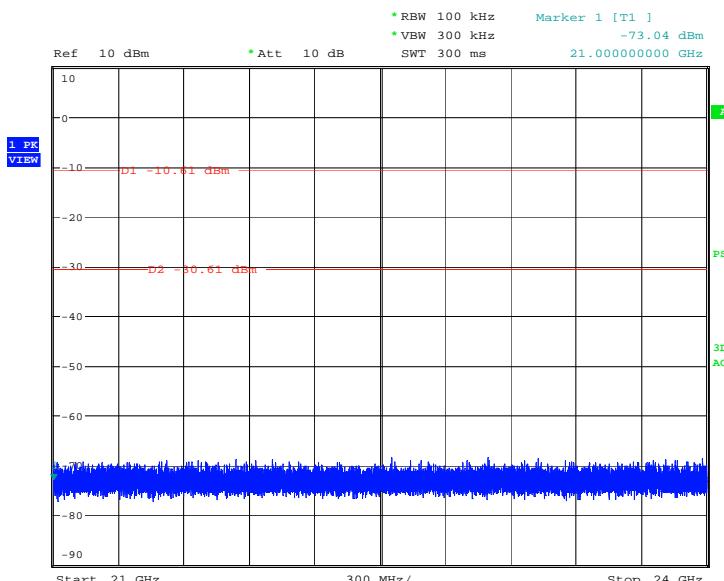
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Figure 31: Spurious Emission from 18 to 21GHz, Mode B (2441MHz), DH1



Mode B, NT, NV, 18-21GHz
Date: 1.JUL.2010 16:48:52

Figure 32: Spurious Emission from 21 to 24GHz, Mode B (2441MHz), DH1



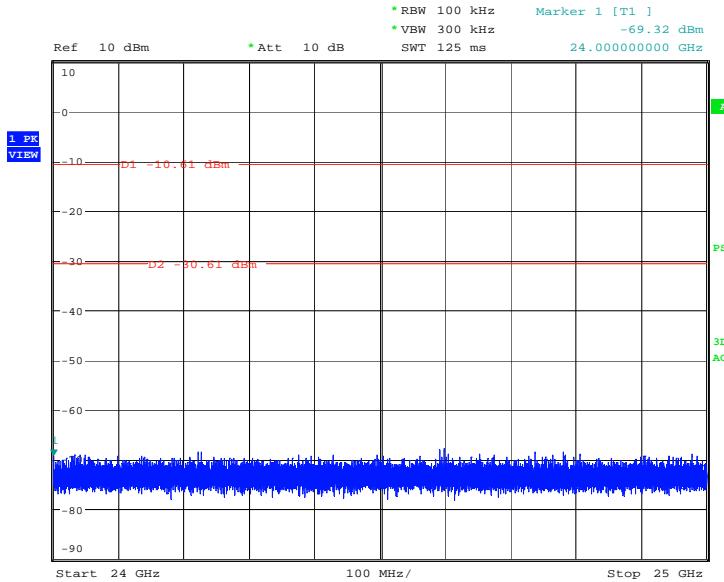
Mode B, NT, NV, 21-24GHz
Date: 1.JUL.2010 16:49:52

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Figure 33: Spurious Emission from 24 to 25GHz, Mode B (2441MHz), DH1



Mode B, NT, NV, 24-25GHz
Date: 1.JUL.2010 16:50:59

Prüfbericht - Nr.:
Test Report No.:

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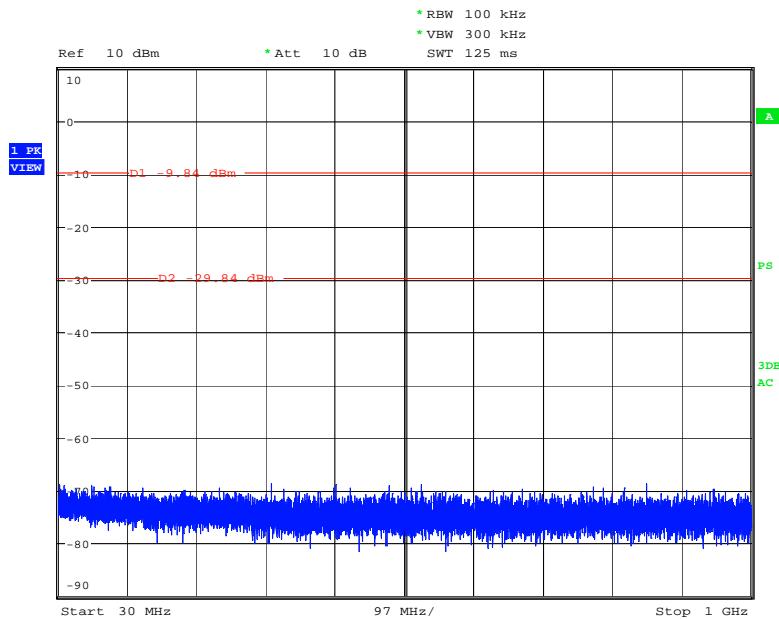
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Table 14: Conducted Spurious Emission, Mode C (2480MHz), DH3

Frequency [MHz]	Reading [dBm]	Correction Factor [dB]	Emission Level [dBm]	Limit [dBm]	Margin [dB]
Fundamental	-9.84	1.69	-8.15	N/A	N/A
4960.10	-61.74	2.29	-59.45	-28.15	31.30

Notes: Limit = Reading of fundamental + Correction factor – 20dB
Emission level = Reading + Correction factor
Correction factor = Total cable loss

Figure 34: Spurious Emission from 30MHz to 1GHz, Mode C (2480MHz), DH1



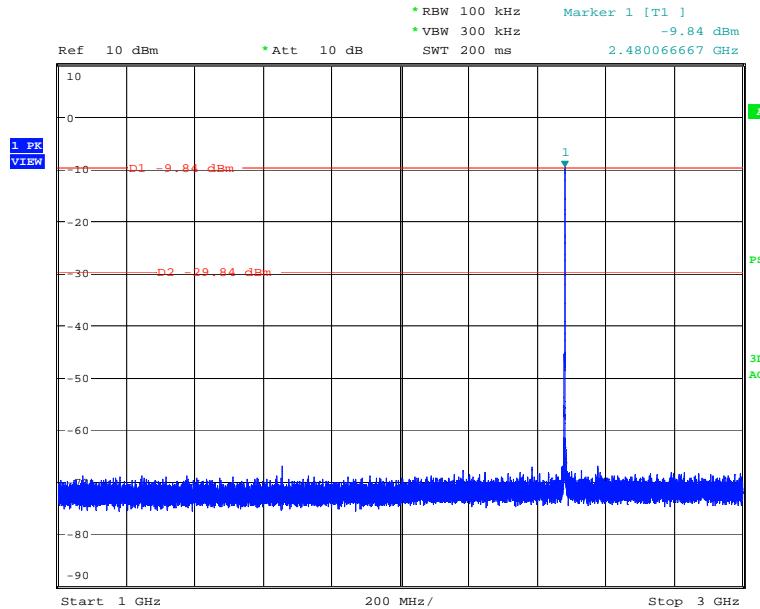
Mode C, NT, NV, 30-1000MHz
Date: 1.JUL.2010 16:55:37

Prüfbericht - Nr.:
Test Report No.:

12607476 001

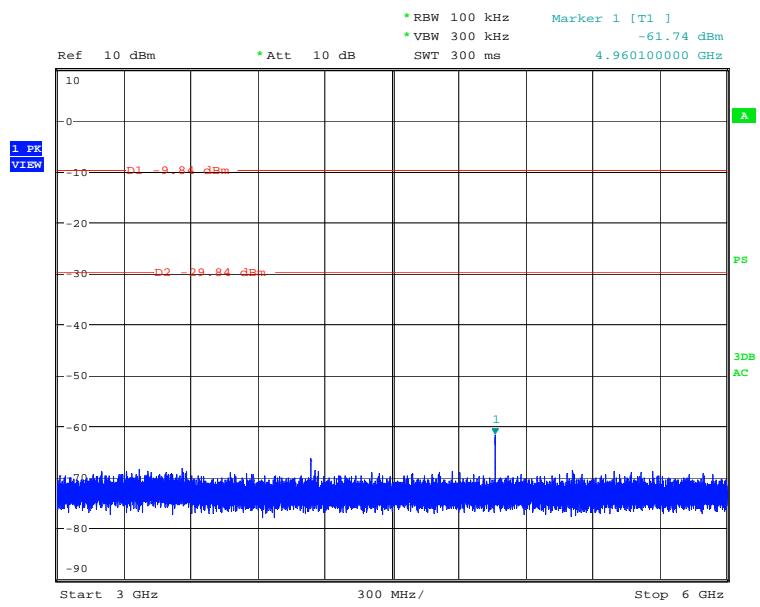
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Figure 35: Spurious Emission from 1 to 3GHz, Mode C (2480MHz), DH1



Mode C, NT, NV, 1-3GHz
Date: 1.JUL.2010 16:54:32

Figure 36: Spurious Emission from 3 to 6GHz, Mode C (2480MHz), DH1



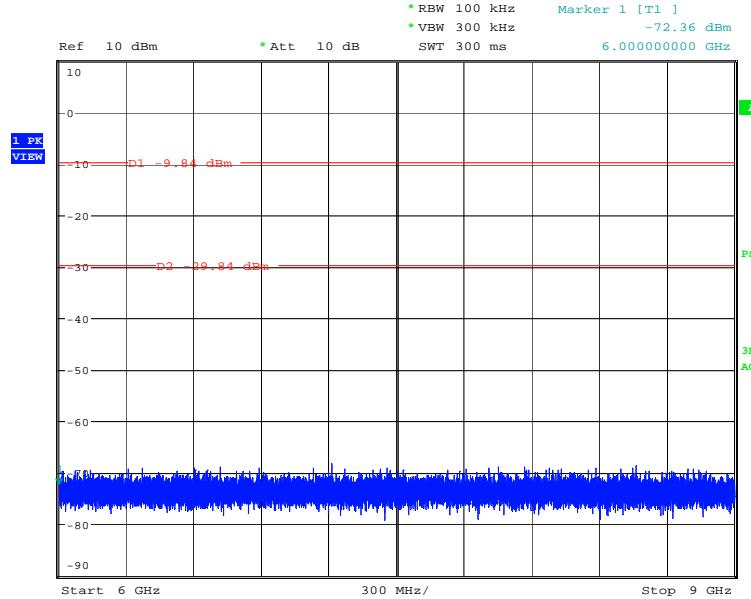
Mode C, NT, NV, 3-6GHz
Date: 1.JUL.2010 16:57:17

Prüfbericht - Nr.:
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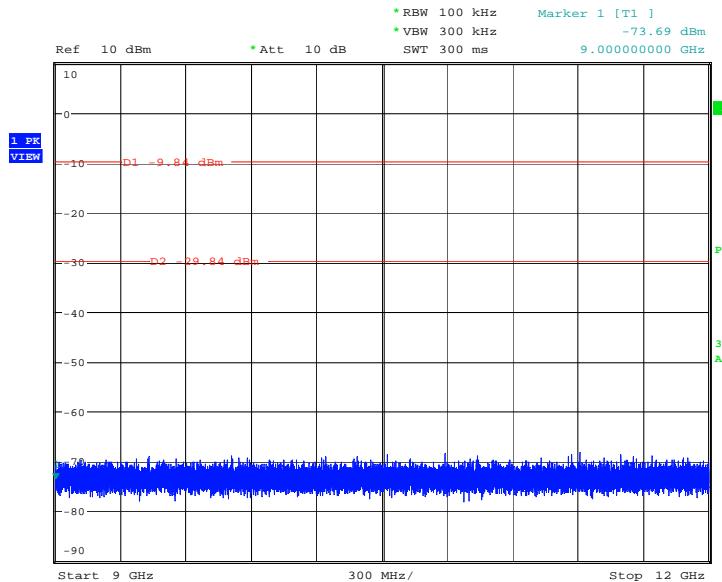
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Figure 37: Spurious Emission from 6 to 9GHz, Mode C (2480MHz), DH1



Mode C, NT, NV, 6-9GHz
Date: 1.JUL.2010 16:58:08

Figure 38: Spurious Emission from 9 to 12GHz, Mode C (2480MHz), DH1



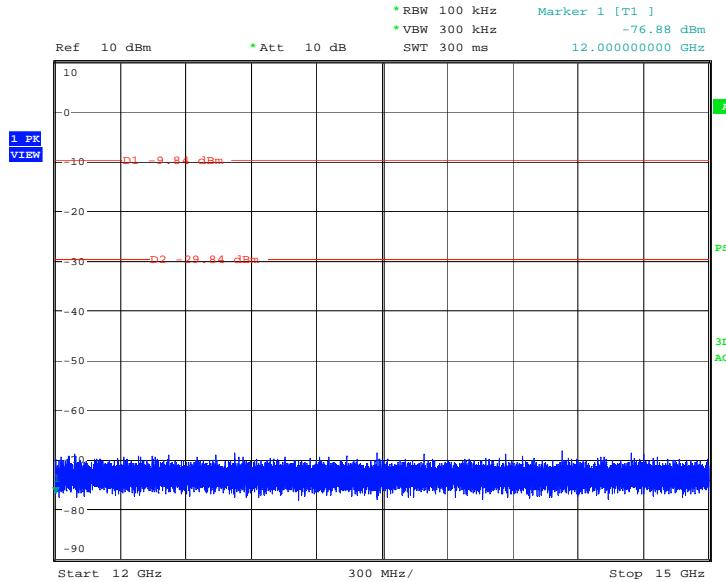
Mode C, NT, NV, 9-12GHz
Date: 1.JUL.2010 16:59:06

Prüfbericht - Nr.:
Test Report No.:

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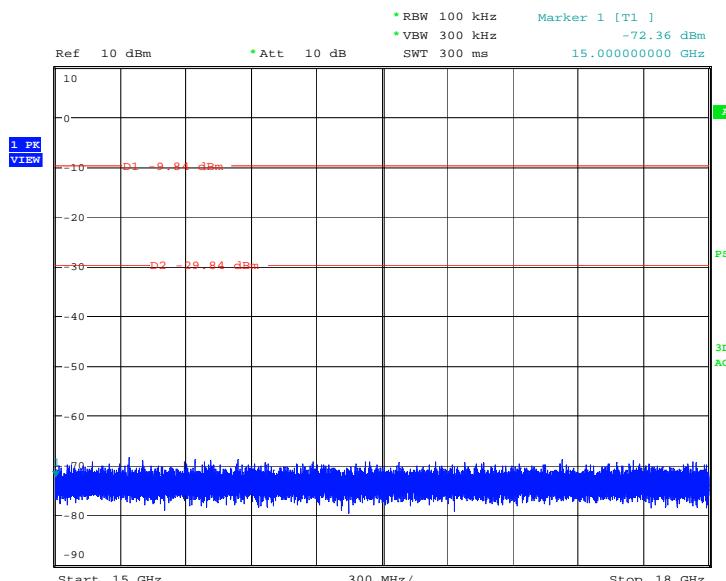
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Figure 39: Spurious Emission from 12 to 15GHz, Mode C (2480MHz), DH1



Mode C, NT, NV, 12-15GHz
Date: 1.JUL.2010 17:00:02

Figure 40: Spurious Emission from 15 to 18GHz, Mode C (2480MHz), DH1



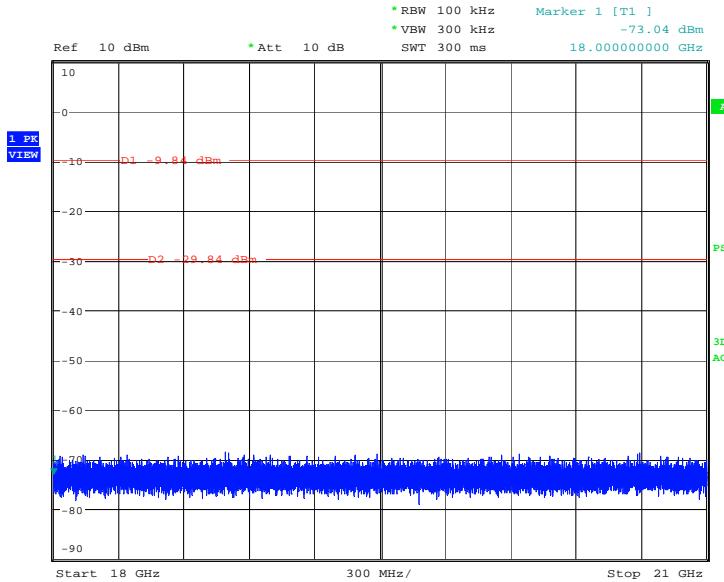
Mode C, NT, NV, 15-18GHz
Date: 1.JUL.2010 17:01:20

Prüfbericht - Nr.:
Test Report No.:

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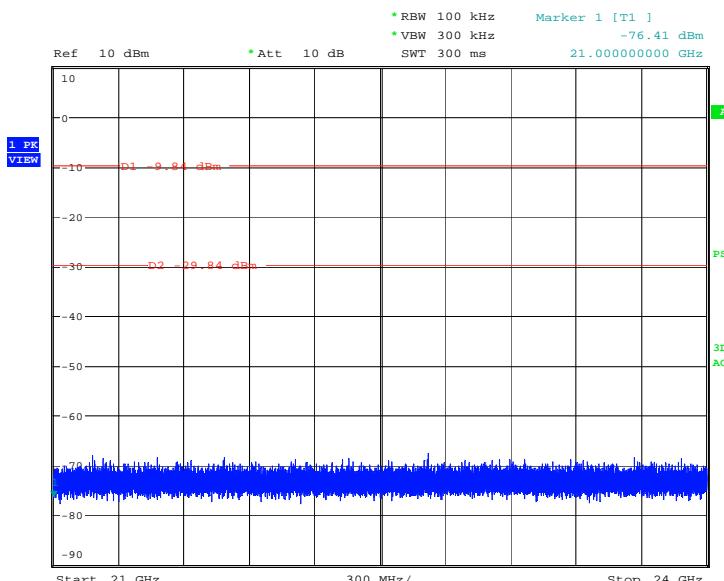
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Figure 41: Spurious Emission from 18 to 21GHz, Mode C (2480MHz), DH1



Mode C, NT, NV, 18-21GHz
Date: 1.JUL.2010 17:02:31

Figure 42: Spurious Emission from 21 to 24GHz, Mode C (2480MHz), DH1



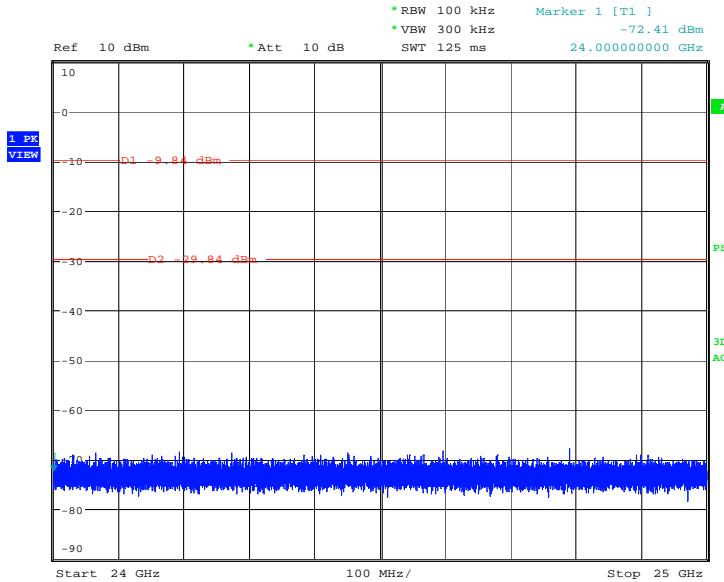
Mode C, NT, NV, 21-24GHz
Date: 1.JUL.2010 17:03:35

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Figure 43: Spurious Emission from 24 to 25GHz, Mode C (2480MHz), DH1



Mode C, NT, NV, 24-25GHz
Date: 1.JUL.2010 17:04:42

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6. Test Results AC Mains Conducted Emission

6.1 AC Mains Conducted Emission of Transmitter

6.1.1 Mains Terminal Continuous Disturbance Voltage of Transmitter, FCC 15.207 and RSS-Gen 7.2.2

RESULT:

N/A

Requirements:

The AC power line on any frequency within the band 150 kHz to 30MHz shall not exceed the limits specified in FCC 15.207 and RSS-Gen 7.2.2.

Test procedure:

ANSI C63.4-2003 and RSS-Gen 7.2.2

Note:

It is not applicable as the EUT is powered by DC battery

6.2 AC Power Line Conducted Emission of Receiver

6.2.1 AC Power Line Conducted Emission of Receiver, FCC 15.107 and RSS-Gen 7.2.2

RESULT:

N/A

Requirements:

The AC power line on any frequency within the band 150 kHz to 30MHz shall not exceed the limits specified in FCC 15.107(a) and RSS-Gen 7.2.2.

Test procedure:

ANSI C63.4-2003 and RSS-Gen 7.2.2

Note:

It is not applicable as the EUT is powered by DC battery

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7. Test Results Radiated Emission

7.1 Radiated Emission of Transmitter

7.1.1 Band Edge Radiated Emission, FCC 15.247(d) and RSS- 210 2.2

RESULT: Pass

Date of testing: 2010-07-08

Ambient temperature: 21°C

Relative humidity: 71%

Atmospheric pressure: 1005hPa

Measurement distance: 3m

Kind of test site: Semi Anechoic Chamber

Requirements:

Radiated emissions which fall in the restricted bands, as defined in FCC 15.205(a) and RSS-210 2.7 (Table 1), must comply with the radiated emission limits specified in FCC 15.209(a) and RSS-210 2.7 (Table 2 and 3).

Test procedure:

ANSI C63.4-2003, RSS-Gen 4.9, 4.10 and FCC Public Notice DA 00-705, Released March 30, 2000

Measurements were made in a Semi Anechoic Chamber at a measurement distance of 3m. The EUT was placed on a nonconductive turntable 0.8m above the ground plane. The EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the emission's maximum level.

Measurements were taken using both horizontal and vertical antenna polarizations for 3 orientations (X, Y and Z) of the EUT.

Peak (1 MHz RBW/VBW) and average (1 MHz RBW/10 Hz VBW) radiated measurements were taken with a suitable span to encompass the peak of the fundamental.

The highest emission amplitudes relative to the appropriate limit were measured and recorded in this report.

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Table 15: Band Edge Radiated Emission

Operating Frequency [MHz]	EUT / Antenna Orient.	Average Value [dBuV/m]	Peak Value [dBuV/m]	Average Limit [dBuV/m]	Peak Limit [dBuV/m]	Average Margin [dB]	Peak Margin [dB]
2402	X / H	33.76	46.99	54.00	74.00	20.24	27.01
2480	X / H	51.34	55.41	54.00	74.00	2.66*	18.59

Notes: All correction factors (antenna, cable, pre-amplifier) are included in the measurement values.

Average limit in dBuV/m is calculated as follows: Average limit = 20 x log(500uV/m).

Peak limit in dBuV/m is calculated as follows: Peak limit = Average limit + 20dB.

Uncertainty

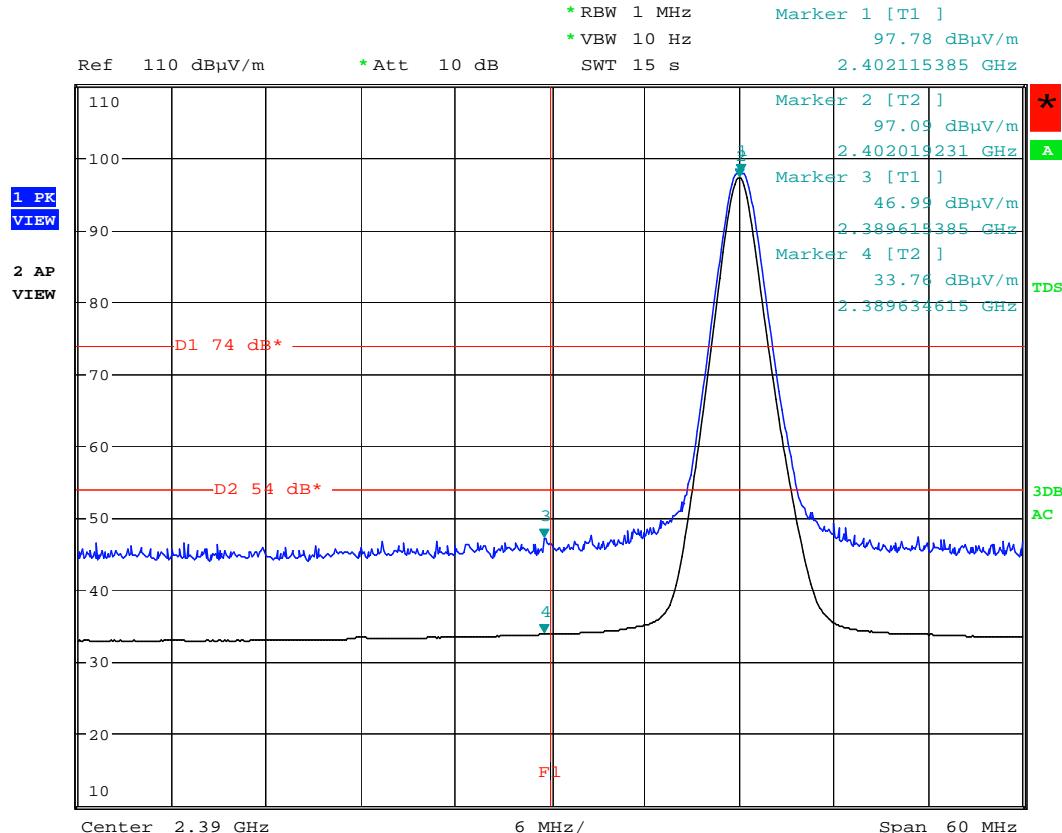
(*) The measured result is below the specification limit by a margin less than the measurement uncertainty; it is not therefore possible to determine compliance at a level of confidence of 95%. However, the measured result indicates a higher probability that the product tested complies with the specification limit.

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Figure 44: Band Edge Radiated Emission, Mode A (2402MHz), Peak and Average



Mode A, X-axis, Hor
Date: 8.JUL.2010 11:03:34

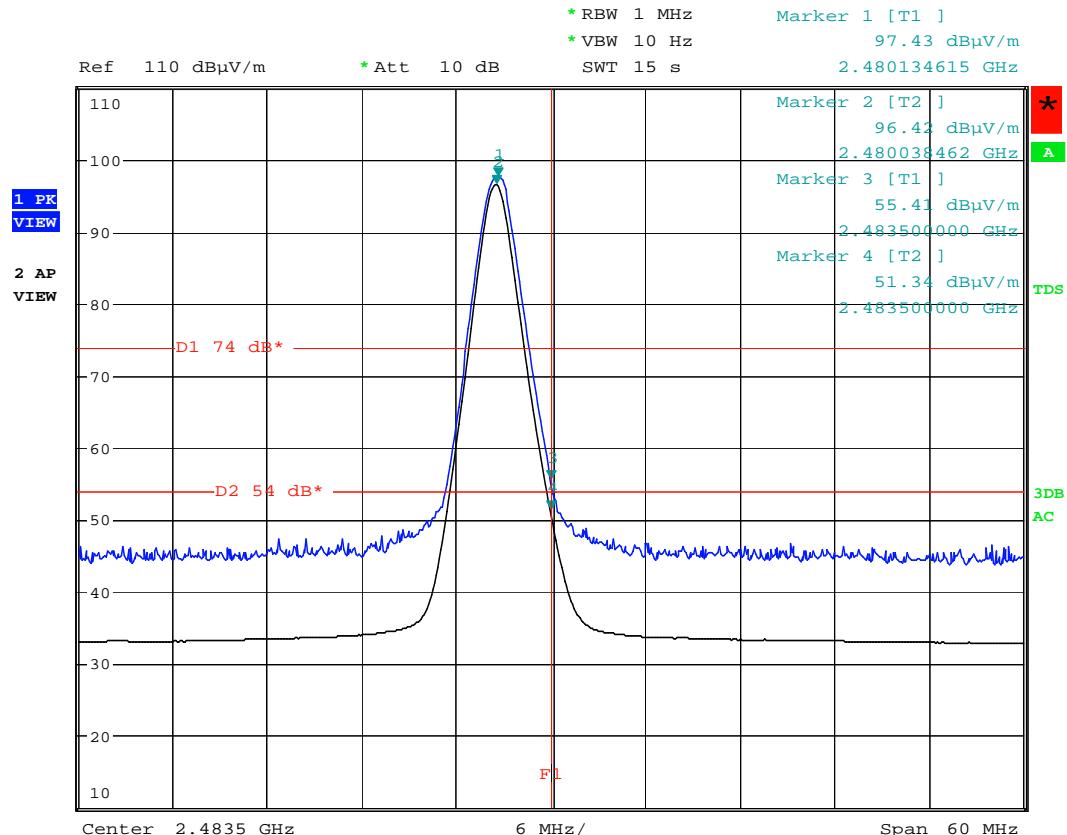
Note: The upper trace shows the peak value and the lower trace shows the average value.

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Figure 45: Band Edge Radiated Emission, Mode C (2480MHz), Peak and Average



Mode C, X-axis, Hor
Date: 8.JUL.2010 11:18:24

Note: The upper trace shows the peak value and the lower trace shows the average value.

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7.1.2 Radiated Emission, Out-of-Band and Spurious Emission, FCC 15.247(d), FCC 15.205, FCC 15.209, RSS-210 2.2, RSS-210 A8.5 and RSS-Gen 7.2.1

RESULT:

PASS

Date of testing: 2010-07-08 2010-07-09 2010-07-12

Ambient temperature: 21°C 22°C 21°C

Relative humidity: 71% 78% 66%

Atmospheric pressure: 1005hPa 1005hPa 1002hPa

Frequency range: 9kHz – 25GHz

Measurement distance: 3m

Kind of test site: Semi Anechoic Chamber

Requirements:

The emissions from the intentional radiator shall not exceed the field strength specified in FCC 15.209(a) and RSS-210 2.7.

Test procedure:

ANSI C63.4-2003, RSS-Gen 4.9, 4.10 and FCC Public Notice DA 00-705, Released March 30, 2000

Before final measurements of radiated emissions were made in Semi Anechoic Chamber, the EUT was scanned to determine its emission spectrum profile. The physical arrangement of the test system, the associated cabling and the orientation (X, Y and Z) of the EUT were varied in order to ensure that maximum emission amplitudes were attained.

The EUT was placed on a nonconductive turntable 0.8m above the ground plane. Final radiated emission measurements were made at 3m. The spectrum was examined from 30 MHz to the 10th harmonic of the highest fundamental transmitter frequency (25 GHz).

At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the emission's maximum level. Measurements were taken using both horizontal and vertical antenna polarizations.

For frequencies between 30MHz and 1GHz, the spectrum analyzer's 6 dB bandwidth was set to 120 kHz, and the analyzer was operated in the CISPR quasi-peak detection mode. For emissions above 1GHz, emissions were measured using following settings: Peak: RBW=1MHz, VBW=1MHz, Average: RBW=1MHz, VBW=10Hz.

The highest emission amplitudes relative to the appropriate limit were recorded in this report. Emissions other than those mentioned are small or not detectable.

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Table 16: Radiated Emission 30MHz – 1GHz, Horizontal & Vertical Antenna Orientations, Quasi Peak Data, Mode A

Freq. [MHz]	EUT / Antenna Orientation	Reading QP [dB(µV)]	Factor [dB(1/m)]	Level QP [dB(µV/m)]	Limit [dB(µV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
331.007	Y / V	56.9	-19.9	37.0	46.0	9.0	103	193
336.002	Y / H	56.4	-19.7	36.7	46.0	9.3	101	359
336.017	Y / V	49.5	-19.8	29.7	46.0	16.3	102	74
348.014	Y / H	51.9	-19.4	32.5	46.0	13.5	101	10
600.006	Y / H	47.8	-13.4	34.4	46.0	11.6	148	201
612.007	Y / H	48.8	-13.2	35.6	46.0	10.4	147	194
635.986	Y / H	45.7	-13.0	32.7	46.0	13.3	142	180

Note: Level QP = Reading QP + Factor

Table 17: Radiated Emission 1GHz – 25GHz, Horizontal & Vertical Antenna Orientations, Peak and Average Data, Mode A

Freq. [MHz]	EUT / Antenna P	Reading AV [dB(µV)]	Reading PK [dB(µV)]	Factor [dB(1/m)]	Level AV [dB(µV/m)]	Level PK [dB(µV/m)]	Limit AV / PK [dB(µV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [°]
3202.68	X / H	38.2	52.2	-11.3	26.9	40.9	54.0 / 74.0	27.1	33.1	161	179
4804.01	X / H	44.6	54.8	-9.5	35.1	45.3	54.0 / 74.0	18.9	28.7	117	202
5100.92	X / V	38.5	52.9	-9.0	29.5	43.9	54.0 / 74.0	24.5	30.1	110	217
5446.26	X / V	38.4	52.6	-7.7	30.7	44.9	54.0 / 74.0	23.3	29.1	193	193
6591.14	X / V	38.0	51.8	-5.9	32.1	45.9	54.0 / 74.0	21.9	28.1	108	249
7335.82	X / V	38.2	52.2	-4.6	33.6	47.6	54.0 / 74.0	20.4	26.4	189	135
7776.87	X / H	37.8	51.9	-3.0	34.8	48.9	54.0 / 74.0	19.2	25.1	199	265

Note: All correction factors (antenna, cable, pre-amplifier) are included in the measurement values.

Table 18: Radiated Emission 30MHz – 1GHz, Horizontal & Vertical Antenna Orientations, Quasi Peak Data, Mode B

Freq. [MHz]	EUT / Antenna Orientation	Reading QP [dB(µV)]	Factor [dB(1/m)]	Level QP [dB(µV/m)]	Limit [dB(µV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
216.003	Y / H	51.1	-24.8	26.3	46.0	19.7	157	304
323.988	Y / H	50.5	-20.1	30.4	46.0	15.6	102	352
336.001	Y / H	54.8	-19.7	35.1	46.0	10.9	101	359
347.991	Y / H	50.6	-19.4	31.2	46.0	14.8	103	10
587.983	Y / H	44.0	-13.5	30.5	46.0	15.5	160	203
600.003	Y / H	48.4	-13.4	35.0	46.0	11.0	148	197
611.998	Y / V	41.4	-12.8	28.6	46.0	17.4	152	116
612.004	Y / H	48.9	-13.2	35.7	46.0	10.4	149	192
623.974	Y / H	46.3	-13.1	33.2	46.0	12.8	141	189
635.974	Y / H	44.1	-13.0	31.1	46.0	14.9	145	180

Note: Level QP = Reading QP + Factor

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Table 19: Radiated Emission 1GHz – 25GHz, Horizontal & Vertical Antenna Orientations, Peak and Average Data, Mode B

Freq. [MHz]	EUT / Antenna P	Reading AV [dB(µV)]	Reading PK [dB(µV)]	Factor [dB(1/m)]	Level AV [dB(µV/m)]	Level PK [dB(µV/m)]	Limit AV / PK [dB(µV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [°]
2163.52	X / V	37.4	51.6	-13.0	24.4	38.6	54.0 / 74.0	29.6	35.4	159	18
3661.48	X / V	38.3	52.4	-9.9	28.4	42.5	54.0 / 74.0	25.6	31.5	157	220
4238.68	X / V	38.4	52.4	-10.0	28.4	42.4	54.0 / 74.0	25.6	31.6	122	26
4882.01	X / V	43.9	53.7	-9.2	34.7	44.5	54.0 / 74.0	19.3	29.5	119	342
4882.04	X / H	47.5	55.0	-9.2	38.3	45.8	54.0 / 74.0	15.7	28.2	100	284
7323.04	X / V	42.8	54.1	-4.6	38.2	49.5	54.0 / 74.0	15.8	24.5	102	140

Note: All correction factors (antenna, cable, pre-amplifier) are included in the measurement values.

Table 20: Radiated Emission 30MHz – 1GHz, Horizontal & Vertical Antenna Orientations, Quasi Peak Data, Mode C

Freq. [MHz]	EUT / Antenna Orientation	Reading QP [dB(µV)]	Factor [dB(1/m)]	Level QP [dB(µV/m)]	Limit [dB(µV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
119.996	Y / V	46.6	-24.7	21.9	43.5	21.6	101	8
216.053	Y / H	48.5	-24.8	23.7	46.0	22.3	159	112
324.008	Y / H	51.7	-20.1	31.6	46.0	14.4	101	1
336.015	Y / H	53.7	-19.7	34.0	46.0	12.0	101	1
347.993	Y / H	50.3	-19.4	30.9	46.0	15.2	101	5
600.010	Y / H	47.0	-13.4	33.6	46.0	12.4	151	195
612.003	Y / H	47.5	-13.2	34.3	46.0	11.7	147	187
624.020	Y / H	47.2	-13.1	34.1	46.0	11.9	142	183
923.604	Y / H	30.8	-9.5	21.3	46.0	24.7	353	68
924.534	Y / V	44.2	-9.8	34.4	46.0	11.6	104	315

Note: Level QP = Reading QP + Factor

Table 21: Radiated Emission 1GHz – 25GHz, Horizontal & Vertical Antenna Orientations, Peak and Average Data, Mode C

Freq. [MHz]	EUT / Antenna P	Reading AV [dB(µV)]	Reading PK [dB(µV)]	Factor [dB(1/m)]	Level AV [dB(µV/m)]	Level PK [dB(µV/m)]	Limit AV / PK [dB(µV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [°]
4597.61	X / H	38.1	52.0	-9.6	28.5	42.4	54.0 / 74.0	25.5	31.6	156	69
4960.04	X / H	52.5	57.8	-8.9	43.6	48.9	54.0 / 74.0	10.4	25.1	101	286
4960.06	X / V	46.3	54.9	-8.9	37.4	46.0	54.0 / 74.0	16.6	28.0	116	11
5507.44	X / V	38.5	52.5	-7.6	30.9	44.9	54.0 / 74.0	23.1	29.1	144	158
7723.68	X / H	37.6	51.6	-3.3	34.3	48.2	54.0 / 74.0	19.7	25.8	152	93
7916.36	X / V	37.9	52.7	-2.9	35.0	49.8	54.0 / 74.0	19.0	24.2	157	148

Note: All correction factors (antenna, cable, pre-amplifier) are included in the measurement values.

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7.2 Radiated Emission of Receiver

7.2.1 Radiated Emission of Receiver, FCC 15.109, RSS-210 2.2, RSS-210 2.6, RSS-210 A8.5, RSS-Gen 7.2.3.2

RESULT:

PASS

Date of testing: 2010-07-08 2010-07-09 2010-07-12

Ambient temperature: 21°C 22°C 21°C

Relative humidity: 71% 78% 66%

Atmospheric pressure: 1005hPa 1005hPa 1002hPa

Frequency range: 30MHz – 12.5GHz

Equipment classification: Class B

Measurement distance: 3m

Kind of test site: Semi Anechoic Chamber

Requirements:

The emissions from the unintentional radiator shall not exceed the field strength specified in 15.109(a) and RSS-210 Table 2 (and RSS-Gen Table 1).

Test procedure:

ANSI C63.4-2003 and RSS-Gen 4.9, 4.10

Before final measurements of radiated emissions were made in Semi Anechoic Chamber, the EUT was scanned to determine its emission spectrum profile. The physical arrangement of the test system, the associated cabling and the orientation (X, Y and Z) of the EUT were varied in order to ensure that maximum emission amplitudes were attained.

The EUT was placed on a nonconductive turntable 0.8m above the ground plane. Final radiated emission measurements were made at 3m. The spectrum was examined from 30 MHz to the 5th harmonic of the highest fundamental transmitter frequency (12.5 GHz).

At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the emission's maximum level. Measurements were taken using both horizontal and vertical antenna polarizations.

For frequencies between 30MHz and 1GHz, the spectrum analyzer's 6 dB bandwidth was set to 120 kHz, and the analyzer was operated in the CISPR quasi-peak detection mode. For emissions above 1GHz, emissions were measured using following settings: Peak: RBW=1MHz, VBW=1MHz, Average: RBW=1MHz, VBW=10Hz.

The highest emission amplitudes relative to the appropriate limit were recorded in this report. Emissions other than those mentioned are small or not detectable.

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Table 22: Radiated Emission 30MHz – 1GHz, Horizontal & Vertical Antenna Orientations, Quasi Peak Data, Mode E

Freq. [MHz]	EUT / Antenna Orientation	Reading QP [dB(µV)]	Factor [dB(1/m)]	Level QP [dB(µV/m)]	FCC Limit [dB(µV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
40.460	X / V	38.8	-23.6	15.2	40.0	24.8	125	5
100.855	X / H	31.4	-25.6	5.8	43.5	37.7	163	164
120.001	X / V	41.0	-24.7	16.3	43.5	27.2	102	134
323.979	X / H	52.7	-20.1	32.6	46.0	13.4	101	193
328.957	X / V	49.3	-20.0	29.3	46.0	16.7	102	48
335.986	X / H	54.0	-19.7	34.3	46.0	11.7	112	194
552.007	X / H	38.3	-14.1	24.2	46.0	21.8	206	359
563.908	X / H	30.4	-13.9	16.5	46.0	29.5	188	211
624.014	X / H	41.0	-13.1	27.9	46.0	18.1	169	313
636.010	X / V	37.9	-12.6	25.3	46.0	20.7	148	103

Note: Level QP = Reading QP + Factor

Table 23: Radiated Emission 1GHz – 12.5GHz, Horizontal & Vertical Antenna Orientations, Peak and Average Data, Mode E

Freq. [MHz]	EUT / Antenna P	Reading AV [dB(µV)]	Reading PK [dB(µV)]	Factor [dB(1/m)]	Level AV [dB(µV/m)]	Level PK [dB(µV/m)]	Limit AV / PK [dB(µV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [°]
2442.996	Y / V	47.7	55.3	-13.3	34.4	42.0	54.0 / 74.0	19.6	32.0	102	59
2443.003	Y / H	51.6	56.6	-13.3	38.3	43.3	54.0 / 74.0	15.7	30.7	138	129
4893.706	Y / H	38.3	52.0	-9.1	29.2	42.8	54.0 / 74.0	24.8	31.2	199	184
5624.695	Y / H	38.6	52.3	-7.7	30.9	44.6	54.0 / 74.0	23.1	29.4	147	24
6327.165	Y / V	37.7	51.6	-6.4	31.3	45.2	54.0 / 74.0	22.7	28.8	148	169
7726.773	Y / V	37.6	51.8	-3.3	34.3	48.5	54.0 / 74.0	19.7	25.5	195	249

Note: All correction factors (antenna, cable, pre-amplifier) are included in the measurement values.

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8. Photographs of test setup

Details refer to the attachment

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11. Attachment: Photographs of test setup

7 pages following