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EMC/Radio Test report – Radiated Emissions

339635-1TRFEMC-R1

Date of issue: October 24, 2017

Applicant:

Ericsson Canada

Product:

Radio DOT Transceiver

Model:	Part number:	FCC ID:
RD 4442 B25B66A	KRY 901 386/1	TA8AKRY901386-1
RD 2243 B25	KRY 901 402/1	TA8AKRY901402-1
RD 2243 B66A	KRY 901 404/1	TA8AKRY901404-1

Requirements/Summary:

Standard	Clause	Compliance
FCC CFR 47 Part 15, Subpart B	§15.109 Radiated emission limits.	Yes
FCC 47 CFR Part 24 – Personal Communications Services	§24.238 Emission limitations for Broadband PCS equipment. (a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.	Yes
FCC 47 CFR Part 27 – Miscellaneous Wireless Communications Services	§27.53 Emission limits. (h) AWS emission limits—(1) General protection levels. Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log10 (P) dB.	Yes
ICES-003 Issue 6 January 2016	6.2 Radiated Emissions Limits	Yes
RSS-133 Issue 6, January 2013 — 2 GHz Personal Communications Services	6.5 Transmitter Unwanted Emissions 6.5.1 Out-of-Block Emissions ii. After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10p(watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required.	Yes
RSS-139 Issue 3, July 2015 – Advanced Wireless Services (AWS) Equipment Operating in the Bands 1710-1780 MHz and 2110-2180 MHz	6.5 Transmitter Unwanted Emissions ii. After the first 1.0 MHz outside the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least 43 + 10 log10 p (watts) dB.	Yes

Lab and test locations

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Tested by	Predrag Golic, EMC Specialist,
Reviewed by	Kevin Rose, Wireless/EMC Specialist
Review date	October 12, 2017
Reviewer signature	

Limits of responsibility

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.
This test report has been completed in accordance with the requirements of ISO/IEC 17025. All results contain in this report are within Nemko Canada's ISO/IEC 17025 accreditation.

Copyright notification

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Section 1 Report summary

1.1 Test specifications

FCC CFR 47 Part 15, Subpart B	Title 47: Telecommunication; Part 15—Radio Frequency Devices
FCC 47 CFR Part 24	Personal Communications Services
FCC 47 CFR Part 27	Miscellaneous Wireless Communications Services
ICES-003	Information Technology Equipment (Including Digital Apparatus) — Limits and Methods of Measurement
RSS-133 Issue 6, January 2013	2 GHz Personal Communications Services
RSS-139 Issue 3, July 2015	Advanced Wireless Services (AWS) Equipment Operating in the Bands 1710-1780 MHz and 2110-2180 MHz

1.2 Exclusions

As per Nemko quote Q102126421R only Emissions Testing is performed. Client requested a scan from 30 to 22000 MHz

1.3 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 1.2 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.

See "Summary of test results" for full details.

1.4 Test report revision history

Table 1.4-1: *Test report revision history*

Revision #	Details of changes made to test report
TRF	Original report issued

Section 2 Summary of test results

2.1 Results

Table 2.1-1: *Emissions Testing results*

Part/RSS	Section	Test description	Verdict
§15.109	(a)	Radiated emission limits.	Pass
§24.238	(a)	Emission limitations for Broadband PCS equipment.	Pass
§27.53	(h)	Emission limits.	Pass
ICES-003	6.2	Radiated Emissions Limits	Pass
133	6.5.1 (ii)	Out-of-Block Emissions	Pass
139	6.5 (ii)	Transmitter Unwanted Emissions	Pass

Notes: None

Section 3 Equipment under test (EUT) details

3.1 Applicant/Manufacturer

Company name	Ericsson Canada Inc.
Address	349 Terry Fox Drive, Ottawa, ON, Canada, K2K 2V6

3.2 Sample information

Receipt date	September 29, 2017
Nemko sample ID number	1

3.3 EUT information

Product name	Radio DOT Transceiver
Model	Tested: RD 4442 B25B66A (De-populated variants: RD 2243 B25 & RD 2243 B66A)
Part number	Tested: KRY 901 386/1 (De-populated variants: KRY 901 402/1 & KRY 901 404/1)
Revision	R1B
Serial number	TD3T308275
Nominal Voltage:	-48 V_{DC} @ 0.5 A
Total Power based on IBW:	4 x 50 mW
Operating Temperature:	5° C to +40° C
IF Interface:	DL: 110 – 150 MHz
	UL: 40 – 80 MHz
Regulatory Requirements	Radio: FCC CFR 47 Part 2, 24, 27; RSS-133, RSS-139
	EMC: FCC CFR 47 Part 15; ICES-003
Antenna ports	4 TX/RX Ports
Side 1 FDD Band	**Band 25**
Antenna ports	2 TX/RX Ports
BW	65 MHz
IBW	40 MHz
Frequency:	TX (DL): 1930 - 1995 MHz
	RX (UL): 1850 – 1915 MHz
Total number of supported E-UTRA carriers	2 (Contiguous Operations Only)
Total number of supported UTRA carriers	4 (Contiguous Operations Only)
Nominal O/P per Antenna Port:	Single Carrier: 1 x 50 mW (17 dBm)
	Multi-Carrier: 2 x 25 mW (14 dBm)
	Multi-Carrier: 3 x 16.7 mW (12.2 dBm)
	Multi-Carrier: 4 x 12.5 mW (11 dBm)
	Multi-Carrier: 5 x 10 mW (10 dBm)
	Multi-Carrier: 6 x 8.3mW (9.2 dBm)
Accuracy (Nominal):	+/- 0.1 PPM
RAT:	LTE, WCDMA
Modulation:	LTE: QPSK, 16QAM, 64QAM, 256QAM (DL only)
	WCDMA: QPSK, 16QAM, 64QAM, 256QAM (DL only)

3.3 EUT information, continued

Channel Bandwidth:	LTE: 5, 10, 15, 20 MHz
	WCDMA: 5 MHz
Maximum Combined OBW per Port:	40 MHz
Channel Raster:	LTE: 100 kHz, WCDMA: 200 kHz
Multi-carrier:	Single Antenna, Tx Diversity, MIMO
Supported Carrier Configurations:	LTE BW = 5, 10, 15, 20 MHz (1-2), WCDMA BW = 5 MHz (1-4)
Side 2 FDD Band	**Band 66A**
Antenna ports	2 TX/RX Ports
BW	70 MHz
IBW	40 MHz
Frequency:	TX (DL): 2110 - 2180 MHz
	RX (UL): 1710 – 1780 MHz
Total number of supported E-UTRA carriers	2 (Contiguous Operations Only)
Total number of supported UTRA carriers	4 (Contiguous Operations Only)
Nominal O/P per Antenna Port:	Single Carrier: 1 x 50 mW (17 dBm)
	Multi-Carrier: 2 x 25 mW (14 dBm)
	Multi-Carrier: 3 x 16.7 mW (12.2 dBm)
	Multi-Carrier: 4 x 12.5 mW (11 dBm)
	Multi-Carrier: 5 x 10 mW (10 dBm)
	Multi-Carrier: 6 x 8.3mW (9.2 dBm)
Accuracy (Nominal):	+/- 0.1 PPM
RAT:	LTE, WCDMA
Modulation:	LTE: QPSK, 16QAM, 64QAM, 256QAM (DL only)
	WCDMA: QPSK, 16QAM, 64QAM, 256QAM (DL only)
Channel Bandwidth:	LTE: 5, 10, 15, 20 MHz
	WCDMA: 5 MHz
Maximum Combined OBW per Port:	40 MHz
Channel Raster:	LTE: 100 kHz, WCDMA: 200 kHz
Multi-carrier:	Single Antenna, Tx Diversity, MIMO
Supported Carrier Configurations:	LTE BW = 5, 10, 15, 20 MHz (1-2), WCDMA BW = 5 MHz (1-4)

3.3 EUT information, continued

Description/theory of operation	The test object is an RD 4442 B25B66A (Dual Band Radio DOT) designed for use in LTE Radio Base Station (RBS) equipment. RD 4442 supports two separate bands in one radio dot connected with one CAT cable to two IRU 2242 using a passive splitter (Y-Adaptor) on the IRU end. The RD 4442 product provides radio access for mobile and fixed devices and is intended for the indoor environment. The RD 4442 is a Radio Unit (RU) forming part of the Ericsson RBS equipment and RDS (Radio DOT System) RBS consisting of a Digital Unit (DU), an IRU 2242 (Indoor Radio Unit) and Radio DOT (RD 4442). The IRU and RD are connected over a CAT 6 Interface (Radio DOT Interface (RDI)) with a capacity of 8 DOTs per IRU. The IRU provides DC, control and the baseband to IF conversion while the RD 4442 provides the IF to RF conversion and wireless transceiver functions. The RD supports four TX/RX RF-branches. The RD 4442 B25B66A operates in LTE/WCDMA FDD mode at a maximum RF output of 4 x 17dBm and supports single carrier (SC) and multi-carrier (MC) configured for a maximum of 6 carriers per port. The RD 2243 B25 product is a de-populated variant of the RD 4442 B2B66A where the B66A components have been removed. The RD 2243 B66A product is a de-populated variant of the RD 4442 B2B66A where the B25 components have been removed. The RDS IRU 2242 (KRC 161 444/2) can support either TDD or FDD operation, but not simultaneously.
Operational frequencies	
Port description	
Physical	
Software details	CXP 901 3268/14 R65FH08
Label product ID	

Clocks / Oscillators	
10 MHz	SYNC
40 MHz	MCU
12.5 MHz	AGC
16.67 MHz	AGC
230 MHz	FSK Modem

Port	**Description**
RDI	Shielded RJ45 (CAT6)
Antenna A/B	RF Probe

Dimensions	95 x 140 x 140 mm [H x W x D] (Including mounting HW)
Weight	439 g
Cooling	Convection
Mounting	Ceiling or Wall Mount

3.4 Test Frequencies

The following tables display the test parameters displayed and verified by the EMC test bed system for each RAT used for radiated emissions.

Test Parameter and Set-up Details:

Band 25	Band 66A
TX (DL): 1930 – 1995 MHz	TX (DL): 2110 - 2180 MHz
RX (UL): 1850 – 1915 MHz	RX (UL): 1710 – 1780 MHz
Duplex Spacing: 80 MHz	Duplex Spacing: 400 MHz

Test Frequencies:

B25 LTE Single Carrier												
BW	**Transmit / DL (MHz)**						**Receive / UL (MHz)**					
MHz	**B**	**EARFCN**	**M**	**EARFCN**	**T**	**EARFCN**	**B**	**EARFCN**	**M**	**EARFCN**	**T**	**EARFCN**
5	1932.5	8065	1962.5	8365	1992.5	8665	1852.5	26065	1882.5	26365	1912.5	26665
10	1935.0	8090	1962.5	8365	1990.0	8640	1855.0	26090	1882.5	26365	1910.0	26640
15	1937.5	8115	1962.5	8365	1987.5	8615	1857.5	26115	1882.5	26365	1907.5	26615
20	1940.0	8140	1962.5	8365	1985.0	8590	1860.0	26140	1882.5	26365	1905.0	26590

B25 LTE Multiple-Carriers (2x)												
BW	**Transmit /DL (MHz)**											
MHz	**B1**	**EARFCN**	**B2**	**EARFCN**	**M1**	**EARFCN**	**M2**	**EARFCN**	**T1**	**EARFCN**	**T2**	**EARFCN**
5	1932.5	8065	1937.5	8115	1960.0	8340	1965.0	8390	1987.5	8615	1992.5	8665

B25 WCDMA Single Carrier						
BW	**Transmit / DL (MHz)**			**Receive / UL (MHz)**		
MHz	**B**	**M**	**T**	**B**	**M**	**T**
5	1932.4	1962.4	1992.6	1852.4	1882.4	1912.6
ARFCN	5112	5262	5413	4887	5037	5188

B25 1W+1L Multiple-Carriers (LTE 5MHz BW)						
BW	**Transmit / DL (MHz)**					
MHz	**WM1**	**LM2**				
5	1960.0	1965.0				

B25 2W+1L Multiple-Carriers (LTE 5MHz BW)						
BW	**Transmit / DL (MHz)**					
MHz	**WM1**	**WM2**	**LM3**			
5	1957.4	1962.4	1967.4			

B25 4W+2L Multiple-Carriers (LTE 5MHz BW)						
BW	**Transmit / DL (MHz)**					
MHz	**WM1**	**WM2**	**WM3**	**WM4**	**LM5**	**LM6**
5	1950.0	1955.0	1960.0	1965.0	1970.0	1975.0

B66A LTE Single Carrier												
BW	**Transmit / DL (MHz)**						**Receive / UL (MHz)**					
MHz	**B**	**EARFCN**	**M**	**EARFCN**	**T**	**EARFCN**	**B**	**EARFCN**	**M**	**EARFCN**	**T**	**EARFCN**
5	2112.5	66461	2145	66786	2177.5	67111	1712.5	131997	1745.0	132322	1777.5	132647
10	2115.0	66486	2145	66786	2175.0	67086	1715.0	132022	1745.0	132322	1775.0	132622
15	2117.5	66511	2145	66786	2172.5	67061	1717.5	132047	1745.0	132322	1772.5	132597
20	2120.0	66536	2145	66786	2170.0	67036	1720.0	132072	1745.0	132322	1770.0	132572

3.4 Test Frequencies, continued

B66A LTE Multiple-Carriers (2x)												
BW	Transmit /DL (MHz)											
MHz	B1	EARFCN	B2	EARFCN	M1	EARFCN	M2	EARFCN	T1	EARFCN	T2	EARFCN
5	2112.5	66461	2117.5	66511	2142.5	66761	2147.5	66811	2172.5	67061	2177.5	67111

B66A WCDMA Single Carrier						
BW	Transmit / DL (MHz)			Receive / UL (MHz)		
MHz	B	M	T	B	M	T
5	2112.4	2145	2177.6	1712.4	1745.0	1777.6
ARFCN	1537	1700	1863	1312	1475	1638

B66A 1W+1L Multiple-Carriers (LTE 5MHz BW)						
BW	Transmit / DL (MHz)					
MHz	WM1	LM2				
5	2142.4	2147.40				

B66A 2W+1L Multiple-Carriers (LTE 5MHz BW)						
BW	Transmit / DL (MHz)					
MHz	WM1	WM2	LM3			
5	2140.0	2145.0	2150.0			

B66A 4W+2L Multiple-Carriers (LTE 5MHz BW)						
BW	Transmit / DL (MHz)					
MHz	WM1	WM2	WM3	WM4	LM5	LM6
5	2132.4	2137.4	2142.4	2147.40	2152.40	2157.4

3.5 EMC Test Bed Test Parameters

RAT	Modulation	Test Model / Configuration
LTE	QPSK	E-TM1.1
WCDMA	16QAM	TM5

3.6 EUT setup details

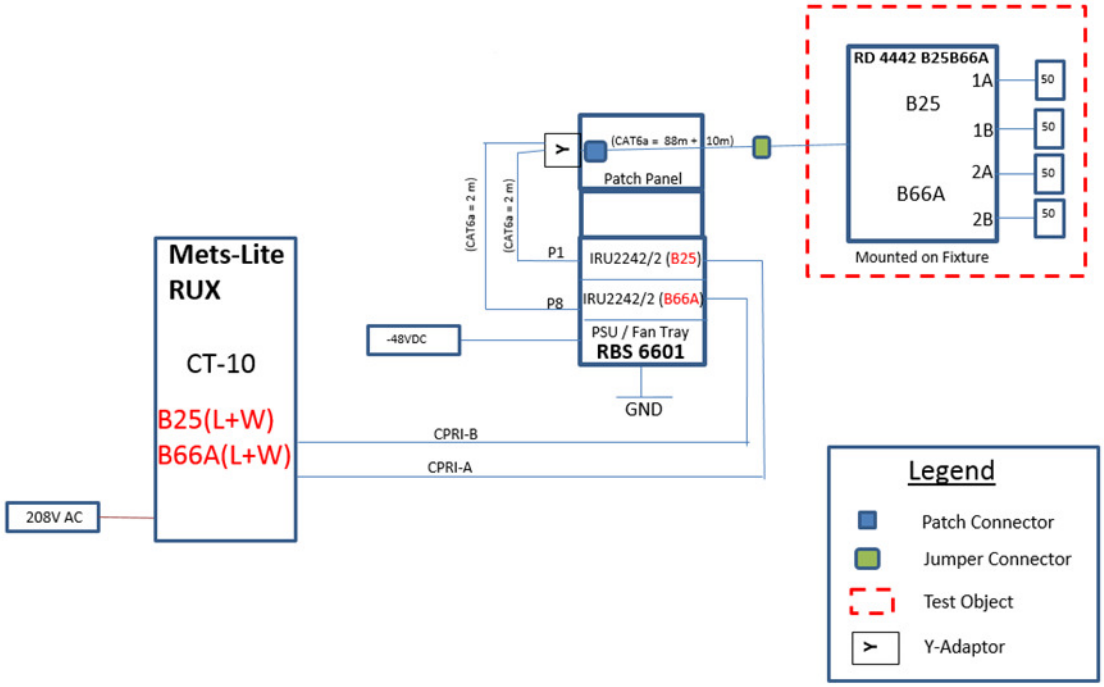

Figure 3.6-1: *Setup diagram*

Test Object:	

Product Name	Model Number	R-State	Serial Number
RD 4442 B25B66A	KRY 901 386/1	R1B	TD3T308275

Associated Equipment:

Product Name	Model Number	R-State	Serial Number
RBS-6601	BFL 901 009/4	R2A	BR83523705
IRU 2242	KRC 161 444/2	R2B	D822456537
IRU 2242	KRC 161 444/2	R2B	D822439694
METS-Lite	n/a	n/a	n/a

Section 4 Engineering considerations

4.1 Modifications incorporated in the EUT

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

4.2 Technical judgment

There are 3 models being certified. RD 4442 B25B66A is formally tested being a more complex product than the two depopulated versions RD 2243 B25 and RD 2243 B66A which will only support single Band of operation.

4.3 Deviations from laboratory tests procedures

No deviations were made from laboratory procedures.

Section 5 Test conditions

5.1 Atmospheric conditions

Temperature	15–30 °C
Relative humidity	20–75 %
Air pressure	86–106 kPa

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.

5.2 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 6 Measurement uncertainty

6.1 Uncertainty of measurement

Nemko Canada Inc. has calculated measurement uncertainty and is documented in EMC/MUC/001 “Uncertainty in EMC measurements.” Measurement uncertainty was calculated using the methods described in CISPR 16-4 Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC measurements; as well as described in UKAS LAB34: The expression of Uncertainty in EMC Testing. Measurement uncertainty calculations assume a coverage factor of K=2 with 95% certainty.

Test name	Measurement uncertainty, dB
Radiated electromagnetic fields	3.78

Section 7 Testing data

7.1 Radiated emissions

7.1.1 Definitions and limits

FCC §15.109 and ICES-003 Section 6.2:

(a) Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Table 7.1-1: *Requirements as per FCC Part 15 Subpart B Class B*

Frequency range [MHz]	Measurement		limits
	Distance [m]	Detector type/ bandwidth	[dBµV/m]
30–88	3	Quasi Peak/120 kHz	40.0
88–216			43.5
216–960			46.0
960–1000			54.0
>1000	3	Linear average/1 MHz	54.0
		Peak/1 MHz	74.0

Notes: Where there is a step in the relevant limit, the lower value was applied at the transition frequency.

FCC §24.238:

Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

FCC §27.53:

(h) AWS emission limits—(1) General protection levels. Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log10 (P) dB.

RSS-133 Section 6.5.1:

(ii). After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10p(watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required.

RSS-139 Section 6.5:

(ii). After the first 1.0 MHz outside the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least 43 + 10 log10 p (watts) dB.

7.1.2 Test summary

Verdict	Pass		
Test date	October 2, 2017 to October 4, 2017	Temperature	24 °C
Test engineer	Predrag Golic	Air pressure	1020 mbar
Test location	Ottawa	Relative humidity	35 %

7.1.3 Observations/special notes

EUT can operate in single carrier, multicarrier and multiRAT mode as well as it can transmit two types of signal [LTE and WCDMA].

- In LTE single mode, the 5, 10, 15, and 20 MHz BW configurations were pre-scanned and 5 MHz mode was formally tested as the worst-case representative;
- In a single mode both LTE and WCDMA transmission modes are formally tested while EUT was transmitting on middle channel. LTE transmission was deemed worst case and it is formally tested while EUT was transmitting on top and bottom channel as well.
- In LTE dual carrier mode, middle channel is tested as a representative.
- In a multiRAT mode EUT was set up as 1W+1L, 2W+1L and 4W+2L on middle channel and pre-scanned. 1W+1L is deemed worst case and it is formally tested.

7.1.4 Setup details

Test facility	3 m Semi anechoic chamber
Measuring distance (m)	3
Antenna height variation (m)	1–4
Turn table position (°)	0–360
Spectrum analyzer settings	30 MHz to 1 GHz: Spectrum analyzer bandwidth (3 dB) Settings: 100 kHz RBW and 300 kHz VBW, positive peak detector. 1 GHz to 22 GHz: Spectrum analyzer bandwidth (3 dB) Settings: 1 MHz RBW and 3 MHz VBW, positive peak detector

Table 7.1-2: *Modes assessed*

LTE Single Carrier – 5 MHz middle channel, pre-scan
LTE Single Carrier – 10 MHz middle channel, pre-scan
LTE Single Carrier – 15 MHz middle channel, pre-scan
LTE Single Carrier – 20 MHz middle channel, pre-scan
LTE Single Carrier – 5 MHz middle channel, full scan
WCDMA Single Carrier – middle channel, full scan
LTE Single Carrier – 5 MHz bottom channel, full scan
LTE Single Carrier – 5 MHz top channel, full scan
LTE dual Carrier – 5 MHz middle channel, full scan
Multi-RAT 1W+1L(5MHz) -- middle channel, pre-scan
Multi-RAT 2W+1L(5MHz) -- middle channel, pre-scan
Multi-RAT 4W+2L(5MHz) -- middle channel, pre-scan
Multi-RAT 1W+1L(5MHz) -- middle channel, full scan

7.1.5 Test equipment list

Table 7.1-3: *Equipment list*

Equipment	Manufacturer	Model no.	Asset no.	Cal cycle	Next cal.
3 m EMI test chamber	TDK	SAC-3	FA002047	1 year	Dec. 01/17
Receiver/spectrum analyzer	Rohde & Schwarz	ESU 26	FA002043	1 year	Jan. 31/18
Spectrum analyzer	Rohde & Schwarz	FSU	FA001877	1 year	Jul. 18/18
Bilog antenna (20–3000 MHz)	Sunol	JB3	FA002108	1 year	June 27/18
Horn with Preamp	ETS-Lindgren	3117-PA	FA002840	1 year	Nov. 11/17
Horn antenna (18–40 GHz)	EMCO	3116	FA001847	1 year	June 27/18
Pre-amplifier (18–26 GHz)	Narda	BBS-1826N612	FA001550	—	VOU
50 Ω coax cable	C.C.A.	None	FA002555	1 year	May 2/18
50 Ω coax cable	Huber + Suhner	None	FA002074	1 year	May 12/18

Notes: VOU - verify on use

7.1.6 Test data

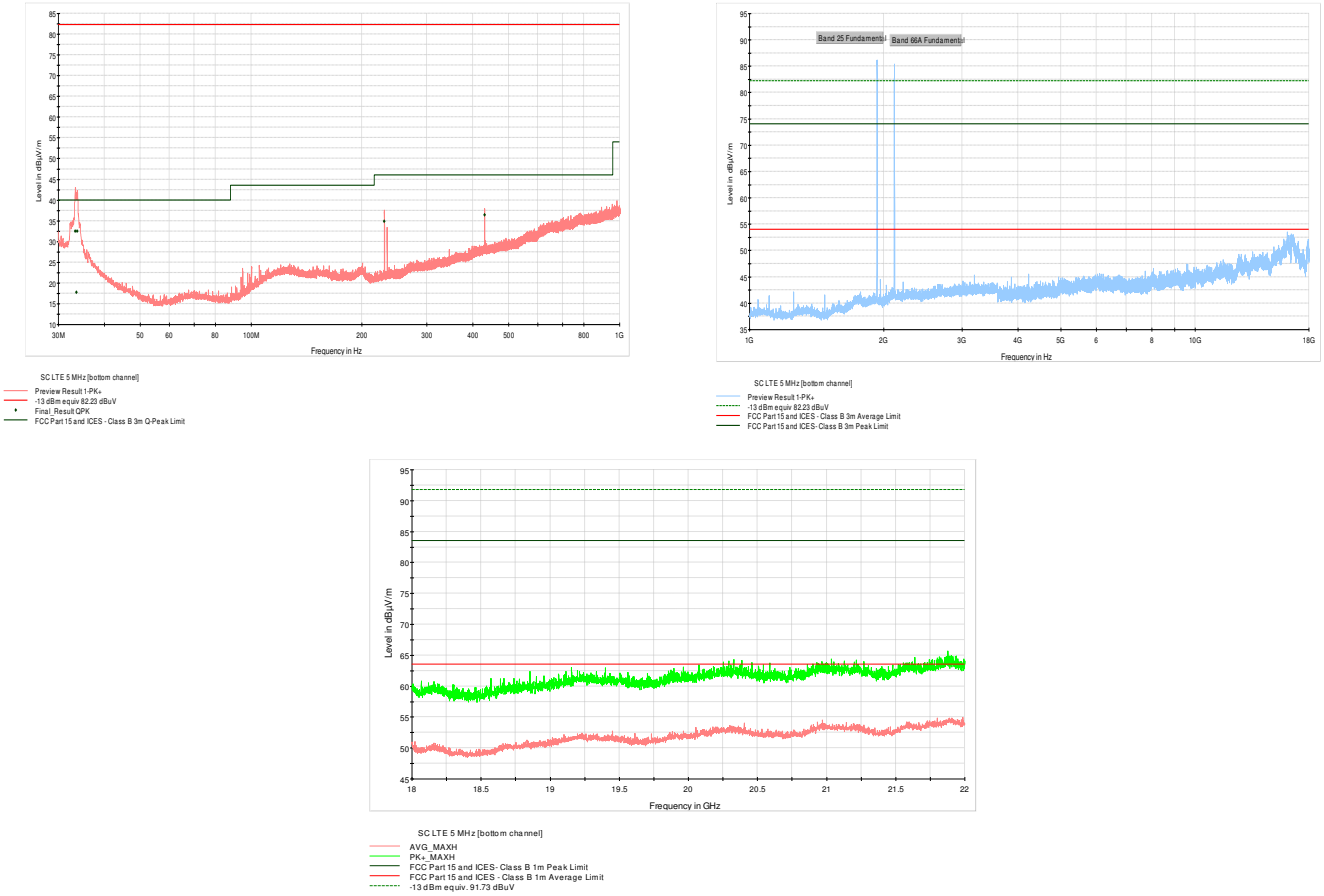

Figure 7.1-1: *Radiated emissions spectral plot (30 to 22000 MHz) –* ***Single carrier 5 MHz channel [bottom][LTE]***

Table 7.1-4: *Radiated emissions results*

Frequency (MHz)	Detector	Field strength[1] (dBµV/m)	3 m limit (dBµV/m)	Margin (dB)	Bandwidth (MHz)	Correction factor[2] (dB)
33.36	QuasiPeak	32.5	40.0	7.6	0.120	20.2
33.60	QuasiPeak	17.7	40.0	22.3	0.120	20.0
33.78	QuasiPeak	32.5	40.0	7.5	0.120	19.8
229.95	QuasiPeak	34.8	46.0	11.2	0.120	13.6
430.08	QuasiPeak	36.4	46.0	9.6	0.120	19.1

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factor = antenna factor ACF (dB) + cable loss (dB)

Sample calculation: 32.5 dBµV/m (field strength) = 12.3 dBµV (receiver reading) + 20.2 dB (Correction factor)

7.1.6 Test data, continued

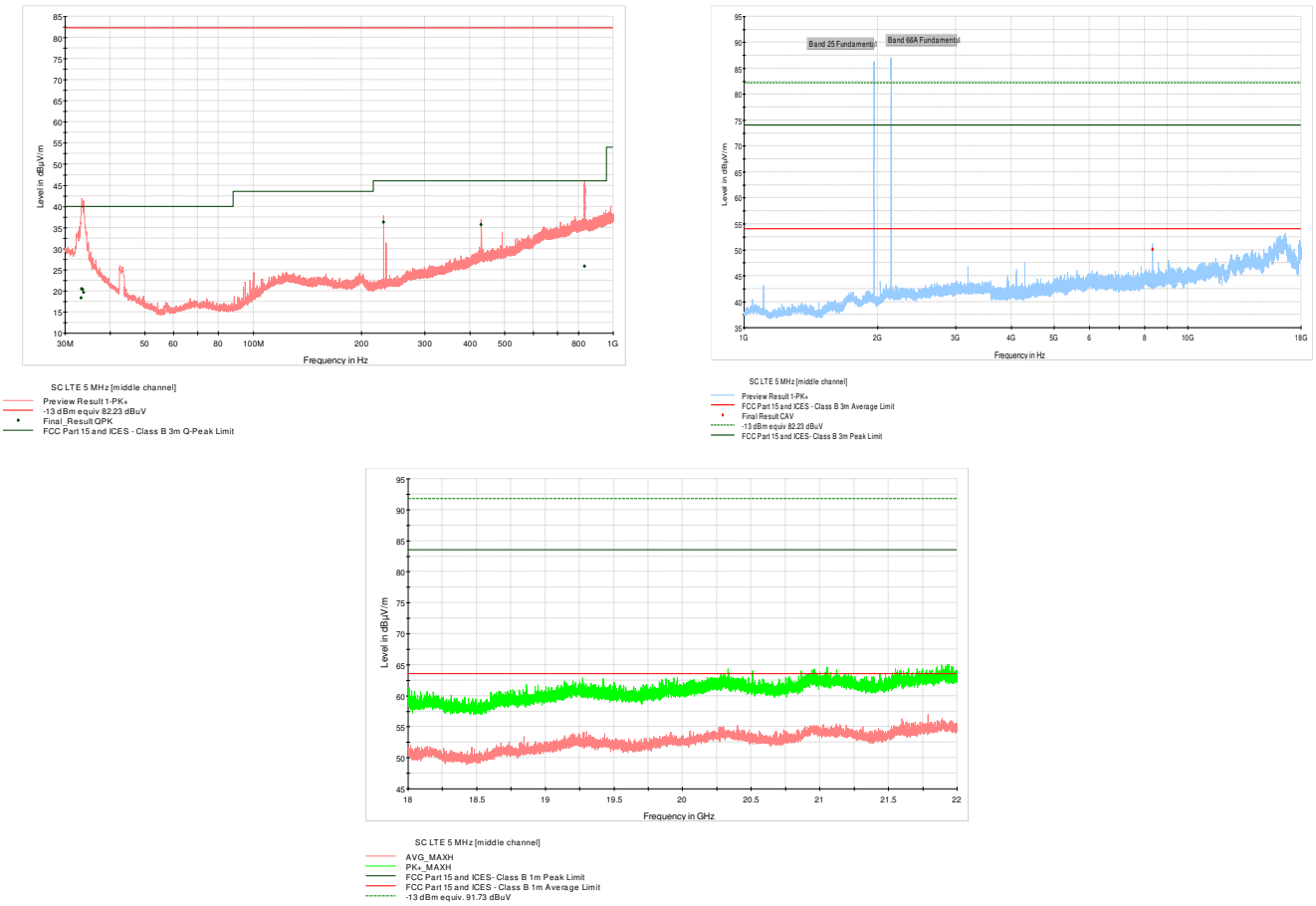

Figure 7.1-2: *Radiated emissions spectral plot (30 to 22000 MHz) –* ***Single carrier 5 MHz channel [middle][LTE]***

Table 7.1-5: *Radiated emissions results*

Frequency (MHz)	Detector	Field strength[1] (dBµV/m)	3 m limit (dBµV/m)	Margin (dB)	Bandwidth (MHz)	Correction factor[2] (dB)
33.24	QuasiPeak	18.3	40.0	21.7	0.12	20.3
33.39	QuasiPeak	20.4	40.0	19.6	0.12	20.2
33.60	QuasiPeak	20.3	40.0	19.7	0.12	20.0
33.78	QuasiPeak	19.6	40.0	20.4	0.12	19.8
229.95	QuasiPeak	36.3	46.0	9.7	0.12	13.6
430.08	QuasiPeak	35.7	46.0	10.3	0.12	19.1
832.92	QuasiPeak	25.8	46.0	20.2	0.12	25.2
8319.93	CAverage	50.1	54.0	3.9	1.00	-2.4

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factor = antenna factor ACF (dB) + cable loss (dB)

Sample calculation: 18.3 dBµV/m (field strength) = (-2.0) dBµV (receiver reading) + 20.3 dB (Correction factor)

7.1.6 Test data, continued

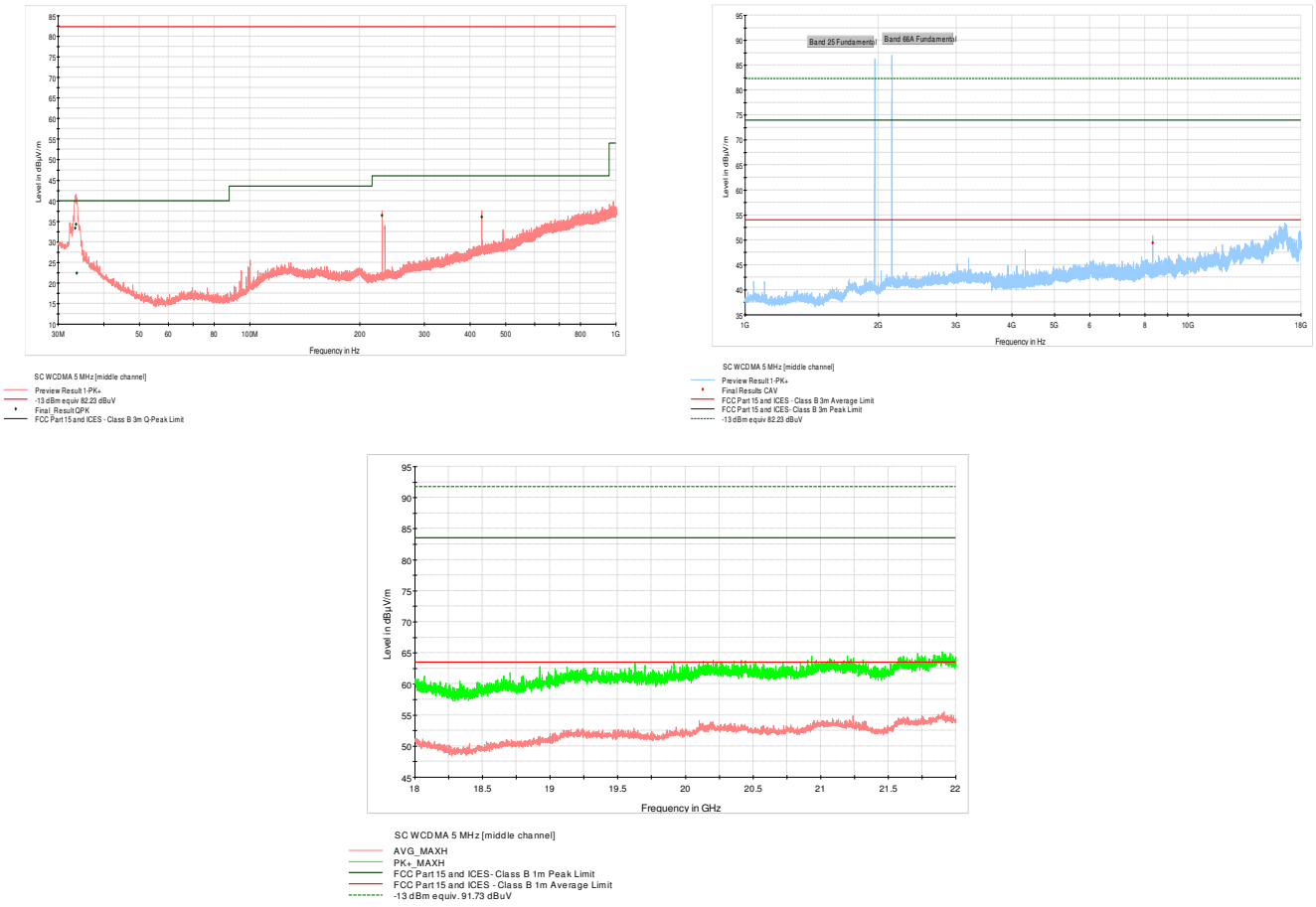

Figure 7.1-3: *Radiated emissions spectral plot (30 to 22000 MHz) –* ***Single carrier 5 MHz channel [middle][WCDMA]***

Table 7.1-6: *Radiated emissions results*

Frequency (MHz)	Detector	Field strength[1] (dBµV/m)	3 m limit (dBµV/m)	Margin (dB)	Bandwidth (MHz)	Correction factor[2] (dB)
33.39	QuasiPeak	33.3	40.0	6.7	0.12	20.2
33.60	QuasiPeak	34.2	40.0	5.8	0.12	20.0
33.78	QuasiPeak	22.3	40.0	17.7	0.12	19.8
229.95	QuasiPeak	36.4	46.0	9.6	0.12	13.6
430.08	QuasiPeak	36.1	46.0	9.9	0.12	19.1
8319.93	CAverage	49.4	54.0	4.6	1.00	-2.4

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factor = antenna factor ACF (dB) + cable loss (dB)

Sample calculation: 33.3 dBµV/m (field strength) = 13.1 dBµV (receiver reading) + 20.2 dB (Correction factor)

7.1.6 Test data, continued

Figure 7.1-4: *Radiated emissions spectral plot (30 to 22000 MHz) –* ***Single carrier 5 MHz channel [top][LTE]***

Table 7.1-7: *Radiated emissions results*

Frequency (MHz)	Detector	Field strength[1] (dBµV/m)	3 m limit (dBµV/m)	Margin (dB)	Bandwidth (MHz)	Correction factor[2] (dB)
33.24	QuasiPeak	29.0	40.0	11.1	0.12	20.3
33.60	QuasiPeak	36.1	40.0	3.9	0.12	20.0
33.78	QuasiPeak	25.7	40.0	14.3	0.12	19.8
229.95	QuasiPeak	35.0	46.0	11.0	0.12	13.6
234.03	QuasiPeak	30.1	46.0	15.9	0.12	13.8
430.08	QuasiPeak	36.1	46.0	9.9	0.12	19.1
16544.54	CAverage	39.7	54.0	14.3	1.00	12.4

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factor = antenna factor ACF (dB) + cable loss (dB)

Sample calculation: 29.0 dBµV/m (field strength) = 8.7 dBµV (receiver reading) + 20.3 dB (Correction factor)

7.1.6 Test data, continued

Figure 7.1-5: *Radiated emissions spectral plot (30 to 22000 MHz) –* ***Dual carrier 5 MHz channel [middle][LTE]***

Table 7.1-8: *Radiated emissions results*

Frequency (MHz)	Detector	Field strength[1] (dBµV/m)	3 m limit (dBµV/m)	Margin (dB)	Bandwidth (MHz)	Correction factor[2] (dB)
33.21	QuasiPeak	31.9	40.0	8.1	0.12	20.3
33.36	QuasiPeak	34.1	40.0	5.9	0.12	20.2
33.60	QuasiPeak	36.2	40.0	3.8	0.12	20.0
33.78	QuasiPeak	31.8	40.0	8.3	0.12	19.8
229.95	QuasiPeak	36.5	46.0	9.5	0.12	13.6
430.08	QuasiPeak	36.0	46.0	10.0	0.12	19.1
8319.95	CAverage	48.0	54.0	6.0	1.00	-2.4
16572.03	CAverage	39.9	54.0	14.1	1.00	12.4

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factor = antenna factor ACF (dB) + cable loss (dB)

Sample calculation: 31.9 dBµV/m (field strength) = 11.6 dBµV (receiver reading) + 20.3 dB (Correction factor)

7.1.6 Test data, continued

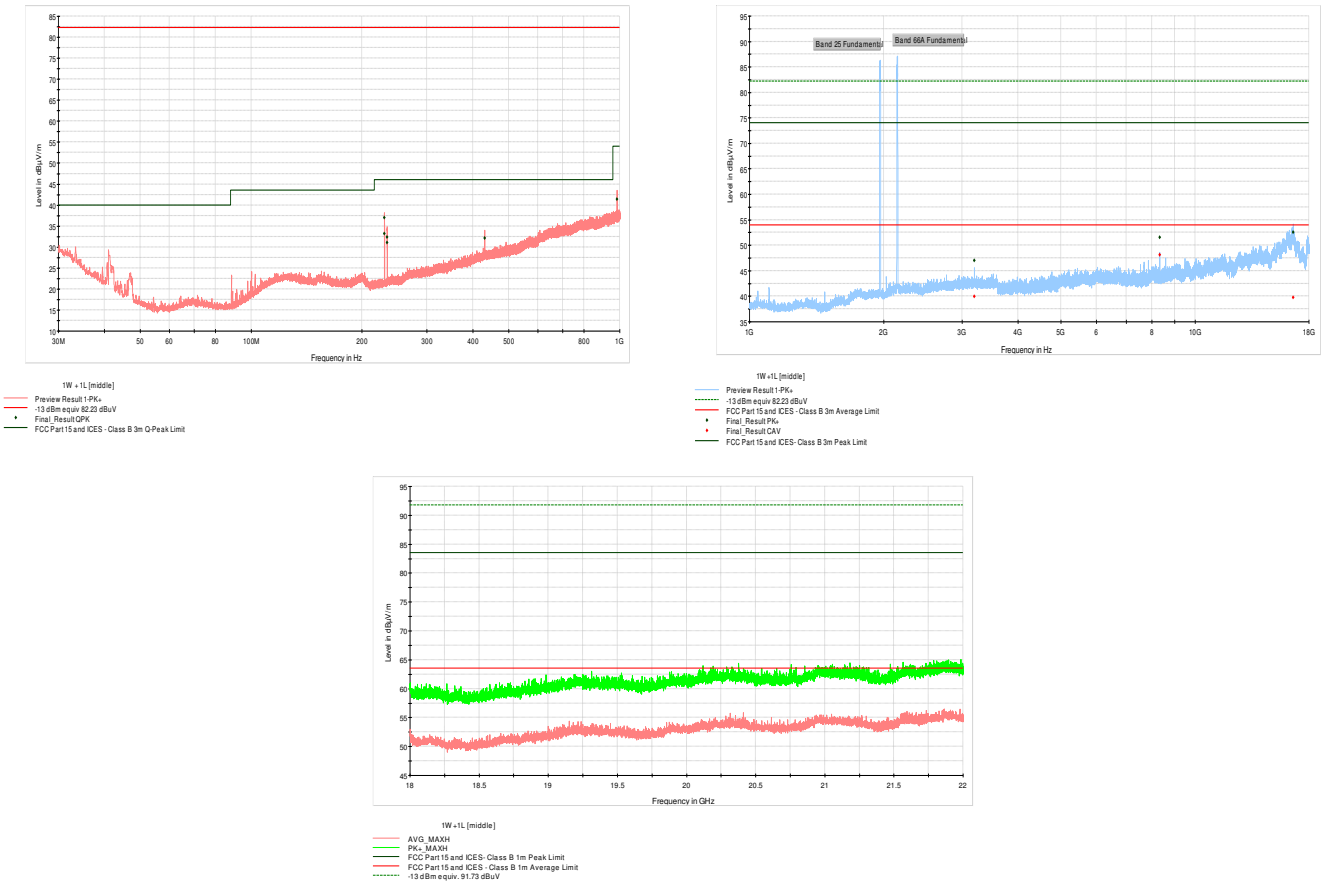

Figure 7.1-6: *Radiated emissions spectral plot (30 to 22000 MHz) –* ***MultiRAT 1W+1L [middle]***

Table 7.1-9: *Radiated emissions results*

Frequency (MHz)	Detector	Field strength[1] (dBµV/m)	3 m limit (dBµV/m)	Margin (dB)	Bandwidth (MHz)	Correction factor[2] (dB)
229.95	QuasiPeak	36.9	46.0	9.1	0.12	13.6
230.04	QuasiPeak	33.2	46.0	12.8	0.12	13.6
233.94	QuasiPeak	32.3	46.0	13.7	0.12	13.8
234.03	QuasiPeak	31.0	46.0	15.0	0.12	13.8
430.08	QuasiPeak	32.1	46.0	13.9	0.12	19.1
983.04	QuasiPeak	41.4	54.0	12.6	0.12	26.8
3194.88	CAverage	40.0	54.0	14.0	1.00	-10.3
8319.93	CAverage	48.1	54.0	5.9	1.00	-2.4
16582.12	CAverage	39.8	54.0	14.2	1.00	12.3
16582.12	MaxPeak	52.5	74.0	21.5	1.00	12.3

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factor = antenna factor ACF (dB) + cable loss (dB)

Sample calculation: 36.9 dBµV/m (field strength) = 23.3 dBµV (receiver reading) + 13.6 dB (Correction factor)

7.1.7 Setup photos

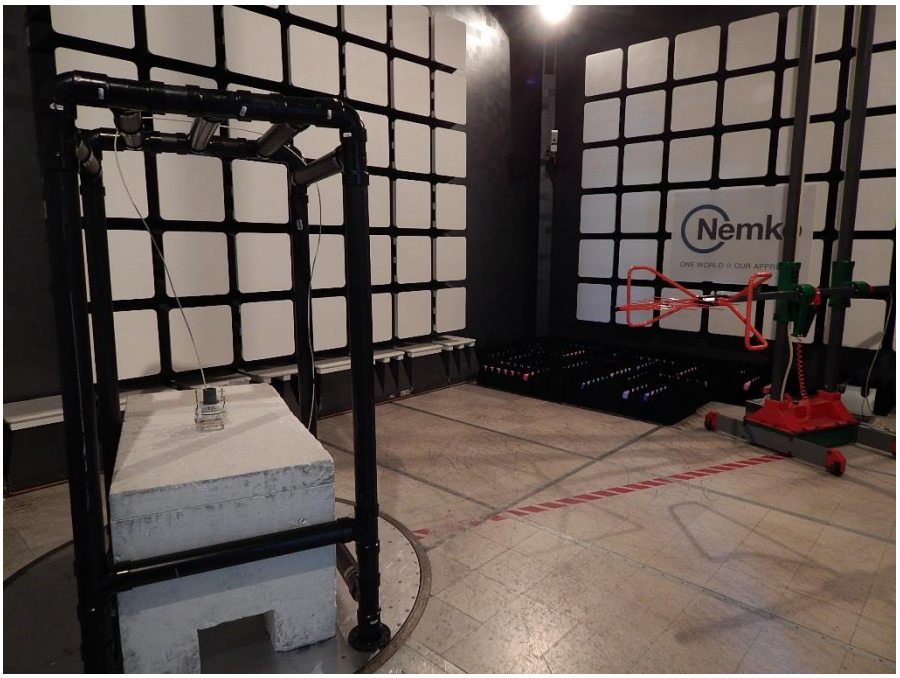

Figure 7.1-7: *Radiated emissions setup photo – below 1 GHz*

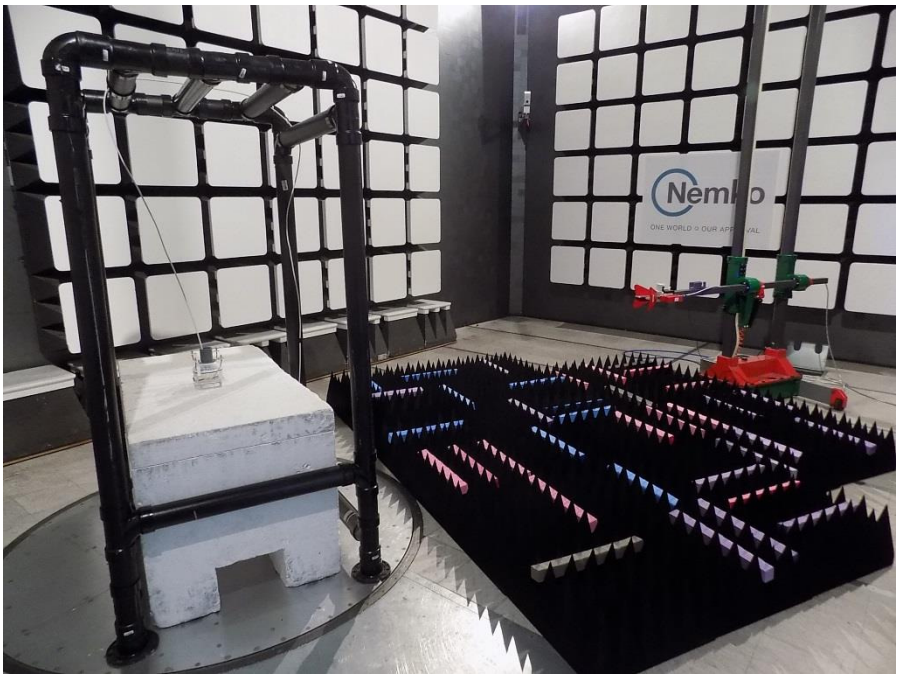

Figure 7.1-8: *Radiated emissions setup photo – above 1 GHz*

7.1.6 Setup photos, continued

Figure 7.1-9: *Radiated emissions setup photo – above 1 GHz*