Annex 1: Measurement diagrams to
T E S T R E P O R T
No.: 17-1-0060101T06a

According to:

FCC Regulations
Part 15.205
Part 15.207
Part 15.209
Part 15.247

for

Viessmann Werke GmbH & Co. KG

Vitoconnect OT2

FCC ID: 2AIZ9-VC0218

Laboratory Accreditation and Listings		
DAkkS Deutsche Akkreditierungsstelle D-PL-12047-01-01 Accredited EMC-Test Laboratory	Industry Canada Reg. No.: 3462D-1 Reg. No.: 3462D-2 Reg. No.: 3462D-3	Voluntary Controls for Electromagnetic Emissions Reg. No.: R-20013, C-20009, T-20006, G-20013
Wi Fi ALLIANCE AUTHORIZED RF LABORATORY	ctia Authorized™ Test Lab Lab Code: 20011130-00	FCC MRA US-EU 0003
accredited according to DIN EN ISO/IEC 17025		

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1. Conducted RF-Measurements

EUT Information for Conducted Measurements

EUT Name:	Vitoconnect OT2
Applicant:	Viessmann Werke GmbH & Co.KG
Serial Number:	GNV 7637415600222108
Hardware Rev:	V005, BOM Rev-k
Software Rev:	Linux:0.10.0 | STM:1.33.02 | EFR32 v1.0 | Ember Node Test Application v1.0
Connected Interfaces:	None
Test Mode Configuration:	Atheros Radio Test 2 (ART2-GUI) Test Software via USB-LAN Adapter
Power Supply:	12 VDC using AC/DC Adapter
AC/DC Adapter Details:	PHIHONG|Model:PSAC12R-120|Input:Ac100-240V 50-60Hz 0.5A| S/N:P70104309A1
Conducted Ports:	WLAN 2.4 GHz Port to Test System | ZigBee 2.4 GHz Port Terminated with 50 Ohm
2nd TXChain:	Not Used

Frequencies		
WLAN CH 1 (2412 MHz)	WLAN CH 6 (2437 MHz)	WLAN CH 11 (2462 MHz)
Bandwidths		
20 MHz (20 MHz)		
Frequencies		
WLAN CH 3 (2422 MHz)	WLAN CH 7 (2442 MHz)	WLAN CH 9 (2452 MHz)
Bandwidths		
40 MHz (40 MHz)		
Power		
Refer Chapter 1.1		
Beamforming Gain		
	0 dB	
Gain Tables		
	Port 1: W224Z0-B4| XAVi Module PCB Antenna: 4.32 dBi	

DUT Settings	
No. of transmission chains	1
Equipment Type	Other
Digital Modulation	Yes
Frequency Hopping	No

Hardware Setup: WMS Measurements\WMS for Conducted Measurements

Spectrum Analyzer:	SA FSU 26 (SA FSU 26) @ VISA (ADR TCPIP::192.168.48.145::INST0::INSTR), SN 200571/026, FW 4.51
Vector Generator:	VG SMU200A (VG SMU200A) @ VISA (ADR TCPIP::192.168.48.148::INST0::INSTR), SN 100754, FW 2.1.96.0-02.10.111.189
Generator:	SMF100A (SMF100A) @ VISA (ADR TCPIP::192.168.48.146::INST0::INSTR), SN 102073, FW Rev 2.21.1, 02/2017, CVI 2015
OSP:	OSP (OSP) @ VISA (ADR TCPIP::192.168.48.147::INST0::INSTR), SN OSP120 V02, 101183, FW 2.53.140911
Power Meter:	OSP-B157 Power Meter (OSP-B157 Power Meter) @ USB (ADR 20), SN 25955149, FW 3.1

1.1. RF Peak Output Power Verification- WLAN 2.4 GHz b/g/n(HT20)/n(HT40) Modes

For each mode data rate giving Maximum output power (Worst Case) have been found using Pre-Certified Module **W224Z0-B4 (FCC ID:RYU-W224Z0)**.

Refer **W224Z0YYYYY | XAVi Module| Report No: FR5N0423-02,Rev.02 issue date May 05,2017**|Sporton International Inc.

The measurements are then performed with these Maximum output power (Worst Case) Data rates with TX Chain 1 Only. (TX Chain 2 is not implemented in Vitoconnect OT2)

Worst Case Data Rate b Mode → 1 Mbps → TX Chain: 1

Worst Case Data Rate g Mode → 6 Mbps→ TX Chain: 1

Worst Case Data Rate n(HT20)→ MCS0 → TX Chain: 1

Worst Case Data Rate n(HT40)→ MCS0 → TX Chain: 1

WLAN 802.11b/g/n Channels Power Settings Of Main EUT as Declared by Applicant

EUT Model	**Vitoconnect OT2**	
EUT Model Type	**--**	
EUT Applications	**Wall mounted device for home applications for remote control of heating systems**	
Hardware Version	**V005, BOM Rev-k**	
Software Version	**Linux:0.10.0 | STM:1.33.02 | EFR32 v1.0**	
	Ember Node Test Application v1.0	
Frequency (USA Harmonized Bands)	2412 MHz to 2462 MHz (HT20)	2422 MHz to 2452 MHz (HT40)

Atheros Radio Test 2 (ART2-GUI) Channels Power Settings Applicant's Declaration Max. Rated Values				
Atheros Radio Test 2 (ART2-GUI) Test Software- Channels Power Settings				
WLAN 2.4 GHz Modulation (820.11 b|g|n)	**Frequency (MHz)**	**Channel (Number)**	**FCC Module Certification Power Settings (dBm)**	**Vitoconnect OT2 FCC Certification Power Settings (dBm)**
CCK (b)	2412	1	**15**	**15**
CCK (b)	2437	6	**15.5**	**15.5**
CCK (b)	2462	11	**16**	**16**
OFDM (g)	2412	1	**13**	**13**
OFDM(g)	2437	6	**20**	**20**
OFDM(g)	2462	11	**14**	**14**
HT20(n)	2412	1	**12**	**12**
HT20(n)	2437	6	**20**	**20**
HT20(n)	2462	11	**13**	**13**
HT40(n)	2422	3	**9**	**9**
HT40(n)	2437	6	**13**	**13**
HT40(n)	2452	9	**10.5**	**10.5**

1.2. RF Peak Output Power

1.2.1. Peak Power - WLAN2.4GHz-b Mode-1Mbit

DUT Frequency (MHz)	Peak Power (dBm)	Limit Max (dBm)	Result	Software Power Settings (dBm)
2412.000000	16.9	30.0	PASS	15
2437.000000	17.9	30.0	PASS	15.5
2462.000000	19.9	30.0	PASS	16

1.2.2. Peak Power - WLAN2.4GHz-g Mode-6Mbit

DUT Frequency (MHz)	Peak Power (dBm)	Limit Max (dBm)	Result	Software Power Settings (dBm)
2412.000000	19.4	30.0	PASS	13
2437.000000	20.2	30.0	PASS	20
2462.000000	21.7	30.0	PASS	14

1.2.3. Peak Power - WLAN2.4GHz-n(HT20) Mode-MCS0

DUT Frequency (MHz)	Peak Power (dBm)	Limit Max (dBm)	Result	Software Power Settings (dBm)
2412.000000	18.3	30.0	PASS	12
2437.000000	25.9	30.0	PASS	20
2462.000000	20.6	30.0	PASS	13

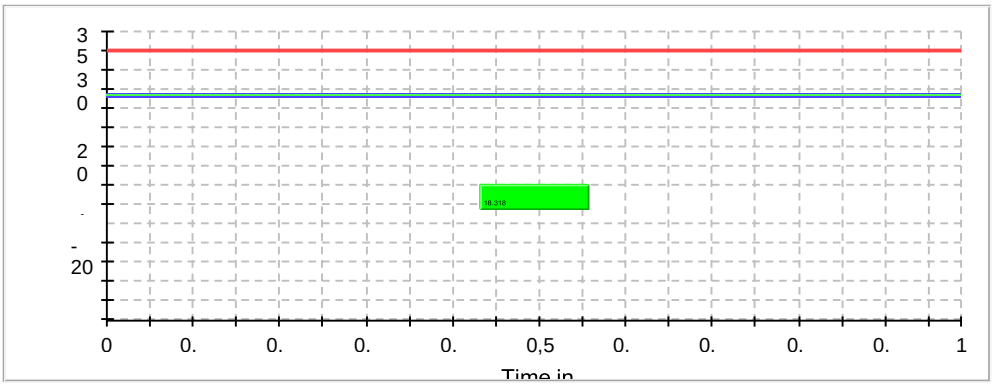
1.2.4. Peak Power - WLAN2.4GHz-n(HT40) Mode-MCS0

DUT Frequency (MHz)	Peak Power (dBm)	Limit Max (dBm)	Result	Software Power Settings (dBm)
2422.000000	13.6	30.0	PASS	9
2437.000000	18.2	30.0	PASS	13
2452.000000	16.1	30.0	PASS	10.5

1.3. RF RMS Output Power & Duty Cycle Measurement

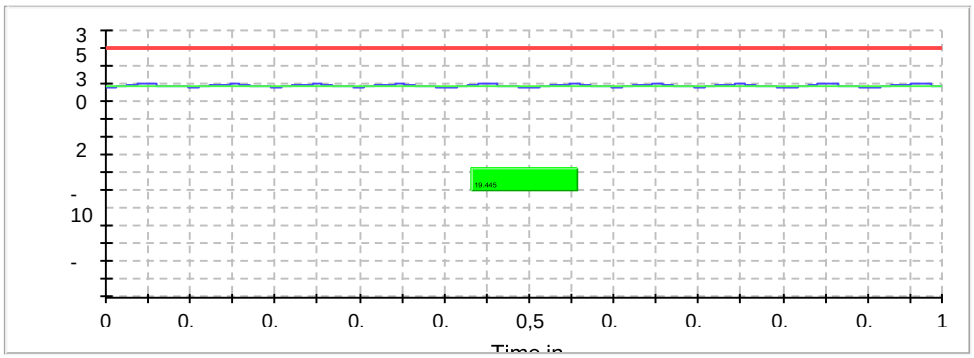
1.3.1. RMS Power + Duty Cycle - WLAN2.4GHz-b Mode-1Mbit

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	Duty Cycle (%)	Result
2412.000000	14.0	30.0	18.3	99.647	PASS



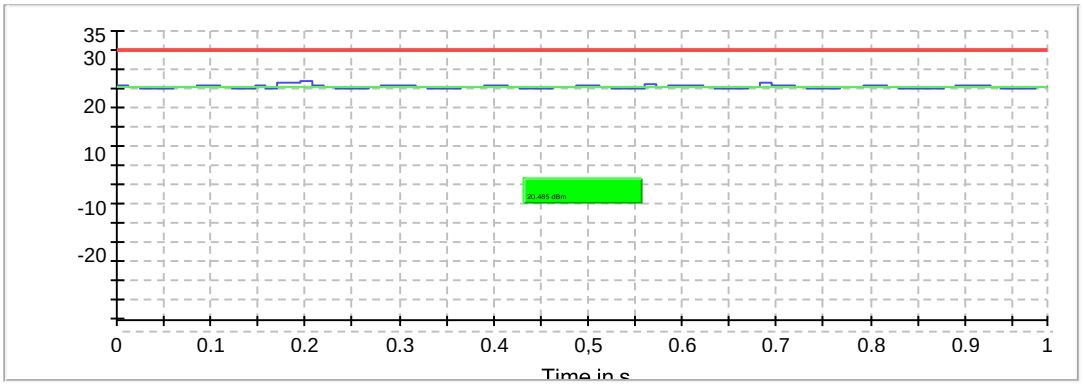
RMS Power + Duty Cycle-WLAN2.4GHz-b Mode-1Mbit-CH1-15dBm

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	Duty Cycle (%)	Result
2437.000000	15.1	30.0	19.4	99.647	PASS



RMS Power + Duty Cycle -WLAN2.4GHz-b Mode-1Mbit-CH6-15.5dBm

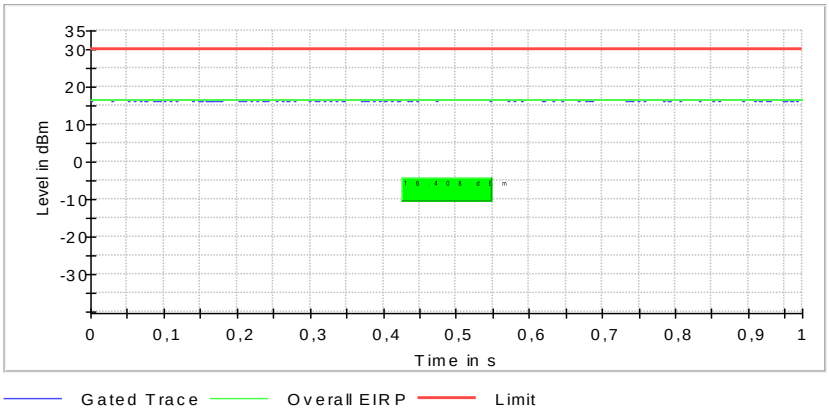
DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	Duty Cycle (%)	Result
2462.000000	16.2	30.0	20.5	99.647	PASS



RMS Power + Duty Cycle-WLAN2.4GHz-b Mode-1Mbit-CH11-16dBm

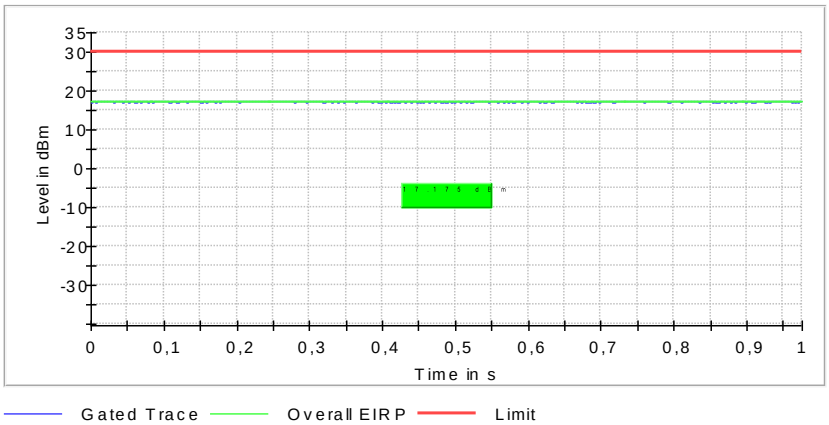
1.3.2. RMS Power + Duty Cycle - WLAN2.4GHz-g Mode-6Mbit

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	Duty Cycle (%)	Result
2412.000000	12.1	30.0	16.4	97.609	PASS



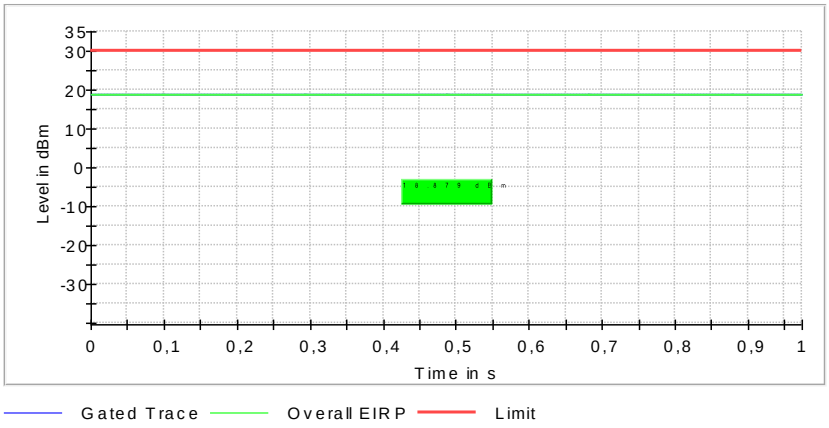
RMS Power + Duty Cycle-WLAN2.4GHz-g Mode-6Mbit-CH1-13dBm

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	Duty Cycle (%)	Result
2437.000000	12.9	30.0	17.2	97.608	PASS



RMS Power + Duty Cycle -WLAN2.4GHz-g Mode-6Mbit-CH6-20dBm

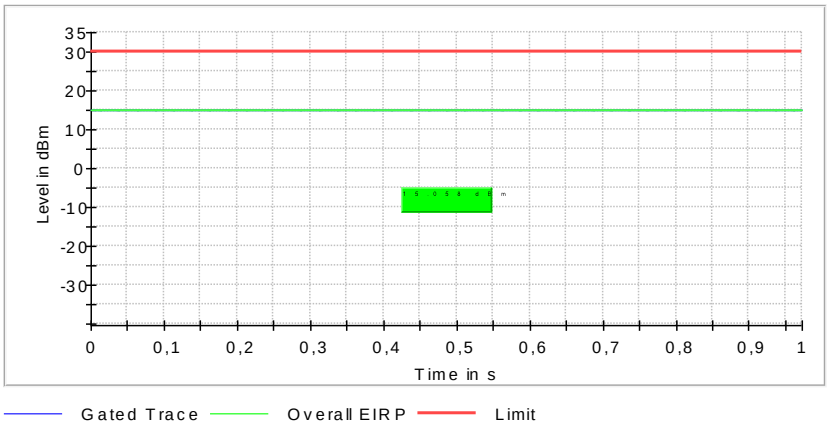
DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	Duty Cycle (%)	Result
2462.000000	14.6	30.0	18.9	97.605	PASS



RMS Power + Duty Cycle-WLAN2.4GHz-g Mode-6Mbit-CH11-14dBm

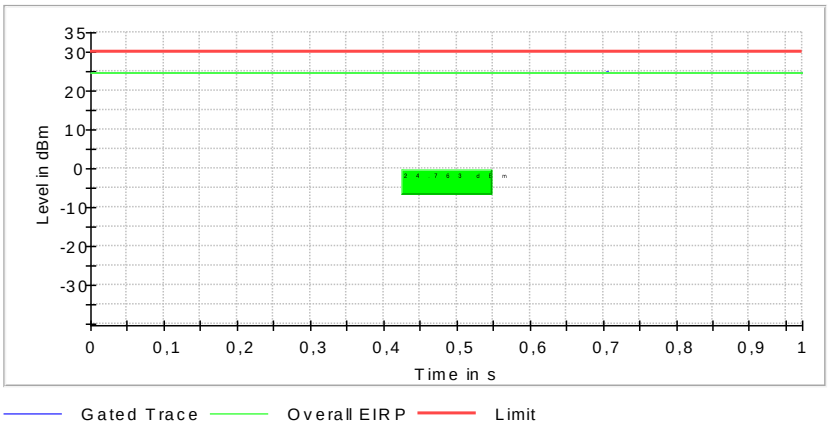
1.3.3. RMS Power + Duty Cycle - WLAN2.4GHz-n(HT20) Mode-MCS0

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	Duty Cycle (%)	Result
2412.000000	10.7	30.0	15.1	97.443	PASS



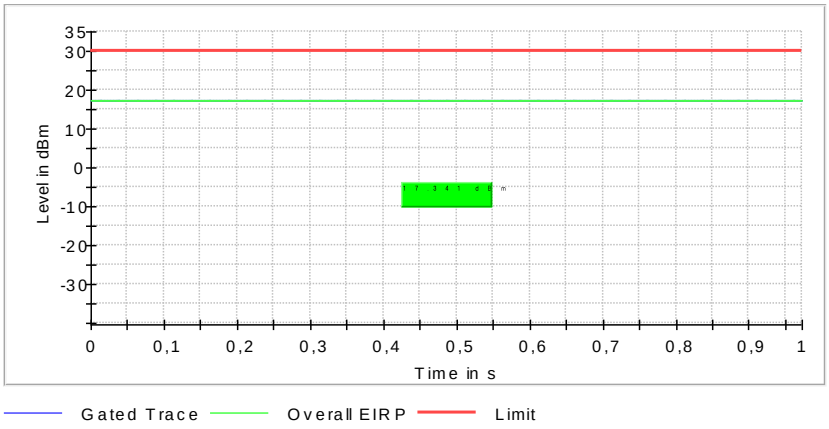
RMS Power + Duty Cycle-WLAN2.4GHz- n(HT20) Mode-MCS0-CH1-12dBm

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	Duty Cycle (%)	Result
2437.000000	20.4	30.0	24.8	97.437	PASS



RMS Power + Duty Cycle -WLAN2.4GHz- n(HT20) Mode-MCS0- CH6-20dBm

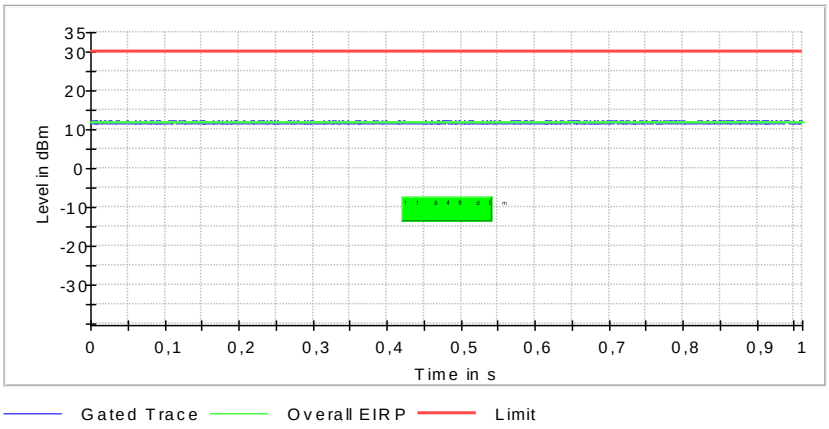
DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	Duty Cycle (%)	Result
2462.000000	13.0	30.0	17.3	97.440	PASS



RMS Power + Duty Cycle-WLAN2.4GHz- n(HT20) Mode-MCS0-CH11-13dBm

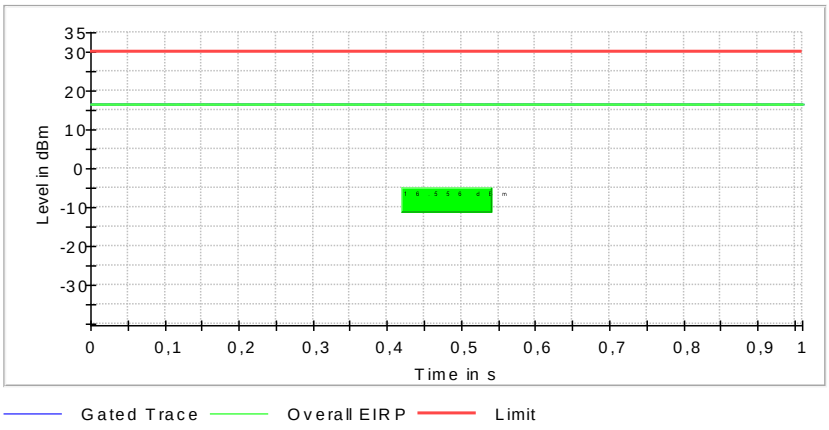
1.3.4. RMS Power + Duty Cycle - WLAN2.4GHz-n(HT40) Mode-MCS0

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	Duty Cycle (%)	Result
2422.000000	7.5	30.0	11.8	96.156	PASS



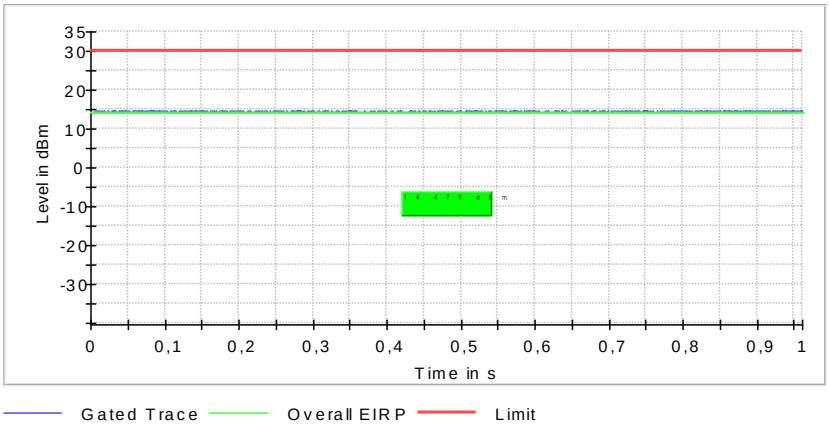
RMS Power + Duty Cycle-WLAN2.4GHz- n(HT40) Mode-MCS0-CH3-9dBm

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	Duty Cycle (%)	Result
2437.000000	12.2	30.0	16.6	96.146	PASS



RMS Power + Duty Cycle -WLAN2.4GHz- n(HT40) Mode-MCS0- CH6-13dBm

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	Duty Cycle (%)	Result
2452.000000	10.2	30.0	14.5	96.154	PASS

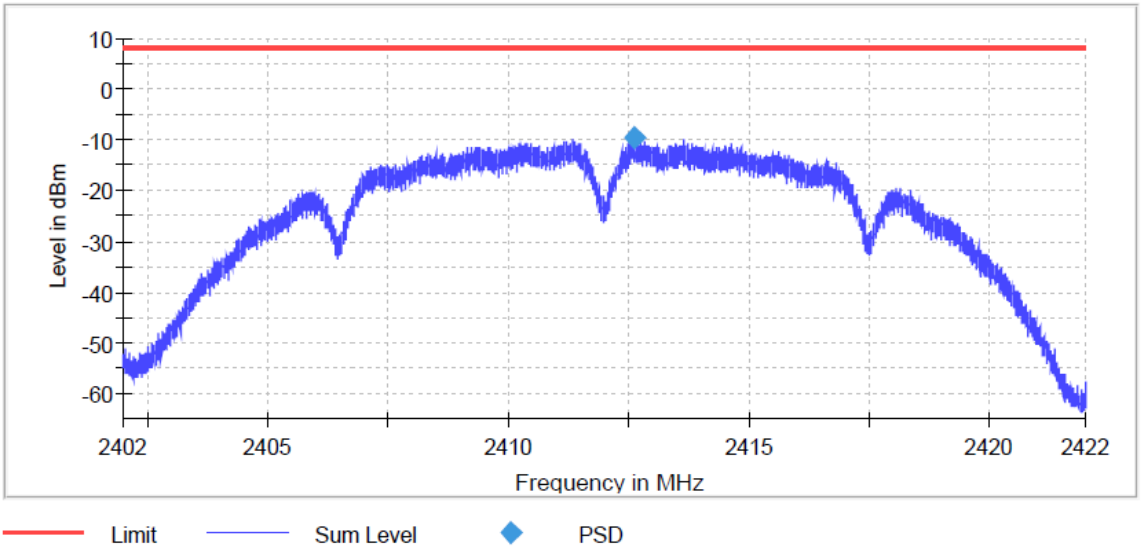


RMS Power + Duty Cycle-WLAN2.4GHz- n(HT40) Mode-MCS0-CH9-10.5dBm

1.4. Power Spectral Density (Peak)

1.4.1. Power Spectral Density Peak- WLAN2.4GHz-b Mode-1Mbit

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2412.000000	2412.636090	-9.504	8.0	PASS

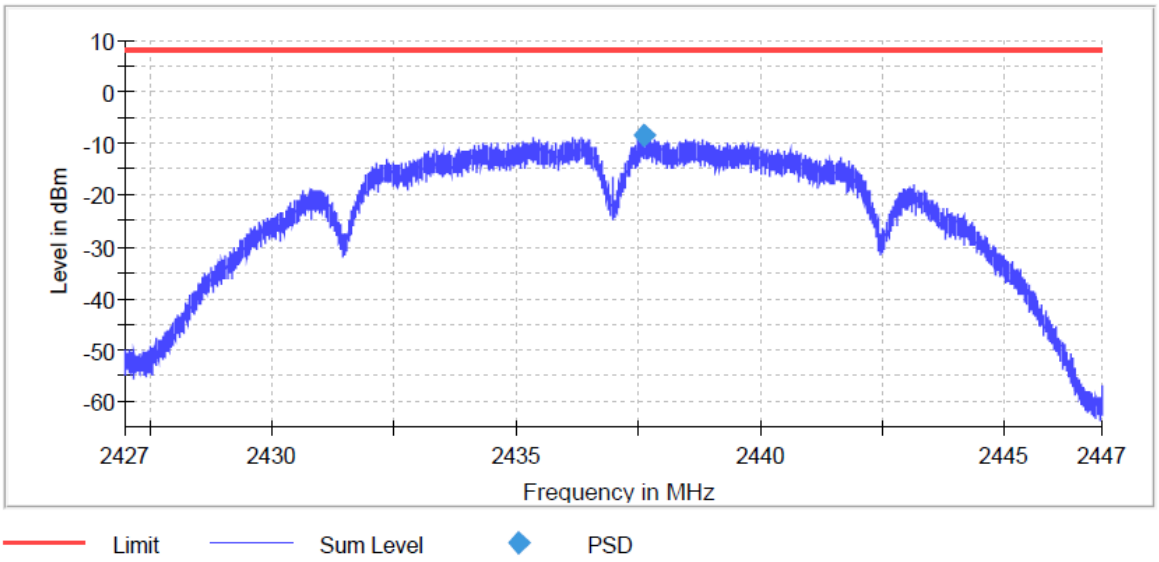


Power Spectral Density-Peak -WLAN2.4GHz-b Mode-1Mbit-CH1-15dBm

Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.40200 GHz	2.40200 GHz
Stop Frequency	2.42200 GHz	2.42200 GHz
Span	20.000 MHz	20.000 MHz
RBW	3.000 kHz	<= 3.000 kHz
VBW	10.000 kHz	>= 9.000 kHz
SweepPoints	13301	~ 13333
Sweeptime	450.000 s	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	35.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	Channel	Channel
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	Sweep
Preamp	off	off

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2437.000000	2437.636090	-8.229	8.0	PASS

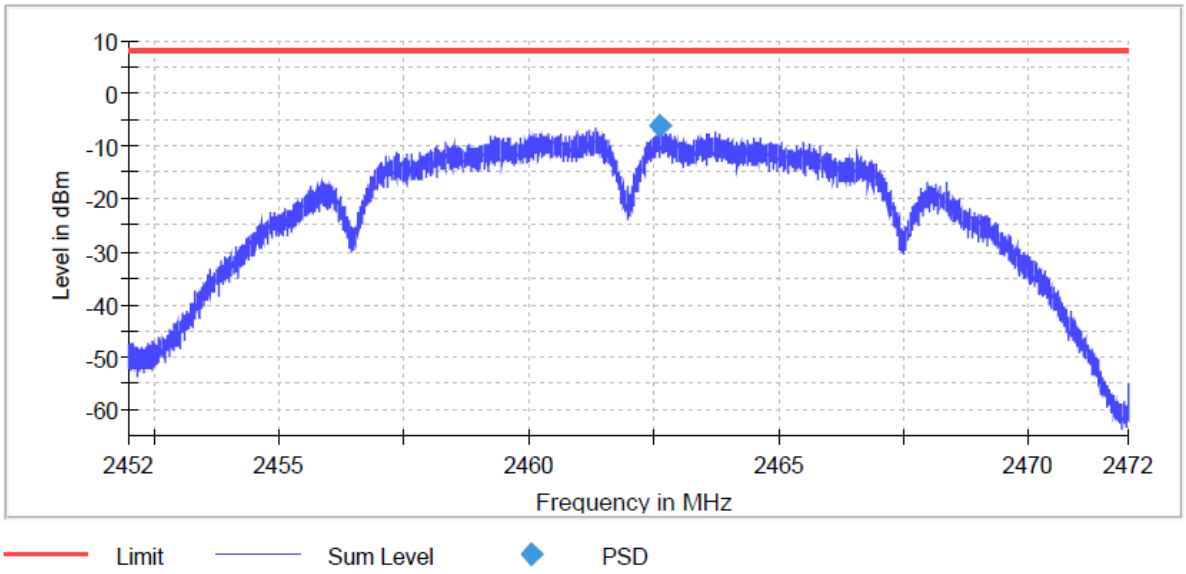


Power Spectral Density-Peak -WLAN2.4GHz-b Mode-1Mbit-CH6-15.5dBm

Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.42700 GHz	2.42700 GHz
Stop Frequency	2.44700 GHz	2.44700 GHz
Span	20.000 MHz	20.000 MHz
RBW	3.000 kHz	<= 3.000 kHz
VBW	10.000 kHz	>= 9.000 kHz
SweepPoints	13301	~ 13333
Sweeptime	450.000 s	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	35.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	Channel	Channel
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	Sweep
Preamp	off	off

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2462.000000	2462.636090	-6.252	8.0	PASS



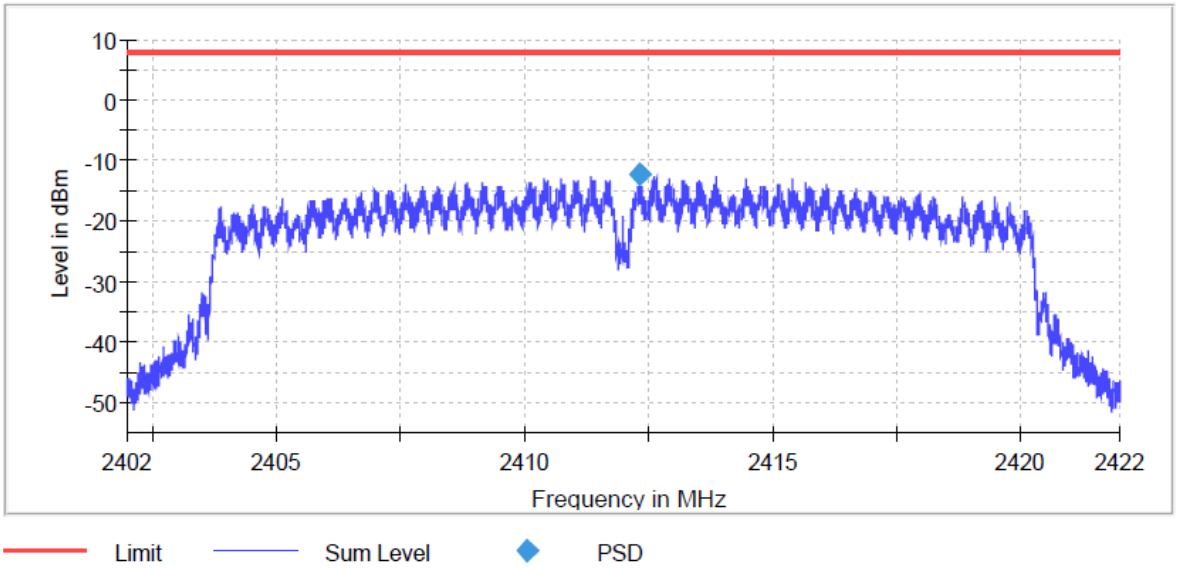
Power Spectral Density-Peak -WLAN2.4GHz-b Mode-1Mbit-CH11-16dBm

Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.45200 GHz	2.45200 GHz
Stop Frequency	2.47200 GHz	2.47200 GHz
Span	20.000 MHz	20.000 MHz
RBW	3.000 kHz	<= 3.000 kHz
VBW	10.000 kHz	>= 9.000 kHz
SweepPoints	13301	~ 13333
Sweeptime	450.000 s	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	35.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	Channel	Channel
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	Sweep
Preamp	off	off

1.4.2. Power Spectral Density Peak- WLAN2.4GHz-g Mode-6Mbit

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2412.000000	2412.309774	-12.345	8.0	PASS

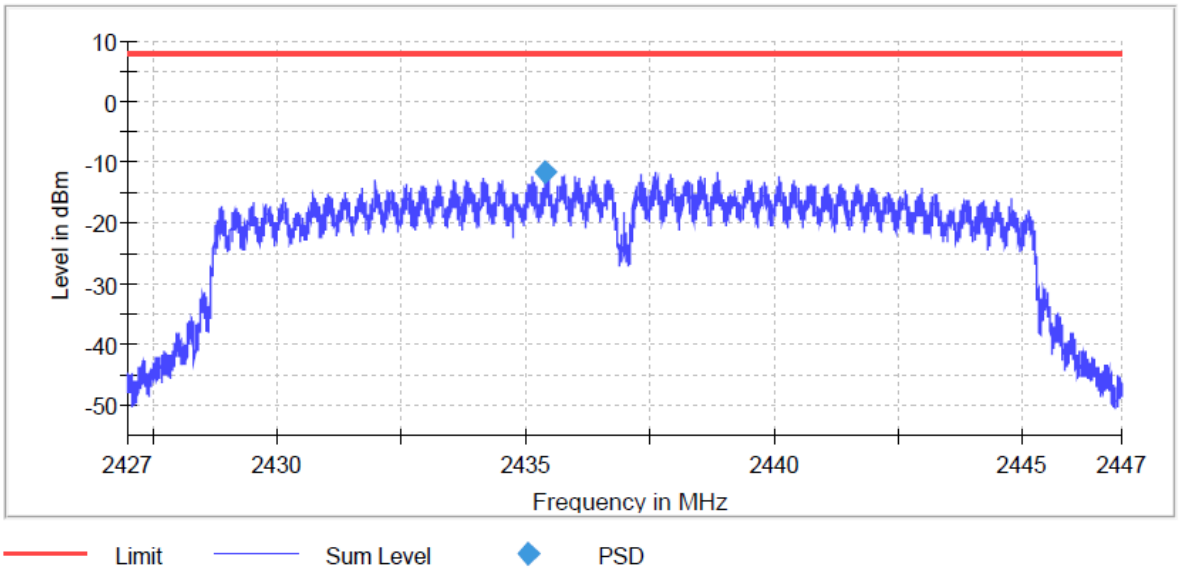


Power Spectral Density-Peak -WLAN2.4GHz-g Mode-6Mbit-CH1-13dBm

Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.40200 GHz	2.40200 GHz
Stop Frequency	2.42200 GHz	2.42200 GHz
Span	20.000 MHz	20.000 MHz
RBW	3.000 kHz	<= 3.000 kHz
VBW	10.000 kHz	>= 9.000 kHz
SweepPoints	13301	~ 13333
Sweeptime	450.000 s	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	35.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	Channel	Channel
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	Sweep
Preamp	off	off

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2437.000000	2435.413534	-11.517	8.0	PASS

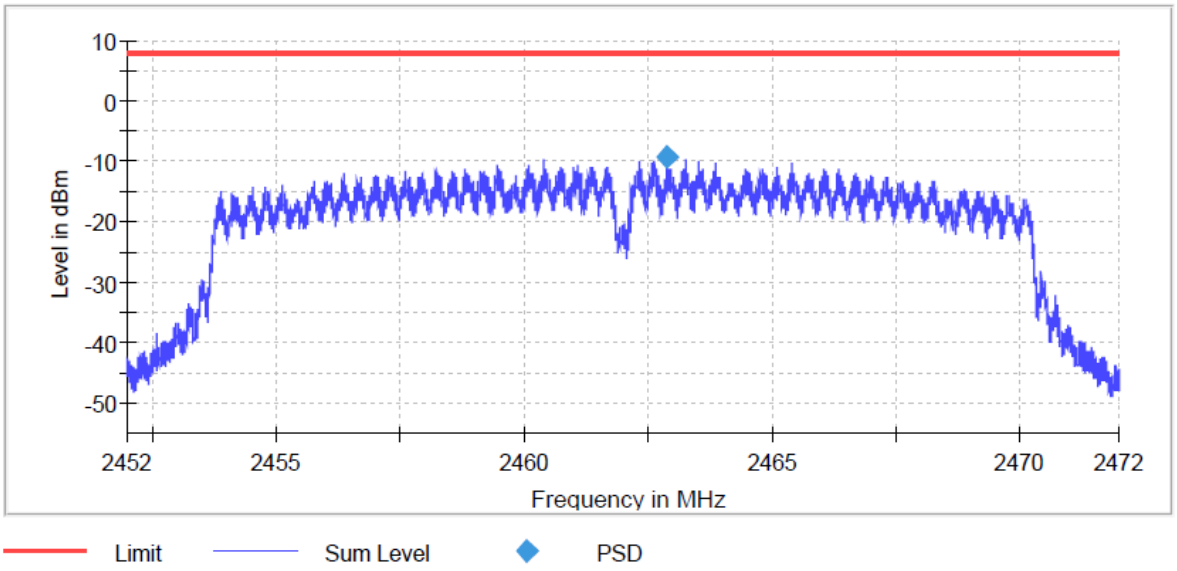


Power Spectral Density-Peak -WLAN2.4GHz-g Mode-6Mbit-CH6-20dBm

Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.42700 GHz	2.42700 GHz
Stop Frequency	2.44700 GHz	2.44700 GHz
Span	20.000 MHz	20.000 MHz
RBW	3.000 kHz	<= 3.000 kHz
VBW	10.000 kHz	>= 9.000 kHz
SweepPoints	13301	~ 13333
Sweeptime	450.000 s	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	35.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	Channel	Channel
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	Sweep
Preamp	off	off

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2462.000000	2462.891729	-9.317	8.0	PASS



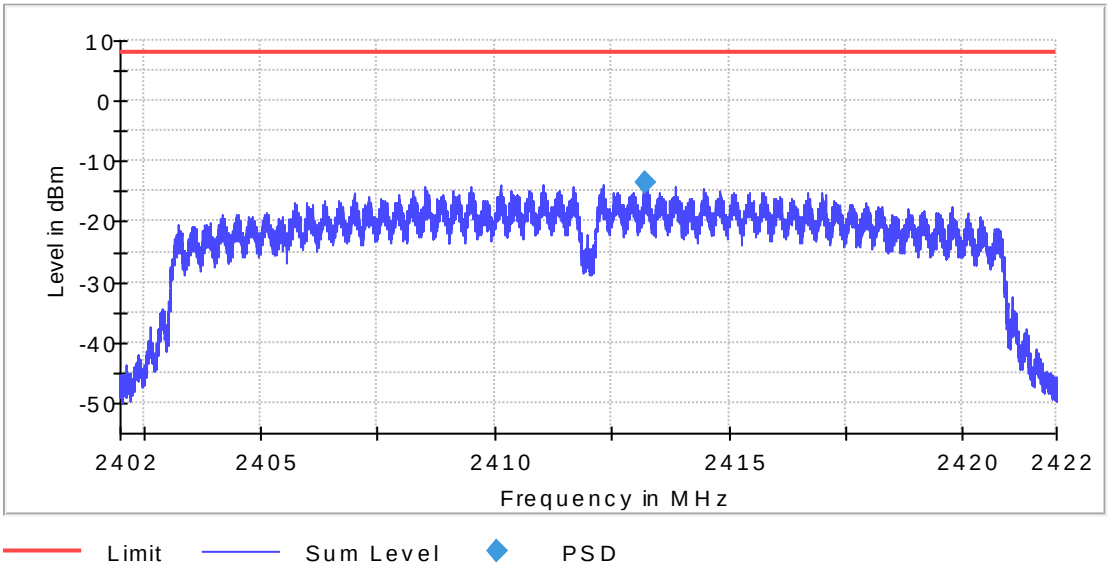
Power Spectral Density-Peak -WLAN2.4GHz-g Mode-6Mbit-CH11-14dBm

Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.45200 GHz	2.45200 GHz
Stop Frequency	2.47200 GHz	2.47200 GHz
Span	20.000 MHz	20.000 MHz
RBW	3.000 kHz	<= 3.000 kHz
VBW	10.000 kHz	>= 9.000 kHz
SweepPoints	13301	~ 13333
Sweeptime	450.000 s	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	35.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	Channel	Channel
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	Sweep
Preamp	off	off

1.4.3. Power Spectral Density Peak- WLAN2.4GHz-n(HT20) Mode-MCS0

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2412.000000	2413.239098	-13.650	8.0	PASS

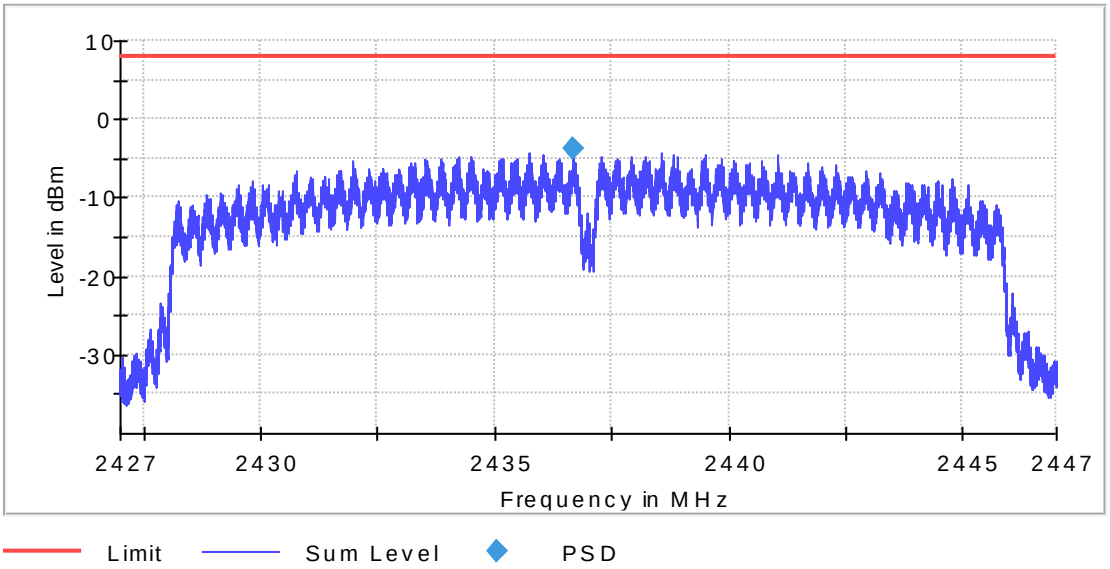


Power Spectral Density-Peak -WLAN2.4GHz-n(HT20)Mode-MCS0-CH1-12 dBm

Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.40200 GHz	2.40200 GHz
Stop Frequency	2.42200 GHz	2.42200 GHz
Span	20.000 MHz	20.000 MHz
RBW	3.000 kHz	<= 3.000 kHz
VBW	10.000 kHz	>= 9.000 kHz
SweepPoints	13301	~ 13333
Sweeptime	450.000 s	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	35.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	Channel	Channel
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	Sweep
Preamp	off	off

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2437.000000	2436.693233	-3.892	8.0	PASS

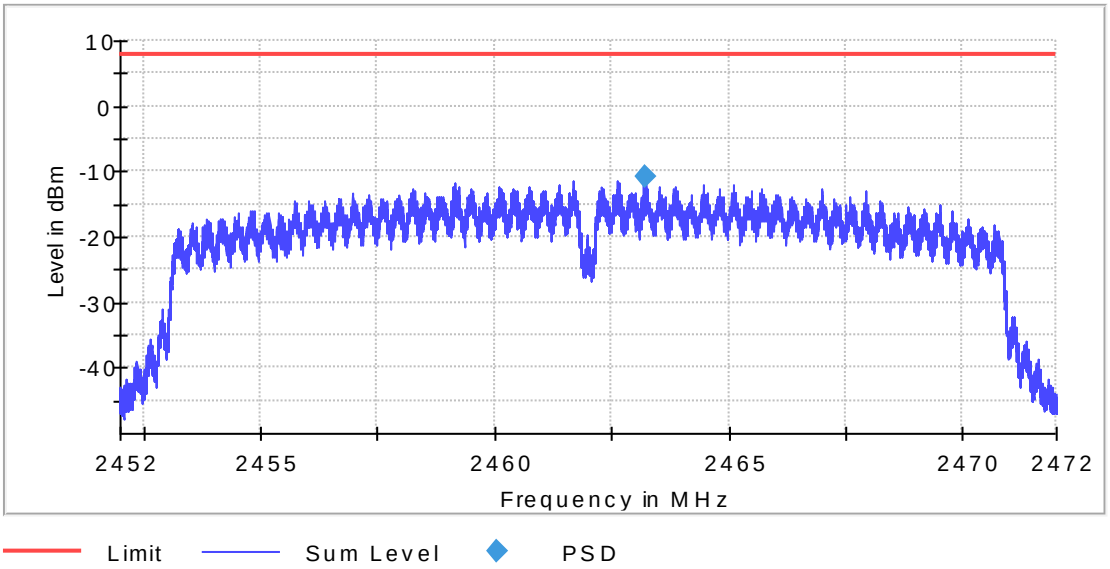


Power Spectral Density-Peak -WLAN2.4GHz-n(HT20)Mode-MCS0-CH6-20 dBm

Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.42700 GHz	2.42700 GHz
Stop Frequency	2.44700 GHz	2.44700 GHz
Span	20.000 MHz	20.000 MHz
RBW	3.000 kHz	<= 3.000 kHz
VBW	10.000 kHz	>= 9.000 kHz
SweepPoints	13301	~ 13333
Sweeptime	450.000 s	AUTO
Reference Level	20.000 dBm	20.000 dBm
Attenuation	45.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	Channel	Channel
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	Sweep
Preamp	off	off

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2462.000000	2463.240602	-10.953	8.0	PASS



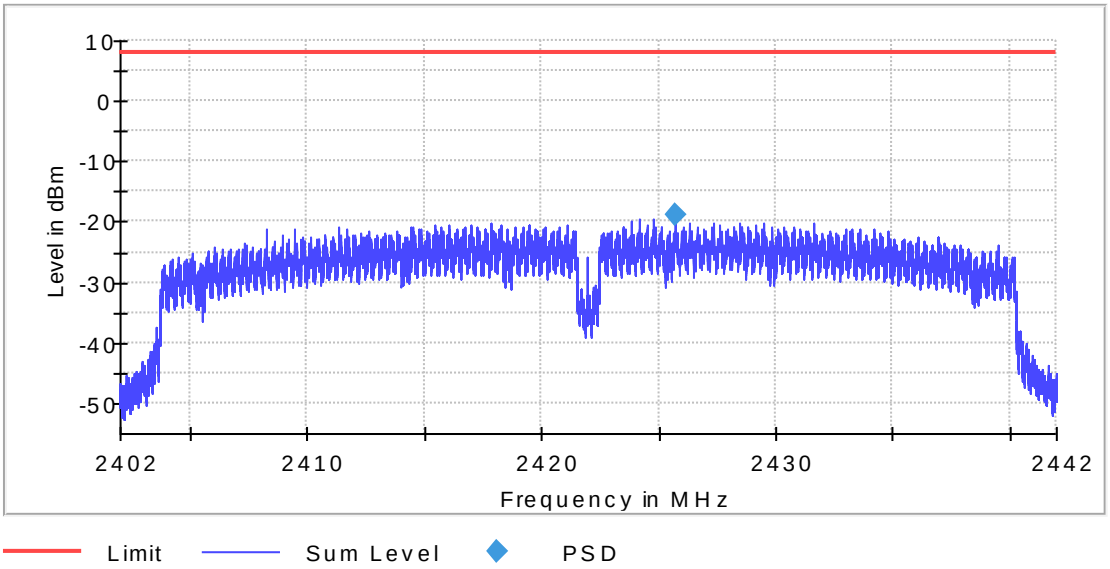
Power Spectral Density-Peak -WLAN2.4GHz-n(HT20)Mode-MCS0-CH11-13 dBm

Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.45200 GHz	2.45200 GHz
Stop Frequency	2.47200 GHz	2.47200 GHz
Span	20.000 MHz	20.000 MHz
RBW	3.000 kHz	<= 3.000 kHz
VBW	10.000 kHz	>= 9.000 kHz
SweepPoints	13301	~ 13333
Sweeptime	450.000 s	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	35.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	Channel	Channel
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	Sweep
Preamp	off	off

1.4.4. Power Spectral Density Peak- WLAN2.4GHz-n(HT40) Mode-MCS0

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2422.000000	2425.742322	-18.727	8.0	PASS

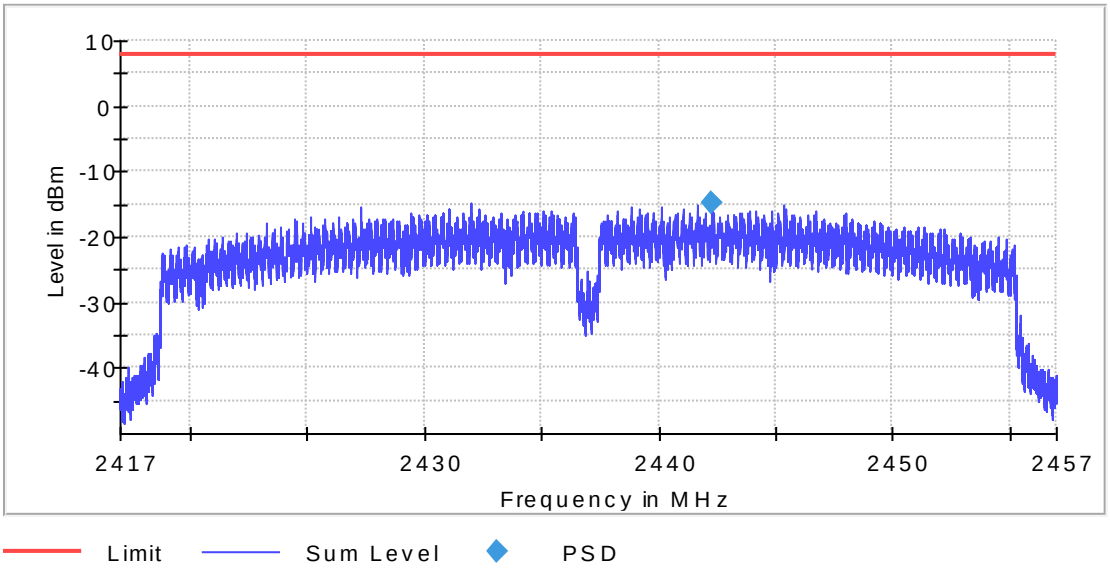


Power Spectral Density-Peak -WLAN2.4GHz-n(HT40)Mode-MCS0-CH3-9dBm

Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.40200 GHz	2.40200 GHz
Stop Frequency	2.44200 GHz	2.44200 GHz
Span	40.000 MHz	40.000 MHz
RBW	3.000 kHz	<= 3.000 kHz
VBW	10.000 kHz	>= 9.000 kHz
SweepPoints	26701	~ 26667
Sweeptime	900.000 s	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	35.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	Channel	Channel
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	Sweep
Preamp	off	off

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2437.000000	2442.309363	-14.809	8.0	PASS

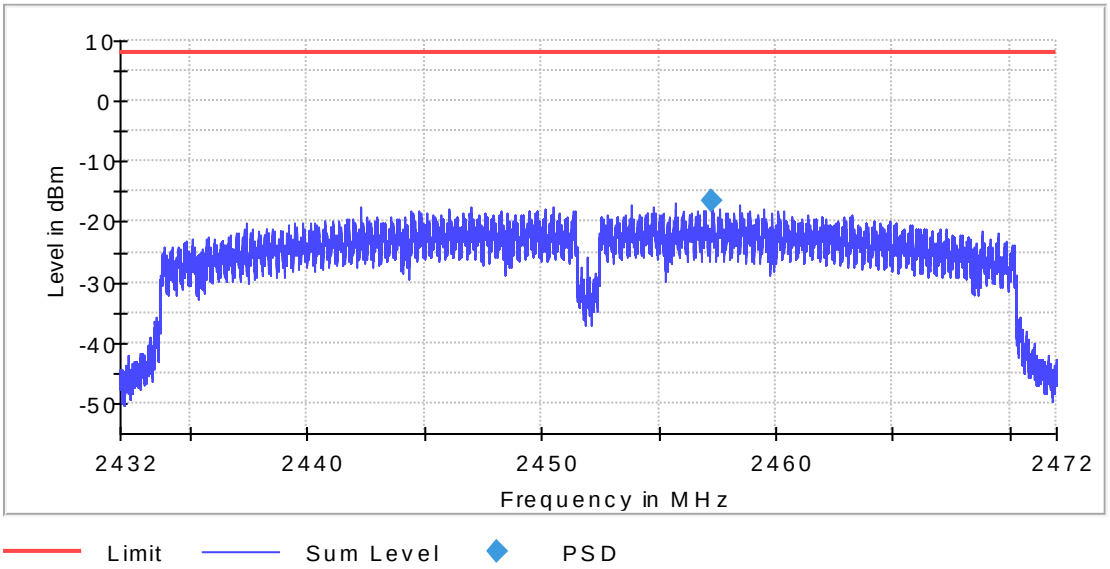


Power Spectral Density-Peak -WLAN2.4GHz-n(HT40)Mode-MCS0-CH6-13dBm

Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.41700 GHz	2.41700 GHz
Stop Frequency	2.45700 GHz	2.45700 GHz
Span	40.000 MHz	40.000 MHz
RBW	3.000 kHz	<= 3.000 kHz
VBW	10.000 kHz	>= 9.000 kHz
SweepPoints	26701	~ 26667
Sweeptime	900.000 s	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	35.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	Channel	Channel
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	Sweep
Preamp	off	off

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2452.000000	2457.309363	-16.542	8.0	PASS



Power Spectral Density-Peak -WLAN2.4GHz-n(HT40)Mode-MCS0-CH9-10.5dBm

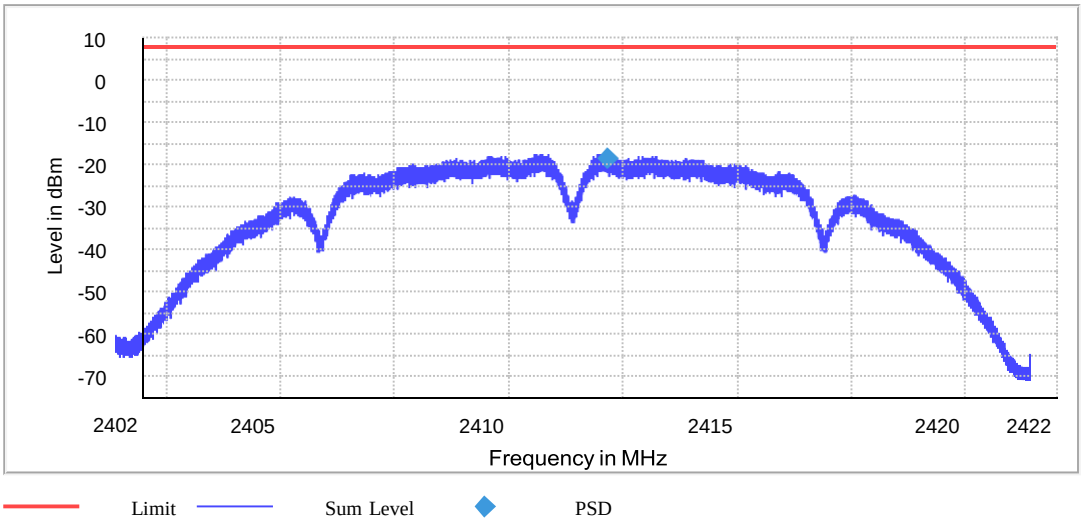
Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.43200 GHz	2.43200 GHz
Stop Frequency	2.47200 GHz	2.47200 GHz
Span	40.000 MHz	40.000 MHz
RBW	3.000 kHz	<= 3.000 kHz
VBW	10.000 kHz	>= 9.000 kHz
SweepPoints	26701	~ 26667
Sweeptime	900.000 s	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	35.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	Channel	Channel
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	Sweep
Preamp	off	off

1.5. Power Spectral Density (RMS)

1.5.1. Power Spectral Density RMS- WLAN2.4GHz-b Mode-1Mbit

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2412.000000	2412.747368	-18.448	8.0	PASS

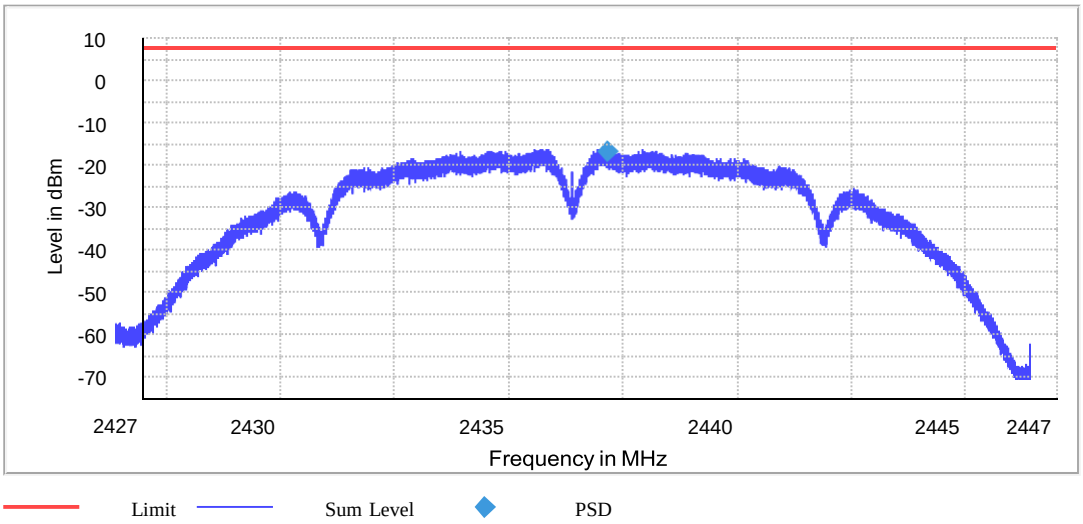


Power Spectral Density-RMS -WLAN2.4GHz-b Mode-1Mbit-CH1-15dBm

Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.40200 GHz	2.40200 GHz
Stop Frequency	2.42200 GHz	2.42200 GHz
Span	20.000 MHz	20.000 MHz
RBW	3.000 kHz	<= 3.000 kHz
VBW	10.000 kHz	>= 9.000 kHz
SweepPoints	13301	~ 13333
Sweeptime	450.000 s	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	35.000 dB	AUTO
Detector	RMS	RMS
SweepCount	1	1
Filter	Channel	Channel
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	Sweep
Preamp	off	off

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2437.000000	2437.748872	-17.100	8.0	PASS

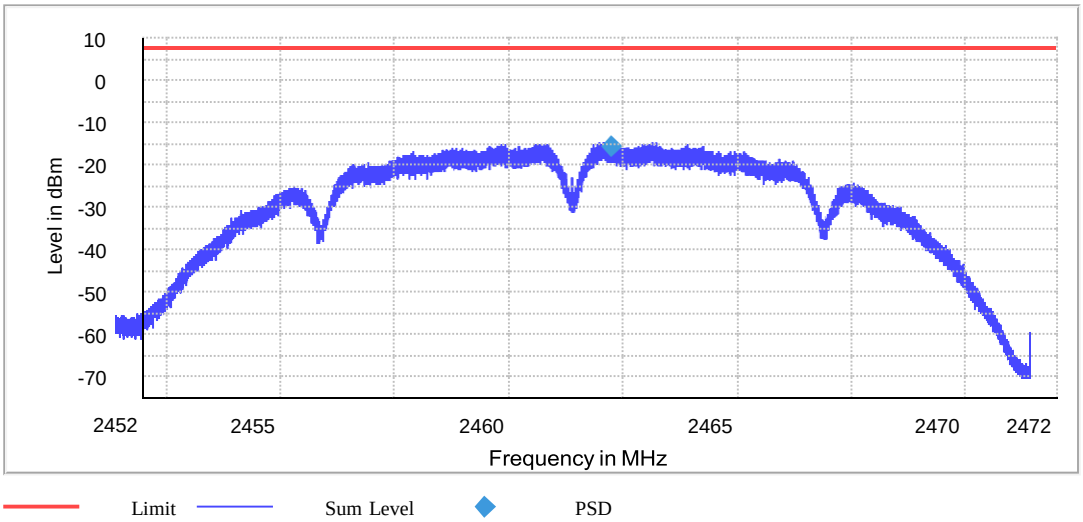


Power Spectral Density-RMS -WLAN2.4GHz-b Mode-1Mbit-CH6-15.5dBm

Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.42700 GHz	2.42700 GHz
Stop Frequency	2.44700 GHz	2.44700 GHz
Span	20.000 MHz	20.000 MHz
RBW	3.000 kHz	<= 3.000 kHz
VBW	10.000 kHz	>= 9.000 kHz
SweepPoints	13301	~ 13333
Sweeptime	450.000 s	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	35.000 dB	AUTO
Detector	RMS	RMS
SweepCount	1	1
Filter	Channel	Channel
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	Sweep
Preamp	off	off

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2462.000000	2462.831579	-15.430	8.0	PASS



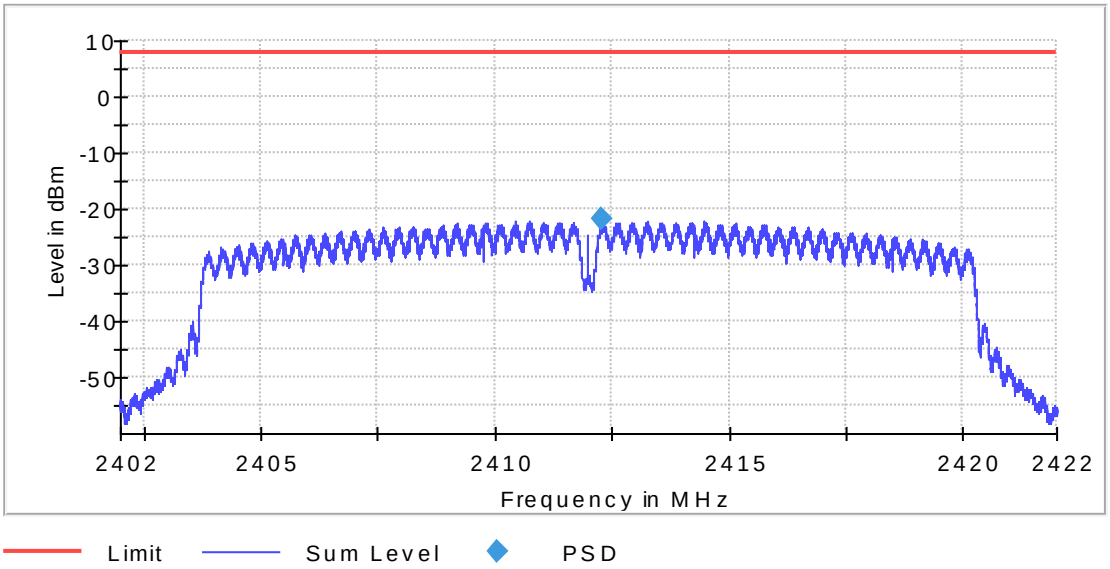
Power Spectral Density-RMS -WLAN2.4GHz-b Mode-1Mbit-CH11-16dBm

Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.45200 GHz	2.45200 GHz
Stop Frequency	2.47200 GHz	2.47200 GHz
Span	20.000 MHz	20.000 MHz
RBW	3.000 kHz	<= 3.000 kHz
VBW	10.000 kHz	>= 9.000 kHz
SweepPoints	13301	~ 13333
Sweeptime	450.000 s	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	35.000 dB	AUTO
Detector	RMS	RMS
SweepCount	1	1
Filter	Channel	Channel
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	Sweep
Preamp	off	off

1.5.2. Power Spectral Density RMS- WLAN2.4GHz-g Mode-6Mbit

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2412.000000	2412.296241	-21.755	8.0	PASS

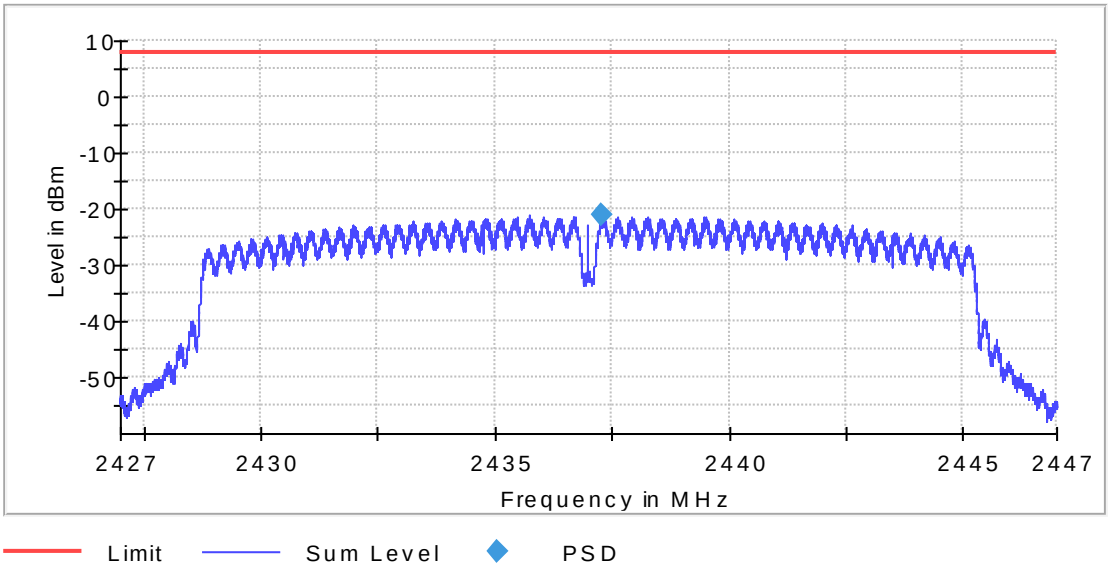


Power Spectral Density-RMS -WLAN2.4GHz-g Mode-6Mbit-CH1-13dBm

Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.40200 GHz	2.40200 GHz
Stop Frequency	2.42200 GHz	2.42200 GHz
Span	20.000 MHz	20.000 MHz
RBW	3.000 kHz	<= 3.000 kHz
VBW	10.000 kHz	>= 9.000 kHz
SweepPoints	13301	~ 13333
Sweeptime	450.000 s	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	35.000 dB	AUTO
Detector	RMS	RMS
SweepCount	1	1
Filter	Channel	Channel
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	Sweep
Preamp	off	off

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2437.000000	2437.296241	-21.057	8.0	PASS

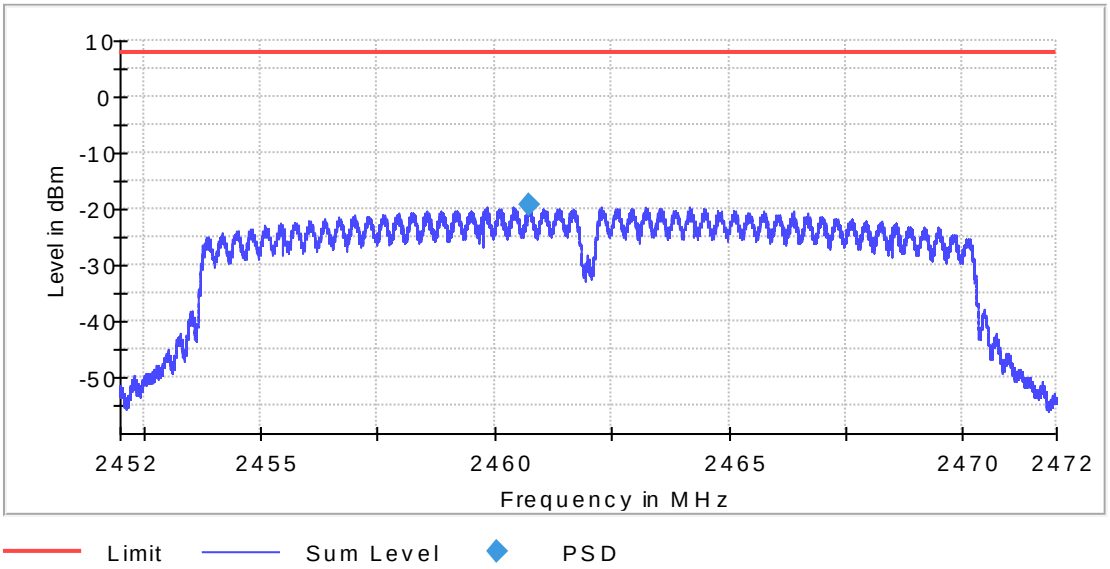


Power Spectral Density-RMS -WLAN2.4GHz-g Mode-6Mbit-CH6-20dBm

Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.42700 GHz	2.42700 GHz
Stop Frequency	2.44700 GHz	2.44700 GHz
Span	20.000 MHz	20.000 MHz
RBW	3.000 kHz	<= 3.000 kHz
VBW	10.000 kHz	>= 9.000 kHz
SweepPoints	13301	~ 13333
Sweeptime	450.000 s	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	35.000 dB	AUTO
Detector	RMS	RMS
SweepCount	1	1
Filter	Channel	Channel
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	Sweep
Preamp	off	off

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2462.000000	2460.726316	-19.369	8.0	PASS



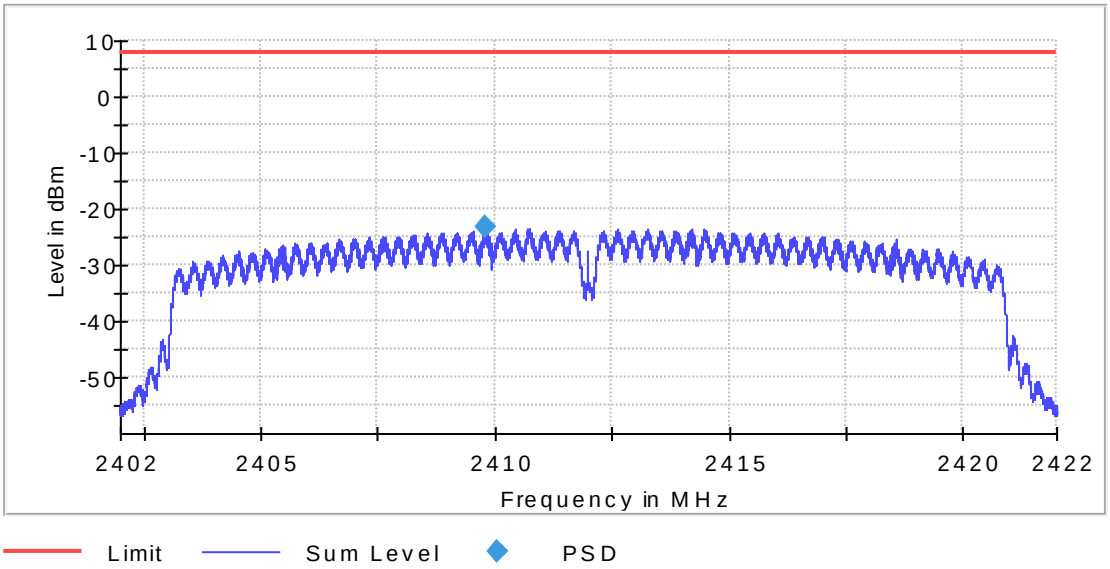
Power Spectral Density-RMS -WLAN2.4GHz-g Mode-6Mbit-CH11-14dBm

Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.45200 GHz	2.45200 GHz
Stop Frequency	2.47200 GHz	2.47200 GHz
Span	20.000 MHz	20.000 MHz
RBW	3.000 kHz	<= 3.000 kHz
VBW	10.000 kHz	>= 9.000 kHz
SweepPoints	13301	~ 13333
Sweeptime	450.000 s	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	35.000 dB	AUTO
Detector	RMS	RMS
SweepCount	1	1
Filter	Channel	Channel
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	Sweep
Preamp	off	off

1.5.3. Power Spectral Density RMS- WLAN2.4GHz-n(HT20) Mode-MCS0

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2412.000000	2409.795489	-23.037	8.0	PASS

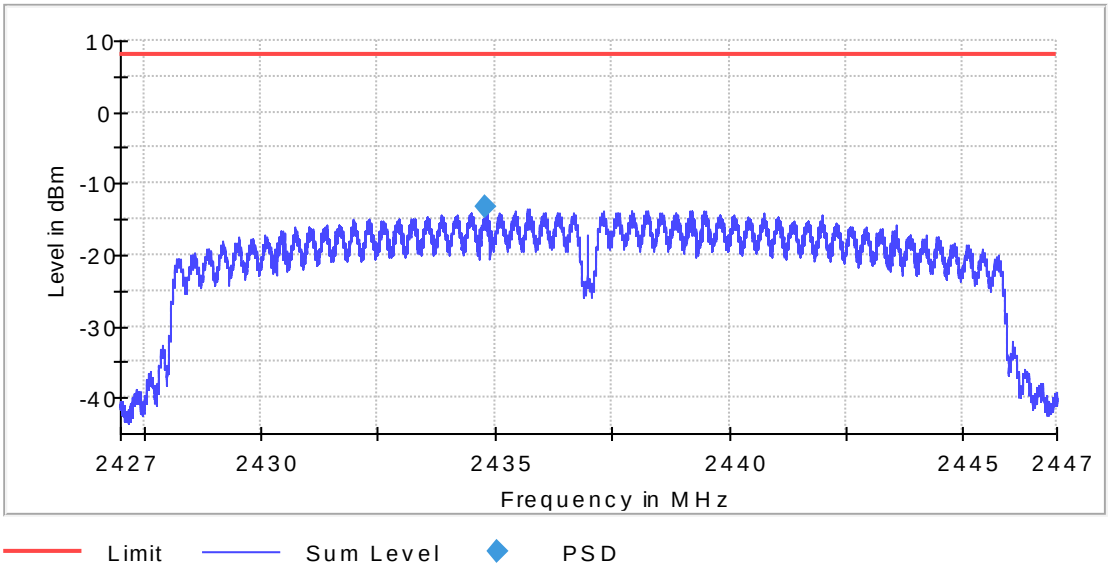


Power Spectral Density-RMS -WLAN2.4GHz-n(HT20)Mode-MCS0-CH1-12 dBm

Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.40200 GHz	2.40200 GHz
Stop Frequency	2.42200 GHz	2.42200 GHz
Span	20.000 MHz	20.000 MHz
RBW	3.000 kHz	<= 3.000 kHz
VBW	10.000 kHz	>= 9.000 kHz
SweepPoints	13301	~ 13333
Sweeptime	450.000 s	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	35.000 dB	AUTO
Detector	RMS	RMS
SweepCount	1	1
Filter	Channel	Channel
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	Sweep
Preamp	off	off

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2437.000000	2434.792481	-13.225	8.0	PASS

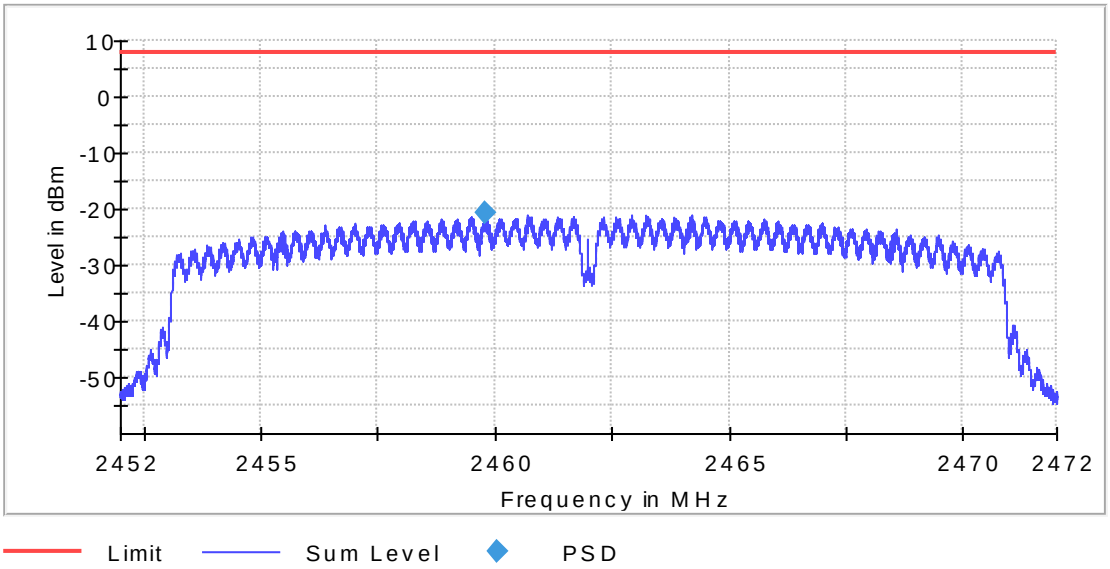


Power Spectral Density-RMS -WLAN2.4GHz-n(HT20)Mode-MCS0-CH6-20 dBm

Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.42700 GHz	2.42700 GHz
Stop Frequency	2.44700 GHz	2.44700 GHz
Span	20.000 MHz	20.000 MHz
RBW	3.000 kHz	<= 3.000 kHz
VBW	10.000 kHz	>= 9.000 kHz
SweepPoints	13301	~ 13333
Sweeptime	450.000 s	AUTO
Reference Level	20.000 dBm	20.000 dBm
Attenuation	45.000 dB	AUTO
Detector	RMS	RMS
SweepCount	1	1
Filter	Channel	Channel
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	Sweep
Preamp	off	off

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2462.000000	2459.795489	-20.736	8.0	PASS



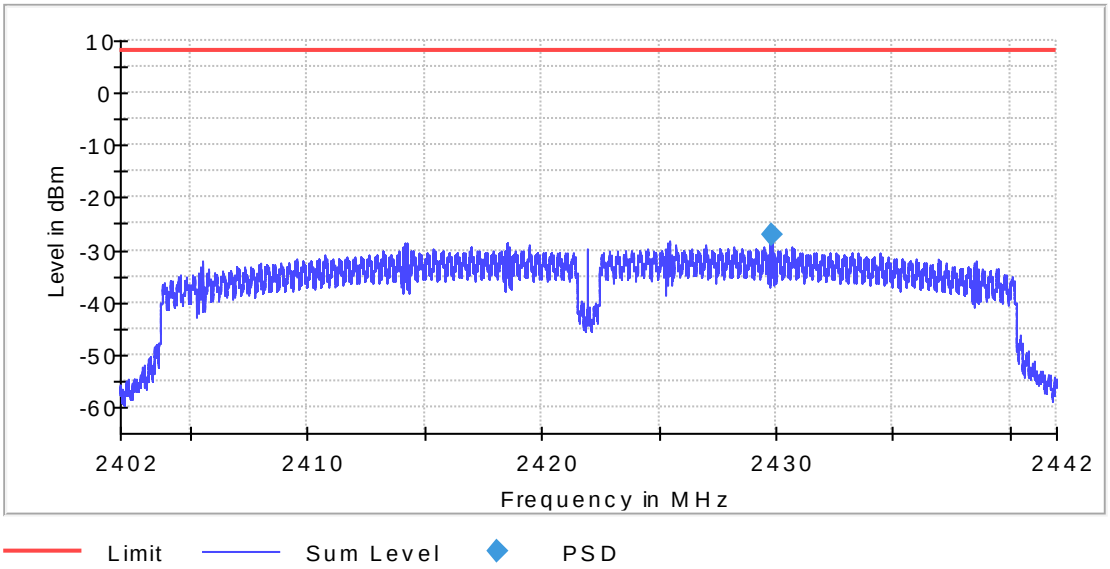
Power Spectral Density-RMS -WLAN2.4GHz-n(HT20)Mode-MCS0-CH11-13 dBm

Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.45200 GHz	2.45200 GHz
Stop Frequency	2.47200 GHz	2.47200 GHz
Span	20.000 MHz	20.000 MHz
RBW	3.000 kHz	<= 3.000 kHz
VBW	10.000 kHz	>= 9.000 kHz
SweepPoints	13301	~ 13333
Sweeptime	450.000 s	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	35.000 dB	AUTO
Detector	RMS	RMS
SweepCount	1	1
Filter	Channel	Channel
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	Sweep
Preamp	off	off

1.5.4. Power Spectral Density RMS- WLAN2.4GHz-n(HT40) Mode-MCS0

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2422.000000	2429.809738	-27.253	8.0	PASS

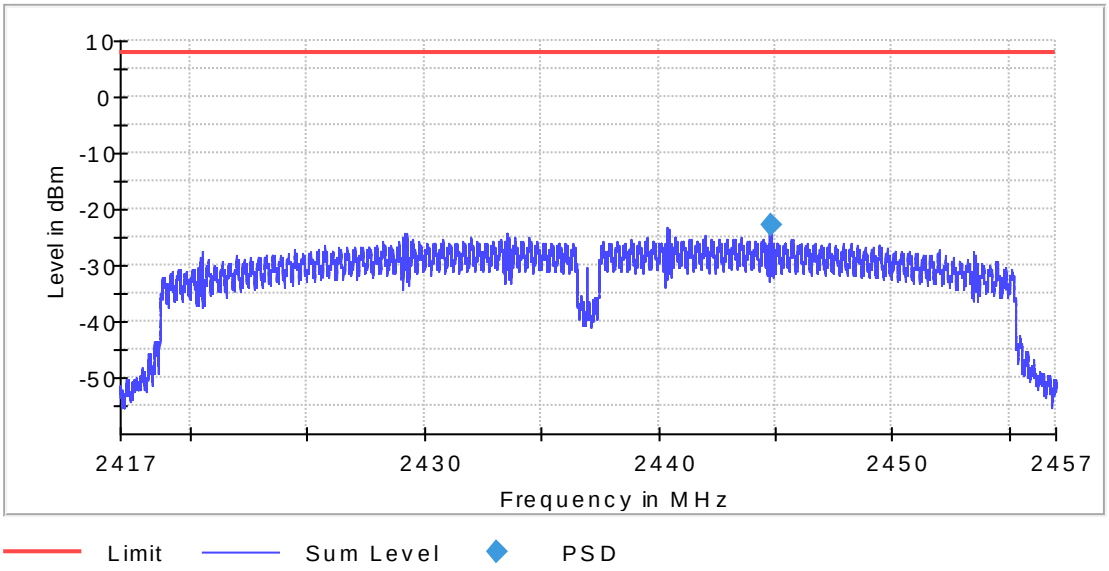


Power Spectral Density-RMS -WLAN2.4GHz-n(HT40)Mode-MCS0-CH3-9dBm

Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.40200 GHz	2.40200 GHz
Stop Frequency	2.44200 GHz	2.44200 GHz
Span	40.000 MHz	40.000 MHz
RBW	3.000 kHz	<= 3.000 kHz
VBW	10.000 kHz	>= 9.000 kHz
SweepPoints	26701	~ 26667
Sweeptime	900.000 s	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	35.000 dB	AUTO
Detector	RMS	RMS
SweepCount	1	1
Filter	Channel	Channel
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	Sweep
Preamp	off	off

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2437.000000	2444.797753	-22.925	8.0	PASS

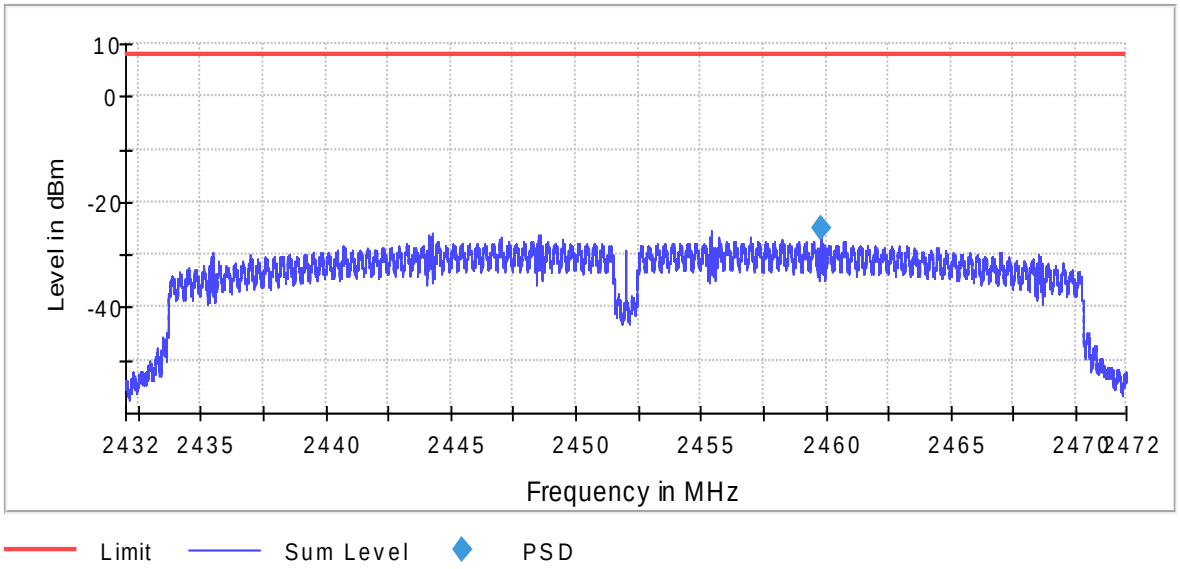


Power Spectral Density-RMS -WLAN2.4GHz-n(HT40)Mode-MCS0-CH6-13dBm

Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.41700 GHz	2.41700 GHz
Stop Frequency	2.45700 GHz	2.45700 GHz
Span	40.000 MHz	40.000 MHz
RBW	3.000 kHz	<= 3.000 kHz
VBW	10.000 kHz	>= 9.000 kHz
SweepPoints	26701	~ 26667
Sweeptime	900.000 s	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	35.000 dB	AUTO
Detector	RMS	RMS
SweepCount	1	1
Filter	Channel	Channel
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	Sweep
Preamp	off	off

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2452.000000	2459.797753	-25.123	8.0	PASS



Power Spectral Density-RMS -WLAN2.4GHz-n(HT40)Mode-MCS0-CH9-10.5dBm

Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.43200 GHz	2.43200 GHz
Stop Frequency	2.47200 GHz	2.47200 GHz
Span	40.000 MHz	40.000 MHz
RBW	3.000 kHz	<= 3.000 kHz
VBW	10.000 kHz	>= 9.000 kHz
SweepPoints	26701	~ 26667
Sweeptime	900.000 s	AUTO
Reference Level	10.000 dBm	10.000 dBm
Attenuation	35.000 dB	AUTO
Detector	RMS	RMS
SweepCount	1	1
Filter	Channel	Channel
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	Sweep
Preamp	off	off

2. Radiated Field Strength Measurements

2.1. Radiated Field Strength Emissions – 9 kHz to 30 MHz

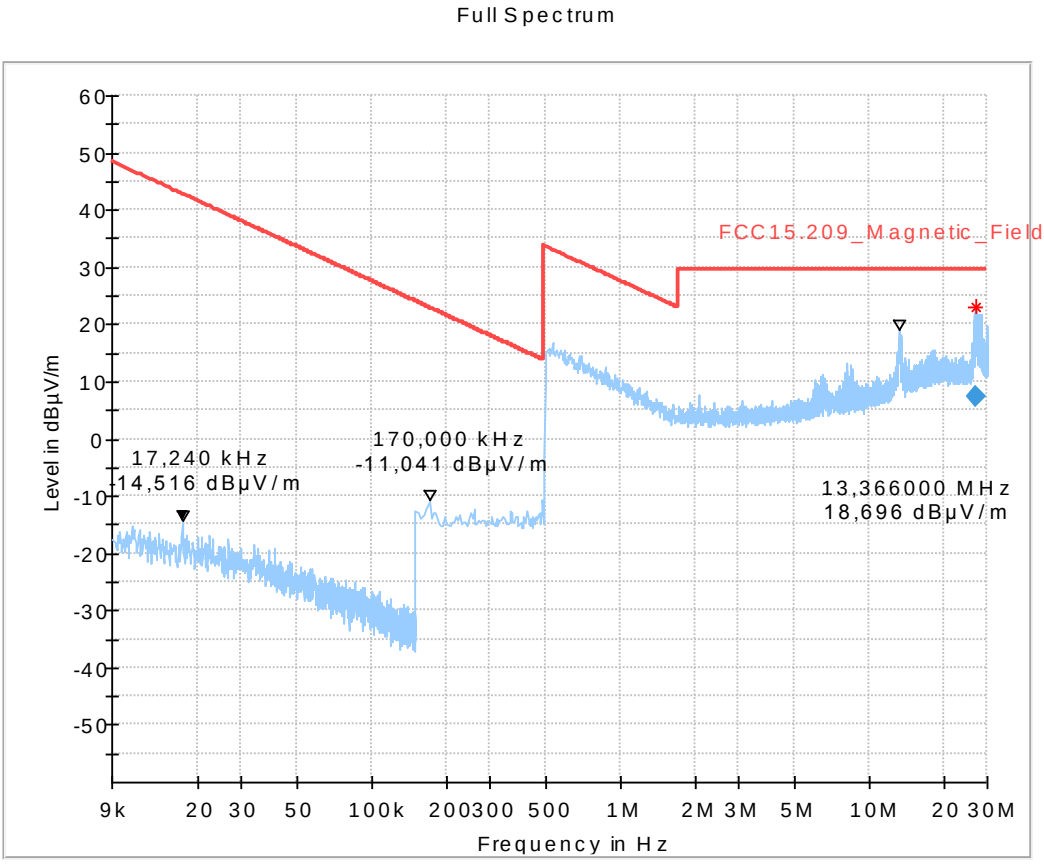
Diagram No. 2.11_ Vitoconnect OT2-WLAN2.4 GHz-TX- bMode-B.W.20MHz-1Mbps-Ch1-15dBm

Common Information

Test description:	Magnetic Field Strength Measurement related to 30/300 m distance
Test site and distance:	Ref.-Nr. 441 Semi Anechoic Room (SAR) with 3 m measurement distance
Version of Testsoftware:	EMC32 V9.25.0
Distance correction:	used accord. table, pls. see test report
Technical Data:	Please see page 2 for detailed data of measurement setup
Rec. antenna (pre-scan):	height 1.00 m, parallel and 90° to EUT polarisation
Used filter:	bypass
Test specification:	FCC 15.205 § 15.209
Operator:	RIs
Operating conditions:	Continuous TX-WLAN 2.4GHz- b Mode-B.W. 20 MHz-1Mbps-Ch 1 (2412 MHz)-PWR+15dBm

EUT Information

Applicant:	Viessmann Werke GmbH & Co.KG
---	---
EUT:	Vitoconnect OT2
S/N:	GNV 7637415600219108
HW version:	V005, BOM Rev-k
SW version:	Linux:0.10.0 | STM:1.33.02 | EFR32 | v1.0
Test Application:	Ember Node Test Application v1.0 Jul 1 2016
Connected Interfaces:	Optolink Via USB + UART 2 + Opentherm Loop(Master to Slave)
Test Mode Configurations:	OpenTherm & Optolink Communication Loop + Processor Load 25%
Power Supply:	12 VDC using AC/DC Adapter
AC/DC Adapter Details:	PHIHONG|Model:PSAC12R-120|Input:Ac100-240V 50-60Hz 0.5A
Line Power Supply:	120 V AC 60 Hz



Final_Result

Frequency (MHz)	RMS (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
26.806000	7.41	29.54	22.13	1000.0	10.000	100.0	V	230.0	90.0	0.6

(continuation of the "Final_Result" table from column 17 ...)

Frequency (MHz)	Comment
26.806000	20:24:04 - 05.08.2017

Diagram No. 2.12_ Vitoconnect OT2-WLAN2.4 GHz-TX- gMode-B.W.20MHz-6Mbps-Ch6-20dBm

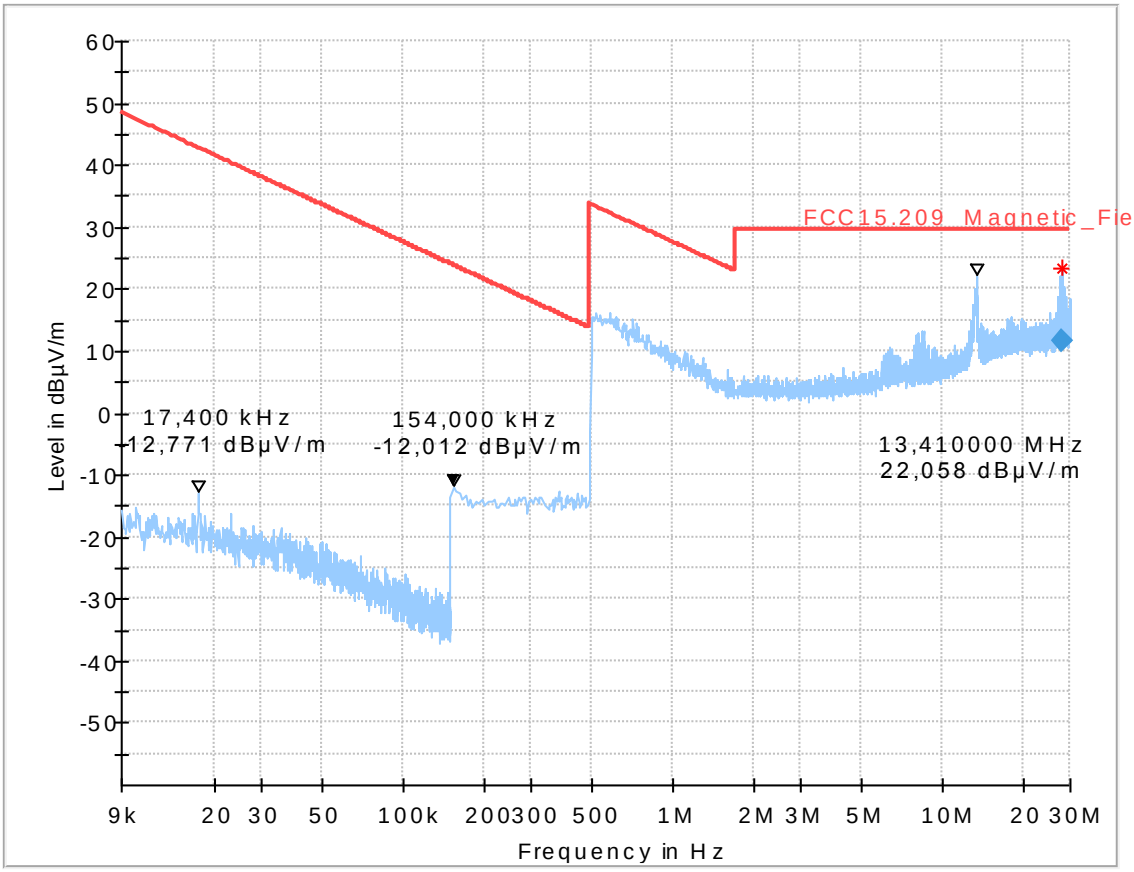
Common Information

Test description:	Magnetic Field Strength Measurement related to 30/300 m distance
Test site and distance:	Ref.-Nr. 441 Semi Anechoic Room (SAR) with 3 m measurement distance
Version of Testsoftware:	EMC32 V9.25.0
Distance correction:	used accord. table, pls. see test report
Technical Data:	Please see page 2 for detailed data of measurement setup
Rec. antenna (pre-scan):	height 1.00 m, parallel and 90° to EUT polarisation
Used filter:	bypass
Test specification:	FCC 15.205 § 15.209
Operator:	RIs
Operating conditions:	Continuous TX-WLAN 2.4GHz- g Mode-B.W. 20 MHz-6Mbps-Ch 6 (2437 MHz)-PWR+20dBm

EUT Information

Applicant:	Viessmann Werke GmbH & Co.KG
---	---
EUT:	Vitoconnect OT2
S/N:	GNV 7637415600219108
HW version:	V005, BOM Rev-k
SW version:	Linux:0.10.0 | STM:1.33.02 | EFR32 | v1.0
Test Application:	Ember Node Test Application v1.0 Jul 1 2016
Connected Interfaces:	Optolink Via USB + UART 2 + Opentherm Loop(Master to Slave)
Test Mode Configurations:	OpenTherm & Optolink Communication Loop + Processor Load 25%
Power Supply:	12 VDC using AC/DC Adapter
AC/DC Adapter Details:	PHIHONG|Model:PSAC12R-120|Input:Ac100-240V 50-60Hz 0.5A
Line Power Supply:	120 V AC 60 Hz

Full Spectrum



Final_Result

Frequency (MHz)	RMS (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
27.886000	11.58	29.54	17.96	1000.0	10.000	100.0	V	255.0	0.0	0.5

(continuation of the "Final_Result" table from column 17 ...)

Frequency (MHz)	Comment
27.886000	19:17:40 - 05.08.2017

Diagram No. 2.13_ Vitoconnect OT2-WLAN2.4 GHz-TX- nMode-B.W.20MHz-MCS0-Ch11-13dBm

Common Information

Test description:	Magnetic Field Strength Measurement related to 30/300 m distance
Test site and distance:	Ref.-Nr. 441 Semi Anechoic Room (SAR) with 3 m measurement distance
Version of Testsoftware:	EMC32 V9.25.0
Distance correction:	used accord. table, pls. see test report
Technical Data:	Please see page 2 for detailed data of measurement setup
Rec. antenna (pre-scan):	height 1.00 m, parallel and 90° to EUT polarisation
Used filter:	bypass
Test specification:	FCC 15.205 § 15.209
Operator:	RIs
Operating conditions:	Continuous TX-WLAN 2.4GHz- n Mode-B.W. 20 MHz-MCS0-Ch 11 (2462 MHz)-PWR+13dBm

EUT Information

Applicant:	Viessmann Werke GmbH & Co.KG
---	---
EUT:	Vitoconnect OT2
S/N:	GNV 7637415600219108
HW version:	V005, BOM Rev-k
SW version:	Linux:0.10.0 | STM:1.33.02 | EFR32 | v1.0
Test Application:	Ember Node Test Application v1.0 Jul 1 2016
Connected Interfaces:	Optolink Via USB + UART 2 + Opentherm Loop(Master to Slave)
Test Mode Configurations:	OpenTherm & Optolink Communication Loop + Processor Load 25%
Power Supply:	12 VDC using AC/DC Adapter
AC/DC Adapter Details:	PHIHONG|Model:PSAC12R-120|Input:Ac100-240V 50-60Hz 0.5A
Line Power Supply:	120 V AC 60 Hz

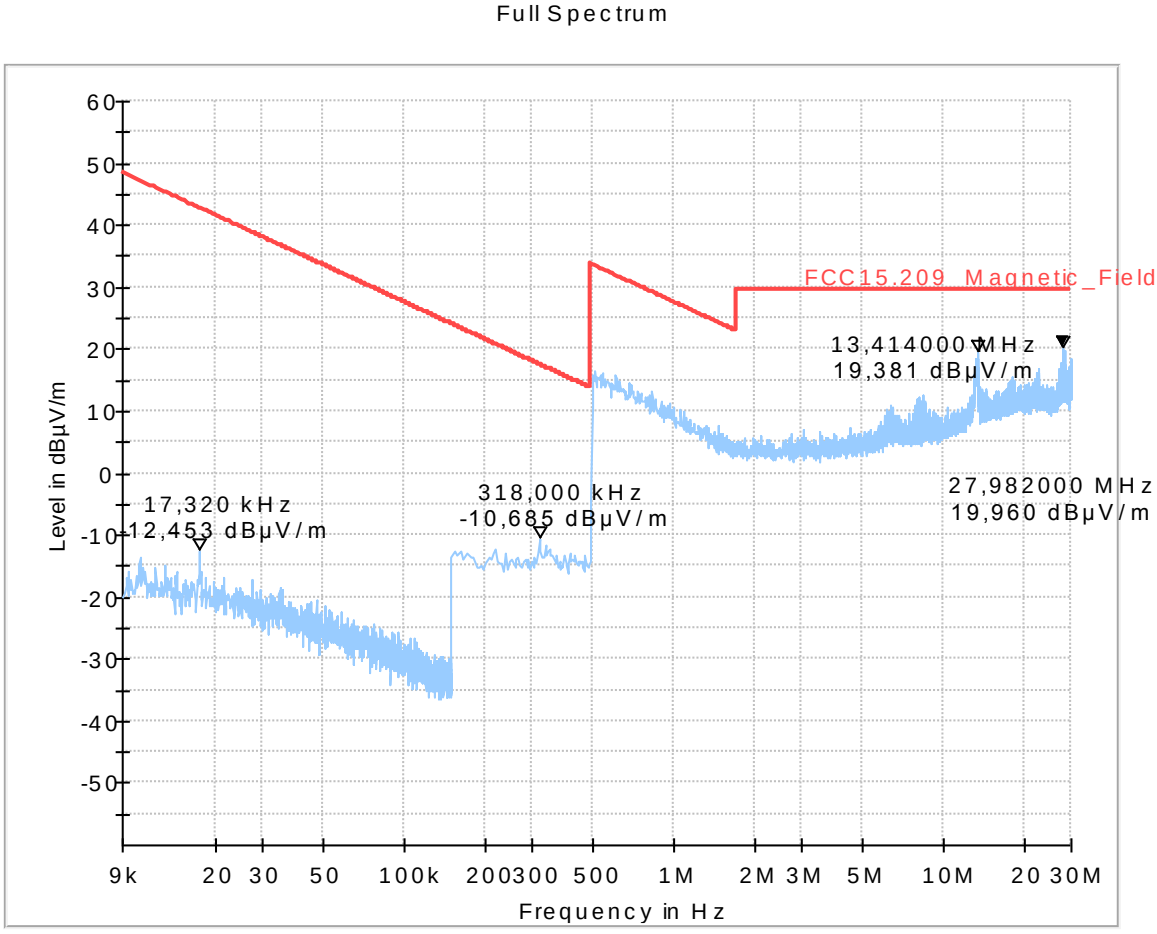


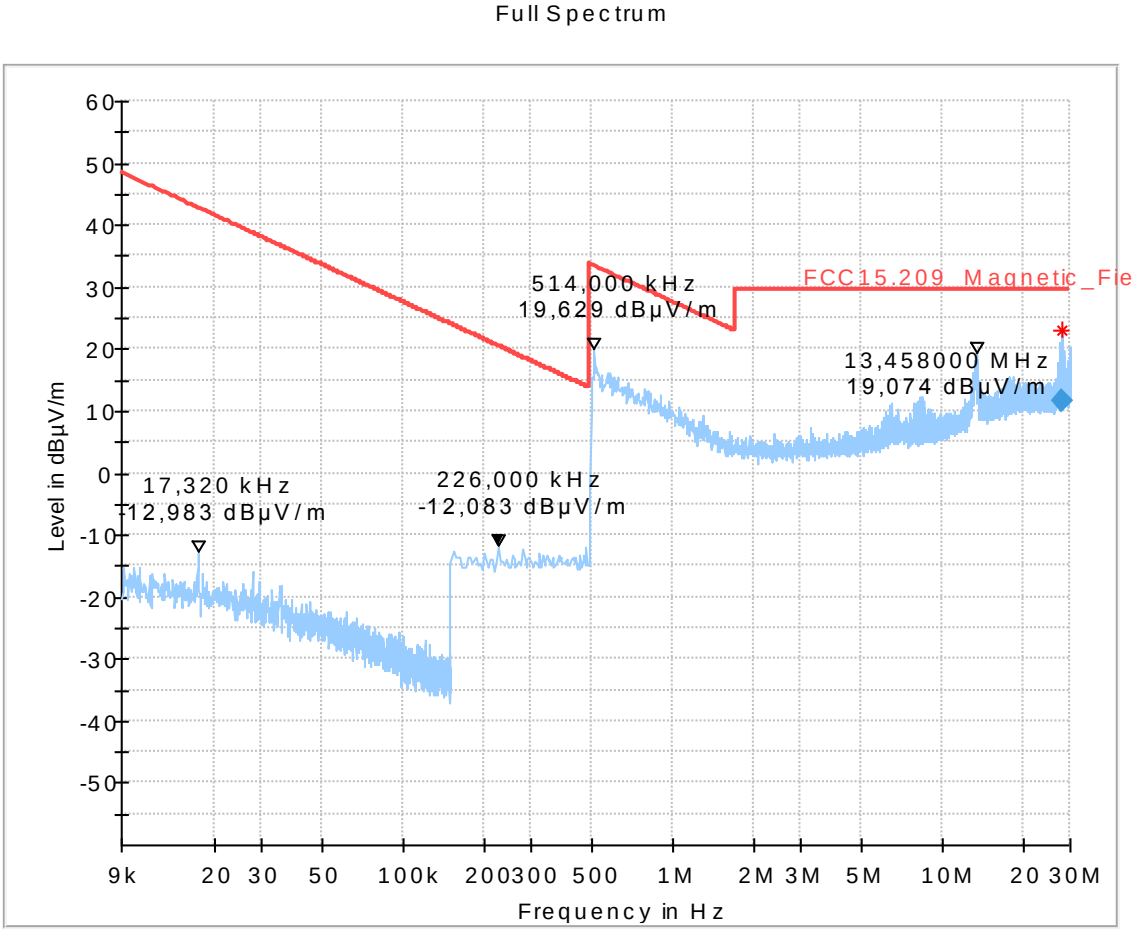
Diagram No. 2.14_ Vitoconnect OT2-WLAN2.4 GHz-TX- nMode-B.W.40MHz-MCS0-Ch6-13dBm

Common Information

Test description:	Magnetic Field Strength Measurement related to 30/300 m distance
Test site and distance:	Ref.-Nr. 441 Semi Anechoic Room (SAR) with 3 m measurement distance
Version of Testsoftware:	EMC32 V9.25.0
Distance correction:	used accord. table, pls. see test report
Technical Data:	Please see page 2 for detailed data of measurement setup
Rec. antenna (pre-scan):	height 1.00 m, parallel and 90° to EUT polarisation
Used filter:	bypass
Test specification:	FCC 15.205 § 15.209
Operator:	RIs
Operating conditions:	Continuous TX-WLAN 2.4GHz- n Mode-B.W. 40 MHz-MCS0-Ch 6 (2437 MHz)-PWR+13dBm

EUT Information

Applicant:	Viessmann Werke GmbH & Co.KG
---	---
EUT:	Vitoconnect OT2
S/N:	GNV 7637415600219108
HW version:	V005, BOM Rev-k
SW version:	Linux:0.10.0 | STM:1.33.02 | EFR32 | v1.0
Test Application:	Ember Node Test Application v1.0 Jul 1 2016
Connected Interfaces:	Optolink Via USB + UART 2 + Opentherm Loop(Master to Slave)
Test Mode Configurations:	OpenTherm & Optolink Communication Loop + Processor Load 25%
Power Supply:	12 VDC using AC/DC Adapter
AC/DC Adapter Details:	PHIHONG|Model:PSAC12R-120|Input:Ac100-240V 50-60Hz 0.5A
Line Power Supply:	120 V AC 60 Hz



Final_Result

Frequency (MHz)	RMS (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
27.998000	11.51	29.54	18.03	1000.0	10.000	100.0	V	251.0	90.0	0.5

(continuation of the "Final_Result" table from column 17 ...)

Frequency (MHz)	Comment
27.998000	16:47:47 - 05.08.2017

2.2. Radiated Field Strength Emissions – 30 MHz to 1 GHz

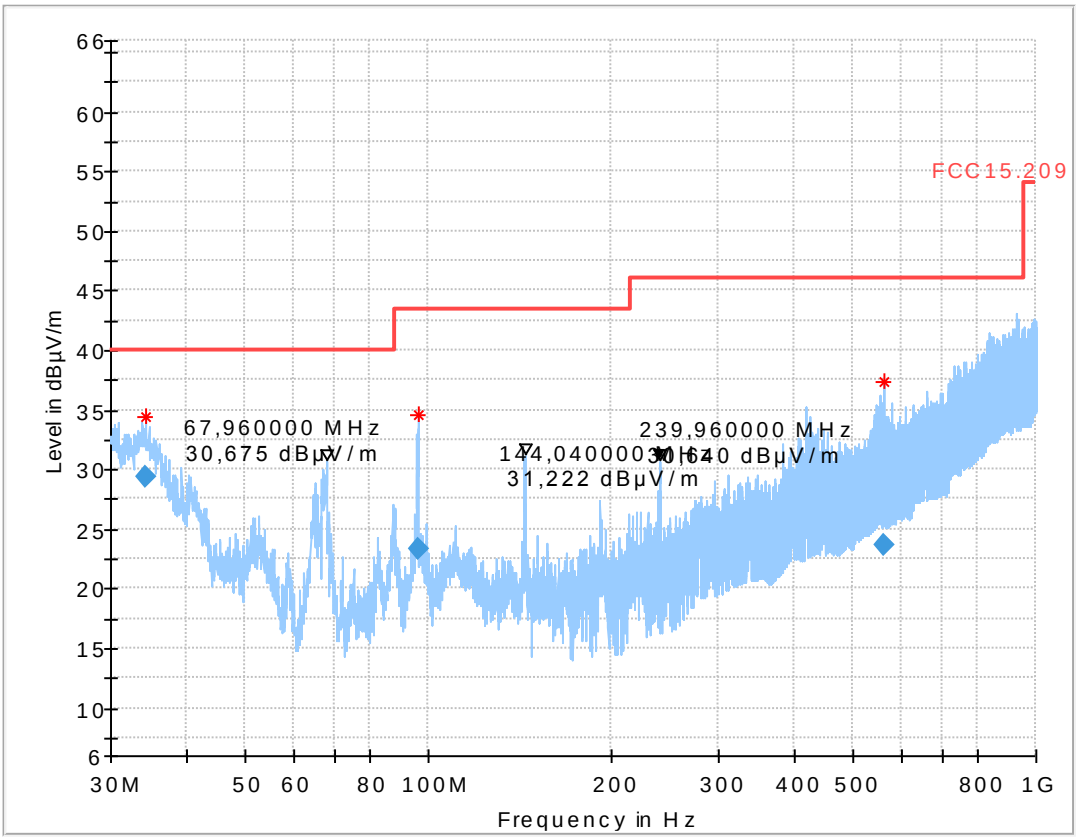
Diagram No. 3.11_ Vitoconnect OT2-WLAN2.4 GHz-TX- bMode-B.W.20MHz-1Mbps-Ch1-15dBm

Common Information

Test description:	Electric Field Strength Measurement
Test site and distance:	Ref.-Nr. 441 Semi Anechoic Room (SAR) with 3 m measurement distance
Version of Testsoftware:	EMC32 V9.25.0
Distance correction:	not used
Used filter:	not used
Technical Data:	please see page 2 for detailed data of measurement setup
Test specification.:	FCC 15.205 § 15.209
Operator:	APh
Operating conditions:	Continuous TX-WLAN 2.4GHz- b Mode-B.W. 20 MHz-1Mbps-Ch 1 (2412 MHz)-PWR+15dBm

EUT Information

Applicant:	Viessmann Werke GmbH & Co.KG
---	---
EUT:	Vitoconnect OT2
S/N:	GNV 7637415600219108
HW version:	V005, BOM Rev-k
SW version:	Linux:0.10.0 | STM:1.33.02 | EFR32 | v1.0
Test Application:	Ember Node Test Application v1.0 Jul 1 2016
Connected Interfaces:	Optolink Via USB + UART 2 + Opentherm Loop(Master to Slave)
Test Mode Configurations:	OpenTherm & Optolink Communication Loop + Processor Load 25%
Power Supply:	12 VDC using AC/DC Adapter
AC/DC Adapter Details:	PHIHONG|Model:PSAC12R-120|Input:Ac100-240V 50-60Hz 0.5A
Line Power Supply:	120 V AC 60 Hz



Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
34.328000	29.42	40.00	10.58	1000.0	120.000	214.0	H	122.0	90.0	19.5
96.016000	23.33	43.50	20.17	1000.0	120.000	105.0	V	-20.0	0.0	8.2
560.872000	23.60	46.00	22.40	1000.0	120.000	139.0	H	332.0	90.0	21.6

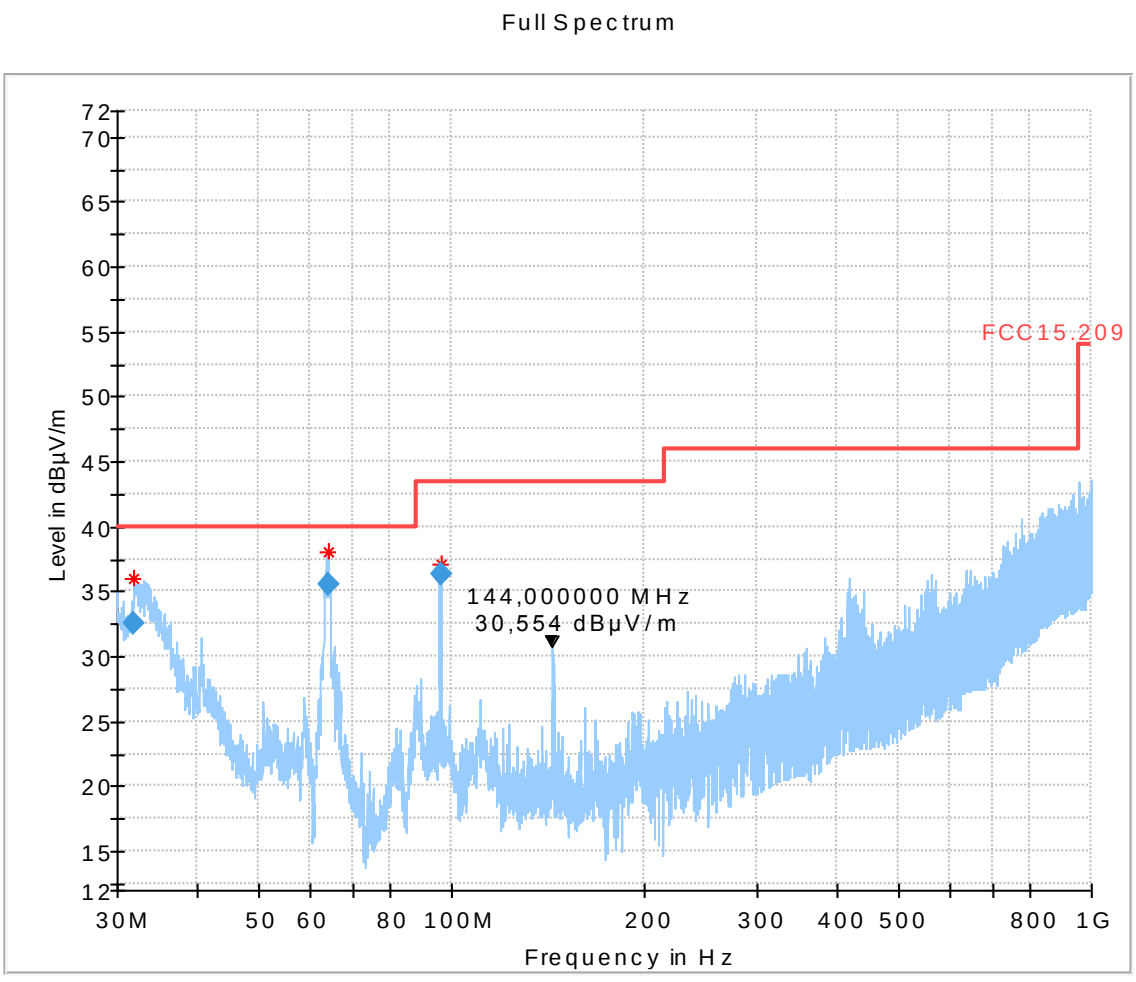
Diagram No. 3.12_ Vitoconnect OT2-WLAN2.4 GHz-TX- gMode-B.W.20MHz-6Mbps-Ch6-20dBm

Common Information

Test description:	Electric Field Strength Measurement
Test site and distance:	Ref.-Nr. 441 Semi Anechoic Room (SAR) with 3 m measurement distance
Version of Testsoftware:	EMC32 V9.25.0
Distance correction:	not used
Used filter:	not used
Technical Data:	please see page 2 for detailed data of measurement setup
Test specification.:	FCC 15.205 § 15.209
Operator:	APh
Operating conditions:	Continuous TX-WLAN 2.4GHz- g Mode-B.W. 20 MHz-6Mbps-Ch 6 (2437 MHz)-PWR+20dBm

EUT Information

Applicant:	Viessmann Werke GmbH & Co.KG
---	---
EUT:	Vitoconnect OT2
S/N:	GNV 7637415600219108
HW version:	V005, BOM Rev-k
SW version:	Linux:0.10.0 | STM:1.33.02 | EFR32 | v1.0
Test Application:	Ember Node Test Application v1.0 Jul 1 2016
Connected Interfaces:	Optolink Via USB + UART 2 + Opentherm Loop(Master to Slave)
Test Mode Configurations:	OpenTherm & Optolink Communication Loop + Processor Load 25%
Power Supply:	12 VDC using AC/DC Adapter
AC/DC Adapter Details:	PHIHONG|Model:PSAC12R-120|Input:Ac100-240V 50-60Hz 0.5A
Line Power Supply:	120 V AC 60 Hz



Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
31.784000	32.59	40.00	7.42	1000.0	120.000	170.0	H	35.0	90.0	20.7
64.084000	35.45	40.00	4.55	1000.0	120.000	124.0	V	48.0	90.0	7.5
96.012000	36.38	43.50	7.12	1000.0	120.000	105.0	V	78.0	90.0	8.2

Diagram No. 3.13_ Vitoconnect OT2-WLAN2.4 GHz-TX- nMode-B.W.20MHz-MCS0-Ch11-13dBm

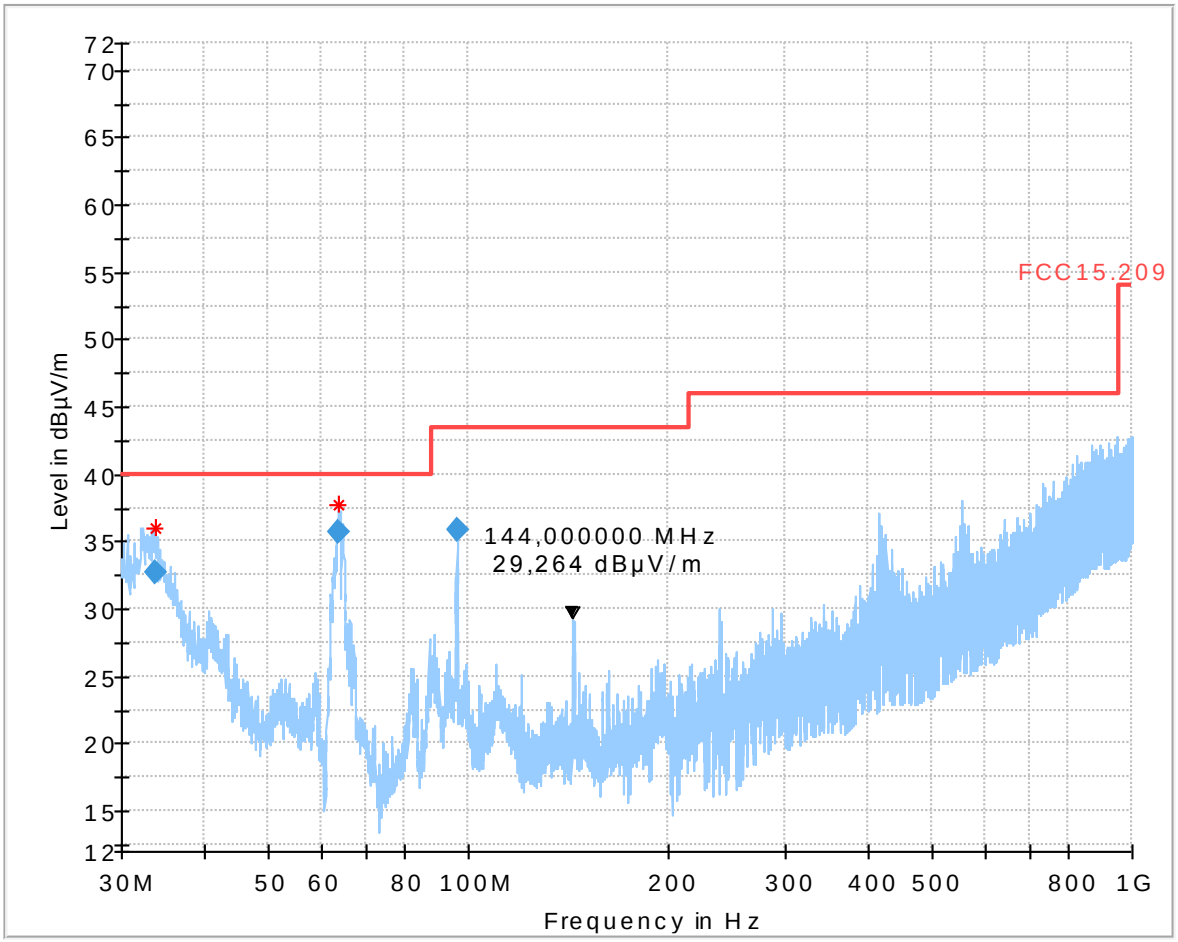
Common Information

Test description:	Electric Field Strength Measurement
Test site and distance:	Ref.-Nr. 441 Semi Anechoic Room (SAR) with 3 m measurement distance
Version of Testsoftware:	EMC32 V9.25.0
Distance correction:	not used
Used filter:	not used
Technical Data:	please see page 2 for detailed data of measurement setup
Test specification.:	FCC 15.205 § 15.209
Operator:	APh
Operating conditions:	Continuous TX-WLAN 2.4GHz- n Mode-B.W. 20 MHz-MCS0-Ch 11 (2462 MHz)-PWR+13dBm

EUT Information

Applicant:	Viessmann Werke GmbH & Co.KG
---	---
EUT:	Vitoconnect OT2
S/N:	GNV 7637415600219108
HW version:	V005, BOM Rev-k
SW version:	Linux:0.10.0 | STM:1.33.02 | EFR32 | v1.0
Test Application:	Ember Node Test Application v1.0 Jul 1 2016
Connected Interfaces:	Optolink Via USB + UART 2 + Opentherm Loop(Master to Slave)
Test Mode Configurations:	OpenTherm & Optolink Communication Loop + Processor Load 25%
Power Supply:	12 VDC using AC/DC Adapter
AC/DC Adapter Details:	PHIHONG|Model:PSAC12R-120|Input:Ac100-240V 50-60Hz 0.5A
Line Power Supply:	120 V AC 60 Hz

Full Spectrum



Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
33.640000	32.69	40.00	7.31	1000.0	120.000	155.0	H	19.0	90.0	19.8
63.560000	35.70	40.00	4.30	1000.0	120.000	105.0	V	70.0	90.0	7.7
96.008000	35.78	43.50	7.72	1000.0	120.000	115.0	V	70.0	90.0	8.2

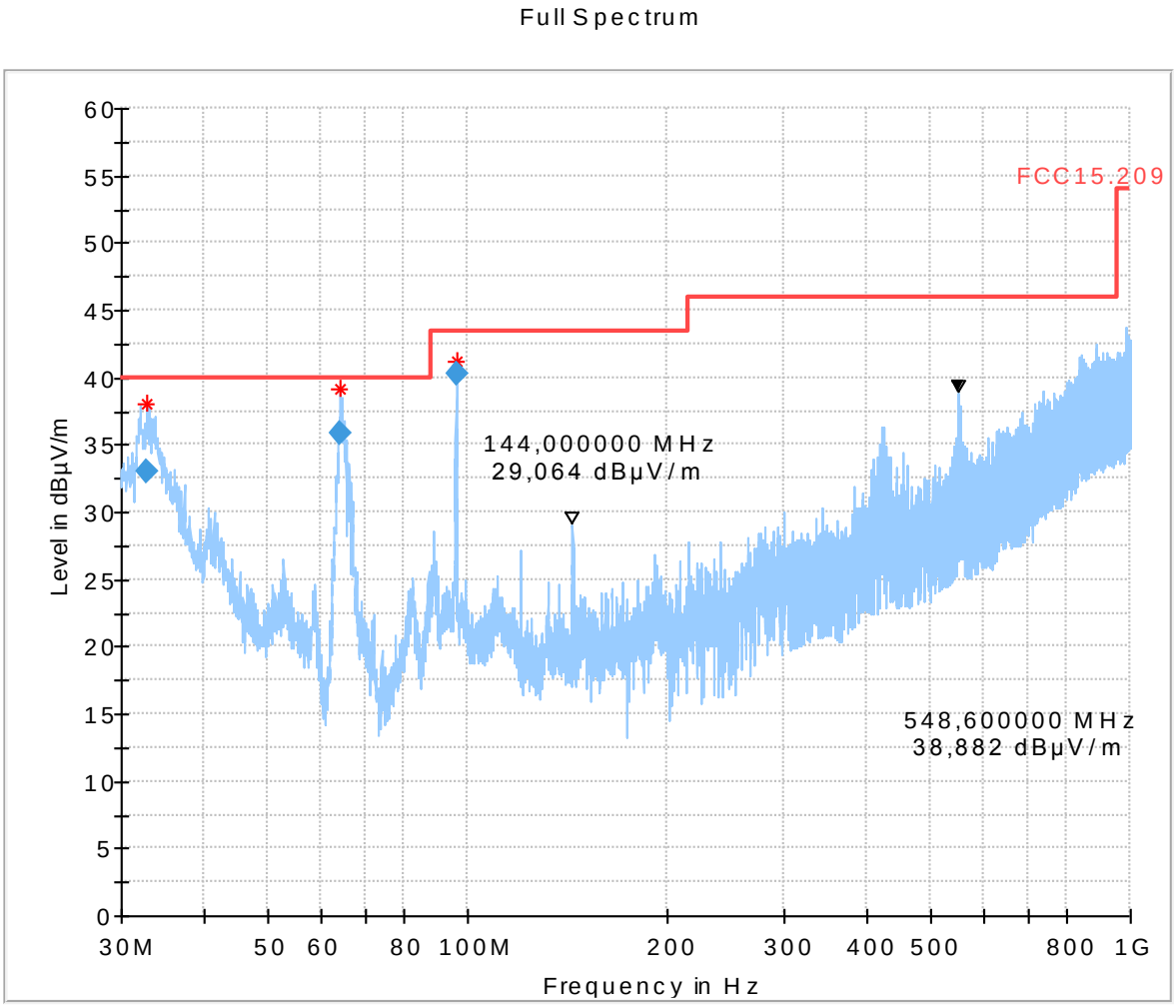
Diagram No. 3.14_ Vitoconnect OT2-WLAN2.4 GHz-TX- nMode-B.W.40MHz-MCS0-Ch6-13dBm

Common Information

Test description:	Electric Field Strength Measurement
Test site and distance:	Ref.-Nr. 441 Semi Anechoic Room (SAR) with 3 m measurement distance
Version of Testsoftware:	EMC32 V9.25.0
Distance correction:	not used
Used filter:	not used
Technical Data:	please see page 2 for detailed data of measurement setup
Test specification.:	FCC 15.205 § 15.209
Operator:	APh
Operating conditions:	Continuous TX-WLAN 2.4GHz- n Mode-B.W. 40 MHz-MCS0-Ch 6 (2437 MHz)-PWR+13dBm

EUT Information

Applicant:	Viessmann Werke GmbH & Co.KG
---	---
EUT:	Vitoconnect OT2
S/N:	GNV 7637415600219108
HW version:	V005, BOM Rev-k
SW version:	Linux:0.10.0 | STM:1.33.02 | EFR32 | v1.0
Test Application:	Ember Node Test Application v1.0 Jul 1 2016
Connected Interfaces:	Optolink Via USB + UART 2 + Opentherm Loop(Master to Slave)
Test Mode Configurations:	OpenTherm & Optolink Communication Loop + Processor Load 25%
Power Supply:	12 VDC using AC/DC Adapter
AC/DC Adapter Details:	PHIHONG|Model:PSAC12R-120|Input:Ac100-240V 50-60Hz 0.5A
Line Power Supply:	120 V AC 60 Hz



Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
32.808000	33.00	40.00	7.00	1000.0	120.000	153.0	H	5.0	90.0	20.3
64.204000	35.85	40.00	4.15	1000.0	120.000	136.0	V	42.0	0.0	7.5
96.004000	40.27	43.50	3.23	1000.0	120.000	199.0	H	-8.0	90.0	8.2

2.3. Radiated Field Strength Emissions – 1 GHz to 18 GHz

Diagram No.: 4.11_ Vitoconnect OT2-WLAN2.4 GHz-TX- bMode-B.W.20MHz-1Mbps-Ch1-15dBm

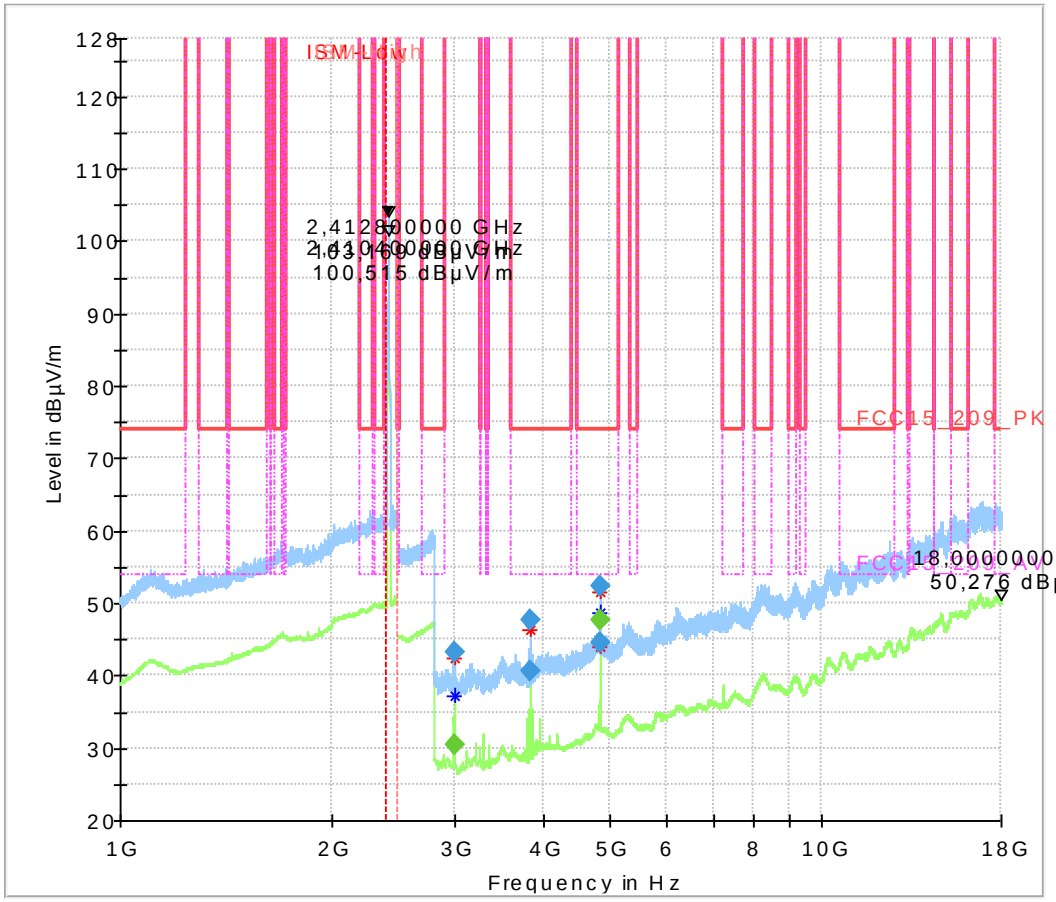
Common Information

Test Description:	Radiated Field Strength Emissions in 3m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.205 § 15.209 & FCC 15.247 Intentional Radiator
Antenna polarisation:	horizontal/vertical
Operation mode:	Continuous TX-WLAN 2.4GHz- b Mode-B.W. 20 MHz-1Mbps-Ch 1 (2412 MHz)-PWR+15dBm
Operator Name:	SLo

EUT Information

Applicant:	Viessmann Werke GmbH & Co.KG
---	---
EUT:	Vitoconnect OT2
S/N:	GNV 7637415600219108
HW version:	V005, BOM Rev-k
SW version:	Linux:0.10.0 | STM:1.33.02 | EFR32 | v1.0
Test Application:	Ember Node Test Application v1.0 Jul 1 2016
Connected Interfaces:	Optolink Via USB + UART 2 + Opentherm Loop(Master to Slave)
Test Mode Configurations:	OpenTherm & Optolink Communication Loop + Processor Load 25%
Power Supply:	12 VDC using AC/DC Adapter
AC/DC Adapter Details:	PHIHONG|Model:PSAC12R-120|Input:Ac100-240V 50-60Hz 0.5A
Line Power Supply:	120 V AC 60 Hz

Duty Cycle Correction Factors are applicable to Average Values indicated by Markers.



Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m) With Duty Cycle Correction-Factor	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)
2988.840000	43.24	---	150.00	106.76	100.0	1000.000	155.0	H	265.0	90.0
2989.200000	---	30.52	150.00	119.48	100.0	1000.000	155.0	H	268.0	90.0
3837.000000	40.52	---	74.00	33.48	100.0	1000.000	155.0	H	163.0	0.0
3840.760000	47.76	---	74.00	26.24	100.0	1000.000	155.0	V	3.0	0.0
4823.960000	---	47.71	54.00	6.29	100.0	1000.000	155.0	H	90.0	90.0
4823.960000	52.43	---	74.00	21.57	100.0	1000.000	155.0	H	87.0	90.0
4825.600000	44.57	---	74.00	29.43	100.0	1000.000	155.0	H	283.0	0.0

(continuation of the "Final_Result" table from column 16 ...)

Frequency (MHz)	Corr. (dB)
2988.840000	-1.0
2989.200000	-1.0
3837.000000	0.4
3840.760000	0.4
4823.960000	4.8
4823.960000	4.8
4825.600000	4.8

Diagram No.: 4.12_ Vitoconnect OT2-WLAN2.4 GHz-TX- gMode-B.W.20MHz-6Mbps-Ch6-20dBm

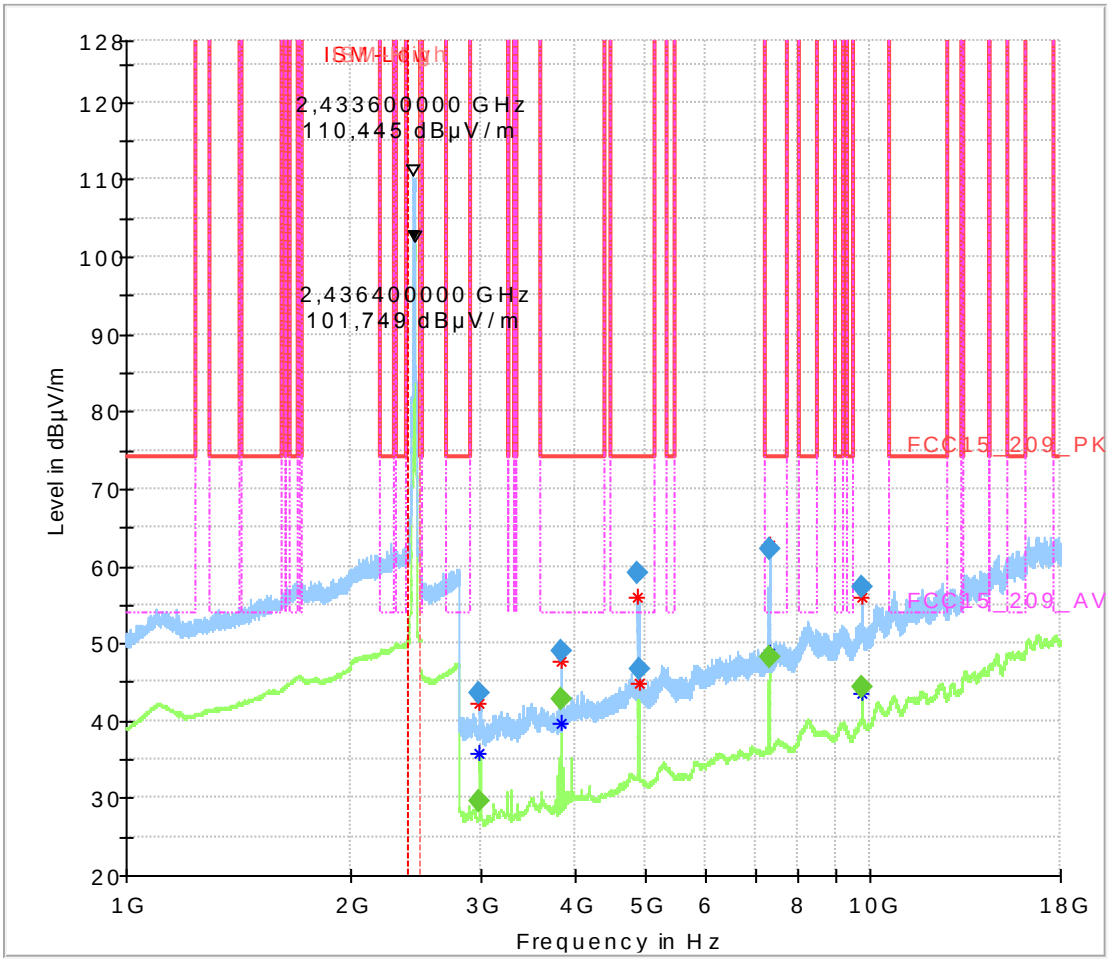
Common Information

Test Description:	Radiated Field Strength Emissions in 3m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.205 § 15.209 & FCC 15.247 Intentional Radiator
Antenna polarisation:	horizontal/vertical
Operation mode:	Continuous TX-WLAN 2.4GHz- g Mode-B.W. 20 MHz-6Mbps-Ch 6 (2437 MHz)-PWR+20dBm
Operator Name:	SLo

EUT Information

Applicant:	Viessmann Werke GmbH & Co.KG
---	---
EUT:	Vitoconnect OT2
S/N:	GNV 7637415600219108
HW version:	V005, BOM Rev-k
SW version:	Linux:0.10.0 | STM:1.33.02 | EFR32 | v1.0
Test Application:	Ember Node Test Application v1.0 Jul 1 2016
Connected Interfaces:	Optolink Via USB + UART 2 + Opentherm Loop(Master to Slave)
Test Mode Configurations:	OpenTherm & Optolink Communication Loop + Processor Load 25%
Power Supply:	12 VDC using AC/DC Adapter
AC/DC Adapter Details:	PHIHONG|Model:PSAC12R-120|Input:Ac100-240V 50-60Hz 0.5A
Line Power Supply:	120 V AC 60 Hz

Duty Cycle Correction Factors are applicable to Average Values indicated by Markers.



Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m) With Duty Cycle Correction-Factor	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)
2985.720000	---	29.68	150.00	120.32	100.0	1000.000	155.0	V	274.0	0.0
2986.440000	43.60	---	150.00	106.40	100.0	1000.000	155.0	V	271.0	0.0
3840.760000	---	43.03	54.00	10.97	100.0	1000.000	155.0	H	-30.0	0.0
3840.760000	49.01	---	74.00	24.99	100.0	1000.000	155.0	H	-15.0	0.0
4875.200000	59.14	---	74.00	14.86	100.0	1000.000	155.0	V	127.0	0.0
4889.000000	46.72	---	74.00	27.28	100.0	1000.000	155.0	H	187.0	90.0
7309.720000	---	48.25	54.00	5.75	100.0	1000.000	155.0	H	90.0	90.0
7311.560000	62.17	---	74.00	11.83	100.0	1000.000	155.0	H	9.0	90.0
9747.960000	---	44.54	150.00	105.46	100.0	1000.000	155.0	H	58.0	90.0
9754.200000	57.36	---	150.00	92.64	100.0	1000.000	155.0	H	315.0	90.0

(continuation of the "Final_Result" table from column 16 ...)

Frequency (MHz)	Corr. (dB)
2985.720000	-1.0
2986.440000	-1.0
3840.760000	0.4
3840.760000	0.4
4875.200000	4.7
4889.000000	4.6
7309.720000	10.6
7311.560000	10.6
9747.960000	14.8
9754.200000	14.8

Diagram No.: 4.13_ Vitoconnect OT2-WLAN2.4 GHz-TX- nMode-B.W.20MHz-MCS0-Ch11-13dBm

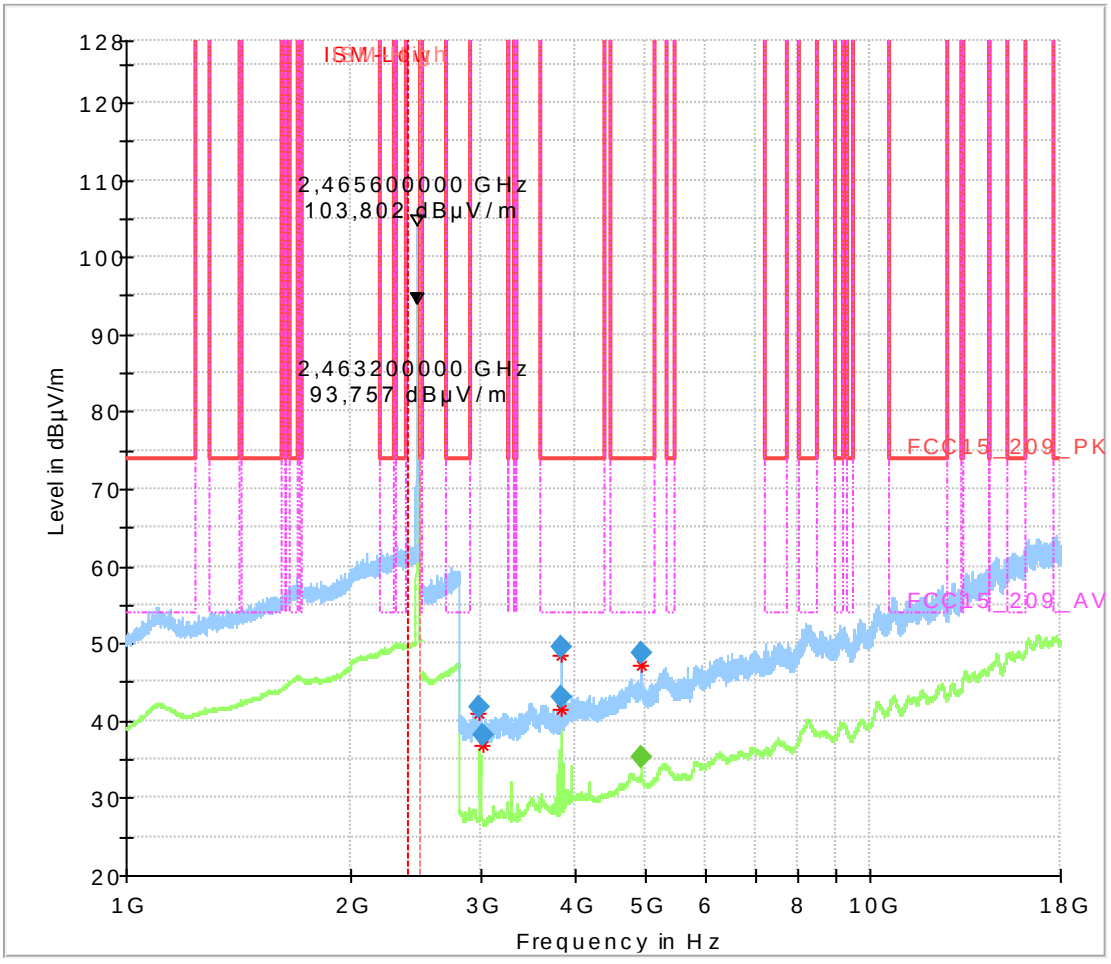
Common Information

Test Description:	Radiated Field Strength Emissions in 3m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.205 § 15.209 & FCC 15.247 Intentional Radiator
Antenna polarisation:	horizontal/vertical
Operation mode:	Continuous TX-WLAN 2.4GHz- n Mode-B.W. 20 MHz-MCS0-Ch 11 (2462 MHz)-PWR+13dBm
Operator Name:	SLo

EUT Information

Applicant:	Viessmann Werke GmbH & Co.KG
---	---
EUT:	Vitoconnect OT2
S/N:	GNV 7637415600219108
HW version:	V005, BOM Rev-k
SW version:	Linux:0.10.0 | STM:1.33.02 | EFR32 | v1.0
Test Application:	Ember Node Test Application v1.0 Jul 1 2016
Connected Interfaces:	Optolink Via USB + UART 2 + Opentherm Loop(Master to Slave)
Test Mode Configurations:	OpenTherm & Optolink Communication Loop + Processor Load 25%
Power Supply:	12 VDC using AC/DC Adapter
AC/DC Adapter Details:	PHIHONG|Model:PSAC12R-120|Input:Ac100-240V 50-60Hz 0.5A
Line Power Supply:	120 V AC 60 Hz

Duty Cycle Correction Factors are applicable to Average Values indicated by Markers.



Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m) With Duty Cycle Correction-Factor	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)
2985.920000	41.87	---	150.00	108.13	100.0	1000.000	155.0	V	261.0	90.0
3020.120000	38.11	---	150.00	111.89	100.0	1000.000	155.0	V	95.0	0.0
3840.760000	49.57	---	74.00	24.43	100.0	1000.000	155.0	H	-2.0	0.0
3852.800000	42.96	---	74.00	31.04	100.0	1000.000	155.0	V	327.0	90.0
4923.960000	---	35.44	54.00	18.56	100.0	1000.000	155.0	H	49.0	90.0
4926.720000	48.83	---	74.00	25.17	100.0	1000.000	155.0	H	44.0	90.0

(continuation of the "Final_Result" table from column 16 ...)

Frequency (MHz)	Corr. (dB)
2985.920000	-1.0
3020.120000	-1.2
3840.760000	0.4
3852.800000	0.4
4923.960000	4.5
4926.720000	4.5

Diagram No.: 4.14_ Vitoconnect OT2-WLAN2.4 GHz-TX- nMode-B.W.40MHz-MCS0-Ch6-13dBm

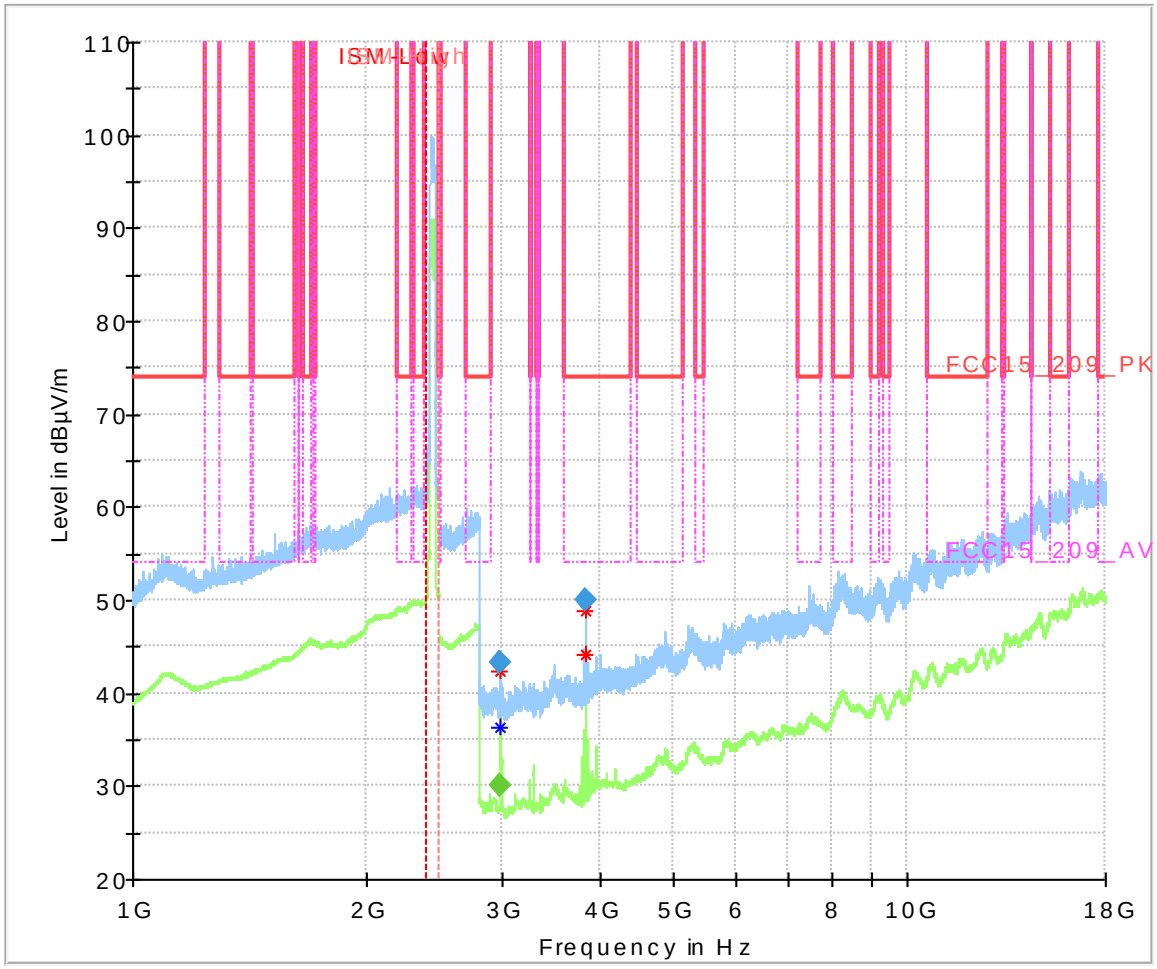
Common Information

Test Description:	Radiated Field Strength Emissions in 3m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.205 § 15.209 & FCC 15.247 Intentional Radiator
Antenna polarisation:	horizontal/vertical
Operation mode:	Continuous TX-WLAN 2.4GHz- n Mode-B.W. 40 MHz-MCS0-Ch 6 (2437 MHz)-PWR+13dBm
Operator Name:	APh

EUT Information

Applicant:	Viessmann Werke GmbH & Co.KG
EUT:	Vitoconnect OT2
S/N:	GNV 7637415600219108
HW version:	V005, BOM Rev-k
SW version:	Linux:0.10.0 | STM:1.33.02 | EFR32 | v1.0
Test Application:	Ember Node Test Application v1.0 Jul 1 2016
Connected Interfaces:	Optolink Via USB + UART 2 + Opentherm Loop(Master to Slave)
Test Mode Configurations:	OpenTherm & Optolink Communication Loop + Processor Load 25%
Power Supply:	12 VDC using AC/DC Adapter
AC/DC Adapter Details:	PHIHONG|Model:PSAC12R-120|Input:Ac100-240V 50-60Hz 0.5A
Line Power Supply:	120 V AC 60 Hz

Duty Cycle Correction Factors are applicable to Average Values indicated by Markers.



Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m) With Duty Cycle Correction-Factor	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)
2985.720000	---	30.34	150.00	119.66	100.0	1000.000	155.0	H	265.0	90.0
2985.840000	43.28	---	150.00	106.72	100.0	1000.000	155.0	H	263.0	90.0
3840.760000	50.09	---	74.00	23.91	100.0	1000.000	155.0	H	-2.0	0.0

(continuation of the "Final_Result" table from column 16 ...)

Frequency (MHz)	Corr. (dB)
2985.720000	-1.0
2985.840000	-1.0
3840.760000	0.4

2.4. Radiated Field Strength Emissions – 18 GHz to 25 GHz

Diagram No.: 4.11a_Vitoconnect OT2-WLAN2.4Ghz-TX-bMode-B.W.20MHz-1Mbps-CH1-15dBm

Common Information

Test Description:	Radiated field strength emission in 1m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.205 § 15.209 & FCC 15.247 Intentional Radiator
Antenna polarisation:	horizontal/vertical
Distance correction factor	3 to 1m: -10.5 dB applying to measurement results
SW-Version:	EMC32 V8.53.0
Operation mode:	Continuous TX-WLAN 2.4GHz- b Mode-B.W. 20 MHz-1Mbps-Ch 1 (2412 MHz)-PWR+15dBm
Operator Name:	TFr

EUT Information

Applicant:	Viessmann Werke GmbH & Co.KG
---	---
EUT:	Vitoconnect OT2
S/N:	GNV 7637415600219108
HW version:	V005, BOM Rev-k
SW version:	Linux:0.10.0 | STM:1.33.02 | EFR32 | v1.0
Test Application:	Ember Node Test Application v1.0 Jul 1 2016
Connected Interfaces:	Optolink Via USB + UART 2 + Opentherm Loop(Master to Slave)
Test Mode Configurations:	OpenTherm & Optolink Communication Loop + Processor Load 25%
Power Supply:	12 VDC using AC/DC Adapter
AC/DC Adapter Details:	PHIHONG|Model:PSAC12R-120|Input:Ac100-240V 50-60Hz 0.5A
Line Power Supply:	120 V AC 60 Hz

Duty Cycle Correction Factors are applicable to Average Values indicated by Markers.

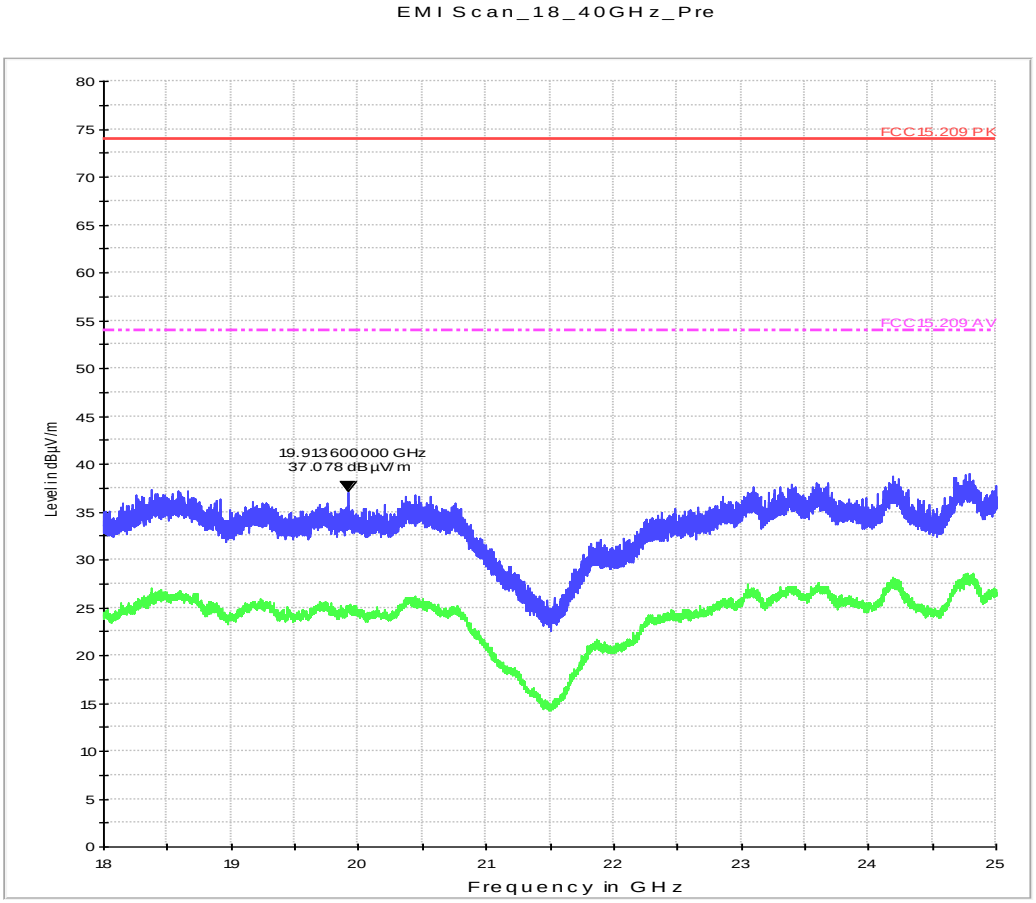


Diagram No.: 4.12a_Vitoconnect OT2-WLAN2.4Ghz-TX-gMode-B.W.20MHz-6Mbps-CH6-20dBm

Common Information

Test Description:	Radiated field strength emission in 1m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.205 § 15.209 & FCC 15.247 Intentional Radiator
Antenna polarisation:	horizontal/vertical
Distance correction factor	3 to 1m: -10.5 dB applying to measurement results
SW-Version:	EMC32 V8.53.0
Operation mode:	Continuous TX-WLAN 2.4GHz- g Mode-B.W. 20 MHz-6Mbps-Ch 6 (2437 MHz)-PWR+20dBm
Operator Name:	TFr

EUT Information

Applicant:	Viessmann Werke GmbH & Co.KG
---	---
EUT:	Vitoconnect OT2
S/N:	GNV 7637415600219108
HW version:	V005, BOM Rev-k
SW version:	Linux:0.10.0 | STM:1.33.02 | EFR32 | v1.0
Test Application:	Ember Node Test Application v1.0 Jul 1 2016
Connected Interfaces:	Optolink Via USB + UART 2 + Opentherm Loop(Master to Slave)
Test Mode Configurations:	OpenTherm & Optolink Communication Loop + Processor Load 25%
Power Supply:	12 VDC using AC/DC Adapter
AC/DC Adapter Details:	PHIHONG|Model:PSAC12R-120|Input:Ac100-240V 50-60Hz 0.5A
Line Power Supply:	120 V AC 60 Hz

Duty Cycle Correction Factors are applicable to Average Values indicated by Markers.

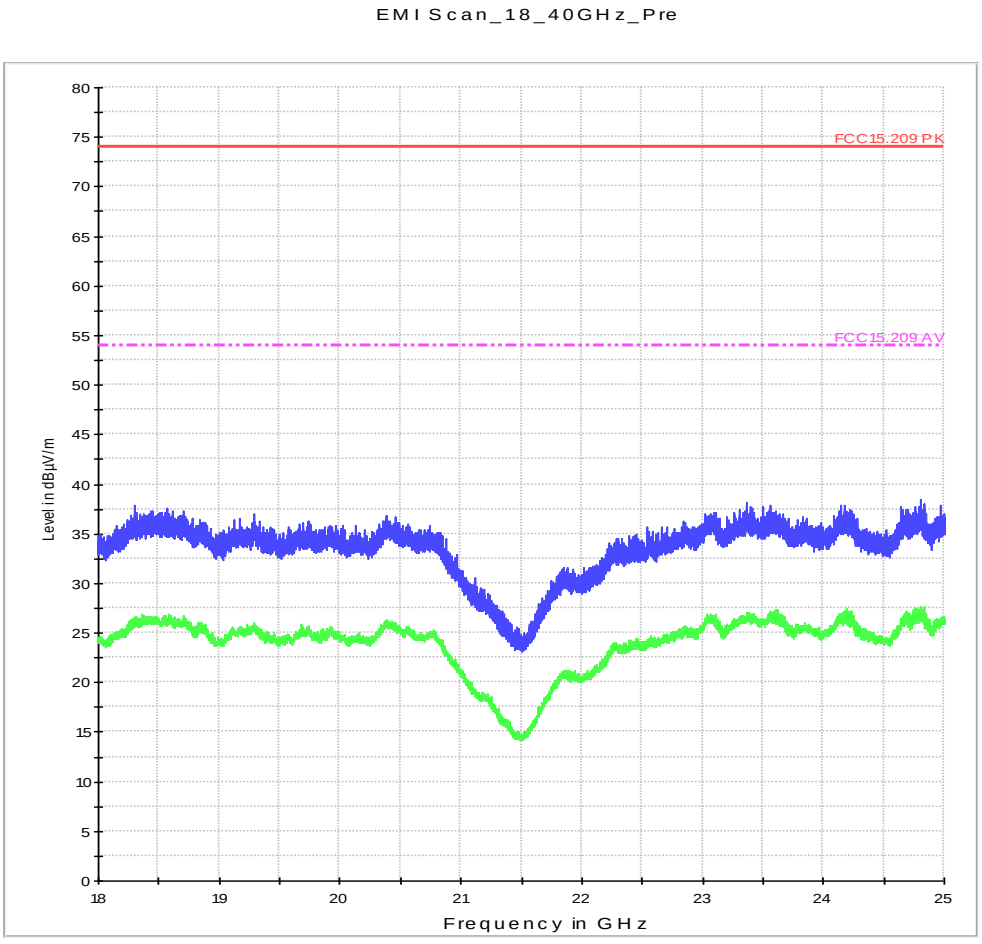


Diagram No.: 4.13a_Vitoconnect OT2-WLAN2.4Ghz-TX-nMode-B.W.20MHz-MCS0-CH11-13dBm

Common Information

Test Description:	Radiated field strength emission in 1m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.205 § 15.209 & FCC 15.247 Intentional Radiator
Antenna polarisation:	horizontal/vertical
Distance correction factor	3 to 1m: -10.5 dB applying to measurement results
SW-Version:	EMC32 V8.53.0
Operation mode:	Continuous TX-WLAN 2.4GHz- n Mode-B.W. 20 MHz-MCS0-Ch 11 (2462 MHz)-PWR+13dBm
Operator Name:	TFr

EUT Information

Applicant:	Viessmann Werke GmbH & Co.KG
---	---
EUT:	Vitoconnect OT2
S/N:	GNV 7637415600219108
HW version:	V005, BOM Rev-k
SW version:	Linux:0.10.0 | STM:1.33.02 | EFR32 | v1.0
Test Application:	Ember Node Test Application v1.0 Jul 1 2016
Connected Interfaces:	Optolink Via USB + UART 2 + Opentherm Loop(Master to Slave)
Test Mode Configurations:	OpenTherm & Optolink Communication Loop + Processor Load 25%
Power Supply:	12 VDC using AC/DC Adapter
AC/DC Adapter Details:	PHIHONG|Model:PSAC12R-120|Input:Ac100-240V 50-60Hz 0.5A
Line Power Supply:	120 V AC 60 Hz

Duty Cycle Correction Factors are applicable to Average Values indicated by Markers.

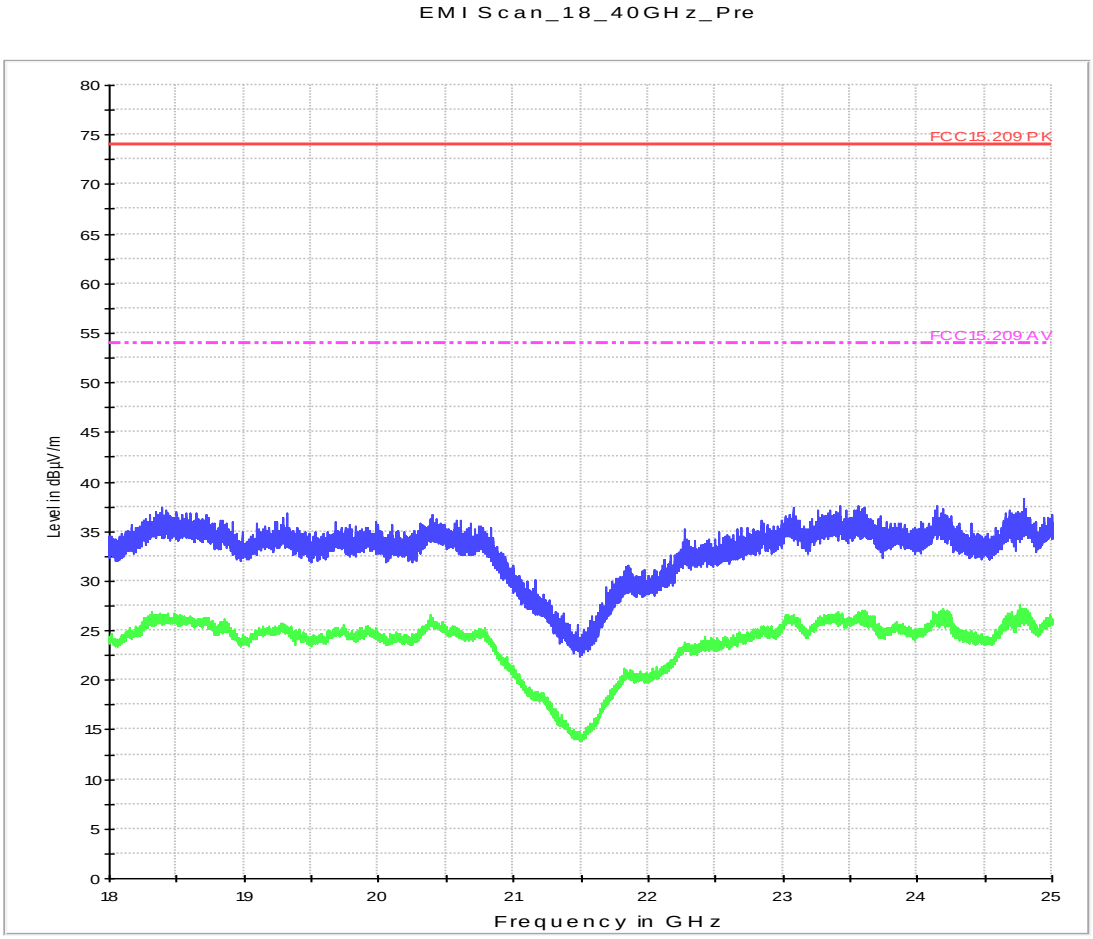


Diagram No.: 4.14a_Vitoconnect OT2-WLAN2.4Ghz-TX-nMode-B.W.40MHz-MCS0-CH6-13dBm

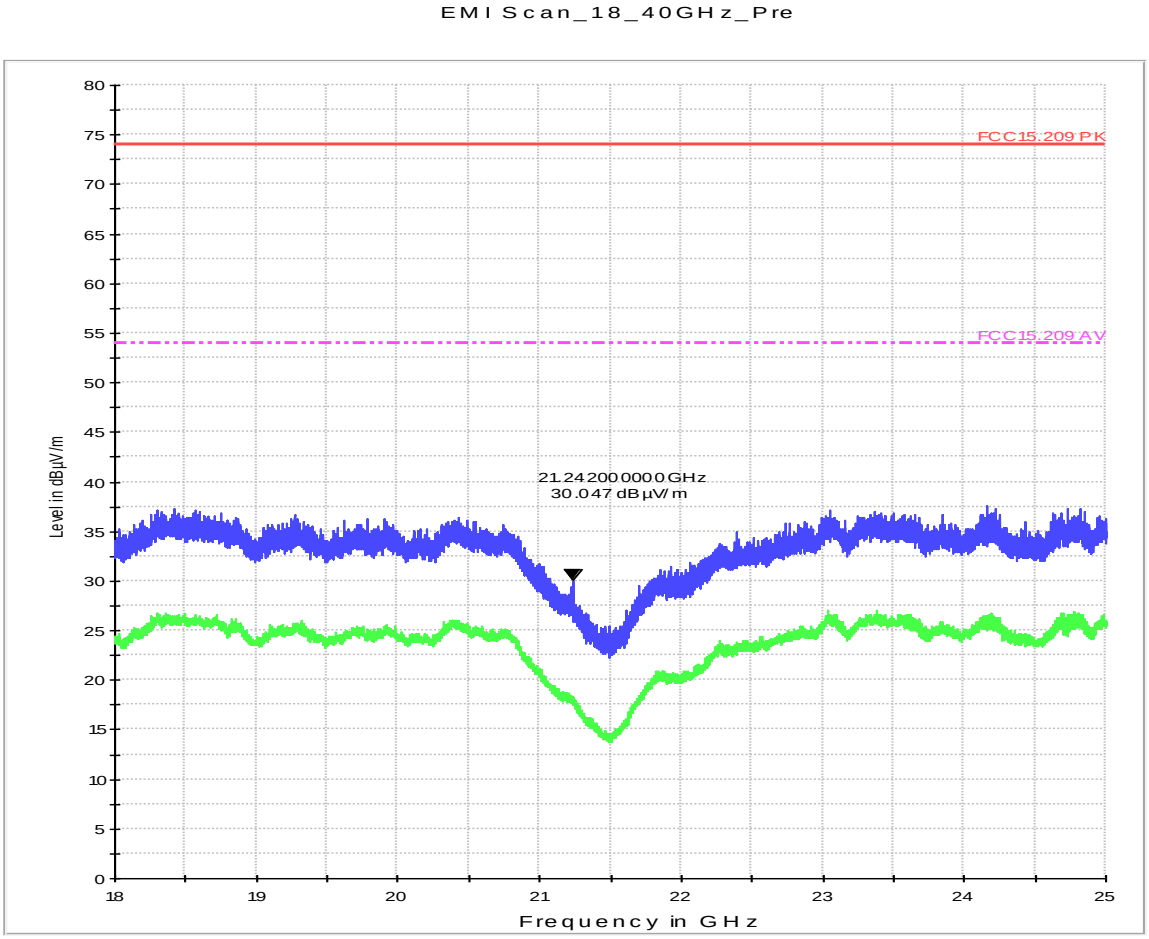
Common Information

Test Description:	Radiated field strength emission in 1m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.205 § 15.209 & FCC 15.247 Intentional Radiator
Antenna polarisation:	horizontal/vertical
Distance correction factor	3 to 1m: -10.5 dB applying to measurement results
SW-Version:	EMC32 V8.53.0
Operation mode:	Continuous TX-WLAN 2.4GHz- n Mode-B.W. 40 MHz-MCS0-Ch 6 (2437 MHz)-PWR+13dBm
Operator Name:	TFr

EUT Information

Applicant:	Viessmann Werke GmbH & Co.KG
---	---
EUT:	Vitoconnect OT2
S/N:	GNV 7637415600219108
HW version:	V005, BOM Rev-k
SW version:	Linux:0.10.0 | STM:1.33.02 | EFR32 | v1.0
Test Application:	Ember Node Test Application v1.0 Jul 1 2016
Connected Interfaces:	Optolink Via USB + UART 2 + Opentherm Loop(Master to Slave)
Test Mode Configurations:	OpenTherm & Optolink Communication Loop + Processor Load 25%
Power Supply:	12 VDC using AC/DC Adapter
AC/DC Adapter Details:	PHIHONG|Model:PSAC12R-120|Input:Ac100-240V 50-60Hz 0.5A
Line Power Supply:	120 V AC 60 Hz

Duty Cycle Correction Factors are applicable to Average Values indicated by Markers.



3. Radiated Band-Edge Measurements

3.1. Band-Edge Measurements – WLAN2.4 GHz-b Mode-1Mbps

Diagram No.: 9.11_BE Low- Vitoconnect OT2-WLAN2.4 GHz-TX- bMode-B.W.20MHz-1Mbps-Ch1-15dBm

Common Information

Test Description:	Band-Edge: Radiated Field Strength Emissions in 3m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.205 § 15.209 & FCC 15.247 Intentional Radiator
Antenna polarisation:	horizontal/vertical
Operation mode:	Continuous TX-WLAN 2.4GHz- b Mode-B.W. 20 MHz-1Mbps-Ch 1 (2412 MHz)-PWR+15dBm
Operator Name:	APh

EUT Information

Applicant:	Viessmann Werke GmbH & Co.KG
---	---
EUT:	Vitoconnect OT2
S/N:	GNV 7637415600219108
HW version:	V005, BOM Rev-k
SW version:	Linux:0.10.0 | STM:1.33.02 | EFR32 | v1.0
Test Application:	Ember Node Test Application v1.0 Jul 1 2016
Connected Interfaces:	Optolink Via USB + UART 2 + Opentherm Loop(Master to Slave)
Test Mode Configurations:	OpenTherm & Optolink Communication Loop + Processor Load 25%
Power Supply:	12 VDC using AC/DC Adapter
AC/DC Adapter Details:	PHIHONG|Model:PSAC12R-120|Input:Ac100-240V 50-60Hz 0.5A
Line Power Supply:	120 V AC 60 Hz

Duty Cycle Correction Factors are applicable to Average Values indicated by Markers.

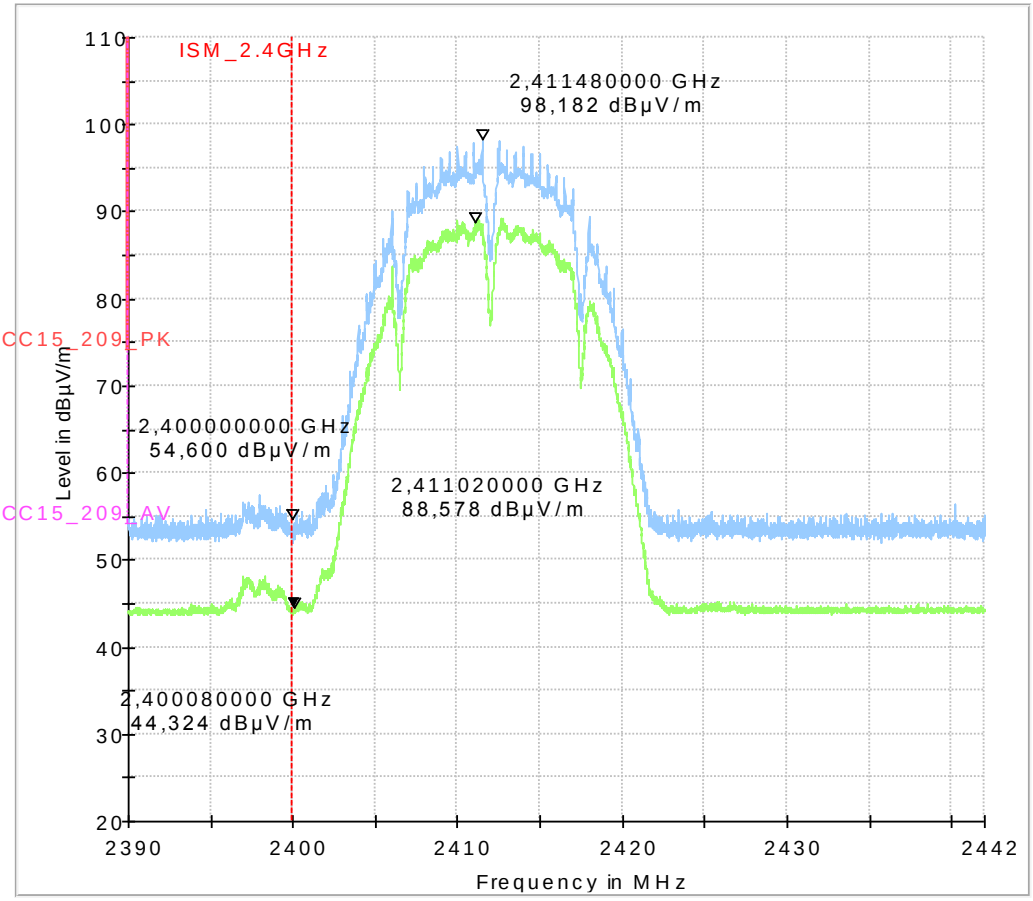


Diagram No.: 9.12_BE High- Vitoconnect OT2-WLAN2.4 GHz-TX- bMode-B.W.20MHz-1Mbps-Ch11-16dBm

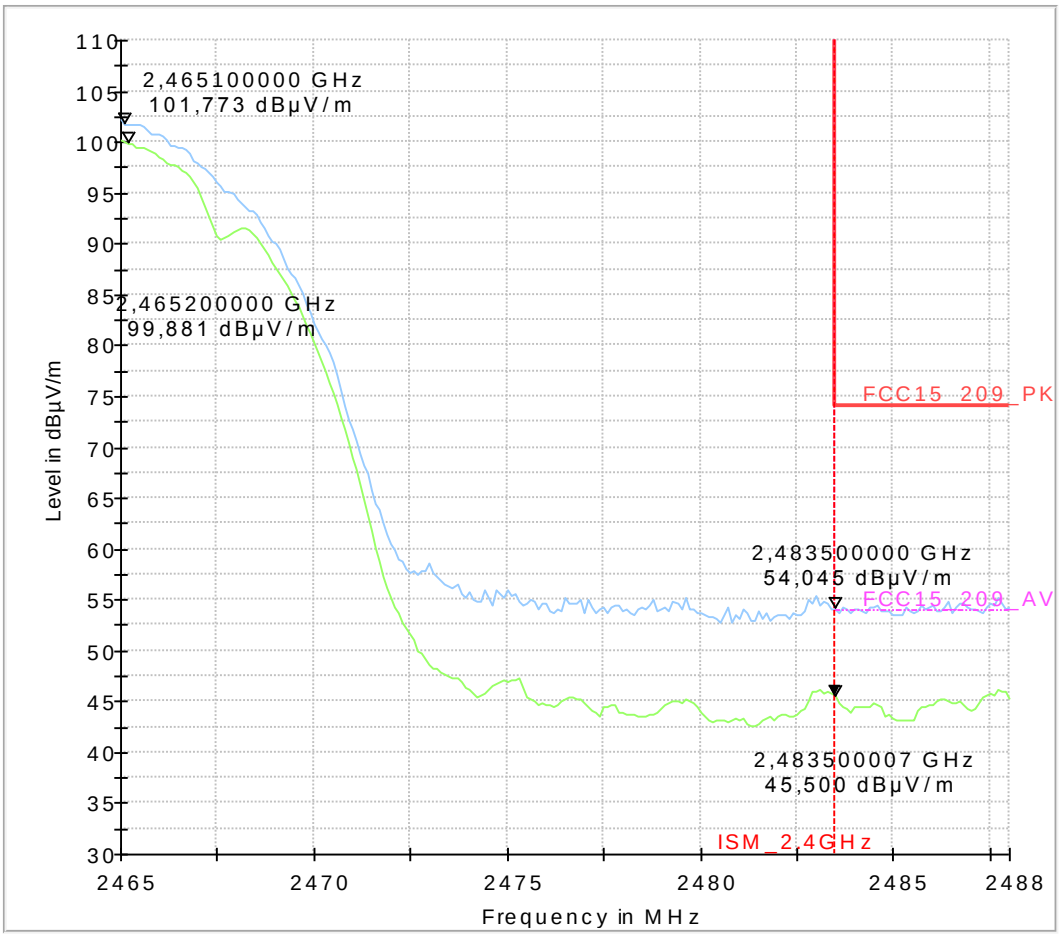
Common Information

Test Description:	Band-Edge: Radiated Field Strength Emissions in 3m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.205 § 15.209 & FCC 15.247 Intentional Radiator
Antenna polarisation:	horizontal/vertical
Operation mode:	Continuous TX-WLAN 2.4GHz- b Mode-B.W. 20 MHz-1Mbps-Ch 11 (2462 MHz)-PWR+16dBm
Operator Name:	KIv

EUT Information

Applicant:	Viessmann Werke GmbH & Co.KG
---	---
EUT:	Vitoconnect OT2
S/N:	GNV 7637415600219108
HW version:	V005, BOM Rev-k
SW version:	Linux:0.10.0 | STM:1.33.02 | EFR32 | v1.0
Test Application:	Ember Node Test Application v1.0 Jul 1 2016
Connected Interfaces:	Optolink Via USB + UART 2 + Opentherm Loop(Master to Slave)
Test Mode Configurations:	OpenTherm & Optolink Communication Loop + Processor Load 25%
Power Supply:	12 VDC using AC/DC Adapter
AC/DC Adapter Details:	PHIHONG|Model:PSAC12R-120|Input:Ac100-240V 50-60Hz 0.5A
Line Power Supply:	120 V AC 60 Hz

Duty Cycle Correction Factors are applicable to Average Values indicated by Markers.



3.2. Band-Edge Measurements – WLAN2.4 GHz- g Mode-6Mbps

Diagram No.: 9.13_BE Low- Vitoconnect OT2-WLAN2.4 GHz-TX- gMode-B.W.20MHz-6Mbps-Ch1-13dBm

Common Information

Test Description:	Band-Edge: Radiated Field Strength Emissions in 3m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.205 § 15.209 & FCC 15.247 Intentional Radiator
Antenna polarisation:	horizontal/vertical
Operation mode:	Continuous TX-WLAN 2.4GHz- g Mode-B.W. 20 MHz-6Mbps-Ch 1 (2412 MHz)-PWR+13dBm
Operator Name:	KIv

EUT Information

Applicant:	Viessmann Werke GmbH & Co.KG
---	---
EUT:	Vitoconnect OT2
S/N:	GNV 7637415600219108
HW version:	V005, BOM Rev-k
SW version:	Linux:0.10.0 | STM:1.33.02 | EFR32 | v1.0
Test Application:	Ember Node Test Application v1.0 Jul 1 2016
Connected Interfaces:	Optolink Via USB + UART 2 + Opentherm Loop(Master to Slave)
Test Mode Configurations:	OpenTherm & Optolink Communication Loop + Processor Load 25%
Power Supply:	12 VDC using AC/DC Adapter
AC/DC Adapter Details:	PHIHONG|Model:PSAC12R-120|Input:Ac100-240V 50-60Hz 0.5A
Line Power Supply:	120 V AC 60 Hz

Duty Cycle Correction Factors are applicable to Average Values indicated by Markers.

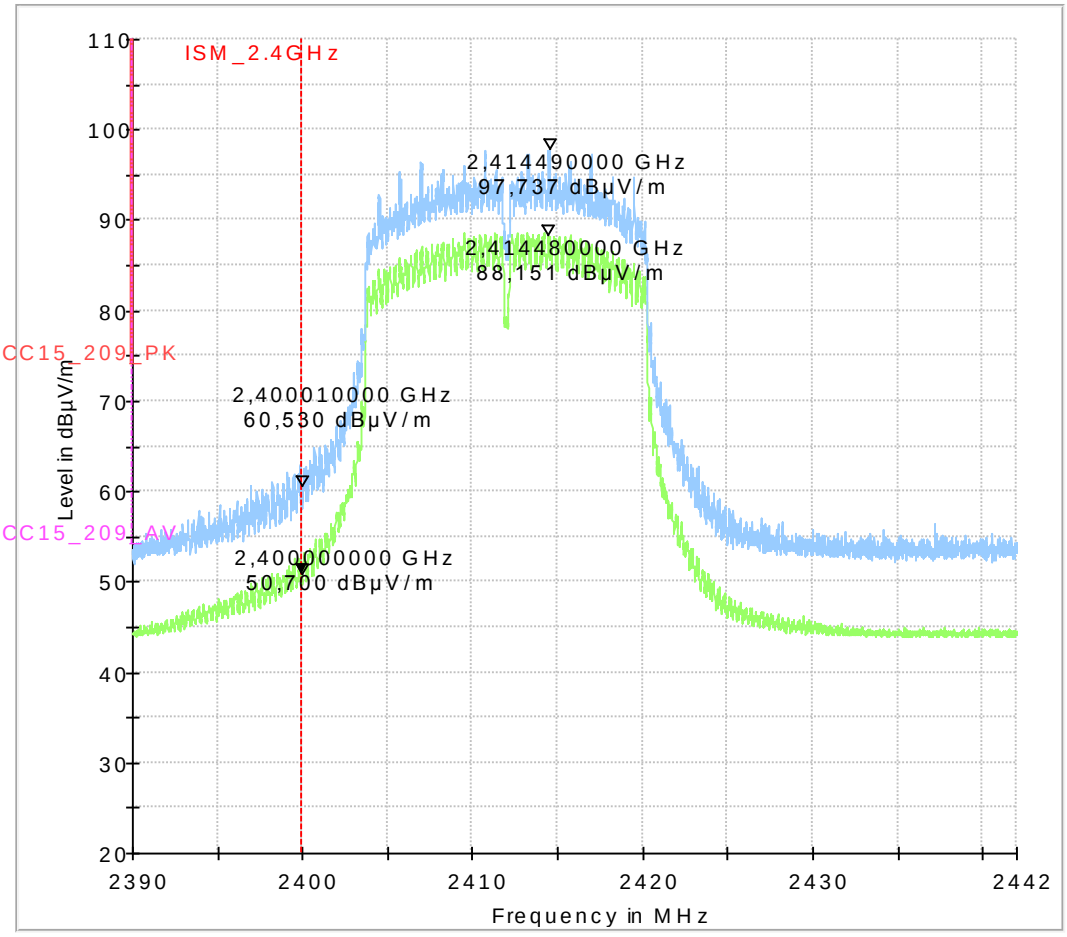


Diagram No.: 9.14_BE High- Vitoconnect OT2-WLAN2.4 GHz-TX- gMode-B.W.20MHz-6Mbps-Ch11-14dBm

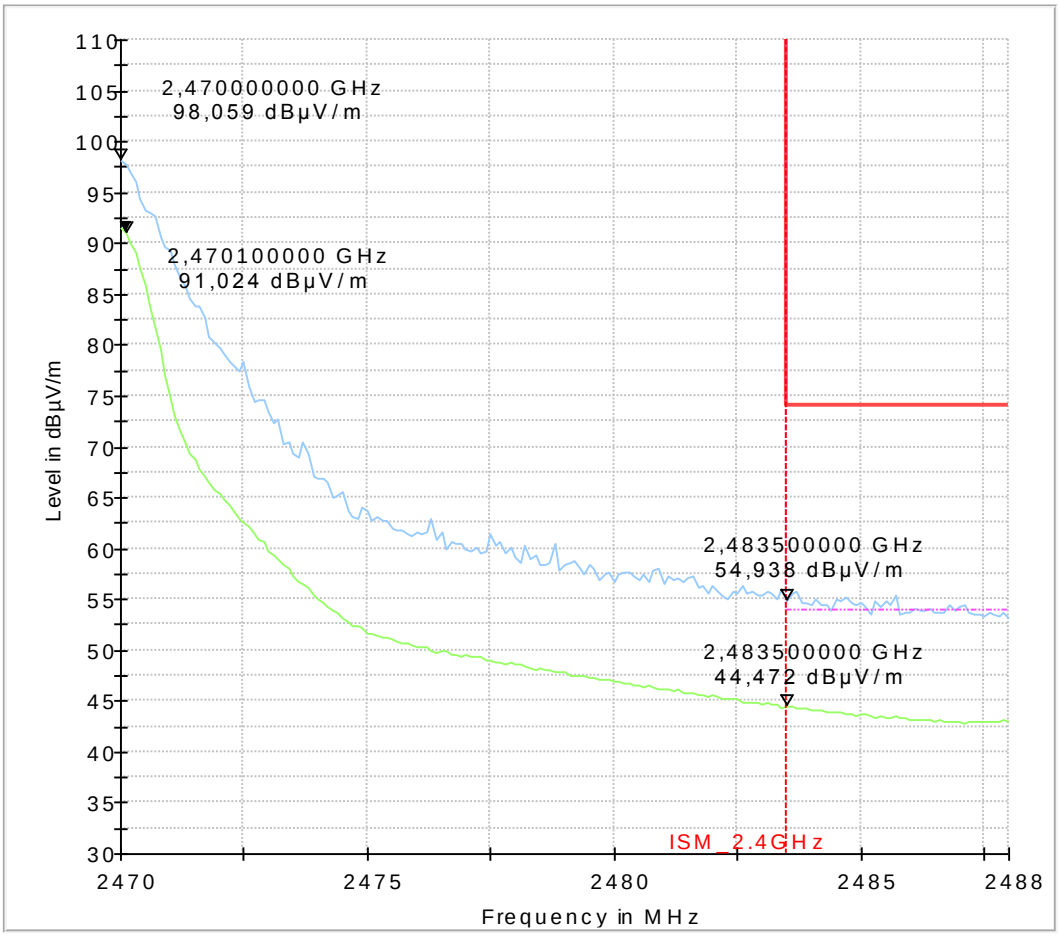
Common Information

Test Description:	Band-Edge: Radiated Field Strength Emissions in 3m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.205 § 15.209 & FCC 15.247 Intentional Radiator
Antenna polarisation:	horizontal/vertical
Operation mode:	Continuous TX-WLAN 2.4GHz- g Mode-B.W. 20 MHz-6Mbps-Ch 11 (2462 MHz)-PWR+14dBm
Operator Name:	KIv

EUT Information

Applicant:	Viessmann Werke GmbH & Co.KG
---	---
EUT:	Vitoconnect OT2
S/N:	GNV 7637415600219108
HW version:	V005, BOM Rev-k
SW version:	Linux:0.10.0 | STM:1.33.02 | EFR32 | v1.0
Test Application:	Ember Node Test Application v1.0 Jul 1 2016
Connected Interfaces:	Optolink Via USB + UART 2 + Opentherm Loop(Master to Slave)
Test Mode Configurations:	OpenTherm & Optolink Communication Loop + Processor Load 25%
Power Supply:	12 VDC using AC/DC Adapter
AC/DC Adapter Details:	PHIHONG|Model:PSAC12R-120|Input:Ac100-240V 50-60Hz 0.5A
Line Power Supply:	120 V AC 60 Hz

Duty Cycle Correction Factors are applicable to Average Values indicated by Markers.



3.3. Band-Edge Measurements –WLAN2.4GHz-n(HT20) Mode-MCS0

Diagram No.: 9.15_BE Low- Vitoconnect OT2-WLAN2.4 GHz-TX- nMode-B.W.20MHz-MCS0-Ch1-12dBm

Common Information

Test Description:	Band-Edge: Radiated Field Strength Emissions in 3m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.205 § 15.209 & FCC 15.247 Intentional Radiator
Antenna polarisation:	horizontal/vertical
Operation mode:	Continuous TX-WLAN 2.4GHz- n Mode-B.W. 20 MHz-MCS0-Ch 1 (2412 MHz)-PWR+12dBm
Operator Name:	KIv

EUT Information

Applicant:	Viessmann Werke GmbH & Co.KG
---	---
EUT:	Vitoconnect OT2
S/N:	GNV 7637415600219108
HW version:	V005, BOM Rev-k
SW version:	Linux:0.10.0 | STM:1.33.02 | EFR32 | v1.0
Test Application:	Ember Node Test Application v1.0 Jul 1 2016
Connected Interfaces:	Optolink Via USB + UART 2 + Opentherm Loop(Master to Slave)
Test Mode Configurations:	OpenTherm & Optolink Communication Loop + Processor Load 25%
Power Supply:	12 VDC using AC/DC Adapter
AC/DC Adapter Details:	PHIHONG|Model:PSAC12R-120|Input:Ac100-240V 50-60Hz 0.5A
Line Power Supply:	120 V AC 60 Hz

Duty Cycle Correction Factors are applicable to Average Values indicated by Markers.

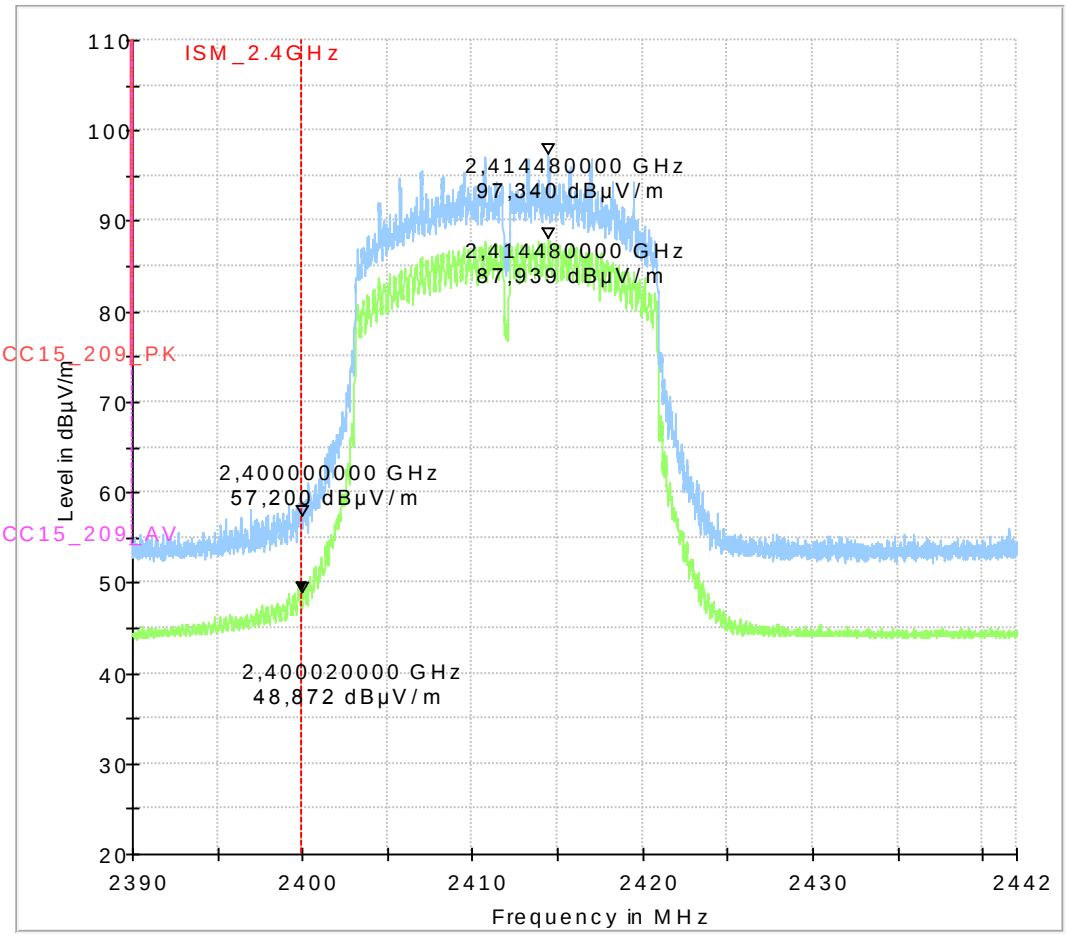


Diagram No.: 9.16_BE High- Vitoconnect OT2-WLAN2.4 GHz-TX- nMode-B.W.20MHz-MCS0-Ch11-13dBm

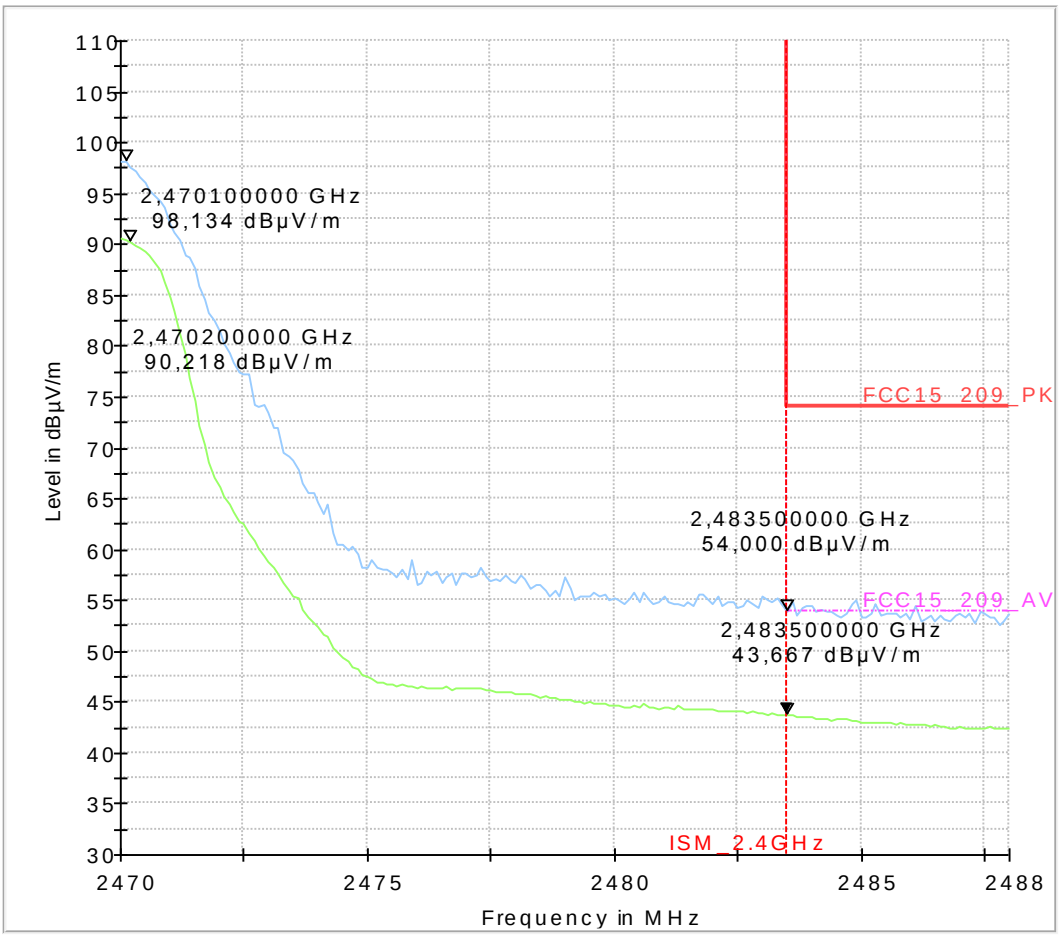
Common Information

Test Description:	Band-Edge: Radiated Field Strength Emissions in 3m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.205 § 15.209 & FCC 15.247 Intentional Radiator
Antenna polarisation:	horizontal/vertical
Operation mode:	Continuous TX-WLAN 2.4GHz- n Mode-B.W. 20 MHz-MCS0-Ch 11 (2462 MHz)-PWR+13dBm
Operator Name:	KIv

EUT Information

Applicant:	Viessmann Werke GmbH & Co.KG
---	---
EUT:	Vitoconnect OT2
S/N:	GNV 7637415600219108
HW version:	V005, BOM Rev-k
SW version:	Linux:0.10.0 | STM:1.33.02 | EFR32 | v1.0
Test Application:	Ember Node Test Application v1.0 Jul 1 2016
Connected Interfaces:	Optolink Via USB + UART 2 + Opentherm Loop(Master to Slave)
Test Mode Configurations:	OpenTherm & Optolink Communication Loop + Processor Load 25%
Power Supply:	12 VDC using AC/DC Adapter
AC/DC Adapter Details:	PHIHONG|Model:PSAC12R-120|Input:Ac100-240V 50-60Hz 0.5A
Line Power Supply:	120 V AC 60 Hz

Duty Cycle Correction Factors are applicable to Average Values indicated by Markers.



3.4. Band-Edge Measurements –WLAN2.4GHz-n(HT40) Mode-MCS0

Diagram No.: 9.17_BE Low- Vitoconnect OT2-WLAN2.4 GHz-TX- nMode-B.W.40MHz-MCS0-Ch3-9dBm

Common Information

Test Description:	Band-Edge: Radiated Field Strength Emissions in 3m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.205 § 15.209 & FCC 15.247 Intentional Radiator
Antenna polarisation:	horizontal/vertical
Operation mode:	Continuous TX-WLAN 2.4GHz- n Mode-B.W. 40 MHz-MCS0-Ch 3 (2422 MHz)-PWR+9dBm
Operator Name:	KIv

EUT Information

Applicant:	Viessmann Werke GmbH & Co.KG
---	---
EUT:	Vitoconnect OT2
S/N:	GNV 7637415600219108
HW version:	V005, BOM Rev-k
SW version:	Linux:0.10.0 | STM:1.33.02 | EFR32 | v1.0
Test Application:	Ember Node Test Application v1.0 Jul 1 2016
Connected Interfaces:	Optolink Via USB + UART 2 + Opentherm Loop(Master to Slave)
Test Mode Configurations:	OpenTherm & Optolink Communication Loop + Processor Load 25%
Power Supply:	12 VDC using AC/DC Adapter
AC/DC Adapter Details:	PHIHONG|Model:PSAC12R-120|Input:Ac100-240V 50-60Hz 0.5A
Line Power Supply:	120 V AC 60 Hz

Duty Cycle Correction Factors are applicable to Average Values indicated by Markers.

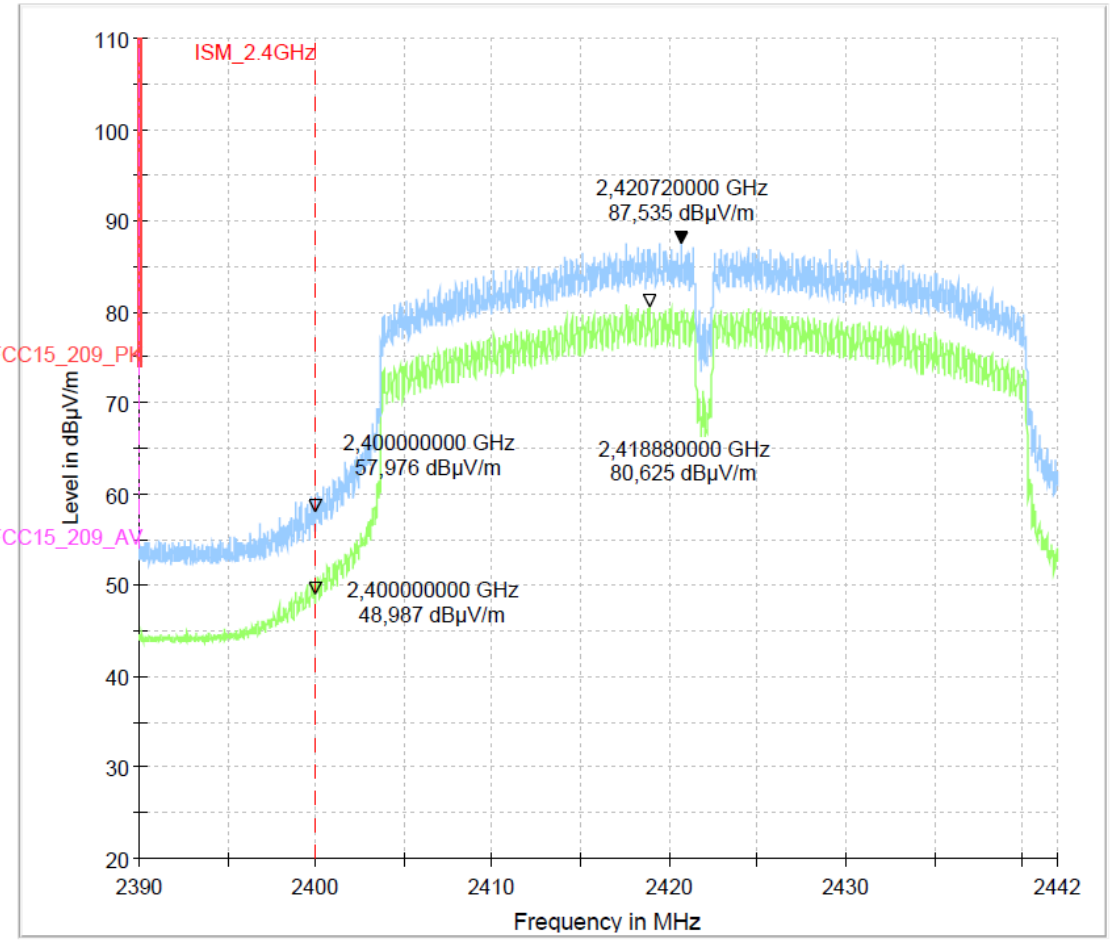


Diagram No.: 9.18_BE High- Vitoconnect OT2-WLAN2.4 GHz-TX- nMode-B.W.40MHz-MCS0-Ch9-10.5dBm

Common Information

Test Description:	Band-Edge: Radiated Field Strength Emissions in 3m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.205 § 15.209 & FCC 15.247 Intentional Radiator
Antenna polarisation:	horizontal/vertical
Operation mode:	Continuous TX-WLAN 2.4GHz- n Mode-B.W. 40 MHz-MCS0-Ch 9 (2452 MHz)-PWR+10.5dBm
Operator Name:	KIv

EUT Information

Applicant:	Viessmann Werke GmbH & Co.KG
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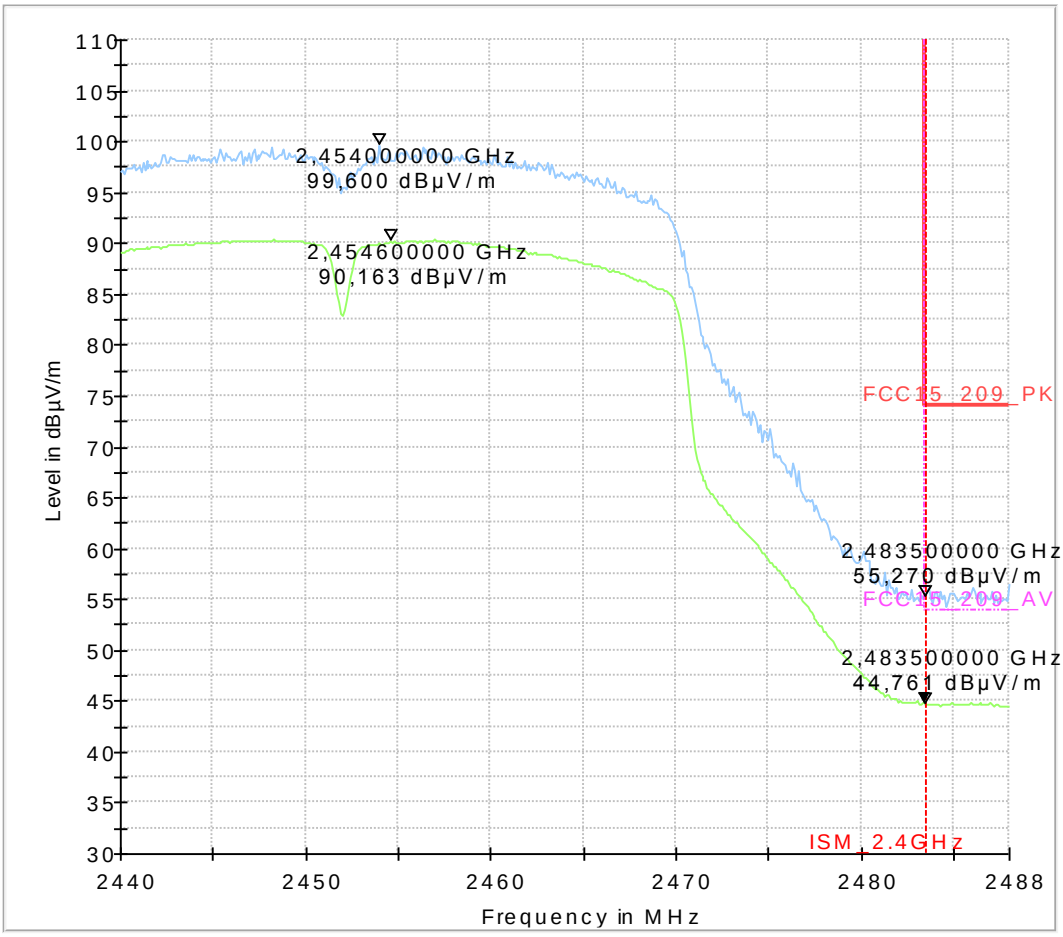
EUT:	Vitoconnect OT2
S/N:	GNV 7637415600219108
HW version:	V005, BOM Rev-k
SW version:	Linux:0.10.0 | STM:1.33.02 | EFR32 | v1.0
Test Application:	Ember Node Test Application v1.0 Jul 1 2016
Connected Interfaces:	Optolink Via USB + UART 2 + Opentherm Loop(Master to Slave)
Test Mode Configurations:	OpenTherm & Optolink Communication Loop + Processor Load 25%
Power Supply:	12 VDC using AC/DC Adapter
AC/DC Adapter Details:	PHIHONG|Model:PSAC12R-120|Input:Ac100-240V 50-60Hz 0.5A
Line Power Supply:	120 V AC 60 Hz

Duty Cycle Correction Factors are applicable to Average Values indicated by Markers.



4. AC Power Lines Conducted Emissions Measurements

Diagram No.: 1.01 - Vitoconnect OT2-WLAN 2.4GHz- g Mode-B.W. 20 MHz-6Mbps-Ch 6-20dBm

Common Information

Test Description:	Conducted Voltage Measurement Class B
Test Site & Location:	Conducted Emission, CETECOM GmbH Essen
Test Software:	R&S EMC32 v9.15
Test Specification:	FCC 15.207 & FCC 15.247 Intentional Radiator
Operating Mode:	TX-WLAN 2.4GHz- g Mode-B.W. 20 MHz-6Mbps-Ch 6 (2437 MHz)- PWR+20dBm
Measured on line:	N/L1
Diagram details:	Shows the peak values as a sum of measured ports in maxhold mode
Environmental Conditions:	Humidity: 47%rH; Temperature: 21°C
Operator:	HLa

EUT Information

Applicant:	Viessmann Werke GmbH & Co.KG
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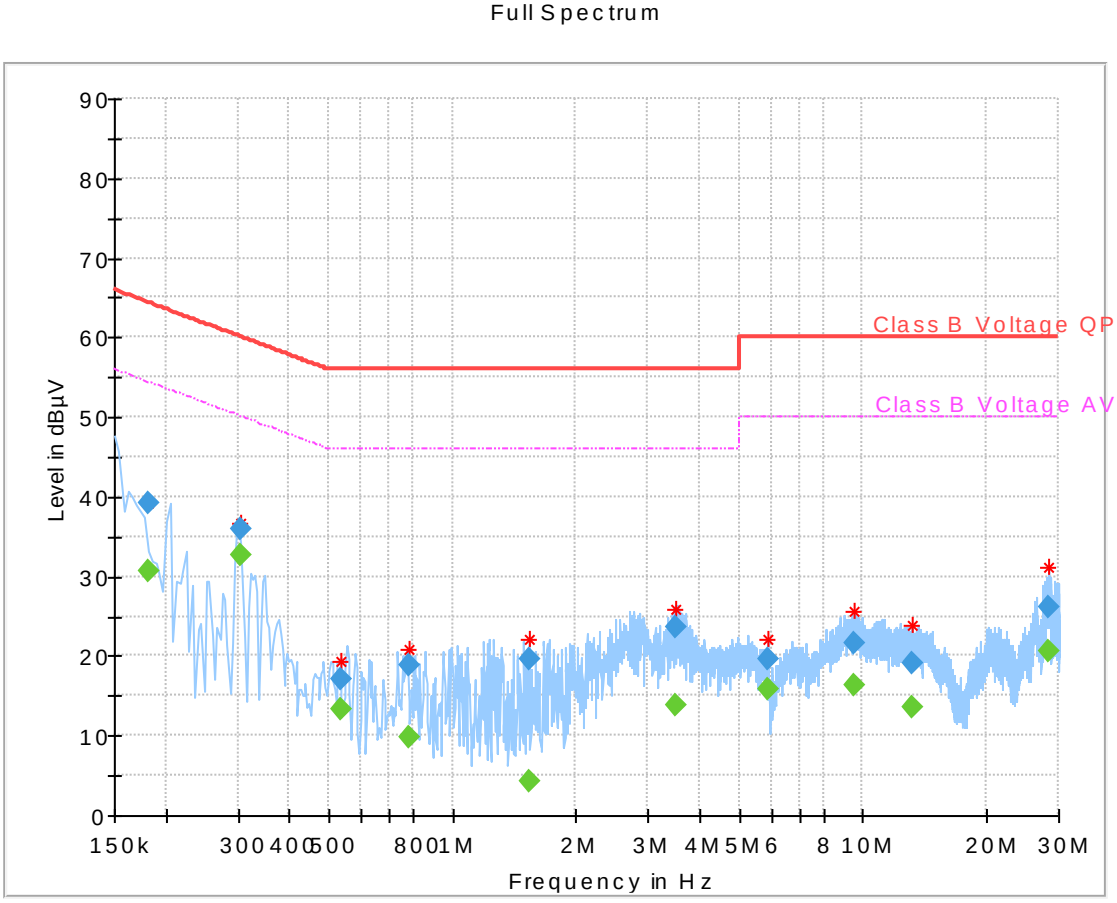
EUT:	Vitoconnect OT2
S/N:	GNV 7637415600219108
HW version:	V005, BOM Rev-k
SW version:	Linux:0.10.0 | STM:1.33.02 | EFR32 | v1.0
Test Application:	Ember Node Test Application v1.0 Jul 1 2016
Connected Interfaces:	Optolink Via USB + UART 2 + Opentherm Loop(Master to Slave)
Test Mode Configurations:	OpenTherm & Optolink Communication Loop + Processor Load 25%
Power Supply:	12 VDC using AC/DC Adapter
AC/DC Adapter Details:	PHIHONG|Model:PSAC12R-120|Input:Ac100-240V 50-60Hz 0.5A
Line Power Supply:	120 V AC 60 Hz



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE	Corr. (dB)
0.182188	---	30.77	54.39	23.62	1000.0	9.000	N	GND	0.1
0.182188	39.15	---	64.39	25.24	1000.0	9.000	N	GND	0.1
0.304844	36.06	---	60.11	24.05	1000.0	9.000	L1	GND	0.1
0.304844	---	32.71	50.11	17.40	1000.0	9.000	L1	GND	0.1
0.532500	17.20	---	56.00	38.80	1000.0	9.000	L1	GND	0.1
0.532500	---	13.41	46.00	32.59	1000.0	9.000	L1	GND	0.1
0.781406	---	9.90	46.00	36.10	1000.0	9.000	L1	GND	0.3
0.781406	18.82	---	56.00	37.18	1000.0	9.000	L1	GND	0.3
1.539219	19.59	---	56.00	36.41	1000.0	9.000	L1	GND	0.3
1.539219	---	4.21	46.00	41.79	1000.0	9.000	L1	GND	0.3
3.490156	---	13.93	46.00	32.07	1000.0	9.000	L1	GND	0.3
3.490156	23.54	---	56.00	32.46	1000.0	9.000	L1	GND	0.3
5.874063	---	15.95	50.00	34.05	1000.0	9.000	N	GND	0.4
5.874063	19.72	---	60.00	40.28	1000.0	9.000	N	GND	0.4
9.518125	21.54	---	60.00	38.46	1000.0	9.000	N	GND	0.4
9.518125	---	16.31	50.00	33.69	1000.0	9.000	N	GND	0.4
13.263594	19.20	---	60.00	40.80	1000.0	9.000	N	GND	0.7
13.263594	---	13.56	50.00	36.44	1000.0	9.000	N	GND	0.7
28.430469	26.11	---	60.00	33.89	1000.0	9.000	L1	GND	0.5
28.430469	---	20.71	50.00	29.29	1000.0	9.000	L1	GND	0.5