

Test report

337762-3TRFWL

Date of issue: May 22, 2018

Applicant:

Phonak Communications AG

Product:

Wireless Microphone (ALD)

Model:

Roger Table Mic II

FCC ID:

KWC-TX29V1

ISED Reg. Number:

2262A-TX29V1

Specifications:

◆ **FCC 47 CFR Part 15, Subpart C**

Frequency Hopping Transmitters / Digital Transmission Systems

◆ **RSS-247, Issue 2, February 2017**

Digital Transmission Systems (DTSS), Frequency Hopping Systems (FHSs) and
Licence-Exempt Local Area Network (LE-LAN) Devices

Test location

Company name	Nemko Canada Inc.
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Website	www.nemko.com
Site number	FCC: CA2040; IC: 2040A-4 (3 m semi anechoic chamber)

Tested by	Frode Sveinsen, Senior Wireless Engineer
Reviewed by	Andrey Adelberg, Senior Wireless/EMC Specialist
Date	May 22, 2018
Signature of reviewer	

Limits of responsibility

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025. All results contain in this report are within Nemko Canada's ISO/IEC 17025 accreditation.

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1 INFORMATION

1.1 Applicant information

Name :	Phonak Communications AG
Address:	Laenggasse 17 CH-3280 Murten Switzerland

1.2 Tested Item

Name:	Phonak
Additional information:	Hybrid System DSSS and FHSS for 2.4GHz
Model name:	Roger Table Mic II
FCC ID:	KWC-TX29V1
Industry Canada Registration Number:	2262A-TX29V1
Serial number:	/
Trademark:	PHONAK
Hardware identity and/or version:	V2
Software identity and/or version:	V1801
Tested to ISSED Radio Standard (RSS):	RSS-247 Issue 2; RSS-Gen Issue 5
Frequency Range:	2402–2476 MHz (Hopping Mode, Full Power) 2402, 2450 and 2480 MHz (Control Carriers, Low Power)
Number of Channels:	Hopping Mode: Minimum 20 and Maximum 38 Hopping Channels Control Carriers: 3
Operating Modes :	Adaptive Frequency Hopping with Control Carrier
Type of Modulation:	Digital (Gaussian Frequency Shift Keying)
Conducted Output Power:	41.7 mW (Full Power) 10.2 mW (Low Power)
Antenna Connector:	None
Number of Antennas:	1
Antenna Diversity Supported:	No
Power Supply:	Internal Battery and External Power Adaptor for Charging and Operation Secondary Battery (3.7V Li-Ion) and USB Adaptor (5.0V _{DC})
Interface:	USB for Charging and SW updates

1.3 Testing dates

Tested in period:	January 22–26, 2018, February 12–16, 2018 and April 4–6, 2018
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1.4 Description of Tested Device

The EUT is a Wireless Desktop Microphone that uses Frequency Hopping and a fixed Control Carrier. Several Wireless Microphones may be synchronized, for this the system uses a Control Carrier at 2402, 2450 or 2480 MHz. The Control Carrier uses Dynamic Frequency Selection.

This device has been tested as a DTS system and fulfils all requirements for a DTS systems. The only difference between hopping carriers and control carriers is duty cycle and output power, and the frequency 2480 MHz is only used for control carrier with lowered output power.

1.5 Test Conditions

Temperature:	15–30 °C
Relative humidity	20–75 %
Air pressure	860–1060 mbar
Normal test voltage	3.7 V _{DC} (Nominal Voltage)

All tests were performed with the EUT powered from a fully charged battery. For radiated emissions tests the EUT was also powered from a USB charger supplied by the manufacturer. Power Line Conducted emissions Tests were performed with the supplied power adaptor.

Values above are the limit registered during the test period.

1.6 Test Engineer(s)

Frode Sveinsen

1.7 Antenna Requirement

Does the EUT have detachable antenna(s)?	☐ YES	☒ NO
If detachable, is the antenna connector(s) non-standard?	☐ YES	☐ NO
The tested equipment has only integral antennas. Conducted tests with a temporary antenna connector.		

Requirement: FCC 15.203, 15.204, 15.317; RSS-GEN Issue 5, Section 6.8

1.8 Other Comments

The EUT uses frequency hopping with 38 hopping channels from 2402 to 2476 MHz. Additionally the EUT transmit a control signal alternatingly on 2402, 2450 and 2480 MHz. The control signal is transmitted with the same modulation and bandwidth but with reduced Output Power.

Radiated measurements were done with the EUT powered by a fully charged battery. Measurements below 1 GHz was performed with the EUT charging from a USB power adaptor.

Antenna Conducted tests were performed with the EUT powered from a regulated power supply. It was also checked that power variations of ± 15 % did not have any influence on Output Power.

2 TEST REPORT SUMMARY

2.1 General

All measurements are traceable to national standards.

The tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 15, paragraph 15.247 and Industry Canada RSS-247 Issue 2 / RSS-Gen Issue 5 / RSP-100 Issue 11.

All tests were conducted in accordance with ANSI C63.4-2014 and ANSI C63.10-2013.

A description of the test facility is on file with the FCC and Industry Canada.

☒ New Submission

☒ Production Unit

☐ Class II Permissive Change

☐ Pre-production Unit

DTS Equipment Code

☐ Family Listing



THIS TEST REPORT APPLIES ONLY TO THE ITEM(S) AND CONFIGURATIONS TESTED.

Deviations from, additions to, or exclusions from the test specifications are described in "Summary of Test Data".

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2.2 Test Summary

Name of test	FCC Part 15 reference	RSS-247 Issue 2, RSS-GEN Issue 5 reference	Result
Supply Voltage Variations	15.31(e)	6.11 (RSS-GEN)	Complies
Number of Operating Frequencies	15.31(m) 15.247(a)	5.1	N/A ¹
Antenna Requirement	15.203	6.8 (RSS-GEN)	Complies
Power Line Conducted Emission	15.107(a) 15.207(a)	8.8 (RSS-GEN)	Complies
Channel Separation	15.247(a)(1)	5.1	N/A ¹
Pseudorandom Hopping Algorithm	15.247(a)(1)	5.1	N/A ¹
Time of Occupancy	15.247(a)(1)(iii)	5.1	N/A ¹
20 dB Bandwidth	15.247(a)(1)	5.1	N/A ¹
Occupied Bandwidth (99%)	N/A	6.7 (RSS-GEN)	N/A ²
Minimum 6 dB Bandwidth	15.247(a)(2)	5.2 a)	Complies
Peak Power Output	15.247(b)	5.4 b)	Complies
Power Spectral Density	15.247(d)	5.2 b)	Complies
Spurious Emissions (Antenna Conducted)	15.247(c)	5.5	Complies
Spurious Emissions (Radiated)	15.247(c) 15.109(a) 15.209(a)	6.13 (RSS-GEN) 8.9 (RSS-GEN)	Complies

¹ Only applicable for FHSS systems

² No requirement, reported for information only

3 TEST RESULTS

3.1 Power Line Conducted Emissions

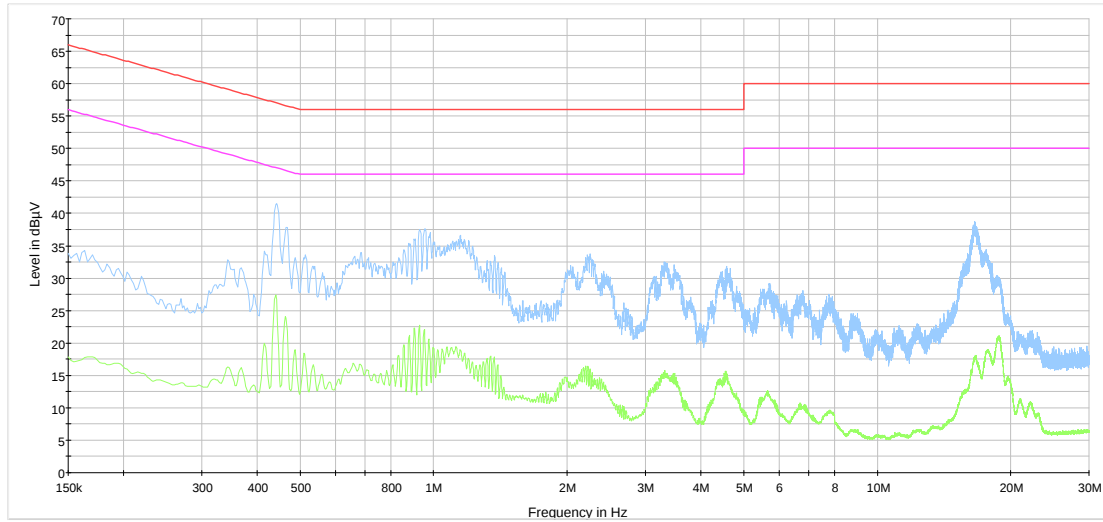
FCC Part 15.207(a)

RSS-213 Clause 6.3, RSS-GEN Clause 8.8

Measurement procedure: ANSI C63.4-2014 using 50 μ H/50 ohms LISN.

Test Results: Complies

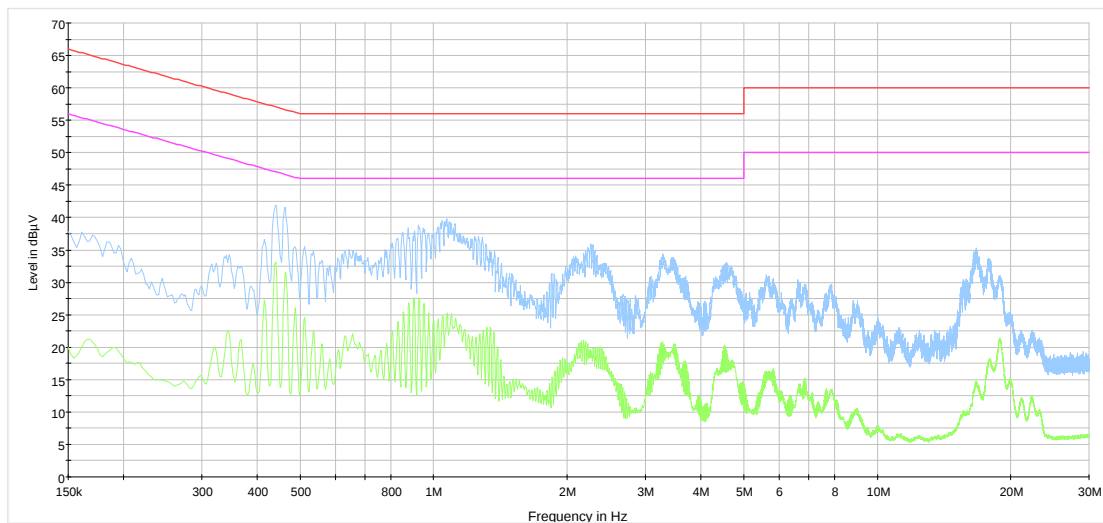
Measurement Data: See attached plots



Phonak Ingvar v2 _ 120V 60Hz Neutral

- CISPR 32 Mains Q-Peak Class B Limit
- CISPR 32 Mains Average Class B Limit
- Preview Result 1-PK+
- Preview Result 2-AVG

USB Adaptor (120V 60Hz), Phase N



Phonak Ingvar v2 _ 120V 60Hz Phase

- CISPR 32 Mains Q-Peak Class B Limit
- CISPR 32 Mains Average Class B Limit
- Preview Result 1-PK+
- Preview Result 2-AVG

USB Adaptor (120V 60Hz), Phase L1

3.2 Minimum 6 dB Bandwidth

FCC Part 15.247 (a)(2)

RSS-247 Issue 2, Clause 5.2 (a)

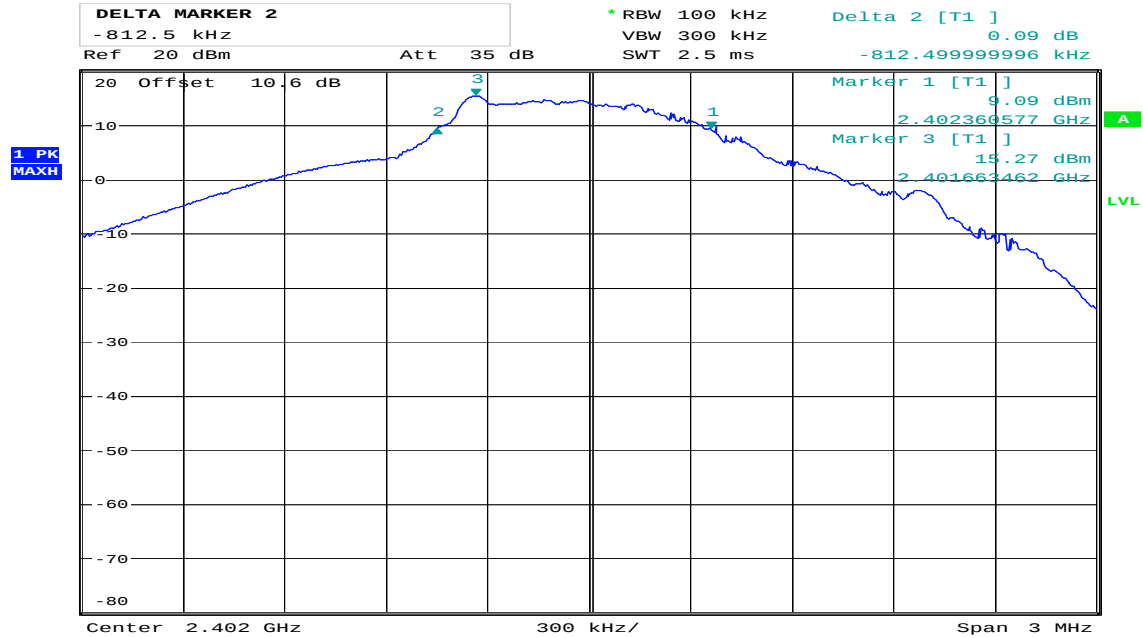
Test Results: Complies

Measurement Data:

Modulation type and bitrate	Measured 6 dB Bandwidth (kHz)
2402 MHz	812
2440 MHz	808
2476 MHz	817
2480 MHz	827

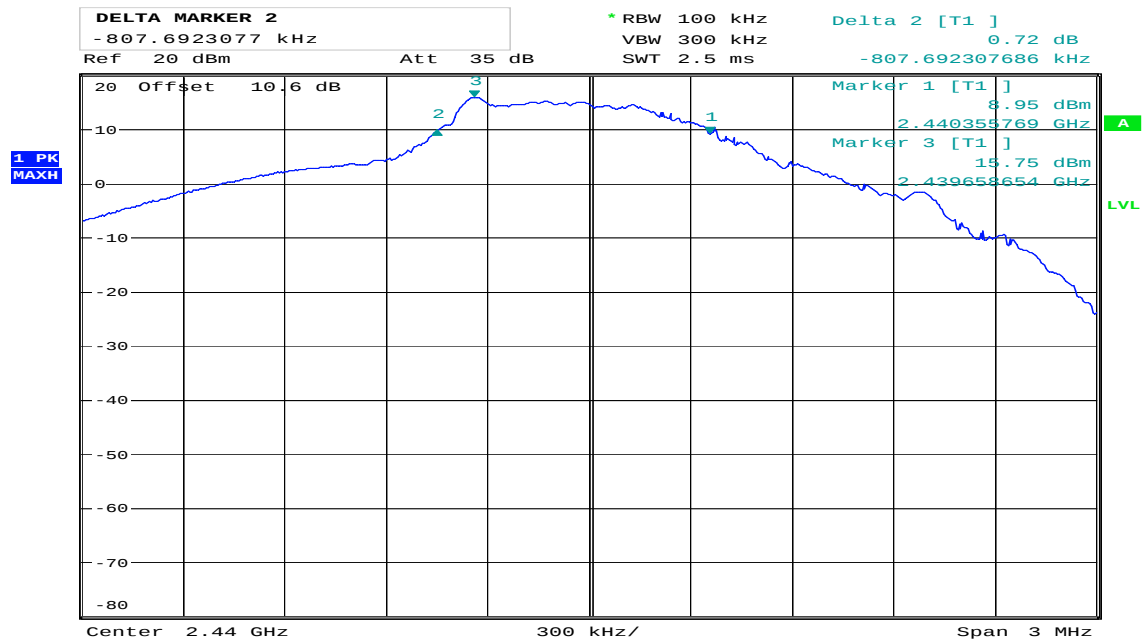
Requirements:

For Digital Transmission Systems in the 2400–2483.5 MHz band the minimum 6 dB bandwidth shall be at least 500 kHz.



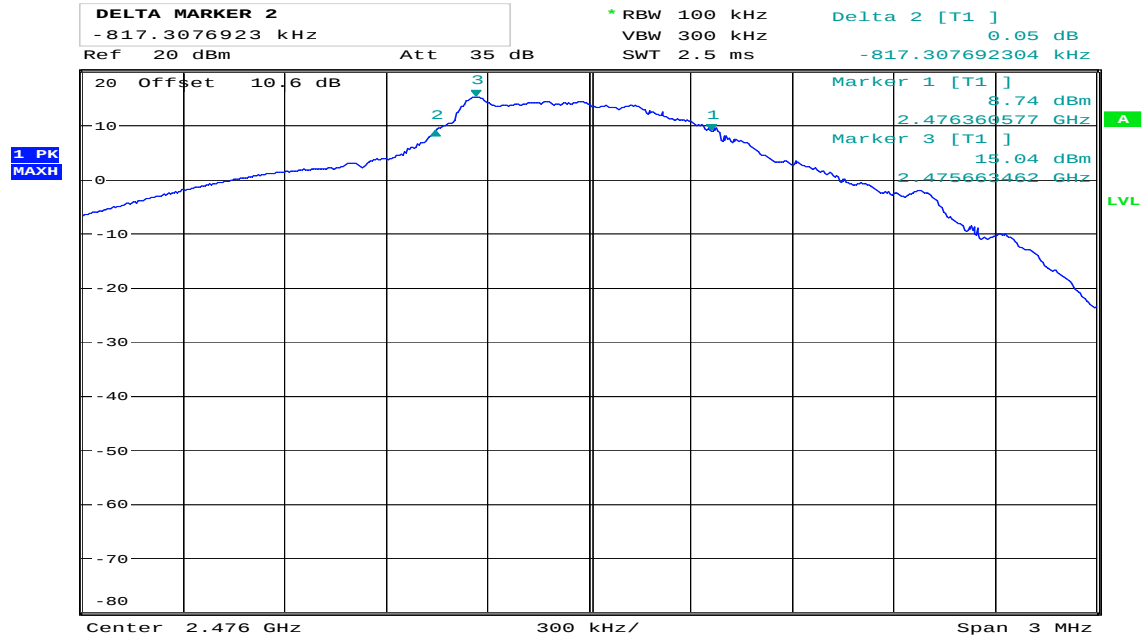
Date: 22.JAN.2018 13:11:25

DTS Bandwidth, 2402 MHz, Max Power



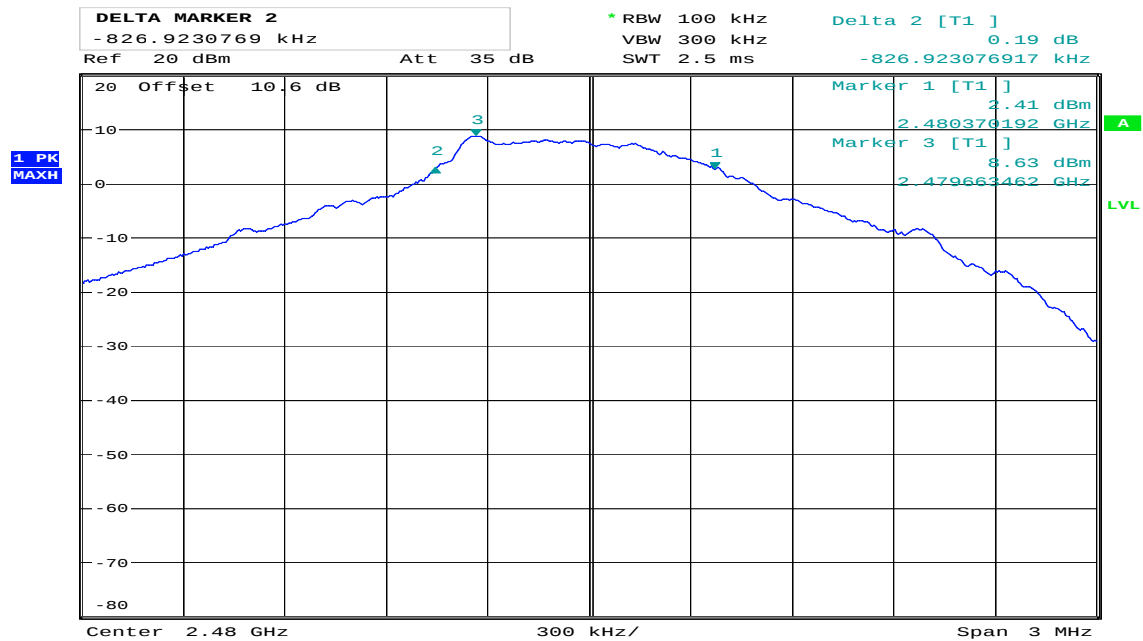
Date: 22.JAN.2018 13:13:30

DTS Bandwidth, 2440 MHz, Max Power



Date: 22.JAN.2018 13:15:47

DTS Bandwidth, 2476 MHz, Max Power



Date: 22.JAN.2018 13:27:05

DTS Bandwidth, 2480 MHz, Low Power

3.3 Occupied Bandwidth

RSS-GEN Issue 5, Clause 6.7

Test Results: Complies

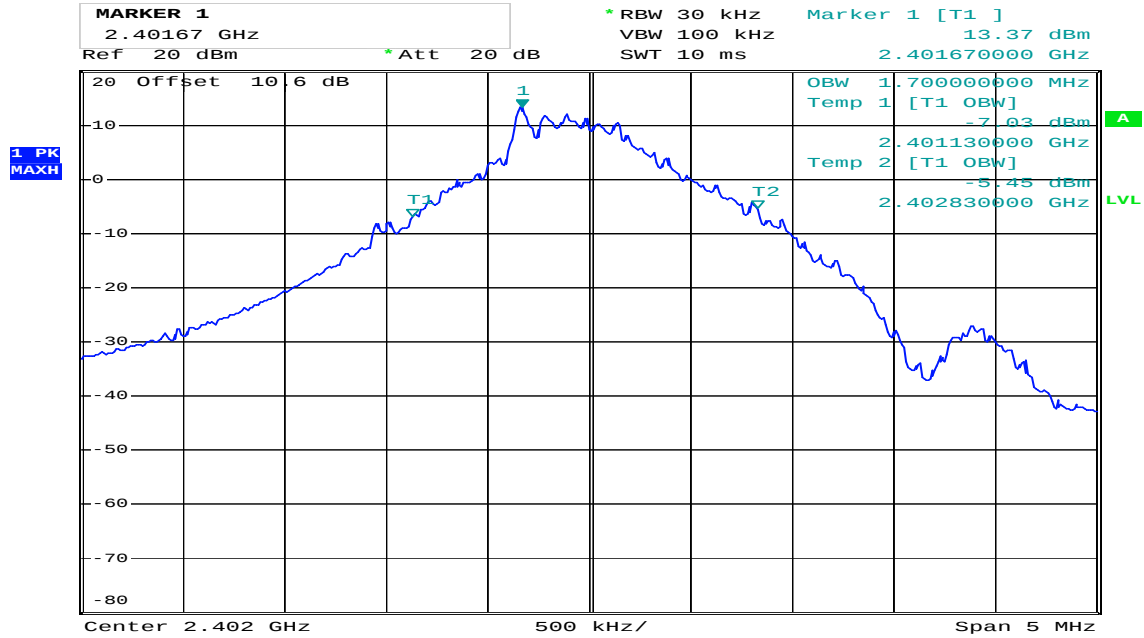
Measurement Data:

Carrier Frequency	Occupied Bandwidth (99% BW)
2402 MHz	1.70 MHz
2440 MHz	1.81 MHz
2450 MHz	1.71 MHz
2476 MHz	1.85 MHz

See attached plots.

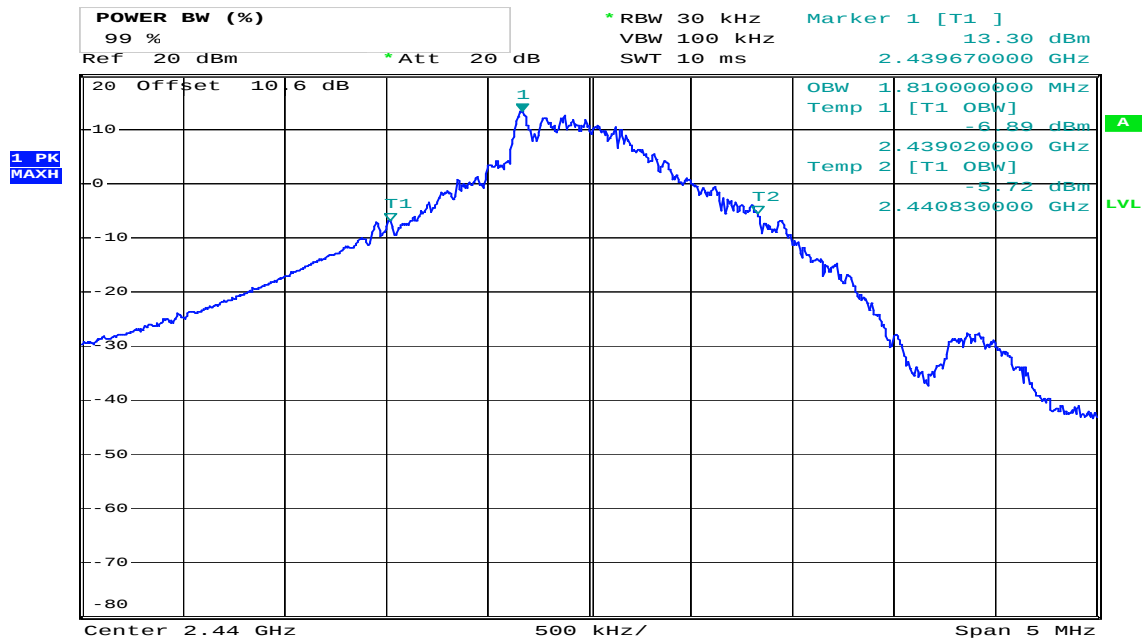
Requirements:

No limit specified.



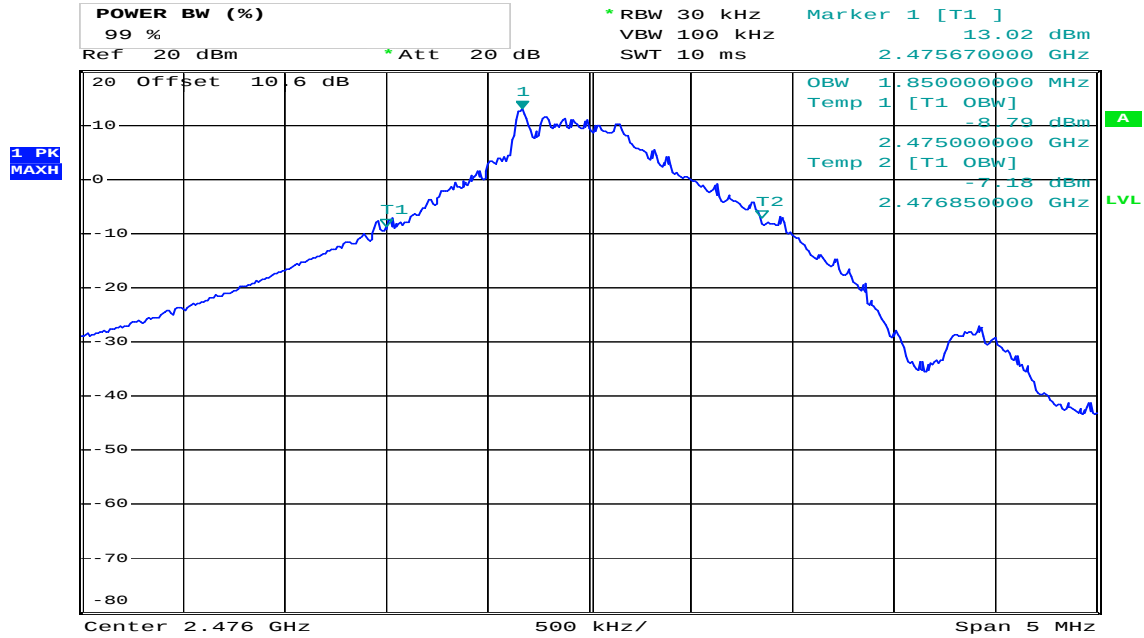
Date: 25. JAN. 2018 11:32:43

Occupied Bandwidth, 99%, 2402 MHz, Max Power



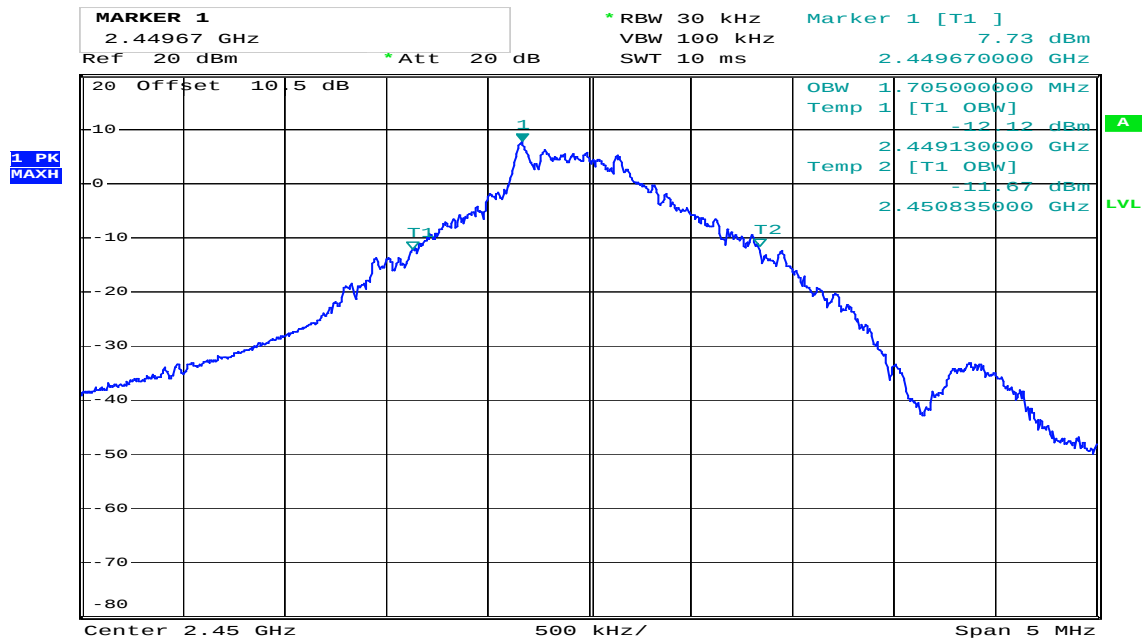
Date: 22. JAN. 2018 12:31:02

Occupied Bandwidth, 99%, 2440 MHz, Max Power



Date: 25.JAN.2018 11:30:45

Occupied Bandwidth, 99%, 2476 MHz, Max Power



Date: 12.FEB.2018 09:47:57

Occupied Bandwidth, 99%, 2450 MHz, Low Power

3.4 Peak Output Power

FCC 15.247 (b)

RSS-247 Issue 2, Clause 5.4 (d)

Test Results: Complies

Measurement Data:

Maximum Peak Power, Max Power			
	2402 MHz	2440 MHz	2476 MHz
Peak Power (dBm)	15.6	16.2	15.5
Peak Power (Watts)	0.0363	0.0417	0.0355
Declared Antenna Gain (dBi)	0.7	0.7	0.7

Maximum Peak Power, Low Power			
	2402 MHz	2450 MHz	2480 MHz
Conducted Power (dBm)	8.1	10.1	9.1
Conducted Power (Watts)	0.00646	0.0102	0.00813
Declared Antenna Gain (dBi)	0.7	0.7	0.7

Output Power reported is Maximum Peak Power.

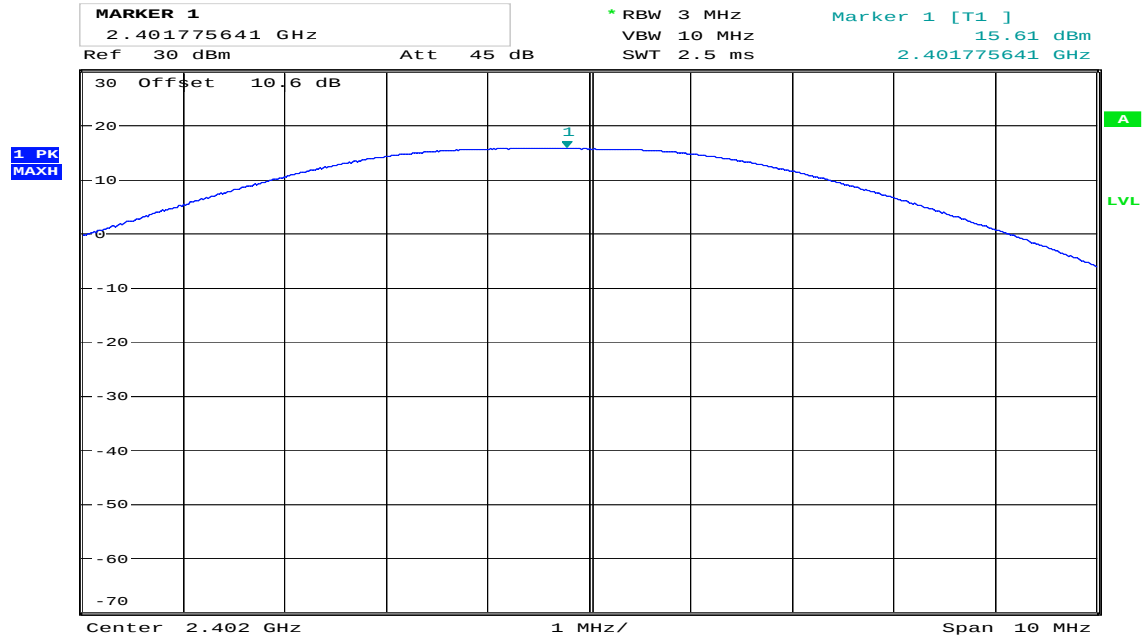
See attached plots.

Requirements:

The maximum peak output power shall not exceed the following limits:

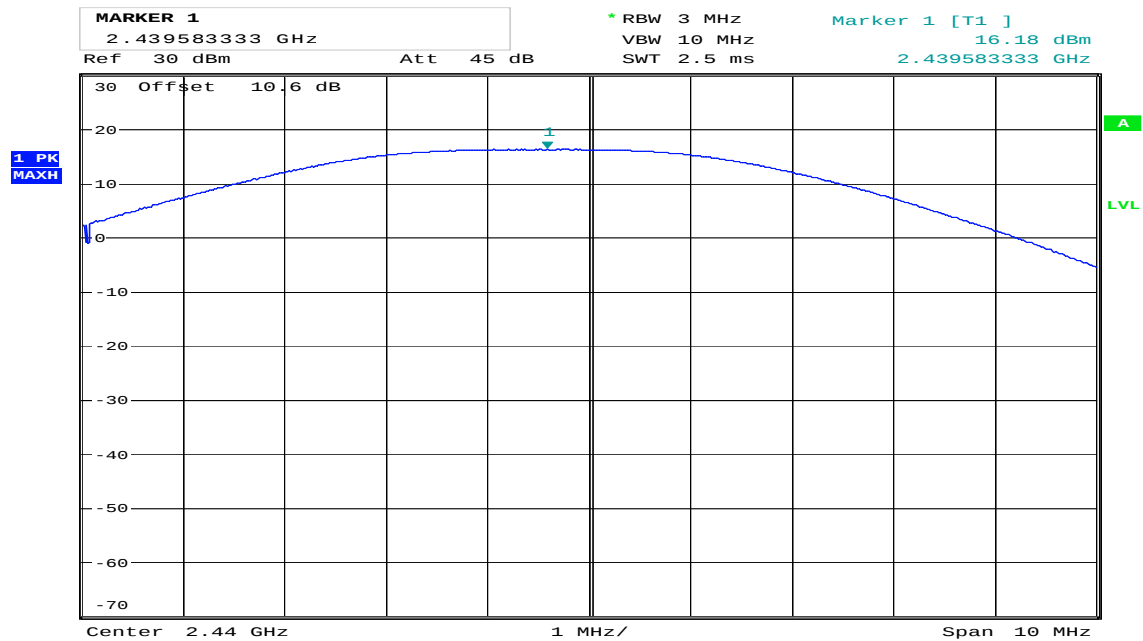
For Digital Transmission Systems in the 2400–2483.5 MHz band: 1 Watt

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power from the intentional radiator shall be reduced below the stated value above by the amount in dB that the directional gain of the antenna exceeds 6 dBi.



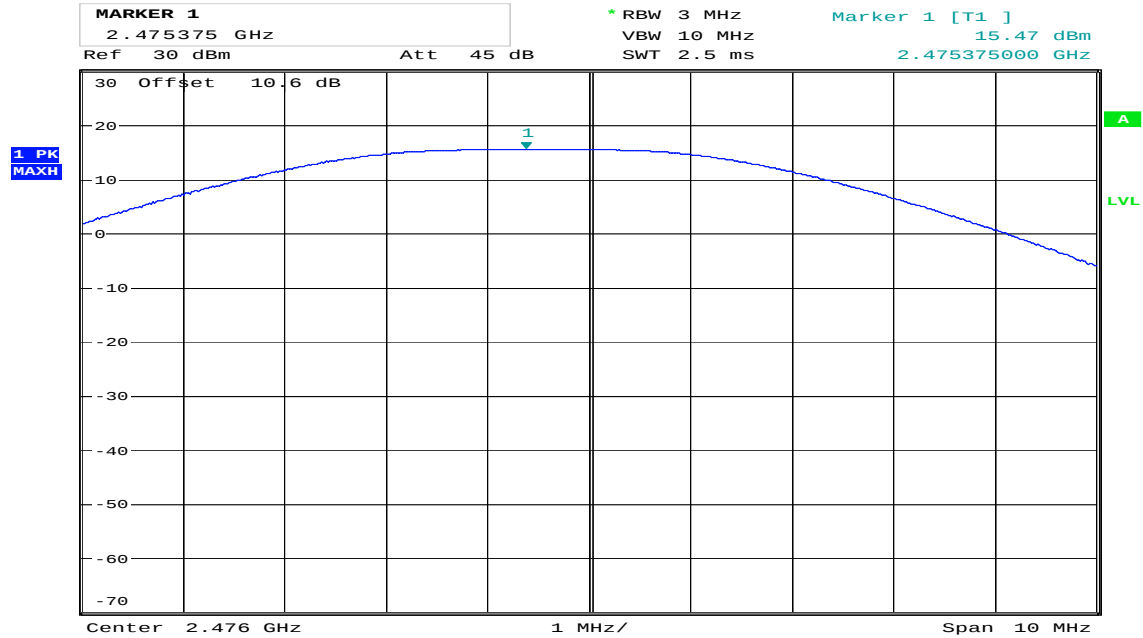
Date: 22.JAN.2018 13:31:32

Conducted Power, 2402 MHz, Max Power



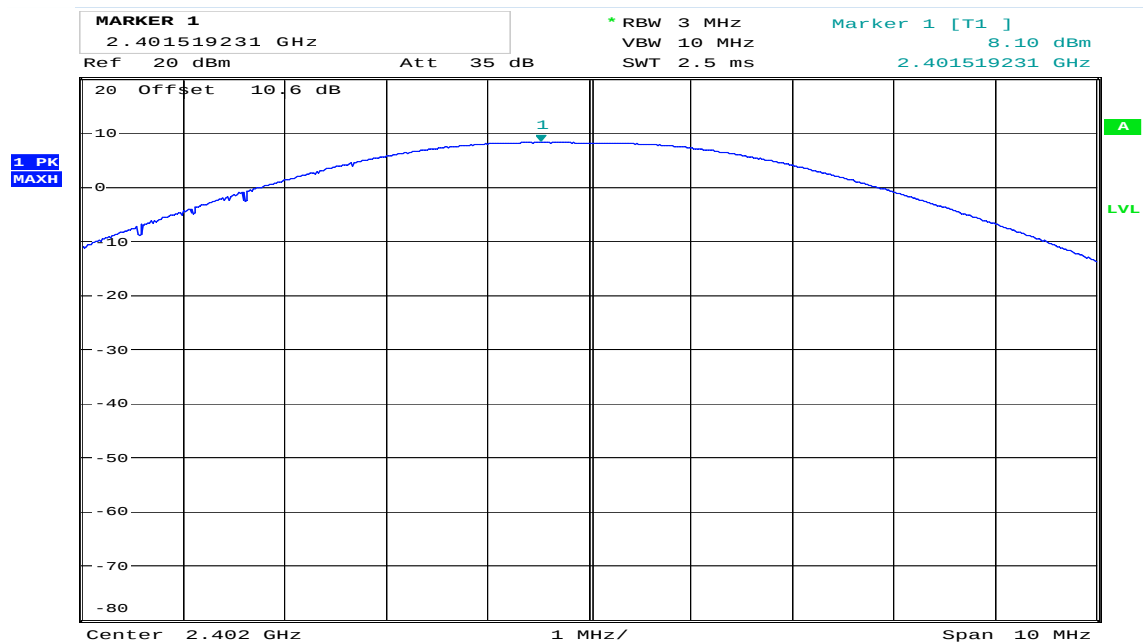
Date: 22.JAN.2018 13:30:45

Conducted Power, 2440 MHz, Max Power



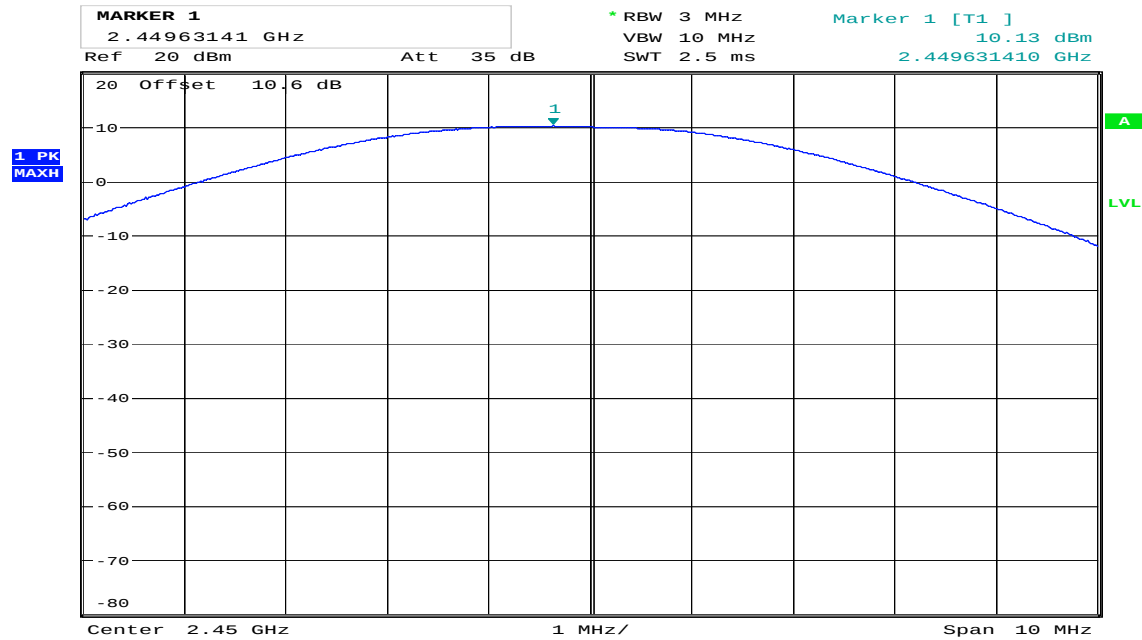
Date: 22.JAN.2018 13:29:44

Conducted Power, 2476 MHz, Max Power



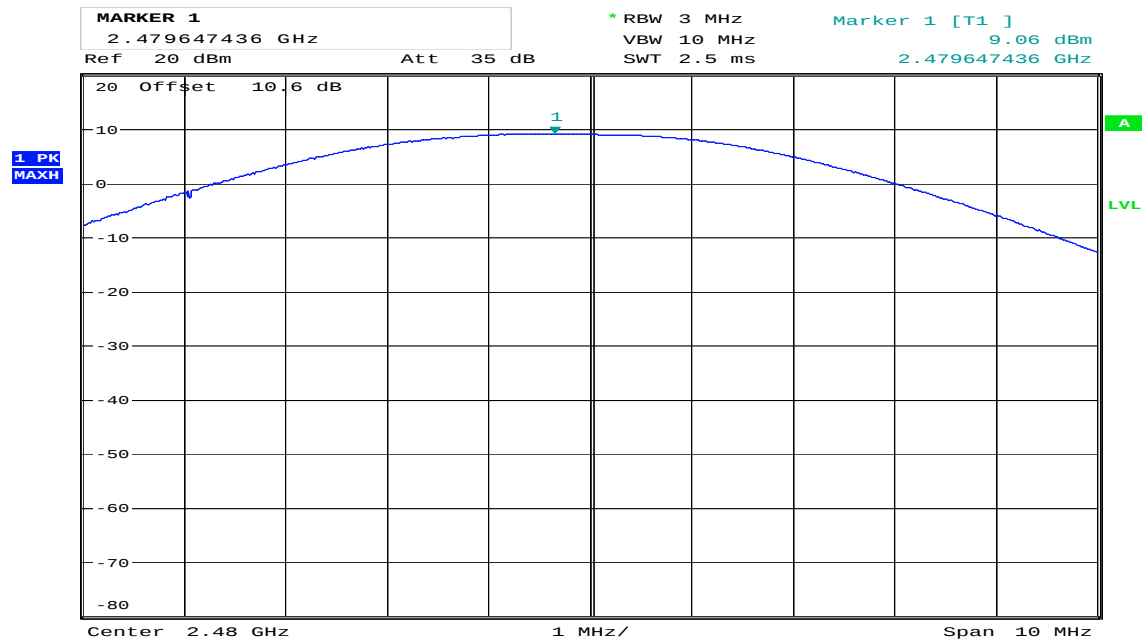
Date: 22.JAN.2018 13:32:16

Conducted Power, 2402 MHz, Low Power



Date: 22.JAN.2018 13:33:19

Conducted Power, 2450 MHz, Low Power



Date: 22.JAN.2018 13:28:27

Conducted Power, 2480 MHz, Low Power

3.5 Power Spectral Density (PSD)

Para. No.: 15.247 (d)

Test Results: Passed

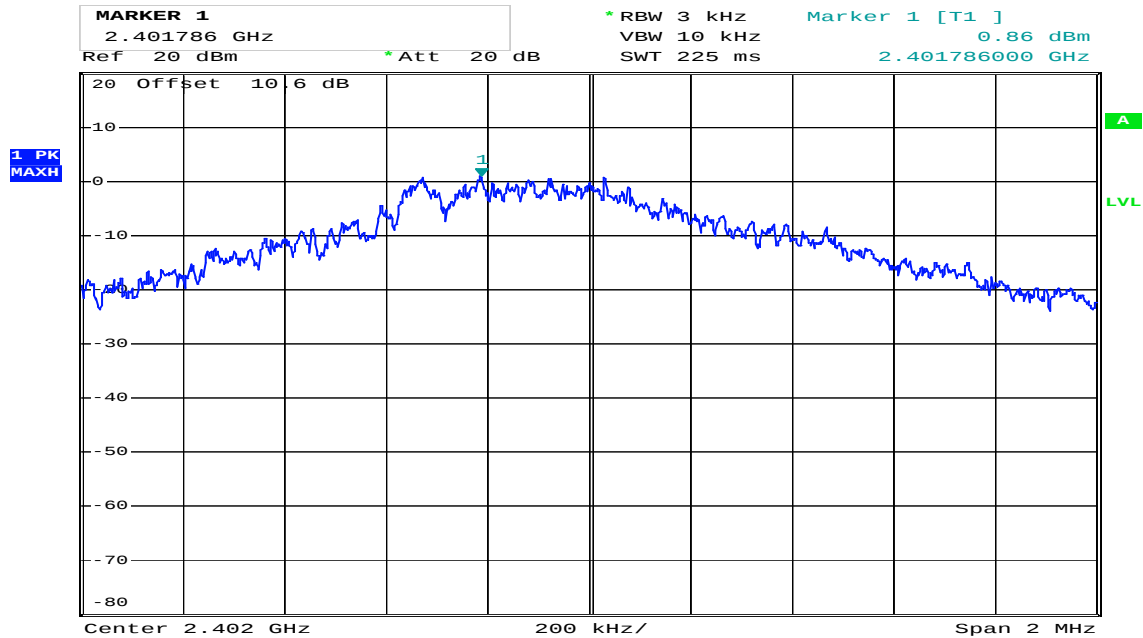
Measured and Calculated Data:

The measurement procedures PKPSD described in ANSI C63.10-2013 was used.

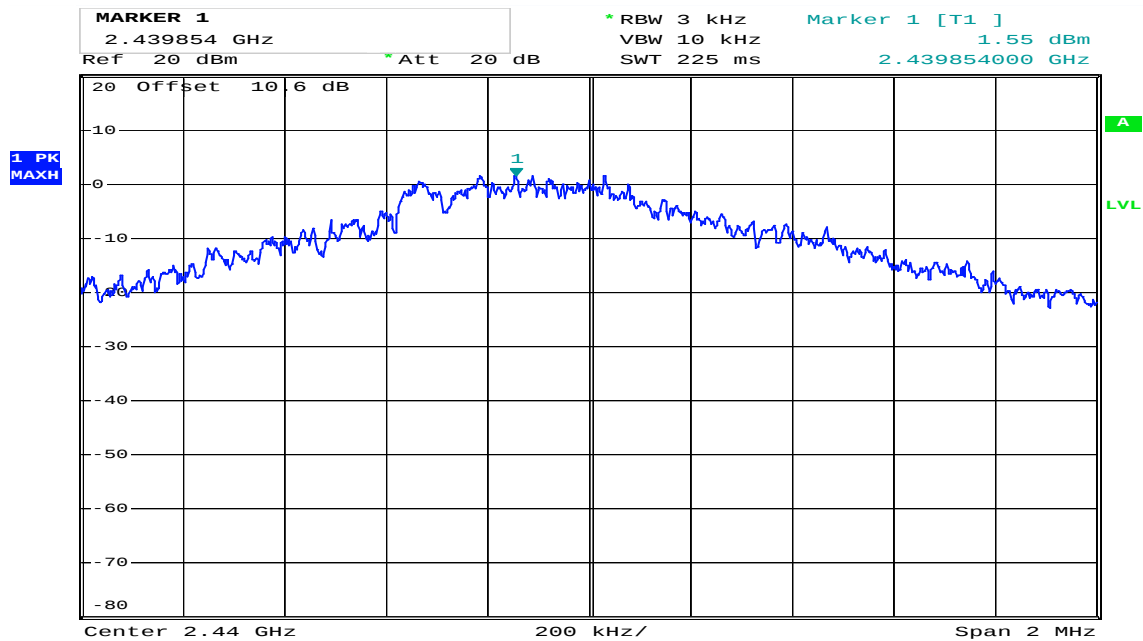
Carrier Frequency (MHz)	Power Spectral Density (dBm/3 kHz)
2402	0.9
2440	1.6
2476	1.0
2480	-5.4

Requirements:

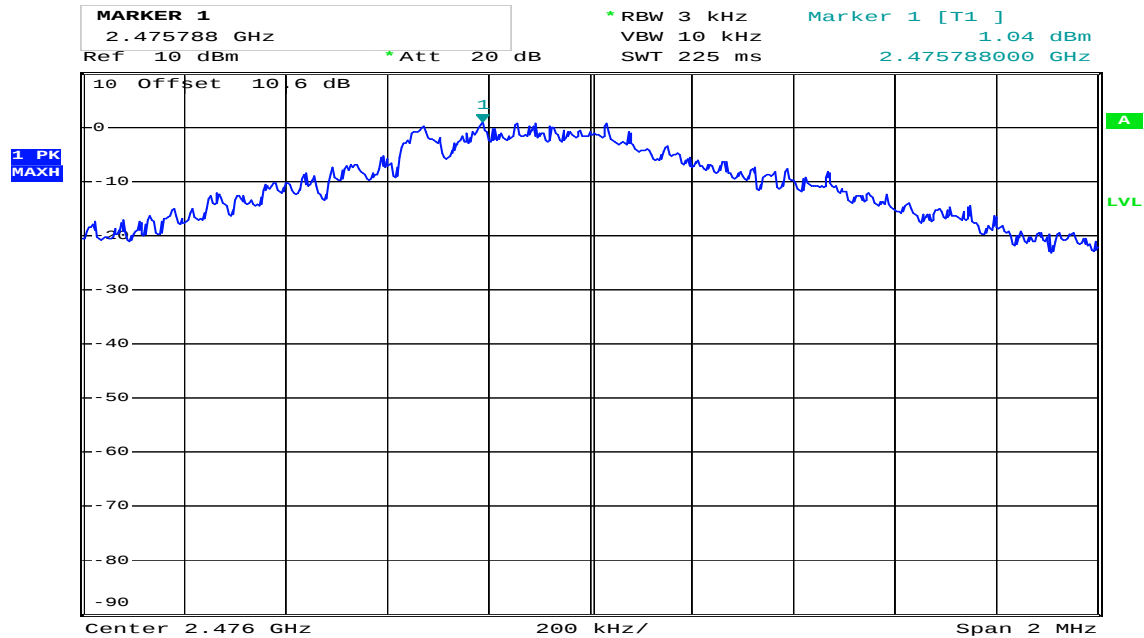
The Power Spectral Density of a Digital Transmission System shall be no greater than +8 dBm in any 3 kHz band



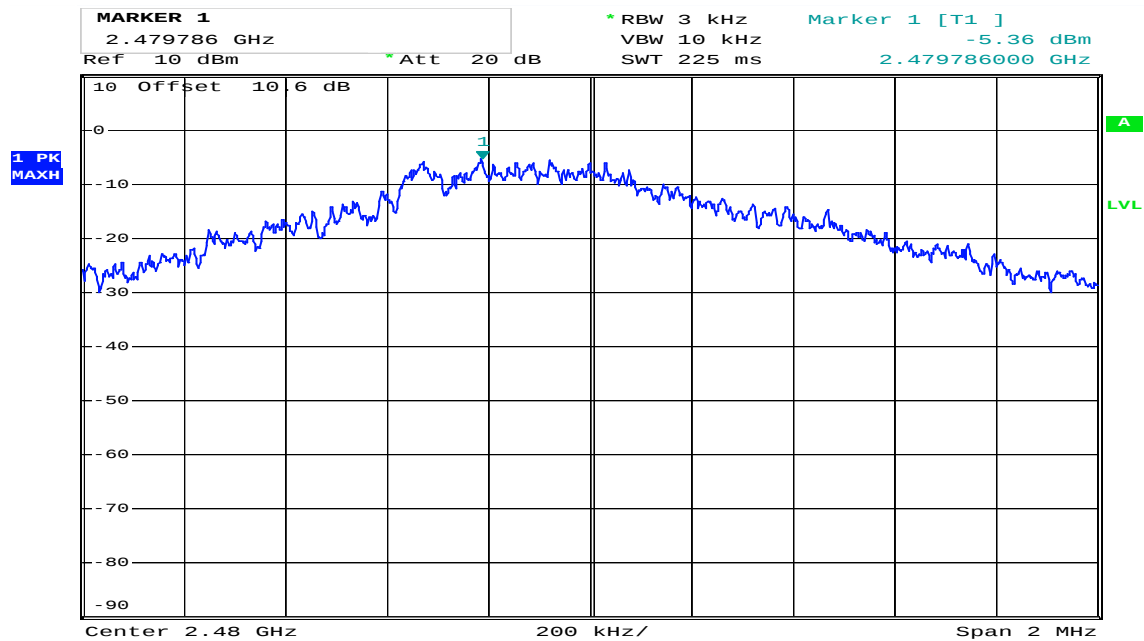
Date: 22.JAN.2018 13:25:08
Power Spectral Density, 2402 MHz, Max Power



Date: 22.JAN.2018 13:23:08
Power Spectral Density, 2440 MHz, Max Power



Date: 25.JAN.2018 11:23:59
Power Spectral Density, 2476 MHz, Max Power



Date: 22.JAN.2018 13:43:04
Power Spectral Density, 2480 MHz, Low Power

3.6 Conducted Emissions at Antenna Connector

FCC Part 15.247 (d)

RSS-247 Issue 2, Clause 5.5

Test Results: Complies

Measurement Data:

Carrier Frequency	Highest Value (dBc)	Margin (dB)	Verdict
All	> 30	> 10	Pass

Measured with Peak Detector

Out-of-Band emissions were measured with the EUT transmitting at 4 frequencies, 2402, 2440 and 2476 MHz with Max Power, and at 2480 MHz with Low Power.

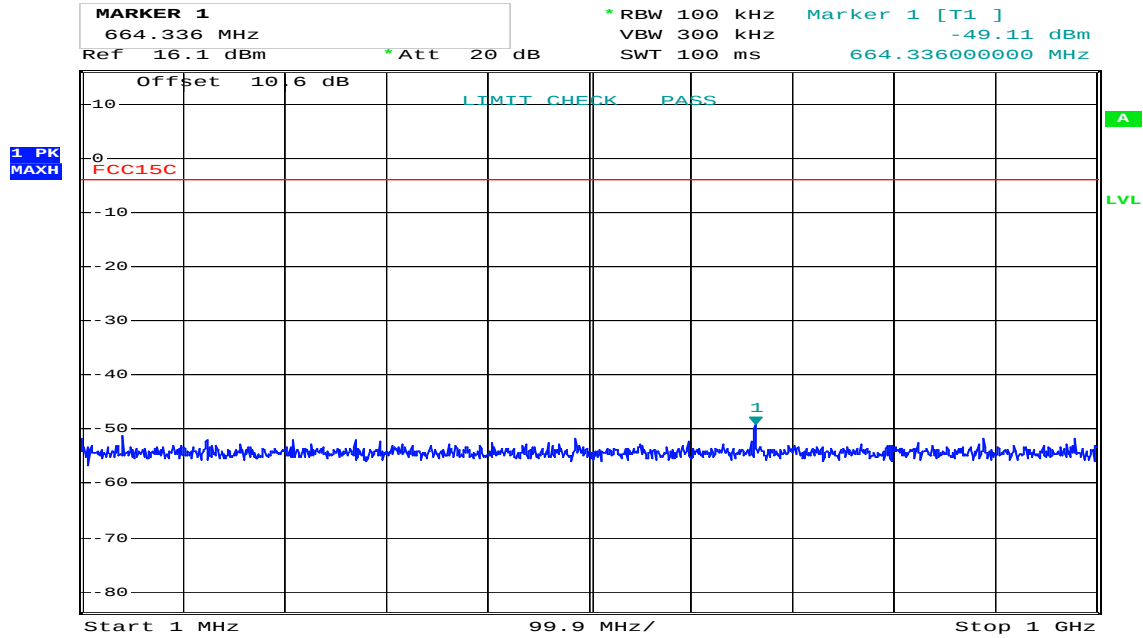
RF conducted power to 25 GHz: see attached plots.

Limit

Peak measurement	RMS averaging
20 dBc or more in 100 kHz bandwidth	30 dBc or more in 100 kHz bandwidth

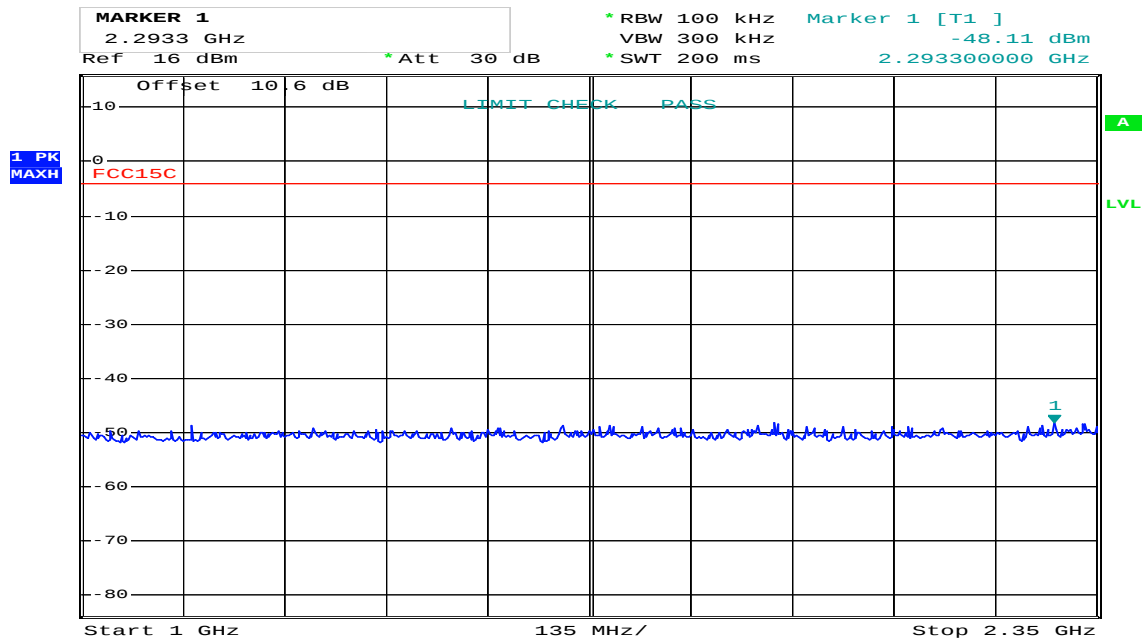
Detector type shall be the same as used for measuring Output Power.

Attenuation below the general limits specified in part 15.209(a) and RSS-GEN Issue 5, clause 8.9, is not required.



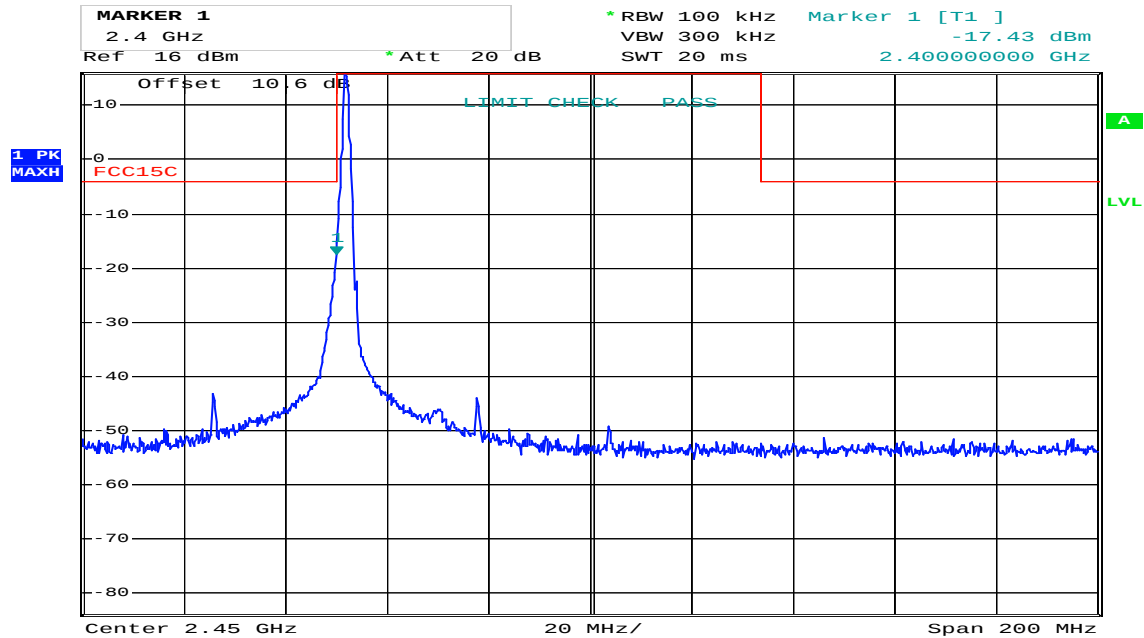
Date: 22.JAN.2018 14:39:43

Conducted Emissions, 1–1000 MHz, Max Power



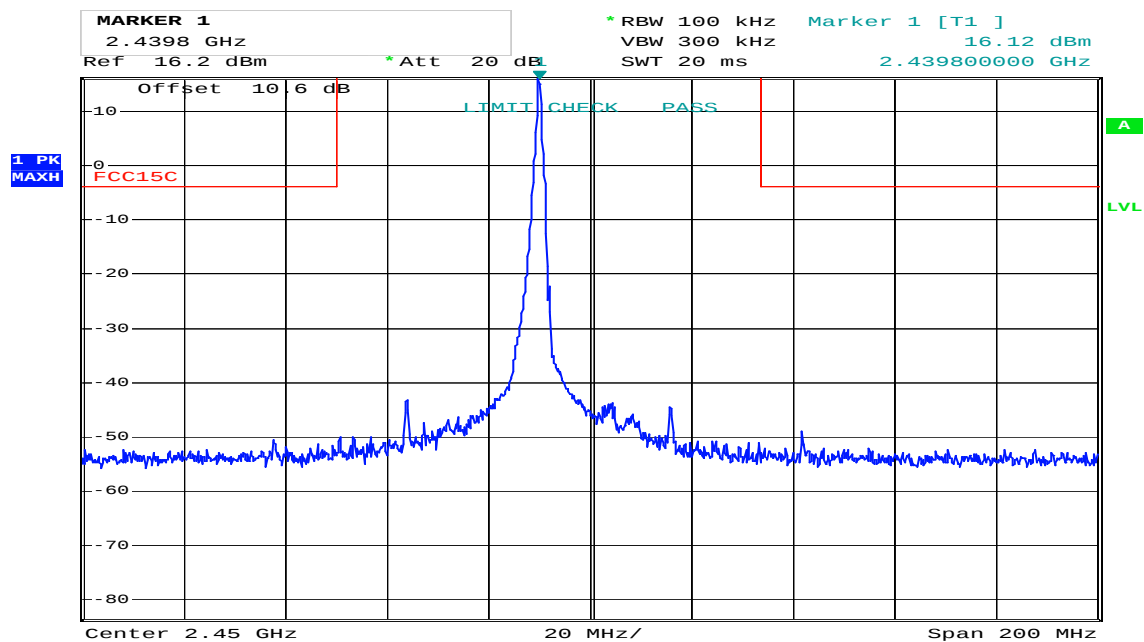
Date: 25.JAN.2018 10:47:26

Conducted Emissions, 1000–2350 MHz, Max Power



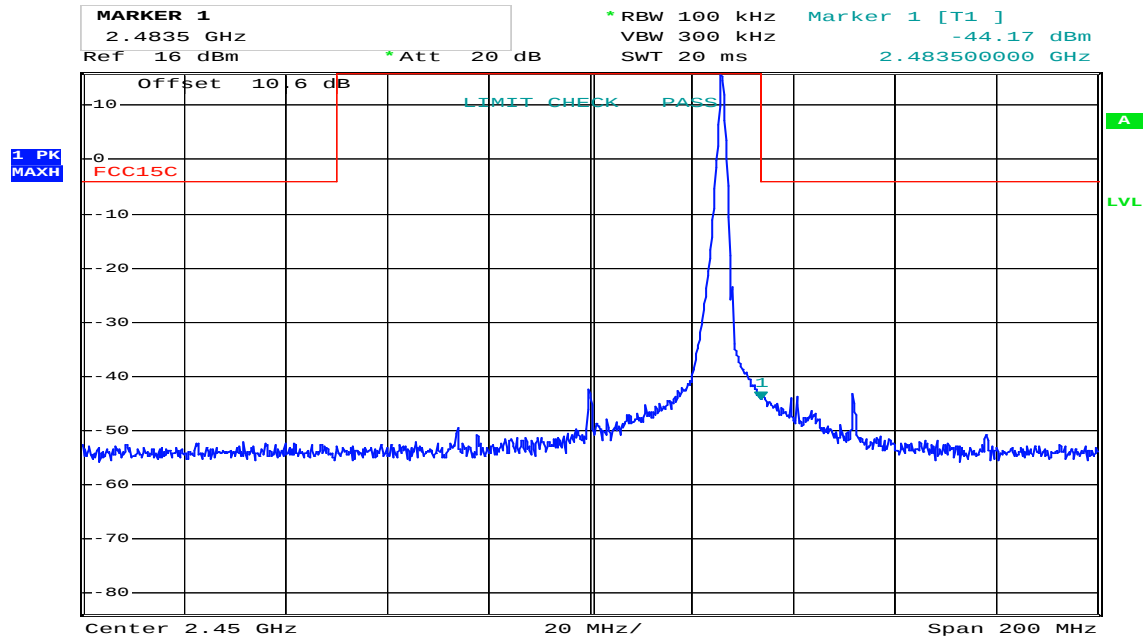
Date: 5.APR.2018 13:36:58

Conducted Emissions, 2350–2550 MHz, 2402 MHz, Max Power



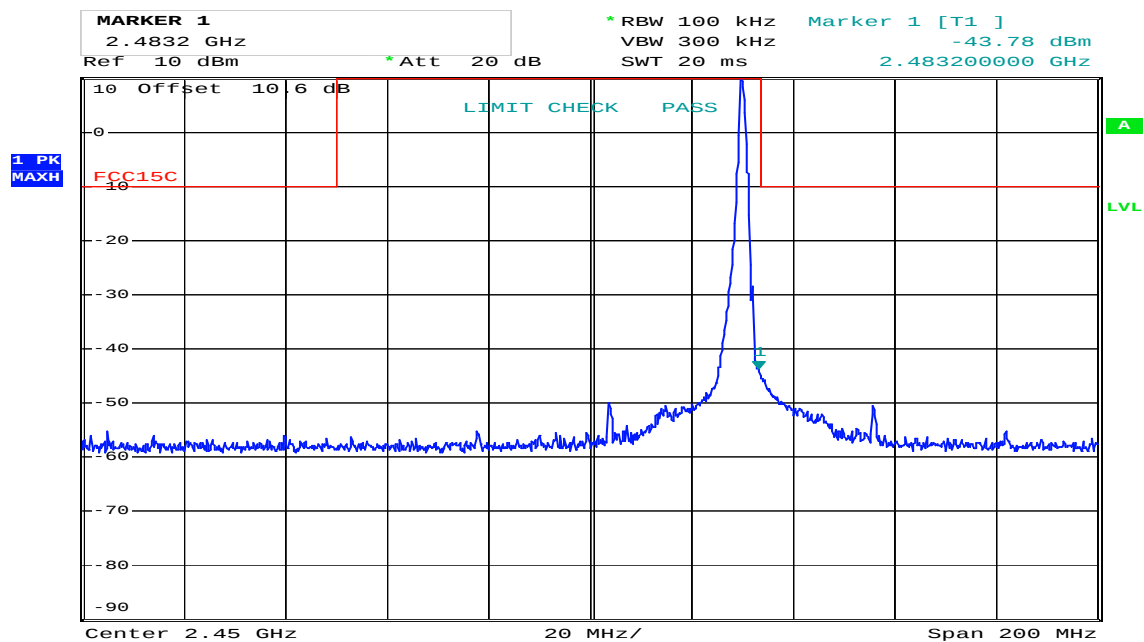
Date: 5.APR.2018 13:39:24

Conducted Emissions, 2350–2550 MHz, 2440 MHz, Max Power



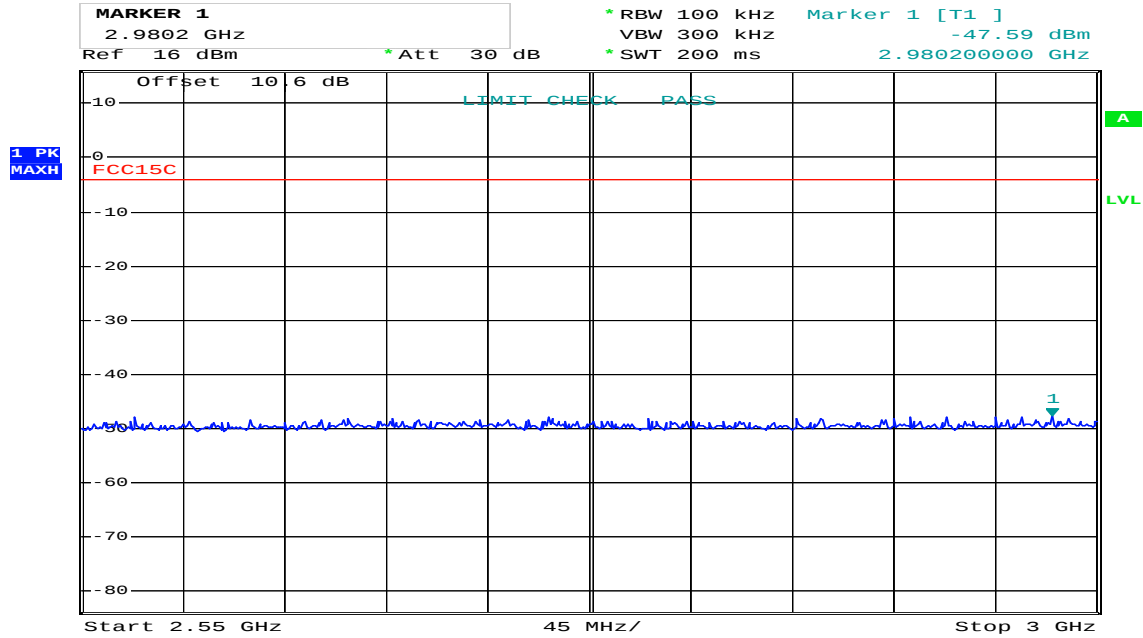
Date: 5.APR.2018 13:40:18

Conducted Emissions, 2350–2550 MHz, 2476 MHz, Max Power



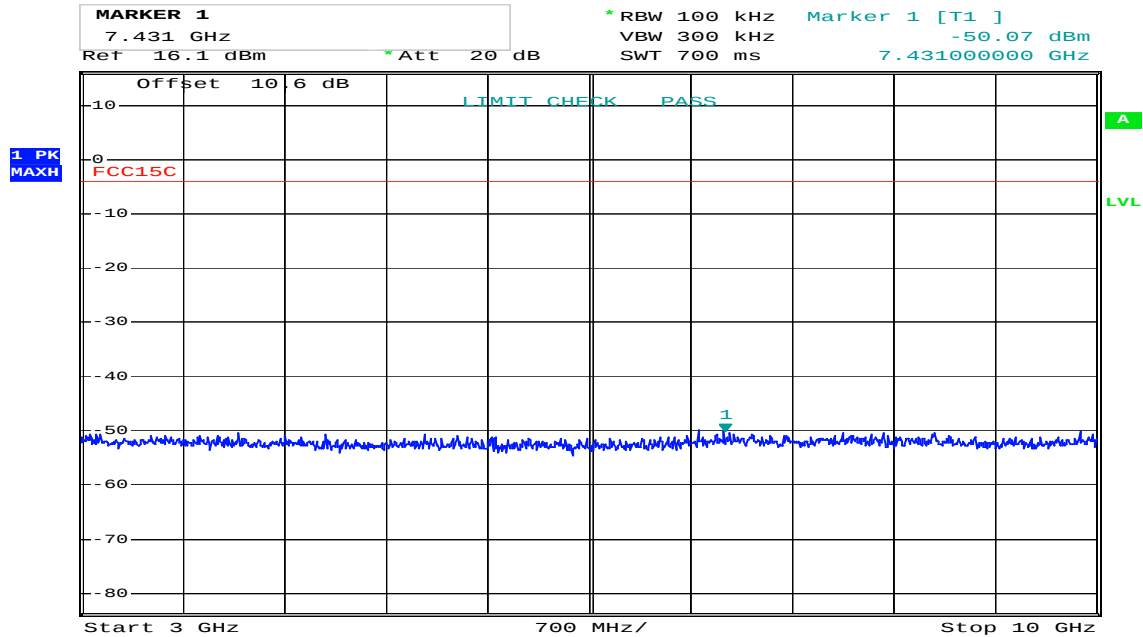
Date: 5.APR.2018 13:33:49

Conducted Emissions, 2350–2550 MHz, 2480 MHz, Low Power



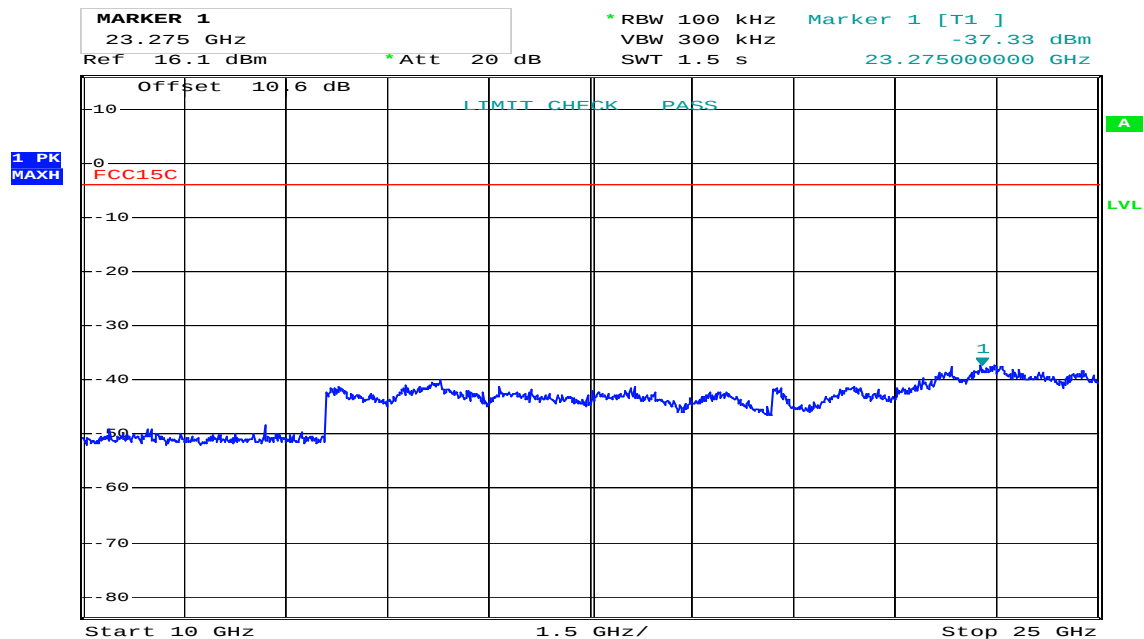
Date: 25.JAN.2018 10:48:51

Conducted Emissions, 2550–3000 MHz, Max Power



Date: 22.JAN.2018 14:42:09

Conducted Emissions, 3000–10000 MHz, Max Power



Date: 22.JAN.2018 14:48:05

Conducted Emissions, 10000–25000 MHz, Max Power

3.7 Restricted Bands of operation

Restricted Bands of operation for FCC and ISSED are defined in FCC Part 15.205 and ISSED RSS-GEN, Issue 5 clause 8.10.

Generally, no fundamentals are allowed in the restricted bands and all emissions must comply with the limits in FCC 15.209 or RSS-GEN, Issue 5, clause 8.9.

FCC (MHz)	ISED (MHz)	FCC (GHz)	ISED (GHz)
0.090–0.110		0.96–1.24 1.3–1.427	0.96–1.427
0.495–0.505		1.435–1.6265	
2.1735–2.1905		1.6455–1.6465	
	3.020–3.026	1.660–1.710	
4.125–4.128		1.7188–1.7222	
4.17725–4.17775		2.2–2.3	
4.20725–4.20775		2.31–2.39	
	5.677–5.683	2.4835–2.5	
6.215–6.218		2.69–2.9	2.655–2.9
6.26775–6.26825		3.26–3.267	
6.31175–6.31225		3.332–3.339	
8.291–8.294		3.3458–3.358	
8.362–8.366		3.6–4.4	3.5–4.4
8.37625–8.38675		4.5–5.15	
8.41425–8.41475		5.35–5.46	
12.29–12.293		7.25–7.75	
12.51975–12.52025		8.025–8.5	
12.57675–12.57725		9.0–9.2	
13.36–13.41		9.3–9.5	
16.42–16.423		10.6–12.7	
16.69475–16.69525		13.25–13.4	
16.80425–16.80475		14.47–14.5	
25.5–25.67		15.35–16.2	
37.5–38.25		17.7–21.4	
73–74.6		22.01–23.12	
74.8–75.2		23.6–24.0	
108–121.94 123–138	108–138	31.2–31.8	
149.9–150.05		36.43–36.5	
156.52475–156.52525		Above 38.6	
156.7–156.9			
162.0125–167.17			
167.72–173.2			
240–285			
322–335.4			
399.9–410			
608–614			

Frequencies in **Bold** text are specific for FCC or ISSED, all other frequencies are common.

3.8 Spurious Emissions (Radiated)

FCC Part 15.209

Test Results: Complies

Measurement Data:

	Measured field strength (dBμV/m)		Limit (dBμV/m)	Margin (dB)	
	2390 MHz	2483.5 MHz			
Peak Detector	70.6	73.3	74	3.4	0.7
Average Detector	50.6	53.3	54	3.4	0.7

Band Edge is measured with the EUT transmitting with Max Power on 2402 or 2476 MHz and with Low Power at 2480 MHz. The measured value when transmitting at low power on 2480 MHz is less than when transmitting at full power on 2476 MHz, therefore only the result for full power at 2476MHz is reported above.

In normal mode the EUT is always hopping with minimum 20 hopping channels when transmitting at Max Power.

Low Power is only used for Control Beacons, Control Beacons are transmitted on 2402, 2450 or 2480 MHz.

All Radiated Emissions tests were performed with the EUT transmitting on a fixed channel with full power, and with low power at 2480 MHz.

Average values are calculated from Peak Values using the appropriate Duty Cycle correction factor.

See attached plots.

Duty Cycle Correction Factors

When transmitting at Max Power (2402 MHz to 2476 MHz):

Correction Factor = $-20 \times \log(\text{Sum of Bursts} / (\text{Frame Length} \times (\text{Min \# Hopping Channels} / \text{Bursts per frame})))$
 $= -20 \times \log((0.140 + 3 \times 0.164) / (4.000 \times (20 / 4))) \text{ dB} = -20 \times \log(0.632 / 20) = 30.0 \text{ dB}$

Maximum Allowed Correction Factor = 20 dB

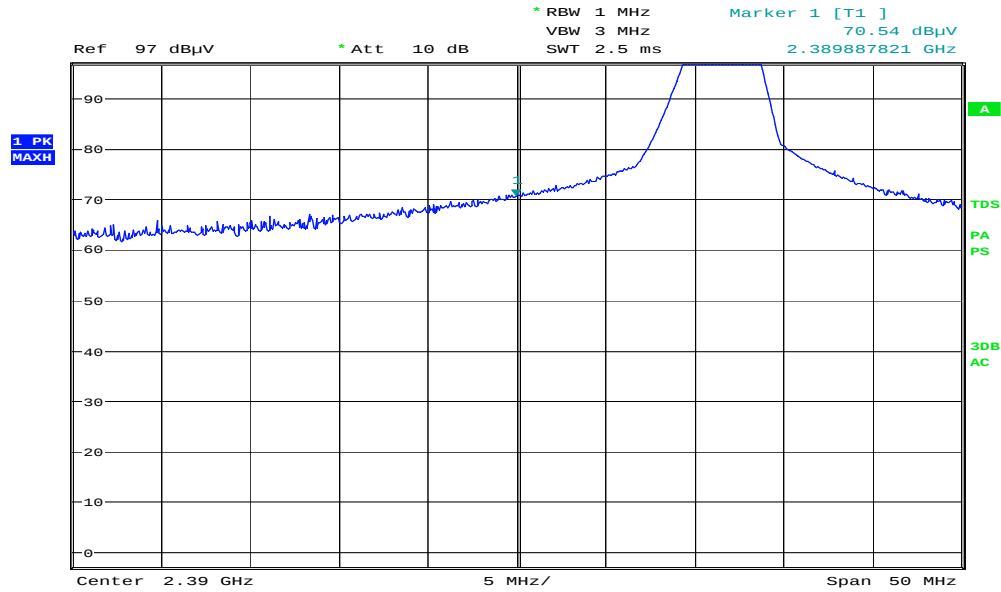
EUT Transmits one BEACON packet (140μs) and 3 AUDIO packets (164μs) per frame, for each packets the frequency is chosen randomly and equally. BEACON and AUDIO packets are transmitted at full power.

When transmitting at Low Power (2402, 2450 and 2480 MHz):

Correction Factor = $-20 \times \log(\text{Beacon Length} / \text{Frame Length})$
 $= -20 \times \log(0.096 / 4.000) \text{ dB} = 32.4 \text{ dB}$

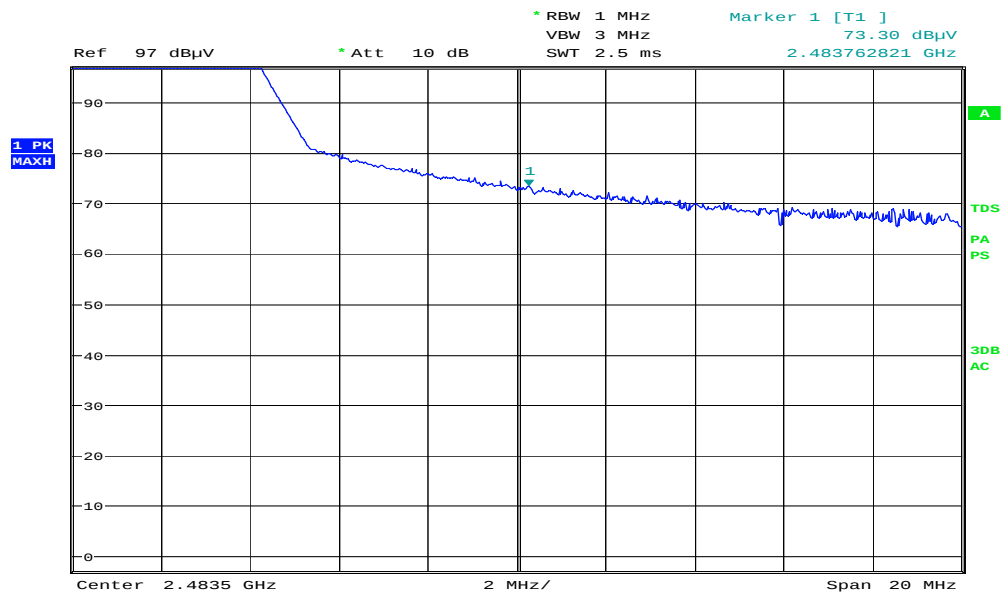
Maximum Allowed Correction Factor = 20 dB

EUT transmits one FHS (96μs) on each Control Channel (2402, 2450 and 2480 MHz) for every Frame. FHS packets are transmitted at low power



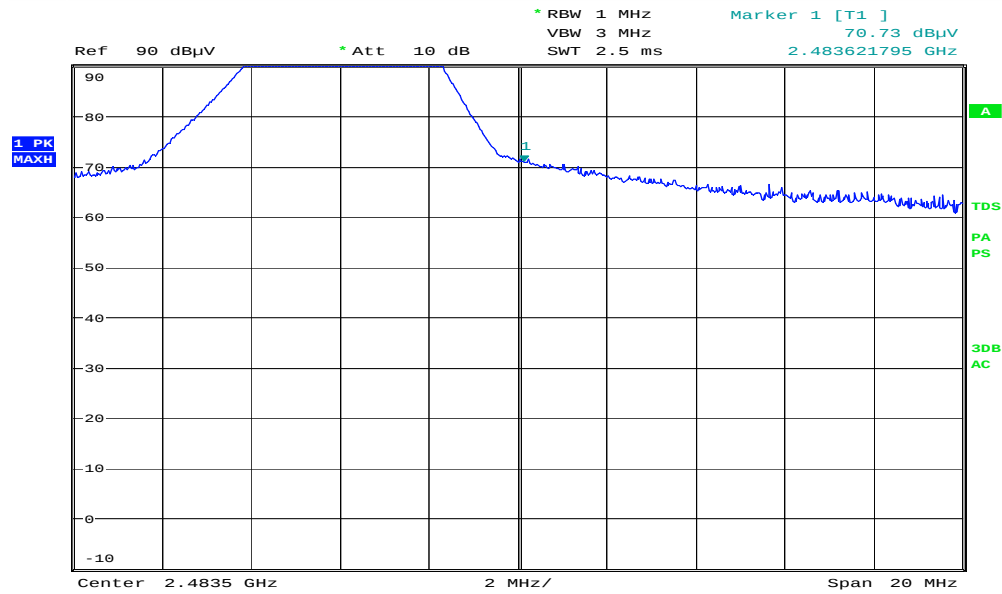
Date: 4.APR.2018 23:42:01

Band Edge, Lower, Peak, 2402 MHz, Max Power



Date: 4.APR.2018 23:19:08

Band Edge, Upper, Peak, 2476 MHz, Max Power



Date: 4.APR.2018 23:24:21

Band Edge, Upper, Peak, 2480 MHz, Low Power

3.9 Radiated Emissions, below 1GHz

FCC 15.205, 15.209

ISED RSS-GEN, Issue 5, Clause 8.9

Test Results: Complies

Radiated emission 30–1000 MHz

Measuring distance 3 m.

Tested in test mode with EUT transmitting on 3 hopping channels.

All measurements were performed with the EUT transmitting at Max Power.

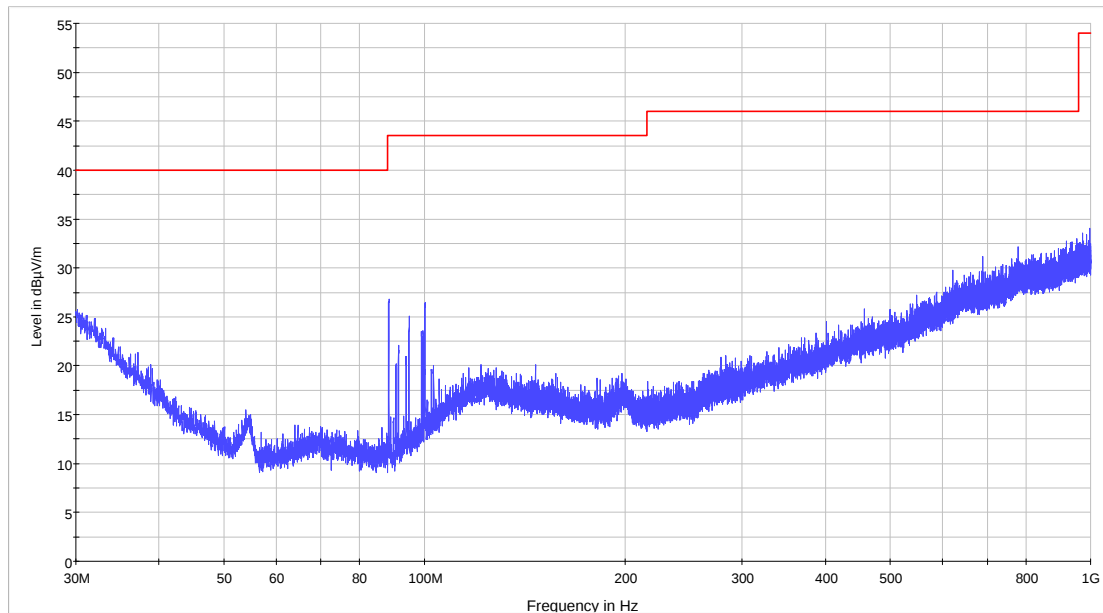
Measured values:

No spurious emissions were detected.

See attached plots.

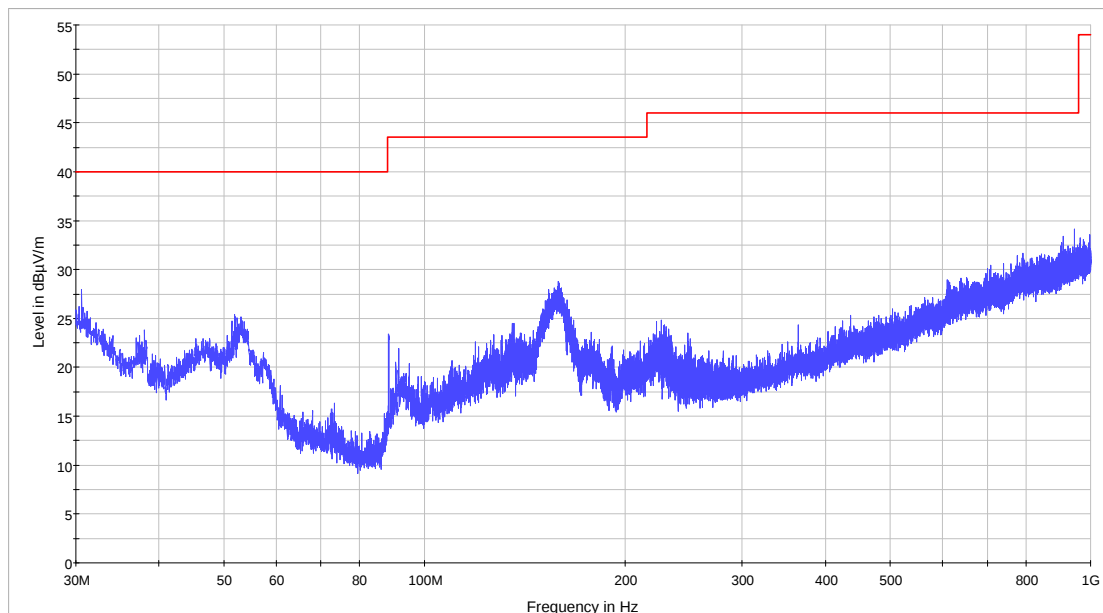
Requirements/Limit

FCC	Part 15.209 @ frequencies defined in §15.205	
ISED	RSS-GEN Issue 5, clause 8.9 @ frequencies defined in clause 8.10	
	Radiated emission limit @3 meters	
Frequency (MHz)	Quasi Peak (µV/m)	Quasi Peak (dBµV/m)
30–88	100	40.0
88–216	150	43.5
216–960	200	46.0
Above 960	500	54.0



Phonak Ingvar v2
— FCC Part 15 and ICES - Class B 3m Q-Peak Limit
— Preview Result 1-PK+

Radiated Emissions, 30–1000 MHz, Powered from Battery



Phonak Ingvar v2
— FCC Part 15 and ICES - Class B 3m Q-Peak Limit
— Preview Result 1-PK+

Radiated Emissions, 30–1000 MHz, Connected to USB Adaptor

3.10 Radiated Emissions, above 1GHz

FCC 15.205, 15.209

ISED RSS-GEN, Issue 5, Clause 8.9

Test Results: Complies

Measurement Data:

Radiated Emissions, 1–25 GHz

Measuring distance: 3 m (1–18 GHz)
10 cm (18-25 GHz)

A pre-scan at approx. 10 cm was performed above 18 GHz and no spurious emissions were detected.

Measured values:

Frequency (MHz)	Channel	Polarization	Peak (dBμV/m)	Average (dBμV/m)	Peak Margin (dB)	Av Margin (dB)
all	Mid	V/H	< 62	< 42	74	54

All measurements were performed with the EUT transmitting at Max Power.

All Peak values are more than 12 dB below the limit.

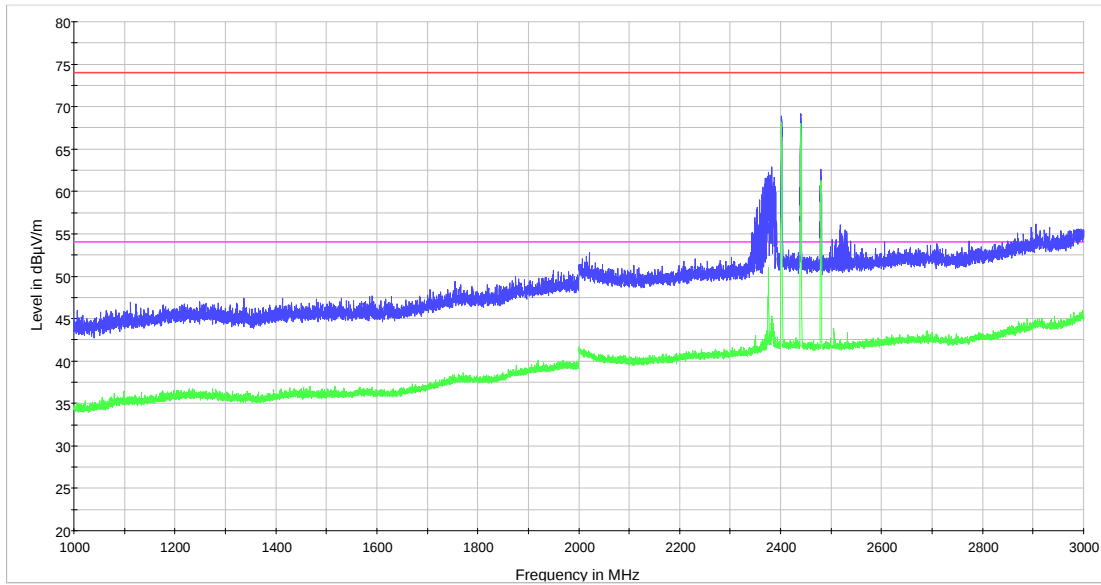
Average Values are calculated from Peak Values by Duty Cycle Correction Factor.

Antenna factor, amplifier gain and cable loss are included in spectrum analyzer "Transducer factor".

See plots.

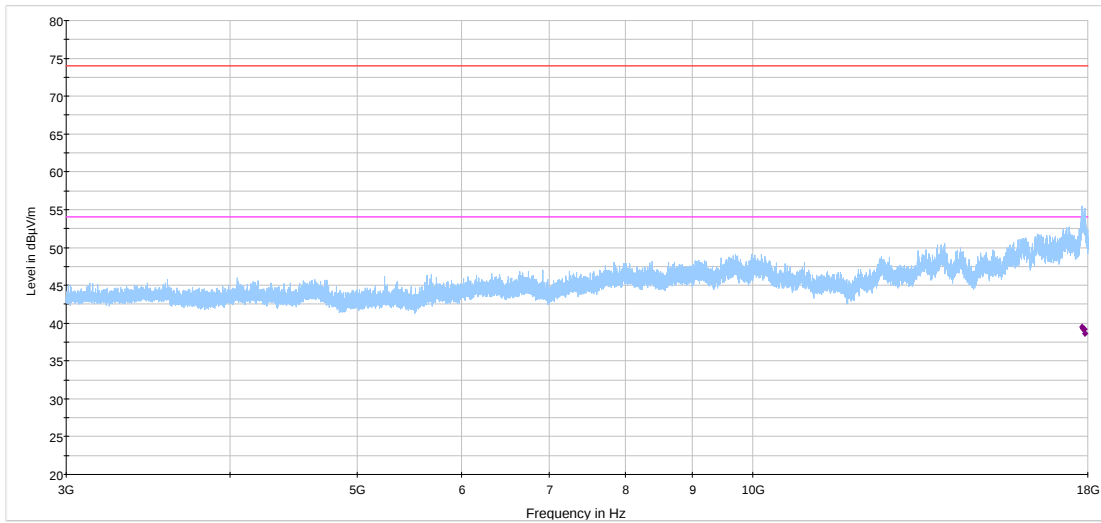
Requirements/Limit

FCC	Part 15.209 @ frequencies defined in §15.205	
ISED	RSS-GEN Issue 5, clause 8.9 @ frequencies defined in clause 8.10	
	Radiated emission limit @3 meters	
Frequency (MHz)	AV (dBμV/m)	Peak (dBμV/m)
Above 1 GHz	54.0	74.0



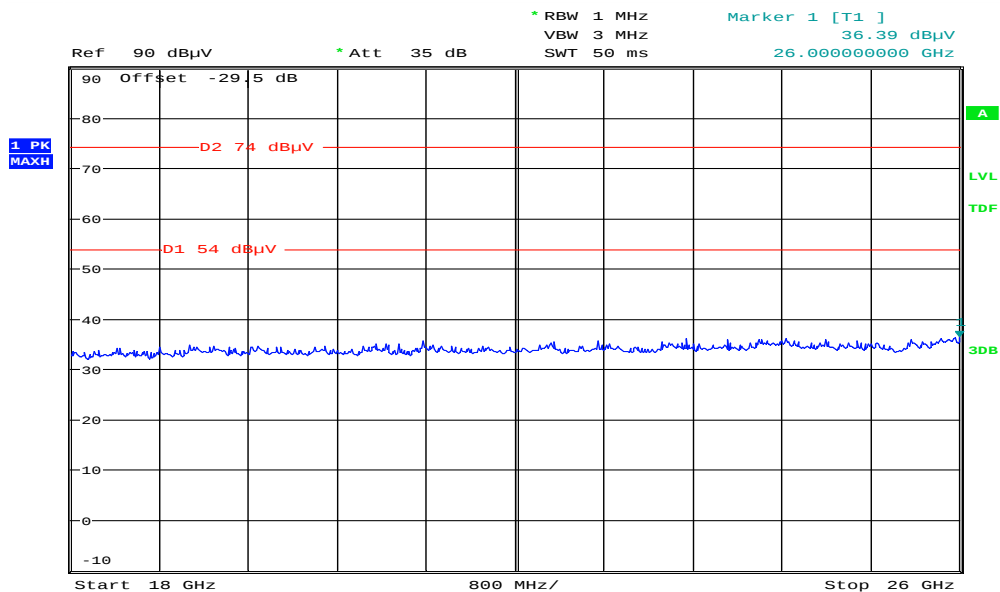
Phonak Ingvar v2
 — FCC Part 15 and ICES- Class B 3m Peak Limit
 — FCC Part 15 and ICES- Class B 3m Average Limit
 — Preview Result 1-PK+
 — Preview Result 2-AVG

Radiated Emissions, 1–3 GHz



Phonak Ingvar v2
 — FCC Part 15 and ICES- Class B 3m Peak Limit
 — FCC Part 15 and ICES- Class B 3m Average Limit
 — Preview Result 1-PK+
 ♦ Final_Result CAV

Radiated Emissions, 3–18 GHz



Date: 4.APR.2018 19:35:24

Pre-scan, 18–26 GHz, @10 cm
(Distance correction factor included in level offset)

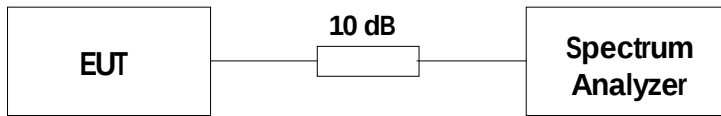
4 Measurement Uncertainty

Measurement Uncertainty Values		
Test Item		Uncertainty
Output Power		±0.5 dB
Power Spectral Density		±0.5 dB
Out of Band Emissions, Conducted (RBW < 100 kHz)	< 3.6 GHz	±0.6 dB
	> 3.6 GHz	±0.9 dB
Spurious Emissions, Radiated	< 1 GHz	±2.5 dB
	> 1 GHz	±2.2 dB
Emission Bandwidth		±4 %
Power Line Conducted Emissions		+2.9 / -4.1 dB
Spectrum Mask Measurements	Frequency	±5 %
	Amplitude	±1.0 dB
Frequency Error		±0.6 ppm
Timing and Jitter Measurements		±2.0 ns
Frame Timing Measurements		±1.4 ppm
Receiver Blocking Levels		±1.0 dB
Temperature Uncertainty		±1 °C

All uncertainty values are expanded standard uncertainty to give a confidence level of 95%, based on coverage factor k=2

5 Test Setups

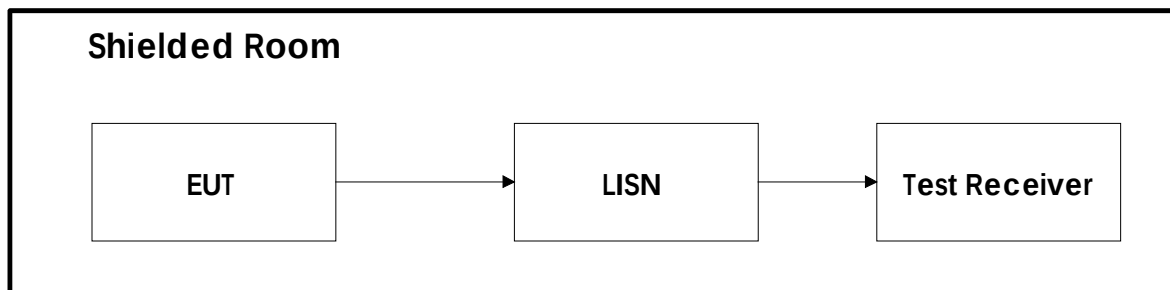
5.1 Conducted Emission Test



Test Set-up 3

This setup is used for all conducted emission tests.

5.2 Power Line Conducted Emissions Test



Test Set-Up 5

6 Test Equipment Used

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment and ancillaries are identified (numbered) by the Testhouse.

No.	Model number	Description	Manufacturer	Ref. no.	Cal. date	Cal. Due
1	FSP30	Spectrum Analyzer	Rohde & Schwarz	LR 1551	2017.06	2019.06
2	6810.17B	Attenuator	Suhner	LR 1669	COU	
3	ESU 26	Receiver/spectrum analyzer	Rohde & Schwarz	FA002043	2018.01	2019.01
4	JB3	Hybrid Antenna	Sunol	FA002108		
5	Model 3117	Horn Antenna with Preamplifier	EMCO	FA002873	2017.11	2018.11
6	ENV216	LISN	Rohde & Schwarz	FA002023	2017.05	2018.05
7	ST18/SMA/N/36	RF Cable	Suhner	LR 1627	COU	
8	FSU46	Spectrum Analyzer	Rohde & schwarz	FA001877	2017.10	2018.10
9	3115	Horn Antenna	EMCO	FA000825	2017.06	2018.06

Note: COU – calibrate on use; N/A – Not Applicable

The software listed below has been used for one or more tests.

No.	Manufacturer	Name	Version	Comment
1	Rohde & Schwarz	GPBshot	2.7	Screenshots from R&S Spectrum Analyzers
2	Rohde & Schwarz	EMC 32	9.26.01	Software for EMC Measurements of Power-Line Conducted Tests

Revision history

Version	Date	Comment	Sign
1.0	2018.04.06	First edition	FS