Choose Scandinavian trust

RADIO TEST REPORT

Report ID:
REP071908

Project number:
PRJ0054054

Type of assessment:
Final product testing

Type of radio equipment:
Spread Spectrum/Digital Device (2400–2483.5 MHz)

Equipment class:
FHSS

Applicant:
Cooper Industries (Electrical) Inc.

Description of product:
FHSS radio transceiver module for 2.4GHz ISM band

Model number/HVIN:
XPD2400B

Product marketing name (PMN):
XPD2400

FCC identifier:
FCC ID: IA9XPD2400B

ISED certification number:
IC: 1338B-XPD2400B

Specifications:

- FCC 47 CFR Part 15 Subpart C, §15.247
- RSS-247, Issue 3, August 2023, Section 5

Date of issue: May 22, 2025

Kevin Rose, EMC/RF Specialist
Dhara Patel, EMC/RF Specialist
Tested by

Andrey Adelberg, Senior EMC/RF Specialist
Reviewed by

Signature

Lab locations

Company name	Nemko Canada Inc.
Facilities	**Ottawa site:** 303 River Road, Ottawa, ON, Canada, K1V 1H2 Tel: +1 613 737 9680, Fax: +1 613 737 9691 **Montréal site:** 292 Labrosse Avenue, Pointe-Claire, QC, Canada, H9R 5L8 Tel: +1 514 694 2684, Fax: +1 514 694 3528 **Cambridge site:** 1-130 Saltsman Drive, Cambridge, ON, Canada, N3E 0B2 Tel: +1 519 650 4811
Test site registration number:	– CA2040 (Ottawa) – CA2041 (Montreal) – CA0101 (Cambridge)
Website	www.nemko.com

Limits of responsibility

Note that this report's results 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 this report.
This test report has been completed following the requirements of ISO/IEC 17025. All results contained in this report are within Nemko Canada's ISO/IEC 17025 accreditation.

Copyright notification

Nemko Canada Inc. authorizes the applicant to reproduce this report, provided it is reproduced in its entirety and for use by the company's employees only. Any use that a third party makes of this report, or any reliance on, or decisions made based on it, is such third parties' responsibility.
Nemko Canada Inc. accepts no responsibility for damages, if any, suffered by any third party due to decisions made or actions based on this report.

Table of Contents

Section 1 Report summary

1.1 Test specifications

FCC 47 CFR Part 15, Subpart C, Clause 15.247	Operation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz
RSS-247, Issue 3, August 2023, Section 5	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

1.2 Test methods

558074 D01 15.247 Meas Guidance v05r02 (April 2, 2019)	Guidance for compliance measurements on digital transmission system, frequency hopping spread spectrum system, and hybrid system devices operating under section 15.247 of the FCC rules.
DA 00-705, Released March 30, 2000	Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems
RSS-Gen, Issue 5, April 2018	General Requirements for Compliance of Radio Apparatus
ANSI C63.10 v2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

1.3 Exclusions

None

1.4 Statement of compliance

In the configuration tested, the EUT was found compliant.

Testing was performed against all relevant requirements of the test standard except as noted in section 1.3 above. Results obtained indicate that the product under test complies in full with the requirements tested. The test results relate only to the items tested.
Determining compliance is based on the results of the compliance measurement, not taking into account measurement uncertainty, in accordance with section 1.3 of ANSI C63.10 v2013.

See "Summary of test results" for full details.

1.5 Test report revision history

Table 1.5-1: *Test report revision history*

Revision #	Date of issue	Details of changes made to test report
REP0071908	May 22, 2025	Original report issued

Section 2 Engineering considerations

2.1 Modifications incorporated in the EUT for compliance

There were no modifications performed to the EUT during this assessment.

2.2 Technical judgment

The EUT power settings was set to S20 to comply with the Spurious emission requirements

2.3 Model variant declaration

There were no model variants declared by the applicant.

2.4 Deviations from laboratory tests procedures

No deviations were made from laboratory procedures.

Section 3 Test conditions

3.1 Atmospheric conditions

Temperature	15 °C – 35 °C
Relative humidity	20 % – 75 %
Air pressure	86 kPa (860 mbar) – 106 kPa (1060 mbar)

When it is impracticable to carry out tests under these conditions, a note to this effect stating the ambient temperature and relative humidity during the tests shall be recorded and stated.

3.2 Power supply range

The normal test voltage for equipment to be connected to the mains shall be the nominal mains voltage. For the purpose of the present document, the nominal voltage shall be the declared voltage, or any of the declared voltages ±5 %, for which the equipment was designed.

Section 4 Information provided by the applicant

4.1 Disclaimer

This section contains information provided by the applicant and has been utilized to support the test plan. Inaccurate information provided by the applicant can affect the validity of the results contained within this test report. Nemko accepts no responsibility for the information contained within this section and the impact it may have on the test plan and resulting measurements.

4.2 Applicant

Applicant name	Cooper Industries (Electrical) Inc.
Applicant address	74-1833 Coast Meridian Rd., Port Coquitlam, BC, Canada, V3C 6G5

4.3 EUT information

Product description	FHSS radio transceiver module for 2.4GHz ISM band used in EATON host devices
Model number/ HVIN	XPD2400B
Model name	XPD2400
Serial number	1E824785
Part number	TPCB-3499-03
Power supply requirements	5 V_{DC}
Product description and theory of operation	This is a 2.4GHz FHSS radio transceiver module. It is used in Eaton host devices (wireless remote-control devices) to provide wireless control or monitoring of industrial equipment. The host devices can be mobile or portable devices.

4.4 Radio technical information

Category of Wideband Data Transmission equipment	Frequency Hopping Spread Spectrum (FHSS) equipment
Frequency band	2400–2483.5 MHz
Frequency Min	2.4031 GHz
Frequency Max	2.4798 GHz
RF power Max (W), Conducted	0.123 W (20.91 dBm)
Measured BW (kHz), 99% OBW	31.4 kHz
20 dB BW (kHz)	24.08 kHz
Type of modulation	2-level FSK
Emission classification	31K4F1D
Operational duty cycle (max)	53% (proprietary protocol)
Transmitter spurious, dBµV/m @ 3 m	68.0 dBµV/m Peak, 50.8 dBµV/m Average, @ 7439.4 MHz
Antenna information	See section 7.3

4.5 EUT setup details

4.5.1 Radio exercise details

Transmitter set into continuous transmit mode

4.5.2 EUT setup configuration

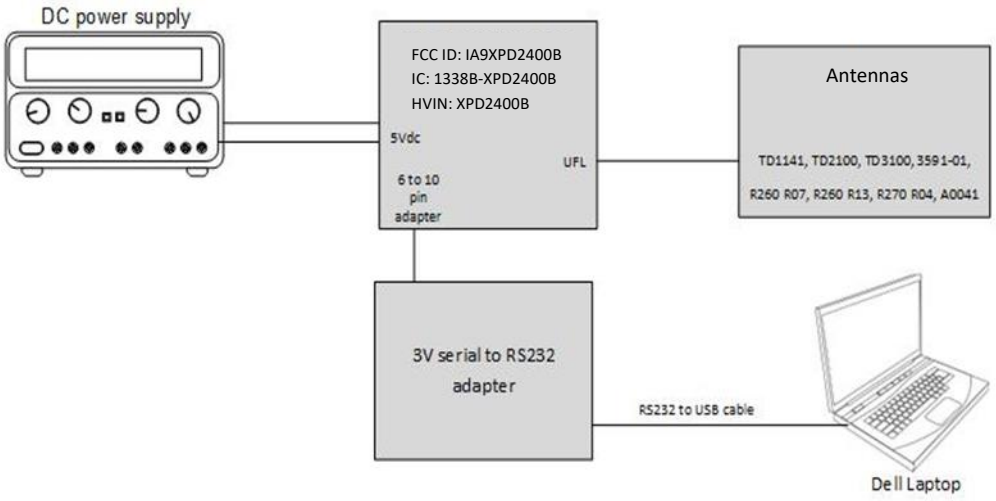


Figure 4.5-1: *Block diagram*

Section 5 Summary of test results

5.1 Testing period

Test start date	August 8, 2024	Test end date	December 3, 2024

5.2 Sample information

Receipt date	August 8, 2024	Nemko sample ID number(s)	PRJ00540540001

5.3 FCC test results

Table 5.3-1: *FCC requirements results*

Part	Test description	Verdict
Generic requirements		
§15.207(a)	Conducted limits	Not applicable
§15.31(e)	Variation of power source	Pass
§15.31(m)	Number of tested frequencies	Pass
§15.203	Antenna requirement	Pass
§15.247(c)(1)	Fixed point-to-point operation with directional antenna gains greater than 6 dBi	Not applicable
§15.247(c)(2)	Transmitters operating in the 2400–2483.5 MHz band that emit multiple directional beams	Not applicable
§15.247(d)	Spurious emissions	Pass
FHSS specific requirements		
§15.247(a)(1)(iii)	Requirements for operation in the 2400–2483.5 MHz band	Pass
§15.247(b)(1)	Maximum peak output power in the 2400–2483.5 MHz band and 5725–5850 MHz band	Pass

Notes: None

5.4 ISED test results

Table 5.4-1: *ISED requirements results*

Part	Test description	Verdict
Generic requirements		
RSS-Gen, 7.3	Receiver radiated emission limits	Not applicable
RSS-Gen, 7.4	Receiver conducted emission limits	Not applicable
RSS-Gen, 6.9	Operating bands and selection of test frequencies	Pass
RSS-Gen, 8.8	AC powerline conducted emissions limits	Not applicable
RSS-247, 5.5	Unwanted emissions	Pass
FHSS specific requirements		
RSS-247, 5.1 (b)	Minimum channel spacing	Pass
RSS-247, 5.1 (d)	Number of hopping channels, dwell time and occupied channel bandwidth in the 2400–2483.5 MHz band	Pass
RSS-247, 5.4 (b)	Transmitter output power and e.i.r.p. requirements in the 2400–2483.5 MHz band	Pass

Notes: [1]According to sections 5.2 and 5.3 of RSS-Gen, Issue 5 the EUT does not have a stand-alone receiver neither scanner receiver, therefore exempt from receiver requirements.

Section 6 Test equipment

6.1 Test equipment list

Table 6.1-1: *Equipment list*

Equipment	Manufacturer	Model no.	Asset no.	Cal cycle	Next cal.
3 m EMI test chamber	TDK	SAC-3	FA002047	1 year	January 18, 2025
Flush mount turntable	Sunol	FM2022	FA002082	—	NCR
Controller	Sunol	SC104V	FA002060	—	NCR
Antenna mast	Sunol	TLT2	FA002061	—	NCR
61505 AC/DC programmable source	Chroma	61509	FA003036	—	NCR
Receiver/spectrum analyzer	Rohde & Schwarz	ESU 40	FA002071	1 year	March 7, 2025
Horn (1–18 GHz)	ETS Lindgren	3117	FA002840	1 year	March 8, 2025
Preamp (1–18 GHz)	ETS Lindgren	124334	FA002877	1 year	November 19, 2025
Horn antenna (18–40 GHz)	EMCO	3116	FA001847	1 year	May 21, 2025
2.4 GHz band Notch Filter	Microwave Circuits	N0324413	FA003306	1 year	March 12, 2025
Pre-amplifier (18–26 GHz)	Narda	BBS-1826N612	FA001550	1 year	February 9, 2025
Spectrum analyzer	Rohde & Schwarz	FSV 40	FA002731	1 year	May 22, 2025

Note: NCR - no calibration required,

All equipment related to the contribution of measurement has been included in this list. Such items include, but are not limited to, cables, attenuators, directional couplers, and pre-amps.

Table 6.1-2: *Measurement uncertainty calculations based on equipment list*

Measurement	Measurement uncertainty, ±dB
Radiated spurious emissions (30 MHz to 1 GHz)	4.16
Radiated spurious emissions (1 GHz to 6 GHz)	4.67
Radiated spurious emissions (6 GHz to 18 GHz)	4.95
Radiated spurious emissions (18 GHz to 26 GHz)	4.39
RF Output power measurement using Spectrum Analyzer[1]	0.71

Notes: UKAS Lab 34, TIA-603 and ETSI TR 100 028-1&2 have been used as guidance for measurement uncertainty reasonable estimations with regards to previous experience and validation of data. Nemko Canada Inc. follows these test methods in order to satisfy ISO/IEC 17025 requirements for estimation of uncertainty of measurement for wireless products. Measurement uncertainty calculations assume a coverage factor of K = 2 with 95% certainty.

Section 7 Testing data

7.1 Variation of power source

7.1.1 References, definitions and limits

FCC §15.31 (e):

For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.

7.1.2 Test summary

Verdict	Pass
Test date	December 3, 2024
Tested by	Kevin Rose
Test location	Ottawa

7.1.3 Observations, settings and special notes

The testing was performed as per ANSI C63.10 Section 5.13.

a) Where the device is intended to be powered from an external power adapter, the voltage variations shall be applied to the input of the adapter provided with the device at the time of sale. If the device is not marketed or sold with a specific adapter, then a typical power adapter shall be used.
b) For devices, where operating at a supply voltage deviating ±15% from the nominal rated value may cause damages or loss of intended function, test to minimum and maximum allowable voltage per manufacturer's specification and document in the report.
c) For devices with wide range of rated supply voltage, test at 15% below the lowest and 15% above the highest declared nominal rated supply voltage.
d) For devices obtaining power from an input/output (I/O) port (USB, firewire, etc.), a test jig is necessary to apply voltage variation to the device from a support power supply, while maintaining the functionalities of the device.
e) For battery-operated equipment, the equipment tests shall be performed using a variable power supply.

7.1.4 Test data

The EUT is battery-powered, and testing was performed with fully charged batteries.

7.2 Number of frequencies

7.2.1 References, definitions and limits

FCC §15.31:

(m) Measurements on intentional radiators or receivers shall be performed and, if required, reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table.

RSS-Gen, Clause 6.9:

Except where otherwise specified, measurements shall be performed for each frequency band of operation for which the radio apparatus is to be certified, with the device operating at the frequencies in each band of operation shown in table below. The frequencies selected for measurements shall be reported in the test report.

Table 7.2-1: *Frequency Range of Operation*

Frequency range over which the device operates (in each band)	Number of test frequencies required	Location of measurement frequency inside the operating frequency range
1 MHz or less	1	Center (middle of the band)
1–10 MHz	2	1 near high end, 1 near low end
Greater than 10 MHz	3	1 near high end, 1 near center and 1 near low end

Notes: "near" means as close as possible to or at the centre / low end / high end of the frequency range over which the device operates.

7.2.2 Test summary

Verdict	Pass
Test date	December 3, 2024
Tested by	Kevin Rose
Test location	Ottawa

7.2.3 Observations, settings and special notes

ANSI C63.10, Clause 5.6.2.1:

The number of channels tested can be reduced by measuring the center channel bandwidth first and then applying the following relaxations as appropriate:

a) For each operating mode, if the measured channel bandwidth on the middle channel is at least 150% of the minimum permitted bandwidth, then it is not necessary to measure the bandwidth on the high and low channels.

b) For multiple-input multiple-output (MIMO) systems, if the measured channel bandwidth on testing the middle channel exceeds the minimum permitted bandwidth by more than 50% on one transmit chain, then it is not necessary to repeat testing on the other chains.

c) If the measured channel bandwidth on the middle channel is less than 50% of the maximum permitted bandwidth, then it is not necessary to measure the bandwidth on the high and low channels.

ANSI C63.10, Clause 5.6.2.2:

For devices with multiple operating modes, measurements on the middle channel can be used to determine the worst-case mode(s). The worst-case modes are as follows:

a) Band edge requirements—Measurements on the mode with the widest bandwidth can be used to cover the same channel (center frequency) on modes with narrower bandwidth that have the same or lower output power for each modulation family (e.g., OFDM and direct sequence spread spectrum).

b) Spurious emissions—Measure the mode with the highest output power and the mode with the highest output power spectral density for each modulation family (e.g., OFDM and direct sequence spread spectrum).

c) In-band PSD—Measurements on the mode with the narrowest bandwidth can be used to cover all modes within the same modulation family of an equal or lower output power provided the result is less than 50% of the limit.

7.2.4 Test data

Table 7.2-2: *Test channels selection*

Start of Frequency range, MHz	End of Frequency range, MHz	Frequency range bandwidth, MHz	Low channel, MHz	Mid channel, MHz	High channel, MHz
2400	2483.5	83.5	2403.1	2441.1	2479.8

7.3 Antenna requirement

7.3.1 References, definitions and limits

FCC §15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

FCC §15.247:

(b) The maximum peak conducted output power of the intentional radiator shall not exceed the following:

(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

RSS-Gen, Clause 6.8:

The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report.

7.3.2 Test summary

Verdict	Pass
Test date	December 3, 2024
Tested by	Kevin Rose
Test location	Ottawa

7.3.3 Observations, settings and special notes

None

7.3.4 Test data

Table 7.3-1: *Antenna information for Mobile operation*

Description	Manufacturer	Model number	Maximum gain, dBi
2.4-2.5 Dual Closed Coil Whip	Pulse	NMO5E2400B	5.00
2.4-2.5GHz Edge Inverted L	Cooper Industries	ACAB-2683-07 inside R260 Rev 7	5.40
2.4-2.5GHz Edge Inverted L	Cooper Industries	ACAB-2683-07 inside R260 Rev 13	5.40
2.4-2.5GHz Edge Inverted L	Cooper Industries	ACAB-2683-07 inside R270 Rev 4	4.40

Table 7.3-2: *Antenna information for Portable operation*

Description	Manufacturer	Model number	Maximum gain, dBi
2.4-2.5GHz 1/2λ Dipole	Wellshow	AR010-2.4G	2.00
2.4-2.5GHz SMD Ceramic	Yageo	ANT7020LL05R2400A inside TD1140	2.62
2.4-2.5GHz SMD Ceramic	Yageo	ANT7020LL05R2400A inside TD2100	2.62
2.4-2.5GHz SMD Ceramic	Yageo	ANT7020LL05R2400A inside TD3100	2.62

7.4 Frequency Hopping Systems requirements, 2 GHz operation

7.4.1 References, definitions and limits

FCC §15.247:

(a) Operation under the provisions of this Section is limited to frequency hopping and digitally modulated intentional radiators that comply with the following provisions:

(1) Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

(iii) Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

(f) For the purposes of this section, hybrid systems are those that employ a combination of both frequency hopping and digital modulation techniques. The frequency hopping operation of the hybrid system, with the direct sequence or digital modulation operation turned-off, shall have an average time of occupancy on any frequency not to exceed 0.4 seconds within a time period in seconds equal to the number of hopping frequencies employed multiplied by 0.4. The power spectral density conducted from the intentional radiator to the antenna due to the digital modulation operation of the hybrid system, with the frequency hopping operation turned off, shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

Table 7.4-1: *Summary of the basic requirements*

$P_{max\text{-}pk} \leq 1$ W	$P_{max\text{-}pk} \leq 0.125$ W
$N_{ch} \geq 75$	$N_{ch} \geq 15$
$\Delta f \geq$ MAX { 25 kHz, $BW_{20\ dB}$ }	$\Delta f \geq$ MAX [MAX { 25 kHz, 0.67×$BW_{20\ dB}$ } OR MAX{25 kHz, $BW_{20\ dB}$}]
max. $BW_{20\ dB}$ not specified	max. $BW_{20\ dB}$ not specified
$t_{ch} \leq 0.4$ s for T = 0.4×Nch	$t_{ch} \leq 0.4$ s for T = 0.4×Nch

Note: t_{ch} = average time of occupancy; T = period; N_{ch} = # hopping frequencies; BW = bandwidth; Δf = hopping channel carrier frequency separation

RSS-247, Clause 5.1:

a. The bandwidth of a frequency hopping channel is the 20 dB emission bandwidth, measured with the hopping stopped. The system's radio frequency (RF) bandwidth is equal to the channel bandwidth multiplied by the number of channels in the hopset. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

b. FHSs shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, FHSs operating in the band 2400–2483.5 MHz may have hopping channel carrier frequencies that are separated by 25 kHz or two thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided that the systems operate with an output power no greater than 0.125 W.

d. FHSs operating in the band 2400–2483.5 MHz shall use at least 15 hopping channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds, multiplied by the number of hopping channels employed. Transmissions on particular hopping frequencies may be avoided or suppressed provided that at least 15 hopping channels are used.

RSS-247, Clause 5.3:

Hybrid systems employ a combination of both frequency hopping and digital transmission techniques and shall comply with the following:

a. With the digital transmission operation of the hybrid system turned off, the frequency hopping operation shall have an average time of occupancy on any frequency not exceeding 0.4 seconds within a duration in seconds equal to the number of hopping frequencies multiplied by 0.4.

7.4.2 Test summary

Verdict	Pass		
Test date	December 3, 2024	Temperature	21 °C
Tested by	Kevin Rose	Air pressure	1003 mbar
Test location	Ottawa	Relative humidity	36 %

7.4.3 Observations, settings and special notes

Carrier frequency separation was tested per ANSI C63.10 subclause 7.8.2. Spectrum analyser settings:

Resolution bandwidth	Start with the RBW set to approximately 30% of the channel spacing; adjust as necessary to best identify the center of each individual channel.
Video bandwidth	≥ RBW
Frequency span	Wide enough to capture the peaks of two adjacent channels
Detector mode	Peak
Trace mode	Max Hold

Number of hopping frequencies was tested per ANSI C63.10 subclause 7.8.3. Spectrum analyser settings:

Resolution bandwidth	To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.
Video bandwidth	≥ RBW
Frequency span	The frequency band of operation. Depending on the number of channels the device supports, it may be necessary to divide the frequency range of operation across multiple spans, to allow the individual channels to be clearly seen.
Detector mode	Peak
Trace mode	Max Hold

Time of occupancy (dwell time) was tested per ANSI C63.10 subclause 7.8.4. Spectrum analyser settings:

Resolution bandwidth	shall be ≤ channel spacing and where possible RBW should be set >> 1 / T, where T is the expected dwell time per channel.
Video bandwidth	≥ RBW
Frequency span	Zero span, centered on a hopping channel.
Detector mode	Peak
Trace mode	Max Hold

20 dB bandwidth was tested per ANSI C63.10 subclause 6.9.2. Spectrum analyser settings:

Resolution bandwidth	≥ 1–5% of the 20 dB bandwidth
Video bandwidth	≥ RBW
Frequency span	approximately 2 to 5 times the 20 dB bandwidth, centered on a hopping channel
Detector mode	Peak
Trace mode	Max Hold

7.4.4 Test data

Table 7.4-2: *20 dB bandwidth results*

Frequency, MHz	20 dB bandwidth, kHz
2403.1	23.9
2441.1	24.0
2479.8	24.1

Table 7.4-3: *99% occupied bandwidth results*

Frequency, MHz	99% occupied bandwidth, kHz
2403.1	30.8
2441.1	30.0
2479.8	31.4

Notes: There is no 99% occupied bandwidth limit in the standard's requirements the measurement results provided for information purposes only.

Table 7.4-4: *Carrier frequency separation results*

Carrier frequency separation, kHz	Minimum limit, kHz	Margin, kHz
1200	25	1175

Table 7.4-5: *Number of hopping frequencies results*

Number of hopping frequencies	Minimum limit	Margin
63	15	48

Table 7.4-6: *Average time of occupancy results*

Dwell time of each pulse, ms	Number of pulses within period	Total dwell time within period, ms	Limit, ms	Margin, ms
13.8	17	234.6	400	165.4

Notes: Measurement Period is 20 s

Test data, continued

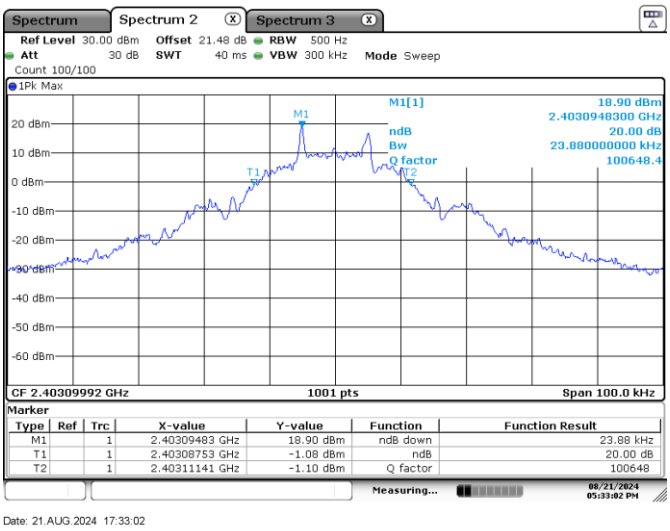


Figure 7.4-1: *20 dB bandwidth on low channel*

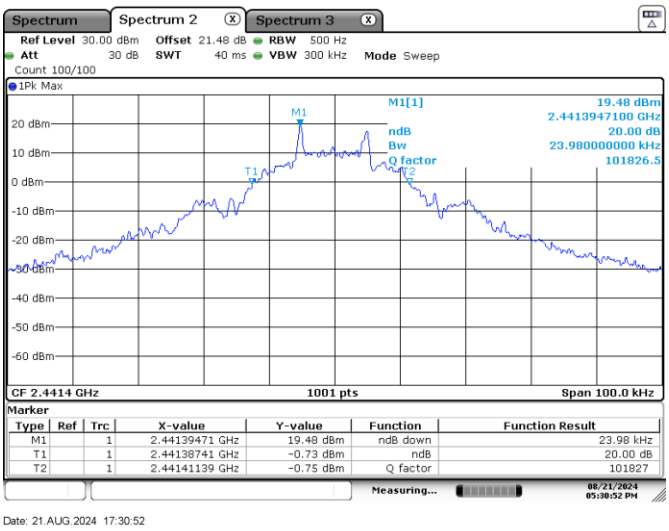
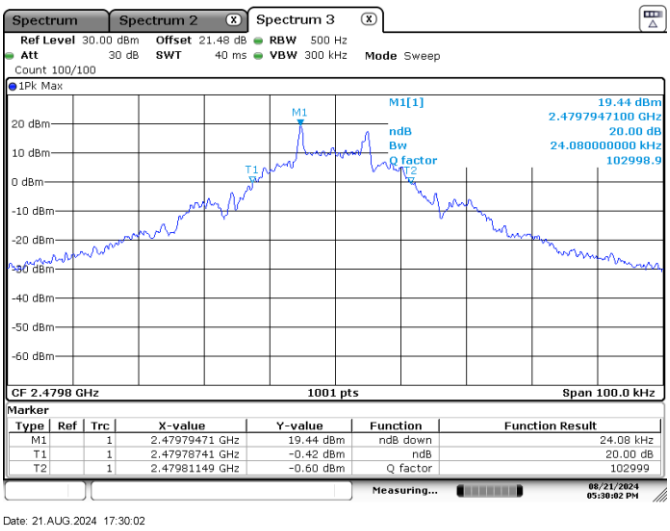


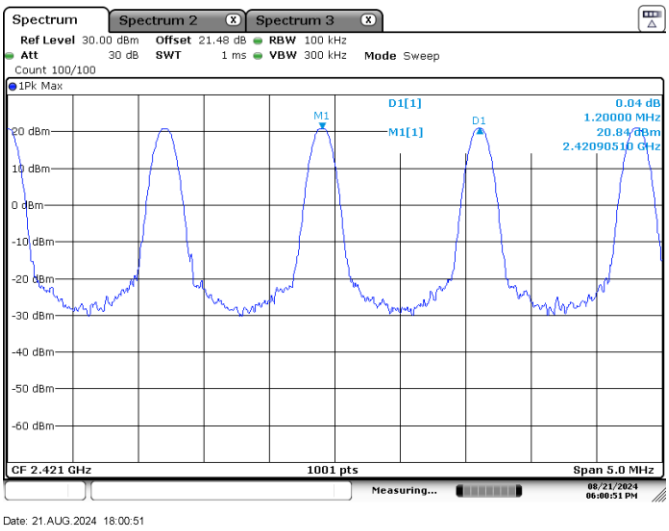
Figure 7.4-2: *20 dB bandwidth on mid channel*

Test data, continued



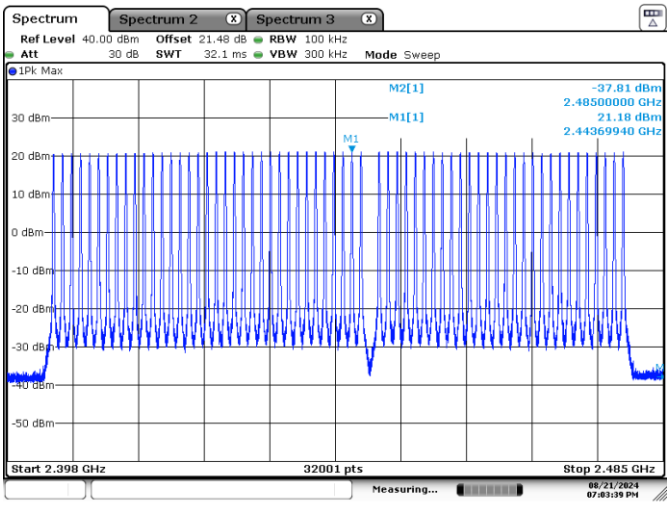
Date: 21.AUG.2024 17:30:02

Figure 7.4-3: *20 dB bandwidth on high channel*



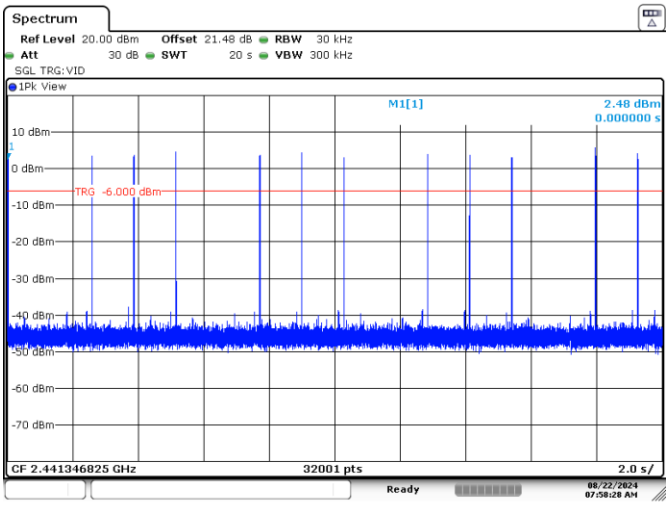
Date: 21.AUG.2024 18:00:51

Figure 7.4-4: *Carrier frequency separation*



Date: 21.AUG.2024 19:03:39

Figure 7.4-5: *Number of hopping channels*



Date: 22.AUG.2024 07:58:28

Figure 7.4-6: *Dwell time*

7.5 Transmitter output power and e.i.r.p. requirements for FHSS 2 GHz

7.5.1 References, definitions and limits

FCC §15.247:

(b) The maximum peak conducted output power of the intentional radiator shall not exceed the following:

(1) For frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 watt (30 dBm). For all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts (21 dBm).

(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

RSS-247, Clause 5.4:

Devices shall comply with the following requirements, where applicable:

b. For FHSs operating in the band 2400–2483.5 MHz, the maximum peak conducted output power shall not exceed 1.0 W (30 dBm) if the hopset uses 75 or more hopping channels; the maximum peak conducted output power shall not exceed 0.125 W (21 dBm) if the hopset uses less than 75 hopping channels. The e.i.r.p. shall not exceed 4 W (36 dBm), except as provided in section 5.4(e).

e. Fixed point-to-point systems in the bands 2400–2483.5 MHz and 5725–5850 MHz are permitted to have an e.i.r.p. higher than 4 W provided that the higher e.i.r.p. is achieved by employing higher gain directional antennas and not higher transmitter output powers. Point-to-multipoint systems, omnidirectional applications and multiple co-located transmitters transmitting the same information are prohibited from exceeding an e.i.r.p. of 4 W.

7.5.2 Test summary

Verdict	Pass		
Test date	December 3, 2024	Temperature	21 °C
Tested by	Kevin Rose	Air pressure	1003 mbar
Test location	Ottawa	Relative humidity	36 %

7.5.3 Observations, settings and special notes

Conducted output power was tested per ANSI C63.10 subclause 7.8.5. The hopping shall be disabled for this test.

Spectrum analyser settings:

Resolution bandwidth	> 20 dB bandwidth of the emission being measured
Video bandwidth	≥ RBW
Frequency span	approximately 5 times the 20 dB bandwidth, centered on a hopping channel
Detector mode	Peak
Trace mode	Max Hold

7.5.4 Test data

Table 7.5-1: *Output power and EIRP results*

Frequency, MHz	Output power, dBm	Output power limit*, dBm	Margin, dB	Antenna gain, dBi	EIRP, dBm	EIRP limit, dBm	EIRP margin, dB
2403.1	20.27	21.00	0.73	5.00	25.27	27.00	1.73
2441.1	20.91	21.00	0.09	5.00	25.91	27.00	1.09
2479.8	20.80	21.00	0.20	5.00	25.80	27.00	1.20
2403.1	20.27	21.00	0.73	5.40	25.67	27.00	1.33
2441.1	20.91	21.00	0.09	5.40	26.31	27.00	0.69
2479.8	20.80	21.00	0.20	5.40	26.20	27.00	0.80
2403.1	20.27	21.00	0.73	4.40	24.67	27.00	2.33
2441.1	20.91	21.00	0.09	4.40	25.31	27.00	1.69
2479.8	20.80	21.00	0.20	4.40	25.20	27.00	1.80
2403.1	20.27	21.00	0.73	2.00	22.27	27.00	4.73
2441.1	20.91	21.00	0.09	2.00	22.91	27.00	4.09
2479.8	20.80	21.00	0.20	2.00	22.80	27.00	4.20
2403.1	20.27	21.00	0.73	2.62	22.89	27.00	4.11
2441.1	20.91	21.00	0.09	2.62	23.53	27.00	3.47
2479.8	20.80	21.00	0.20	2.62	23.42	27.00	3.58

Notes: * Number of hop channels is less than 75. EIRP = Output power + Antenna gain

Test data, continued

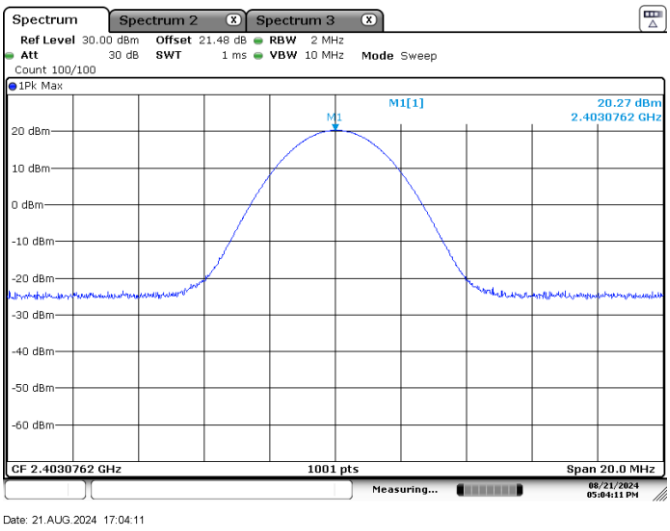


Figure 7.5-1: *Output power on low channel*

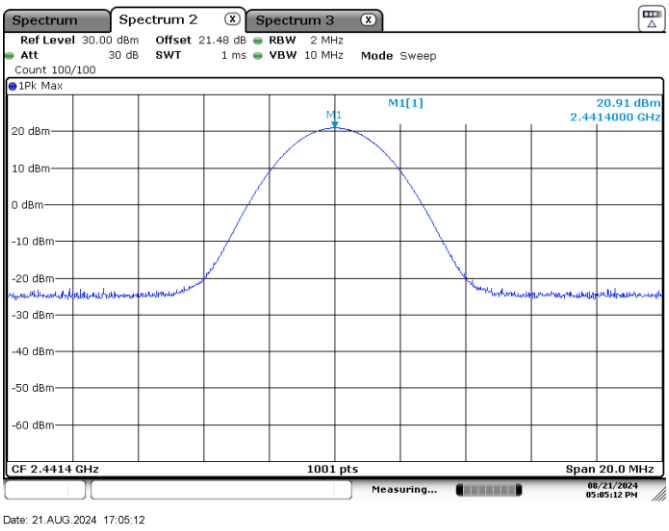


Figure 7.5-2: *Output power on mid channel*

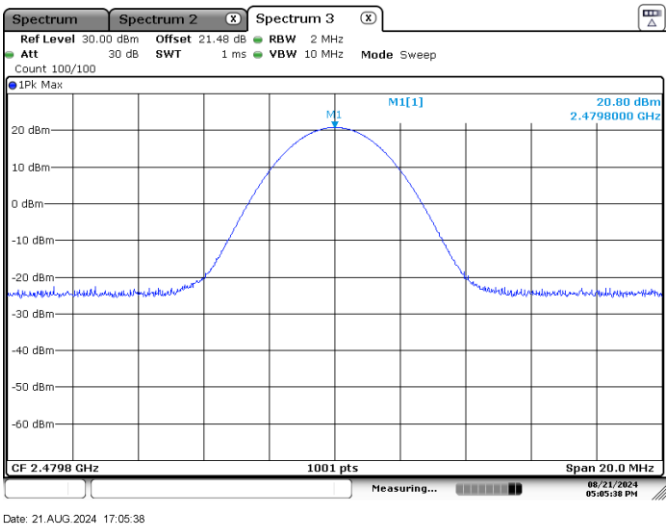


Figure 7.5-3: *Output power on high channel*

7.6 Spurious (out-of-band) unwanted emissions

7.6.1 References, definitions and limits

FCC §15.247:

(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

RSS-247, Clause 5.5:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

RSS-Gen:

8.9 Except where otherwise indicated in the applicable RSS, radiated emissions shall comply with the field strength limits shown in table below.

8.10 Restricted frequency bands are designated primarily for safety-of-life services (distress calling and certain aeronautical activities), certain satellite downlinks, radio astronomy and some government uses. The following conditions related to the restricted frequency bands apply:

a The transmit frequency, including fundamental components of modulation, of licence-exempt radio apparatus shall not fall within the restricted frequency bands.

b Unwanted emissions that fall into restricted frequency bands listed in table 7 shall comply with the limits specified in table below.

c Unwanted emissions that do not fall within the restricted frequency bands shall comply either with the limits specified in the applicable RSS or with those specified in table below.

Table 7.6-1: *FCC §15.209 and RSS-Gen – Radiated emission limits*

	Field strength of emissions		
Frequency, MHz	**µV/m**	**dBµV/m**	**Measurement distance, m**
0.009–0.490	2400/F	$67.6 - 20 \times \log_{10}(F)$	300
0.490–1.705	24000/F	$87.6 - 20 \times \log_{10}(F)$	30
1.705–30.0	30	29.5	30
30–88	100	40.0	3
88–216	150	43.5	3
216–960	200	46.0	3
above 960	500	54.0	3

Notes: In the emission table above, the tighter limit applies at the band edges.
For frequencies above 1 GHz the limit on peak RF emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test.

References, definitions and limits, continued

Table 7.6-2: *ISED restricted frequency bands*

MHz	MHz	MHz	GHz
0.090–0.110	12.57675–12.57725	399.9–410	7.25–7.75
0.495–0.505	13.36–13.41	608–614	8.025–8.5
2.1735–2.1905	16.42–16.423	960–1427	9.0–9.2
3.020–3.026	16.69475–16.69525	1435–1626.5	9.3–9.5
4.125–4.128	16.80425–16.80475	1645.5–1646.5	10.6–12.7
4.17725–4.17775	25.5–25.67	1660–1710	13.25–13.4
4.20725–4.20775	37.5–38.25	1718.8–1722.2	14.47–14.5
5.677–5.683	73–74.6	2200–2300	15.35–16.2
6.215–6.218	74.8–75.2	2310–2390	17.7–21.4
6.26775–6.26825	108–138	2483.5–2500	22.01–23.12
6.31175–6.31225	149.9–150.05	2655–2900	23.6–24.0
8.291–8.294	156.52475–156.52525	3260–3267	31.2–31.8
8.362–8.366	156.7–156.9	3332–3339	36.43–36.5
8.37625–8.38675	162.0125–167.17	3345.8–3358	Above 38.6
8.41425–8.41475	167.72–173.2	3500–4400	
12.29–12.293	240–285	4500–5150	
12.51975–12.52025	322–335.4	5350–5460	

Note: Certain frequency bands listed in Table 7.6-2 and above 38.6 GHz are designated for licence-exempt applications. These frequency bands and the requirements that apply to related devices are set out in the 200 and 300 series of RSSs.

Table 7.6-3: *FCC restricted frequency bands*

MHz	MHz	MHz	GHz
0.090–0.110	16.42–16.423	399.9–410	4.5–5.15
0.495–0.505	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225	123–138	2200–2300	14.47–14.5
8.291–8.294	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675	156.7–156.9	2690–2900	22.01–23.12
8.41425–8.41475	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025	240–285	3345.8–3358	36.43–36.5
12.57675–12.57725	322–335.4	3600–4400	Above 38.6
13.36–13.41			

7.6.2 Test summary

Verdict	Pass		
Test date	December 3, 2024	Temperature	21 °C
Tested by	Kevin Rose and Dhara Patel	Air pressure	1003 mbar
Test location	Ottawa	Relative humidity	36 %

7.6.3 Observations, settings and special notes

- As part of the current assessment, the test range of 9 kHz to 10th harmonic has been fully considered and compared to the actual frequencies utilized within the EUT. Since the EUT contains a transmitter in the GHz range, the EUT has been deemed compliant without formal testing in the 9 kHz to 30 MHz test range, therefore formal test results (tabular data and/or plots) are not provided within this test report.
- EUT was set to transmit with 100 % duty cycle.
- Radiated measurements were performed at a distance of 3 m.
- DTS emissions in non-restricted frequency bands test was performed as per KDB 558074, section 8.5 with reference to ANSI C63.10 subclause 11.11.
- Since fundamental power was tested using the maximum peak conducted output power procedure to demonstrate compliance, the spurious emissions limit is −20 dBc/100 kHz.
- DTS emissions in restricted frequency bands test was performed as per KDB 558074, section 8.6 with reference to ANSI C63.10 subclause 11.12.
- DTS band-edge emission measurements test was performed as per KDB 558074, section 8.7 with reference to ANSI C63.10 subclause 11.13.
- Average was calculated from peak results using duty cycle correction factor (DCCF).
- Pulse width = 13.78 ms, Pulse repetition = (1 pulses within 100 ms) DCCF = 20 × Log_{10} ((13.78 ×1) / 100) = −17.23 dB

Spectrum analyser settings for radiated measurements within restricted bands below 1 GHz:

Resolution bandwidth:	100 kHz
Video bandwidth:	300 kHz
Detector mode:	Peak
Trace mode:	Max Hold

Spectrum analyser settings for peak radiated measurements within restricted bands above 1 GHz:

Resolution bandwidth:	1 MHz
Video bandwidth:	3 MHz
Detector mode:	Peak
Trace mode:	Max Hold

Spectrum analyser settings for average radiated measurements within restricted bands above 1 GHz:

Resolution bandwidth:	1 MHz
Video bandwidth:	10 Hz
Detector mode:	Peak
Trace mode:	Max Hold

Spectrum analyser settings for conducted spurious emissions measurements:

Resolution bandwidth:	100 kHz
Video bandwidth:	300 kHz
Detector mode:	Peak
Trace mode:	Max Hold

7.6.4 Test data

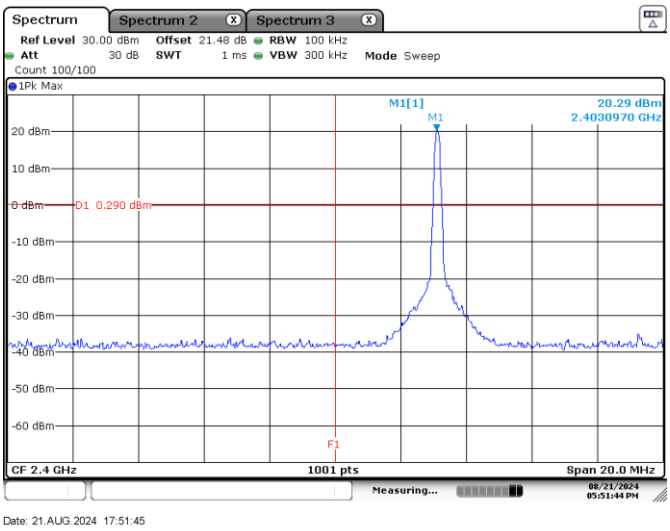


Figure 7.6-1: *Band edge spurious emissions at 2400 MHz*

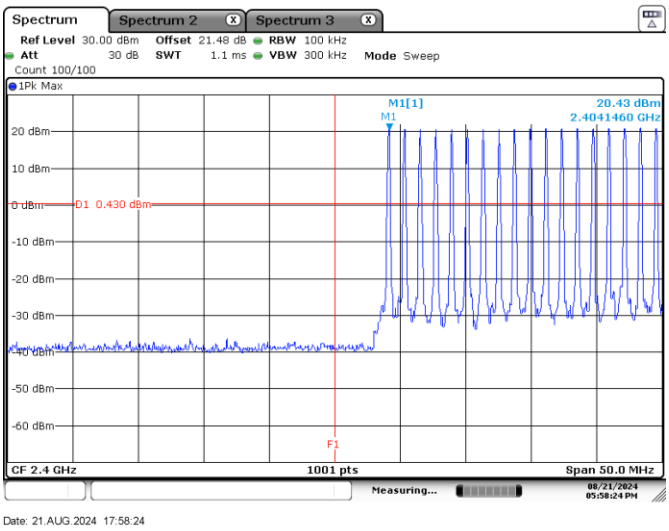


Figure 7.6-2: *Band edge spurious emissions at 2400 MHz Hopping on*

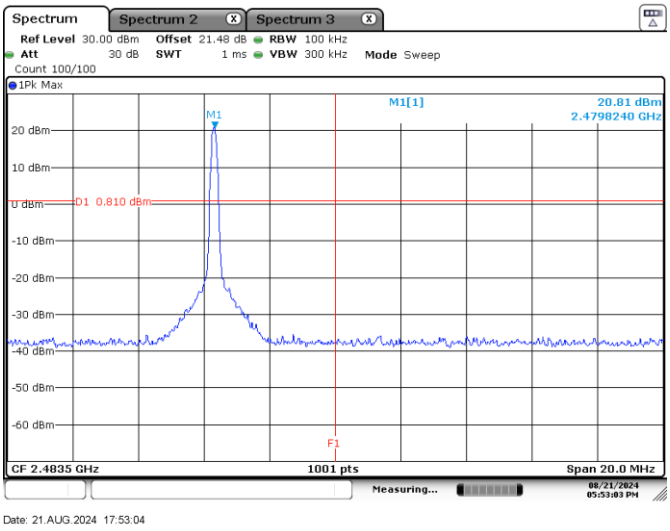


Figure 7.6-3: *Band edge spurious emissions at 2483.5 MHz*

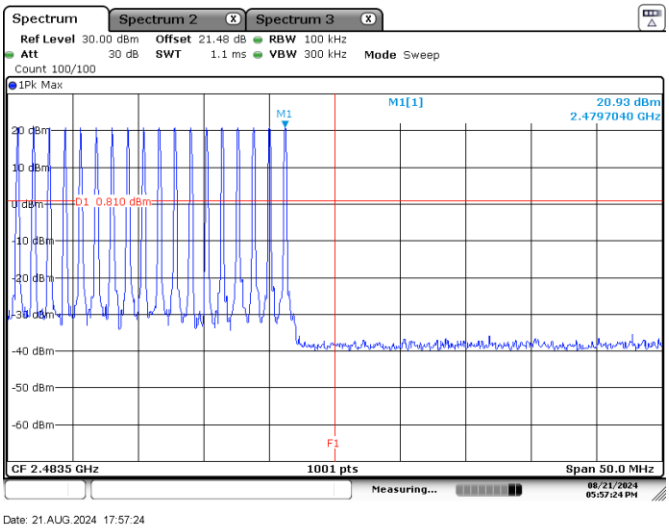


Figure 7.6-4: *Band edge spurious emissions at 2483.5 MHz Hopping on*

Test data, continued

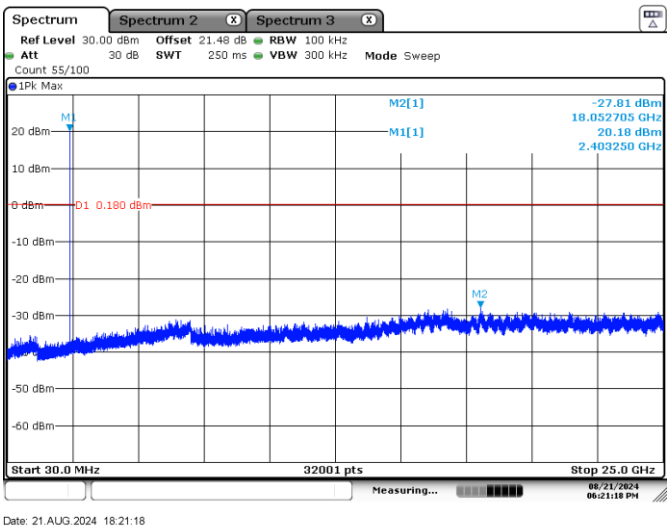


Figure 7.6-7: *Conducted spurious emissions on low channel*

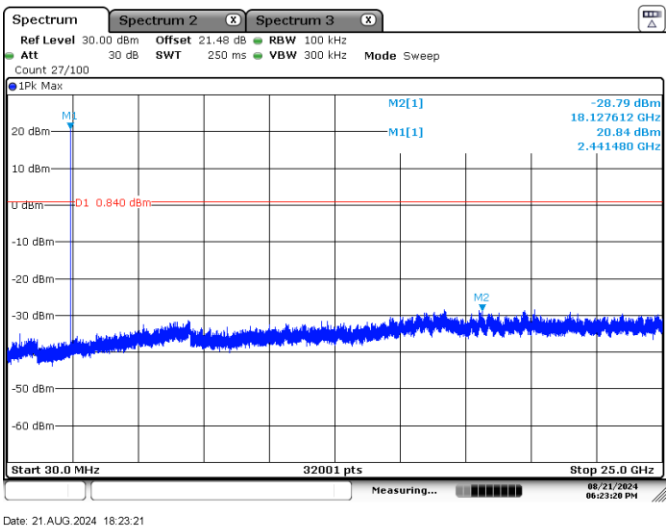


Figure 7.6-8: *Conducted spurious emissions on mid channel*

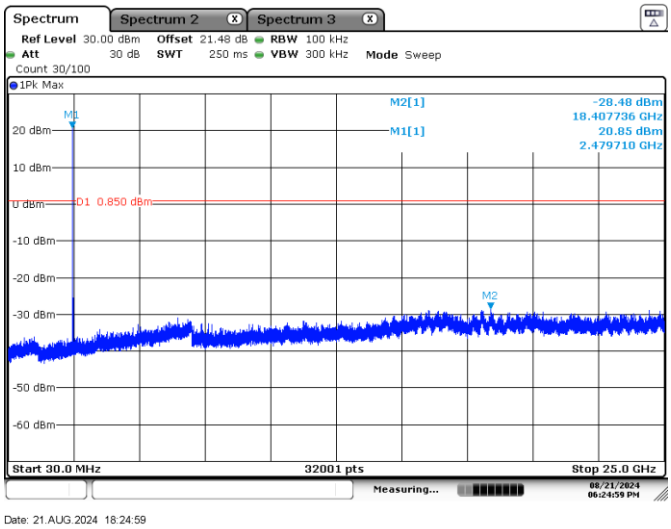
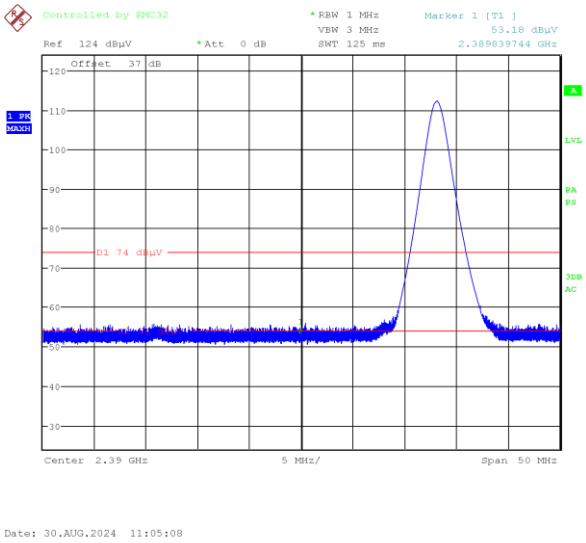


Figure 7.6-9: *Conducted spurious emissions on high channel*

Test data, continued



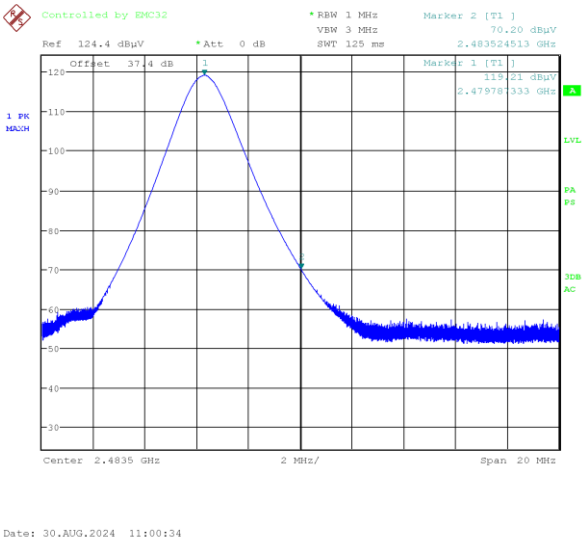


Figure 7.6-10: *Band edge spurious emissions at 2400 MHz (radiated)*

Figure 7.6-11: *Band edge spurious emissions at 2483.5 MHz (radiated)*

Note: Note: These measurements were conducted using the antenna with the highest available gain (5.4 dBi). Comparable or improved performance was observed at the band edges when using antennas with lower gain.

Test data, continued

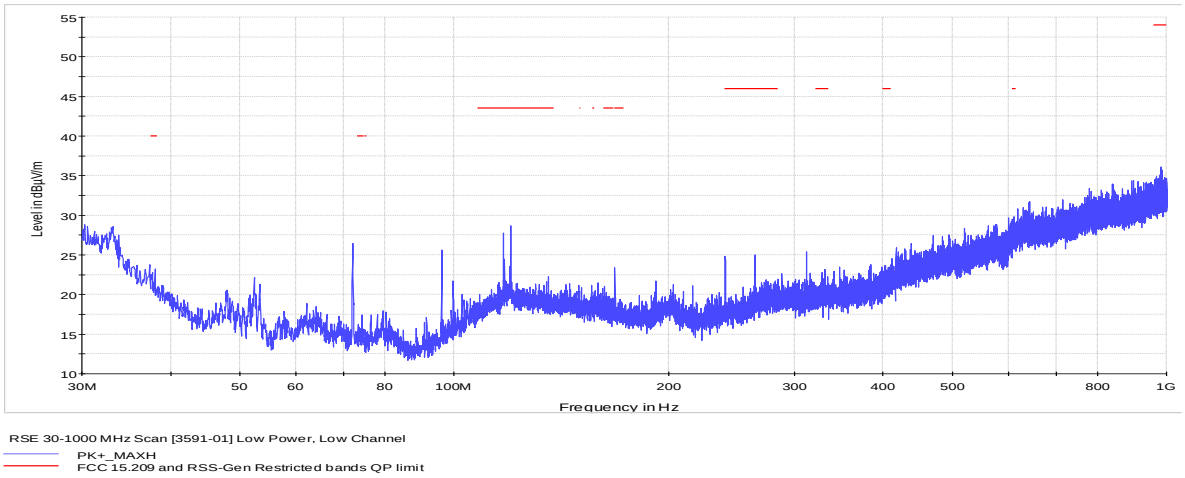


Figure 7.6-12: *Radiated spurious emissions on low channel 30-1000 MHz*

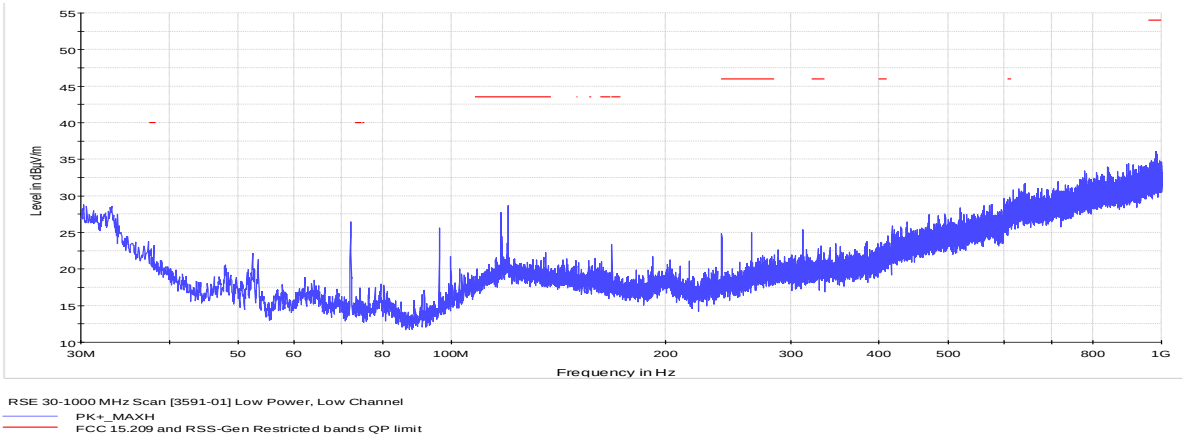


Figure 7.6-13: *Radiated spurious emissions on mid channel 30-1000 MHz*

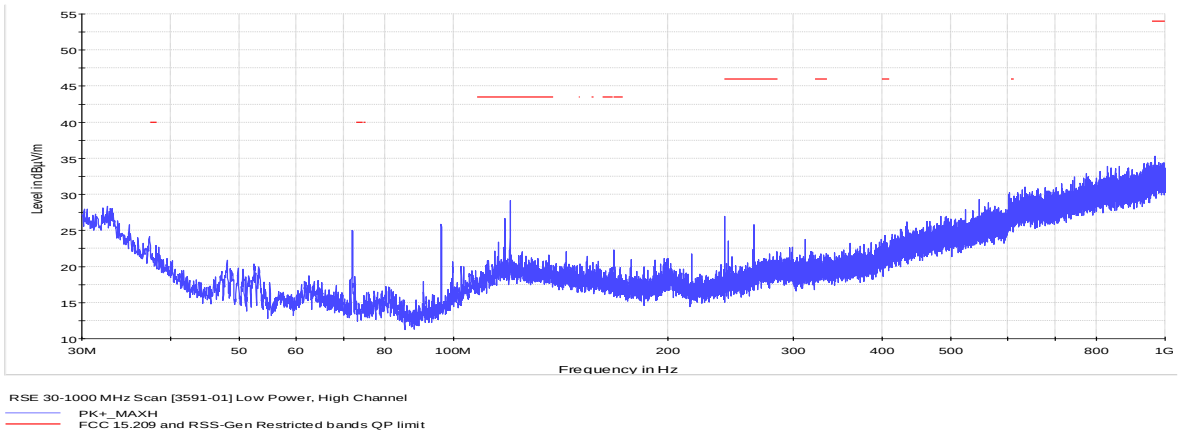


Figure 7.6-14: *Radiated spurious emissions on high channel 30-1000 MHz*

Test data, continued

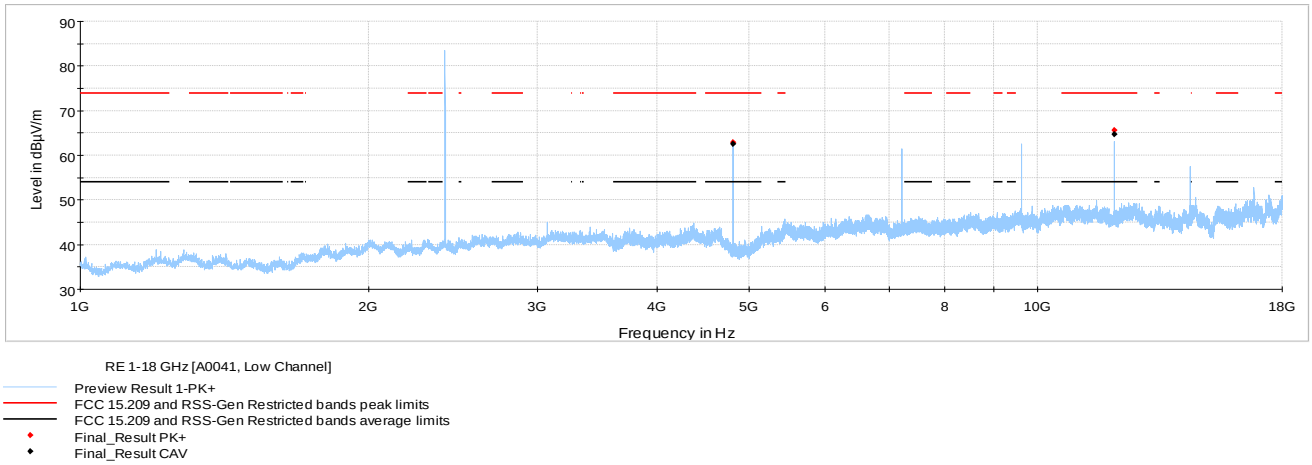


Figure 7.6-15: *Radiated spurious emissions on low channel 1-18 GHz [A0041]*

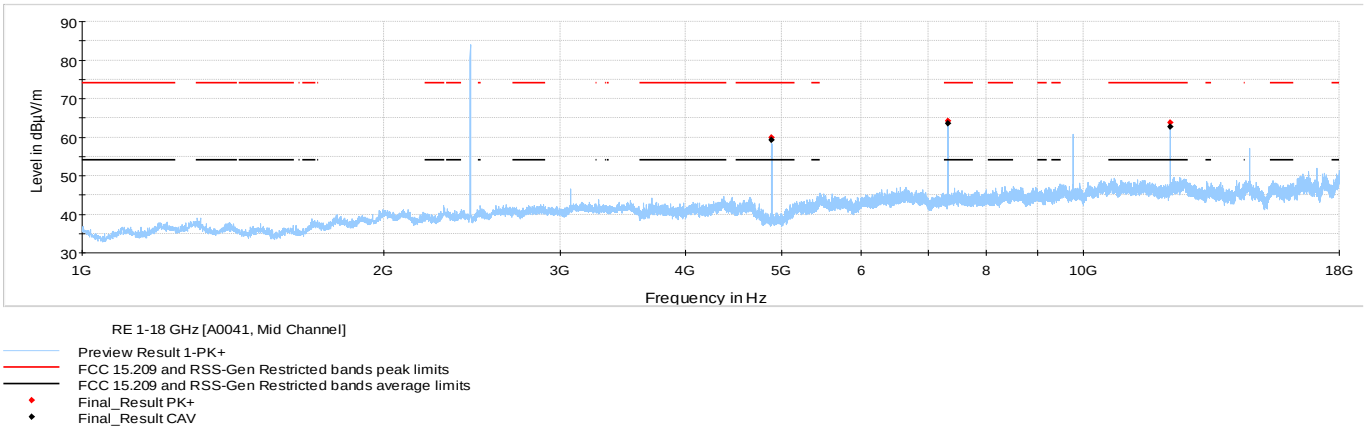


Figure 7.6-16: *Radiated spurious emissions on mid channel 1-18 GHz [A0041]*

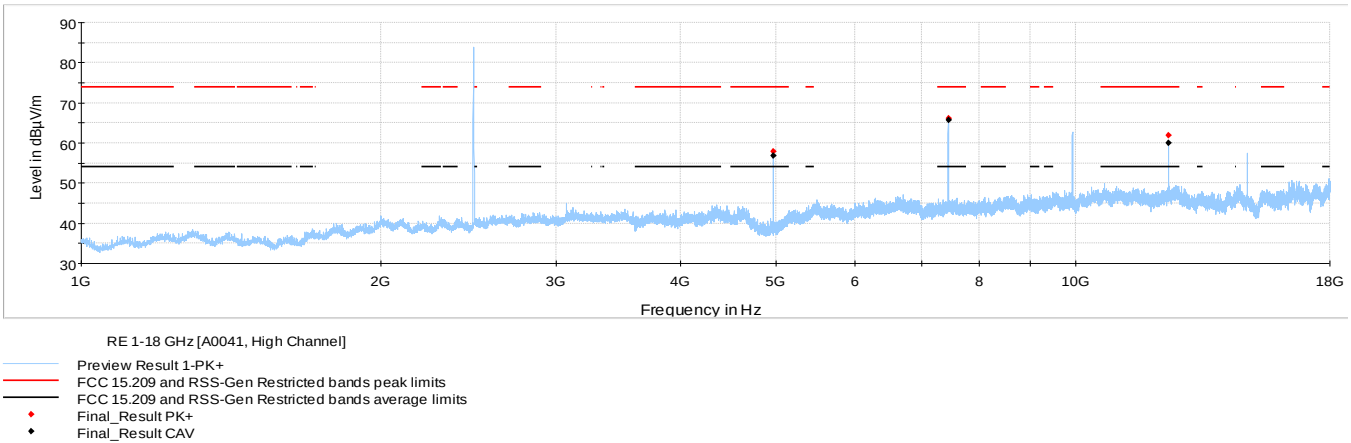


Figure 7.6-17: *Radiated spurious emissions on high channel 1-18 GHz [A0041]*

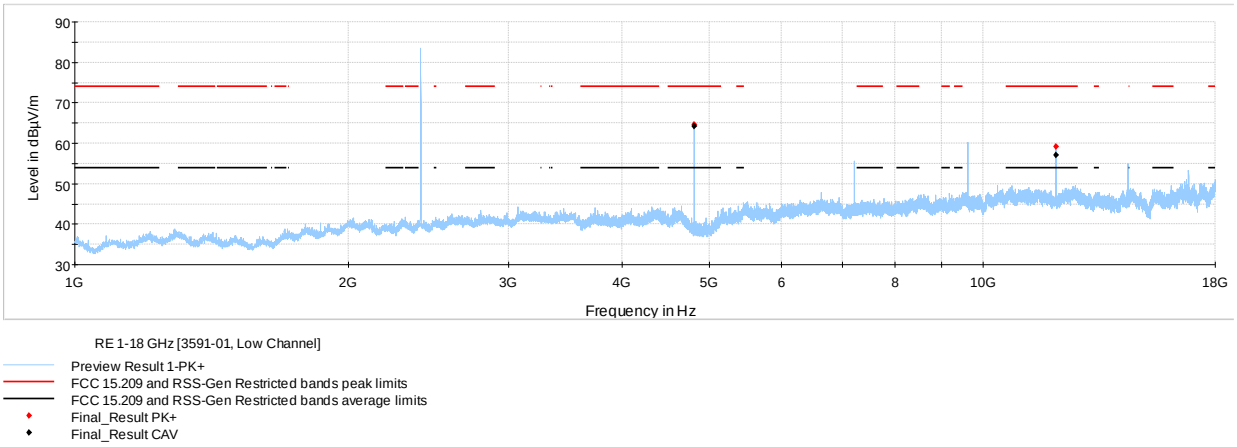


Figure 7.6-18: *Radiated spurious emissions on low channel 1-18 GHz [3591-01]*

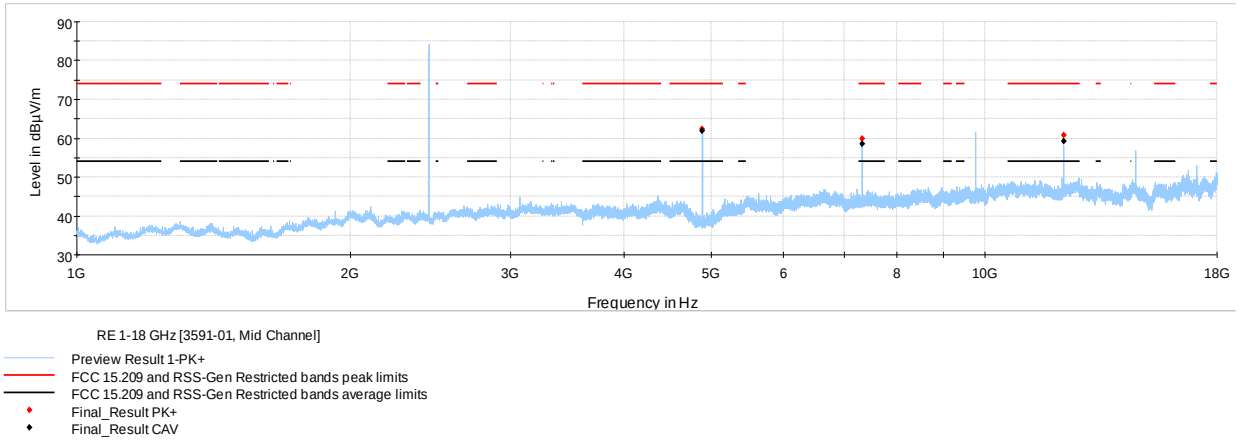


Figure 7.6-19: *Radiated spurious emissions on mid channel 1-18 GHz [3591-01]*

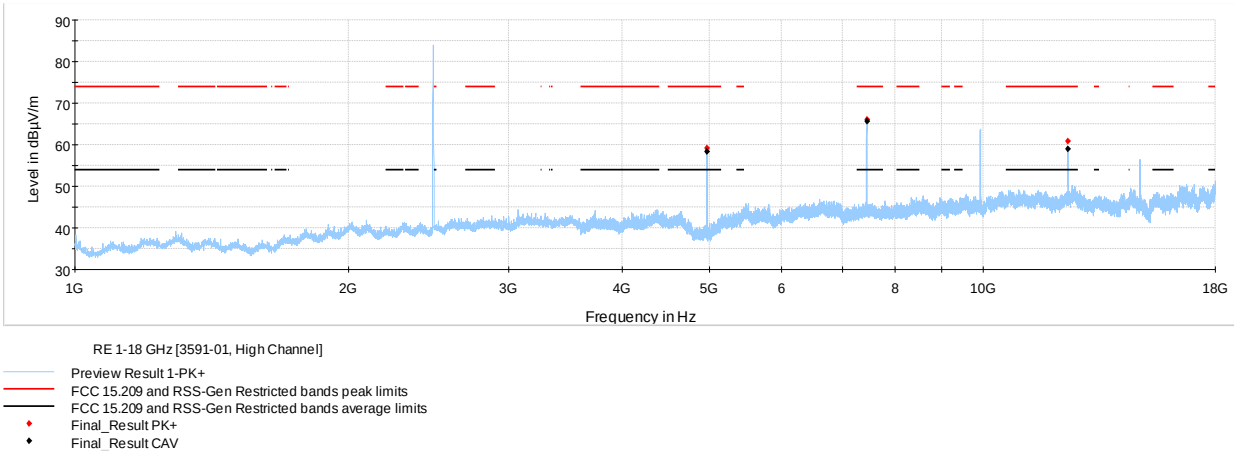


Figure 7.6-20: *Radiated spurious emissions on high channel 1-18 GHz [3591-01]*

Test data, continued

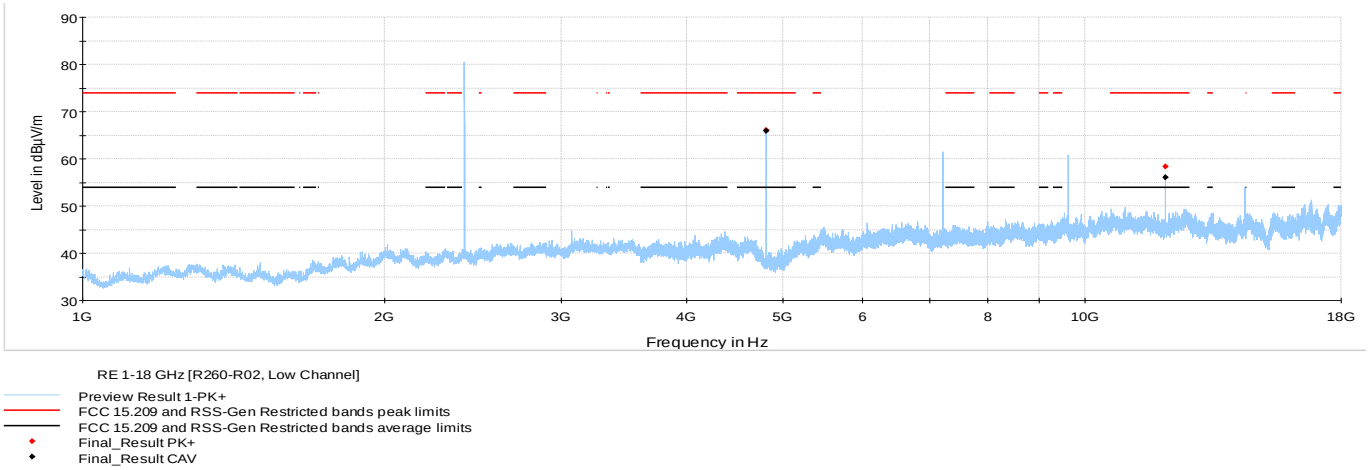


Figure 7.6-21: *Radiated spurious emissions on low channel 1-18 GHz [R260-02]*

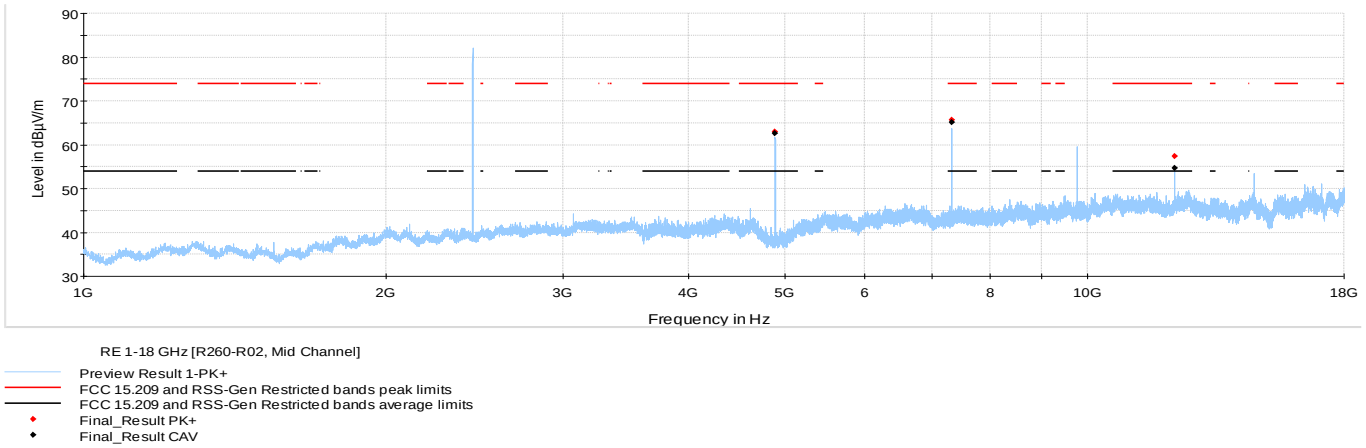


Figure 7.6-22: *Radiated spurious emissions on mid channel 1-18 GHz [R260-02]*

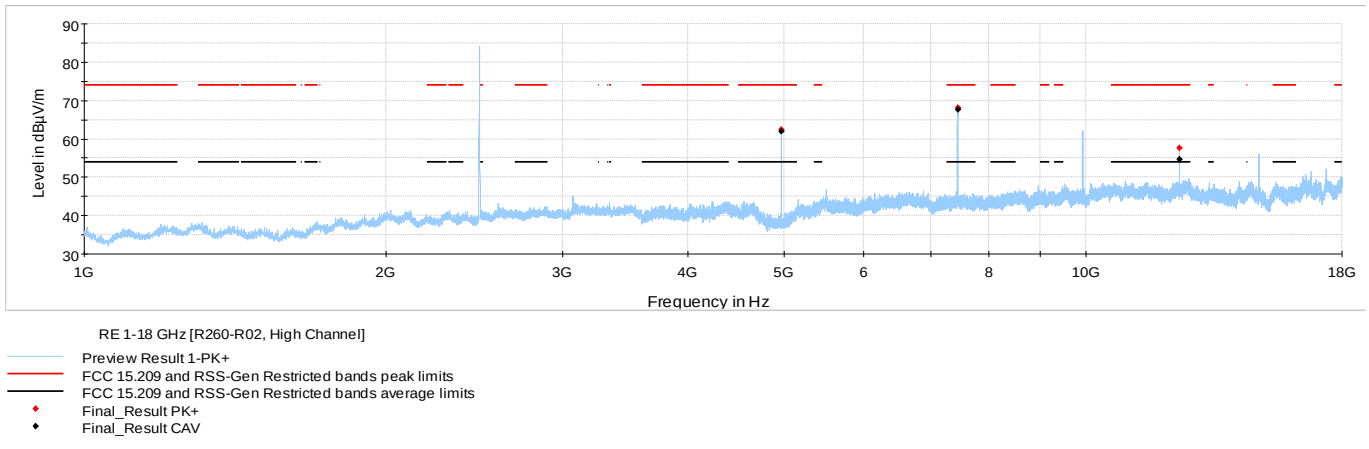


Figure 7.6-23: *Radiated spurious emissions on high channel 1-18 GHz [R260-02]*

Test data, continued

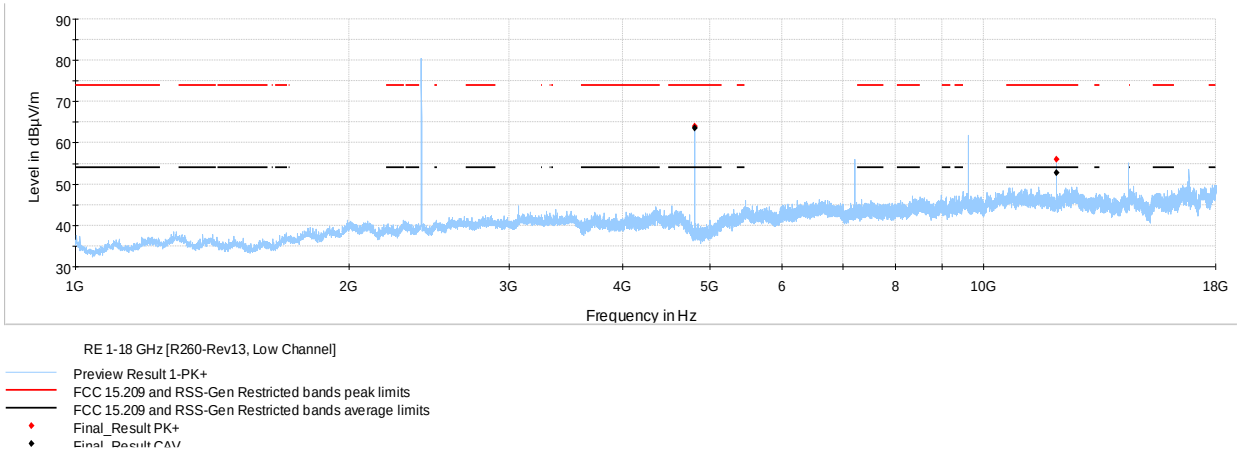


Figure 7.6-24: *Radiated spurious emissions on low channel 1-18 GHz [R260 Rev13]*

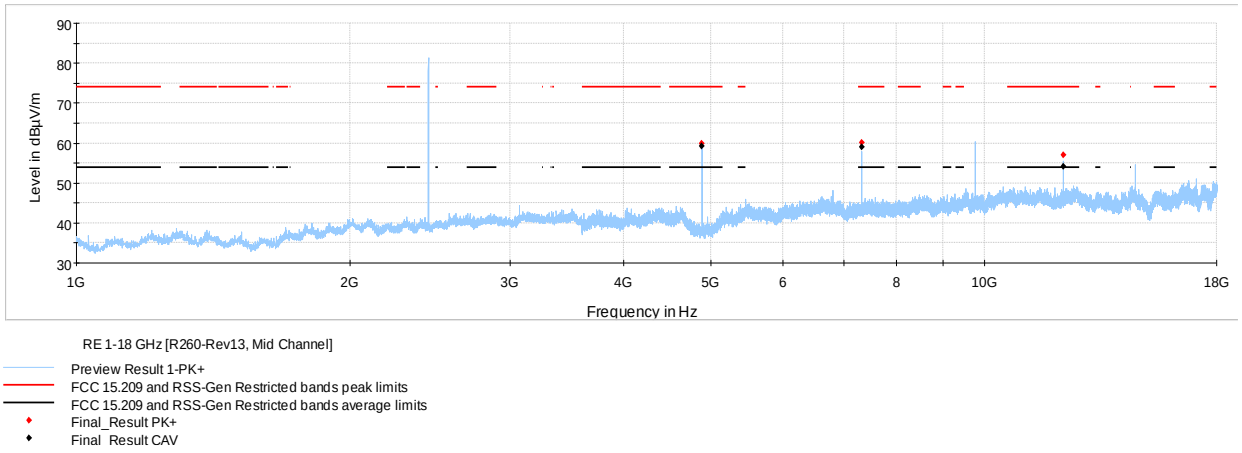


Figure 7.6-25: *Radiated spurious emissions on mid channel 1-18 GHz [R260 Rev13]*

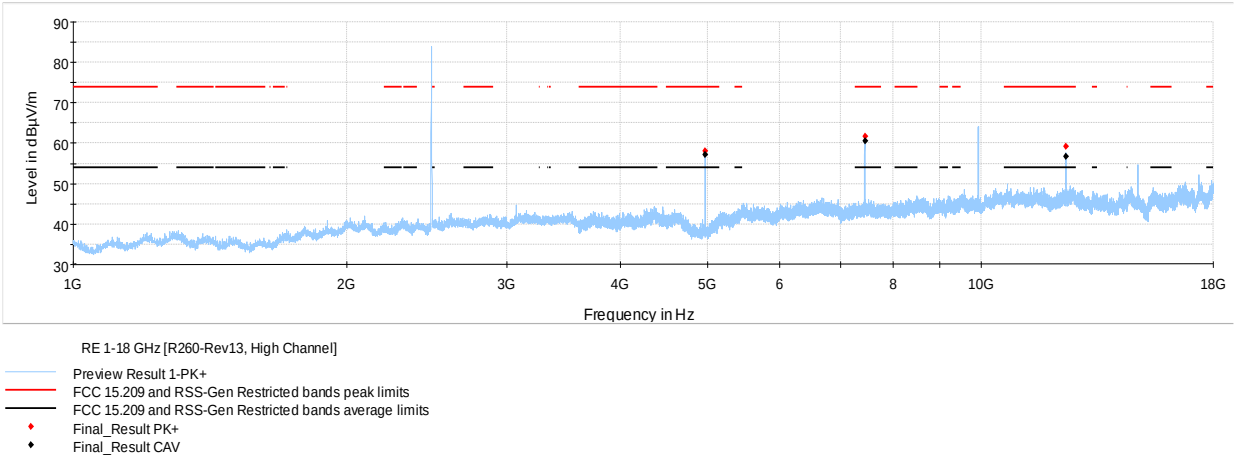


Figure 7.6-26: *Radiated spurious emissions on high channel 1-18 GHz [R260 Rev13]*

Test data, continued

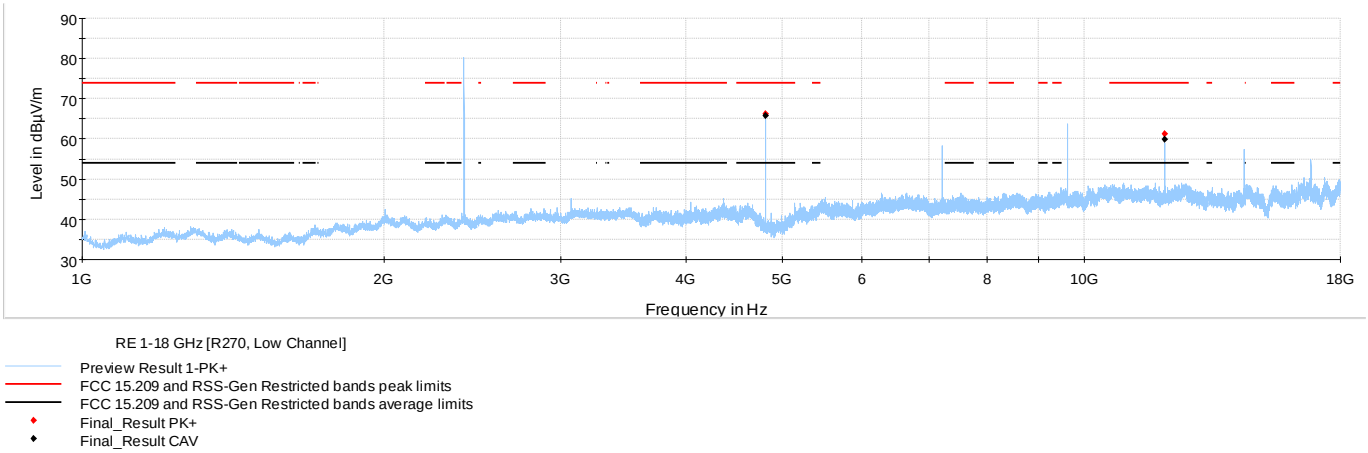


Figure 7.6-27: *Radiated spurious emissions on low channel 1-18 GHz [R270]*

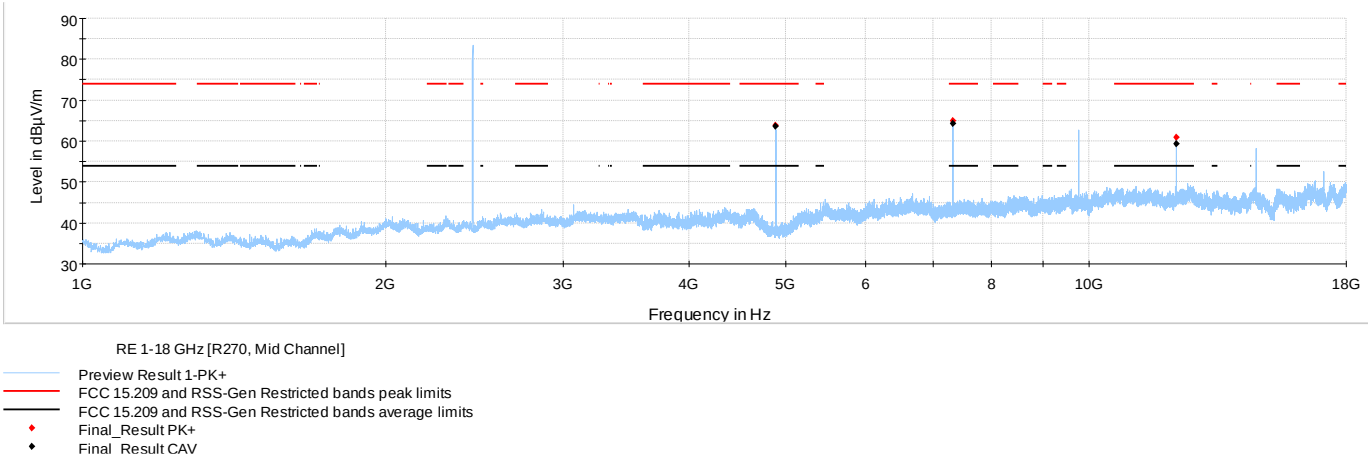


Figure 7.6-28: *Radiated spurious emissions on mid channel 1-18 GHz [R270]*

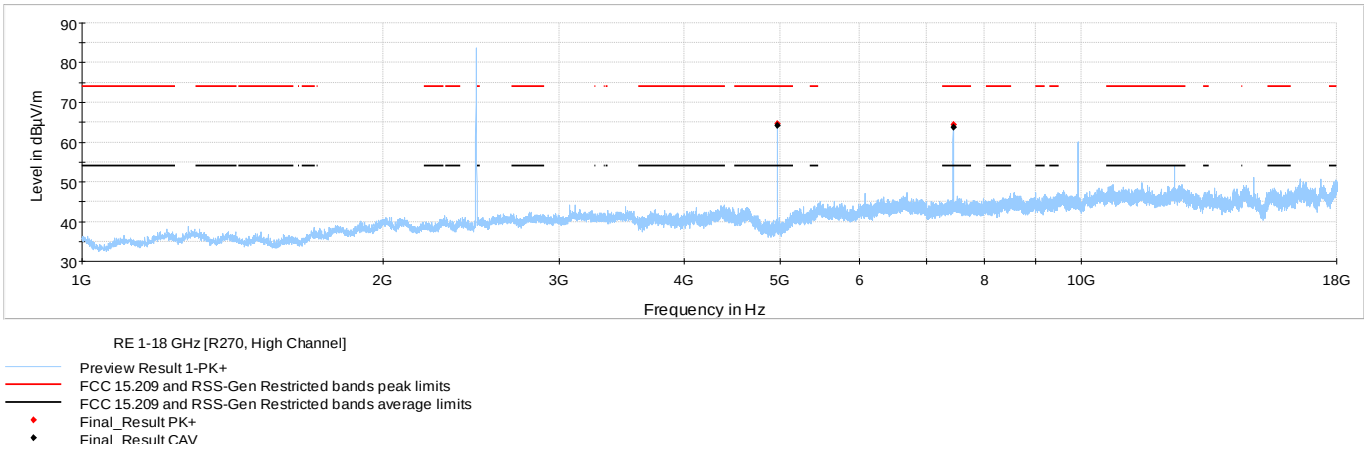


Figure 7.6-29: *Radiated spurious emissions on high channel 1-18 GHz [R270]*

Test data, continued

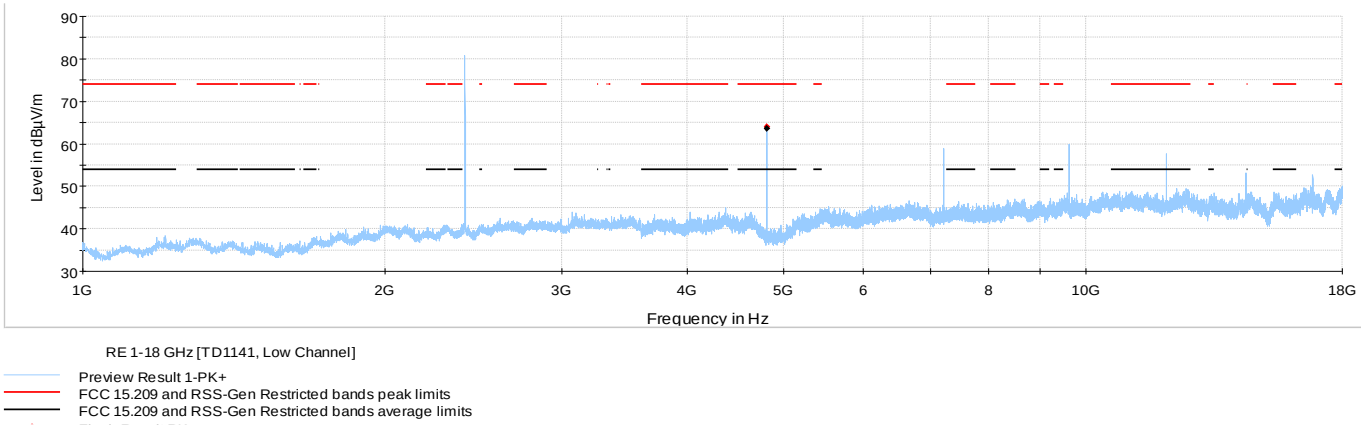


Figure 7.6-30: *Radiated spurious emissions on low channel 1-18 GHz [TD1140]*

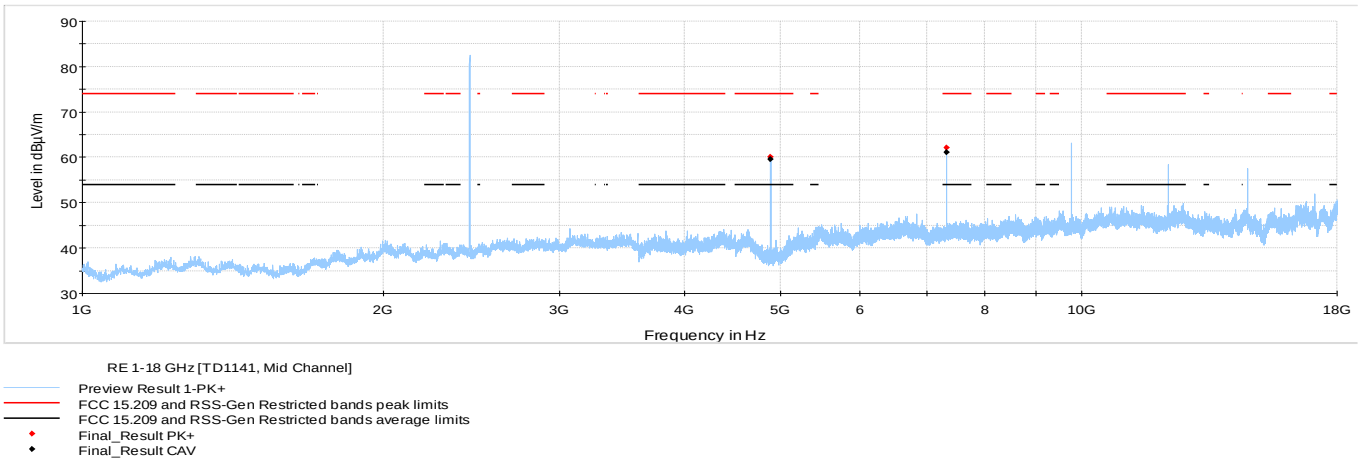


Figure 7.6-31: *Radiated spurious emissions on mid channel 1-18 GHz [TD1140]*

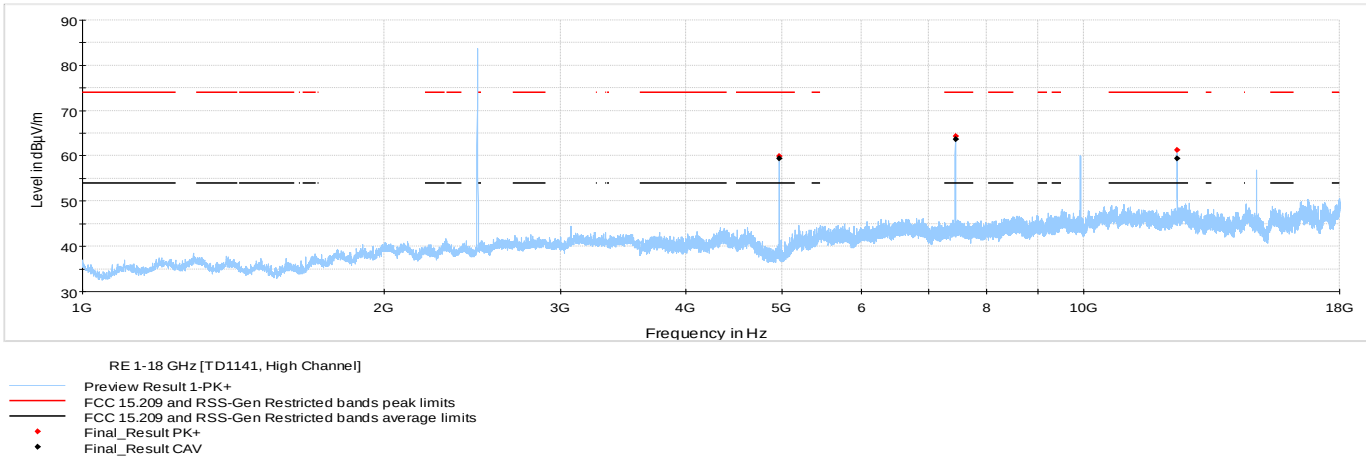


Figure 7.6-32: *Radiated spurious emissions on high channel 1-18 GHz [TD1140]*

Test data, continued

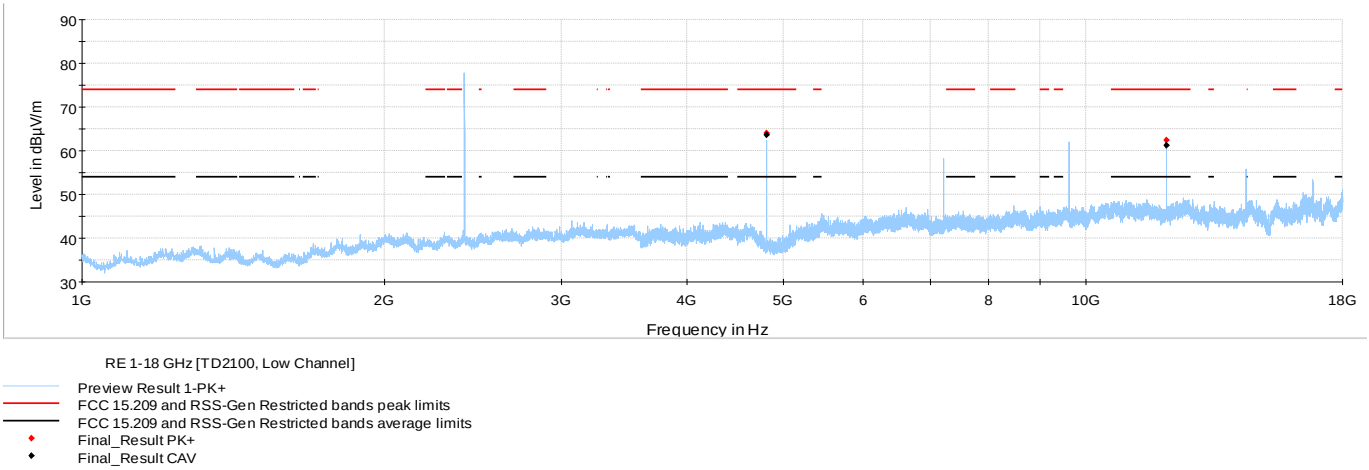


Figure 7.6-33: *Radiated spurious emissions on low channel 1-18 GHz [TD2100]*

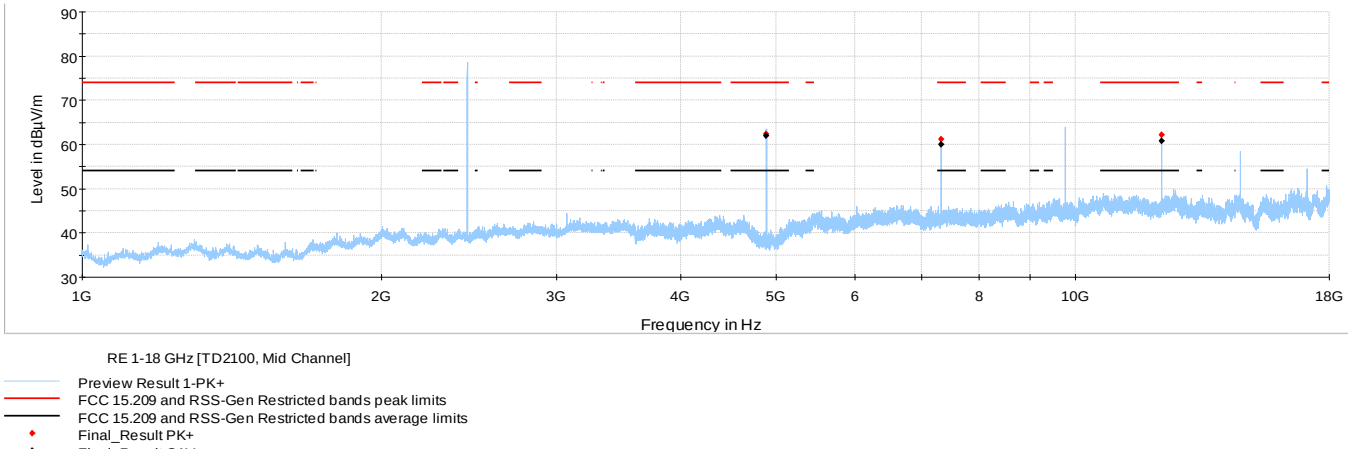


Figure 7.6-34: *Radiated spurious emissions on mid channel 1-18 GHz [TD2100]*

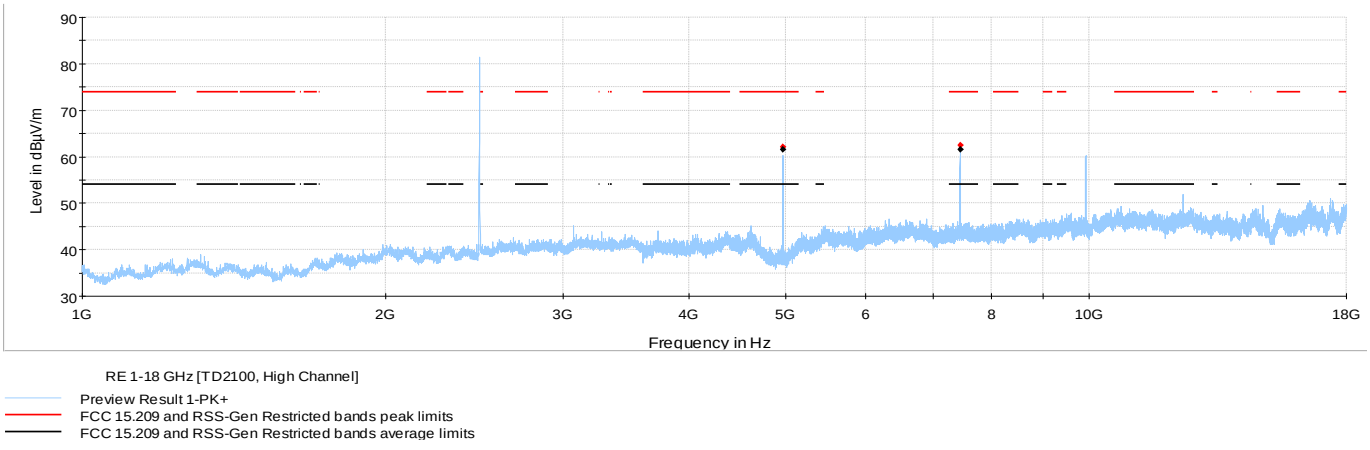


Figure 7.6-35: *Radiated spurious emissions on high channel 1-18 GHz [TD2100]*

Test data, continued

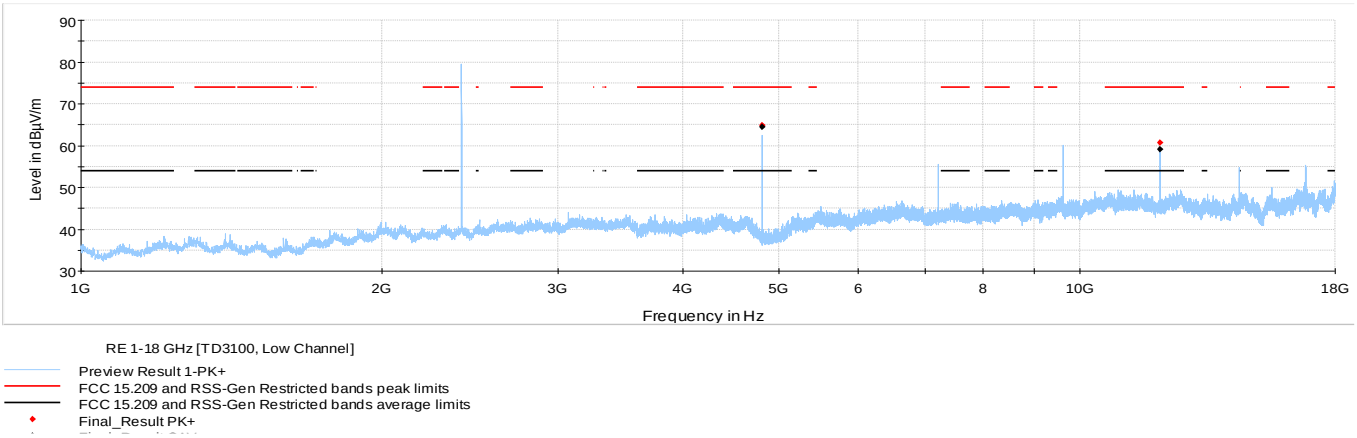


Figure 7.6-36: *Radiated spurious emissions on low channel 1-18 GHz [TD3100]*

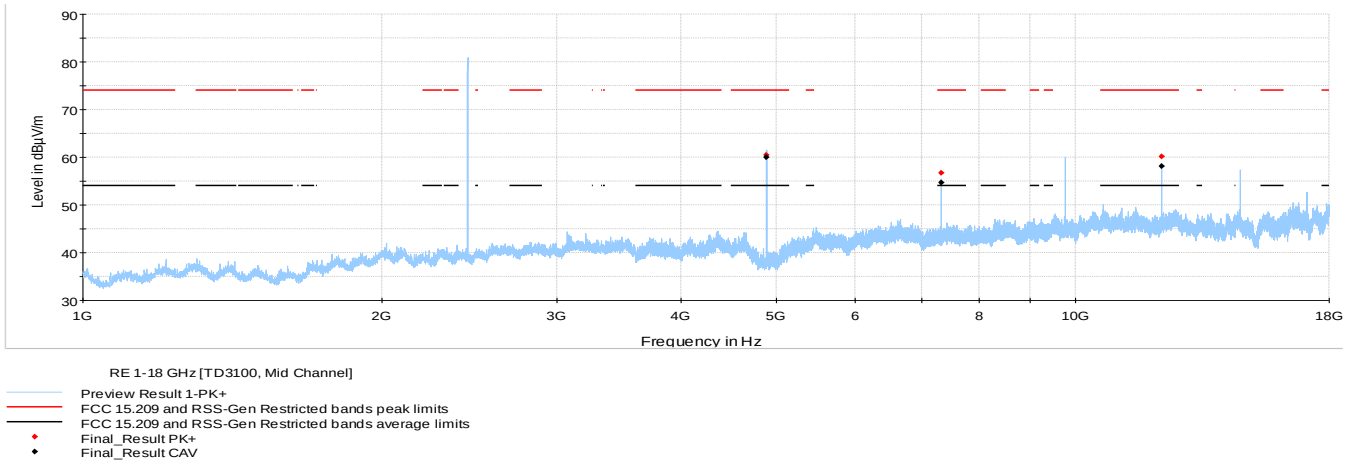


Figure 7.6-37: *Radiated spurious emissions on mid channel 1-18 GHz [TD3100]*

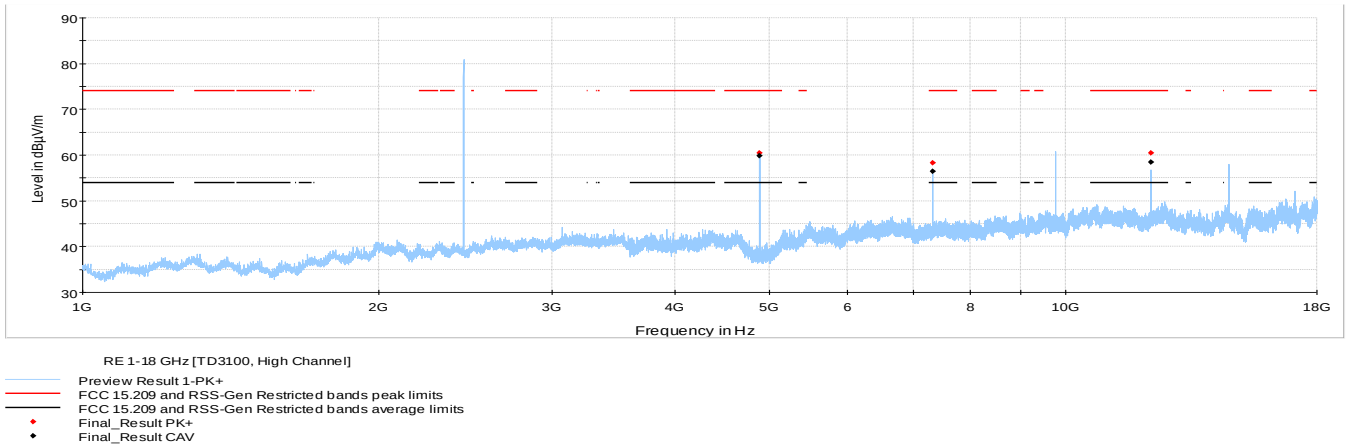


Figure 7.6-38: *Radiated spurious emissions on high channel 1-18 GHz [TD3100]*

Test data, continued

Table 7.6-4: *Radiated field strength measurement results [A0041 – Wellshow antenna]*

Channel	Frequency, MHz	Peak Field strength, dBµV/m		Margin, dB	Average Field strength, dBµV/m		Margin, dB
		Measured	Limit		Calculated	Limit	
Low	4806.2	63.1	74.0	10.9	45.9	54.0	8.1
Low	12015.5	65.3	74.0	8.7	48.1	54.0	5.9
Mid	4882.8	59.9	74.0	14.1	42.7	54.0	11.3
Mid	7324.2	64.2	74.0	9.8	47.0	54.0	7.0
Mid	12206.9	63.8	74.0	10.2	46.6	54.0	7.4
High	4595.6	57.8	74.0	16.2	40.6	54.0	13.4
High	7439.4	66.2	74.0	7.8	49.0	54.0	5.0
High	12399.0	61.9	74.0	12.1	44.7	54.0	9.3

Notes: Field strength includes correction factor of antenna, cable loss, amplifier, and attenuators where applicable.
Average field strength was calculated: Peak field strength – DCCF (17.23 dB)

Table 7.6-5: *Radiated field strength measurement results [3591-01 – Pulse antenna]*

Channel	Frequency, MHz	Peak Field strength, dBµV/m		Margin, dB	Average Field strength, dBµV/m		Margin, dB
		Measured	Limit		Calculated	Limit	
Low	4806.2	64.6	74.0	9.4	47.4	54.0	6.6
Low	12015.5	59.1	74.0	14.9	41.9	54.0	12.1
Mid	4882.8	62.4	74.0	11.6	45.2	54.0	8.8
Mid	7324.2	59.9	74.0	14.1	42.7	54.0	11.3
Mid	12206.9	60.8	74.0	13.2	43.6	54.0	10.4
High	4959.6	59.2	74.0	14.8	42.0	54.0	12.0
High	7439.4	66.1	74.0	7.9	48.9	54.0	5.1
High	12399.0	60.8	74.0	13.2	43.6	54.0	10.4

Notes: Field strength includes correction factor of antenna, cable loss, amplifier, and attenuators where applicable.
Average field strength was calculated: Peak field strength – DCCF (17.23 dB)

Table 7.6-6: *Radiated field strength measurement results [R260-02]*

Channel	Frequency, MHz	Peak Field strength, dBµV/m		Margin, dB	Average Field strength, dBµV/m		Margin, dB
		Measured	Limit		Calculated	Limit	
Low	4806.2	66.1	74.0	7.9	48.9	54.0	5.1
Low	12015.5	58.4	74.0	15.6	41.2	54.0	12.8
Mid	4882.8	63.1	74.0	10.9	45.9	54.0	8.1
Mid	7324.2	65.7	74.0	8.3	48.5	54.0	5.5
Mid	12207.0	57.4	74.0	16.6	40.2	54.0	13.8
High	4959.6	62.4	74.0	11.6	45.2	54.0	8.8
High	7439.4	68.0	74.0	6.0	50.8	54.0	3.2
High	12398.9	57.7	74.0	16.3	40.5	54.0	13.5

Notes: Field strength includes correction factor of antenna, cable loss, amplifier, and attenuators where applicable.
Average field strength was calculated: Peak field strength – DCCF (17.23 dB)

Test data, continued

Table 7.6-7: *Radiated field strength measurement results [R260-Rev13]*

Channel	Frequency, MHz	Peak Field strength, dBµV/m		Margin, dB	Average Field strength, dBµV/m		Margin, dB
		Measured	Limit		Calculated	Limit	
Low	4806.2	64.0	74.0	10.0	46.8	54.0	7.2
Low	12015.5	55.9	74.0	18.1	38.7	54.0	15.3
Mid	4882.8	59.8	74.0	14.2	42.6	54.0	11.4
Mid	7324.2	60.2	74.0	13.8	43.0	54.0	11.0
Mid	12207.0	57.1	74.0	16.9	39.9	54.0	14.1
High	4959.6	58.1	74.0	15.9	40.9	54.0	13.1
High	7439.4	61.6	74.0	12.4	44.4	54.0	9.6
High	12399.0	59.3	74.0	14.7	42.1	54.0	11.9

Notes: Field strength includes correction factor of antenna, cable loss, amplifier, and attenuators where applicable.
Average field strength was calculated: Peak field strength – DCCF (17.23 dB)

Table 7.6-8: *Radiated field strength measurement results [R270]*

Channel	Frequency, MHz	Peak Field strength, dBµV/m		Margin, dB	Average Field strength, dBµV/m		Margin, dB
		Measured	Limit		Calculated	Limit	
Low	4806.2	66.1	74.0	7.9	48.9	54.0	5.1
Low	12015.5	61.3	74.0	12.7	44.1	54.0	9.9
Mid	4882.8	63.9	74.0	10.1	46.7	54.0	7.3
Mid	7324.2	64.9	74.0	9.1	47.7	54.0	6.3
Mid	12207.0	60.9	74.0	13.1	43.7	54.0	10.3
High	4959.6	64.5	74.0	9.5	47.3	54.0	6.7
High	7439.4	64.4	74.0	9.6	47.2	54.0	6.8

Notes: Field strength includes correction factor of antenna, cable loss, amplifier, and attenuators where applicable.
Average field strength was calculated: Peak field strength – DCCF (17.23 dB)

Table 7.6-9: *Radiated field strength measurement results [TD1140]*

Channel	Frequency, MHz	Peak Field strength, dBµV/m		Margin, dB	Average Field strength, dBµV/m		Margin, dB
		Measured	Limit		Calculated	Limit	
Low	4806.2	63.9	74.0	10.1	46.7	54.0	7.3
Mid	4882.8	60.1	74.0	13.9	42.9	54.0	11.1
Mid	7324.2	62.2	74.0	11.2	45.0	54.0	9.0
High	4959.6	60.0	74.0	14.0	42.8	54.0	11.2
High	7439.4	64.4	74.0	9.6	47.2	54.0	6.8
High	12398.9	61.2	74.0	12.8	44.0	54.0	10.0

Notes: Field strength includes correction factor of antenna, cable loss, amplifier, and attenuators where applicable.
Average field strength was calculated: Peak field strength – DCCF (17.23 dB)

Test data, continued

Table 7.6-10: *Radiated field strength measurement results [TD2100]*

Channel	Frequency, MHz	Peak Field strength, dBµV/m		Margin, dB	Average Field strength, dBµV/m		Margin, dB
		Measured	Limit		Calculated	Limit	
Low	4806.2	64.1	74.0	9.9	46.9	54.0	7.1
Low	12015.5	62.4	74.0	11.6	45.2	54.0	8.8
Mid	4882.8	62.4	74.0	11.6	45.2	54.0	8.8
Mid	7324.2	61.2	74.0	12.8	44.0	54.0	10.0
Mid	12207.0	62.3	74.0	11.7	45.1	54.0	8.9
High	4959.6	62.1	74.0	11.9	44.9	54.0	9.1
High	7439.4	62.5	74.0	11.5	45.3	54.0	8.7

Notes: Field strength includes correction factor of antenna, cable loss, amplifier, and attenuators where applicable.
Average field strength was calculated: Peak field strength – DCCF (17.23 dB)

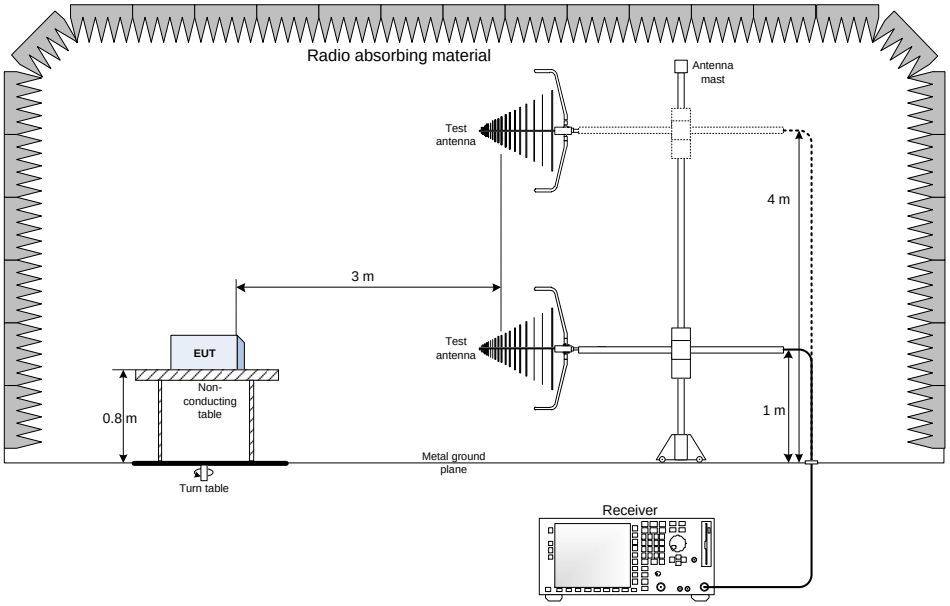
Table 7.6-11: *Radiated field strength measurement results [TD3100]*

Channel	Frequency, MHz	Peak Field strength, dBµV/m		Margin, dB	Average Field strength, dBµV/m		Margin, dB
		Measured	Limit		Calculated	Limit	
Low	4806.2	64.8	74.0	9.2	47.6	54.0	6.4
Low	12015.5	60.7	74.0	13.3	43.5	54.0	10.5
Mid	4882.8	60.5	74.0	13.5	43.3	54.0	10.7
Mid	7324.2	56.7	74.0	17.3	39.5	54.0	14.5
Mid	12207.0	60.2	74.0	13.8	43.0	54.0	11.0
High	4882.8	60.5	74.0	13.5	43.3	54.0	10.7
High	7324.2	58.2	74.0	15.8	41.0	54.0	13.0
High	12206.9	60.4	74.0	13.6	43.2	54.0	10.8

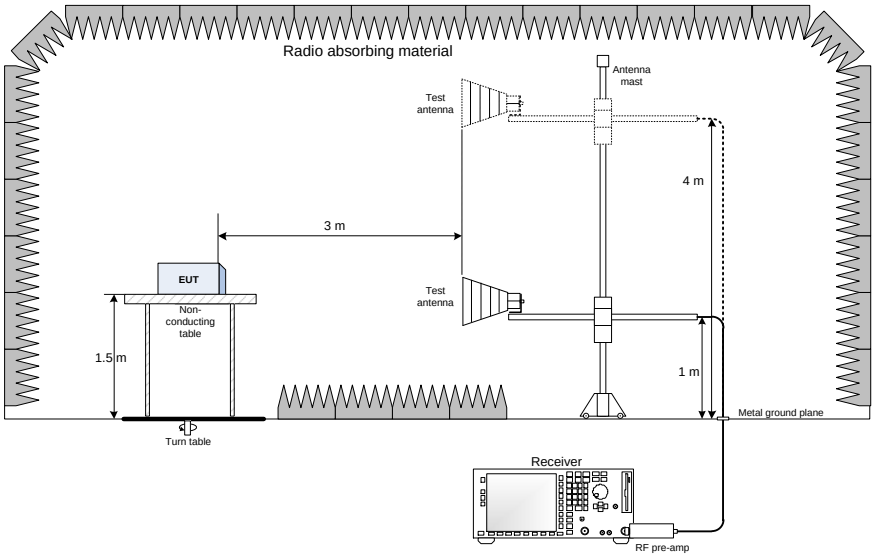
Notes: Field strength includes correction factor of antenna, cable loss, amplifier, and attenuators where applicable.
Average field strength was calculated: Peak field strength – DCCF (17.23 dB)

Section 8 Test setup diagrams

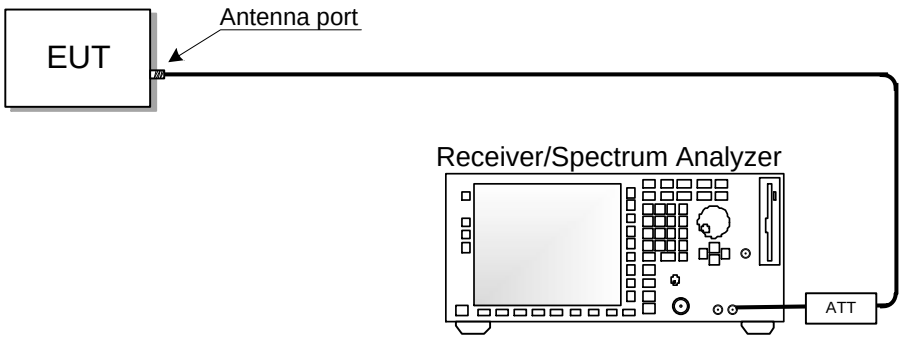
8.1 Radiated emissions set-up for frequencies below 1 GHz



8.2 Radiated emissions set-up for frequencies above 1 GHz



8.3 Antenna port set-up



End of the test report