Nemko

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Wireless test report – 425654-7TRFWL

Type of assessment:

Transmitters co-location

Applicant:

ELEVADORES ATLAS SCHINDLER LTDA

Avenida do Estado, 6116 - 01516-900, São Paulo - Brazil

Product:

Gateway

Model:

Cube Plus XA

FCC ID:

2AZ9H-CUBEPXA

Specifications:

- FCC 47 CFR Part 15 Subpart C, §15.209

  Radiated emission limits; general requirements.

- RSS-GEN, Issue 5, April 2018, section 8.9 – Amendment 1, March 2019 – Amendment 2, February 2021

  Transmitter Emission Limits

Date of issue: April 8, 2021

S. Tessa	
Tested by	Signature
P. Barbieri	
Reviewed by	Signature

Test location(s)

Company name	Nemko Spa
Address	Via del Carroccio, 4
City	Biassono
Province	MB
Postal code	20853
Country	Italy
Telephone	+39 039 220 12 01
Facsimile	+39 039 220 12 21
Website	www.nemko.com
Site number	FCC: 682159; IC: 9109A (10 m semi anechoic chamber)

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 Spa ISO/IEC 17025 accreditation.

Copyright notification

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Section 1. Report summary

1.1 Applicant and manufacturer

Company name	ELEVADORES ATLAS SCHINDLER LTDA
Address	Avenida do Estado, 6116 - 01516-900, São Paulo - Brazil

1.2 Test specifications

FCC 47 CFR Part 15 Subpart C, §15.209	Radiated emission limits; general requirements.
RSS-GEN, Issue 5, April 2018, section 8.9 – Amendment 1, March 2019 – Amendment 2, February 2021	Transmitter Emission Limits for Licence-Exempt Radio Apparatus

1.3 Test methods

ANSI C63.10 v2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

1.4 Statement of compliance

In the configuration tested, the EUT was found compliant.

Testing was performed against all relevant requirements of the test standard except as noted in section 1.5 below. 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.

1.5 Exclusions

As per quote, the purpose of this report is verification of transmitters colocation. Only inter-modulation products within restricted bands were assessed, other requirements were excluded from the scope of this report.

1.6 Test report revision history

Revision #	Date of issue	Details of changes made to test report
425654-7TRFWL	April 8, 2021	Original report issued

Section 2. Summary of test results

2.1 FCC Part 15 Subpart C, general requirements test results

Part	Test description	Verdict
§15.209	Radiated emission limits; general requirements.	Pass

2.2 ISED RSS-GEN, Issue 5, test results

Part	Test description	Verdict
8.9	Transmitter Emission Limits for Licence-Exempt Radio Apparatus	Pass

Section 3. Equipment under test (EUT) details

3.1 Sample information

Receipt date	March 24, 2021
Nemko sample ID number	425654

3.2 EUT information

Product name	Gateway
Model	Cube Plus XA
Serial number	A1XACPG1P12112000002

3.3 Technical information

Frequency band	BLE:2400–2483.5 MHz band and GSM/GPRS, UMTS/HSPA and LTE
EUT power requirements	12 - 24 VDC, Imax ~ 1 A
Antenna information	The EUT uses a unique antenna coupling/ non-detachable antenna to the intentional radiator.

3.4 EUT setup diagram

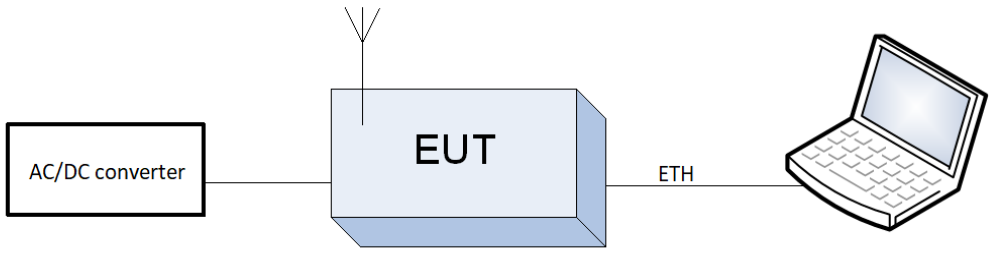


Figure 3.4-1: *Setup diagram*

3.5 Product description and theory of operation

The EUT is the easiest way to get telecommunication services to premises that cannot be reached by telephone landlines, but where there is adequate cellular telephone coverage.
It has an integrated radio module (CUBE PLUS XA) with BLE connectivity, and a Telit radio module (LE910C4-LA) with 2G, 3G, 4G connectivity.
Software version: 5.4.47-cube-plus

3.6 EUT exercise details

To set the EUT is continuous transmission the radio tester CMW250 and AT commands (provided by the applicant) have been used.:

BLE command (CH 19):
fcc_le_tx 0 19 255 1

Radio Tester:
GSM850 (850)
GSM1900 (1900)
LTE BAND4 (1700)
LTE BAND7 (2600)

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

The EUT uses a CUBE PLUS XA radio module with BLE standard.
The radio module Telit uses the following standards GSM, UMTS and LTE. GSM and LTE standards are chosen to be the representative worst-case.

4.3 Deviations from laboratory tests procedures

No deviations were made from laboratory procedures.

Section 5. Test conditions

5.1 Atmospheric conditions

In the laboratory, the following ambient conditions are respected for each test reported below:

Temperature	18 – 33 °C
Relative humidity	25 – 70 %
Air pressure	860 – 1060 mbar

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

The following instruments are used to monitor the environmental conditions:

Equipment	Manufacturer	Model no.	Asset no.	Cal date	Next cal.
Thermo-hygrometer data loggers	Testo	175-H2	20012380/305	12/2020	12/2022
Thermo-hygrometer data loggers	Testo	175-H2	38203337/703	12/2020	12/2022
Barometer	Castle	GPB 3300	072015	03/2020	03/2021

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

The measurement uncertainty was calculated for each test and quantity listed in this test report, according to CISPR 16-4-2 and other specific test standard and is documented in Nemko Spa working manual WML1002.
The assessment of conformity for each test performed on the equipment is performed not taking into account the measurement uncertainty. The two following possible verdicts are stated in the report:
P (Pass) - The measured values of the equipment respect the specification limit at the points tested. The specific risk of false accept is up to 50% when the measured result is close to the limit.
F (Fail) - One or more measured values of the equipment do not respect the specification limit at the points tested. The specific risk of false reject is up to 50% when the measured result is close to the limit.
Hereafter Nemko's measurement uncertainties are reported:

EUT	Type	Test	Range	Measurement Uncertainty	Notes
Transmitter	Conducted	Frequency error	0.001 MHz ÷ 40 GHz	0.08 ppm	(1)
		Carrier power RF Output Power	0.009 MHz ÷ 30 MHz	1.1 dB	(1)
			30 MHz ÷ 18 GHz	1.5 dB	(1)
			18 MHz ÷ 40 GHz	3.0 dB	(1)
			40 MHz ÷ 140 GHz	5.0 dB	(1)
		Adjacent channel power	1 MHz ÷ 18 GHz	1.4 dB	(1)
		Conducted spurious emissions	0.009 MHz ÷ 18 GHz	3.0 dB	(1)
			18 GHz ÷ 40 GHz	4.2 dB	(1)
			40 GHz ÷ 220 GHz	6.0 dB	(1)
		Intermodulation attenuation	1 MHz ÷ 18 GHz	2.2 dB	(1)
		Attack time – frequency behaviour	1 MHz ÷ 18 GHz	2.0 ms	(1)
		Attack time – power behaviour	1 MHz ÷ 18 GHz	2.5 ms	(1)
		Release time – frequency behaviour	1 MHz ÷ 18 GHz	2.0 ms	(1)
		Release time – power behaviour	1 MHz ÷ 18 GHz	2.5 ms	(1)
		Transient behaviour of the transmitter– Transient frequency behaviour	1 MHz ÷ 18 GHz	0.2 kHz	(1)
		Transient behaviour of the transmitter – Power level slope	1 MHz ÷ 18 GHz	9%	(1)
		Frequency deviation - Maximum permissible frequency deviation	0.001 MHz ÷ 18 GHz	1.3%	(1)
		Frequency deviation - Response of the transmitter to modulation frequencies above 3 kHz	0.001 MHz ÷ 18 GHz	0.5 dB	(1)
		Dwell time	-	3%	(1)
		Hopping Frequency Separation	0.01 MHz ÷ 18 GHz	1%	(1)
		Occupied Channel Bandwidth	0.01 MHz ÷ 18 GHz	2%	(1)
		Modulation Bandwidth	0.01 MHz ÷ 18 GHz	2%	(1)
	Radiated	Radiated spurious emissions	0.009 MHz ÷ 26.5 GHz	6.0 dB	(1)
			26.5 GHz ÷ 66 GHz	8.0 dB	(1)
			66 GHz ÷ 220 GHz	10 dB	(1)
		Effective radiated power transmitter	10 kHz ÷ 26.5 GHz	6.0 dB	(1)
			26.5 GHz ÷ 66 GHz	8.0 dB	(1)
			66 GHz ÷ 220 GHz	10 dB	(1)

NOTES:
(1) The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k = 2, which for a normal distribution corresponds to a coverage probability of approximately 95 %

Section 7. Test equipment

7.1 Test equipment list

Table 7.1-1: *Equipment list*

Equipment	Manufacturer	Model no.	Asset no.	Cal cycle	Next cal.
EMI receiver (20 Hz ÷ 8 GHz)	Rohde & Schwarz	ESU8	100202	08/2020	08/2021
EMI receiver (2 Hz ÷ 44 GHz)	Rohde & Schwarz	ESW44	101620	09/2020	09/2021
Spectrum Analyzer (2 Hz ÷ 43 GHz)	Rohde & Schwarz	FSW43	101767	01/2021	01/2022
Trilog Antenna (30 MHz ÷ 7 GHz)	Schwarzbeck	VULB 9162	9162-025	07/2018	07/2021
Bilog antenna (1 ÷ 18 GHz)	Schwarzbeck	STLP 9148	9148-123	07/2018	07/2021
Horn Antenna (4 ÷ 40 GHz)	RFSpin	DRH40	061106A40	04/2020	04/2023
Preamplifier (1 ÷ 18 GHz)	Schwarzbeck	BBV 9718C	00121	01/2021	01/2022
Preamplifier (18 ÷ 40 GHz)	Sage	STB-1834034030-KFKF-L1	18490-01	03/2020	03/2021
Controller	Maturo	FCU3.0	10041	NCR	NCR
Tilt antenna mast	Maturo	TAM4.0-E	10042	NCR	NCR
Turntable	Maturo	TT4.0-5T	2.527	NCR	NCR
Semi-anechoic chamber	Nemko	10m semi-anechoic chamber	530	09/2019	09/2021
Shielded room	Siemens	10m control room	1947	NCR	NCR

Notes: NCR - no calibration required, VOU - verify on use

Section 8. Testing data

8.1 FCC 15.209 and RSS-GEN section 8.9 Radiated emission limits; general requirements

8.1.1 Definitions and limits

FCC:
(f) In accordance with §15.33(a), in some cases the emissions from an intentional radiator must be measured to beyond the tenth harmonic of the highest fundamental frequency designed to be emitted by the intentional radiator because of the incorporation of a digital device. If measurements above the tenth harmonic are so required, the radiated emissions above the tenth harmonic shall comply with the general radiated emission limits applicable to the incorporated digital device, as shown in §15.109 and as based on the frequency of the emission being measured, or, except for emissions contained in the restricted frequency bands shown in §15.205, the limit on spurious emissions specified for the intentional radiator, whichever is the higher limit. Emissions which must be measured above the tenth harmonic of the highest fundamental frequency designed to be emitted by the intentional radiator and which fall within the restricted bands shall comply with the general radiated emission limits in §15.109 that are applicable to the incorporated digital device.

ISED:
Except when the requirements applicable to a given device state otherwise, emissions from licence‑exempt transmitters shall comply with the field strength limits shown in Table below. Additionally, the level of any transmitter emission shall not exceed the level of the transmitter's fundamental emission.

Table 8.1-1: *FCC §15.209 and RSS-Gen – Radiated emission limits*

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

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

Table 8.1-2: *ISED restricted frequency bands*

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

Note: Certain frequency bands listed in Table 8.1-2 and above 38.6 GHz are designated for licence-exempt applications. These frequency bands and the requirements that apply to related devices are set out in the 200 and 300 series of RSSs.

Table 8.1-3: *FCC restricted frequency bands*

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

8.1.2 Test summary

Test start date	March 31, 2021
Test engineer	S. Tessa

8.1.3 Observations, settings and special notes

The spectrum was searched from 30 MHz to 25.8 GHz.
EUT's LTE and WIFI transmitters were set to transmit continuously, different channel setting has been investigated as per provided by client's setup, only the worst-case is presented.
Radiated measurements were performed at a distance of 3 m for frequency rand below 18 GHz, and 1 m for frequency range above 18 GHz. No inter-modulation products emissions were detected above 18 GHz within 6 dB below the limit.

Spectrum analyzer settings for frequencies below 30 MHz:

Detector mode	Quasi-Peak
Resolution bandwidth	9 kHz
Video bandwidth	30 kHz
Trace mode	Max Hold
Measurement time	100 ms

Spectrum analyser settings for radiated measurements within restricted bands 30 MHz to 1 GHz:

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

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

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

8.1.4 Test data

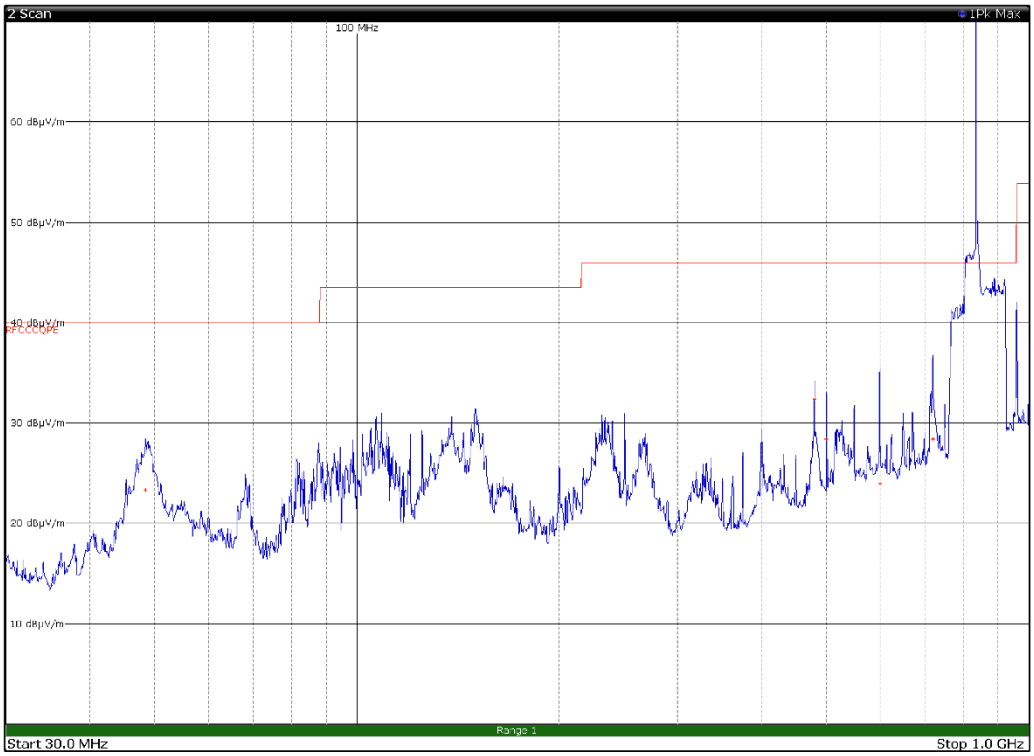


Figure 8.1-1: *Radiated spurious emissions with GSM 850 at mid channel and BLE at mid channel – antenna in horizontal polarization*

Note: Emissions above the limit were intentional. No intermodulation emissions were detected

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
48.4200	23.4	40.0	-16.6	QP
480.0000	32.4	46.0	-13.6	QP
500.0100	28.4	46.0	-17.6	QP
600.0000	24.0	46.0	-22.0	QP
720.0000	28.5	46.0	-17.5	QP
Notes: Field strength includes correction factor of antenna, cable loss, amplifier, and attenuators where applicable.				

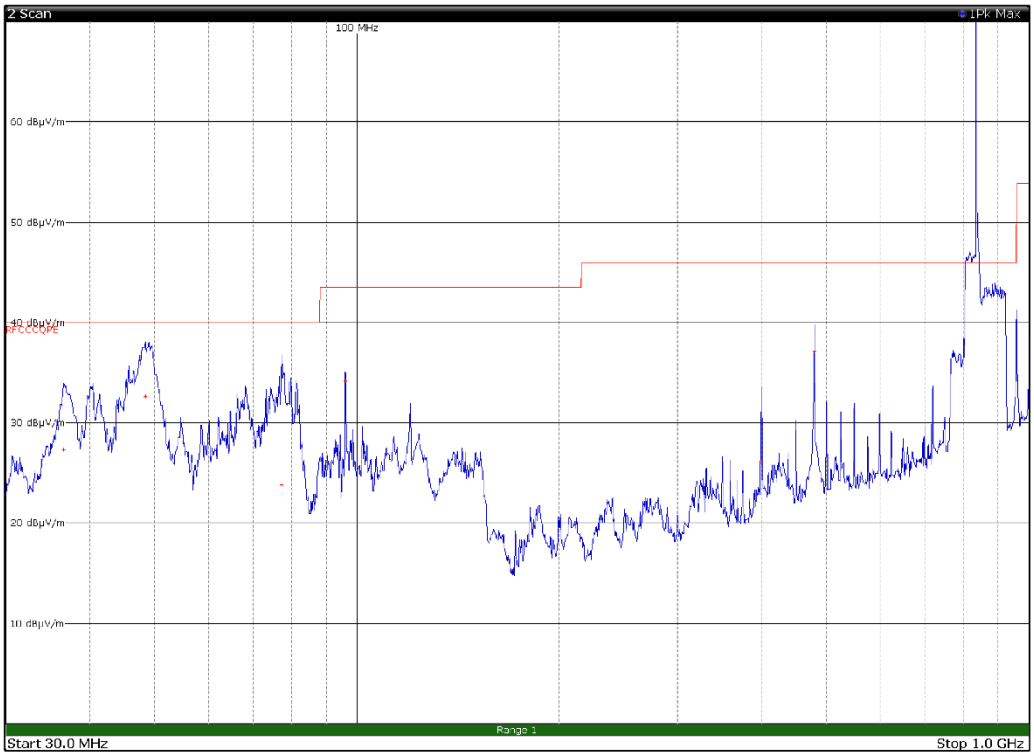


Figure 8.1-2: *Radiated spurious emissions with GSM 850 at mid channel and BLE at mid channel – antenna in vertical polarization*

Note: Emissions above the limit were from intentional emissions. No intermodulation emissions were detected

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
36.6000	27.4	40.0	-12.6	QP
48.3600	32.7	40.0	-7.3	QP
77.1900	23.9	40.0	-16.1	QP
96.0000	34.2	43.5	-9.3	QP
400.0200	26.0	46.0	-20.0	QP
480.0000	37.2	46.0	-8.8	QP
Notes: Field strength includes correction factor of antenna, cable loss, amplifier, and attenuators where applicable.				

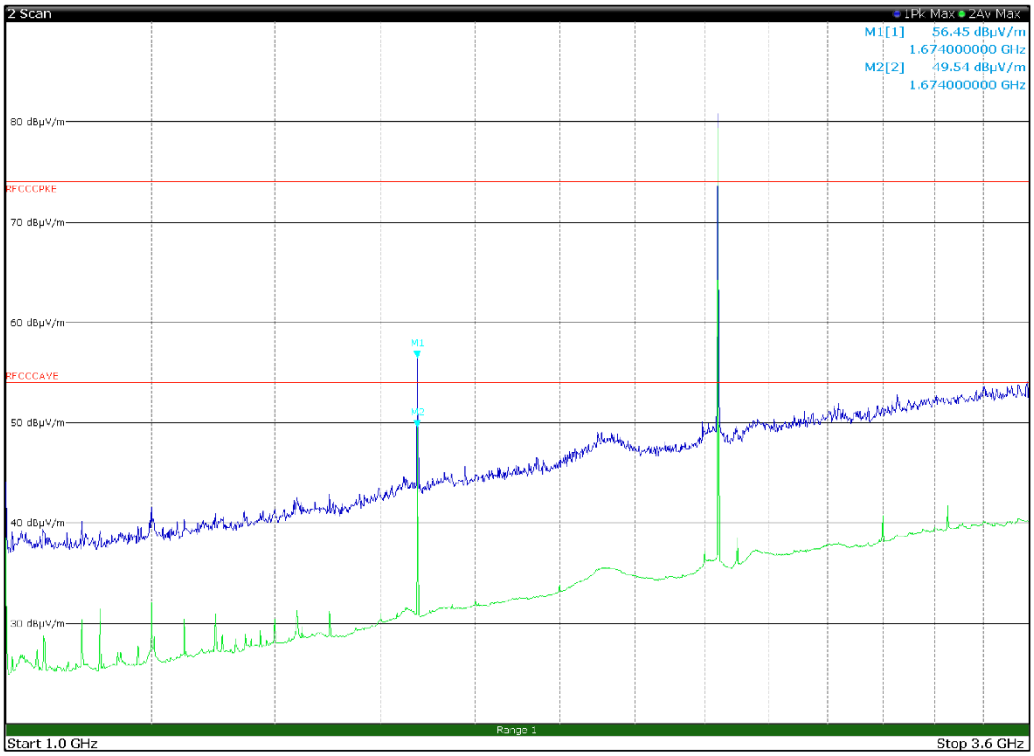


Figure 8.1-3: *Radiated spurious emissions with GSM 850 at mid channel and BLE at mid channel – antenna in horizontal polarization*

Note: Emissions above the limit were intentional. No intermodulation emissions were detected

The limit for GSM 850 is -13 dBm. Limit (dBµV/m) = limit (dBm) + 95.23 = 82.2 dBµV/m

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1674.0000	56.5	82.2	-25.7	Peak
Notes: Field strength includes correction factor of antenna, cable loss, amplifier, and attenuators where applicable.				

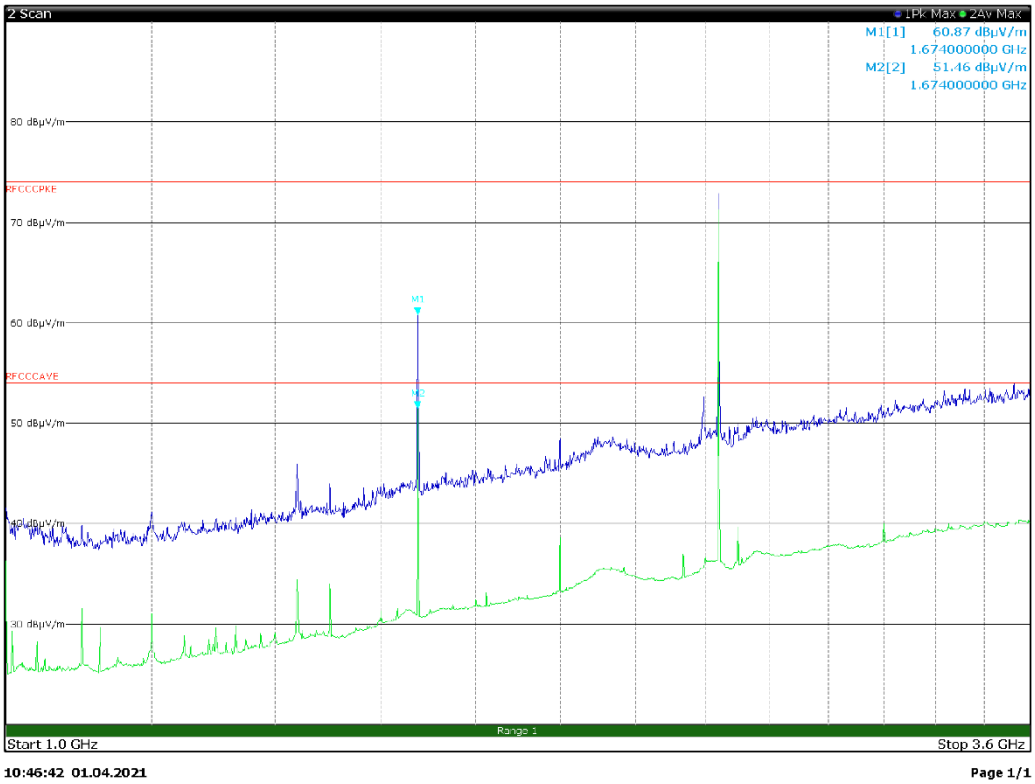


Figure 8.1-4: *Radiated spurious emissions with GSM 850 at mid channel and BLE at mid channel – antenna in vertical polarization*

Note: Emissions above the limit were from intentional emissions. No intermodulation emissions were detected

The limit for GSM 850 is -13 dBm. Limit (dBµV/m) = limit (dBm) + 95.23 = 82.2 dBµV/m

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1674.0000	60.9	82.2	-21.3	Peak
Notes: Field strength includes correction factor of antenna, cable loss, amplifier, and attenuators where applicable.				

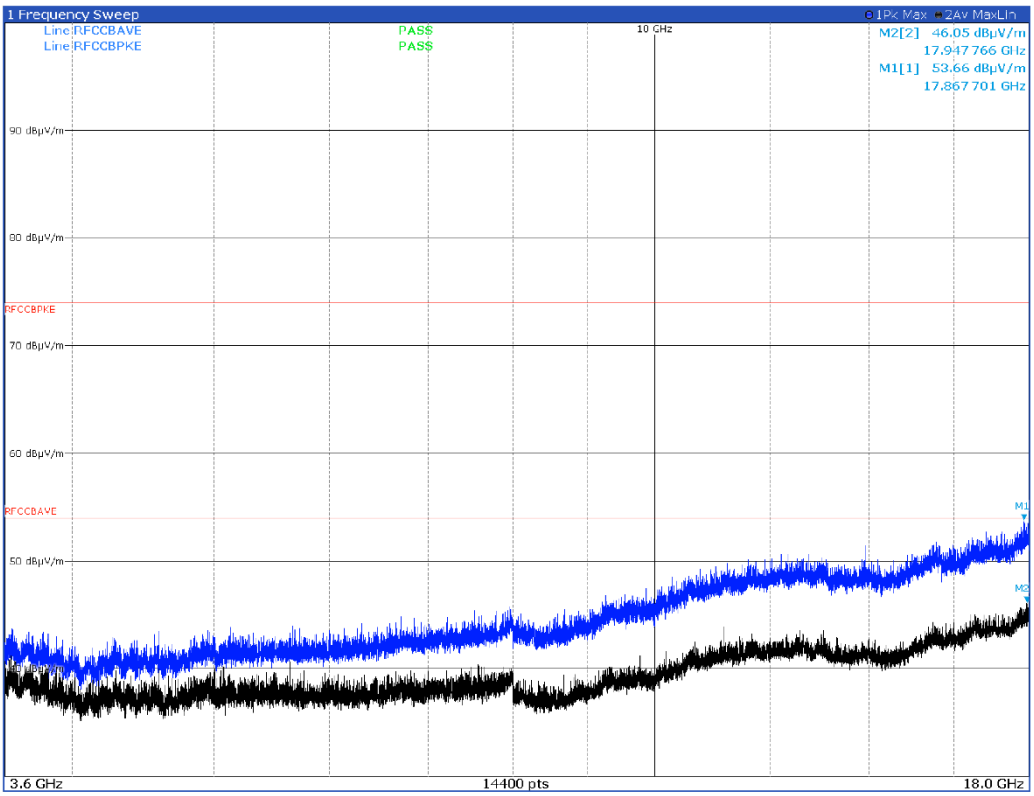


Figure 8.1-5: *Radiated spurious emissions with GSM 850 at mid channel and BLE at mid channel – antenna in horizontal polarization*

Peak level under the average limit – no additional measures need. No intermodulation emissions were detected

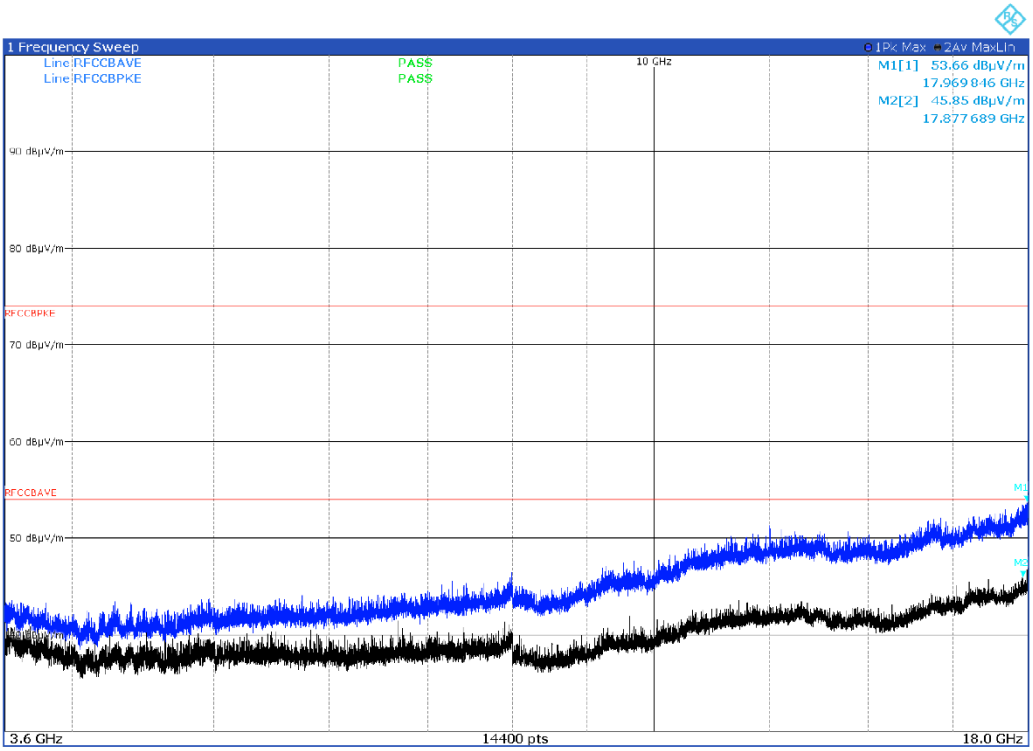


Figure 8.1-6: *Radiated spurious emissions with GSM 850 at mid channel and BLE at mid channel – antenna in vertical polarization*

Peak level under the average limit – no additional measures need. No intermodulation emissions were detected

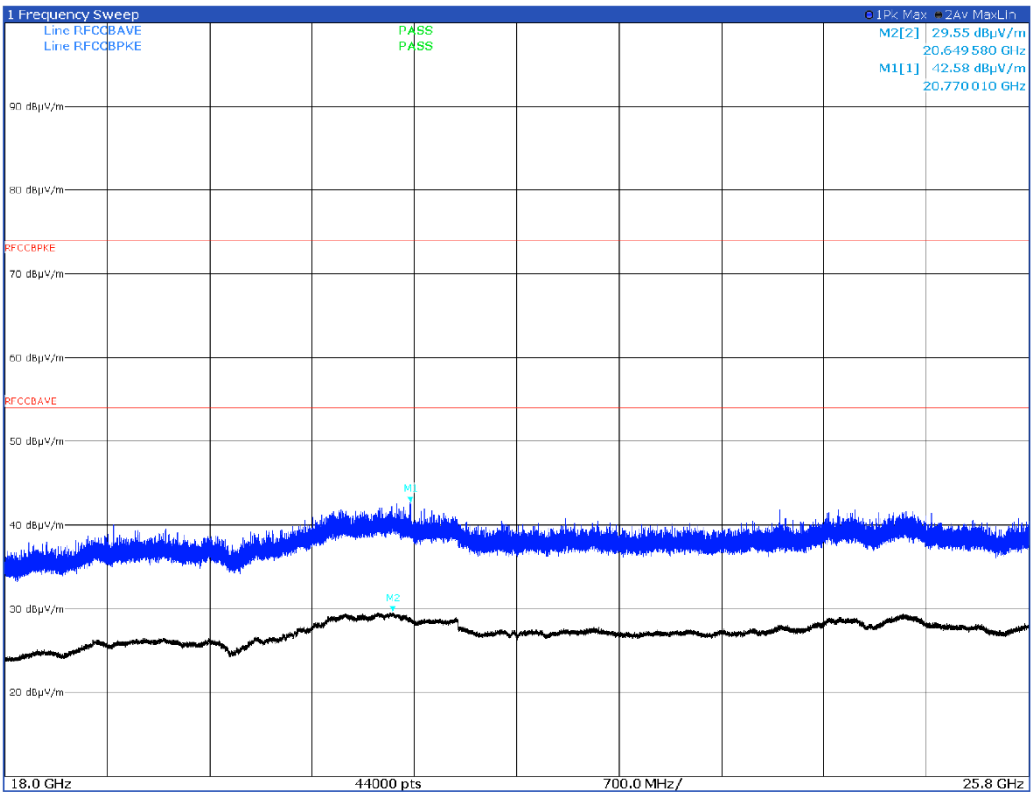


Figure 8.1-7: *Radiated spurious emissions with GSM 850 at mid channel and BLE at mid channel – antenna in horizontal polarization*

Peak level under the average limit – no additional measures need. No intermodulation emissions were detected

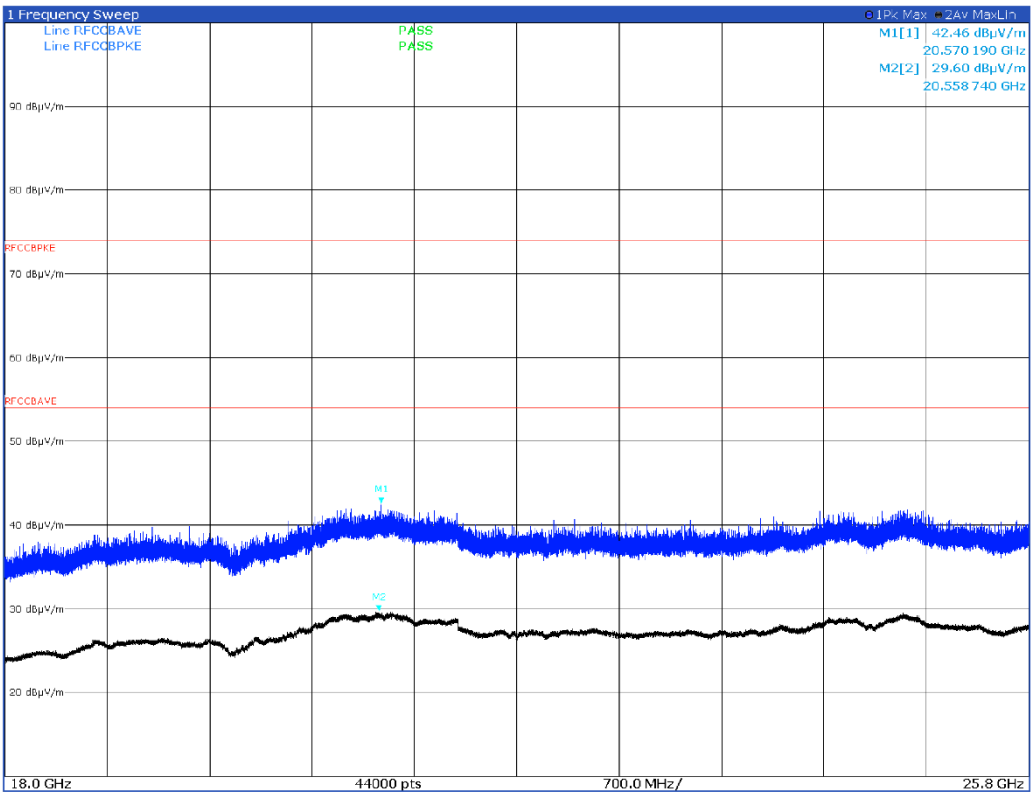


Figure 8.1-8: *Radiated spurious emissions with GSM 850 at mid channel and BLE at mid channel – antenna in vertical polarization*

Peak level under the average limit – no additional measures need. No intermodulation emissions were detected

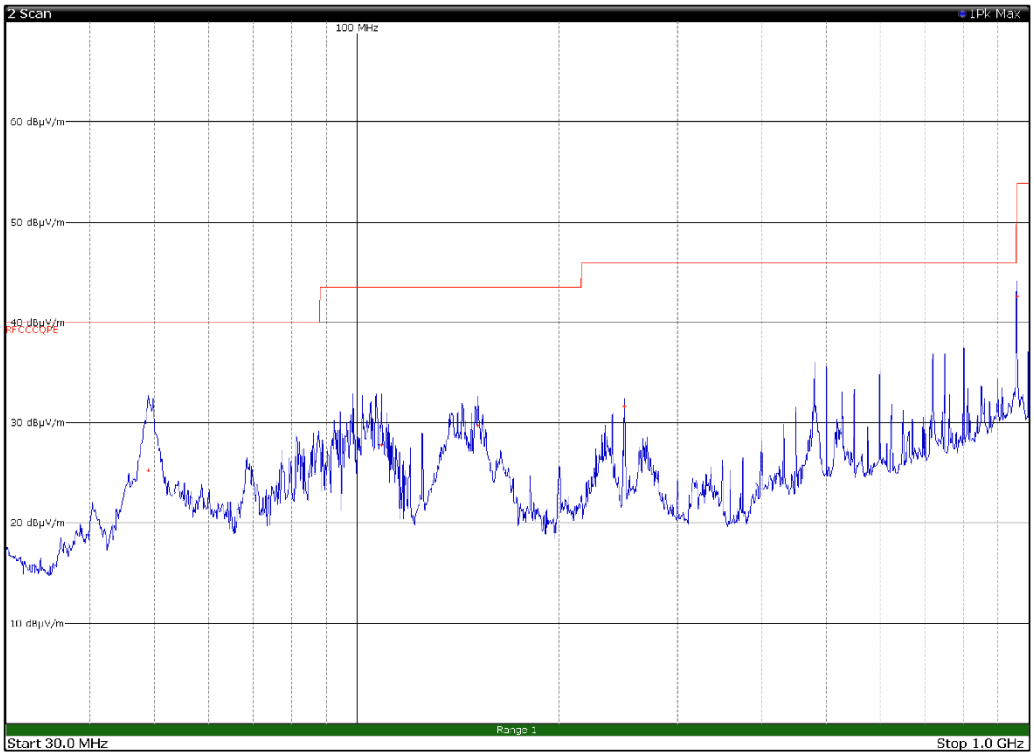


Figure 8.1-9: *Radiated spurious emissions with GSM 1900 at mid channel and BLE at mid channel – antenna in horizontal polarization*

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
48.9000	25.3	40.0	-14.7	QP
108.8100	27.8	43.5	-15.7	QP
151.5600	29.7	43.5	-13.8	QP
249.9900	31.6	46.0	-14.4	QP
960.0000	42.7	53.9	-11.2	QP
Notes: Field strength includes correction factor of antenna, cable loss, amplifier, and attenuators where applicable.				

No intermodulation emissions were detected

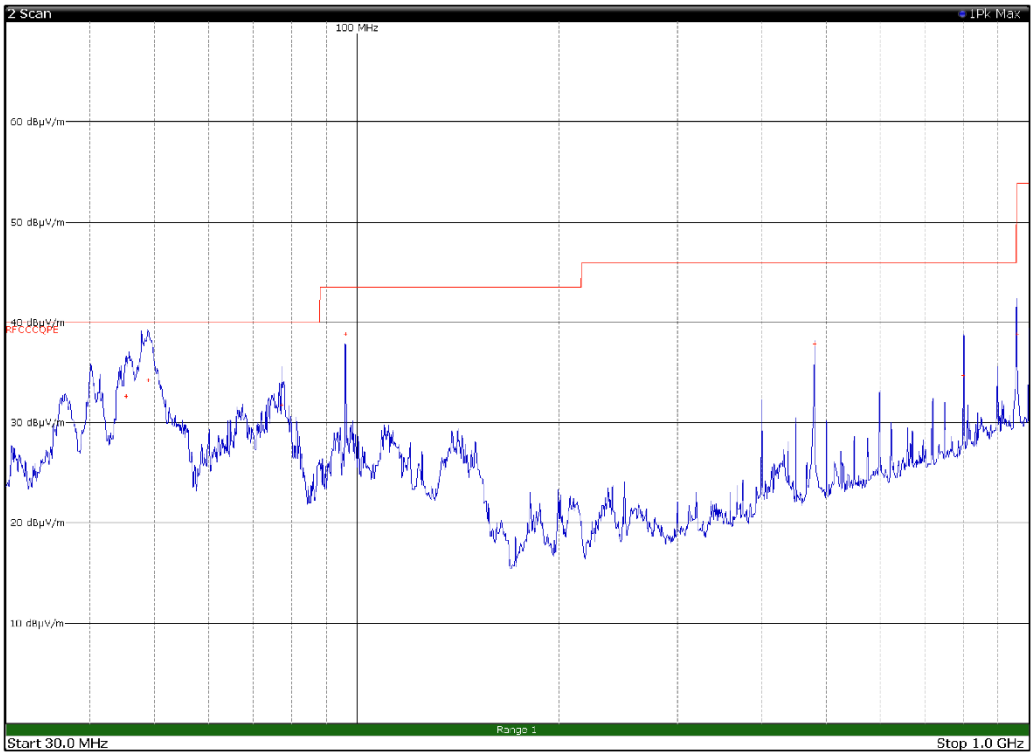


Figure 8.1-10: *Radiated spurious emissions with GSM 1900 at mid channel and BLE at mid channel – antenna in vertical polarization*

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
45.2400	32.6	40.0	-7.4	QP
48.8400	34.2	40.0	-5.8	QP
77.1900	31.8	40.0	-8.2	QP
96.0000	38.9	43.5	-4.6	QP
480.0000	37.9	46.0	-8.1	QP
800.0100	34.7	46.0	-11.3	QP
960.0000	38.8	53.9	-15.1	QP
Notes: Field strength includes correction factor of antenna, cable loss, amplifier, and attenuators where applicable.				

No intermodulation emissions were detected

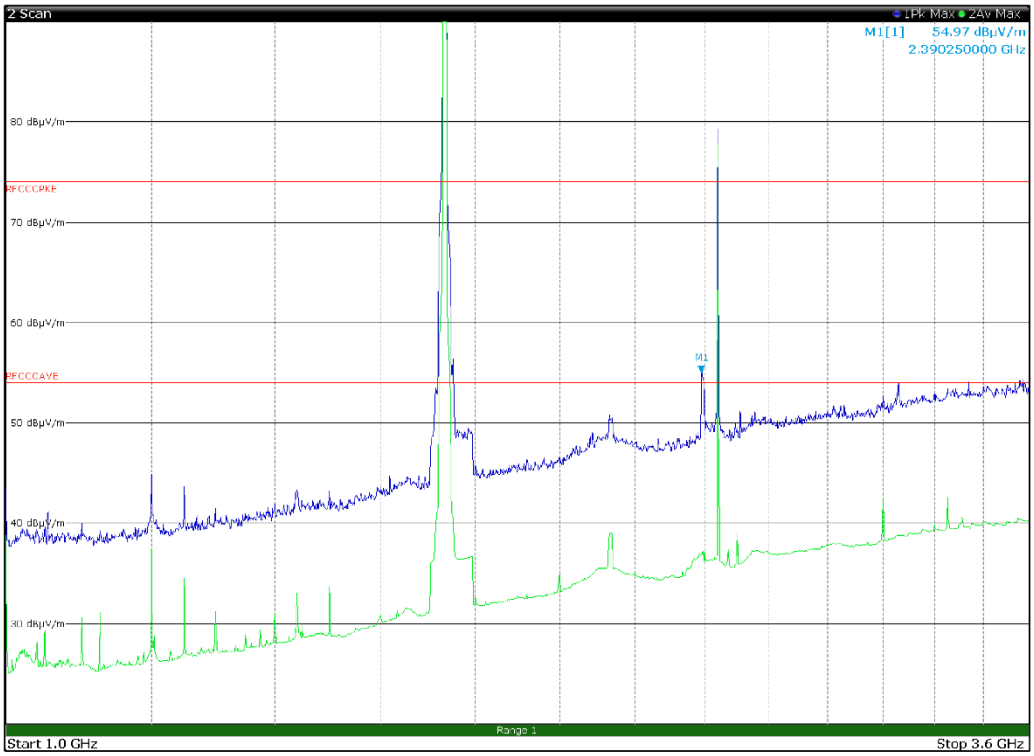


Figure 8.1-11: *Radiated spurious emissions with GSM 1900 at mid channel and BLE at mid channel – antenna in horizontal polarization*

Note: Emissions above the limit were from intentional emissions. No intermodulation emissions were detected

The limit for GSM 1900 is -13 dBm. Limit (dBµV/m) = limit (dBm) + 95.23 = 82.2 dBµV/m

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
2390.2500	55.0	82.2	-27.2	Peak
Notes: Field strength includes correction factor of antenna, cable loss, amplifier, and attenuators where applicable.				

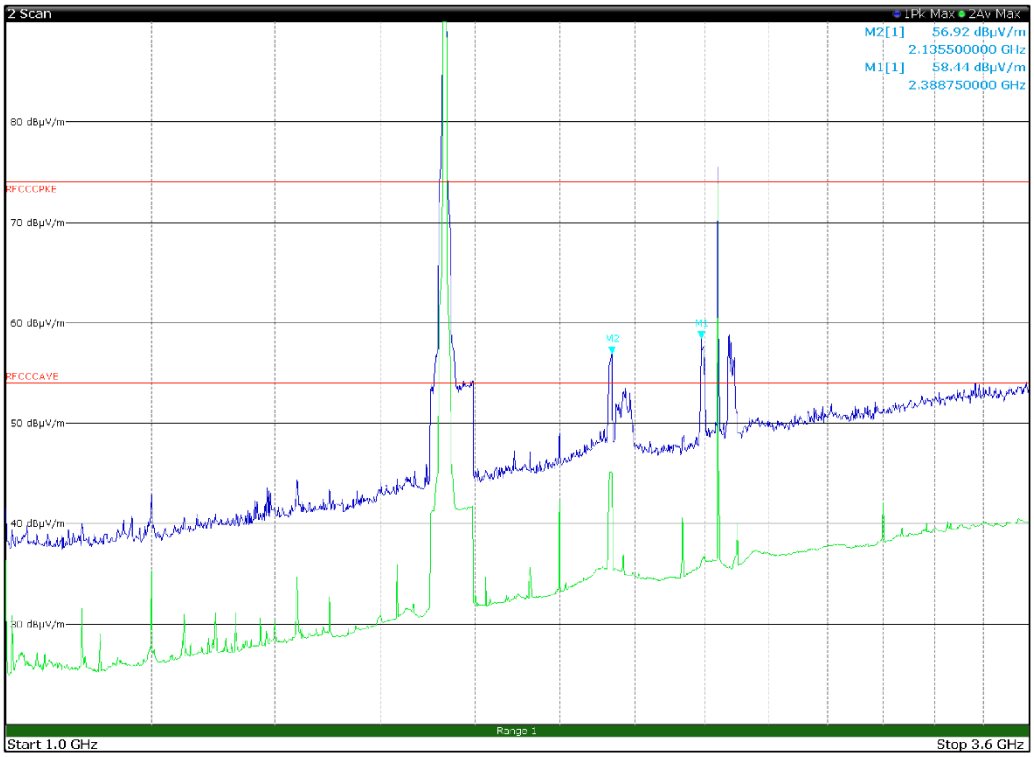


Figure 8.1-12: *Radiated spurious emissions with GSM 1900 at mid channel and BLE at mid channel – antenna in vertical polarization*

Note: Emissions above the limit were from intentional emissions. No intermodulation emissions were detected

The limit for GSM 1900 is -13 dBm. Limit (dBµV/m) = limit (dBm) + 95.23 = 82.2 dBµV/m

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
2135.5000	57.0	82.2	-25.2	Peak
2388.7500	58.5	74.0	-15.5	Peak
Notes: Field strength includes correction factor of antenna, cable loss, amplifier, and attenuators where applicable.				

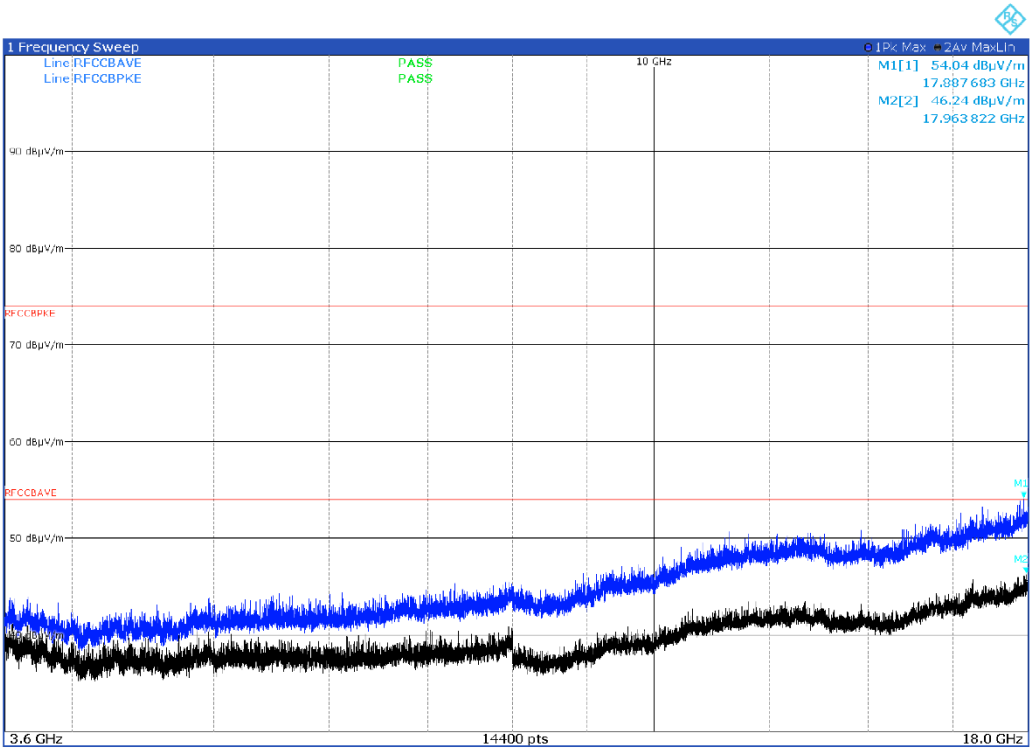


Figure 8.1-13: *Radiated spurious emissions with GSM 1900 at mid channel and BLE at mid channel – antenna in horizontal polarization*

Limits exceed by the GSM 1900 spurious emission. No intermodulation emissions were detected

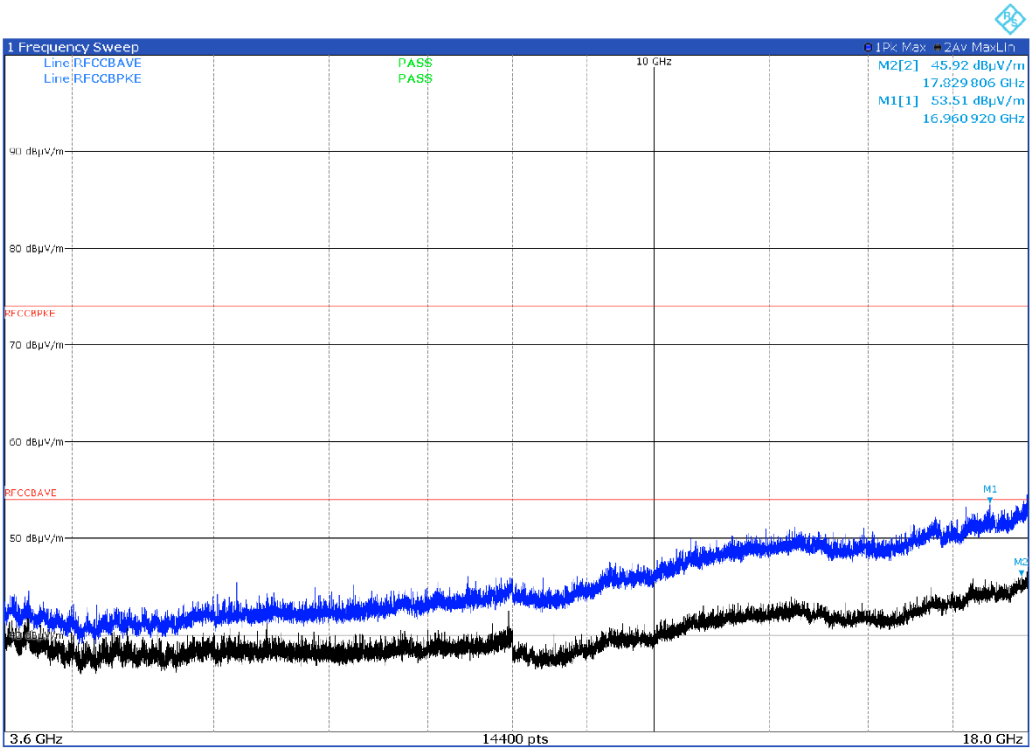


Figure 8.1-14: *Radiated spurious emissions with GSM 1900 at mid channel and BLE at mid channel – antenna in vertical polarization*

Limits exceed by the GSM 1900 spurious emission. No intermodulation emissions were detected

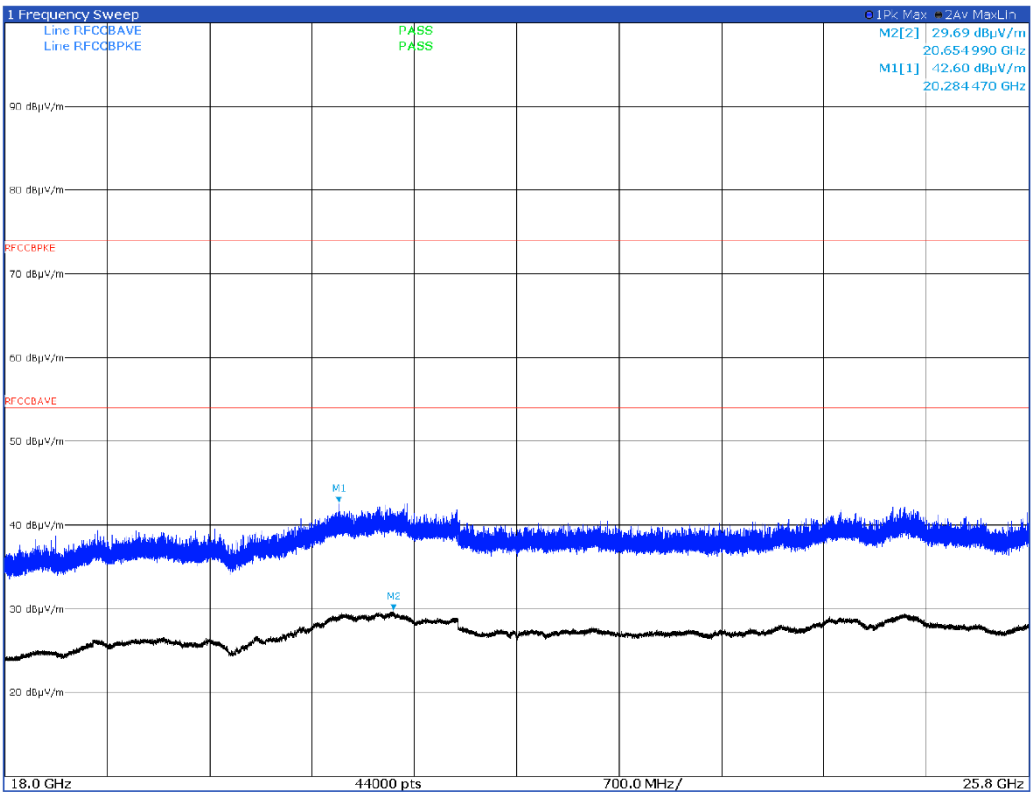


Figure 8.1-15: *Radiated spurious emissions with GSM 1900 at mid channel and BLE at mid channel – antenna in horizontal polarization*

Peak level under the average limit – no additional measures need. No intermodulation emissions were detected

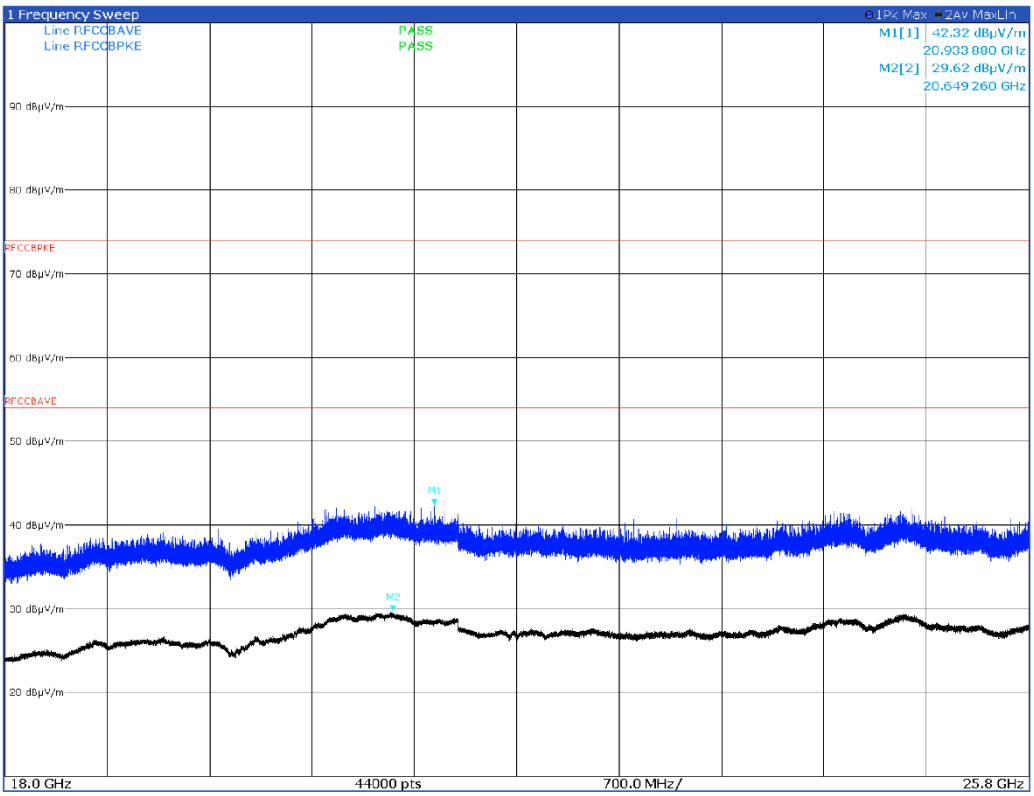


Figure 8.1-16: *Radiated spurious emissions with GSM 1900 at mid channel and BLE at mid channel – antenna in vertical polarization*

Peak level under the average limit – no additional measures need. No intermodulation emissions were detected

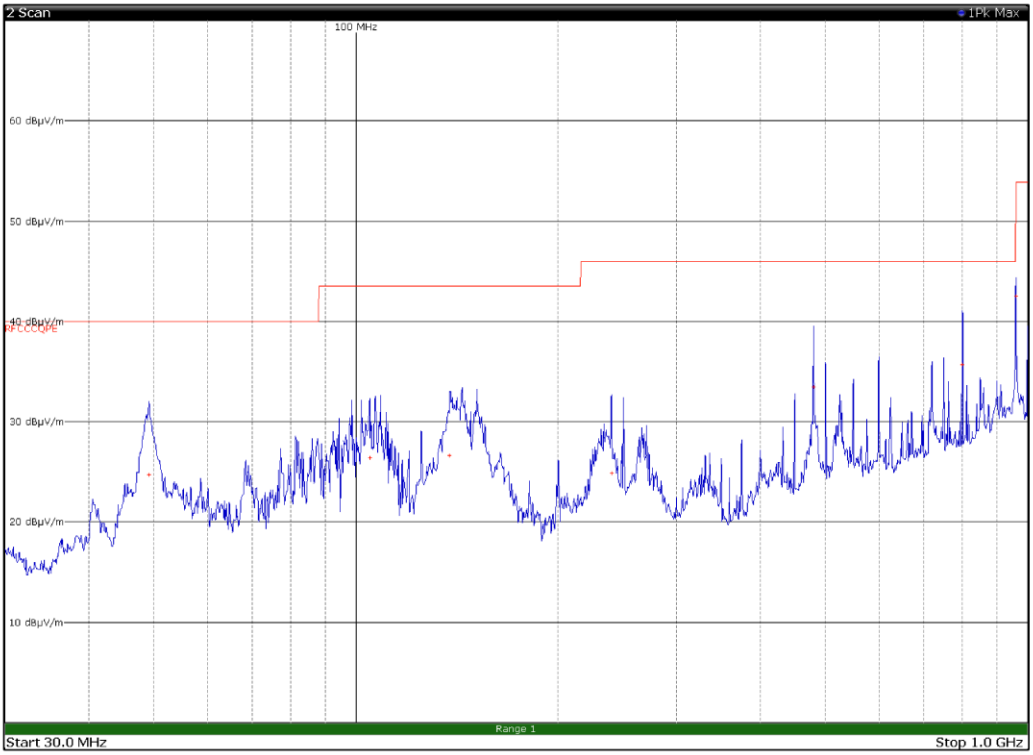


Figure 8.1-17: *Radiated spurious emissions with LTE B4 at mid channel and BLE at mid channel – antenna in horizontal polarization*

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
49.2000	24.8	40.0	-15.2	QP
104.7600	26.5	43.5	-17.0	QP
137.7600	26.7	43.5	-16.8	QP
240.0000	24.9	46.0	-21.1	QP
480.0000	33.5	46.0	-12.5	QP
800.0100	35.7	46.0	-10.3	QP
960.0000	42.6	53.9	-11.3	QP
Notes: Field strength includes correction factor of antenna, cable loss, amplifier, and attenuators where applicable.				

No intermodulation emissions were detected

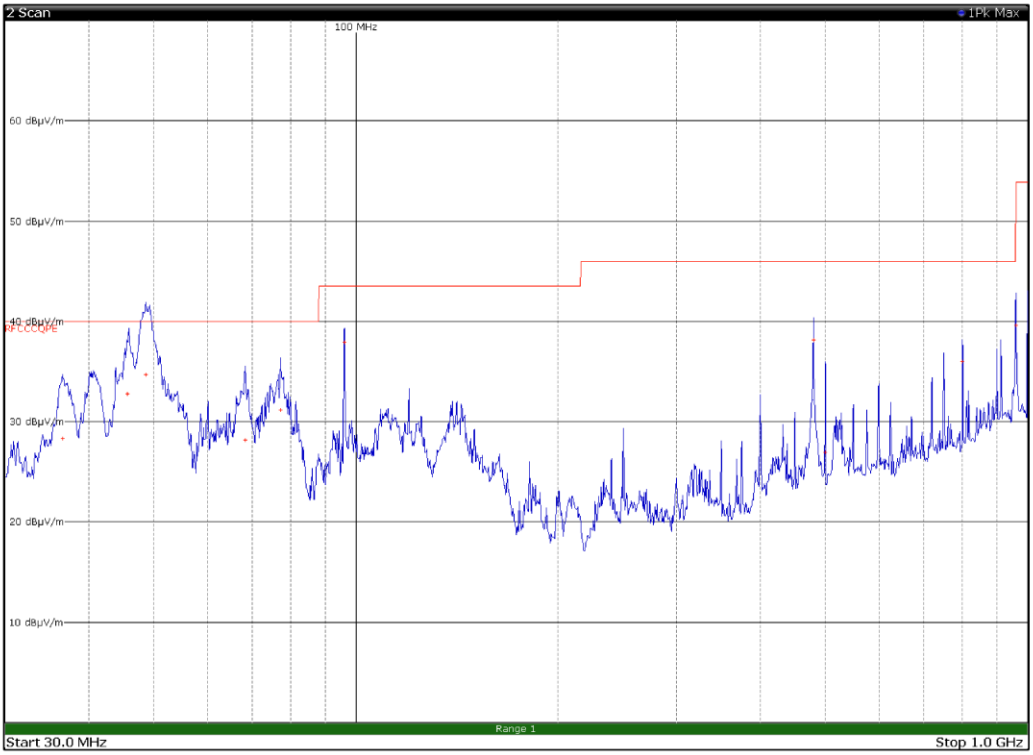


Figure 8.1-18: *Radiated spurious emissions with LTE B4 at mid channel and BLE at mid channel – antenna in vertical polarization*

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
36.5400	28.4	40.0	-11.6	QP
45.6000	32.8	40.0	-7.2	QP
48.6000	34.7	40.0	-5.3	QP
68.3700	28.2	40.0	-11.8	QP
77.2200	31.2	40.0	-8.8	QP
96.0000	38.0	43.5	-5.5	QP
480.0000	38.2	46.0	-7.8	QP
500.0100	27.0	46.0	-19.0	QP
800.0100	36.0	46.0	-10.0	QP
960.0000	39.7	53.9	-14.2	QP
Notes: Field strength includes correction factor of antenna, cable loss, amplifier, and attenuators where applicable.				

No intermodulation emissions were detected

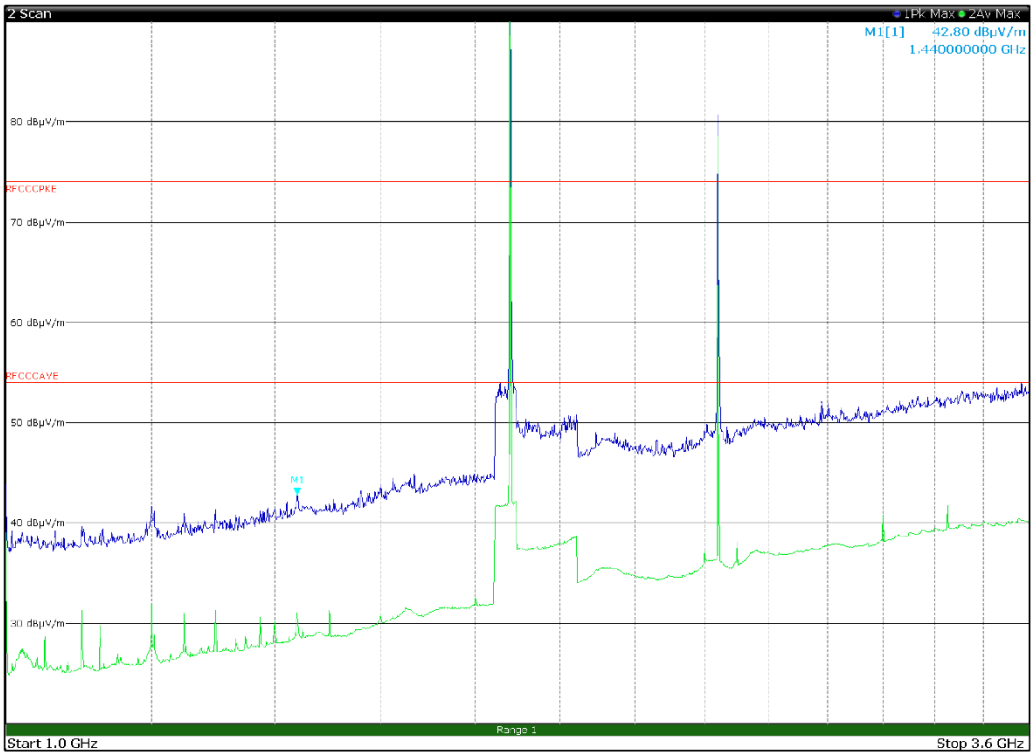


Figure 8.1-19: *Radiated spurious emissions with LTE B4 at mid channel and BLE at mid channel – antenna in horizontal polarization*

Note: Emissions above the limit were from intentional emissions. No intermodulation emissions were detected

Peak level under the average limit – no additional measures need

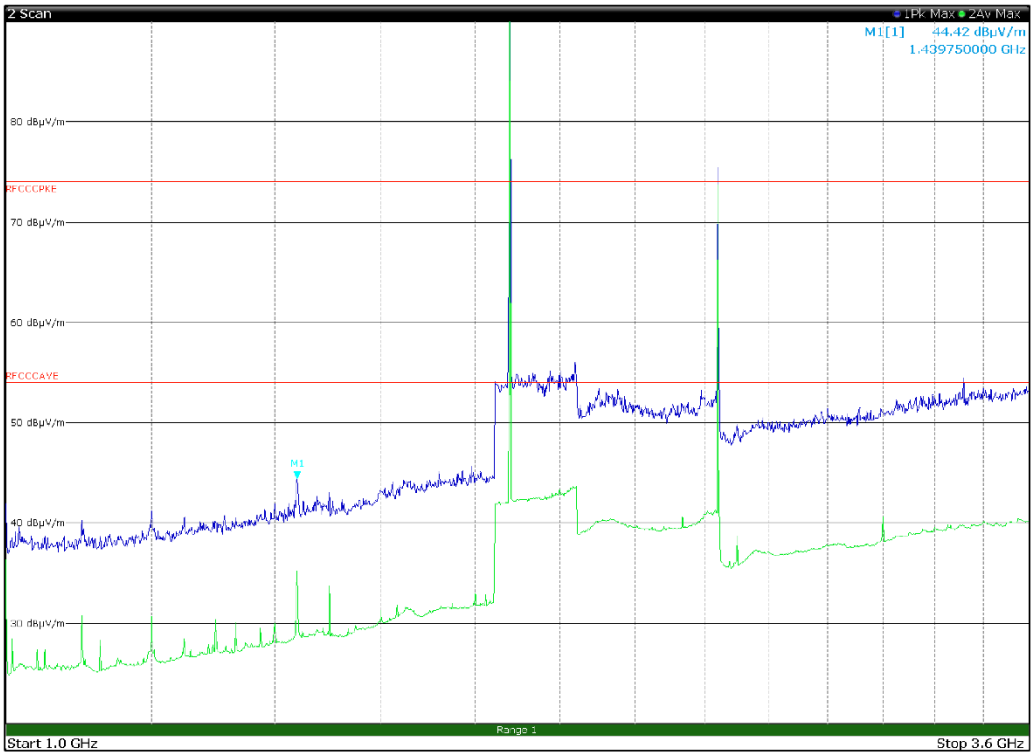
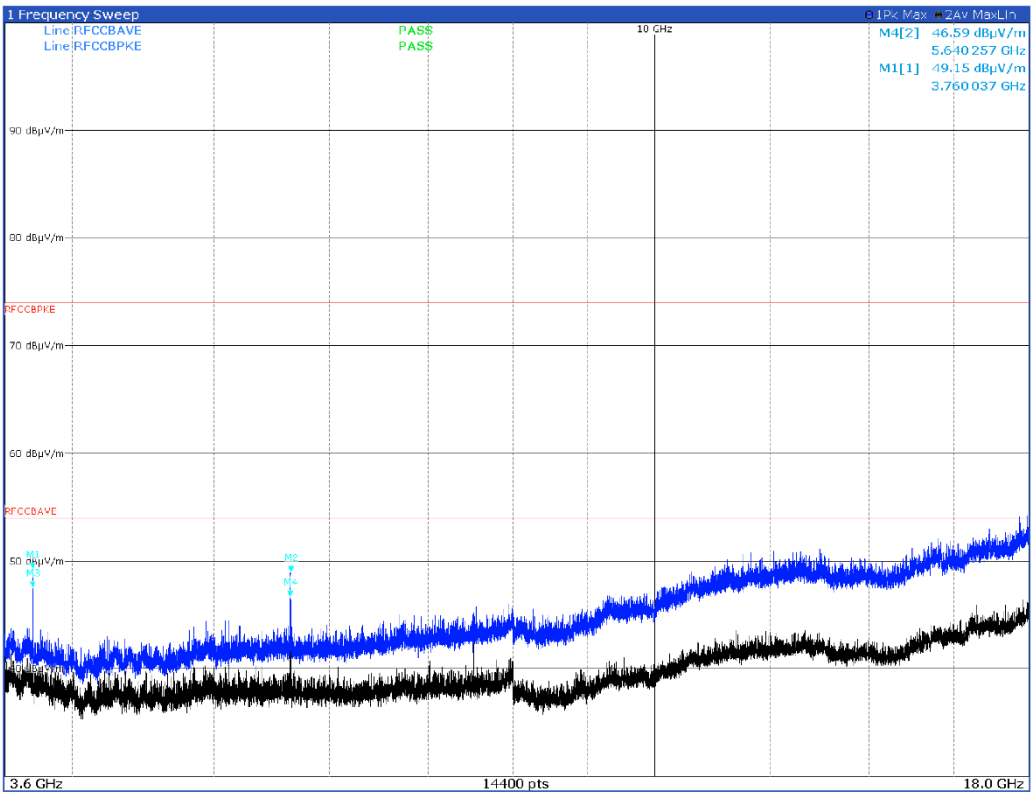


Figure 8.1-20: *Radiated spurious emissions with LTE B4 at mid channel and BLE at mid channel – antenna in vertical polarization*

Note: Emissions above the limit were from intentional emissions. No intermodulation emissions were detected

Peak level under the average limit – no additional measures need

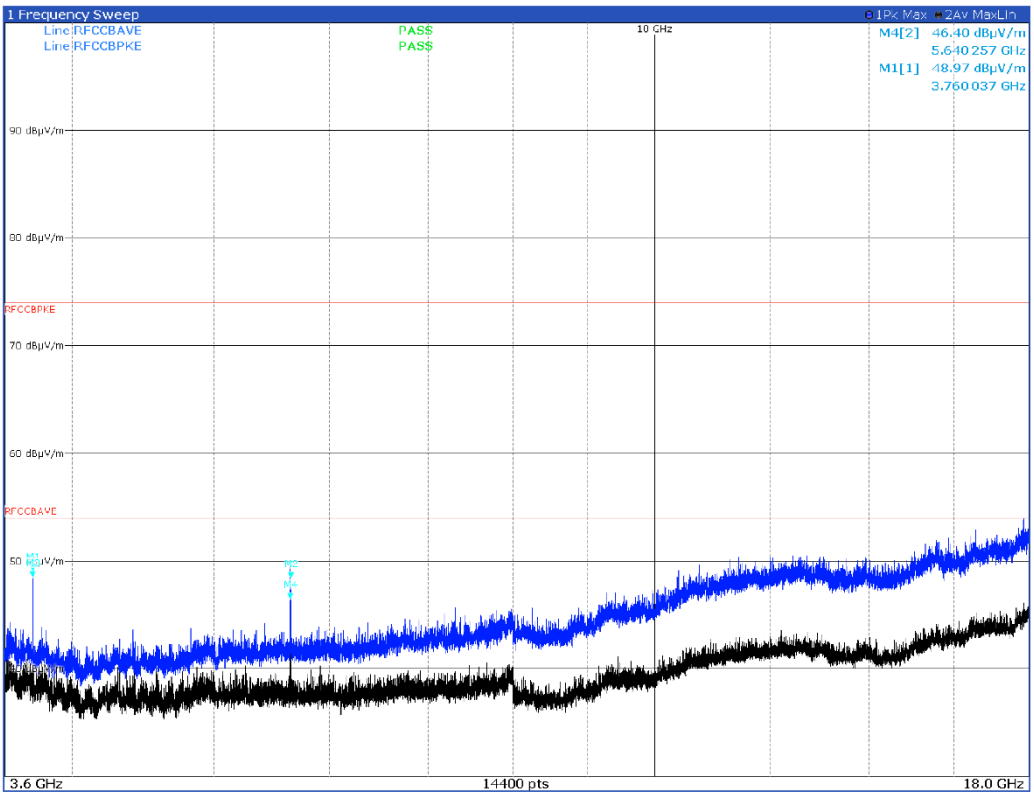


2 Marker Table

Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	**3.760 04 GHz**	**49.15 dBµV/m**		
M2		1	**5.640 51 GHz**	**48.89 dBµV/m**		
M3		2	**3.759 97 GHz**	**47.50 dBµV/m**		
M4		2	**5.640 26 GHz**	**46.59 dBµV/m**		

Figure 8.1-21: *Radiated spurious emissions with LTE B4 at mid channel and BLE at mid channel – antenna in horizontal polarization*

Peak level under the average limit – no additional measures need. No intermodulation emissions were detected



2 Marker Table

Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	**3.760 04 GHz**	**48.97 dBµV/m**		
M2		1	**5.640 51 GHz**	**48.34 dBµV/m**		
M3		2	**3.759 97 GHz**	**48.38 dBµV/m**		
M4		2	**5.640 26 GHz**	**46.40 dBµV/m**		

Figure 8.1-22: *Radiated spurious emissions with LTE B4 at mid channel and BLE at mid channel – antenna in vertical polarization*

Peak level under the average limit – no additional measures need. No intermodulation emissions were detected

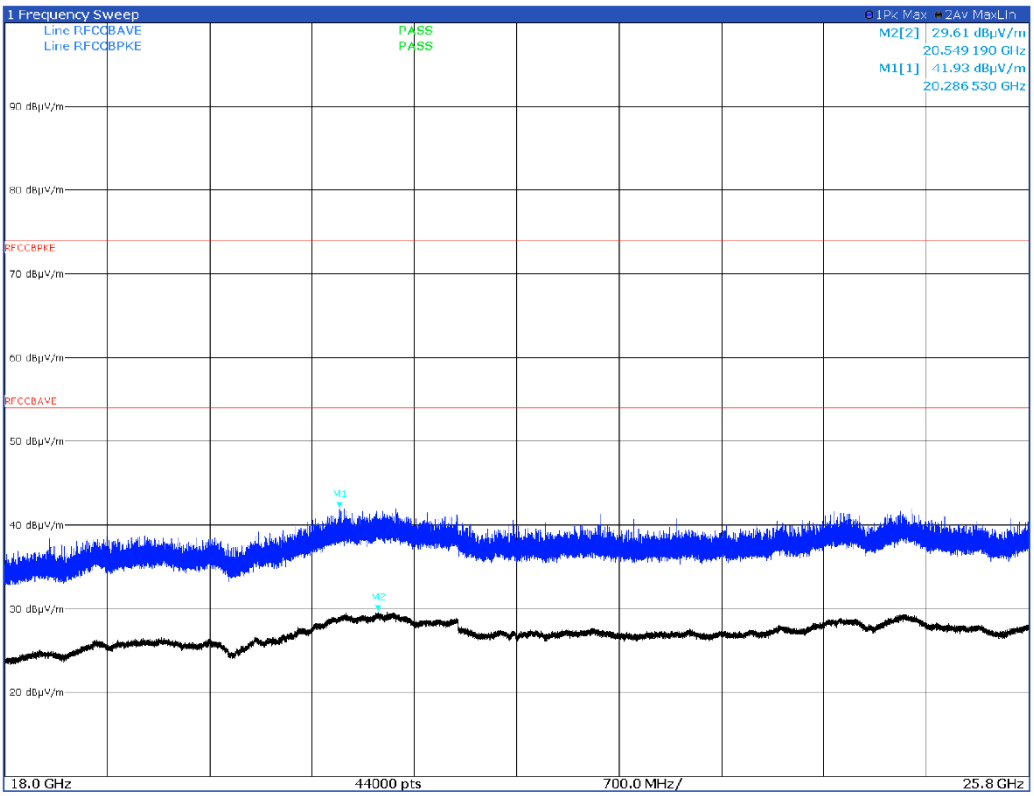


Figure 8.1-23: *Radiated spurious emissions with LTE B4 at mid channel and BLE at mid channel – antenna in horizontal polarization*

Peak level under the average limit – no additional measures need. No intermodulation emissions were detected

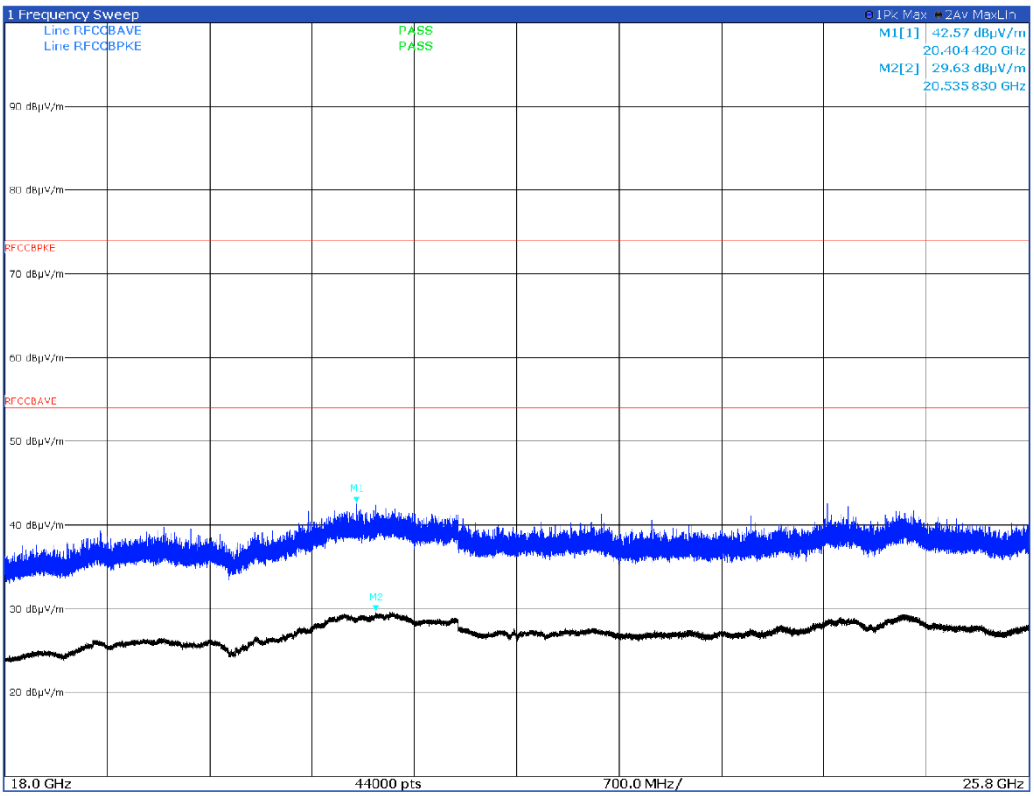


Figure 8.1-24: *Radiated spurious emissions with LTE B4 at mid channel and BLE at mid channel – antenna in vertical polarization*

Peak level under the average limit – no additional measures need. No intermodulation emissions were detected

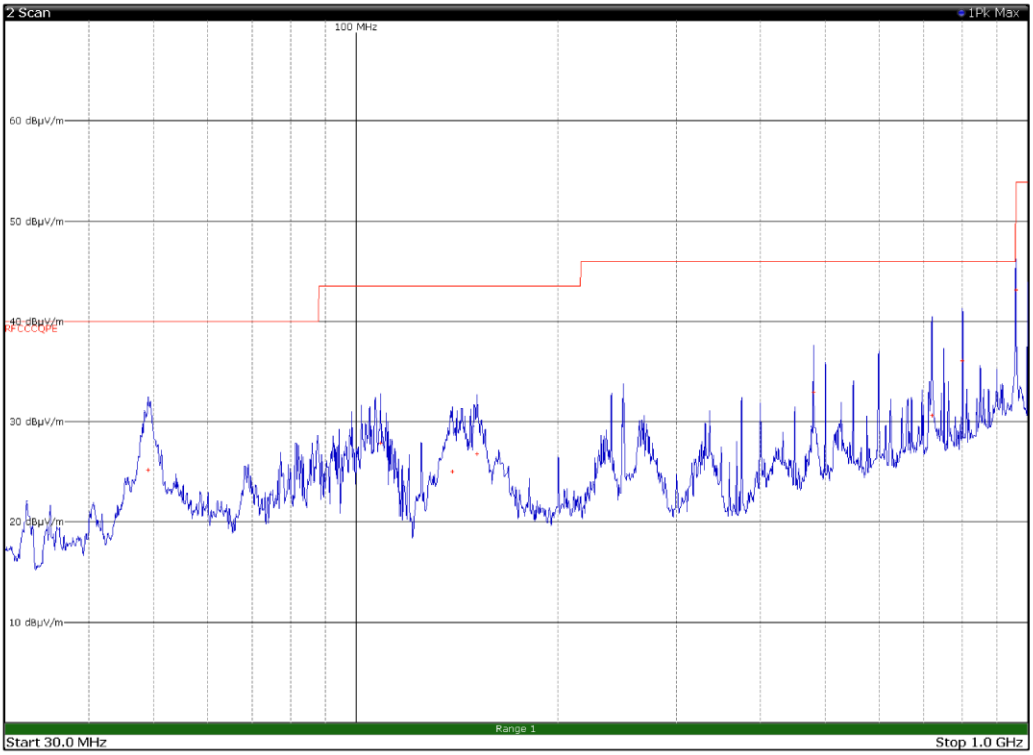


Figure 8.1-25: *Radiated spurious emissions with LTE B7 at mid channel and BLE at mid channel – antenna in horizontal polarization*

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
48.9900	25.2	40.0	-14.8	QP
108.8100	27.9	43.5	-15.6	QP
139.2000	25.1	43.5	-18.4	QP
151.5600	26.8	43.5	-16.7	QP
480.0000	33.0	46.0	-13.0	QP
720.0000	30.7	46.0	-15.3	QP
800.0100	36.1	46.0	-9.9	QP
960.0000	43.2	53.9	-10.7	QP
Notes: Field strength includes correction factor of antenna, cable loss, amplifier, and attenuators where applicable.				

No intermodulation emissions were detected

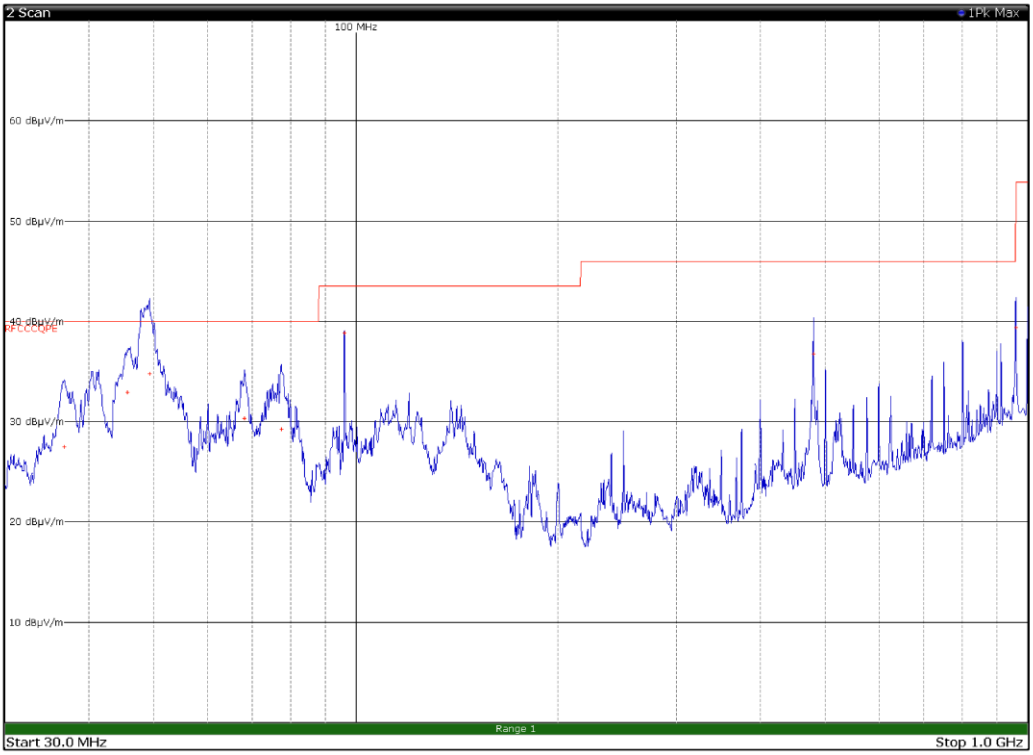


Figure 8.1-26: *Radiated spurious emissions with LTE B7 at mid channel and BLE at mid channel – antenna in vertical polarization*

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
36.7500	27.5	40.0	-12.5	QP
45.6900	33.0	40.0	-7.0	QP
49.2900	34.8	40.0	-5.2	QP
68.2200	30.3	40.0	-9.7	QP
77.4300	29.3	40.0	-10.7	QP
96.0000	38.9	43.5	-4.6	QP
480.0000	36.8	46.0	-9.2	QP
960.0000	39.4	53.9	-14.5	QP
Notes: Field strength includes correction factor of antenna, cable loss, amplifier, and attenuators where applicable.				

No intermodulation emissions were detected

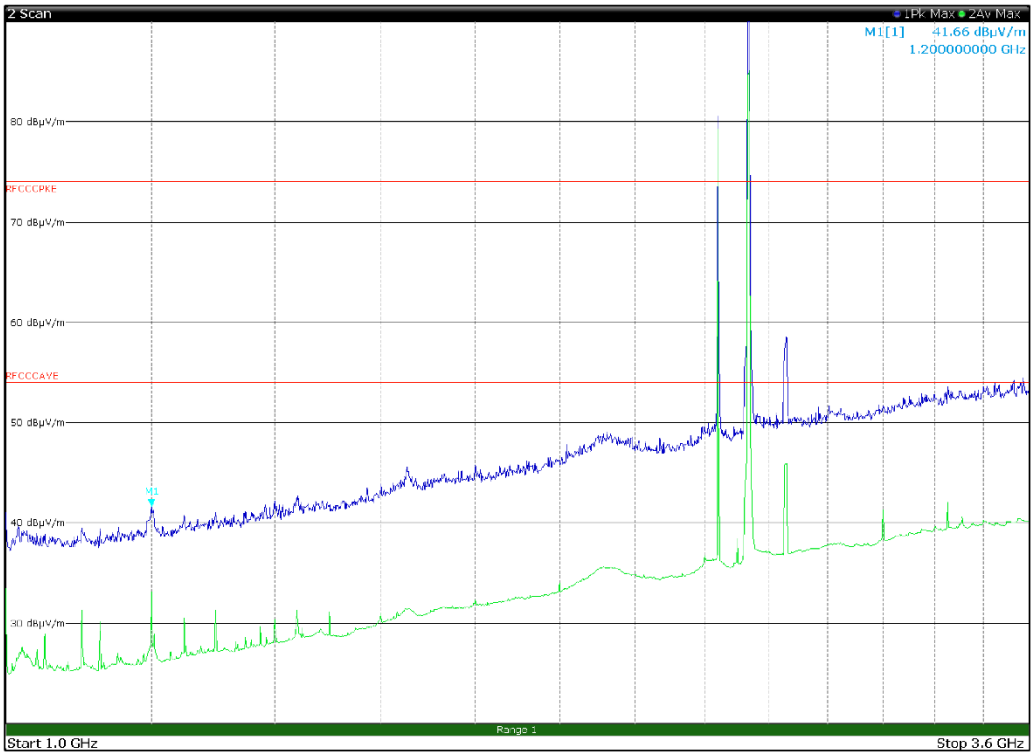


Figure 8.1-27: *Radiated spurious emissions with LTE B7 at mid channel and BLE at mid channel – antenna in horizontal polarization*

Note: Emissions above the limit were from intentional emissions. No intermodulation emissions were detected

Peak level under the average limit – no additional measures need

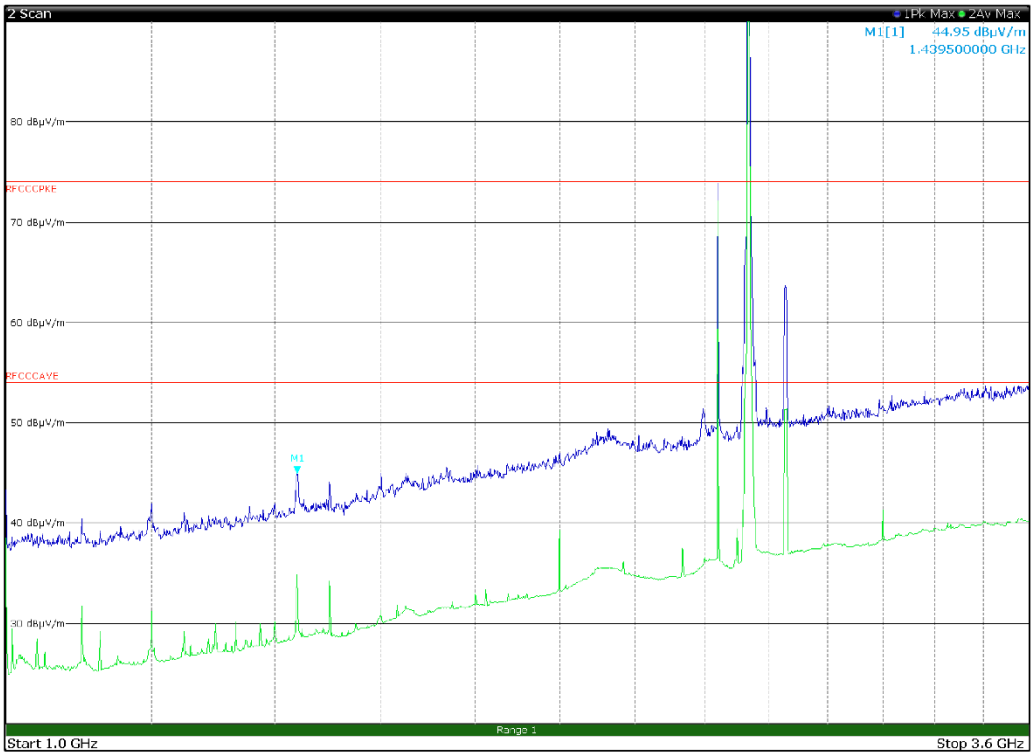


Figure 8.1-28: *Radiated spurious emissions with LTE B7 at mid channel and BLE at mid channel – antenna in vertical polarization*

Note: Emissions above the limit were from intentional emissions. No intermodulation emissions were detected

Peak level under the average limit – no additional measures need

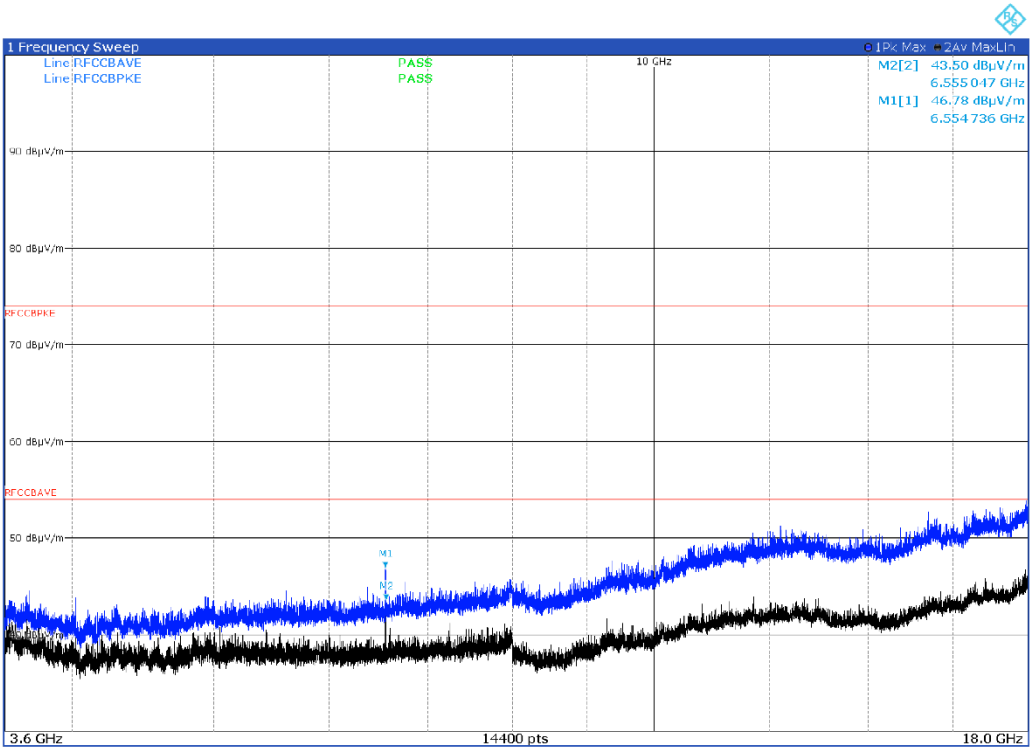


Figure 8.1-29: *Radiated spurious emissions with LTE B7 at mid channel and BLE at mid channel – antenna in horizontal polarization*

Peak level under the average limit – no additional measures need. No intermodulation emissions were detected

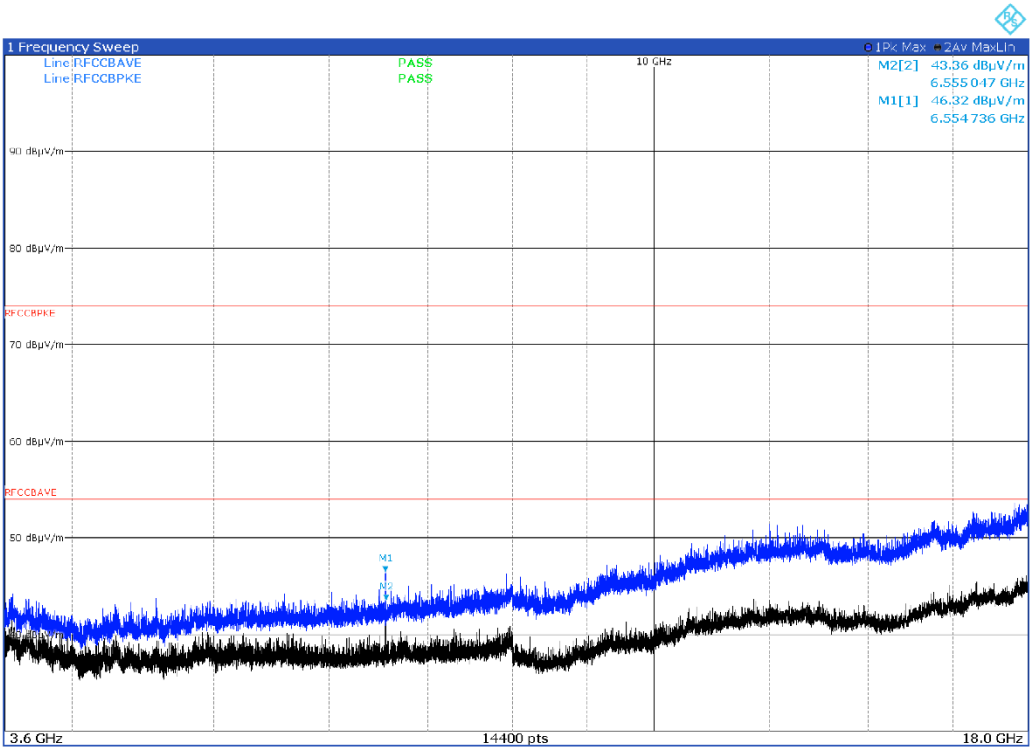


Figure 8.1-30: *Radiated spurious emissions with LTE B7 at mid channel and BLE at mid channel – antenna in vertical polarization*

Peak level under the average limit – no additional measures need. No intermodulation emissions were detected

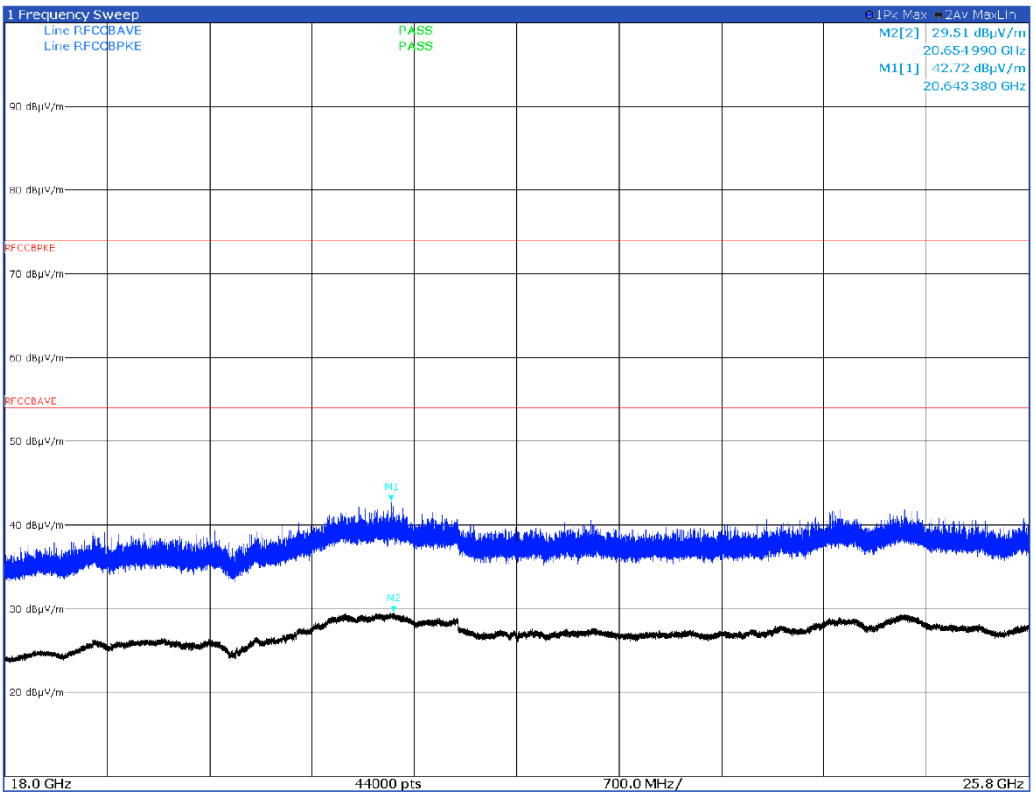


Figure 8.1-31: *Radiated spurious emissions with LTE B7 at mid channel and BLE at mid channel – antenna in horizontal polarization*

Peak level under the average limit – no additional measures need. No intermodulation emissions were detected

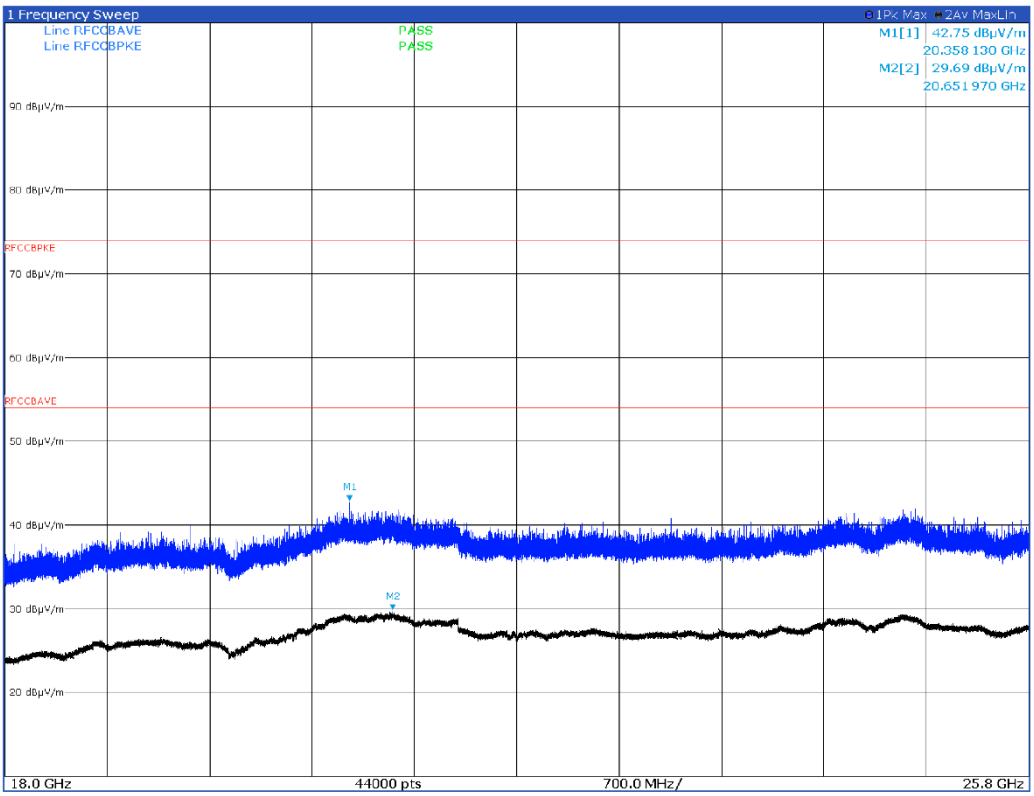
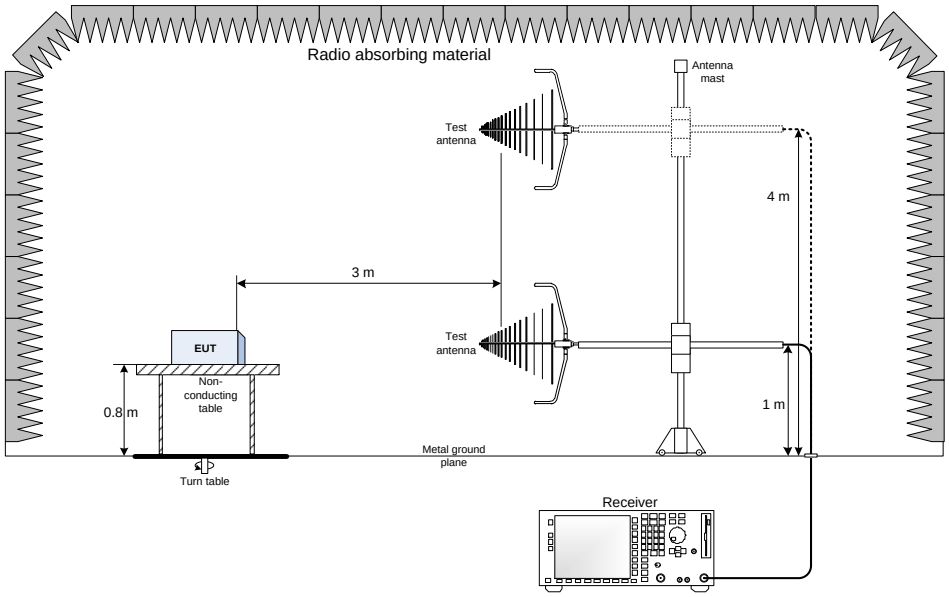


Figure 8.1-32: *Radiated spurious emissions with LTE B7 at mid channel and BLE at mid channel – antenna in vertical polarization*

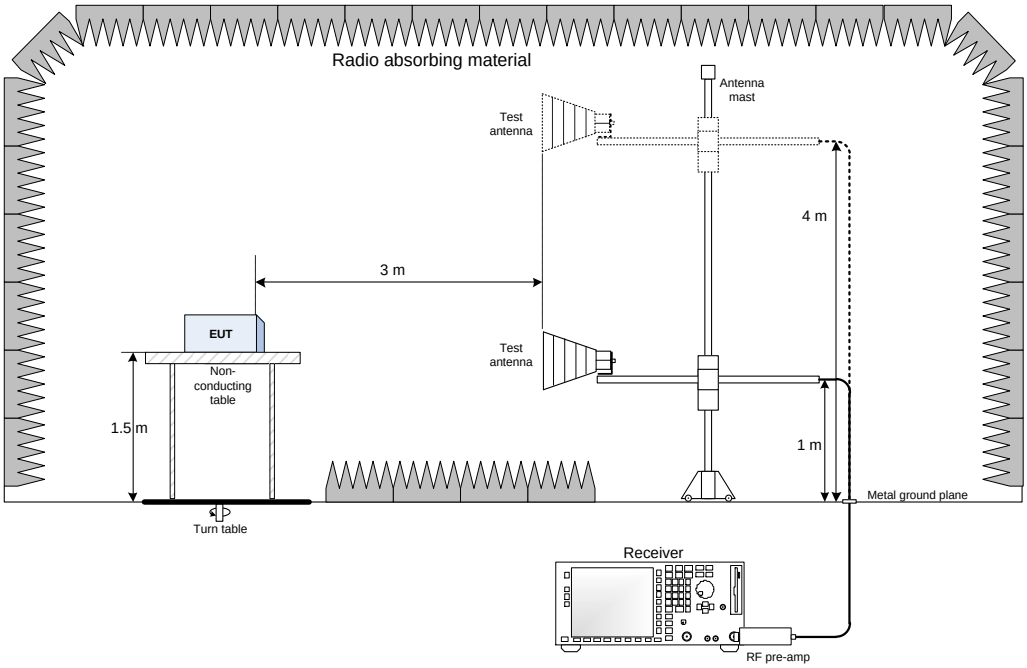
Peak level under the average limit – no additional measures need. No intermodulation emissions were detected

Section 9. Block diagrams of test set-ups

9.1 Radiated emissions set-up for frequencies below 1 GHz

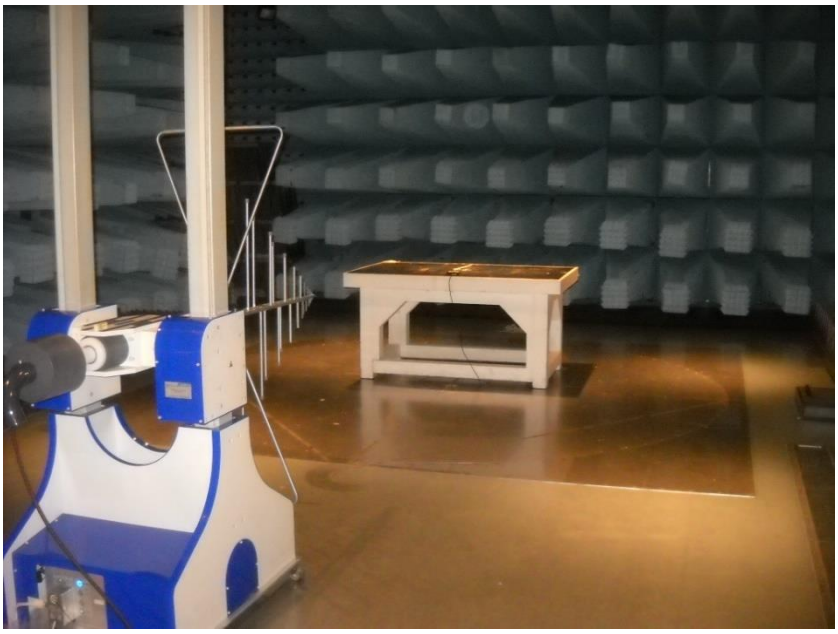


9.2 Radiated emissions set-up for frequencies above 1 GHz

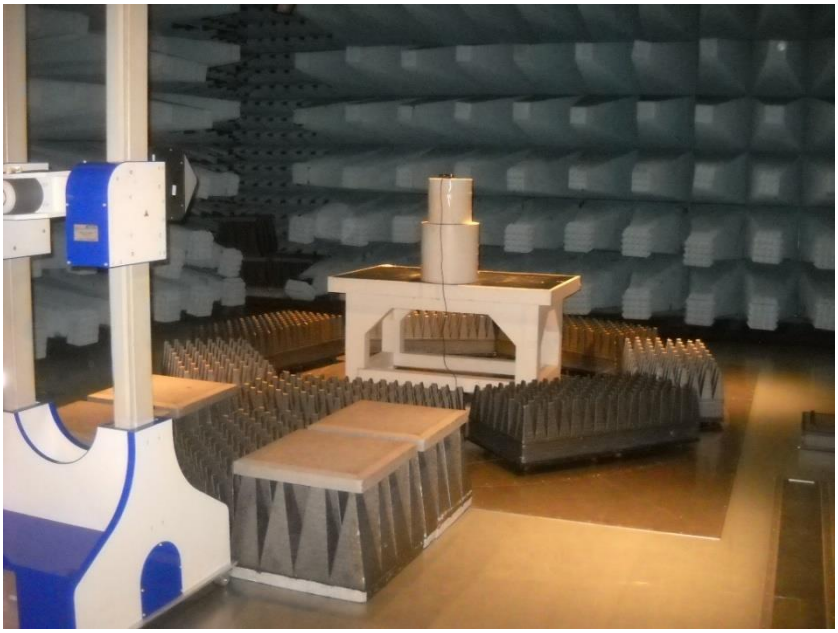


Section 10. Photos

10.1 Photos of the test set-up



Radiated emission below 1 GHz



Radiated emission above 1 GHz

10.2 Photos of the EUT

Top view photo

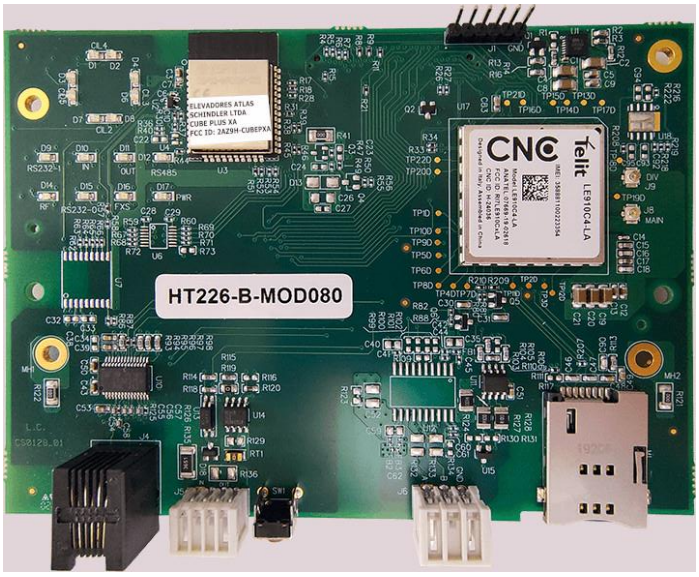
Bottom view photo

Front view photo

Lateral view photo

Lateral view photo

Lateral view photo



Internal view photo

(End of report)