



EMC Test Report for DOT 2274 B25B66 (KRY 901 468/1) and DOT 2284 B25B66 (KRY 901 468/2)

Tested to: **FCC Part 15 Subpart B / ICES 003**
FCC Part 24 (Section 24.238(a))
FCC Part 27 (Section - 27.53(h))
RSS-Gen (Section 7.0)
RSS-133 (Section 6.5)
RSS-139 (Section 6.6)
RSS-170 (Section 5.4)

Test Result summary

FCC/ ICES/ RSS Section	Description	Specification/Method	Pass or Fail	Results in section
15.109 / 6.2	Radiated Emissions (RE)	FCC Part 15 / ICES 003 / ANSI C63.4	Pass	3.2
7.0	Receiver Emissions Limits	RSS-Gen / ANSI C63.4	Pass	3.2
15.107 / 6.1	Conducted Emissions (CE) for AC Power	FCC Part 15 / ICES 003 / ANSI C63.4	Not applicable	
27.53(h)	Transmitter Spurious Emissions (RE)	FCC Part 27 / ANSI C63.26	Pass	3.2
24.238(a)	Out of band Emissions (RE)	FCC Part 24 / ANSI C63.26	Pass	3.2
RSS-133 / 6.5	Transmitter unwanted Emissions	RSS-133 / ANSI C63.26	Pass	3.2
RSS-139 / 6.6	Transmitter unwanted Emissions	RSS-139 / ANSI C63.26	Pass	3.2
RSS-170 / 5.4	Transmitter unwanted Emissions	RSS-170 / ANSI C63.26	Pass	3.2

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1. Executive summary

This document reports the Electromagnetic Compatibility (EMC) testing performed on the product called DOT 2274 B25B66 (KRY 901 468/1) and DOT 2284 B25B66 (KRY 901 468/2) for Ericsson Canada per project number 7169008619. The objective of the test activities is to evaluate compliance of the product to following EMC regulatory standards.

The DOT 2274 B25B66 (KRY 901 468/1) and DOT 2284 B25B66 (KRY 901 468/2) is verified to comply with the Emissions requirements of these standards:

- FCC Part 15 Subpart B [5] (Class B)
- FCC Part 24 [7] (Emissions Limitations for broadband PCS equipment, Section 24.238(a))
- FCC Part 27 [8] (Digital Base Stations, Section - 27.53(h))
- ICES 003 [9] (Class B)
- RSS-Gen [13] (Receiver emissions Limits, Section 7.0)
- RSS-133 [10] (Transmitter unwanted Emissions, Section 6.5)
- RSS-139 [11] (Transmitter unwanted Emissions, Section 6.6)
- RSS-170 [12] (Transmitter unwanted Emissions, Section 5.4)

Information about the test result summary and, the equipment under test (EUT) is in the sections:

- [Compliance summary](#)
- [Details of the equipment under test](#)
- [Detailed test results of Emissions](#)



1.1 Compliance summary

The test results in this report apply only to the tested components that are identified in the section [Assessed hardware](#).

The following table summarizes the EMC test results for the test cases performed on the DOT 2274 B25B66 (KRY 901 468/1) and DOT 2284 B25B66 (KRY 901 468/2)

Table 1: Summary of test results for the USA; FCC Part 15 subpart B

FCC Section	Description	Specification/Method	Pass or Fail	Results in section
15.109	Radiated Emissions (RE)	FCC Part 15/ANSI C63.4	Pass	3.2
15.107	Conducted Emissions (CE) for AC Power	FCC Part 15/ANSI C63.4	Not applicable EUT is POE powered	

Table 2: Summary of test results for the USA; FCC Part 24, Section 24.238 (a)

FCC Section	Description	Specification/Method	Pass or Fail	Results in section
24.238 (a)	Emissions Limitations for Broadband PCS equipment – Out of band emissions	FCC Part 24/ ANSI C63.26	Pass	3.2

Table 3: Summary of test results for the USA; FCC Part 27 subpart C

FCC Section	Description	Specification/Method	Pass or Fail	Results in section
27.53(h)	AWS emission limits	FCC Part 27/ ANSI C63.26	Pass	3.2

Table 4: Summary of test results for Canada; ICES-003

ICES Section	Description	Specification/Method	Pass or Fail	Results in section
6.2	Radiated Emissions (RE)	ICES 003/ANSI C63.4	Pass	3.2
6.1	Conducted Emissions (CE) for AC Power	ICES 003/ANSI C63.4	Not applicable EUT is POE powered	



Table 5: Summary of test results for RSS-Gen, Section 7.0

RSS-Gen Section	Description	Specification/Method	Pass or Fail	Results in section
7.3	Receiver Radiated Emissions	RSS-Gen / ANSI C63.4	Pass	3.2
7.2	Conducted Emissions (CE) for AC Power	RSS-Gen / ANSI C63.4	Not applicable EUT is POE powered	
7.4	Receiver Conducted Emissions	See antenna port conducted emissions in applicable test report		

Table 6: Summary of test results for Canada, RSS-133

RSS-133 Section	Description	Specification/Method	Pass or Fail	Results in section
6.5	Transmitter unwanted Emissions	RSS-133 / ANSI C63.26	Pass	3.2

Table 7: Summary of test results for Canada, RSS-139

RSS-139 Section	Description	Specification/Method	Pass or Fail	Results in section
6.6	Transmitter unwanted Emissions	RSS-139 / ANSI C63.26	Pass	3.2

Table 8: Summary of test results for Canada, RSS-170

RSS-170 Section	Description	Specification/Method	Pass or Fail	Results in section
5.4	Transmitter unwanted Emissions	RSS-170 / ANSI C63.26	Pass	3.2

2. Details of the equipment under test

This section describes the equipment under test (EUT).

2.1 Assessed hardware

The following table indicates the hardware components that were assessed during this test program.

Table 9: Assessed hardware

Hardware component ¹	Part number
DOT 2274 B25B66 - Equipped with 4 internal antennas	KRY 901 468/1
DOT 2284 B25B66 - Equipped with 4 external antenna ports	KRY 901 468/2
Table Notes	
1. The 2 units above use the same pcb and hardware. The only difference between the units is the presence of the internal/external antennas. Therefore all EMC tests were done only on the external antenna ports variant.	

2.2 Product overview

The product trade name is DOT 2274 B25B66 (KRY 901 468/1) and DOT 2284 B25B66 (KRY 901 468/2). The DOT 2274 & DOT 2284 products are indoor wireless telecommunication products. They transmit and receives the cellular signals for 4G and 5G wireless systems; and operates from POE (56 VDC). This DOTs come in 2 variants as mention above in [Table 9: Assessed hardware](#).

Figure 1: The EUT with External antenna (DOT 2284)



The 2 units above use the same pcb and hardware. The only difference between the units is the presence of the internal/external antennas. Therefore all EMC tests were done only on the external antenna port variant.



Table 10: Product specifications – Tested DOT 2284

Product Detail	
Product	DOT 2284 B25B66
Revision:	R1A
P/N:	KRY 901 468/2
Nominal Voltage:	POE, 56Vdc
Operating Temperature:	+5°C to +40°C
Bands	B25, B66
Antennas (external)	4T4R
Output Power per band	200mW (23dBm)
IBW	B25: 65MHz, B66: 70MHz
Nominal O/P per FDD Antenna Port:	Single Carrier: 1 x 200mW (23dBm)
	Multi-Carrier: 2 x 100mW (19.98dBm)
	Multi-Carrier: 3 x 66.7mW (18.25dBm)
	Multi-Carrier: 4 x 50mW (16.97dBm)
IBW limitation:	Contiguous operations only
RAT support	B25: NR + LTE + NBloT IB/GB, SC MC
	B25: WCDMA + LTE + NBloT IB/GB, SC MC
	B66: NR + LTE + NBloT IB/GB SC, MC
	B66: WCDMA + LTE + NBloT IB/GB, SC MC
supported LTE/NR BW:	5, 10, 15, 20MHz
Max No of carriers per Band:	6 (SP1)
Max no of NR per port	2
Max no of GSM per port	na
Modulations, LTE	QPSK, 16QAM, 64QAM, 256QAM
Modulations, GSM	na
NB loT IB per LTE host	1
NB loT GB per LTE host (min 10MHz)	1
NB loT SA per port	na
NR FDD FR1	Yes
IRU models supported	8848, 1648, 1649
Mounting	ceiling or wall
Dimensions: (H x W)	83mm x 210mm
Weight;	< 1.6kg

The configurations of the tested DOT 2284 B25B66 (KRY 901 468/2) are shown in the section [Configurations of the EUT](#).

2.3 Clocks, oscillators, or switching frequencies

The maximum clock frequency used to determine the Radiated Emissions (RE) frequency range to test is 2.197 GHz.

Table 11 lists all the clock sources (for example, discrete crystals, VCXOs, and DC/DC converter switching frequencies) used in the EUT.

Table 11: EUT fundamental frequencies

Fundamental frequencies (MHz)
0.5, 3.84, 25.0, 50.0, 52.0, 125.0, 153.6, 156.25

2.4 Product port definition and EUT cable information

Table 12 identifies all the cables and ports on the EUT. The Environment of the cables is indoor.

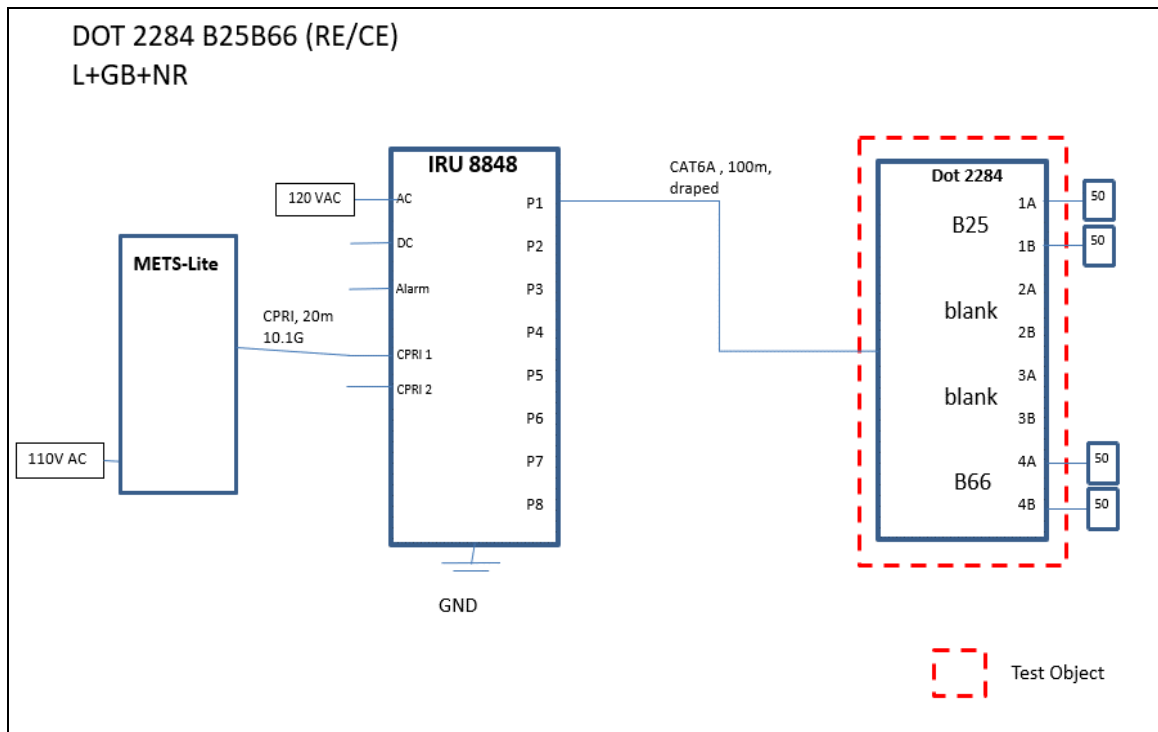
Table 12: System port definition

Port Name	Port Description	Port Type	Interface Detail	Plug-Cable Type
digRDI	Digital RDI	Telecom	ethernet	RJ-45, CAT6A
1A, 1B	RF to antenna B25	Antenna	RF	SMA, Coax >3m
4A, 4B	RF to antenna B66	Antenna	RF	SMA, Coax >3m
2A, 2B, 3A, 3B	blank	na	na	na

2.5 Configurations of the EUT

Figure 2 shows the configuration of the EUT for Emissions test.

Figure 2: Test configuration for Emission tests



Following RAT/carrier configurations were tested during this Radiated Emissions evaluations.

- Radiated Emissions Single RAT / Single Carrier Configurations (WCDMA)
- Radiated Emissions Single RAT / Single Carrier Configurations (LTE)
- Radiated Emissions Single RAT / Single Carrier Configurations (NR)
- Radiated Emissions Single RAT / Multi Carriers Configurations (WCDMA)
- Radiated Emissions Multi RAT/Carrier Configuration (LTE+WCDMA & LTE+NR)



2.5.1 Radiated Emissions Single RAT / Single Carrier Configurations (WCDMA)

Figure 3: Tested carrier detail – Single RAT /Single carrier (WCDMA)

Single RAT/Single Carrier - WCDMA setups for Emissions			
B25 PORT (1A,1B)		B66 Port (4A, 4B)	
WCDMA		LTE	
SR WCDMA Config SC M Carrier setups for Emissions			
Carrier:	Middle channel	Carrier:	Middle channel
1	B25: W, 5MHz, 1962.6MHz	1	B66: L, 5MHz, 2155MHz
SR WCDMA Config SC B Carrier setups for Emissions			
Carrier:	Bottom channel	Carrier:	Bottom channel
1	B25: W, 5MHz, 1932.4MHz	1	B66: L, 5MHz, 2112.5MHz
SR WCDMA Config SC T Carrier setups for Emissions			
Carrier:	Top channel	Carrier:	Top channel
1	B25: W, 5MHz, 1992.6MHz	1	B66: L, 5MHz, 2197.5MHz

Note: All configurations were tested.



2.5.2 Radiated Emissions Single RAT / Single Carrier Configurations (LTE)

Figure 4: Tested carrier detail – Single RAT / Single carrier (LTE)

Single RAT/Single Carrier - LTE setups for Emissions			
B25 PORT (1A,1B)		B66 Port (4A, 4B)	
SR LTE Config SC1 Carrier setups for Emissions			
Carrier:	Middle channel	Carrier:	Middle channel
1	B25: L, 5MHz, 1962.5MHz	1	B66: L, 5MHz, 2155MHz
SR LTE Config SC2 Carrier setups for Emissions			
Carrier:	Middle channel	Carrier:	Middle channel
1	B25: L, 10MHz, 1962.5MHz	1	B66: L, 10MHz, 2155MHz
2	B25: NBloT GB, 800KHz, 1957.9MHz	2	B66: NBloT GB, 800KHz, 2150.4MHz
SR LTE Config SC3 Carrier setups for Emissions			
Carrier:	Middle channel	Carrier:	Middle channel
1	B25: L, 15MHz, 1962.5MHz	1	B66: L, 15MHz, 2155MHz
2	B25: NBloT GB, 800KHz, 1955.4MHz	2	B66: NBloT GB, 800KHz, 2147.9MHz
SR LTE Config SC4 Carrier setups for Emissions			
Carrier:	Middle channel	Carrier:	Middle channel
1	B25: L, 20MHz, 1962.5MHz	1	B66: L, 20MHz, 2155MHz
2	B25: NBloT GB, 800KHz, 1952.9MHz	2	B66: NBloT GB, 800KHz, 2145.4MHz

Note: Radiated Emissions measurements were compared between above 4 LTE carrier setups. **SC1** was found to have higher emissions than **SC2**, **SC3** and **SC4**. All plots with single LTE carrier in this report are therefore measured using **SC1** Middle channel carrier setup.



2.5.3 Radiated Emissions Single RAT / Single Carrier Configurations (NR)

Figure 5: Tested carrier detail – Single RAT / Single carrier (NR)

Single RAT/Single Carrier - NR setups for Emissions			
B25 PORT (1A,1B)		B66 Port (4A, 4B)	
SR NR Config SC1 Carrier setups for Emissions			
Carrier:	Middle channel	Carrier:	Middle channel
1	B25: NR, 5MHz, 1962.5MHz	1	B66: NR, 5MHz, 2155MHz
SR NR Config SC2 Carrier setups for Emissions			
Carrier:	Middle channel	Carrier:	Middle channel
1	B25: NR, 10MHz, 1962.5MHz	1	B66: NR, 10MHz, 2155MHz
SR NR Config SC3 Carrier setups for Emissions			
Carrier:	Middle channel	Carrier:	Middle channel
1	B25: NR, 15MHz, 1962.5MHz	1	B66: NR, 15MHz, 2155MHz
SR NR Config SC4 Carrier setups for Emissions			
Carrier:	Middle channel	Carrier:	Middle channel
1	B25: NR, 20MHz, 1962.5MHz	1	B66: NR, 20MHz, 2155MHz

Note: Radiated Emissions measurements were compared between above 4 NR carrier setups. **SC1** was found to have higher emissions than **SC2**, **SC3** and **SC4**. All plots with single NR carrier in this report are therefore measured using **SC1** Middle channel carrier setup.



2.5.4 Radiated Emissions Single RAT / Multi Carriers Configurations (WCDMA)

Figure 6: Tested carrier detail – Single RAT / Multi carrier (WCDMA)

Single RAT / Multi Carrier - WCDMA setups for Emissions			
B25 PORT (1A,1B)		B66 Port (4A, 4B)	
WCDMA		LTE	
SR WCDMA Config MC1 Carrier setups for Emissions			
Carrier:	Middle channel	Carrier:	Middle channel
1	B25: W, 5MHz, 1960MHz	1	B66: L, 5MHz, 2155MHz
2	B25: W, 5MHz, 1965MHz		
SR WCDMA Config MC2 Carrier setups for Emissions			
Carrier:	Middle channel	Carrier:	Middle channel
1	B25: W, 5MHz, 1957.6MHz	1	B66: L, 5MHz, 2155MHz
2	B25: W, 5MHz, 1962.6MHz		
3	B25: W, 5MHz, 1967.6MHz		
SR WCDMA Config MC3 Carrier setups for Emissions			
Carrier:	Middle channel	Carrier:	Middle channel
1	B25: W, 5MHz, 1950MHz	1	B66: L, 5MHz, 2155MHz
2	B25: W, 5MHz, 1955MHz		
3	B25: W, 5MHz, 1960MHz		
4	B25: W, 5MHz, 1965MHz		
5	B25: W, 5MHz, 1970MHz		
6	B25: W, 5MHz, 1975MHz		

Note: Radiated Emissions measurements were compared between MC1, MC2 and MC3. MC1 was found to have higher emissions. All plots with Single RAT/Multi carrier in this report are therefore measured using MC1 carrier setups.



2.5.5 Radiated Emissions Multi RAT/Carrier Configuration (LTE+WCDMA & LTE+NR)

Figure 7: Tested carrier detail – MultiCarrier / Multi RAT Configuration

Single RAT / Multi Carrier - WCDMA setups for Emissions			
B25 PORT (1A,1B)		B66 Port (4A, 4B)	
LTE+WCDMA & LTE+NR		LTE+NR	
MR Config MR1 Carrier setups for Emissions			
Carrier:	Middle channel	Carrier:	Middle channel
1	B25: L, 5MHz, 1960MHz	1	B66: L, 5MHz, 2152.5MHz
2	B25: W, 5MHz, 1965MHz	2	B66: NR, 5MHz, 2157.5MHz
MR Config MR2 Carrier setups for Emissions			
Carrier:	Middle channel	Carrier:	Middle channel
1	B25: L, 5MHz, 1950MHz	1	B66: L, 5MHz, 2150MHz
2	B25: L, 5MHz, 1955MHz	2	B66: L, 5MHz, 2155MHz
3	B25: W, 5MHz, 1960MHz	3	B66: NR, 5MHz, 2160MHz
4	B25: W, 5MHz, 1965MHz		
5	B25: W, 5MHz, 1970MHz		
6	B25: W, 5MHz, 1975MHz		
MR Config MR3 Carrier setups for Emissions			
Carrier:	Middle channel	Carrier:	Middle channel
1	B25: L, 5MHz, 1960MHz	1	B66: L, 5MHz, 2145MHz
2	B25: NR, 5MHz, 1965MHz	2	B66: L, 5MHz, 2150MHz
		3	B66: L, 5MHz, 2155MHz
		4	B66: NR, 5MHz, 2160MHz
		5	B66: NR, 5MHz, 2165MHz
MR Config MR4 Carrier setups for Emissions			
Carrier:	Middle channel	Carrier:	Middle channel
1	B25: L, 5MHz, 1950MHz	1	B66: L, 5MHz, 2142.5MHz
2	B25: L, 5MHz, 1955MHz	2	B66: L, 5MHz, 2147.5MHz
3	B25: L, 5MHz, 1960MHz	3	B66: L, 5MHz, 2152.5MHz
4	B25: L, 5MHz, 1965MHz	4	B66: L, 5MHz, 2157.5MHz
5	B25: NR, 5MHz, 1970MHz	5	B66: NR, 5MHz, 2162.5MHz
6	B25: NR, 5MHz, 1975MHz	6	B66: NR, 5MHz, 2167.5MHz

Note: Radiated Emissions measurements were compared between **MR1**, **MR2**, **MR3** and **MR4**. **MR1** was found to have higher emissions than **MR2**, **MR3** and **MR4**. All plots with Multi RAT/Multi carrier in this report are therefore measured using **MR1** Middle channel carrier configuration.

2.6 Modifications of the EUT during testing

The EUT was not modified prior to or during testing.

2.7 Inventory of the EUT and support equipments

The following tables identifies the inventory of the EUT.

Table 13: Inventory of the EUT (RE & CE tests)

Equipment Role	Product Name	Product Number	Release	Product Serial#
EUT	DOT 2284 B25B66	KRY 901 468/2	R1A	TD3W005257
SUPPORT	IRU 8848	KRC 161 889/1	R1D	TD3F064191
Optical Fiber	CPRI, LC, SM, 20m	na	na	na
Cable	RDI cable: 100m Cat6A, F/UTP, M-M			
TEST SET	METS-Lite, CT-10, DU-SIM	LPC 102 487/1	R1C	
Software info				
IRU load: iru2plus_app-CXP9013268_25-R84EF.xlf				



3. Detailed test results of Emissions

Emissions from systems manifest themselves in two forms: conducted emissions on cables and radiated emissions from the entire system (i.e. electronic modules, hardware, and cables). Regulatory standards restrict these different forms of emissions generated by the system.

The temperature and humidity in the test facilities are controlled. The temperature is maintained between 20 °C and 25 °C, with a relative humidity between 30 % and 60 %. Levels are recorded and any exceptions are included in the detailed test results sections of this report.

3.1 Measurement instrumentation

The measurement instrumentation conforms to the relevant standards in this report: ANSI C63.2, CISPR 16, CISPR 22, and CISPR 32. Calibration of the measurement instrumentation is maintained in accordance with the supplier's recommendations, or as necessary to ensure its accuracy.

3.2 Radiated Emissions, E-field (RE)

This test verifies that the EUT does not produce excess amounts of E-field Radiated Emissions (RE) that could interfere with licensed radiators.

3.2.1 Test specification and limits

The testing requirements are as follows.

Table 14: RE test requirements

Requirement	Method	Country of application
FCC Part 15, Subpart B	FCC Part 15 / ANSI C63.4	USA
FCC Part 24 (Section 24.238(a))	ANSI C63.26	USA
FCC Part 27 (Section 27.53(h))	ANSI C63.26	USA
ICES 003	FCC Part 15 / ICES 003 / ANSI C63.4	Canada
RSS-Gen (Section 7.3)	FCC Part 15 / ICES 003 / ANSI C63.4	Canada
RSS-133 (Section 6.5)	ANSI C63.26	Canada
RSS- 139 (Section 6.6)	ANSI C63.26	Canada
RSS- 170 (Section 5.4 - 1 & 2)	ANSI C63.26	Canada

The limits of the RE tests are as follows.

Table 15: RE limits at 10 m for Class B of FCC Part 15, ICES 003 & RSS-Gen

Frequency range (MHz)	FCC Part 15 & ICES 003 (dB μ V/m)	Detector
30 to 88	29.5	Quasi-Peak
88 to 216	33.0	Quasi-Peak
216 to 960	35.5	Quasi-Peak
960 to 1000	43.5	Quasi-Peak
1000 to 40000	43.5 ¹	Average

Table 16: Tx unwanted Emissions limits for FCC Part 24, Part 27, RSS-133 & RSS-139

Frequency range (MHz)	EIRP Limit (dBm)	Calculated EIRP Limit in dB μ V/m
30 - 40000	-13	82.2

Table 17: Tx unwanted Emission limits for RSS-170

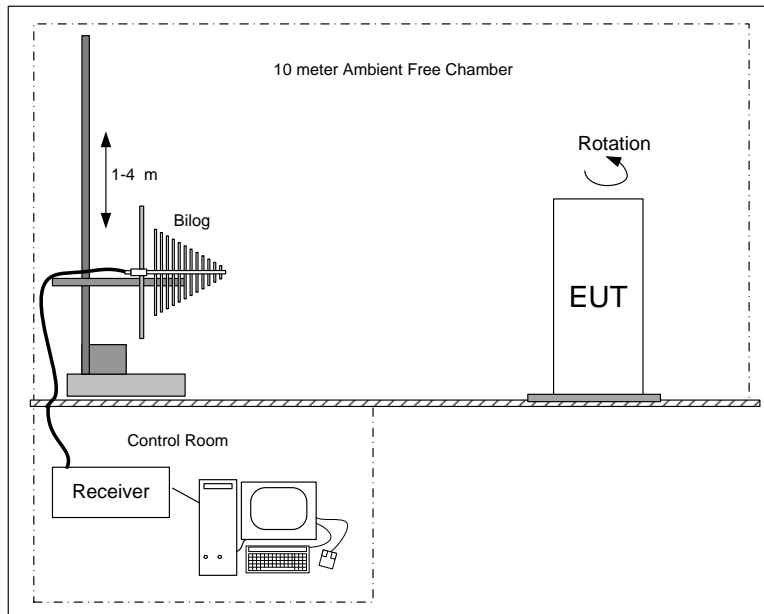
Frequency range (MHz)	EIRP Limit (dBm)	Calculated EIRP Limit in dB μ V/m
30 - 40000	-13	82.2
2200 – 2290	-100.6 dBW/4 kHz	48.6

3.2.2 Test procedure

Verifications of the test equipment and AFC were performed before the installation of the EUT in accordance with the quality assurance procedures documented in the EMC test procedures document. The test was performed according to the relevant procedures listed in [Table 14](#).

- The EUT was placed on the turntable inside the AFC (configured for normal operation). The system and its cables were separated from the ground plane by an insulating support 10 mm in height.
- For tests between 30 MHz and 1 GHz the receive antenna (BiLog®) was placed 3 m away from the EUT. An initial scan was performed to find emissions/frequencies requiring detailed measurement. The pre-scan was performed by rotating the system 360 degrees while recording all emissions (frequency and amplitude). This procedure was repeated for antenna heights of 1 to 4 m, as well as both polarizations of the receiving antenna.
- For tests above 1 GHz the receive antenna (horn) was placed 3 m away from the EUT. Absorbing cones were placed on the floor between the antenna and the EUT. An initial scan was performed to find emissions/frequencies requiring detailed measurement. The pre-scan was performed by rotating the system 360 degrees while recording all emissions (frequency and amplitude). This procedure was repeated for antenna heights of 1 to 4 m, as well as both polarizations of the receiving antenna.
- For tests between 18 and 40 GHz the receive horn antenna was placed at a 1 m distance from the EUT with the absorbing cones placed on the floor. An initial scan was performed to find emissions/frequencies requiring detail measurement. The pre-scan was performed on all sides of the EUT, using both polarization of the receive antenna to find any system emissions.
- For all above frequency ranges, the pre-scan peak data was compared to the limits. Peaks with less than 6 dB of margin were maximized using the proper detector: the EUT was rotated in azimuth over 360 degrees to identify the direction of maximum emission, antenna height was then varied from 1 to 4 m to obtain maximum emission level.

Figure 8: Setup of Radiated Emissions



3.2.3 Calculation of the compliance margin

The following example shows the way in which the compliance margin is calculated in the “RE Test Results” tables.

The rows in these tables are defined as follows.

Meter Reading (dB μ V) = Voltage measured using the spectrum analyzer with the proper detector

Correction (dB) = Cumulative gain or loss of pre-amplifier and cables used in the measurement path (dB) + Antenna Factor (dB)

Level (dB μ V/m) = Corrected value or field strength, that is, the parameter of interest that is compared to the limit

Margin (dB) = Level with respect to the appropriate limit (a negative Margin indicates that the Level is below the limit and that the measurement is a Pass)

The values in the Level row are calculated as follows: Level = Meter Reading + Correction (dB)

The values in the Margin row are calculated as follows: Margin = Level - Limit

3.2.4 Measurement uncertainties

The expanded measurement instrumentation uncertainty with a 95 % level of confidence, calculated according to the method described in CISPR 16 is:

- ± 3.8 dB between 30 MHz and 1 GHz
- ± 4.7 dB between 1 GHz and 10 GHz
- ± 4.8 dB between 10 GHz and 18 GHz
- ± 4.6 dB between 18 GHz and 26.5 GHz
- ± 4.8 dB between 26.5 GHz and 40 GHz



3.2.5 Test results of RE (Single RAT/Single carrier, WCDMA - Bottom channel)

Test location: 10-meter Ambient Free Chamber (AFC)

Date tested: 15 - 22 October 2020

Tested by: Krupal Patel

Test configurations are identified in the section [Configurations of the EUT](#).

For the following test results that have supporting data tables, negative margin values indicate a pass.

Figure 9: Plot of RE at 3 m – 30 to 1000 MHz (WCDMA – Bot channel)

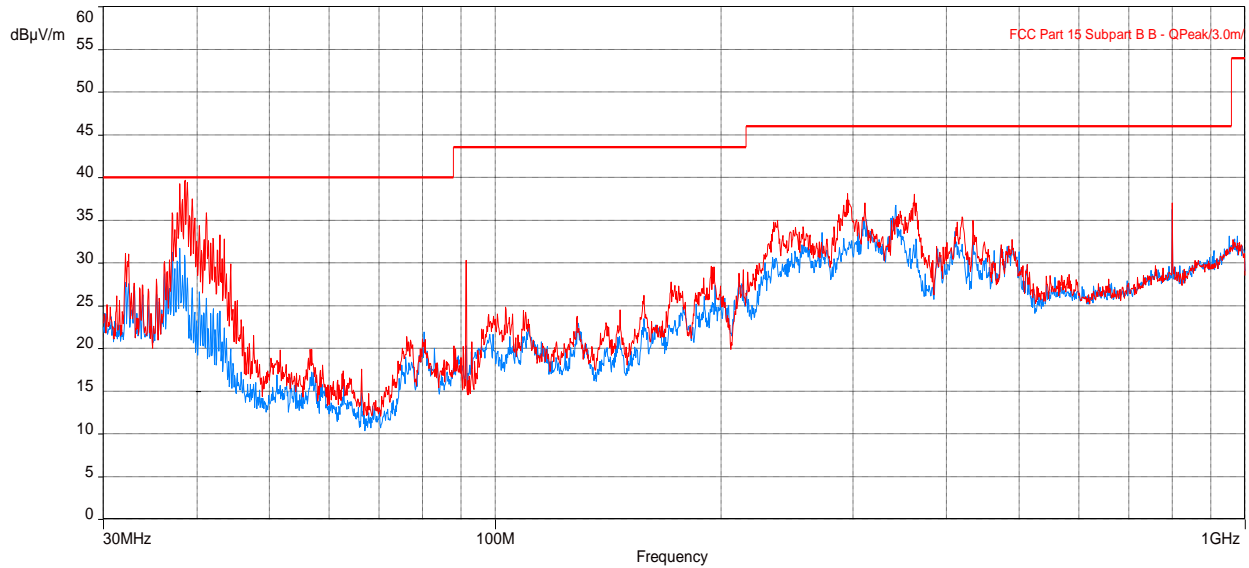


Table 18: RE test results from 30 to 1000 MHz for FCC Part 15 (WCDMA – Bot channel)

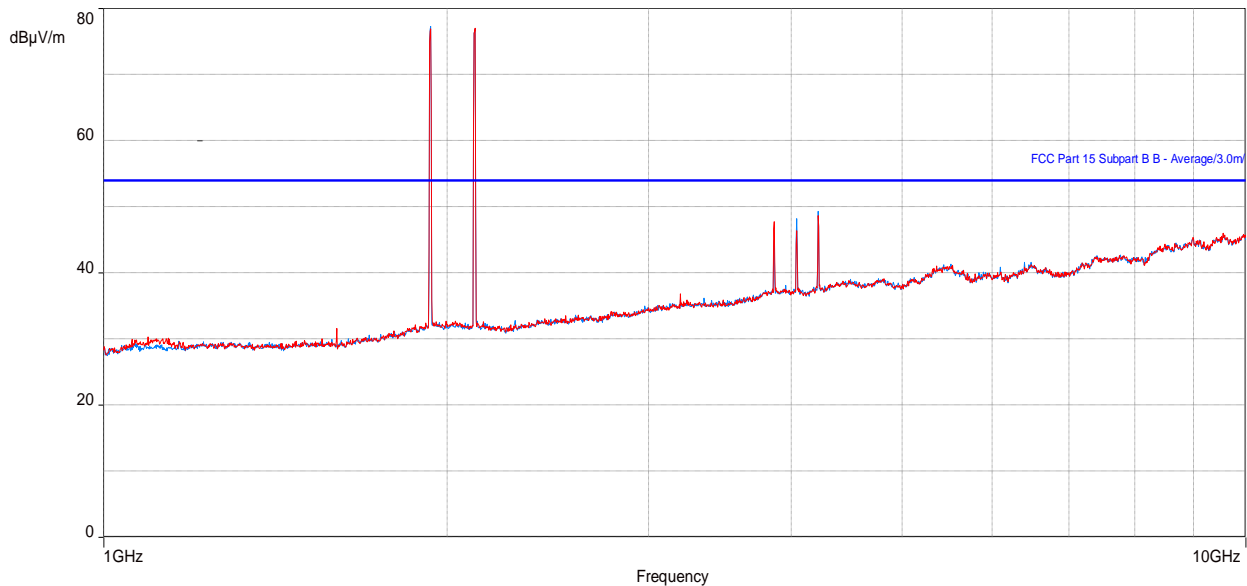
Frequency (MHz)	Level Quasi Peak (dBµV/m)	Limit Quasi-peak (dBµV/m)	Margin to FCC part 15 Class B (dB)	Height (m)	Azimuth (deg)	Polarization	Correction (dB)
37.98573077	34.69	40.00	-5.31	2.63	5.00	Horizontal	-6.30
38.56480736	38.30	40.00	-1.70	1.05	112.50	Vertical	-6.64
38.85516633	37.75	40.00	-2.25	1.05	62.50	Vertical	-6.81
799.9946121	36.58	46.02	-9.44	2.86	247.25	Horizontal	4.29

Table 19: RE test results from 30 to 1000 MHz for FCC Part 24/27 (WCDMA – Bot channel)

Frequency (MHz)	Level (dBµV/m)	EIRP Limit (dBµV/m)	Margin to (dB)	Height (m)	Azimuth (deg)	Polarization	Correction (dB)
37.98573077	34.69	82.2	-47.51	2.63	5.00	Horizontal	-6.30
38.56480736	38.30	82.2	-43.9	1.05	112.50	Vertical	-6.64
38.85516633	37.75	82.2	-44.45	1.05	62.50	Vertical	-6.81
799.9946121	36.58	82.2	-45.62	2.86	247.25	Horizontal	4.29

Note: In the table/Plot above, no emissions exceed the Part 24/Part 27 radiated spurious emissions limit when converted to dBuV/m. For final spurious emissions measurements to FCC Part 24/Part 27, see antenna port conducted emissions in applicable test report.

Figure 10: Plot of RE at 3m from 1 to 10GHz (WCDMA – Bot channel)



Note: Peaks above the limit are leakage of the EUT’s fundamentals from the 50-ohm terminations.

Table 20: RE test results from 1 to 10 GHz for FCC Part 15 (WCDMA – Bot channel)

Frequency (MHz)	Level Average (dBµV/m)	Limit Average (dBµV/m)	Margin to FCC part 15 Class B (dB)	Height (m)	Azimuth (degrees)	Polarization	Correction (dB)
3864.873077	46.49	53.96	-7.47	2.35	254.25	Vertical	2.49
4045.125	46.42	53.96	-7.54	3.48	127.00	Horizontal	2.65
4224.685577	46.82	53.96	-7.14	1.04	156.00	Vertical	2.56

Table 21: RE test results from 1 to 10 GHz for Part 24/27 (WCDMA – Bot channel)

Frequency (MHz)	Level (dBµV/m)	EIRP Limit (dBµV/m)	Margin to (dB)	Height (m)	Azimuth (degrees)	Polarization	Correction (dB)
3864.873077	46.49	82.2	-35.71	2.35	254.25	Vertical	2.49
4045.125	46.42	82.2	-35.78	3.48	127.00	Horizontal	2.65
4224.685577	46.82	82.2	-35.38	1.04	156.00	Vertical	2.56

Note: In the table/Plot above, no emissions exceed the Part 24/Part 27 radiated spurious emissions limit when converted to dBuV/m, except for the fundamentals. For final spurious emissions measurements to FCC Part 24/Part 27, see antenna port conducted emissions in applicable test report.



Figure 11: Plot of RE at 3m from 10 to 18 GHz (WCDMA – Bot channel)

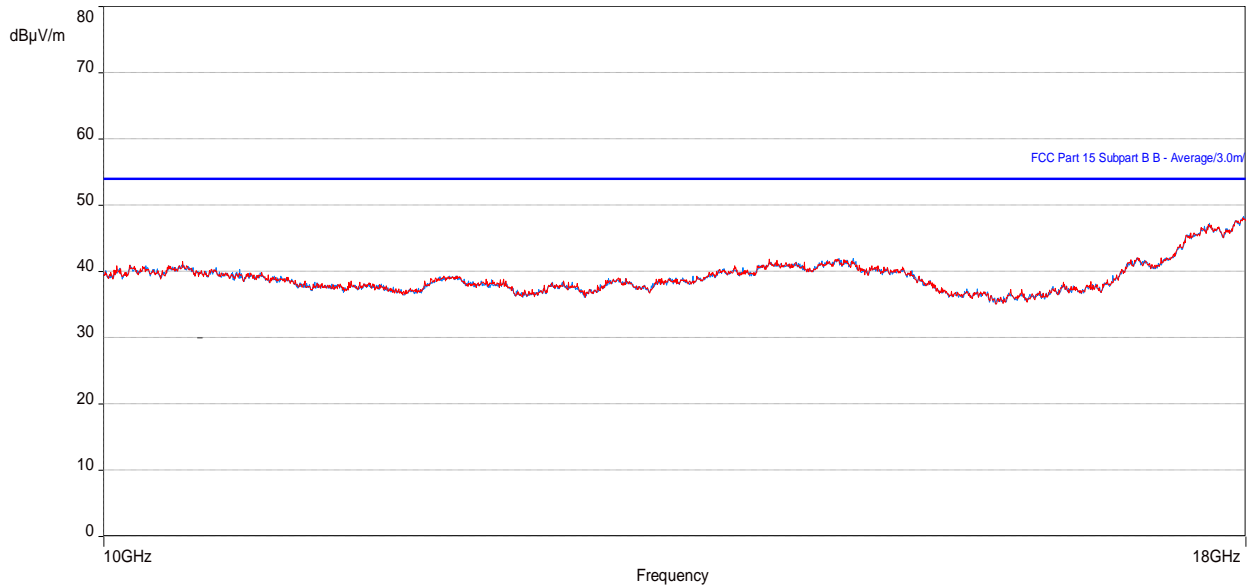


Table 22: RE test results from 10 to 18 GHz for FCC Part 15 (WCDMA – Bot channel)

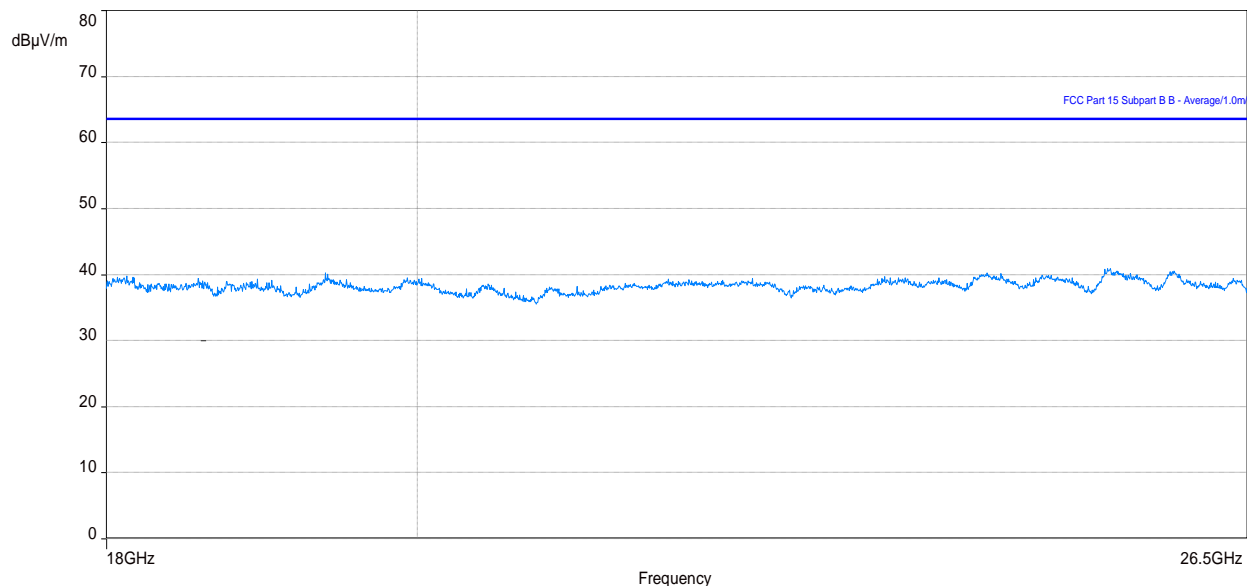
Frequency (MHz)	Level Average (dBµV/m)	Limit Average (dBµV/m)	Margin to FCC part 15 Class B (dB)	Height (m)	Azimuth (degrees)	Polarization	Correction (dB)
14587.79808	38.16	53.96	-15.80	1.00	0.00	Vertical	11.09
14710.09935	38.53	53.96	-15.43	4.00	17.00	Horizontal	10.31
17903.49903	45.02	53.96	-8.94	4.00	2.75	Horizontal	19.19
17908.98687	44.70	53.96	-9.26	1.00	16.50	Vertical	19.29

Table 23: RE test results from 10 to 18 GHz for Part 24/27 (WCDMA – Bot channel)

Frequency (MHz)	Level (dBµV/m)	EIRP Limit (dBµV/m)	Margin to (dB)	Height (m)	Azimuth (degrees)	Polarization	Correction (dB)
14587.79808	38.16	82.2	-44.04	1.00	0.00	Vertical	11.09
14710.09935	38.53	82.2	-43.67	4.00	17.00	Horizontal	10.31
17903.49903	45.02	82.2	-37.18	4.00	2.75	Horizontal	19.19
17908.98687	44.70	82.2	-37.5	1.00	16.50	Vertical	19.29

Note: In the table/Plot above, no emissions exceed the Part 24/Part 27 radiated spurious emissions limit when converted to dBuV/m. For final spurious emissions measurements to FCC Part 24/Part 27, see antenna port conducted emissions in applicable test report.

Figure 12: Plot of RE at 1m from 18 to 26.5 GHz (WCDMA – Bot channel)



Note 1: In the plot above No Emissions exceeds the FCC Part 15/ICES 003 limit.

Note 2: In the plot above, no emissions exceed the Part 24/27 radiated spurious emissions limit when converted to dBuV/m. For final spurious emissions measurements to FCC Part 24/27, see antenna port conducted emissions in applicable test report.



3.2.6 Test results of RE (Single RAT/Single carrier, WCDMA - Middle channel)

Test location: 10-meter Ambient Free Chamber (AFC)

Date tested: 15 - 22 October 2020

Tested by: Krupal Patel

Test configurations are identified in the section [Configurations of the EUT](#).

For the following test results that have supporting data tables, negative margin values indicate a pass.

Figure 13: Plot of RE at 3 m – 30 to 1000 MHz (WCDMA – Mid channel)

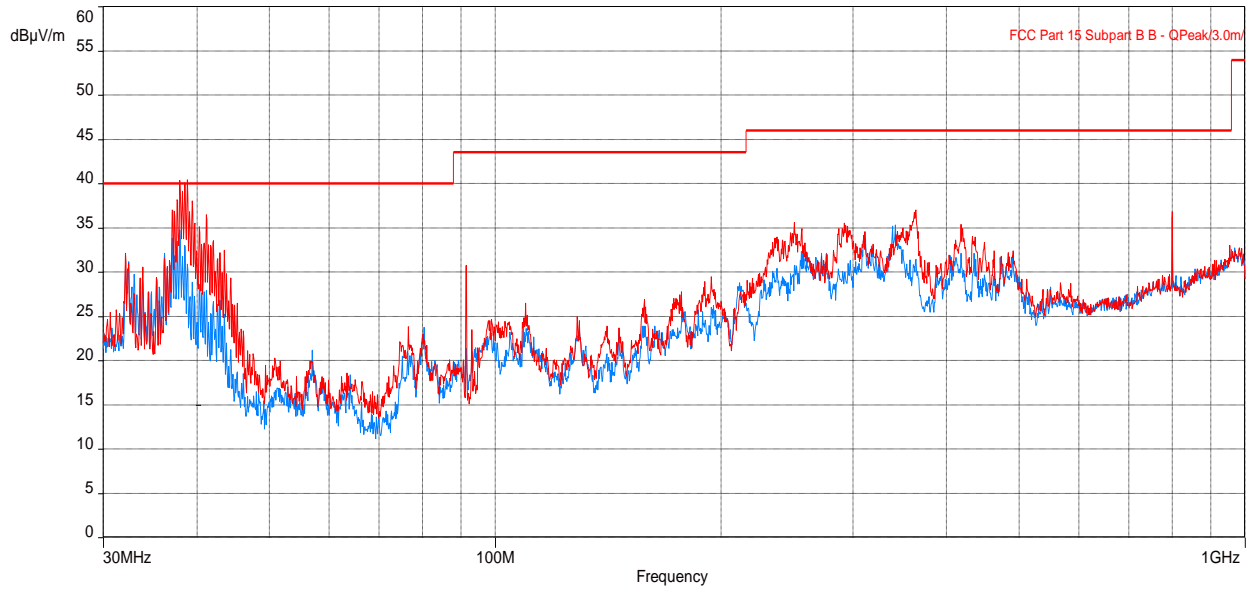


Table 24: RE test results from 30 to 1000 MHz for FCC Part 15 (WCDMA – Mid channel)

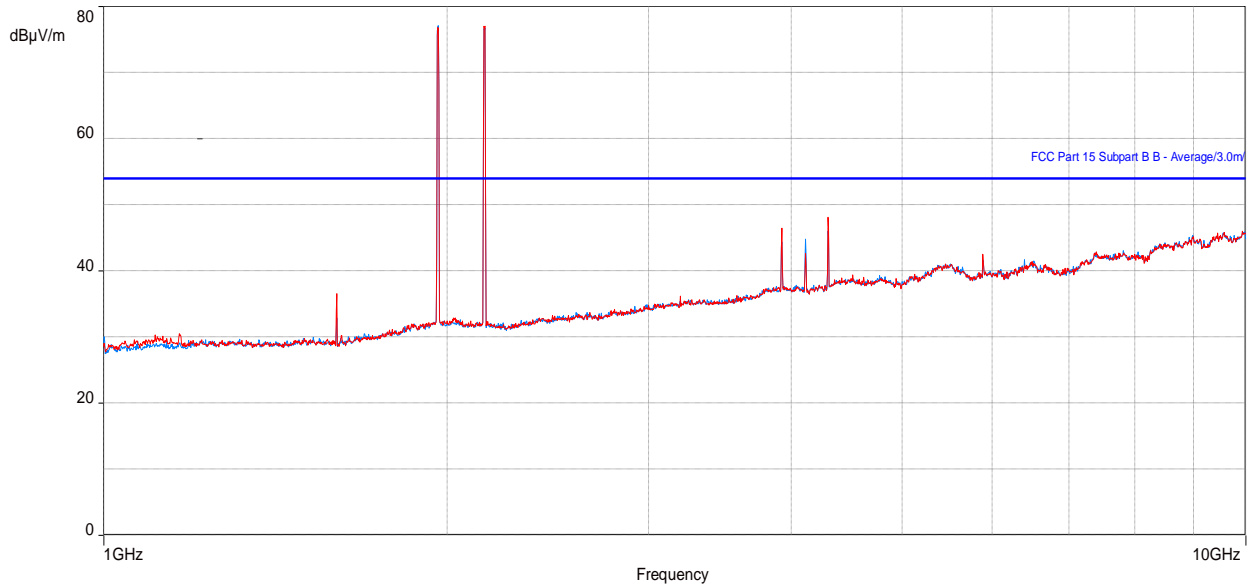
Frequency (MHz)	Level Quasi Peak (dBµV/m)	Limit Quasi-peak (dBµV/m)	Margin to FCC part 15 Class B (dB)	Height (m)	Azimuth (deg)	Polarization	Correction (dB)
37.98733333	36.84	40.00	-3.16	1.00	11.75	Vertical	-6.30
38.57446154	33.26	40.00	-6.74	1.00	4.75	Vertical	-6.64
38.8630189	34.20	40.00	-5.80	1.00	55.25	Vertical	-6.82
799.9944518	36.31	46.02	-9.71	2.96	326.50	Vertical	4.29

Table 25: RE test results from 30 to 1000 MHz for FCC Part 24/27 (WCDMA – Mid channel)

Frequency (MHz)	Level (dBµV/m)	EIRP Limit (dBµV/m)	Margin to (dB)	Height (m)	Azimuth (deg)	Polarization	Correction (dB)
37.98733333	36.84	82.2	-45.36	1.00	11.75	Vertical	-6.30
38.57446154	33.26	82.2	-48.94	1.00	4.75	Vertical	-6.64
38.8630189	34.20	82.2	-48.00	1.00	55.25	Vertical	-6.82
799.9944518	36.31	82.2	-45.89	2.96	326.50	Vertical	4.29

Note: In the table/Plot above, no emissions exceed the Part 24/Part 27 radiated spurious emissions limit when converted to dBuV/m. For final spurious emissions measurements to FCC Part 24/Part 27, see antenna port conducted emissions in applicable test report.

Figure 14: Plot of RE at 3m from 1 to 10GHz (WCDMA – Mid channel)



Note: Peaks above the limit are leakage of the EUT’s fundamentals from the 50-ohm terminations.

Table 26: RE test results from 1 to 10 GHz for FCC Part 15 (WCDMA – Mid channel)

Frequency (MHz)	Level Average (dBµV/m)	Limit Average (dBµV/m)	Margin to FCC part 15 Class B (dB)	Height (m)	Azimuth (degrees)	Polarization	Correction (dB)
3925.816346	43.68	53.96	-10.28	2.28	247.00	Vertical	2.46
4309.95609	43.60	53.96	-10.36	1.00	141.75	Horizontal	2.75
4310.43141	45.94	53.96	-8.02	1.18	155.00	Vertical	2.75

Table 27: RE test results from 1 to 10 GHz for Part 24/27 (WCDMA – Mid channel)

Frequency (MHz)	Level (dBµV/m)	EIRP Limit (dBµV/m)	Margin to (dB)	Height (m)	Azimuth (degrees)	Polarization	Correction (dB)
3925.816346	43.68	82.2	-38.52	2.28	247.00	Vertical	2.46
4309.95609	43.60	82.2	-38.60	1.00	141.75	Horizontal	2.75
4310.43141	45.94	82.2	-36.26	1.18	155.00	Vertical	2.75

Note: In the table/Plot above, no emissions exceed the Part 24/Part 27 radiated spurious emissions limit when converted to dBuV/m, except for the fundamentals. For final spurious emissions measurements to FCC Part 24/Part 27, see antenna port conducted emissions in applicable test report.



Figure 15: Plot of RE at 3m from 10 to 18 GHz (WCDMA – Mid channel)

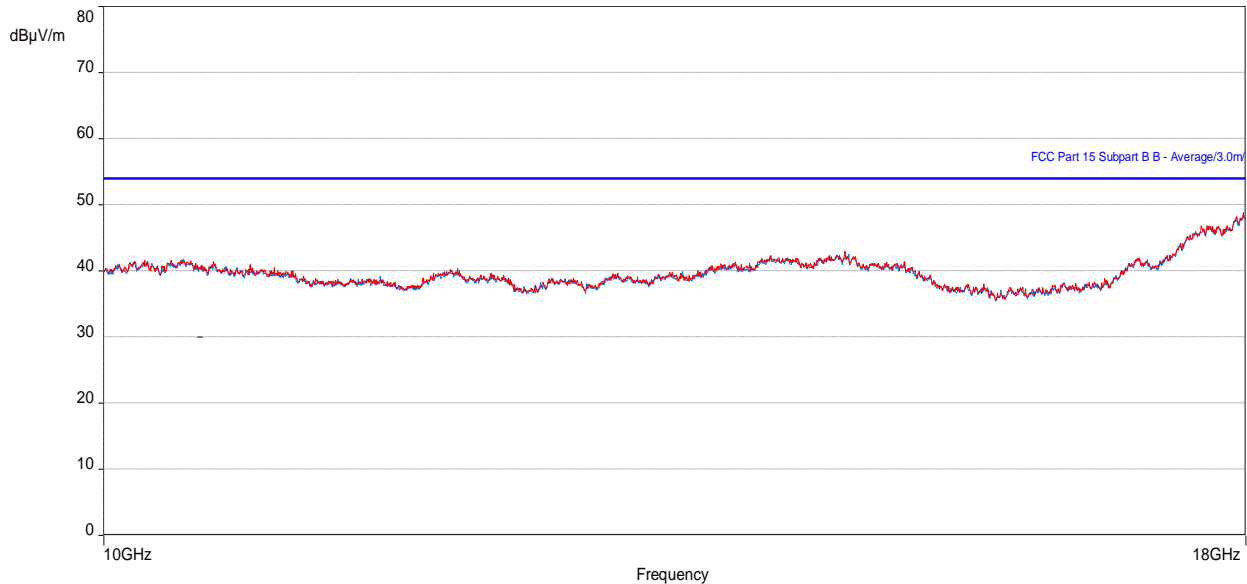


Table 28: RE test results from 10 to 18 GHz for FCC Part 15 (WCDMA – Mid channel)

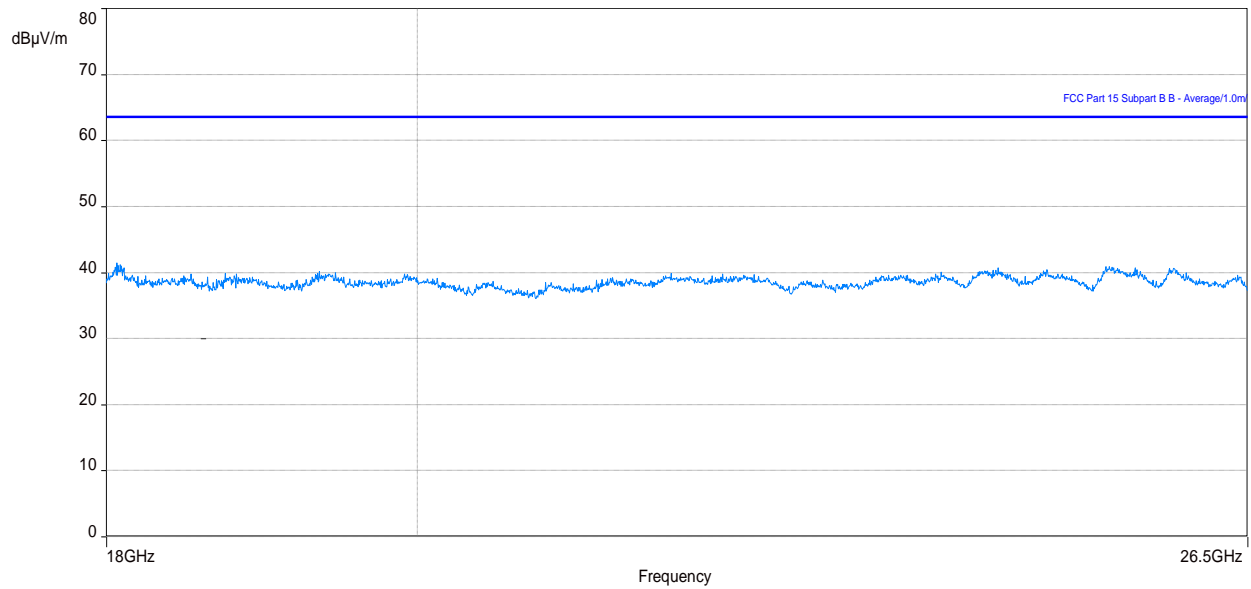
Frequency (MHz)	Level Average (dBµV/m)	Limit Average (dBµV/m)	Margin to FCC part 15 Class B (dB)	Height (m)	Azimuth (degrees)	Polarization	Correction (dB)
14645.43396	39.27	53.96	-14.69	4.00	17.25	Vertical	10.80
14674.3205	38.71	53.96	-15.25	4.00	2.50	Horizontal	10.63
17912.62437	45.29	53.96	-8.67	4.00	247.00	Horizontal	19.36
17917.17277	45.48	53.96	-8.48	4.00	24.25	Vertical	19.45

Table 29: RE test results from 10 to 18 GHz for Part 24/27 (WCDMA – Mid channel)

Frequency (MHz)	Level (dBµV/m)	EIRP Limit (dBµV/m)	Margin to (dB)	Height (m)	Azimuth (degrees)	Polarization	Correction (dB)
14645.43396	39.27	82.2	-42.93	4.00	17.25	Vertical	10.80
14674.3205	38.71	82.2	-43.49	4.00	2.50	Horizontal	10.63
17912.62437	45.29	82.2	-36.91	4.00	247.00	Horizontal	19.36
17917.17277	45.48	82.2	-36.72	4.00	24.25	Vertical	19.45

Note: In the table/Plot above, no emissions exceed the Part 24/Part 27 radiated spurious emissions limit when converted to dBuV/m. For final spurious emissions measurements to FCC Part 24/Part 27, see antenna port conducted emissions in applicable test report.

Figure 16: Plot of RE at 1m from 18 to 26.5 GHz (WCDMA – Mid channel)



Note 1: In the plot above No Emissions exceeds the FCC Part 15/ICES 003 limit.

Note 2: In the plot above, no emissions exceed the Part 24/27 radiated spurious emissions limit when converted to dBuV/m. For final spurious emissions measurements to FCC Part 24/27, see antenna port conducted emissions in applicable test report.



3.2.7 Test results of RE (Single RAT/Single carrier, WCDMA - Top channel)

Test location: 10-meter Ambient Free Chamber (AFC)

Date tested: 15 - 22 October 2020

Tested by: Krupal Patel

Test configurations are identified in the section [Configurations of the EUT](#).

For the following test results that have supporting data tables, negative margin values indicate a pass.

Figure 17: Plot of RE at 3 m – 30 to 1000 MHz (WCDMA – Top channel)

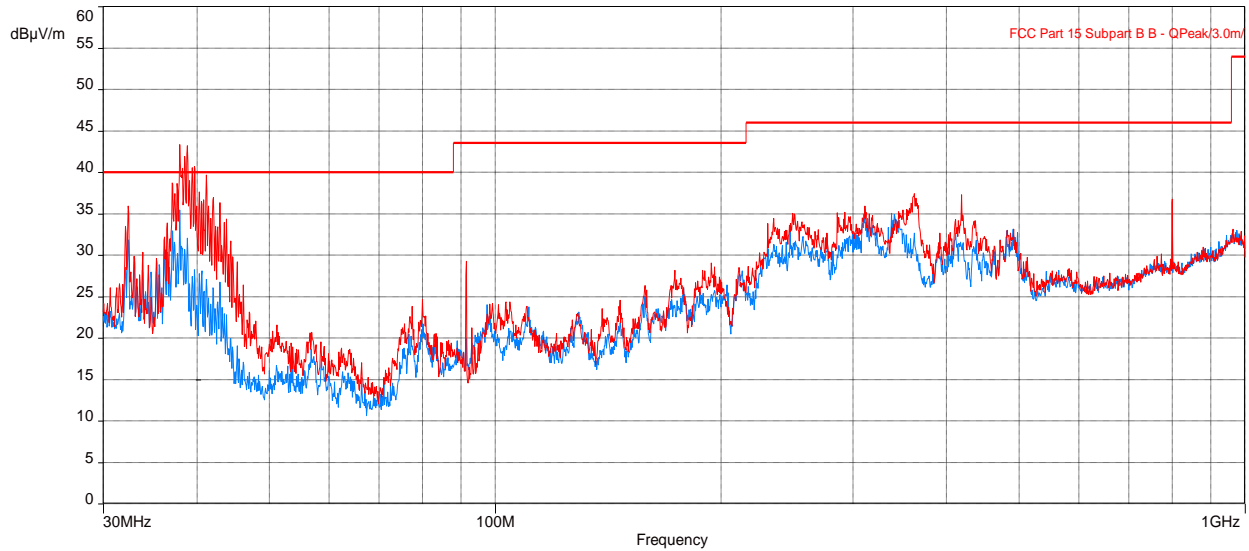


Table 30: RE test results from 30 to 1000 MHz for FCC Part 15 (WCDMA – Top channel)

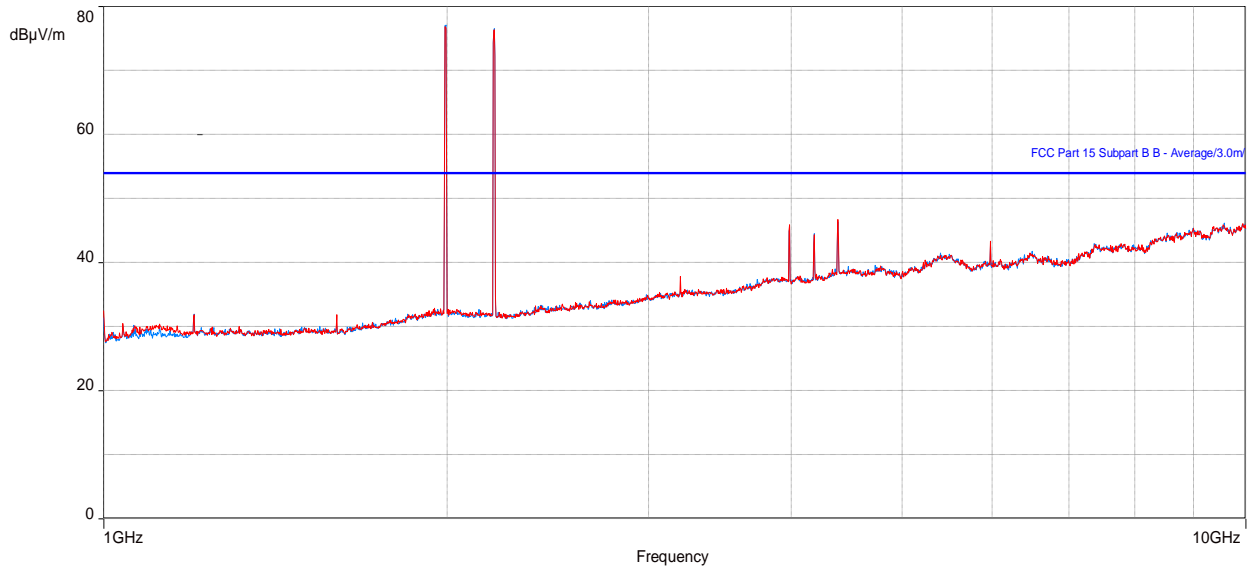
Frequency (MHz)	Level Quasi Peak (dBµV/m)	Limit Quasi-peak (dBµV/m)	Margin to FCC part 15 Class B (dB)	Height (m)	Azimuth (deg)	Polarization	Correction (dB)
37.97851923	33.32	40.00	-6.68	2.71	5.00	Horizontal	-6.30
37.97771795	39.70	40.00	-0.30	1.00	11.75	Vertical	-6.30
38.5646859	33.65	40.00	-6.35	1.00	11.75	Vertical	-6.64
38.85504487	38.61	40.00	-1.39	1.00	62.25	Vertical	-6.81
39.73076923	35.29	40.00	-4.71	1.05	33.50	Vertical	-7.33

Table 31: RE test results from 30 to 1000 MHz for FCC Part 24/27 (WCDMA – Top channel)

Frequency (MHz)	Level (dBµV/m)	EIRP Limit (dBµV/m)	Margin to (dB)	Height (m)	Azimuth (deg)	Polarization	Correction (dB)
37.97851923	33.32	82.2	-48.88	2.71	5.00	Horizontal	-6.30
37.97771795	39.70	82.2	-42.5	1.00	11.75	Vertical	-6.30
38.5646859	33.65	82.2	-48.55	1.00	11.75	Vertical	-6.64
38.85504487	38.61	82.2	-43.59	1.00	62.25	Vertical	-6.81
39.73076923	35.29	82.2	-46.91	1.05	33.50	Vertical	-7.33

Note: In the table/Plot above, no emissions exceed the Part 24/Part 27 radiated spurious emissions limit when converted to dBuV/m. For final spurious emissions measurements to FCC Part 24/Part 27, see antenna port conducted emissions in applicable test report.

Figure 18: Plot of RE at 3m from 1 to 10GHz (WCDMA – Top channel)



Note: Peaks above the limit are leakage of the EUT’s fundamentals from the 50-ohm terminations.

Table 32: RE test results from 1 to 10 GHz for FCC Part 15 (WCDMA – Top channel)

Frequency (MHz)	Level Average (dBµV/m)	Limit Average (dBµV/m)	Margin to FCC part 15 Class B (dB)	Height (m)	Azimuth (degrees)	Polarization	Correction (dB)
3985.357692	44.65	53.96	-9.31	2.07	247.50	Vertical	2.54
4394.817949	44.04	53.96	-9.92	1.00	155.00	Vertical	3.18
9577.078846	42.52	53.96	-11.44	1.00	242.50	Horizontal	14.34

Table 33: RE test results from 1 to 10 GHz for Part 24/27 (WCDMA – Top channel)

Frequency (MHz)	Level (dBµV/m)	EIRP Limit (dBµV/m)	Margin to (dB)	Height (m)	Azimuth (degrees)	Polarization	Correction (dB)
3985.357692	44.65	82.2	-37.55	2.07	247.50	Vertical	2.54
4394.817949	44.04	82.2	-38.16	1.00	155.00	Vertical	3.18
9577.078846	42.52	82.2	-39.68	1.00	242.50	Horizontal	14.34

Note: In the table/Plot above, no emissions exceed the Part 24/Part 27 radiated spurious emissions limit when converted to dBuV/m, except for the fundamentals. For final spurious emissions measurements to FCC Part 24/Part 27, see antenna port conducted emissions in applicable test report.

Figure 19: Plot of RE at 3m from 10 to 18 GHz (WCDMA – Top channel)

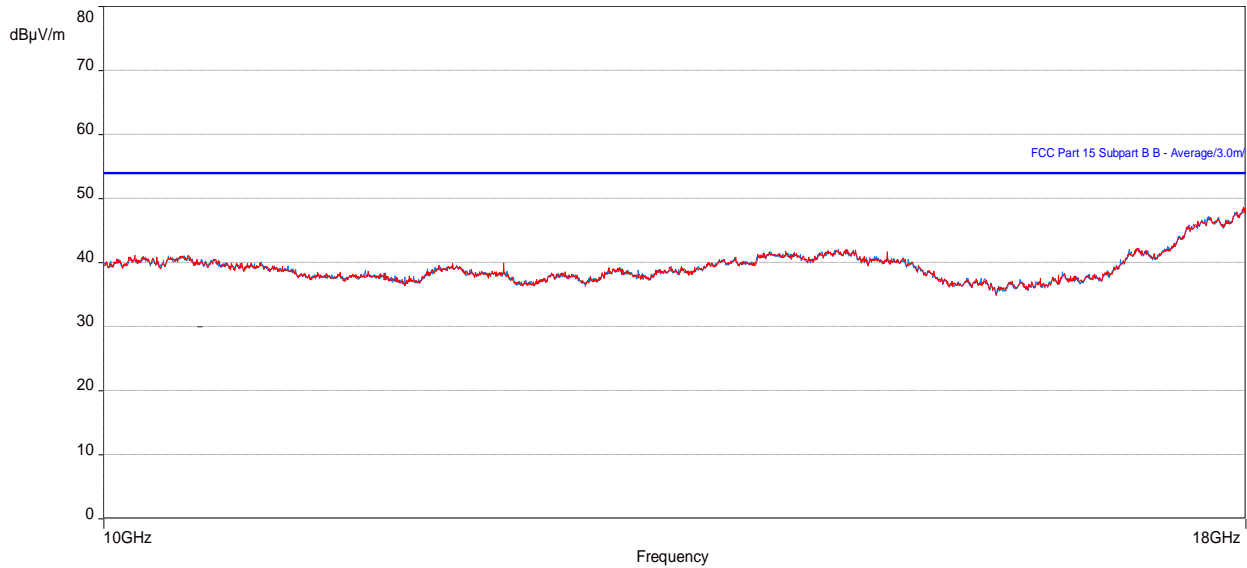


Table 34: RE test results from 10 to 18 GHz for FCC Part 15 (WCDMA – Top channel)

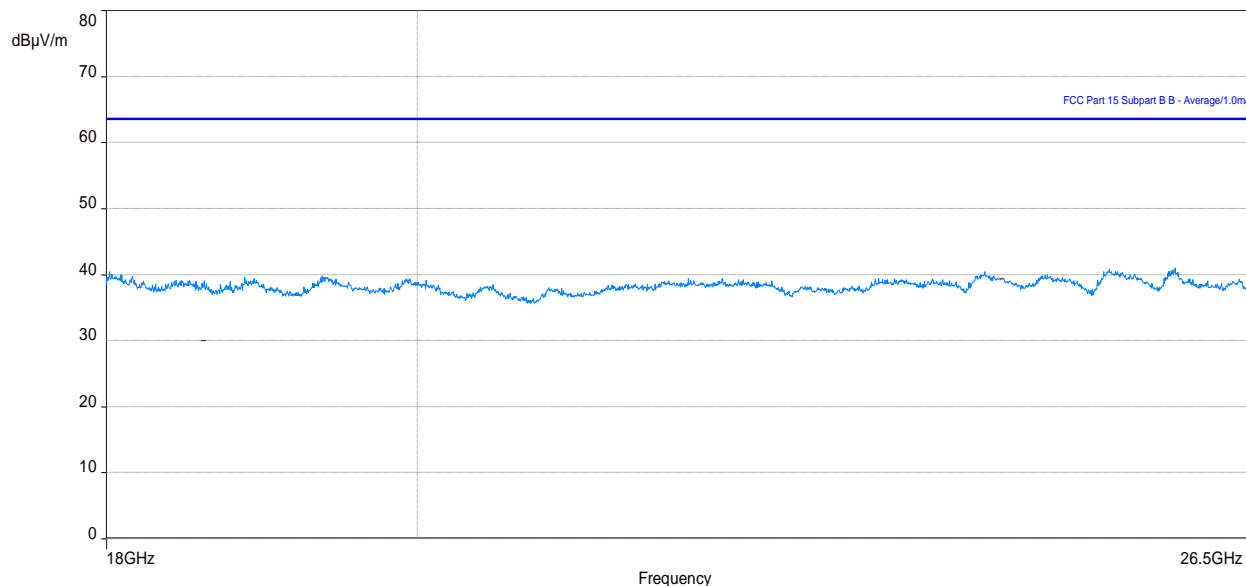
Frequency (MHz)	Level Average (dBµV/m)	Limit Average (dBµV/m)	Margin to FCC part 15 Class B (dB)	Height (m)	Azimuth (degrees)	Polarization	Correction (dB)
14575.80929	38.31	53.96	-15.65	1.00	321.50	Horizontal	11.09
14654.27883	38.19	53.96	-15.77	1.00	271.00	Vertical	10.75
17901.24969	44.92	53.96	-9.04	3.99	-2.00	Horizontal	19.15
17919.09967	44.96	53.96	-9.00	4.00	356.50	Vertical	19.49

Table 35: RE test results from 10 to 18 GHz for Part 24/27 (WCDMA – Top channel)

Frequency (MHz)	Level (dBµV/m)	EIRP Limit (dBµV/m)	Margin to (dB)	Height (m)	Azimuth (degrees)	Polarization	Correction (dB)
14575.80929	38.31	82.2	-43.89	1.00	321.50	Horizontal	11.09
14654.27883	38.19	82.2	-44.01	1.00	271.00	Vertical	10.75
17901.24969	44.92	82.2	-37.28	3.99	-2.00	Horizontal	19.15
17919.09967	44.96	82.2	-37.24	4.00	356.50	Vertical	19.49

Note: In the table/Plot above, no emissions exceed the Part 24/Part 27 radiated spurious emissions limit when converted to dBuV/m. For final spurious emissions measurements to FCC Part 24/Part 27, see antenna port conducted emissions in applicable test report.

Figure 20: Plot of RE at 1m from 18 to 26.5 GHz (WCDMA – Top channel)



Note 1: In the plot above No Emissions exceeds the FCC Part 15/ICES 003 limit.

Note 2: In the plot above, no emissions exceed the Part 24/27 radiated spurious emissions limit when converted to dBuV/m. For final spurious emissions measurements to FCC Part 24/27, see antenna port conducted emissions in applicable test report.



3.2.8 Test results of RE (Single RAT/Single carrier, LTE 5MHz - Middle channel)

Test location: 10-meter Ambient Free Chamber (AFC)

Date tested: 15 - 22 October 2020

Tested by: Krupal Patel

Test configurations are identified in the section [Configurations of the EUT](#).

For the following test results that have supporting data tables, negative margin values indicate a pass.

Figure 21: Plot of RE at 3 m – 30 to 1000 MHz (LTE 5M – Mid channel)

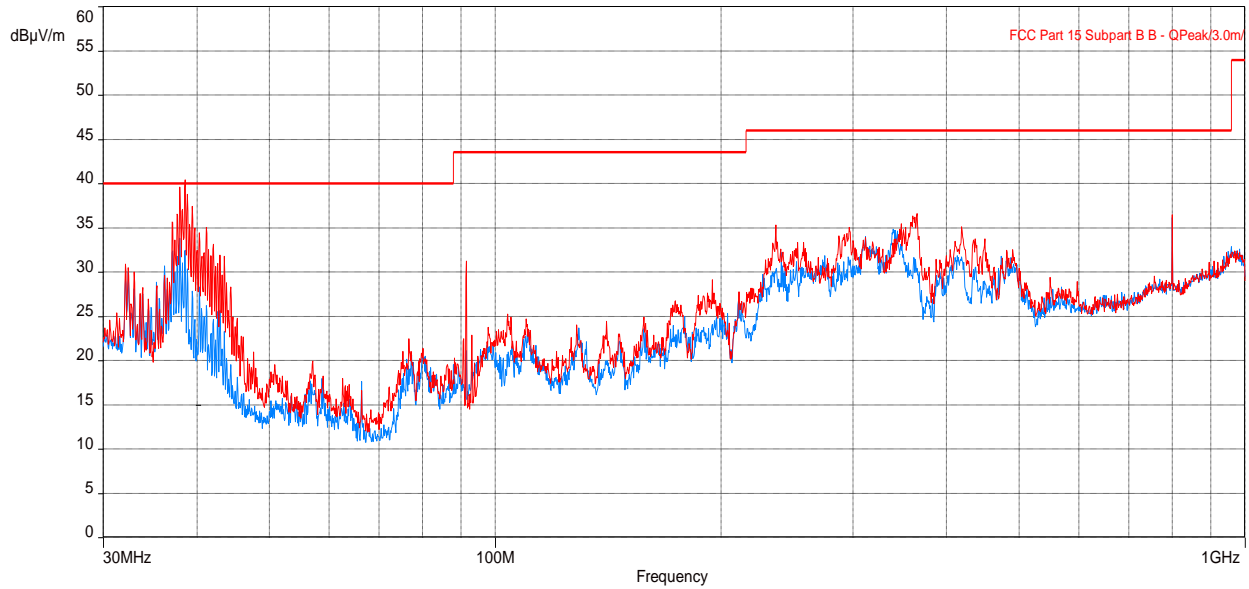


Table 36: RE test results from 30 to 1000 MHz for FCC Part 15 (LTE 5M – Mid channel)

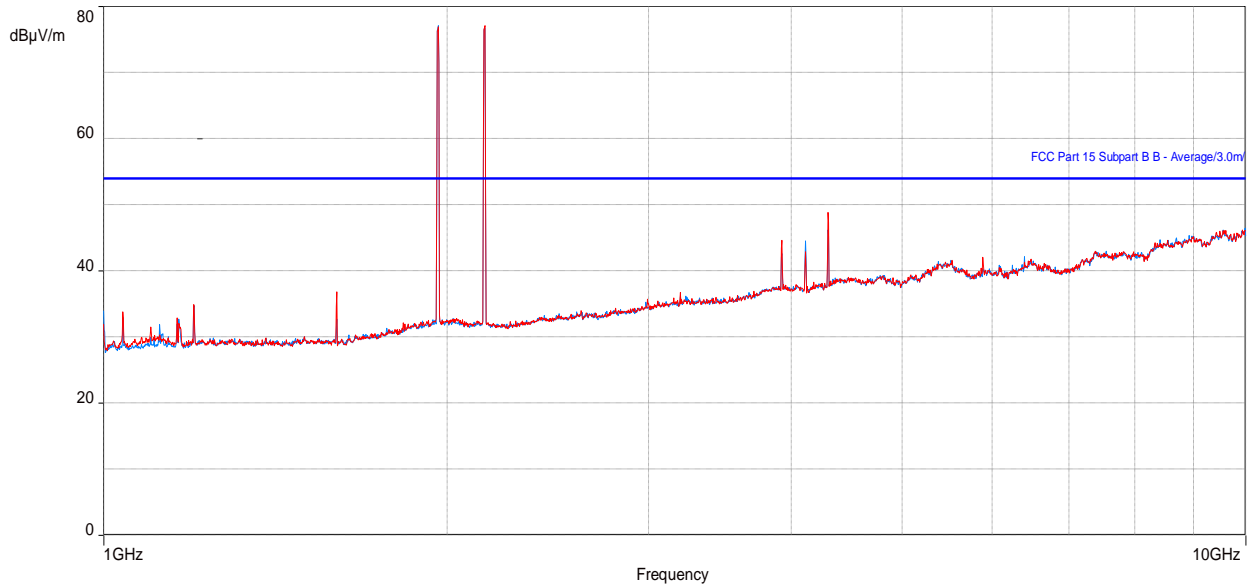
Frequency (MHz)	Level Quasi Peak (dBµV/m)	Limit Quasi-peak (dBµV/m)	Margin to FCC part 15 Class B (dB)	Height (m)	Azimuth (deg)	Polarization	Correction (dB)
37.98921762	36.91	40.00	-3.09	1.00	41.00	Vertical	-6.30
38.57522403	38.54	40.00	-1.46	1.00	62.25	Vertical	-6.64
38.86365992	35.96	40.00	-4.04	1.04	69.75	Vertical	-6.82
799.9946121	36.41	46.02	-9.61	2.96	326.50	Vertical	4.29

Table 37: RE test results from 30 to 1000 MHz for FCC Part 24/27 (LTE 5M – Mid channel)

Frequency (MHz)	Level (dBµV/m)	EIRP Limit (dBµV/m)	Margin to (dB)	Height (m)	Azimuth (deg)	Polarization	Correction (dB)
37.98921762	36.91	82.2	-45.29	1.00	41.00	Vertical	-6.30
38.57522403	38.54	82.2	-43.66	1.00	62.25	Vertical	-6.64
38.86365992	35.96	82.2	-46.24	1.04	69.75	Vertical	-6.82
799.9946121	36.41	82.2	-45.79	2.96	326.50	Vertical	4.29

Note: In the table/Plot above, no emissions exceed the Part 24/Part 27 radiated spurious emissions limit when converted to dBuV/m. For final spurious emissions measurements to FCC Part 24/Part 27, see antenna port conducted emissions in applicable test report.

Figure 22: Plot of RE at 3m from 1 to 10GHz (LTE 5M – Mid channel)



Note: Peaks above the limit are leakage of the EUT’s fundamentals from the 50-ohm terminations.

Table 38: RE test results from 1 to 10 GHz for FCC Part 15 (LTE 5M – Mid channel)

Frequency (MHz)	Level Average (dBµV/m)	Limit Average (dBµV/m)	Margin to FCC part 15 Class B (dB)	Height (m)	Azimuth (degrees)	Polarization	Correction (dB)
3925.258333	43.12	53.96	-10.84	1.80	261.50	Vertical	2.46
4309.923718	45.30	53.96	-8.66	1.80	147.75	Vertical	2.75
9561.910256	42.88	53.96	-11.08	2.21	-0.25	Vertical	14.08

Table 39: RE test results from 1 to 10 GHz for Part 24/27 (LTE 5M – Mid channel)

Frequency (MHz)	Level (dBµV/m)	EIRP Limit (dBµV/m)	Margin to (dB)	Height (m)	Azimuth (degrees)	Polarization	Correction (dB)
3925.258333	43.12	82.2	-39.08	1.80	261.50	Vertical	2.46
4309.923718	45.30	82.2	-36.9	1.80	147.75	Vertical	2.75
9561.910256	42.88	82.2	-39.32	2.21	-0.25	Vertical	14.08

Note: In the table/Plot above, no emissions exceed the Part 24/Part 27 radiated spurious emissions limit when converted to dBuV/m, except for the fundamentals. For final spurious emissions measurements to FCC Part 24/Part 27, see antenna port conducted emissions in applicable test report.

Figure 23: Plot of RE at 3m from 10 to 18 GHz (LTE 5M – Mid channel)

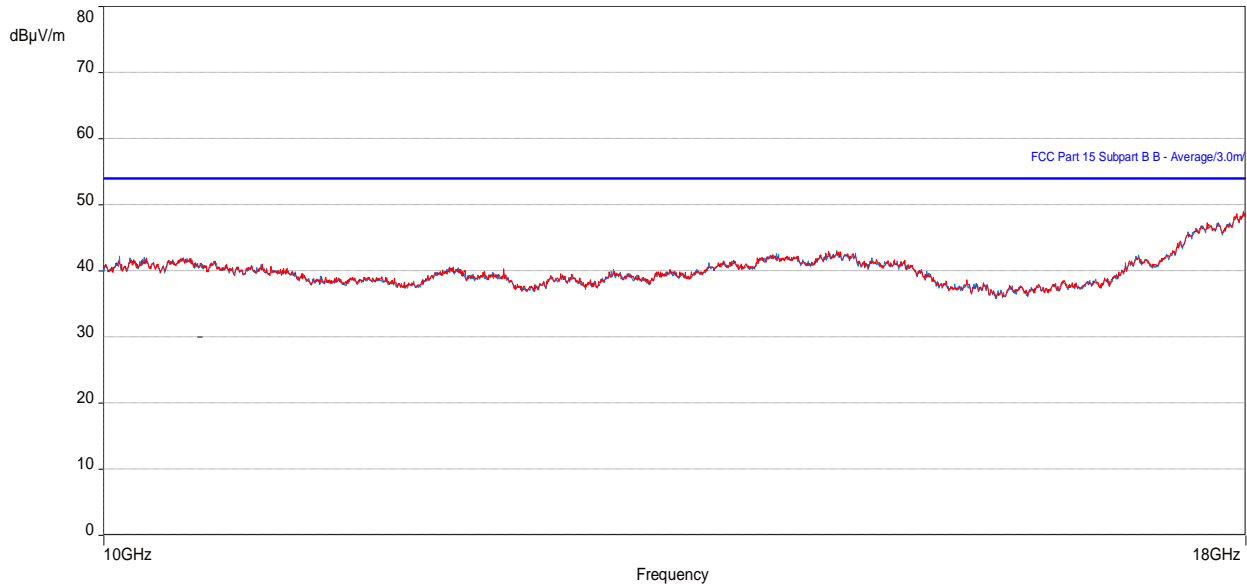


Table 40: RE test results from 10 to 18 GHz for FCC Part 15 (LTE 5M – Mid channel)

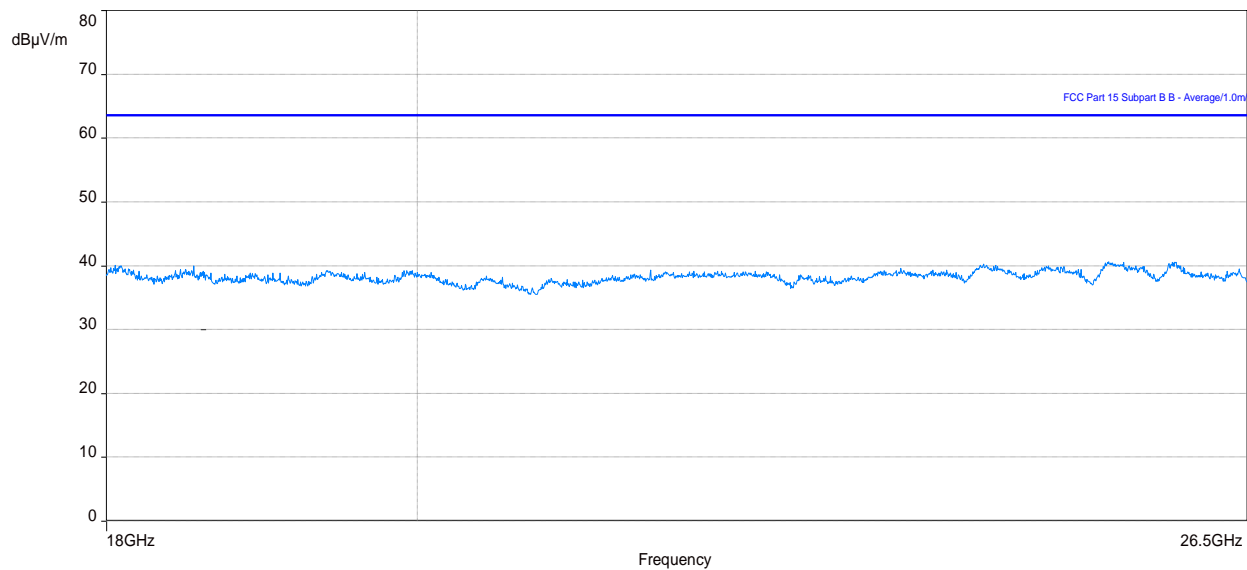
Frequency (MHz)	Level Average (dBµV/m)	Limit Average (dBµV/m)	Margin to FCC part 15 Class B (dB)	Height (m)	Azimuth (degrees)	Polarization	Correction (dB)
14521.96636	38.80	53.96	-15.16	4.00	360.00	Vertical	11.09
14586.22692	39.28	53.96	-14.68	3.93	-0.25	Horizontal	11.09
17907.86378	45.37	53.96	-8.59	4.00	362.00	Horizontal	19.27
17916.9875	45.62	53.96	-8.34	4.00	17.75	Vertical	19.44

Table 41: RE test results from 10 to 18 GHz for Part 24/27 (LTE 5M – Mid channel)

Frequency (MHz)	Level (dBµV/m)	EIRP Limit (dBµV/m)	Margin to (dB)	Height (m)	Azimuth (degrees)	Polarization	Correction (dB)
14521.96636	38.80	82.2	-43.4	4.00	360.00	Vertical	11.09
14586.22692	39.28	82.2	-42.92	3.93	-0.25	Horizontal	11.09
17907.86378	45.37	82.2	-36.83	4.00	362.00	Horizontal	19.27
17916.9875	45.62	82.2	-36.58	4.00	17.75	Vertical	19.44

Note: In the table/Plot above, no emissions exceed the Part 24/Part 27 radiated spurious emissions limit when converted to dBuV/m. For final spurious emissions measurements to FCC Part 24/Part 27, see antenna port conducted emissions in applicable test report.

Figure 24: Plot of RE at 1m from 18 to 26.5 GHz (LTE 5M – Mid channel)



Note 1: In the plot above No Emissions exceeds the FCC Part 15/ICES 003 limit.

Note 2: In the plot above, no emissions exceed the Part 24/27 radiated spurious emissions limit when converted to dBuV/m. For final spurious emissions measurements to FCC Part 24/27, see antenna port conducted emissions in applicable test report.



3.2.9 Test results of RE (Single RAT/Single carrier, NR 5 MHz - Middle channel)

Test location: 10-meter Ambient Free Chamber (AFC)

Date tested: 15 - 22 October 2020

Tested by: Krupal Patel

Test configurations are identified in the section [Configurations of the EUT](#).

For the following test results that have supporting data tables, negative margin values indicate a pass.

Figure 25: Plot of RE at 3 m – 30 to 1000 MHz (NR 5MHz – Mid channel)

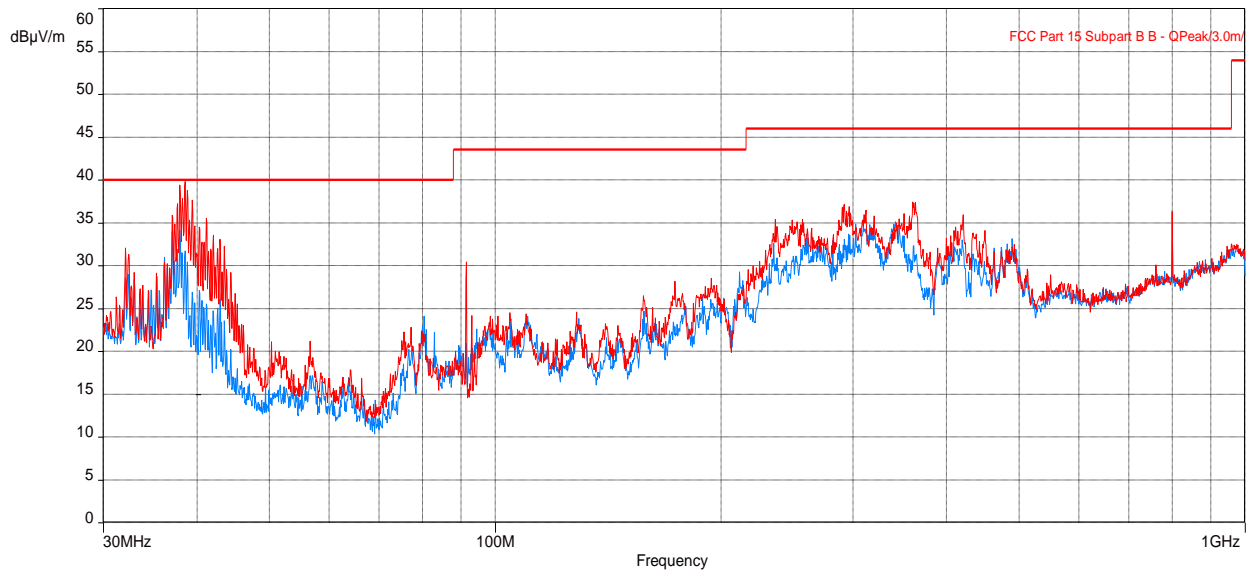


Table 42: RE test results from 30 to 1000 MHz for FCC Part 15 (NR 5MHz – Mid channel)

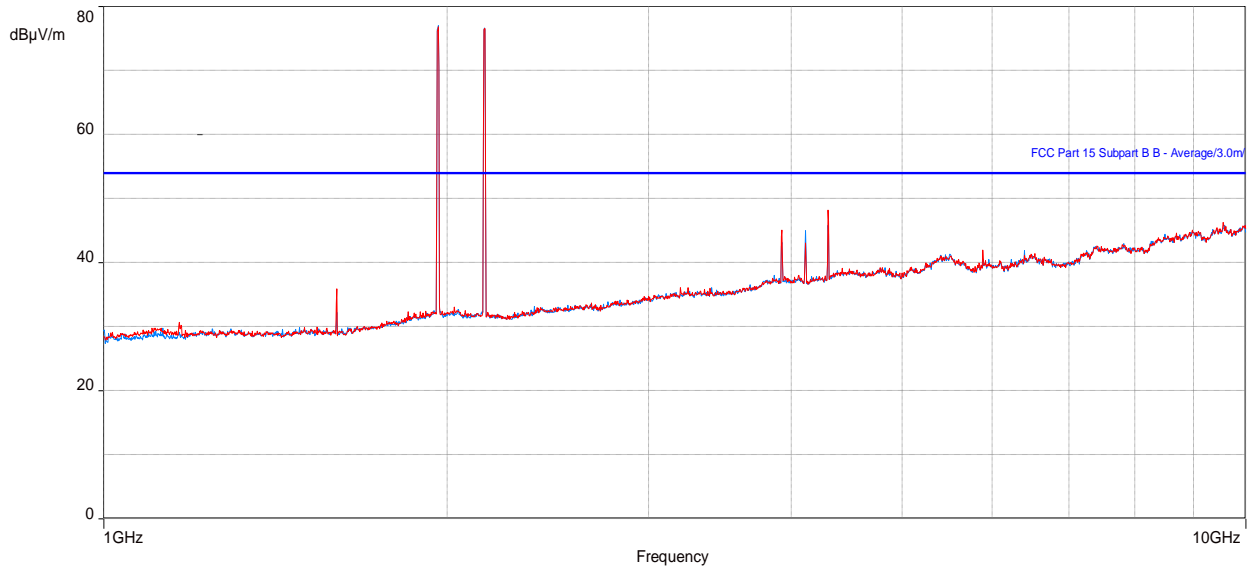
Frequency (MHz)	Level Quasi Peak (dBµV/m)	Limit Quasi-peak (dBµV/m)	Margin to FCC part 15 Class B (dB)	Height (m)	Azimuth (deg)	Polarization	Correction (dB)
37.9888971	37.25	40.00	-2.75	1.00	183.75	Vertical	-6.30
38.56865351	34.79	40.00	-5.21	1.11	61.50	Vertical	-6.64
39.45223044	31.29	40.00	-8.71	1.00	104.75	Vertical	-7.16
799.9946538	36.35	46.02	-9.67	2.92	333.50	Vertical	4.29

Table 43: RE test results from 30 to 1000 MHz for FCC Part 24/27 (NR 5MHz – Mid channel)

Frequency (MHz)	Level (dBµV/m)	EIRP Limit (dBµV/m)	Margin to (dB)	Height (m)	Azimuth (deg)	Polarization	Correction (dB)
37.9888971	37.25	82.2	-44.95	1.00	183.75	Vertical	-6.30
38.56865351	34.79	82.2	-47.41	1.11	61.50	Vertical	-6.64
39.45223044	31.29	82.2	-50.91	1.00	104.75	Vertical	-7.16
799.9946538	36.35	82.2	-45.85	2.92	333.50	Vertical	4.29

Note: In the table/Plot above, no emissions exceed the Part 24/Part 27 radiated spurious emissions limit when converted to dBuV/m. For final spurious emissions measurements to FCC Part 24/Part 27, see antenna port conducted emissions in applicable test report.

Figure 26: Plot of RE at 3m from 1 to 10GHz (NR 5MHz – Mid channel)



Note: Peaks above the limit are leakage of the EUT’s fundamentals from the 50-ohm terminations.

Table 44: RE test results from 1 to 10 GHz for FCC Part 15 (NR 5MHz – Mid channel)

Frequency (MHz)	Level Average (dBµV/m)	Limit Average (dBµV/m)	Margin to FCC part 15 Class B (dB)	Height (m)	Azimuth (degrees)	Polarization	Correction (dB)
4117.476282	42.77	53.96	-11.19	1.94	5.00	Horizontal	2.36
4309.054808	45.50	53.96	-8.46	1.11	155.00	Vertical	2.74
9576.199359	42.68	53.96	-11.28	4.00	17.00	Horizontal	14.32

Table 45: RE test results from 1 to 10 GHz for Part 24/27 (NR 5MHz – Mid channel)

Frequency (MHz)	Level (dBµV/m)	EIRP Limit (dBµV/m)	Margin to (dB)	Height (m)	Azimuth (degrees)	Polarization	Correction (dB)
4117.476282	42.77	82.2	-39.43	1.94	5.00	Horizontal	2.36
4309.054808	45.50	82.2	-36.70	1.11	155.00	Vertical	2.74
9576.199359	42.68	82.2	-39.52	4.00	17.00	Horizontal	14.32

Note: In the table/Plot above, no emissions exceed the Part 24/Part 27 radiated spurious emissions limit when converted to dBuV/m, except for the fundamentals. For final spurious emissions measurements to FCC Part 24/Part 27, see antenna port conducted emissions in applicable test report.



Figure 27: Plot of RE at 3m from 10 to 18 GHz (NR 5MHz – Mid channel)

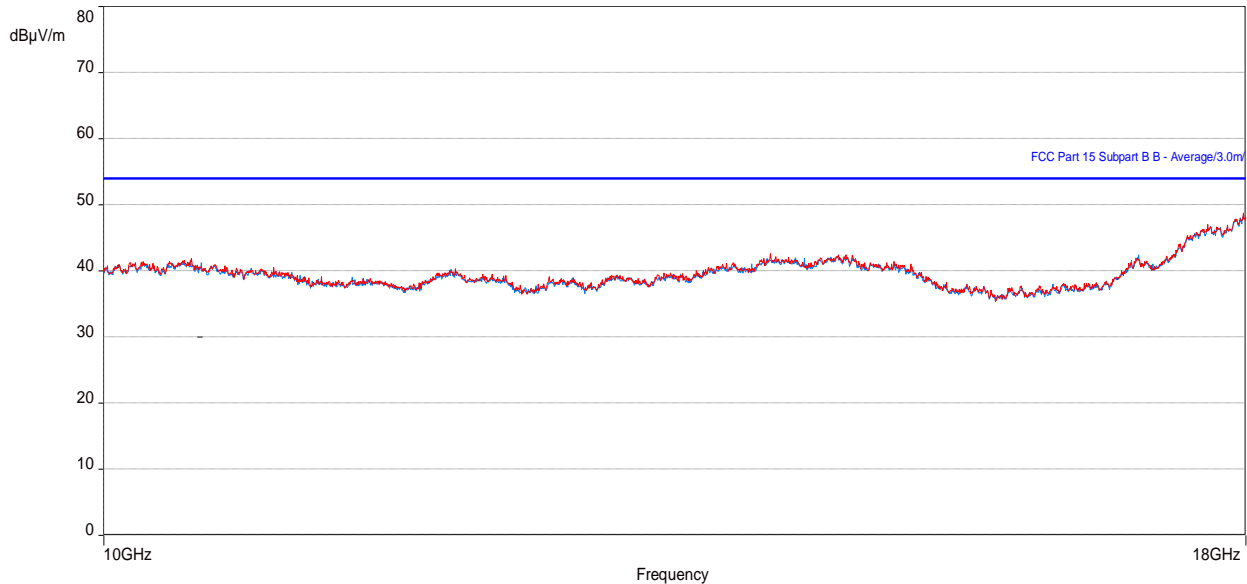


Table 46: RE test results from 10 to 18 GHz for FCC Part 15 (NR 5MHz – Mid channel)

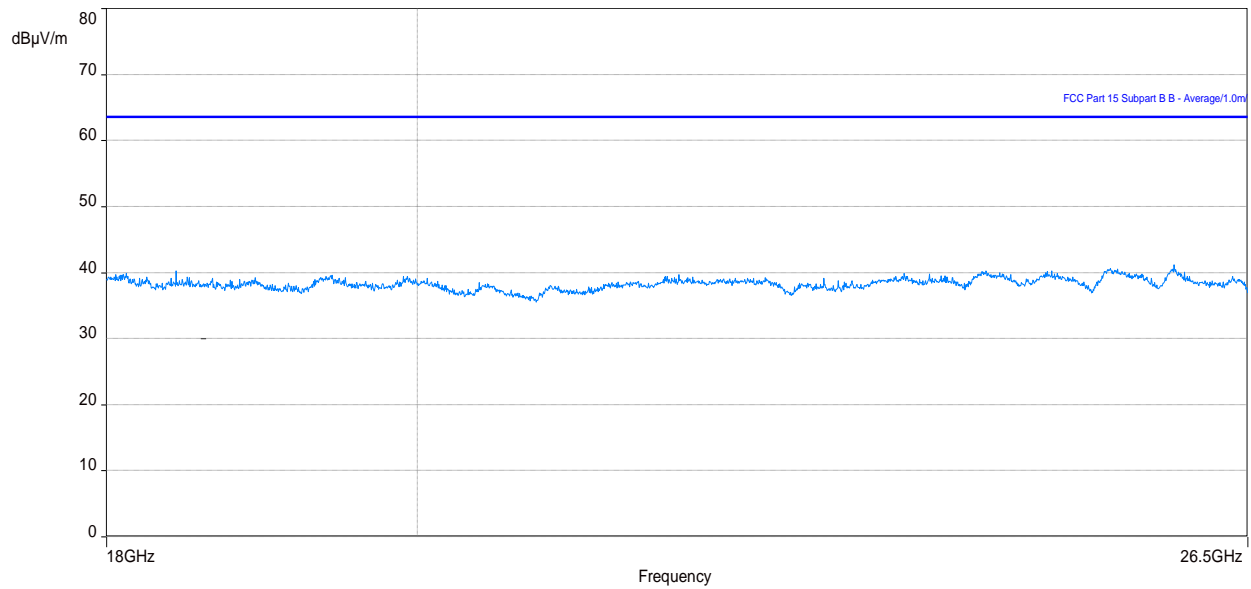
Frequency (MHz)	Level Average (dBµV/m)	Limit Average (dBµV/m)	Margin to FCC part 15 Class B (dB)	Height (m)	Azimuth (degrees)	Polarization	Correction (dB)
14591.05417	38.94	53.96	-15.02	3.89	335.75	Horizontal	11.09
14653.02373	39.04	53.96	-14.92	3.96	350.50	Vertical	10.76
17898.61572	44.95	53.96	-9.01	4.00	31.25	Horizontal	19.08
17919.71056	45.35	53.96	-8.61	4.00	38.25	Vertical	19.50

Table 47: RE test results from 10 to 18 GHz for Part 24/27 (NR 5MHz – Mid channel)

Frequency (MHz)	Level (dBµV/m)	EIRP Limit (dBµV/m)	Margin to (dB)	Height (m)	Azimuth (degrees)	Polarization	Correction (dB)
14591.05417	38.94	82.2	-43.26	3.89	335.75	Horizontal	11.09
14653.02373	39.04	82.2	-43.16	3.96	350.50	Vertical	10.76
17898.61572	44.95	82.2	-37.25	4.00	31.25	Horizontal	19.08
17919.71056	45.35	82.2	-36.85	4.00	38.25	Vertical	19.50

Note: In the table/Plot above, no emissions exceed the Part 24/Part 27 radiated spurious emissions limit when converted to dBuV/m. For final spurious emissions measurements to FCC Part 24/Part 27, see antenna port conducted emissions in applicable test report.

Figure 28: Plot of RE at 1m from 18 to 26.5 GHz (NR 5MHz – Mid channel)



Note 1: In the plot above No Emissions exceeds the FCC Part 15/ICES 003 limit.

Note 2: In the plot above, no emissions exceed the Part 24/27 radiated spurious emissions limit when converted to dBuV/m. For final spurious emissions measurements to FCC Part 24/27, see antenna port conducted emissions in applicable test report.



3.2.10 Test results of RE (Single RAT/Multi carrier, WCDMA - Middle channel)

Test location: 10-meter Ambient Free Chamber (AFC)

Date tested: 15 - 22 October 2020

Tested by: Krupal Patel

Test configurations are identified in the section [Configurations of the EUT](#).

For the following test results that have supporting data tables, negative margin values indicate a pass.

Figure 29: Plot of RE at 3 m – 30 to 1000 MHz (MC1, WCDMA - Mid channel)

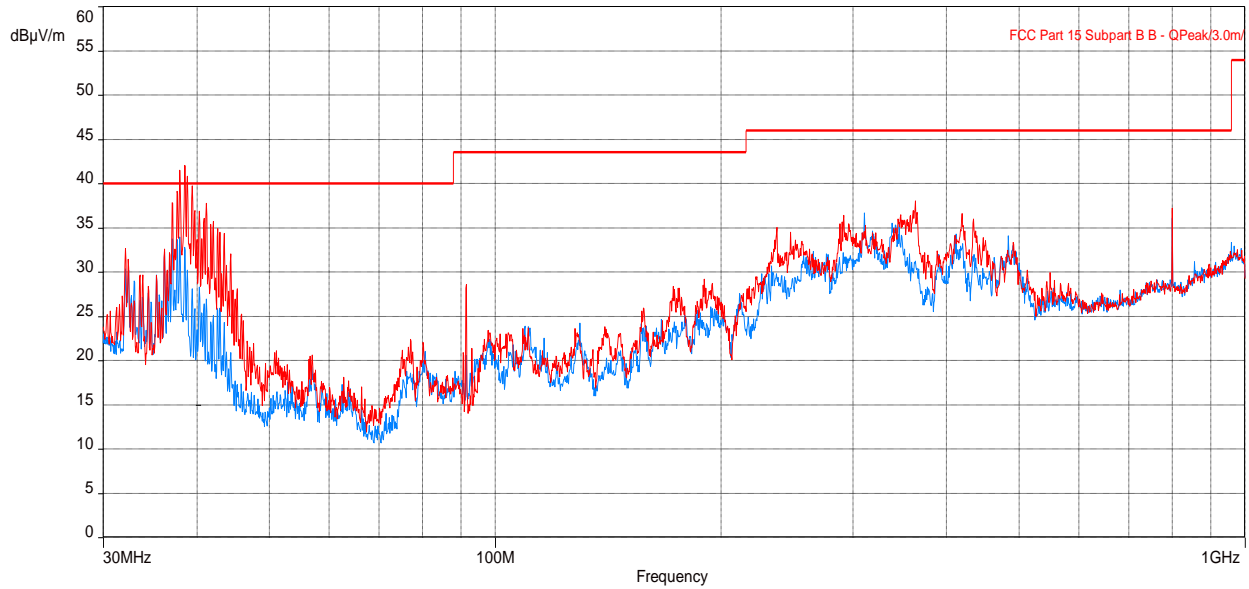


Table 48: RE test results from 30 to 1000 MHz for FCC Part 15 (MC1, WCDMA - Mid channel)

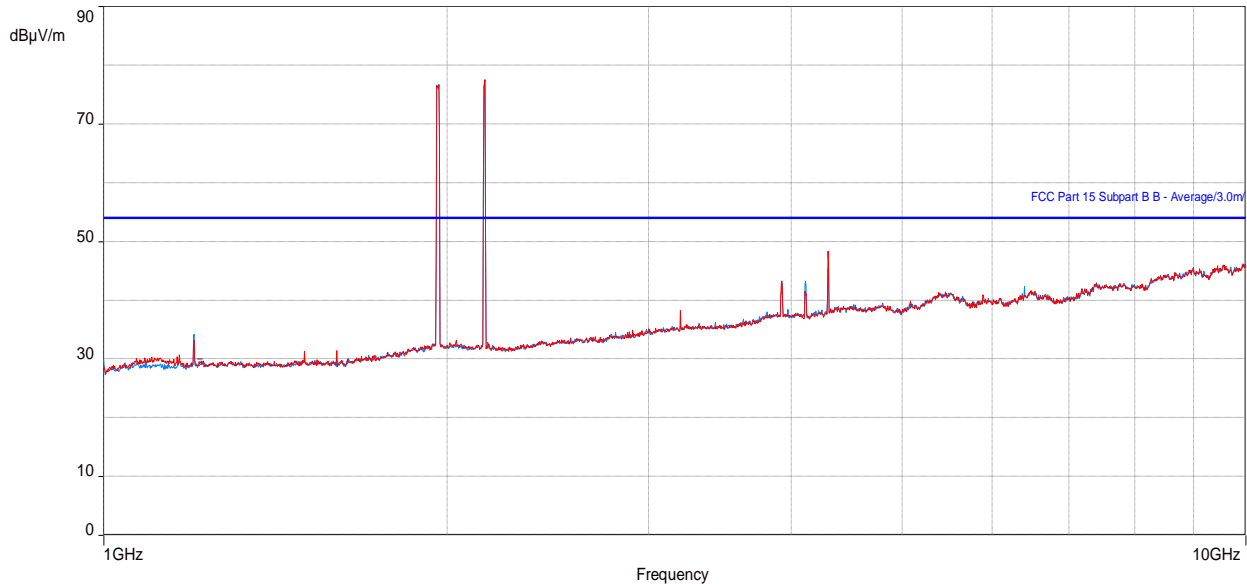
Frequency (MHz)	Level Quasi Peak (dBµV/m)	Limit Quasi-peak (dBµV/m)	Margin to FCC part 15 Class B (dB)	Height (m)	Azimuth (deg)	Polarization	Correction (dB)
37.98316667	32.53	40.00	-7.47	1.00	69.25	Vertical	-6.30
38.56436538	34.21	40.00	-5.79	1.04	25.25	Vertical	-6.64
39.43560256	32.64	40.00	-7.36	1.04	4.00	Vertical	-7.15
799.9946121	36.42	46.02	-9.60	2.92	333.50	Vertical	4.29

Table 49: RE test results from 30 to 1000 MHz for FCC Part 24/27 (MC1, WCDMA - Mid channel)

Frequency (MHz)	Level (dBµV/m)	EIRP Limit (dBµV/m)	Margin to (dB)	Height (m)	Azimuth (deg)	Polarization	Correction (dB)
37.98316667	32.53	82.2	-49.67	1.00	69.25	Vertical	-6.30
38.56436538	34.21	82.2	-47.99	1.04	25.25	Vertical	-6.64
39.43560256	32.64	82.2	-49.56	1.04	4.00	Vertical	-7.15
799.9946121	36.42	82.2	-45.78	2.92	333.50	Vertical	4.29

Note: In the table/Plot above, no emissions exceed the Part 24/Part 27 radiated spurious emissions limit when converted to dBuV/m. For final spurious emissions measurements to FCC Part 24/Part 27, see antenna port conducted emissions in applicable test report.

Figure 30: Plot of RE at 3m from 1 to 10GHz (MC1, WCDMA - Mid channel)



Note: Peaks above the limit are leakage of the EUT's fundamentals from the 50-ohm terminations.

Table 50: RE test results from 1 to 10 GHz for FCC Part 15 (MC1, WCDMA - Mid channel)

Frequency (MHz)	Level Average (dBµV/m)	Limit Average (dBµV/m)	Margin to FCC part 15 Class B (dB)	Height (m)	Azimuth (degrees)	Polarization	Correction (dB)
4116.648718	42.43	53.96	-11.53	1.39	47.75	Horizontal	2.36
4309.684936	46.39	53.96	-7.57	1.11	155.00	Vertical	2.75
9559.930449	43.01	53.96	-10.95	3.82	334.75	Vertical	14.04

Table 51: RE test results from 1 to 10 GHz for Part 24/27 (MC1, WCDMA - Mid channel)

Frequency (MHz)	Level (dBµV/m)	EIRP Limit (dBµV/m)	Margin to (dB)	Height (m)	Azimuth (degrees)	Polarization	Correction (dB)
4116.648718	42.43	82.2	-39.77	1.39	47.75	Horizontal	2.36
4309.684936	46.39	82.2	-35.81	1.11	155.00	Vertical	2.75
9559.930449	43.01	82.2	-39.19	3.82	334.75	Vertical	14.04

Note: In the table/Plot above, no emissions exceed the Part 24/Part 27 radiated spurious emissions limit when converted to dBuV/m, except for the fundamentals. For final spurious emissions measurements to FCC Part 24/Part 27, see antenna port conducted emissions in applicable test report.



Figure 31: Plot of RE at 3m from 10 to 18 GHz (MC1, WCDMA - Mid channel)

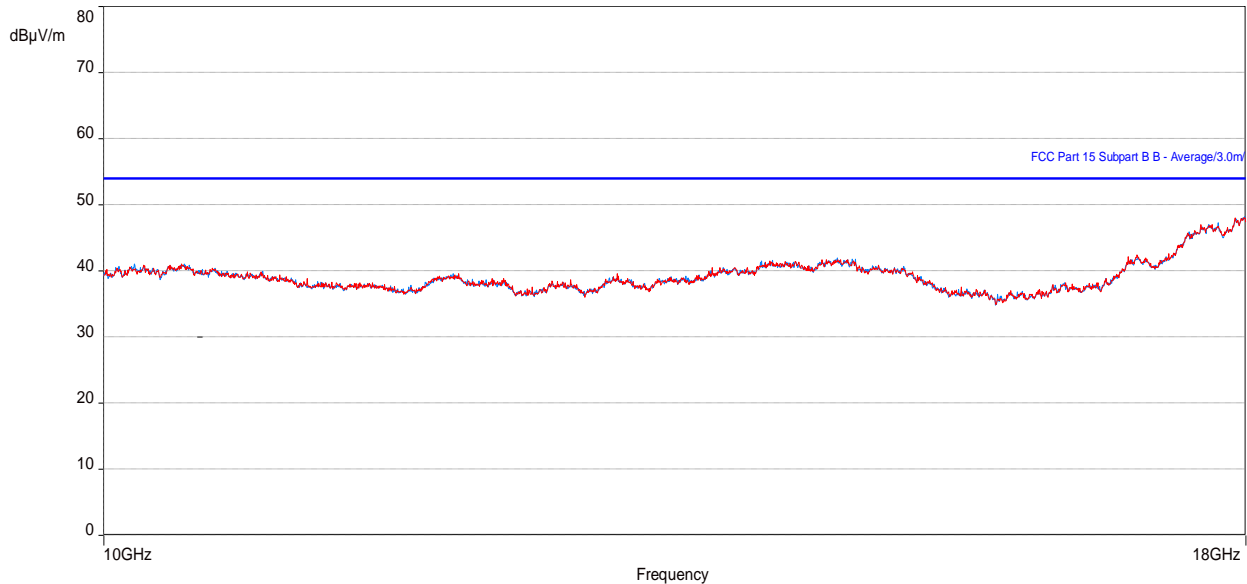


Table 52: RE test results from 10 to 18 GHz for FCC Part 15 (MC1, WCDMA - Mid channel)

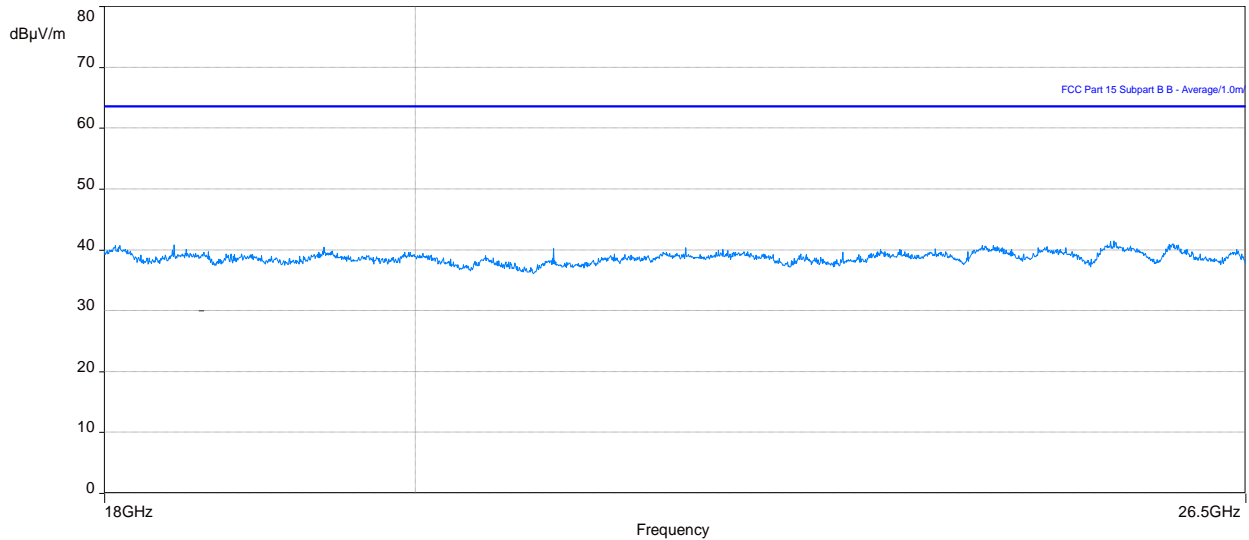
Frequency (MHz)	Level Average (dBµV/m)	Limit Average (dBµV/m)	Margin to FCC part 15 Class B (dB)	Height (m)	Azimuth (degrees)	Polarization	Correction (dB)
14474.5436	37.80	53.96	-16.16	3.86	31.25	Vertical	10.77
14588.00641	38.36	53.96	-15.60	1.00	16.75	Horizontal	11.09
17905.43814	44.66	53.96	-9.30	1.00	31.25	Vertical	19.22
17911.53431	45.09	53.96	-8.87	4.00	350.00	Horizontal	19.34

Table 53: RE test results from 10 to 18 GHz for Part 24/27 (MC1, WCDMA - Mid channel)

Frequency (MHz)	Level (dBµV/m)	EIRP Limit (dBµV/m)	Margin to (dB)	Height (m)	Azimuth (degrees)	Polarization	Correction (dB)
14474.5436	37.80	82.2	-44.40	3.86	31.25	Vertical	10.77
14588.00641	38.36	82.2	-43.84	1.00	16.75	Horizontal	11.09
17905.43814	44.66	82.2	-37.54	1.00	31.25	Vertical	19.22
17911.53431	45.09	82.2	-37.11	4.00	350.00	Horizontal	19.34

Note: In the table/Plot above, no emissions exceed the Part 24/Part 27 radiated spurious emissions limit when converted to dBuV/m. For final spurious emissions measurements to FCC Part 24/Part 27, see antenna port conducted emissions in applicable test report.

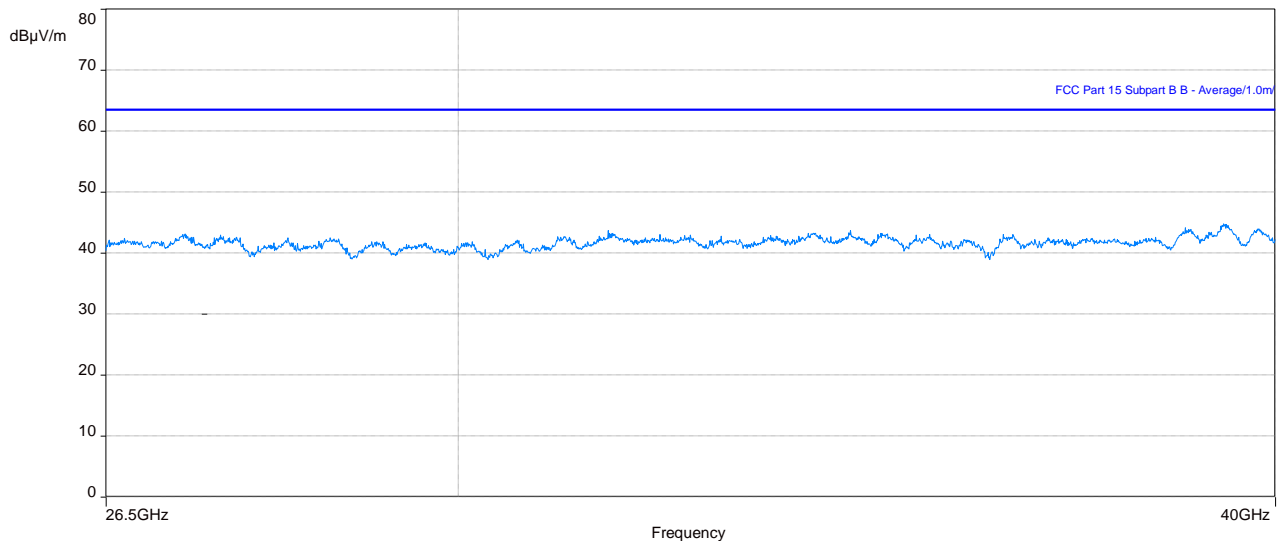
Figure 32: Plot of RE at 1m from 18 to 26.5 GHz (MC1, WCDMA - Mid channel)



Note 1: In the plot above No Emissions exceeds the FCC Part 15/ICES 003 limit.

Note 2: In the plot above, no emissions exceed the Part 24/27 radiated spurious emissions limit when converted to dBuV/m. For final spurious emissions measurements to FCC Part 24/27, see antenna port conducted emissions in applicable test report.

Figure 33: Plot of RE at 1m from 26.5 to 40 GHz (MC1, WCDMA - Mid channel)



Note 1: In the plot above No Emissions exceeds the FCC Part 15/ICES 003 limit.

Note 2: In the plot above, no emissions exceed the Part 24/27 radiated spurious emissions limit when converted to dBuV/m. For final spurious emissions measurements to FCC Part 24/27, see antenna port conducted emissions in applicable test report.



3.2.11 Test results of RE (Multi RAT/Carrier, MR1, LTE+WCDMA & LTE+NR - Mid channel)

Test location: 10-meter Ambient Free Chamber (AFC)

Date tested: 15 - 22 October 2020

Tested by: Krupal Patel

Test configurations are identified in the section [Configurations of the EUT](#).

For the following test results that have supporting data tables, negative margin values indicate a pass.

Figure 34: Plot of RE at 3 m – 30 to 1000 MHz (MR1 - Mid channel)

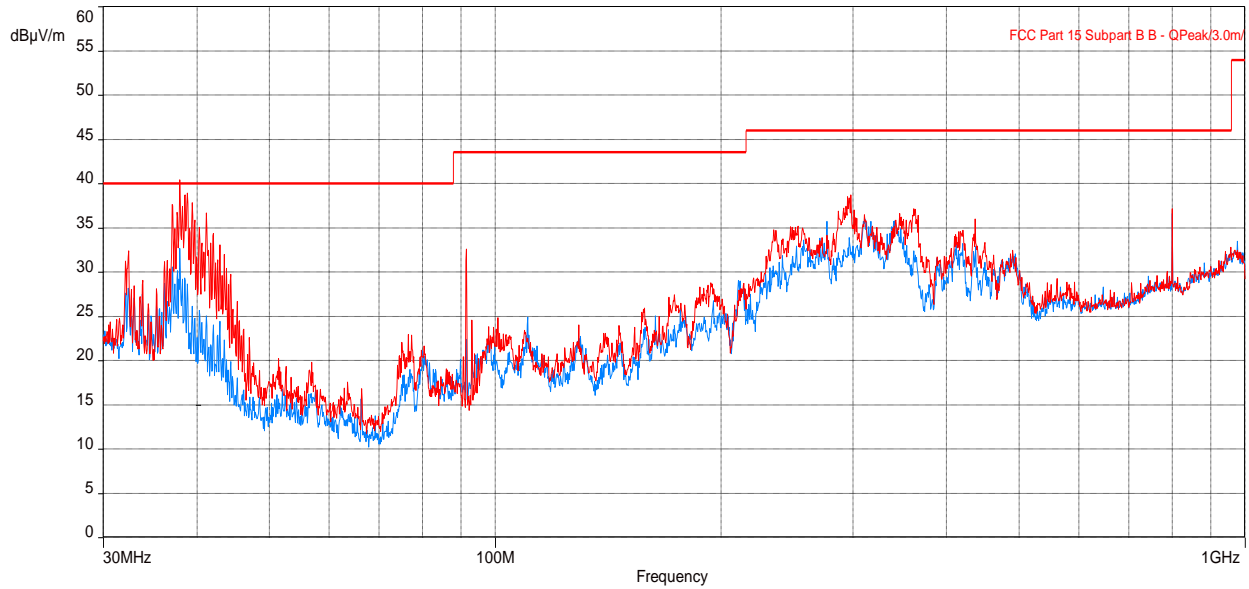


Table 54: RE test results from 30 to 1000 MHz for FCC Part 15 (MR1 - Mid channel)

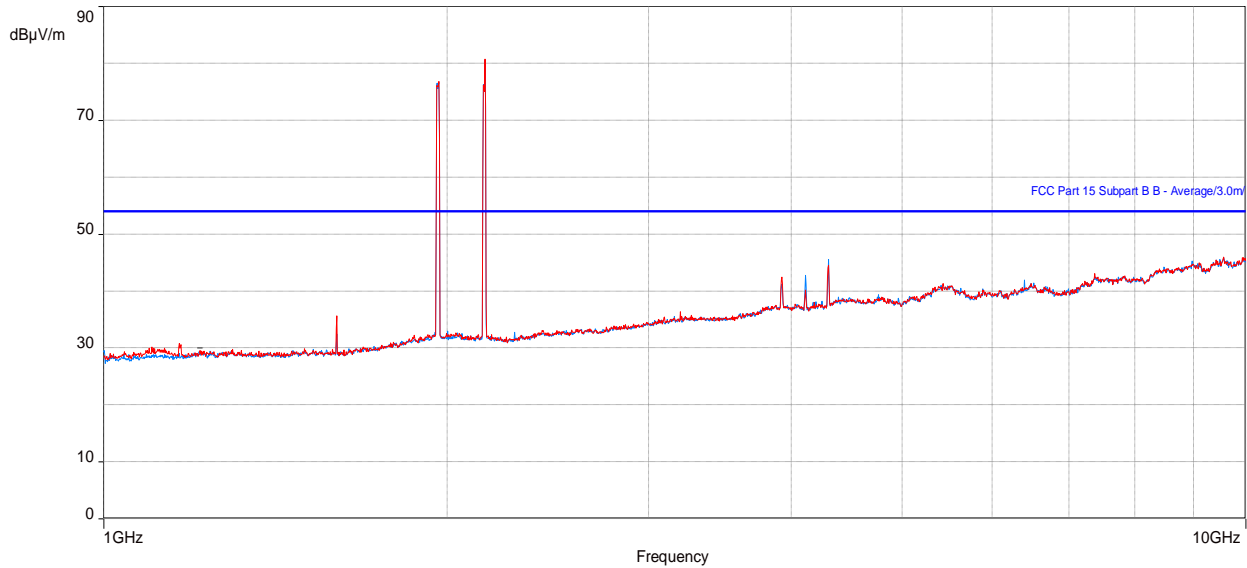
Frequency (MHz)	Level Quasi Peak (dBµV/m)	Limit Quasi-peak (dBµV/m)	Margin to FCC part 15 Class B (dB)	Height (m)	Azimuth (deg)	Polarization	Correction (dB)
37.98072403	36.46	40.00	-3.54	1.00	70.25	Vertical	-6.30
38.56288428	36.49	40.00	-3.51	1.00	62.75	Vertical	-6.64
296.7362597	33.91	46.02	-12.11	2.88	0.00	Vertical	-5.52
799.9944936	36.60	46.02	-9.42	2.87	247.00	Horizontal	4.29

Table 55: RE test results from 30 to 1000 MHz for FCC Part 24/27 (MR1 - Mid channel)

Frequency (MHz)	Level (dBµV/m)	EIRP Limit (dBµV/m)	Margin to (dB)	Height (m)	Azimuth (deg)	Polarization	Correction (dB)
37.98072403	36.46	82.2	-45.74	1.00	70.25	Vertical	-6.30
38.56288428	36.49	82.2	-45.71	1.00	62.75	Vertical	-6.64
296.7362597	33.91	82.2	-48.29	2.88	0.00	Vertical	-5.52
799.9944936	36.60	82.2	-45.60	2.87	247.00	Horizontal	4.29

Note: In the table/Plot above, no emissions exceed the Part 24/Part 27 radiated spurious emissions limit when converted to dBuV/m. For final spurious emissions measurements to FCC Part 24/Part 27, see antenna port conducted emissions in applicable test report.

Figure 35: Plot of RE at 3m from 1 to 10GHz (MR1 - Mid channel)



Note: Peaks above the limit are leakage of the EUT’s fundamentals from the 50-ohm terminations.

Table 56: RE test results from 1 to 10 GHz for FCC Part 15 (MR1 - Mid channel)

Frequency (MHz)	Level Average (dBµV/m)	Limit Average (dBµV/m)	Margin to FCC part 15 Class B (dB)	Height (m)	Azimuth (degrees)	Polarization	Correction (dB)
4116.653205	41.10	53.96	-12.86	1.87	41.00	Horizontal	2.36
4314.969551	44.39	53.96	-9.57	1.18	156.25	Vertical	2.76
9565.251603	42.57	53.96	-11.39	1.52	-2.00	Vertical	14.13

Table 57: RE test results from 1 to 10 GHz for Part 24/27 (MR1 - Mid channel)

Frequency (MHz)	Level (dBµV/m)	EIRP Limit (dBµV/m)	Margin to (dB)	Height (m)	Azimuth (degrees)	Polarization	Correction (dB)
4116.653205	41.10	82.2	-41.10	1.87	41.00	Horizontal	2.36
4314.969551	44.39	82.2	-37.81	1.18	156.25	Vertical	2.76
9565.251603	42.57	82.2	-39.63	1.52	-2.00	Vertical	14.13

Note: In the table/Plot above, no emissions exceed the Part 24/Part 27 radiated spurious emissions limit when converted to dBuV/m, except for the fundamentals. For final spurious emissions measurements to FCC Part 24/Part 27, see antenna port conducted emissions in applicable test report.

Figure 36: Plot of RE at 3m from 10 to 18 GHz (MR1 - Mid channel)

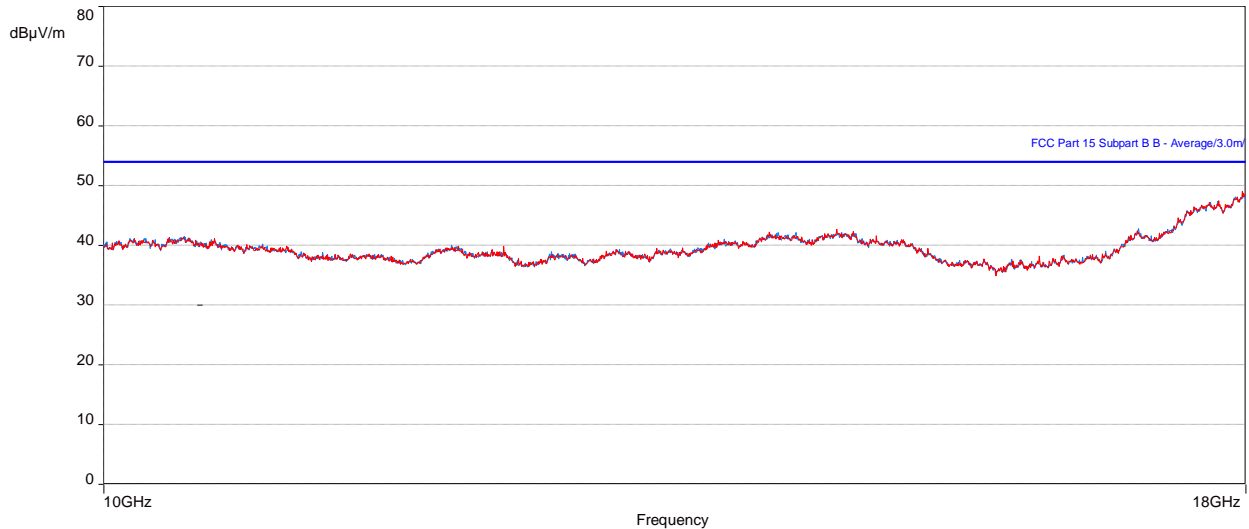


Table 58: RE test results from 10 to 18 GHz for FCC Part 15 (MR1 - Mid channel)

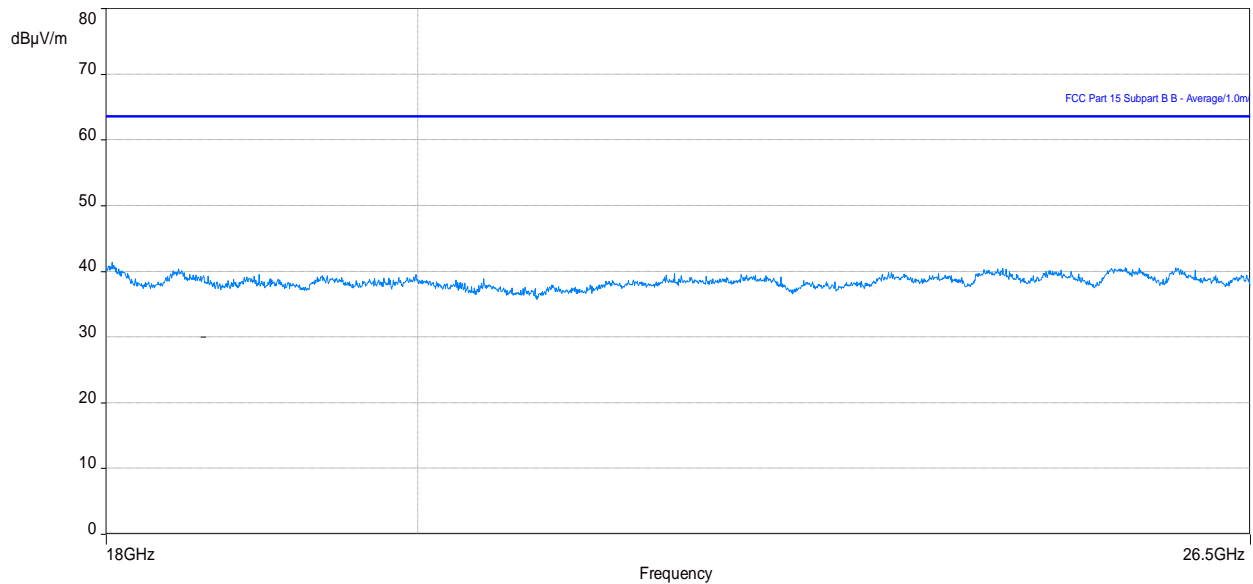
Frequency (MHz)	Level Average (dBµV/m)	Limit Average (dBµV/m)	Margin to FCC part 15 Class B (dB)	Height (m)	Azimuth (degrees)	Polarization	Correction (dB)
14150.42885	37.93	53.96	-16.03	1.00	-2.00	Horizontal	9.77
14583.59678	38.44	53.96	-15.52	1.53	349.25	Vertical	11.09
17908.91859	45.16	53.96	-8.80	4.00	298.75	Horizontal	19.29
17968.97468	45.08	53.96	-8.88	1.00	298.75	Vertical	20.53

Table 59: RE test results from 10 to 18 GHz for Part 24/27 (MR1 - Mid channel)

Frequency (MHz)	Level (dBµV/m)	EIRP Limit (dBµV/m)	Margin to (dB)	Height (m)	Azimuth (degrees)	Polarization	Correction (dB)
14150.42885	37.93	82.2	-44.27	1.00	-2.00	Horizontal	9.77
14583.59678	38.44	82.2	-43.76	1.53	349.25	Vertical	11.09
17908.91859	45.16	82.2	-37.04	4.00	298.75	Horizontal	19.29
17968.97468	45.08	82.2	-37.12	1.00	298.75	Vertical	20.53

Note: In the table/Plot above, no emissions exceed the Part 24/Part 27 radiated spurious emissions limit when converted to dBuV/m. For final spurious emissions measurements to FCC Part 24/Part 27, see antenna port conducted emissions in applicable test report.

Figure 37: Plot of RE at 1m from 18 to 26.5 GHz (MR1 - Mid channel)



Note 1: In the plot above No Emissions exceeds the FCC Part 15/ICES 003 limit.

Note 2: In the plot above, no emissions exceed the Part 24/27 radiated spurious emissions limit when converted to dBuV/m. For final spurious emissions measurements to FCC Part 24/27, see antenna port conducted emissions in applicable test report.

3.2.12 Radiated Emissions test setup pictures

Figure 38: EUT Setup for RE tests (Closeup)

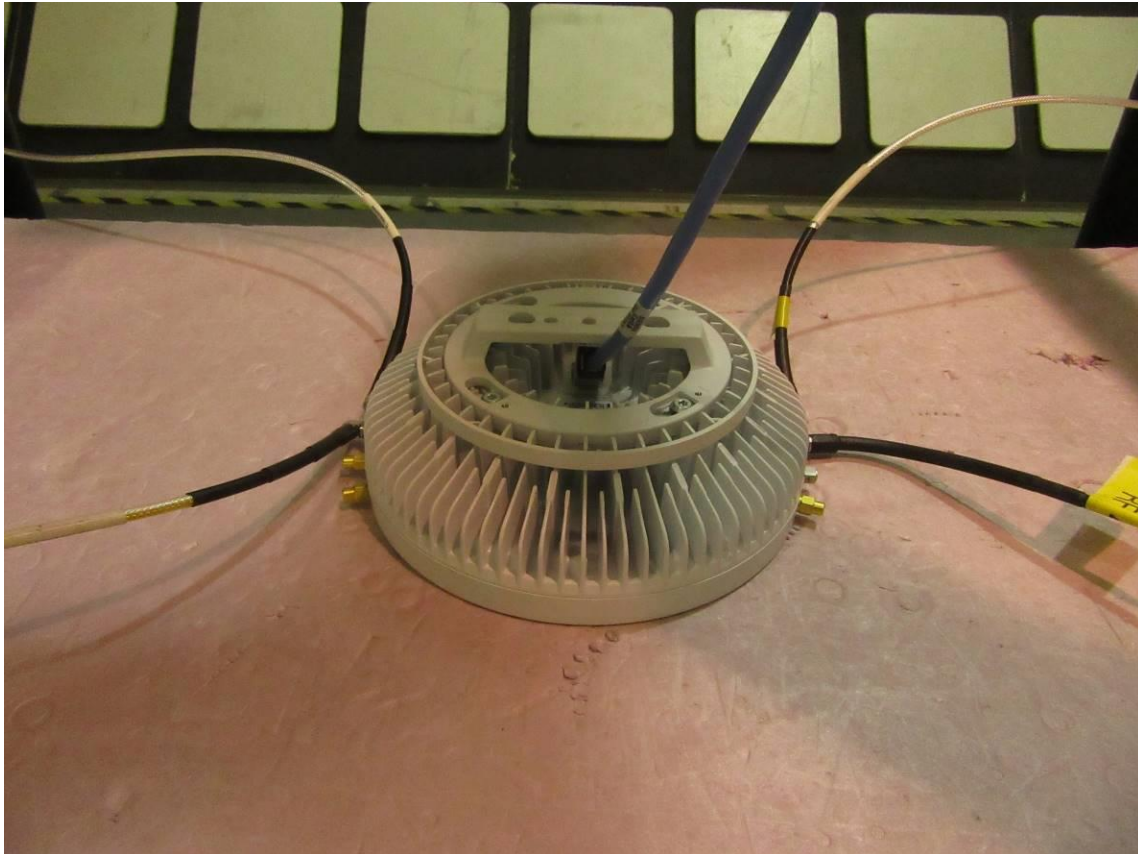
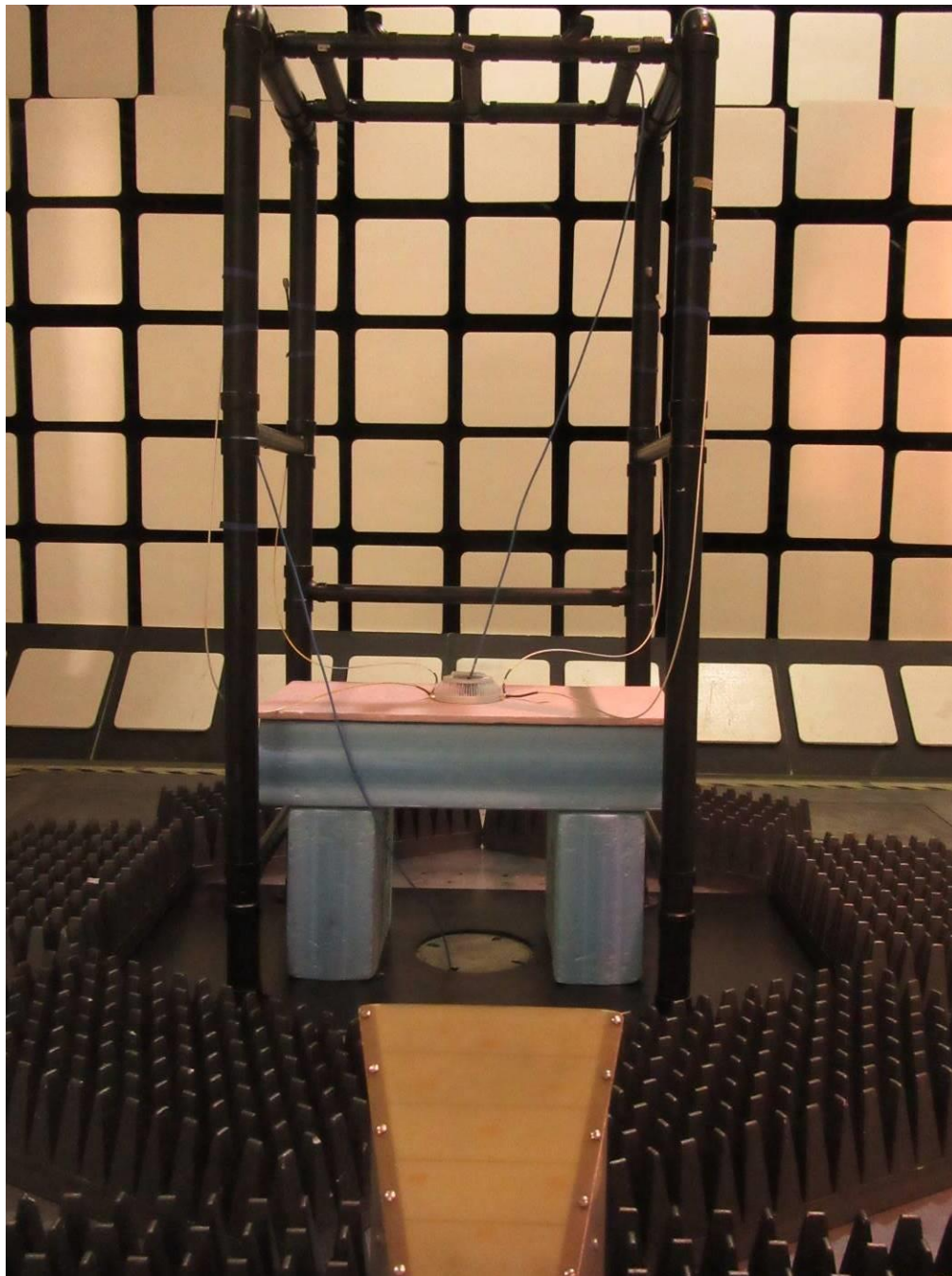


Figure 39: EUT Setup for RE tests at 30 MHz to 1 GHz



Figure 40: EUT Setup for RE tests for above 1 GHz



3.2.13 Test equipment

The equipment used for E-field RE testing was as follows.

Table 60: Test equipment used for RE

Description	Make	Model number	Asset ID	Calibr. date	Calibr. due
EMC Automation Software	Nexio V3.18	BAT-EMC	F0163649	Not required	
Bilog Antenna	Teseq	6111D	SSG013955	2019-12-03	2020-12-03
Double Ridged Horn Antenna	Emco	3115	SSG012508	2020-05-11	2021-05-11
Horn Antenna (18 - 26.5 GHz)	Emco	3160-09	SSG012292	2019-08-26	2021-08-26
Horn Antenna (26.5 - 40 GHz)	Emco	3160-10	SSG012294	2019-08-26	2021-08-26
EMI Receiver	Rohde & Schwarz	ESU26	SSG013729	2020-03-19	2021-03-19
EMI Receiver	Rohde & Schwarz	ESU40	SSG013672	2019-10-08	2021-01-08
Coaxial Cable	Huber & Suhner	106A	SSG013841	2020-01-06	2021-01-06
Coaxial Cable	Huber & Suhner	106A	SSG012711	2020-01-06	2021-01-06
Coaxial Cable	Huber & Suhner	104PEA	SSG012041	2020-01-06	2021-01-06
Coaxial Cable	Huber & Suhner	ST18/Nm/Nm/36	SSG012785	2020-01-06	2021-01-06
Coaxial Cable	Micro-Coax	UFA 210B-1-1500-504504	SSG012376	2020-01-02	2021-01-02
Coaxial Cable	Huber & Suhner	101 PEA, Sucoflex	SSG012290	2018-11-13	2020-11-13
RF Amplifier	Hewlett Packard	8447D	SSG013045	2020-01-08	2021-01-08
Pre-Amplifier	BNR	LNA	SSG012360	2019-09-26	2020-12-26
Power Supply	Hewlett Packard	6216A	SSG013063	not required	not required
Power Supply	Lambda	LPD-421A-FM	SSG013085	not required	not required
RF Filter: High Pass	Microwave Circuits inc.	H3G02G1	SSG012728	2020-01-06	2021-01-06
Attenuator	Narda	N/A	SSG013687	2020-01-06	2021-01-06
Attenuator	Narda	768-10	SSG012714	2019-01-04	2021-01-05

3.2.14 Test conclusion

The DOT 2274 B25B66 (KRY 901 468/1) and DOT 2284 B25B66 (KRY 901 468/2) has passed the E-field Radiated Emission (RE) tests with respect to the standards/sections listed in section [Executive summary](#).

4. References

The documents, regulations, and standards that are referenced throughout this test report are listed alphabetically as follows.

1. ANSI C63.2-2009, American National Standards Institute for Electromagnetic Noise and Field Strength Instrumentation, 10 Hz to 40 GHz – Specifications.
2. ANSI C63.4-2014, American National Standards Institute for Methods of Measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
3. CISPR 16 Publications (all parts and sections), Specification for Radio Disturbance and Immunity Measuring Apparatus and Methods - Part 1: Radio Disturbance and Immunity Measuring Apparatus.
4. CISPR 22 (2008, +IS 1, + IS 2, + IS 3: 2012), Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement.
5. FCC Rules for Radio Frequency Devices, Title 47 of the Code of Federal Regulations, Part 2, U.S. Federal Communications Commission.
6. FCC Rules for Radio Frequency Devices, Title 47 of the Code of Federal Regulations, Part 15 Radio Frequency Devices, U.S. Federal Communications Commission.
7. FCC Rules for Radio Frequency Devices, Title 47 of the Code of Federal Regulations, Part 24 – PERSONAL COMMUNICATIONS SERVICES, U.S. Federal Communications Commission.
8. FCC Rules for Radio Frequency Devices, Title 47 of the Code of Federal Regulations, Part 27 Miscellaneous Wireless Communications Services, U.S. Federal Communications Commission.
9. ICES-003 Issue 6 (2016), Spectrum Management and Telecommunications, Interference-Causing Equipment Standard: Information Technology Equipment (ITE) – Limits and methods of measurement.
10. Radio Standards Specification RSS-133, issue 6 (January 2018), 2 GHz Personal Communication Services, Ministry of Industry, Government of Canada.
11. Radio Standards Specification RSS-139, issue 3 (July 2015), Advanced Wireless Services (AWS) Equipment Operating in the Bands 1710 - 1780 MHz and 2110-2180 MHz. Ministry of Industry, Government of Canada.
12. Radio Standards Specification RSS-170, issue 3 (July 2015), Mobile Earth Stations (MESs) and Ancillary Terrestrial Component (ATC) Equipment Operating in the Mobile-Satellite Service (MSS) Bands. Ministry of Industry, Government of Canada.
13. RSS-Gen – General Requirements for Compliance of Radio Apparatus, Issue 5 (March 2019); Ministry of Industry, Government of Canada.

4.1 Appendix A: Abbreviations

The abbreviations of terms used in this document are as follows.

Term	Definition
A	6 dB Coaxial Attenuator (Conducted Immunity)
AAN	Asymmetric Artificial Network (ISN)
AE	Auxiliary equipment
AFC	Ambient Free Chamber
ANSI	American National Standards Institute
AVG	Average detector
BiLog	Biconical Log-Periodic Hybrid antenna (a registered trademark of Schaffner-Chase EMC Limited, 1993)
CDN	Coupling-decoupling Network
CE	Conducted Emissions
CISPR	Comité International Spécial Perturbation Radioélectrique (International Special Committee on Radio Interference)
CSA	Canadian Standards Association
DN/P	Decoupling / Protection Network
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
ETSI	European Telecommunications Standards Institute
EUT	equipment under test
GND	Ground
HCP	Horizontal Coupling Plane
HME	Harmonics Measurement Equipment
HV	High Voltage
HVP	High Voltage Probe
h/w	hardware
IC	Industry Canada
ICES	Canadian Specification: ICES-003, Issue 3, "Spectrum Management: Interference-causing equipment standard (Digital Apparatus)
IEC	International Electro Technical Association
ISN	Impedance Stabilization Network
LISN	Line Impedance Stabilization Network
ms	millisecond, unless otherwise specified
NA, na	not applicable



Term	Definition
PA	Broadband Power Amplifier
PK	Peak Detector
PS	Power Supply
QP	Quasi-peak Detector
QPA	Quasi-peak Adapter (for the Spectrum Analyzer)
R	100-ohm Injection Resistor (Conducted Immunity)
RBW	Resolution Bandwidth
RE	Radiated Emissions
RF	Radio-Frequency
RI	Radiated Immunity
RMS	Root-mean-square
s/w	software
SA	Spectrum Analyzer, the CISPR 16, ANSI C63.2 Compliant EMI meter
STP	Shielded Twisted Pair
T	50-ohm Coaxial Termination (Conducted Emissions / Immunity)
TL	Transient Limiter
UFA	Uniform field Area
VBW	Video Bandwidth



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