

FCC / IC Radio Test Report

Applicant : Qualcomm Atheros, Inc.
Manufacturer : 1700 Technology Drive, San Jose, CA95110
Equipment : Dual Band 2x2 MIMO 802.11ac/abgn WLAN plus BT
Brand Name : Qualcomm Atheros
Model No. : QCWB342
FCC ID : PPD-QCWB342
IC ID : 4104A-QCWB342
Standard : 47 CFR FCC Part 15.247
RSS-210 Issue 8
Operating Band : 2400 MHz – 2483.5 MHz

The product sample received on Feb. 20, 2013 and completely tested on May 17, 2013. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2009 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by:

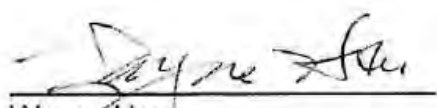

Wayne Hsu

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Summary of Test Result

Conformance Test Specifications					
Report Clause	Ref. Std. Clause	Description	Measured	Limit	Result
1.1.3	15.203	Antenna Requirement	Antenna connector mechanism complied	According to FCC 15.203	Complied
3.1	15.247(a) / RSS-210 A8.1 / RSS-Gen 4.6.1	20dB Bandwidth	EDR: 1.394 MHz	N/A	Complied
		99% Bandwidth	EDR: 1.228 MHz		
		Carrier Frequency Separation (ChS)	EDR: 1 MHz	ChS \geq BW _{20dB} x 2/3.	Complied
3.2	15.247(a) / RSS-210 A8.1	Number of Hopping Frequencies (N)	Max: 79 Min: 20	N \geq 15	Complied
3.3	15.247(a) / RSS-210 A8.1	Time of Occupancy (Dwell Time)	EDR: 0.314 sec	0.4 s within 0.4 x N	Complied
3.4	15.247(b) / RSS-210 A8.4	RF Output Power (Maximum Peak Conducted Output Power)	BR: 4.43 dBm EDR: 7.39 dBm	BR:21 dBm EDR:21 dBm	Complied
3.5	15.247(d) / RSS-210 A8.5	Emission in Non-Restricted Frequency Bands	Non Restricted Bands: 2487.63MHz: 34.18dB	Non-Restricted Bands: > 20 dBc	Complied
3.6.5	15.247(d) / RSS-210 A8.5	Emission in Restricted Frequency Bands	Restricted Bands 7323.000 MHz 49.98 dBuV/m @ 3 m - PK	Restricted Bands: According to FCC 15.209 / RSS-Gen 6.1	Complied
3.7	15.207 / RSS-Gen 7.2.4	AC Power-line Conducted Emissions	17.110 MHz 36.91 dBuV - AV 42.70 dBuV - QP	According to FCC 15.207 / RSS-Gen 7.2.4	Complied



SPORTON INTERNATIONAL INC.
TEL : 886-3-327-3456
FAX : 886-3-327-0973

1 General Description

1.1 Information

1.1.1 RF General Information (Bluetooth)

RF General Information					
Frequency Range (MHz)	Ch. Freq. (MHz)	Channel Number	Bluetooth Mode	RF Output Power (dBm)	Co-location
2400~2483.5	2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480	0-78 [79]	BR-1Mbps	4.43	Yes
			EDR-2Mbps	6.98	
			EDR-3Mbps	7.39	
Note 1: Bluetooth BR uses a GFSK (1Mbps). Note 2: Bluetooth EDR uses a combination of $\pi/4$ -DQPSK (2Mbps) and 8DPSK (3Mbps). Note 3: RF output power specifies that Maximum Peak Conducted Output Power. Note 4: Co-location, Co-location is generally defined as simultaneously transmitting (co-transmitting) antennas within 20 cm of each other. (i.e., EUT has simultaneously co-transmitting that operating 2.4GHz and 5GHz.)					

1.1.2 WLAN/ BT coexistence mode

- ♦ 1X1 WLAN + BT: WLAN/BT concurrent at different antenna port and 18MHz separation between WLAN and BT fundamental.
- ♦ 2X2 WLAN + BT: 5GHz 802.11a/an (or 11ac) transmit concurrent with BT. - 2.4GHz WLAN + BT is timely shared coexistence.

1.1.3 Antenna Information

Antenna Category	
<input checked="" type="checkbox"/>	External antenna (dedicated antennas)
<input checked="" type="checkbox"/>	RF connector provided
<input checked="" type="checkbox"/>	Unique antenna connector. (e.g., MMCX, U.FL, IPX, and RP-SMA, RP-N type...)
<input type="checkbox"/>	Standard antenna connector. (e.g., SMA, N, BNC, and TNC type...)

Antenna General Information			
No.	Ant. Type	Frequency Band	Maximum Gain (dBi)
1	PIFA	2400~2483.5MHz	3.60

1.1.4 Type of EUT

Identify EUT	
EUT Serial Number	N/A
Presentation of Equipment	<input checked="" type="checkbox"/> Production ; <input type="checkbox"/> Pre-Production ; <input type="checkbox"/> Prototype
Type of EUT	
<input checked="" type="checkbox"/>	Stand-alone
<input type="checkbox"/>	Combined (EUT where the radio part is fully integrated within another device) Combined Equipment - Brand Name / Model No.: ...
<input type="checkbox"/>	Plug-in radio (EUT intended for a variety of host systems) Host System - Brand Name / Model No.: ...
<input type="checkbox"/>	Other:

1.1.5 Test Signal Duty Cycle

Operated Mode for Worst Duty Cycle	
<input checked="" type="checkbox"/> Operated test mode for worst duty cycle	
Test Signal Duty Cycle (x)	Power Duty Factor [dB] – (10 log 1/x)
<input checked="" type="checkbox"/> 78.45% - test mode single channel - DH5	1.05
Bluetooth ACL packets can be 1, 3, or 5 time slots. The DH1 packet can cover a single time slot. The DH3 packet can cover up to 3 time slots. The DH5 packet can cover up to 5 time slots. Operate DH5 at maximum dwell time and maximum duty cycle.	

1.1.6 EUT Operational Condition

Supply Voltage	<input type="checkbox"/> AC mains	<input checked="" type="checkbox"/> DC	
Type of DC Source	<input type="checkbox"/> Internal DC supply	<input checked="" type="checkbox"/> Host	<input type="checkbox"/> Battery

1.2 Support Equipment

Support Equipment - Conducted Emissions				
No.	Equipment	Brand Name	Model Name	Serial No.
1	Notebook	DELL	VOSTR3450	DoC
2	(USB) Mouse	Microsoft	1113	DoC
3	(USB) Printer	EPSON	C61	DoC
4	Bluetooth Earphone	SONY	HBH-PV702	--
5	Test Fixture	--	--	--
6	Wireless AP (Remote Workstation)	D-LINK	DNS-G120	DoC

Support Equipment - Radiated Emissions				
No.	Equipment	Brand Name	Model Name	Serial No.
1	Notebook	DELL	E5520	DoC
2	Test Fixture	--	--	--

1.3 Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ◆ 47 CFR FCC Part 15 Subpart C 15.247
- ◆ RSS-210 Issue 8
- ◆ RSS-GEN Issue 3
- ◆ ANSI C63.10-2009
- ◆ FCC KDB 558074
- ◆ FCC DA-00-0705

1.4 Testing Location Information

Testing Location				
<input checked="" type="checkbox"/>	HWA YA	ADD : No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.		
		TEL : 886-3-327-3456 FAX : 886-3-327-0973		
Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
AC Conduction	CO04-HY	Zeus	19.8°C / 61%	May 17, 2013
RF Conducted	TH01-HY	Ian	24.7°C / 64%	Feb. 26, 2013
Radiated Emission	03CH02-HY	Hsiao	23.9°C / 64%	Mar. 06, 2013 ~ May 13, 2013

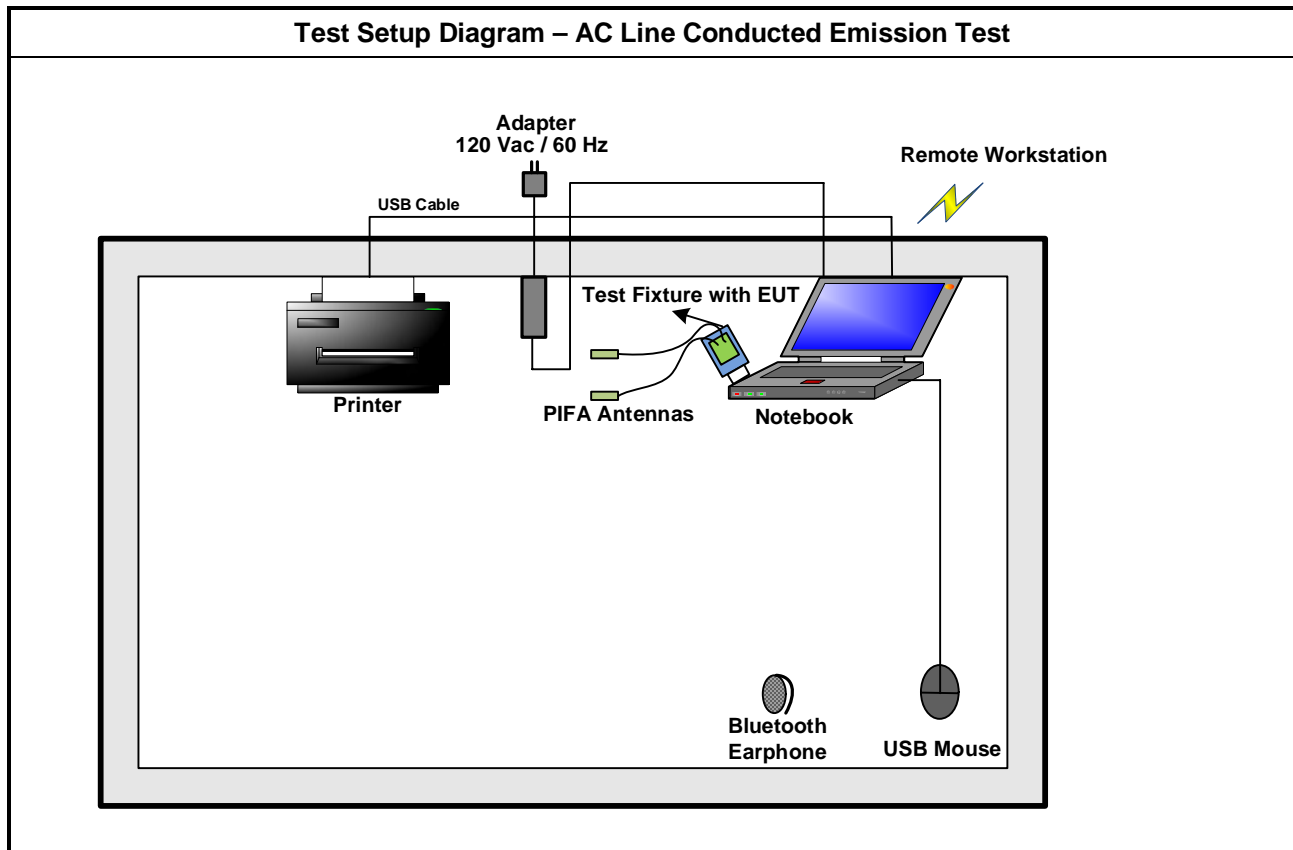
1.5 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))

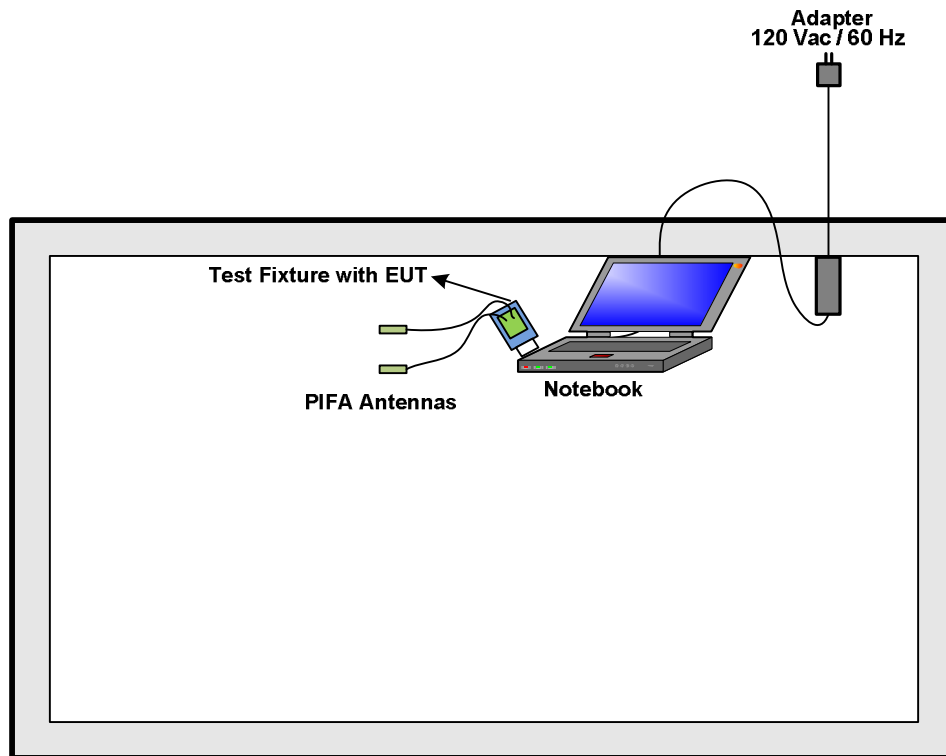
Measurement Uncertainty			
Test Item		Uncertainty	Limit
AC power-line conducted emissions		±2.26 dB	N/A
Emission bandwidth, 6dB bandwidth		±1.42 %	N/A
RF output power, conducted		±0.63 dB	N/A
Power density, conducted		±0.81 dB	N/A
Unwanted emissions, conducted	30 – 1000 MHz	±0.51 dB	N/A
	1 – 18 GHz	±0.67 dB	N/A
	18 – 40 GHz	±0.83 dB	N/A
	40 – 200 GHz	N/A	N/A
All emissions, radiated	30 – 1000 MHz	±2.56 dB	N/A
	1 – 18 GHz	±3.59 dB	N/A
	18 – 40 GHz	±3.82 dB	N/A
	40 – 200 GHz	N/A	N/A
Temperature		±0.8 °C	N/A
Humidity		±3 %	N/A
DC and low frequency voltages		±3 %	N/A
Time		±1.42 %	N/A
Duty Cycle		±1.42 %	N/A

2 Test Configuration of EUT

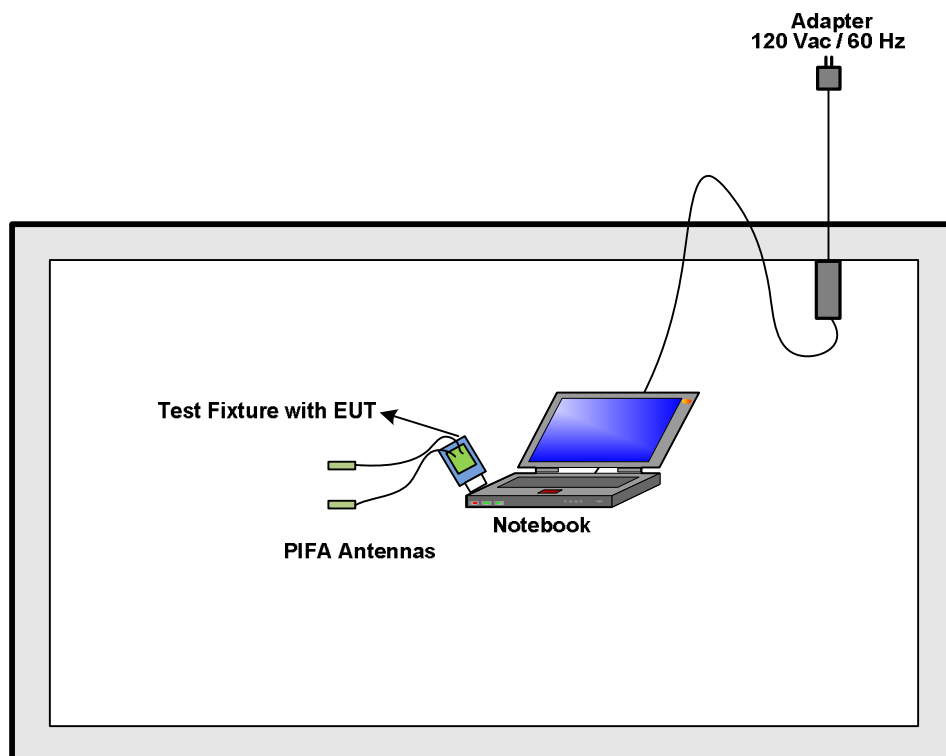
2.1 Test Setup Diagram



Test Setup Diagram - Radiated Test (Below 1GHz)



Test Setup Diagram - Radiated Test (Above 1GHz)



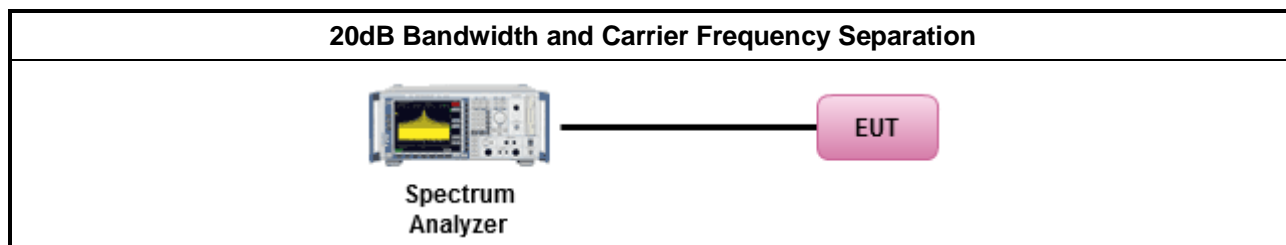
3 Transmitter Test Result

3.1 20dB Bandwidth and Carrier Frequency Separation

3.1.1 Test Procedures

Test Method	
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.9.1 for 20 dB bandwidth measurement.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 7.7.2 for carrier frequency separation measurement.
<input checked="" type="checkbox"/>	For conducted measurement.
<input checked="" type="checkbox"/>	The EUT supports single transmit chain and measurements performed on this transmit chain.
<input type="checkbox"/>	The EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.

3.1.2 Test Setup

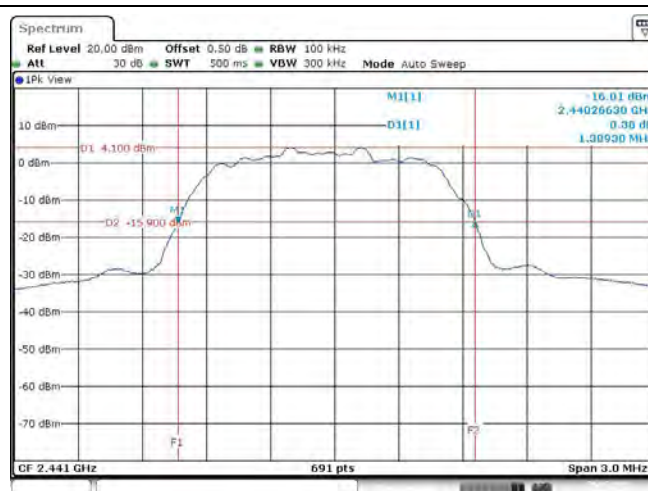


3.1.3 Test Result of 20dB Bandwidth and Carrier Frequency Separation

20dB Bandwidth and Carrier Frequency Separation Result					
Modulation Mode	Freq. (MHz)	20dB Bandwidth (MHz)	99% Bandwidth (MHz)	Channel Separation (MHz)	Channel Separation Limits (MHz)
EDR-3Mbps	2402	1.389	1.228	1.00	0.926
EDR-3Mbps	2440	1.389	1.228	1.00	0.926
EDR-3Mbps	2480	1.394	1.228	1.00	0.926
Result		Complied			

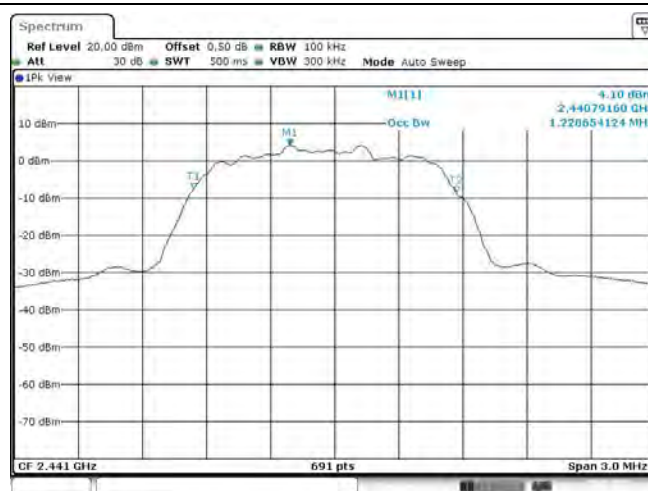
Worst 20dB Bandwidth Plots

EDR-3Mbps



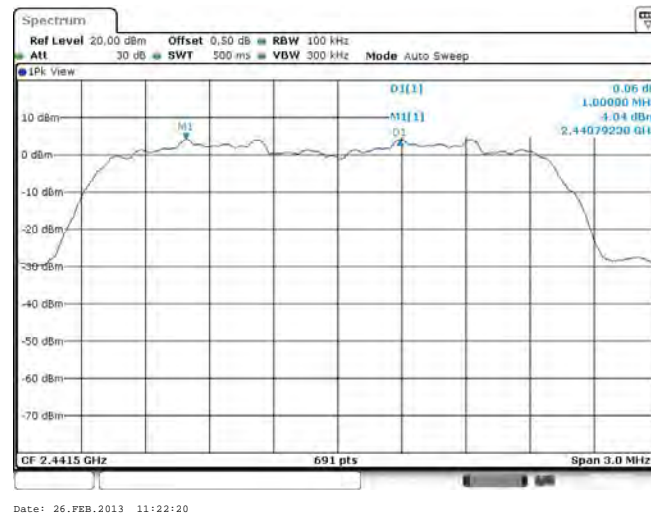
Worst 99% Bandwidth Plots

EDR-3Mbps



Worst Carrier Frequency Separation Plots

EDR-3Mbps

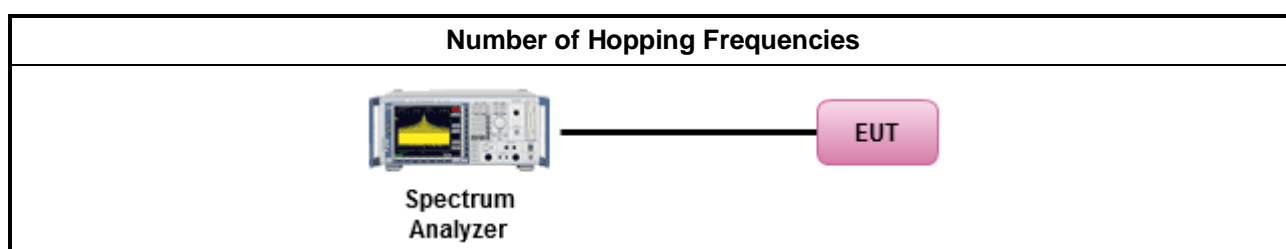


3.2 Number of Hopping Frequencies

3.2.1 Test Procedures

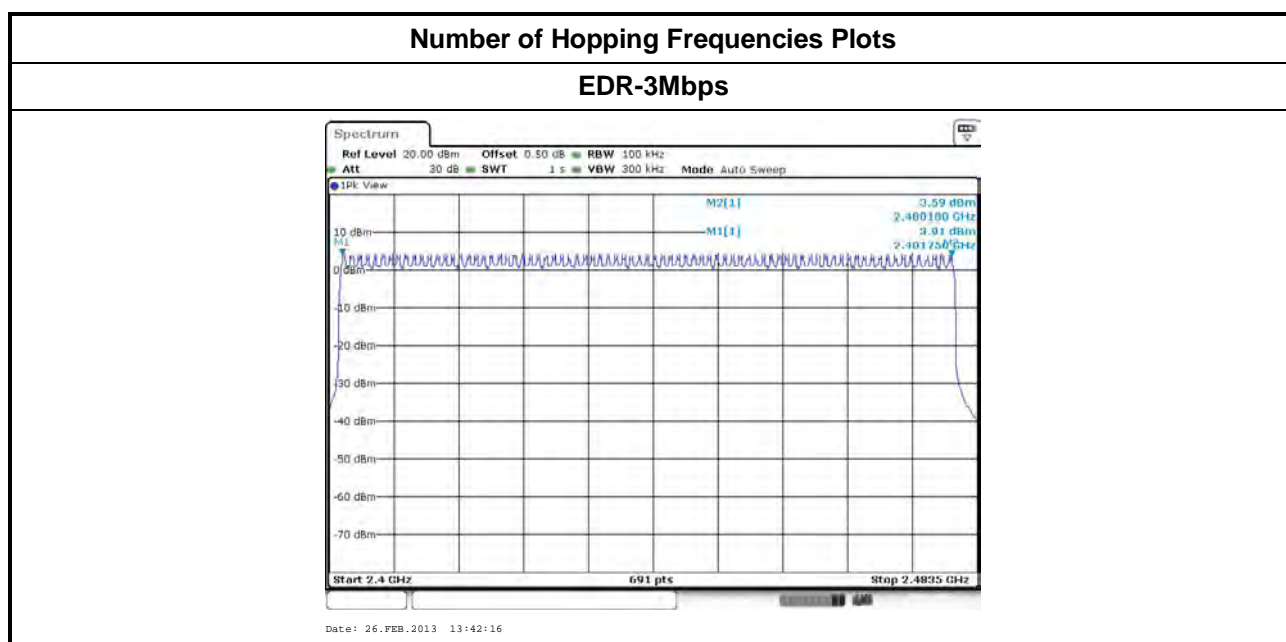
Test Method	
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 7.7.3 for number of hopping frequencies measurement.
<input checked="" type="checkbox"/>	For conducted measurement.
<input checked="" type="checkbox"/>	The EUT supports single transmit chain and measurements performed on this transmit chain.
<input type="checkbox"/>	The EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.

3.2.2 Test Setup



3.2.3 Test Result of Number of Hopping Frequencies

Number of Hopping Frequencies Result			
Modulation Mode	Freq. (MHz)	Hopping Channel Number (N)	Hopping Channel Number Limits
EDR-3Mbps	2402-2480	79	15
Result	Complied		

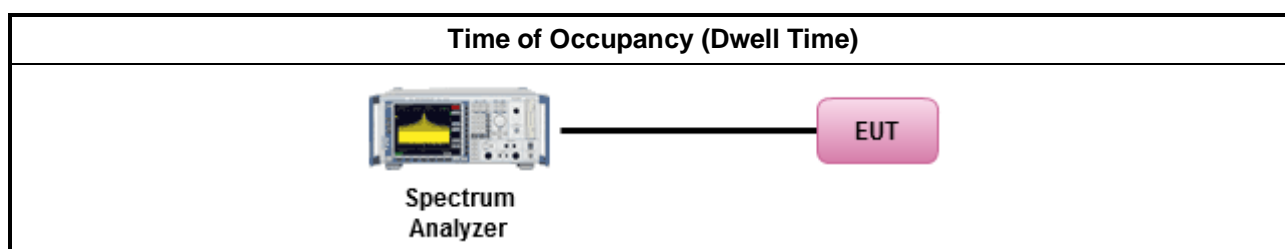


3.3 Time of Occupancy (Dwell Time)

3.3.1 Test Procedures

Test Method	
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 7.7.4 for dwell time measurement.
<input checked="" type="checkbox"/>	Bluetooth ACL packets can be 1, 3, or 5 time slots. Following as dwell time. Operate DH5 at maximum dwell time and maximum duty cycle.
<input checked="" type="checkbox"/>	The DH1 packet can cover a single time slot. A maximum length packet has duration of 1 time slots. The hopping rate is 1600 hops/second so the maximum dwell time is 1/1600 seconds, or 0.625ms. DH1 Packet permit maximum $1600 / 79 / 2 = 10.12$ hops per second in each channel (1 time slot RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times $10.12 \times 31.6 = 320$ within 31.6 seconds.
<input checked="" type="checkbox"/>	The DH3 packet can cover up to 3 time slots. A maximum length packet has duration of 3 time slots. The hopping rate is 1600 hops/second so the maximum dwell time is 3/1600 seconds, or 1.875ms. DH3 Packet permit maximum $1600 / 79 / 4 = 5.06$ hops per second in each channel (3 time slots RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times $5.06 \times 31.6 = 160$ within 31.6 seconds.
<input checked="" type="checkbox"/>	The DH5 packet can cover up to 5 time slots. Operate DH5 at maximum dwell time and maximum duty cycle. A maximum length packet has duration of 5 time slots. The hopping rate is 1600 hops/second so the maximum dwell time is 5/1600 seconds, or 3.125ms. DH5 Packet permit maximum $1600 / 79 / 6 = 3.37$ hops per second in each channel (5 time slots RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times $3.37 \times 31.6 = 106.5$ within 31.6 seconds
<input checked="" type="checkbox"/>	For conducted measurement.
<input checked="" type="checkbox"/>	The EUT supports single transmit chain and measurements performed on this transmit chain.
<input type="checkbox"/>	The EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.

3.3.2 Test Setup

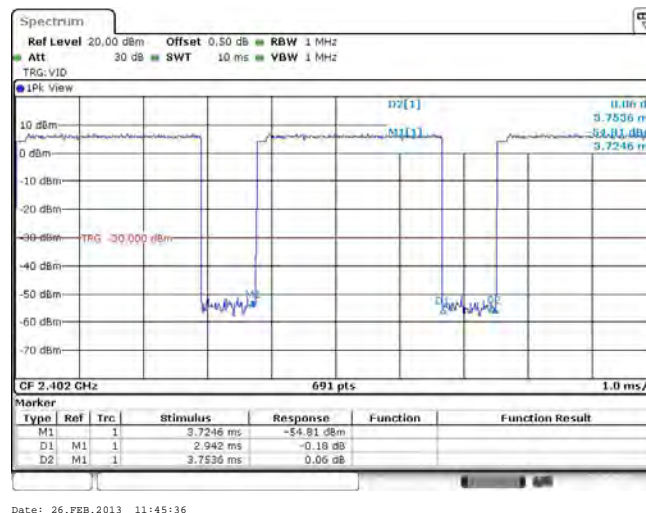


3.3.3 Test Result of Time of Occupancy (Dwell Time)

Time of Occupancy (Dwell Time) Result					
Modulation Mode	Freq. (MHz)	Pulse Time per Hop (ms)	Number of Pulse in [0.4 x N sec]	Dwell Time in [0.4 x N sec] (s)	Dwell Time Limits (s)
EDR-3Mbps	2402	2.942	106.7	0.314	0.4
Result		Complied			
Bluetooth ACL packets can be 1, 3, or 5 time slots. The DH1 packet can cover a single time slot. The DH3 packet can cover up to 3 time slots. The DH5 packet can cover up to 5 time slots. Operate DH5 at maximum dwell time and maximum duty cycle. A maximum length packet has duration of 5 time slots. The hopping rate is 1600 hops/second so the maximum dwell time is 5/1600 seconds, or 3.125ms.					

Worst Pulse Time per Hop Plots

EDR-3Mbps

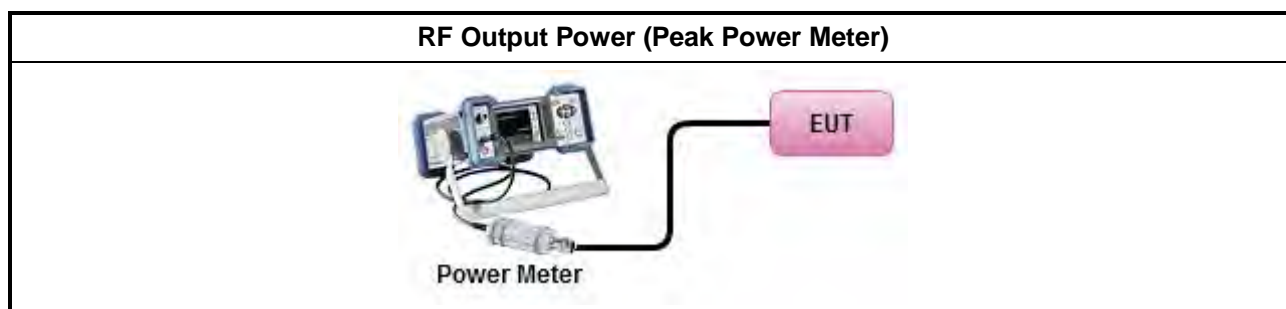


3.4 RF Output Power

3.4.1 Test Procedures

Test Method	
<input checked="" type="checkbox"/>	Maximum Peak Conducted Output Power
<input type="checkbox"/>	Refer as FCC DA 00-0705, spectrum analyzer for peak power.
<input checked="" type="checkbox"/>	Refer as FCC DA 00-0705, peak power meter for peak power.
<input type="checkbox"/>	Refer as ANSI C63.10, clause 6.10.2.1 a) for peak power meter.
<input type="checkbox"/>	Refer as ANSI C63.10, clause 6.10.2.1 a) for spectrum analyzer - (RBW \geq EBW).
<input checked="" type="checkbox"/>	For conducted measurement.
<input checked="" type="checkbox"/>	The EUT supports single transmit chain and measurements performed on this transmit chain.
<input type="checkbox"/>	The EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.

3.4.2 Test Setup



3.4.3 Test Result of Maximum Peak Conducted Output Power

Maximum Peak Conducted Output Power Result						
Condition		RF Output Power (dBm)				
Modulation Mode	Freq. (MHz)	RF Output Power	Power Limit	Antenna Gain (dBi)	EIRP Power	EIRP Limit
BR-1Mbps	2402	4.41	21	3.60	8.01	27
BR-1Mbps	2440	4.43	21	3.60	8.03	27
BR-1Mbps	2480	4.19	21	3.60	7.79	27
EDR-3Mbps	2402	7.36	21	3.60	10.96	27
EDR-3Mbps	2440	7.39	21	3.60	10.99	27
EDR-3Mbps	2480	7.09	21	3.60	10.69	27
Result		Complied				

3.4.4 Test Result of Maximum Average Conducted Output Power

Maximum Average Conducted Output Power Result				
Condition		RF Output Power (dBm)		
Modulation Mode	Freq. (MHz)	RF Output Power	Antenna Gain (dBi)	EIRP Power
BR-1Mbps	2402	4.10	3.60	7.70
BR-1Mbps	2440	4.21	3.60	7.81
BR-1Mbps	2480	3.89	3.60	7.49
EDR-3Mbps	2402	4.31	3.60	7.91
EDR-3Mbps	2440	4.32	3.60	7.92
EDR-3Mbps	2480	4.06	3.60	7.66
Result		Complied		

3.5 Emission in Non-Restricted Frequency Bands

3.5.1 Test Procedures

Test Method – General Information	
<input checked="" type="checkbox"/>	The average emission levels shall be measured in [duty cycle \geq 98 or duty factor].
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.9.2.2 bandedge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band.
<input checked="" type="checkbox"/>	For the transmitter unwanted emissions shall be measured using following options below:
<input checked="" type="checkbox"/>	For unwanted emissions into non-restricted bands. Peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum measured in-band peak PSD level.
<input checked="" type="checkbox"/>	For unwanted emissions into restricted bands.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW). VBW \geq 1/T, where T is pulse time.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 4.2.3.2.2 measurement procedure peak limit.
<input checked="" type="checkbox"/>	For the transmitter bandedge emissions shall be measured using following options below:
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.9.2 for band-edge testing.
<input type="checkbox"/>	Refer as ANSI C63.10, clause 6.9.3 for marker-delta method for band-edge measurements.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 7.7.9 for band-edge testing into non-restricted bands.
<input checked="" type="checkbox"/>	For radiated measurement, refer as ANSI C63.10, clause 6.6 for radiated emissions from above 1 GHz.

3.5.2 Test Result of Emission in Non-Restricted Frequency Bands

EDR-3Mbps						
Test Freq. (MHz)	In-band PSD [i] (dBuV/100kHz)	Freq. (MHz)	Out-band PSD [o] (dBuV/100kHz)	[i] – [o] (dB)	Limit (dB)	Pol.
2402	100.39	2399.56	65.10	35.29	20	H
2480	98.98	2548.23	65.17	33.81	20	H

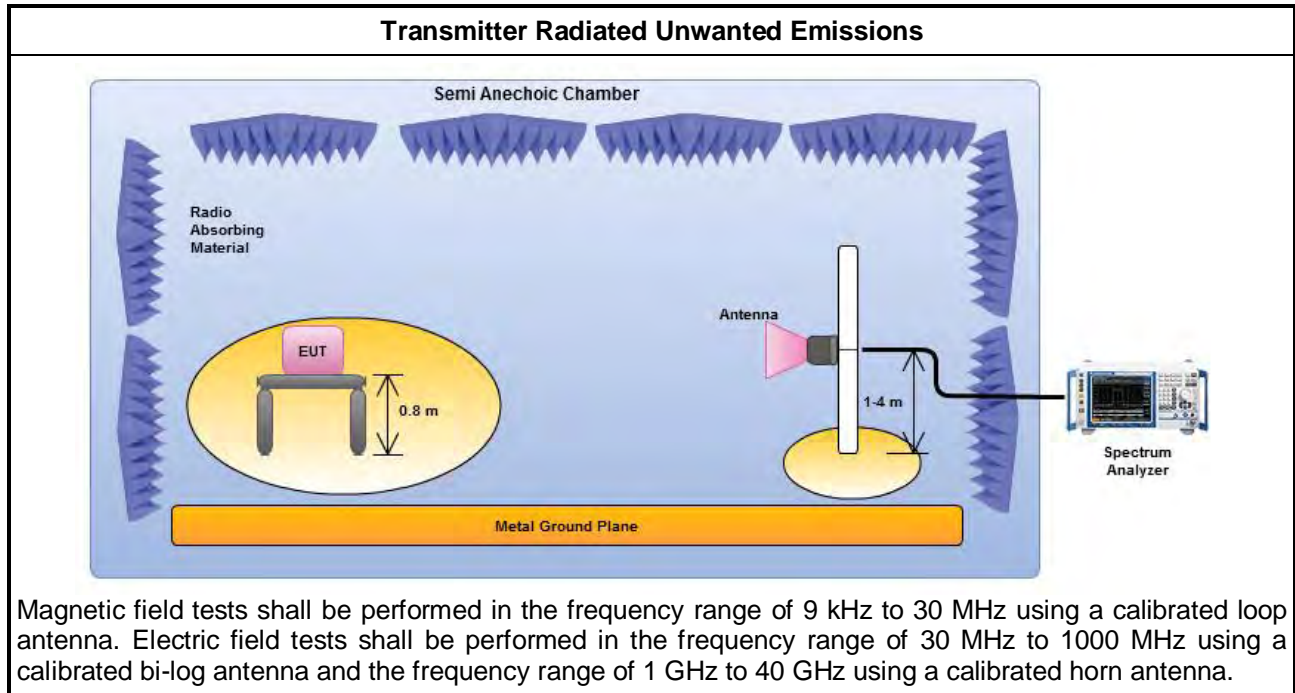
Note 1: Measurement worst emissions of receive antenna polarization

3.6 Emission in Restricted Frequency Bands

3.6.1 Test Procedures

Test Method – General Information	
<input checked="" type="checkbox"/>	Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).
<input checked="" type="checkbox"/>	Measurements in the frequency range 10 GHz - 18GHz are typically made at a closer distance 1m, because the instrumentation noise floor is typically close to the radiated emission limit.
<input checked="" type="checkbox"/>	Measurements in the frequency range above 18 GHz - 25GHz are typically made at a closer distance 0.5m, because the instrumentation noise floor is typically close to the radiated emission limit.
<input checked="" type="checkbox"/>	The average emission levels shall be measured in [duty cycle \geq 98 or duty factor].
<input checked="" type="checkbox"/>	For the transmitter unwanted emissions shall be measured using following options below:
<input checked="" type="checkbox"/>	Refer as FCC DA 00-0705, for spurious radiated emissions. The dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a "duty cycle correction factor", derived from $20\log(\text{dwell time}/100 \text{ ms})$
<input checked="" type="checkbox"/>	For unwanted emissions into non-restricted bands. Peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum measured in-band peak PSD level.
<input checked="" type="checkbox"/>	For unwanted emissions into restricted bands.
<input type="checkbox"/>	Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW). $\text{VBW} \geq 1/T$, where T is pulse time.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 4.2.3.2.2 measurement procedure peak limit.
<input checked="" type="checkbox"/>	For radiated measurement.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.4 for radiated emissions from below 30 MHz.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.5 for radiated emissions from 30 MHz to 1000 MHz.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.6 for radiated emissions from above 1 GHz.

3.6.2 Test Setup

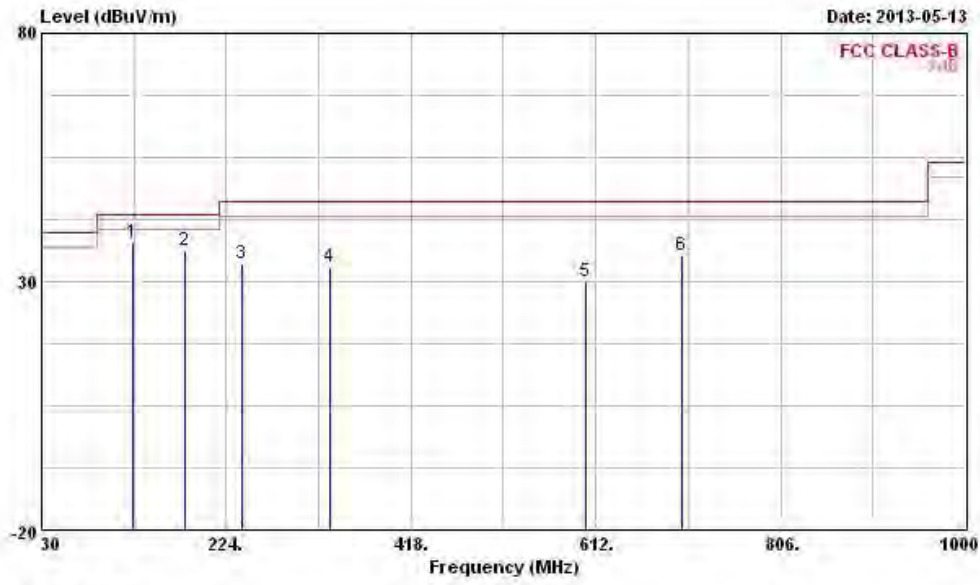


3.6.3 Emission in Restricted Frequency Bands (Below 30MHz)

All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

3.6.4 Emission in Restricted Frequency Bands (Below 1GHz)

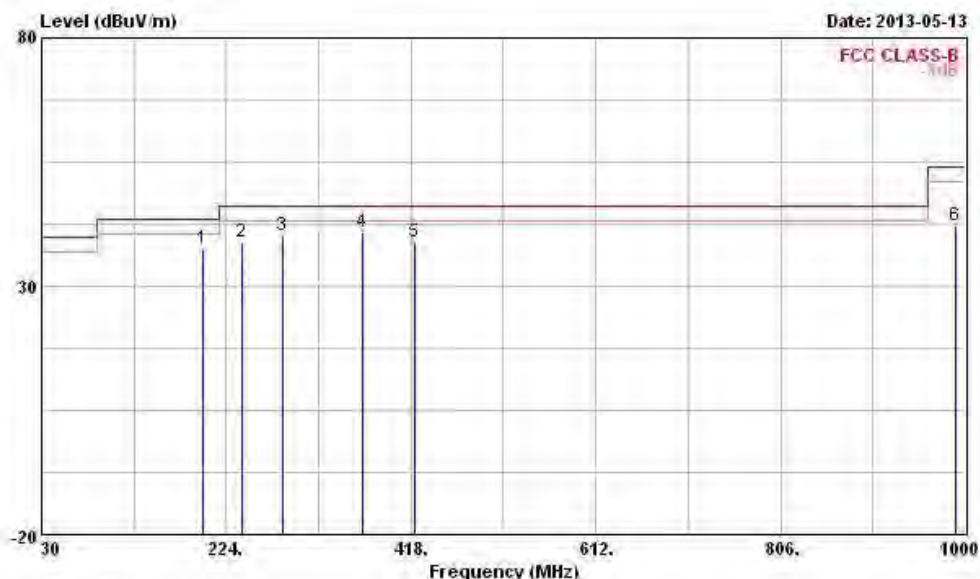
Modulation Mode	EDR-2Mbps	Test Freq. (MHz)	2440
Operating Function	Transmit	Polarization	V



	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp		Ant	Table
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	125.180	38.01	-5.49	43.50	51.04	13.18	1.59	27.80	Peak	---
2	180.770	36.37	-7.13	43.50	52.02	9.97	1.96	27.58	Peak	---
3	240.440	33.76	-12.24	46.00	46.13	12.68	2.33	27.38	Peak	---
4	333.440	32.92	-13.08	46.00	43.42	14.22	2.73	27.45	Peak	---
5	601.050	29.93	-16.07	46.00	34.64	20.17	3.68	28.56	Peak	---
6	703.110	35.24	-10.76	46.00	40.73	18.89	4.04	28.42	Peak	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

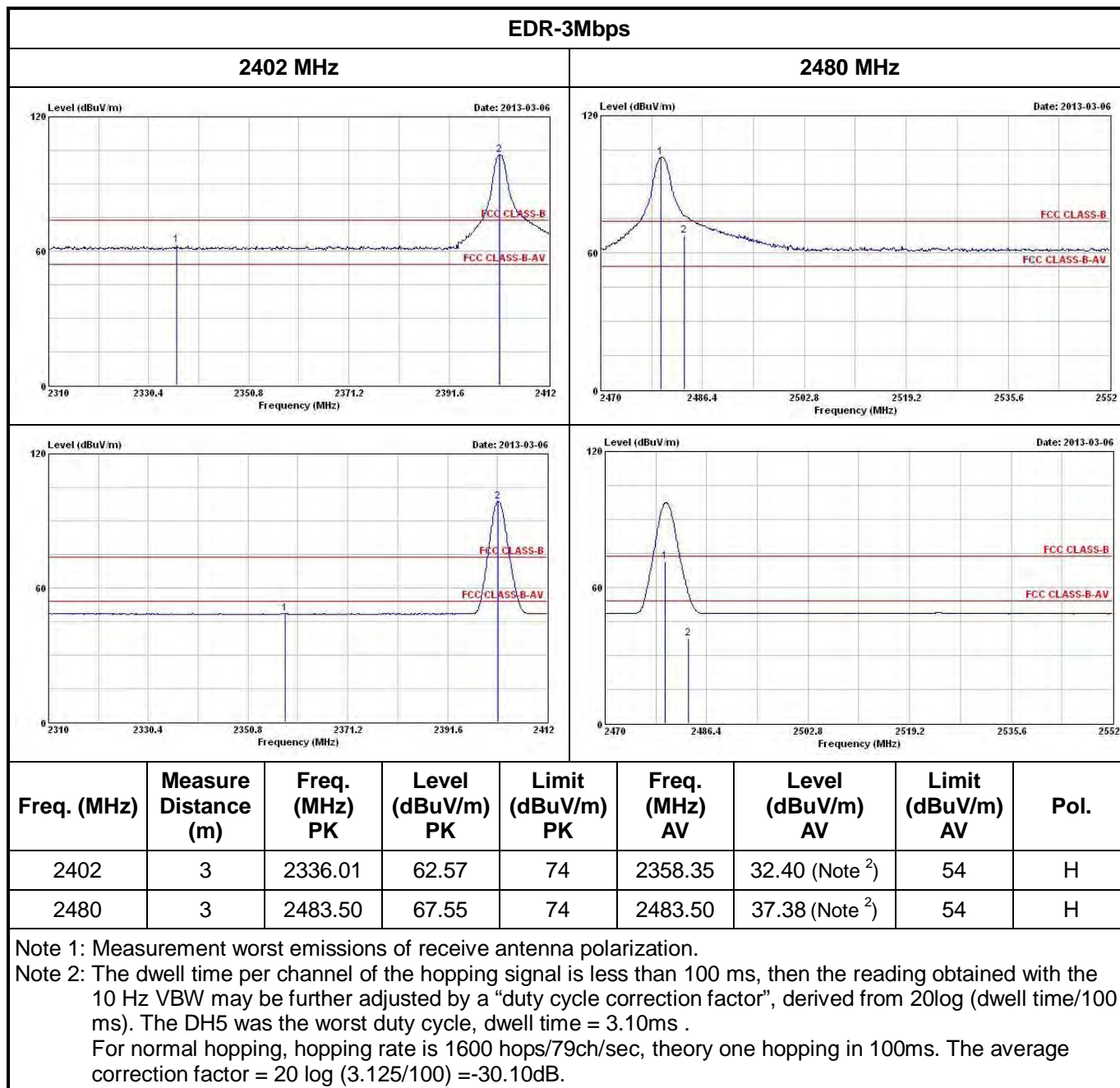
Modulation Mode	EDR-2Mbps	Test Freq. (MHz)	2440
Operating Function	Transmit	Polarization	H



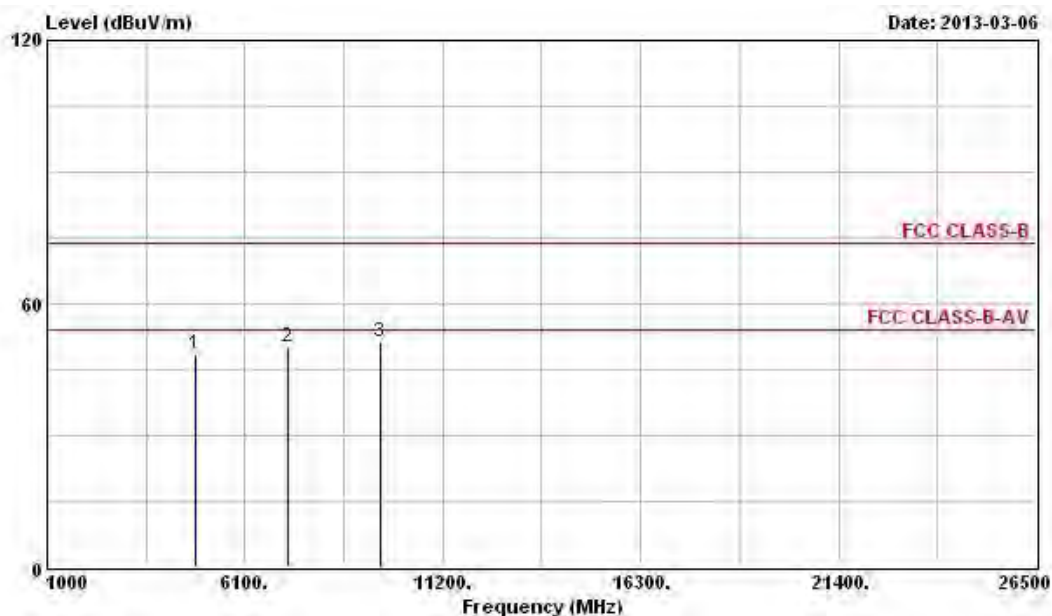
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	200.000	37.43	-6.07	43.50	51.51	11.35	2.07	27.50 Peak	---	---
2	240.550	38.96	-7.04	46.00	51.33	12.68	2.33	27.38 Peak	---	---
3	282.660	40.24	-5.76	46.00	51.56	13.45	2.49	27.26 Peak	---	---
4	366.740	41.00	-5.00	46.00	51.08	14.75	2.87	27.70 Peak	---	---
5	420.950	38.94	-7.06	46.00	48.26	15.68	3.06	28.06 Peak	---	---
6	990.140	42.04	-11.96	54.00	42.22	22.26	4.93	27.37 Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

3.6.5 Emission in Restricted Frequency Bands (Above 1GHz)



Modulation Mode	EDR-2Mbps	Test Freq. (MHz)	2402
Operating Function	Transmit	Polarization	V



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Factor	Preamp Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	4804.000	48.73	-5.27	54.00	44.48	34.81	4.32	34.88 PK	---	---
2	7206.000	50.20			43.74	35.90	5.70	35.14 Peak	---	---
3	9608.000	51.13			43.38	36.87	6.45	35.57 Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

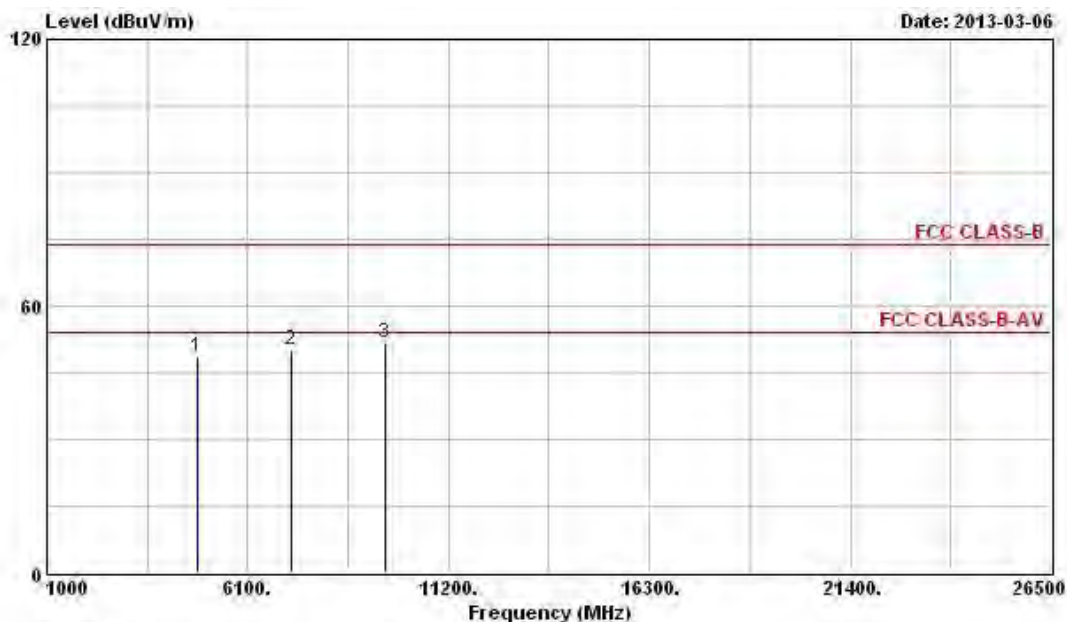
Note 2: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Note 3: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

Note 4: For un-restricted bands, unwanted emissions (item 2 and 3) shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

Note 5: Average emission obtained from the worst average correction factor = $20 \log (3.1 \times 4 / 100) = -18.13 \text{ dB}$.

Modulation Mode	EDR-2Mbps	Test Freq. (MHz)	2402
Operating Function	Transmit	Polarization	H



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4804.000	48.67	-5.33	54.00	44.42	34.81	4.32	34.88	PK	---	---
2	7206.000	50.31			43.85	35.90	5.70	35.14	Peak	---	---
3	9608.000	51.87			44.12	36.87	6.45	35.57	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

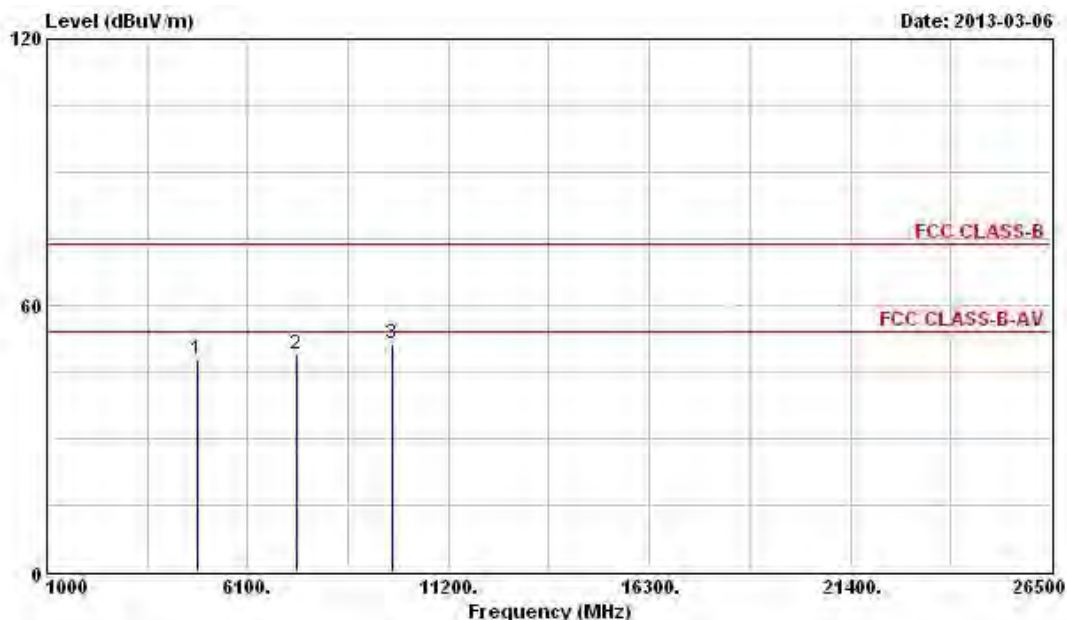
Note 2: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Note 3: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

Note 4: For un-restricted bands, unwanted emissions (item 2 and 3) shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

Note 5: Average emission obtained from the worst average correction factor = $20 \log (3.1 \times 4 / 100) = -18.13 \text{ dB}$.

Modulation Mode	EDR-2Mbps	Test Freq. (MHz)	2440
Operating Function	Transmit	Polarization	V



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4844.000	47.57	-6.43	54.00	43.34	34.79	4.31	34.87	PK	---	---
2	7323.000	49.04	-4.96	54.00	42.60	35.90	5.71	35.17	PK	---	---
3	9764.000	51.15			43.29	37.14	6.30	35.58	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

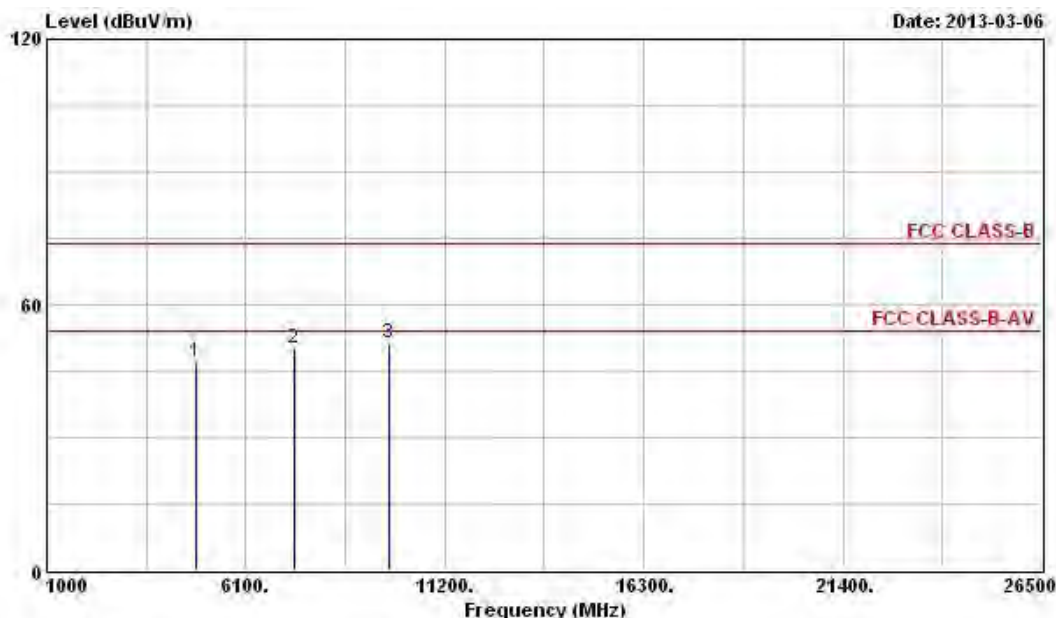
Note 2: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Note 3: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

Note 4: For un-restricted bands, unwanted emissions (item 3) shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

Note 5: Average emission obtained from the worst average correction factor = $20 \log (3.1 \times 4 / 100) = -18.13 \text{ dB}$.

Modulation Mode	EDR-2Mbps	Test Freq. (MHz)	2440
Operating Function	Transmit	Polarization	H



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamplifier	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4844.000	46.91	-7.09	54.00	42.68	34.79	4.31	34.87	PK	---	---
2	7323.000	49.98	-4.02	54.00	43.54	35.90	5.71	35.17	PK	---	---
3	9764.000	51.18			43.32	37.14	6.30	35.58	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

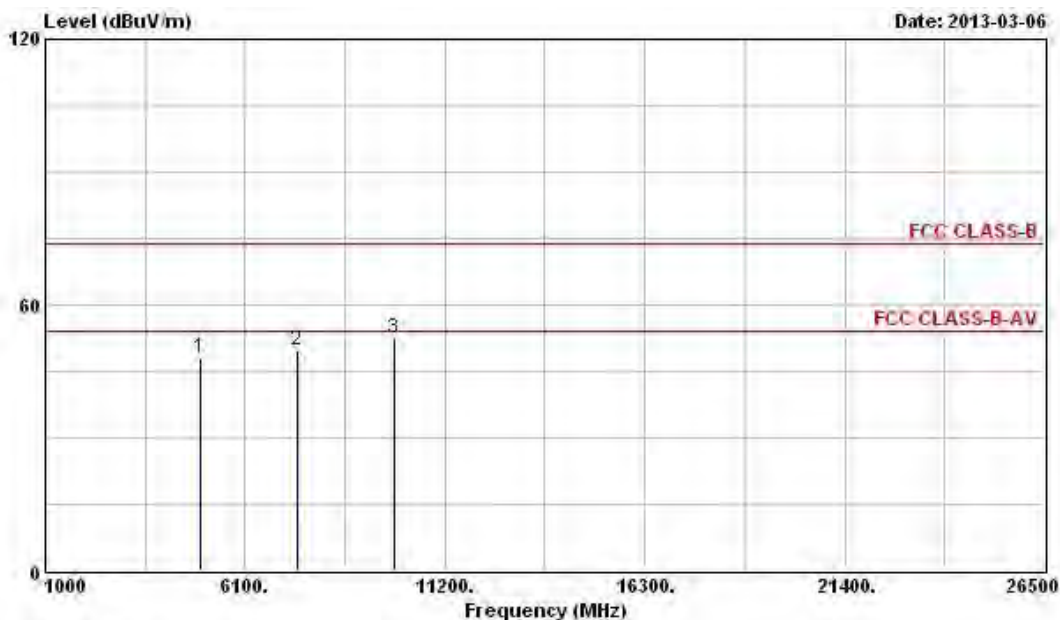
Note 2: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Note 3: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

Note 4: For un-restricted bands, unwanted emissions (item 3) shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

Note 5: Average emission obtained from the worst average correction factor = $20 \log (3.1 \times 4 / 100) = -18.13 \text{ dB}$.

Modulation Mode	EDR-2Mbps	Test Freq. (MHz)	2480
Operating Function	Transmit	Polarization	V



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamplifier	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4960.000	48.01	-5.99	54.00	43.86	34.72	4.27	34.84	PK	---	---
2	7440.000	49.86	-4.14	54.00	43.46	35.90	5.71	35.21	PK	---	---
3	9920.000	52.55			44.61	37.39	6.14	35.59	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

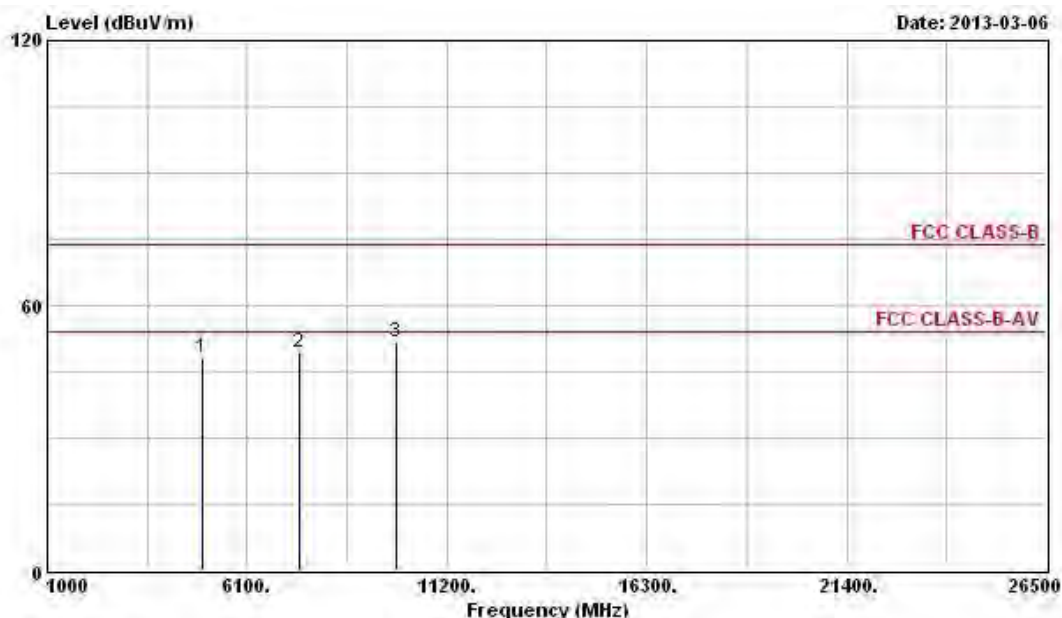
Note 2: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Note 3: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

Note 4: For un-restricted bands, unwanted emissions (item 3) shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

Note 5: Average emission obtained from the worst average correction factor = $20 \log (3.1 \times 4 / 100) = -18.13 \text{ dB}$.

Modulation Mode	EDR-2Mbps	Test Freq. (MHz)	2480
Operating Function	Transmit	Polarization	H



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamplifier	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4960.000	48.24	-5.76	54.00	44.09	34.72	4.27	34.84	PK	---	---
2	7440.000	49.36	-4.64	54.00	42.96	35.90	5.71	35.21	PK	---	---
3	9920.000	51.67			43.73	37.39	6.14	35.59	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Note 3: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

Note 4: For un-restricted bands, unwanted emissions (item 3) shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

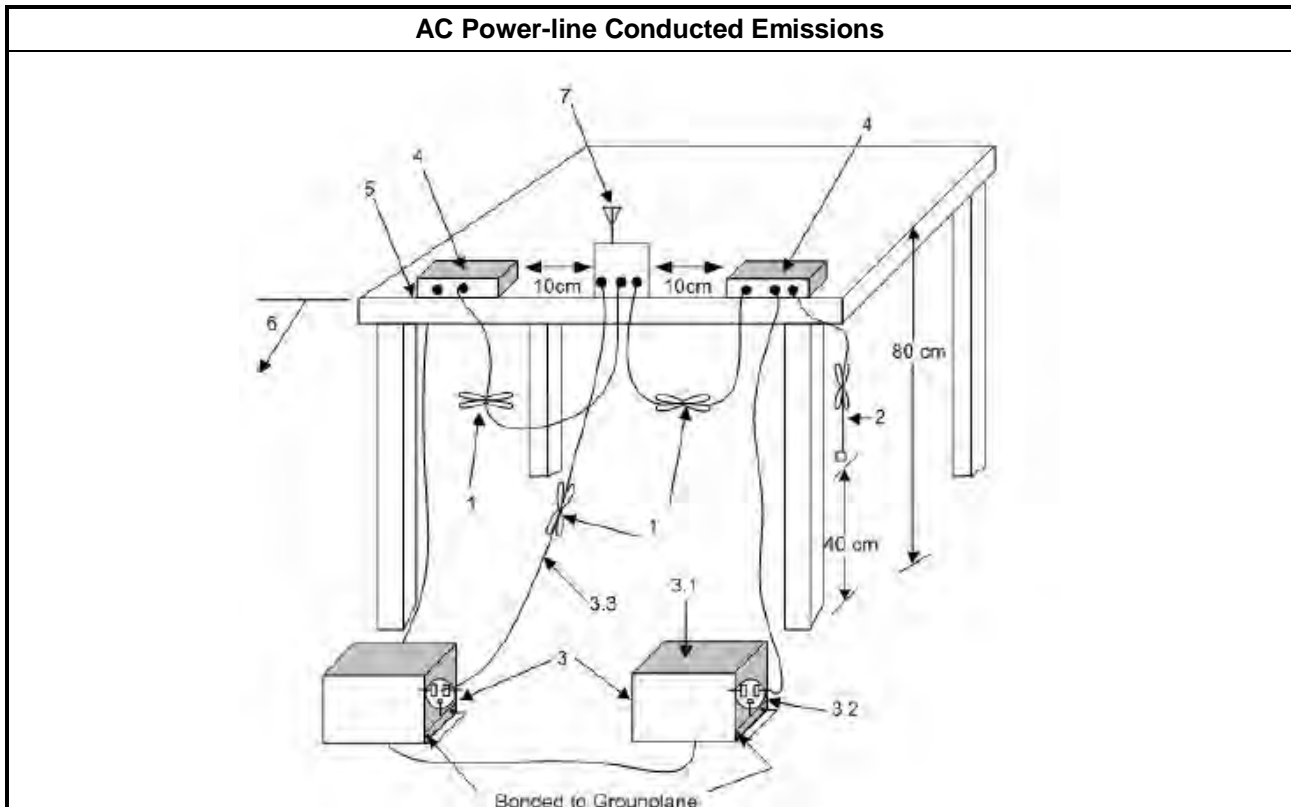
Note 5: Average emission obtained from the worst average correction factor = $20 \log (3.1 \times 4 / 100) = -18.13 \text{ dB}$.

3.7 AC Power-line Conducted Emissions

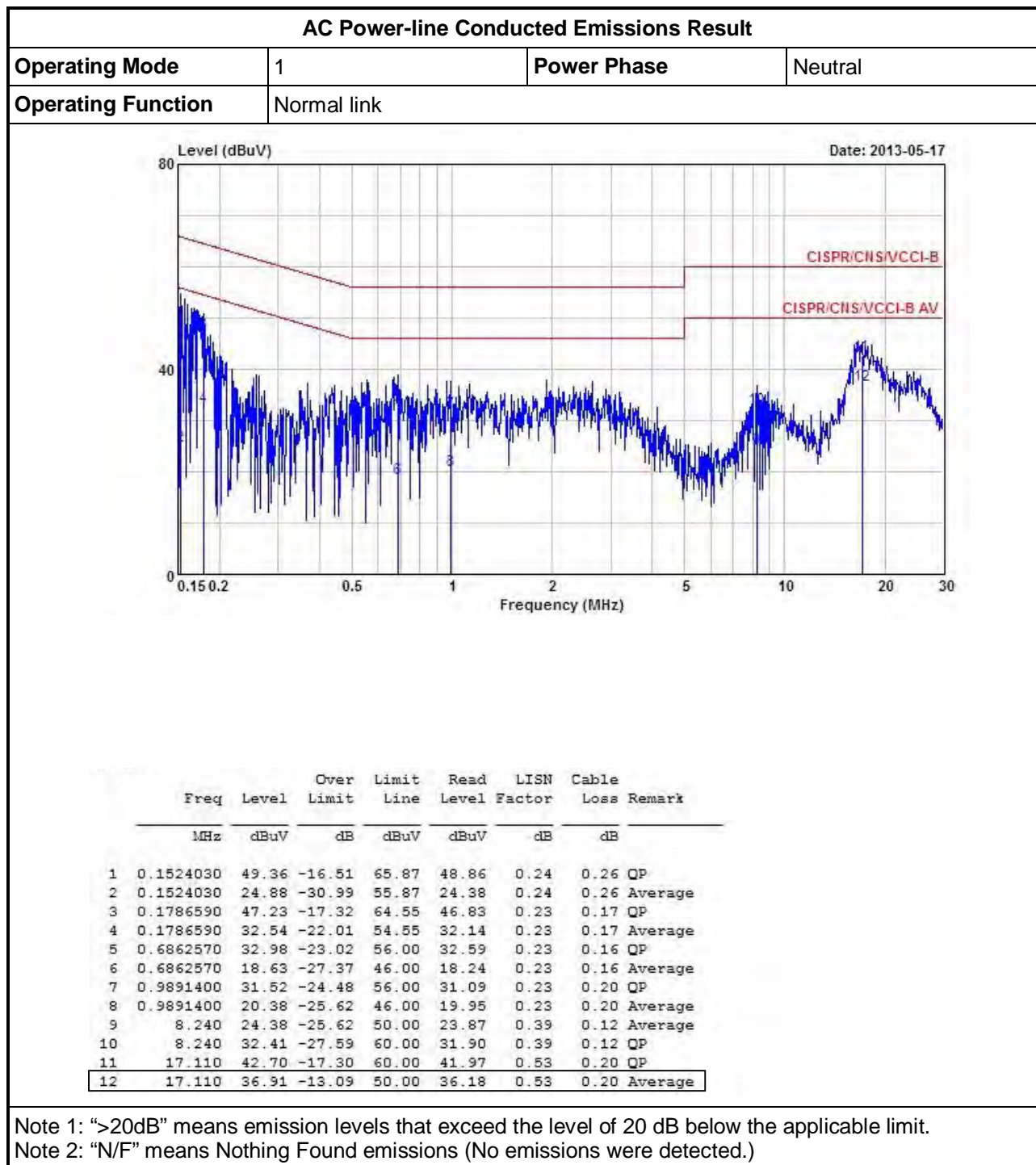
3.7.1 Test Procedures

Test Method
<input checked="" type="checkbox"/> Refer as ANSI C63.10-2009, clause 6.2 for AC power-line conducted emissions.

3.7.2 Test Setup

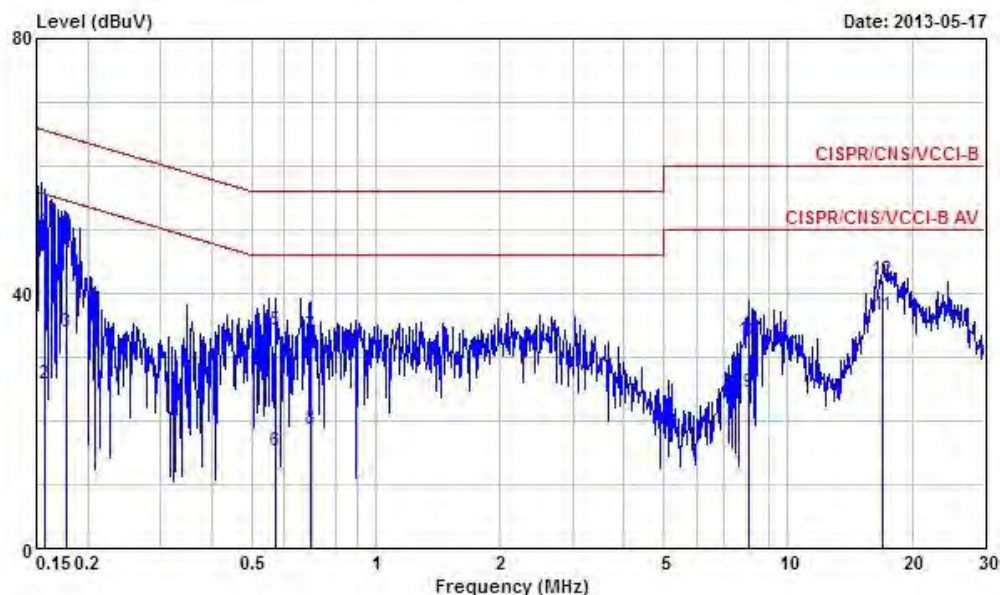


3.7.3 Test Result of AC Power-line Conducted Emissions



AC Power-line Conducted Emissions Result

Operating Mode	1	Power Phase	Line
Operating Function	Normal link		



	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.1564950	49.79	-15.86	65.65	49.44	0.11	0.24	QP
2	0.1564950	25.81	-29.84	55.65	25.46	0.11	0.24	Average
3	0.1777150	33.84	-20.75	54.59	33.56	0.11	0.17	Average
4	0.1777150	48.56	-16.03	64.59	48.28	0.11	0.17	QP
5	0.5731280	34.18	-21.82	56.00	33.94	0.10	0.14	QP
6	0.5731280	15.30	-30.70	46.00	15.06	0.10	0.14	Average
7	0.6972520	33.33	-22.67	56.00	33.06	0.11	0.16	QP
8	0.6972520	18.59	-27.41	46.00	18.32	0.11	0.16	Average
9	8.020	24.58	-25.42	50.00	24.24	0.22	0.12	Average
10	8.020	32.58	-27.42	60.00	32.24	0.22	0.12	QP
11	17.020	36.57	-13.43	50.00	36.08	0.29	0.20	Average
12	17.020	42.06	-17.94	60.00	41.57	0.29	0.20	QP

Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)

4 Test Equipment and Calibration Data

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver	R&S	ESCS 30	100174	9kHz ~ 2.75GHz	Mar. 26, 2013	Conduction (CO04-HY)
LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	8127-477	9kHz ~ 30MHz	Jan. 21, 2013	Conduction (CO04-HY)
LISN (Support Unit)	EMCO	3810/2NM	9703-1839	9kHz ~ 30MHz	Apr. 18, 2013	Conduction (CO04-HY)
RF Cable-CON	HUBER+SUHNER	RG213/U	7.61183201e+012	9kHz ~ 30MHz	Nov. 09, 2012	Conduction (CO04-HY)

Note: Calibration Interval of instruments listed above is one year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSP 40	100305	9kHz~40GHz	Mar. 20, 2013	Conducted (TH01-HY)
AC Power Source	G.W	APS-9102	EL920581	AC 0V ~ 300V	Jul. 02, 2012	Conducted (TH01-HY)
Temp. and Humidity Chamber	Giant Force	GTH-225-20-SP-SD	MAA1112-007	-20 ~ 100℃	Nov. 21, 2012	Conducted (TH01-HY)
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	Jun. 26, 2012	Conducted (TH01-HY)
Power Sensor	Anritsu	MA2411B	0917017	300MHz ~ 40GHz	Feb. 02, 2013	Conducted (TH01-HY)
Power Meter	Anritsu	ML2495A	0949003	300MHz ~ 40GHz	Feb. 02, 2013	Conducted (TH01-HY)
RF Cable-2m	HUBER+SUHNER	SUCOFLEX_104	SN 345675/4	1GHz ~ 26.5GHz	NA	Conducted (TH01-HY)
RF Cable-3m	HUBER+SUHNER	SUCOFLEX_104	SN 345669/4	1GHz ~ 26.5GHz	NA	Conducted (TH01-HY)

Note: Calibration Interval of instruments listed above is one year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSP40	100593	9kHz ~ 40GHz	Sep. 14, 2012	Radiation (03CH02-HY)
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH02-HY	30MHz ~ 1GHz 3m	May 9, 2013	Radiation (03CH02-HY)
Amplifier	Agilent	8447D	2944A11146	100kHz ~ 1.3GHz	Jul. 23, 2012	Radiation (03CH02-HY)
Amplifier	Agilent	8449B	3008A02373	1GHz ~ 26.5GHz	Aug. 10, 2012	Radiation (03CH02-HY)
Horn Antenna	ETS-LINDGREN	3117	00091920	1GHz ~ 18GHz	Nov. 16, 2012	Radiation (03CH02-HY)
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	15GHz ~ 40GHz	Jan. 08, 2013	Radiation (03CH02-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	9kHz ~ 1GHz	Nov. 10, 2012	Radiation (03CH02-HY)
RF Cable-high	SUHNER	SUCOFLEX106	03CH02-HY	1GHz ~ 40GHz	Mar. 05, 2013	Radiation (03CH02-HY)
Bilog Antenna	SCHAFFNER	CBL61128	2723	30MHz ~ 2GHz	Oct. 22, 2012	Radiation (03CH02-HY)
Turn Table	HD	DS 420	420/649/00	0~ 360 degree	N/A	Radiation (03CH02-HY)
Antenna Mast	HD	MA 240	240/559/00	1 ~ 4 m	N/A	Radiation (03CH02-HY)

Note: Calibration Interval of instruments listed above is one year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Loop Antenna	TESEQ	HLA 6120	31244	9 kHz - 30 MHz	Dec. 02, 2012	Radiation (03CH02-HY)

Note: Calibration Interval of instruments listed above is two year.