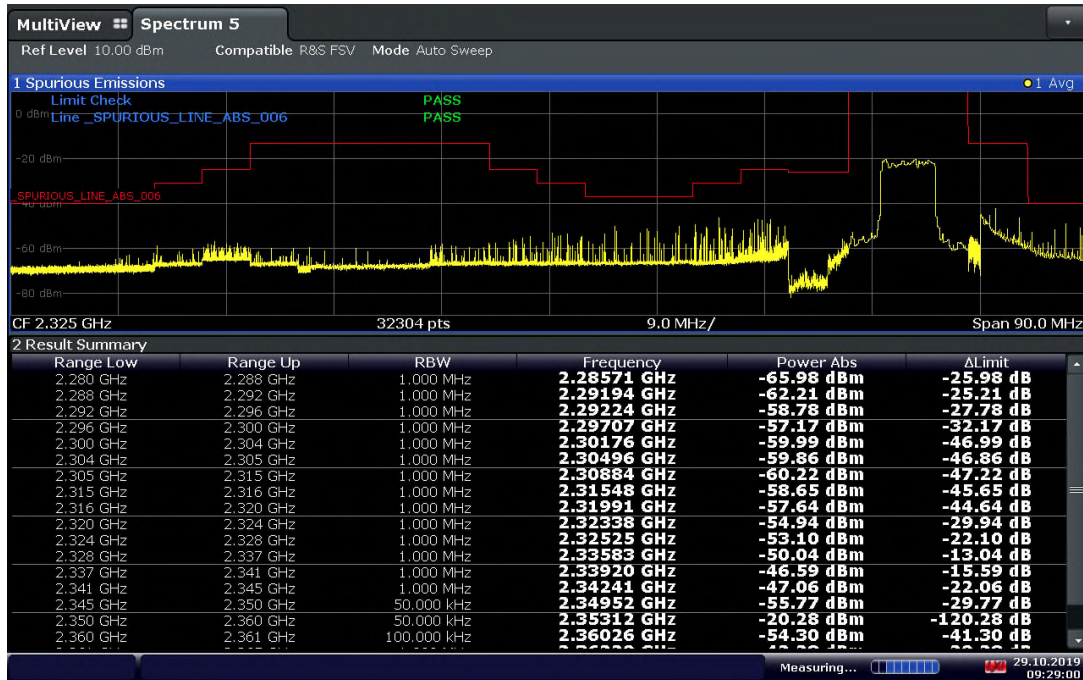
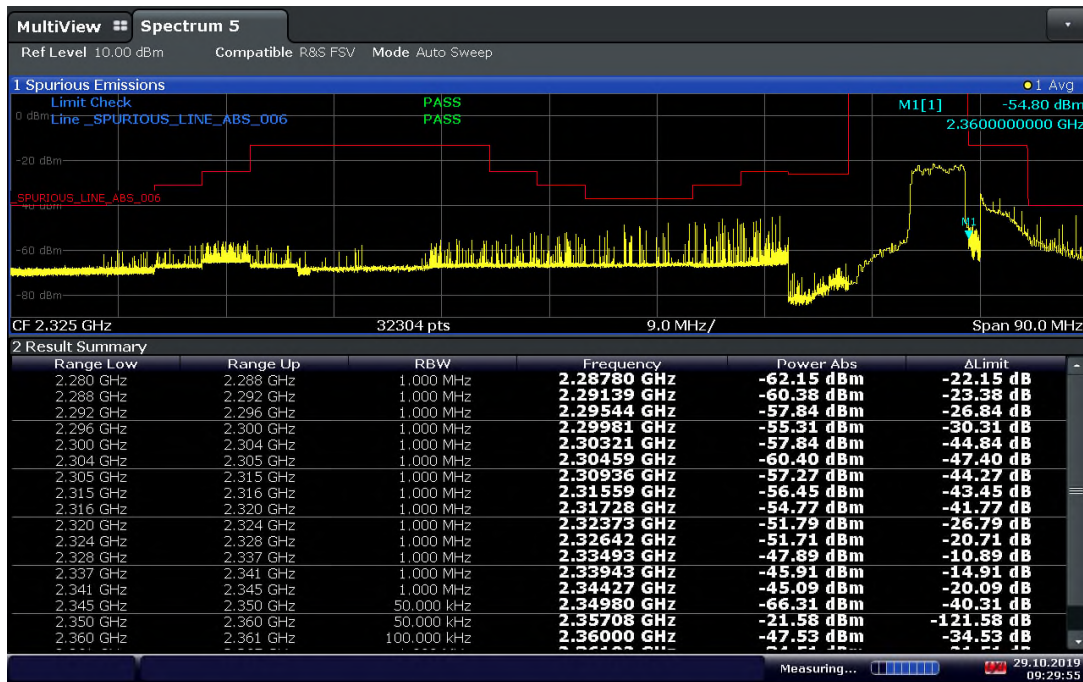


LTE Band 40 / 5 MHz BW / QPSK / Mid Channel 2355 MHz Mask (Full RB)



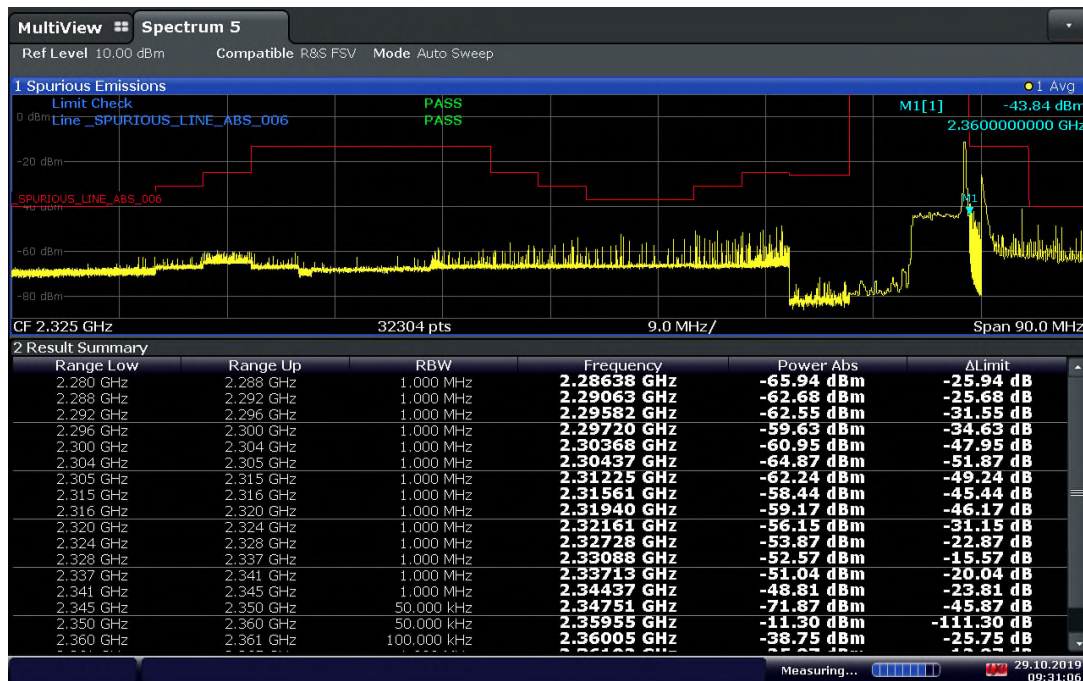
09:29:01 29.10.2019

LTE Band 40 / 5 MHz BW / QPSK / High Channel 2357.5 MHz Mask (Full RB)



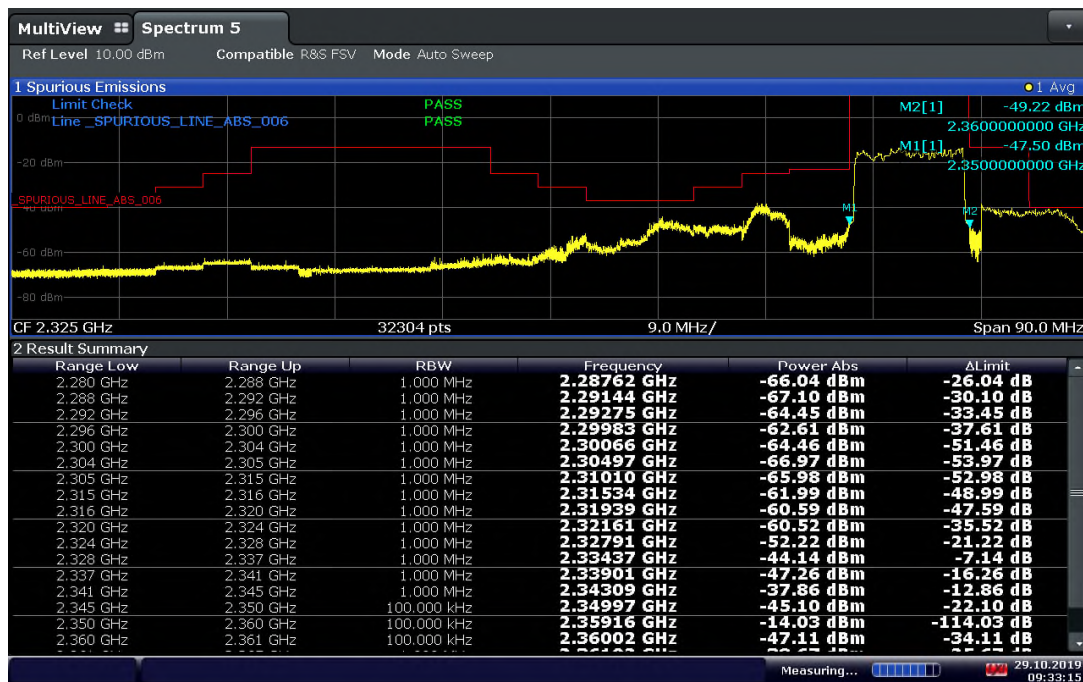
09:29:56 29.10.2019

LTE Band 40 / 5 MHz BW / QPSK / High Channel 2357.5 MHz Mask (1 RB, 24 Offset)



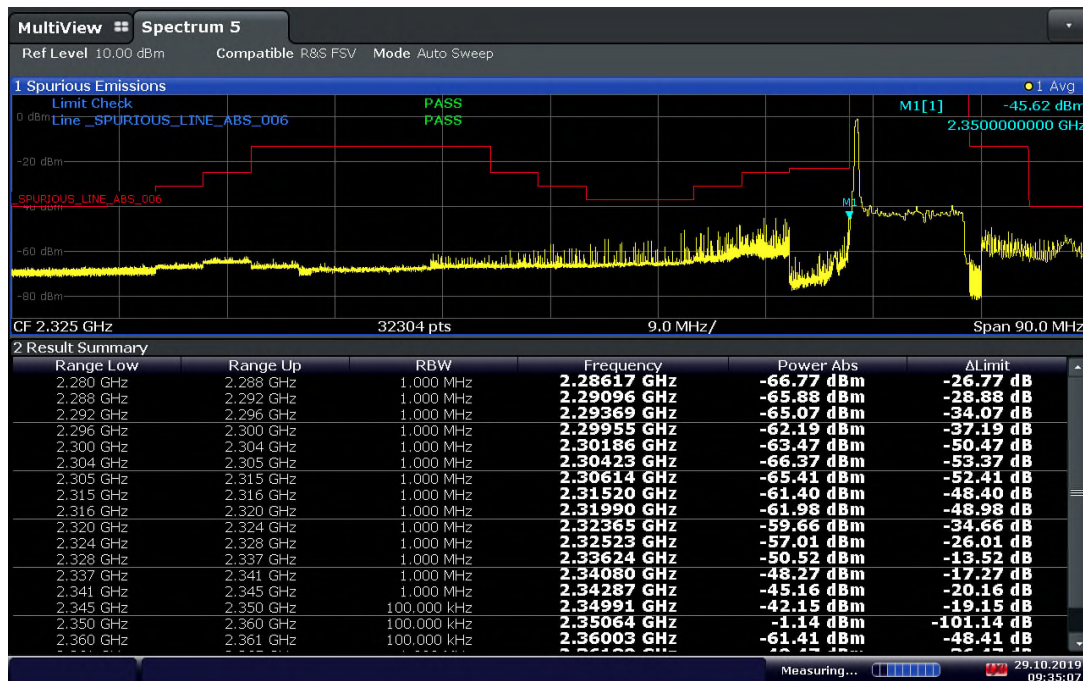
09:31:06 29.10.2019

LTE Band 40 / 10 MHz BW / QPSK / Mid Channel 2355 MHz Mask (Full RB)



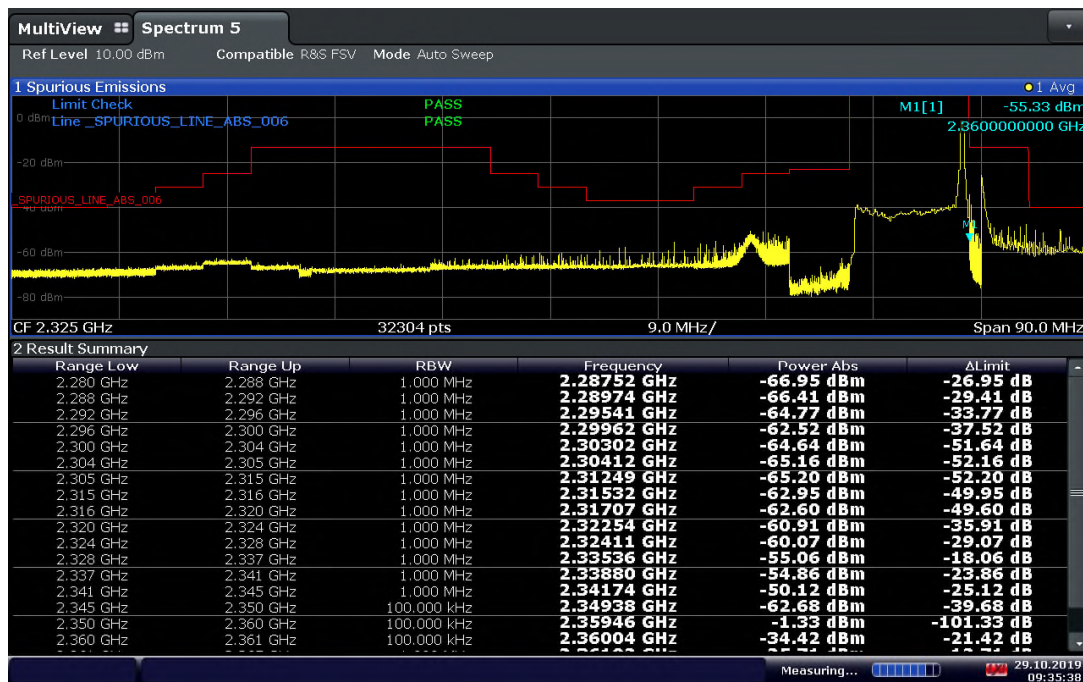
09:33:16 29.10.2019

LTE Band 40 / 10 MHz BW / QPSK / Mid Channel 2355 MHz Mask (1 RB, 0 Offset)



09:35:08 29.10.2019

LTE Band 40 / 10 MHz BW / QPSK / Mid Channel 2355 MHz Mask (1 RB, 49 Offset)



09:35:39 29.10.2019

2.6 CONDUCTED SPURIOUS EMISSIONS

2.6.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1051
FCC 47 CFR Part 27, Clause 27.53(h)(1)(3)
FCC 47 CFR Part 27, Clause 27.53(g)
FCC 47 CFR Part 27, Clause 27.53(m)(4)(6)
FCC 47 CFR Part 27, Clause 27.53(c)(2)(4)(5)(f)
RSS-199, Clause 4.5

2.6.2 Standard Applicable

FCC 47 CFR Part 27.53(a):

For mobile and portable stations operating in the 2305–2315 MHz and 2350–2360 MHz bands:

- (i) By a factor of not less than: $43 + 10 \log (P)$ dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation, not less than $55 + 10 \log (P)$ dB on all frequencies between 2320 and 2324 MHz and on all frequencies between 2341 and 2345 MHz, not less than $61 + 10 \log (P)$ dB on all frequencies between 2324 and 2328 MHz and on all frequencies between 2337 and 2341 MHz, and not less than $67 + 10 \log (P)$ dB on all frequencies between 2328 and 2337 MHz;
- (ii) By a factor of not less than $43 + 10 \log (P)$ dB on all frequencies between 2300 and 2305 MHz, $55 + 10 \log (P)$ dB on all frequencies between 2296 and 2300 MHz, $61 + 10 \log (P)$ dB on all frequencies between 2292 and 2296 MHz, $67 + 10 \log (P)$ dB on all frequencies between 2288 and 2292 MHz, and $70 + 10 \log (P)$ dB below 2288 MHz;
- (iii) By a factor of not less than $43 + 10 \log (P)$ dB on all frequencies between 2360 and 2365 MHz, and not less than $70 + 10 \log (P)$ dB above 2365 MHz.

FCC 47 CFR Part 27.53(m):

For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section.

In addition, the attenuation factor shall not be less than $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

RSS-195, Clause 5.6:

The power of any emission outside the frequency range(s) in which the equipment operates shall be attenuated below the transmitter power, P(dBW), by the amount indicated in Table 2, where p is the transmitter output power measured in watts.

Table 2 — Unwanted Emissions for Mobile, Portable and Low-Power Fixed Subscriber Equipment

Frequency (MHz)	Attenuation (dB)
<2200	$43 + 10 \log_{10}(p)$
2200 - 2288	$70 + 10 \log_{10}(p)$
2288 - 2292	$67 + 10 \log_{10}(p)$
2292 - 2296	$61 + 10 \log_{10}(p)$
2296 - 2300	$55 + 10 \log_{10}(p)$
2300 - 2305	$43 + 10 \log_{10}(p)$
2305 - 2320	$43 + 10 \log_{10}(p)^{\text{Note}}$
2320 - 2324	$55 + 10 \log_{10}(p)$
2324 - 2328	$61 + 10 \log_{10}(p)$
2328 - 2337	$67 + 10 \log_{10}(p)$
2337 - 2341	$61 + 10 \log_{10}(p)$
2341 - 2345	$55 + 10 \log_{10}(p)$
2345 - 2360	$43 + 10 \log_{10}(p)^{\text{Note}}$
2360 - 2365	$43 + 10 \log_{10}(p)$
2365 - 2395	$70 + 10 \log_{10}(p)$
>2395	$43 + 10 \log_{10}(p)$

Note: Measured at the edges of the highest and lowest frequency range(s) in which the equipment is designed to operate. See Section 5.2 for the permitted frequency ranges for various equipment types.

RSS-199, Clause 4.5:

In the 1 MHz band immediately outside and adjacent to the channel edge, the unwanted emission power shall be measured with a resolution bandwidth of at 1% of the occupied bandwidth for base station and fixed subscriber equipment, and 2% for mobile subscriber equipment. Beyond the 1 MHz band, a resolution bandwidth of 1 MHz shall be used.

(b) for mobile subscriber equipment, the power of any unwanted emissions measured as above shall be attenuated (in dB) below the transmitter power, P (dBW), by at least:

- (i) $40 + 10 \log_{10} p$ from the channel edges to 5 MHz away.
 - (ii) $43 + 10 \log_{10} p$ between 5 MHz and X MHz from the channel edges, and
 - (iii) $55 + 10 \log_{10} p$ at X MHz and beyond from the channel edges
- Note: X is 6 MHz or the equipment occupied bandwidth, whichever is greater

2.6.3 Equipment Under Test and Modification State

Serial No: FJ220819C00056 / Test Configuration A

2.6.4 Date of Test/Initial of test personnel who performed the test

October 28, 2019 / AC



2.6.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.6.6 Environmental Conditions/ Test Location

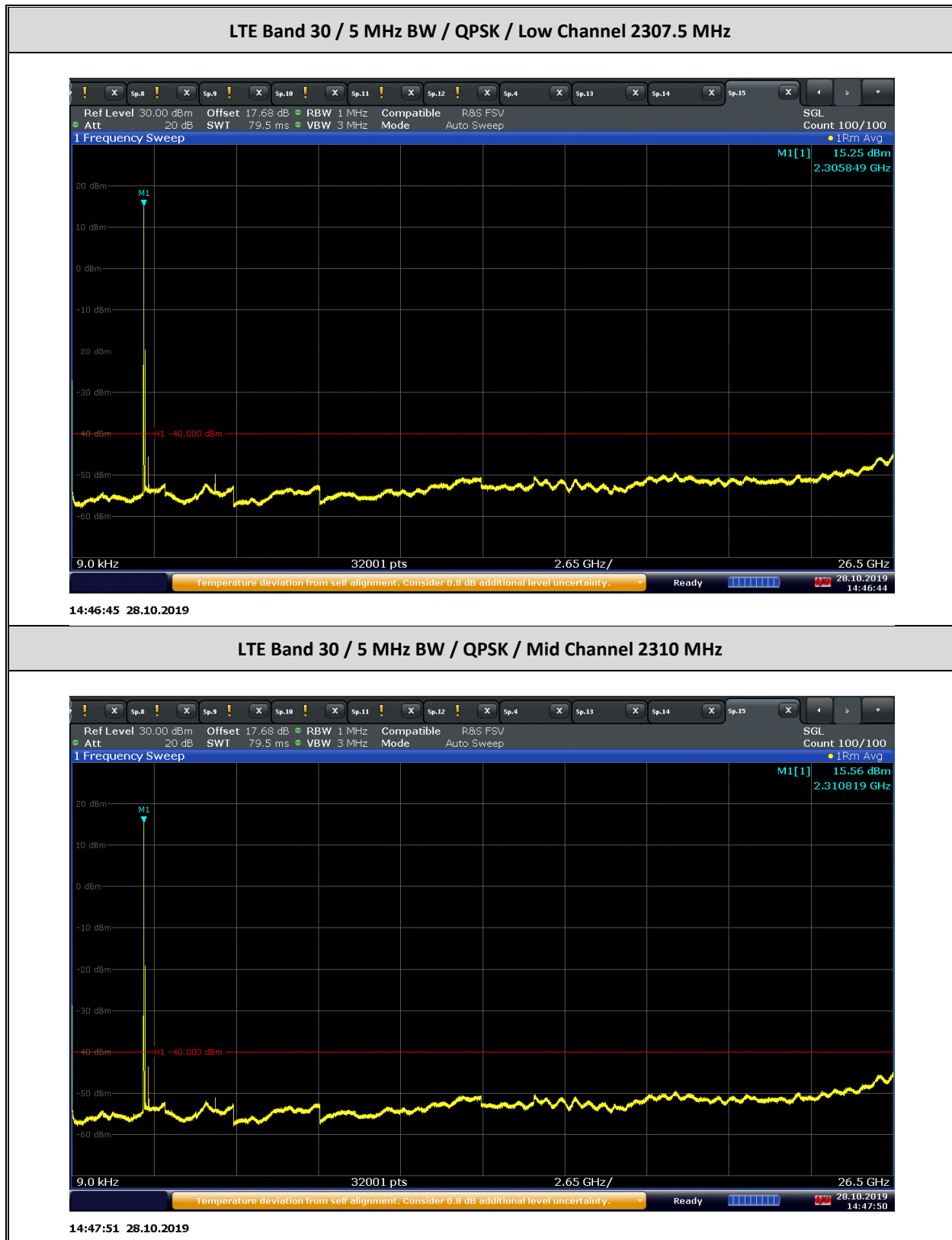
Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

Ambient Temperature	24.8 °C
Relative Humidity	43.2 %
ATM Pressure	98.8 kPa

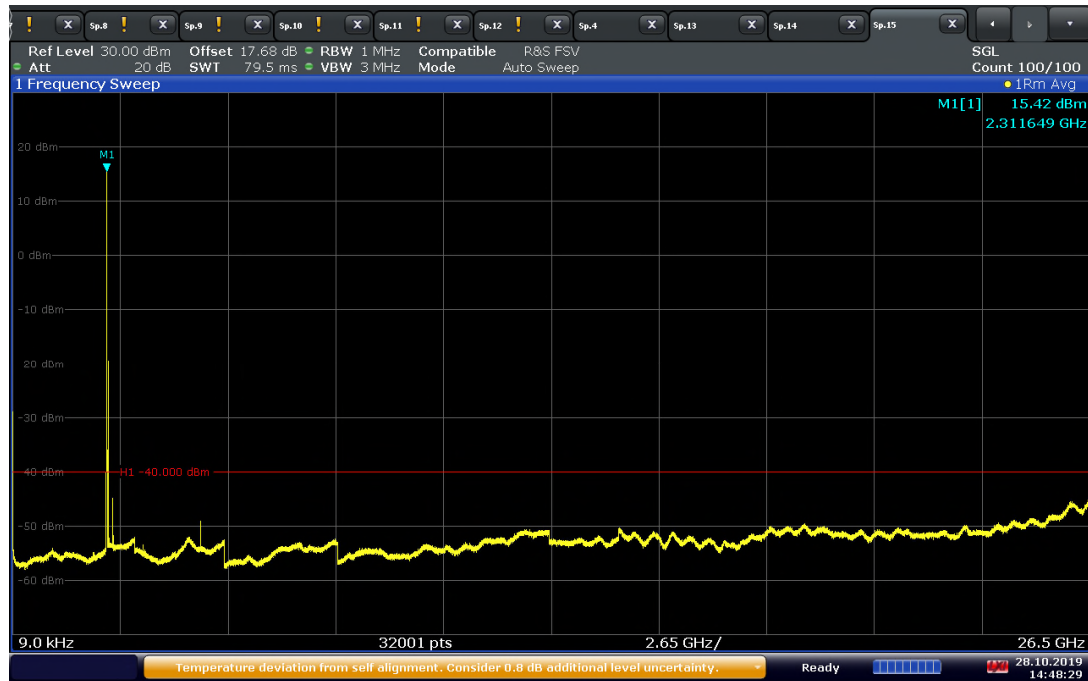
2.6.7 Additional Observations

- This is a conducted test.
- The spectrum was searched from 9 kHz to the 10th harmonic.
- The path loss was measured and entered as a level offset.
- Low, Middle and High channels on all channel bandwidth and modulation are verified. Only the worst case channel of each band presented.

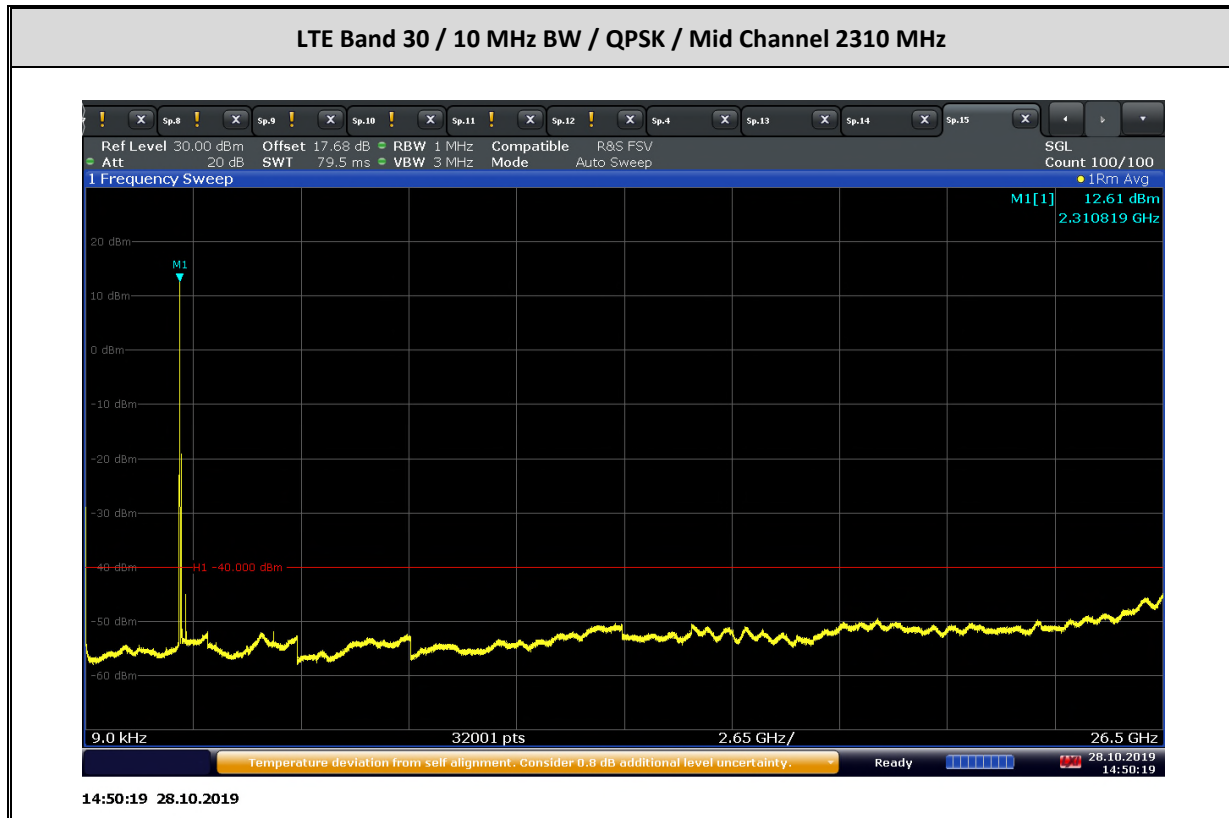
2.6.8 Test Results



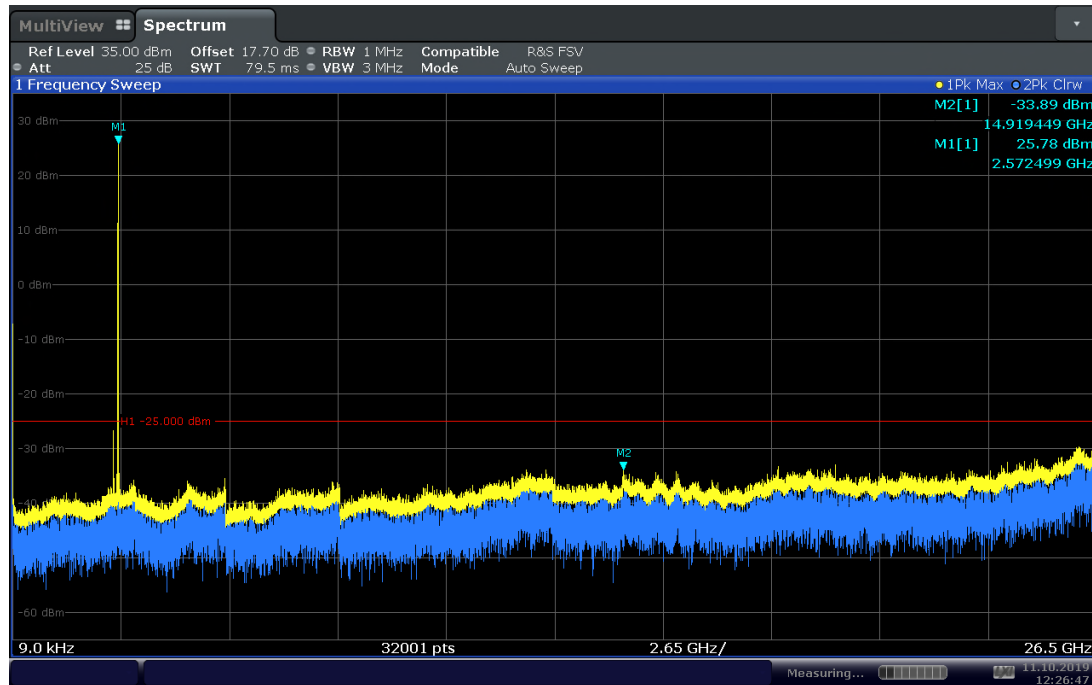
LTE Band 30 / 5 MHz BW / QPSK / High Channel 2312.5 MHz



14:48:30 28.10.2019

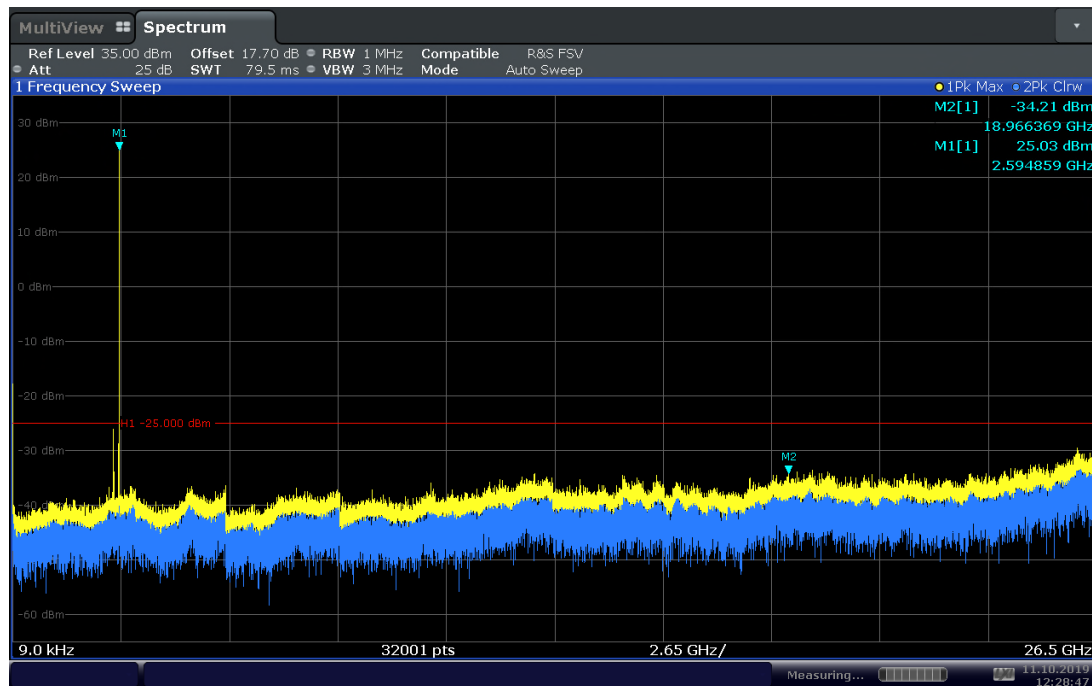


LTE Band 38 / 5 MHz BW / QPSK / Low Channel 2572.5 MHz



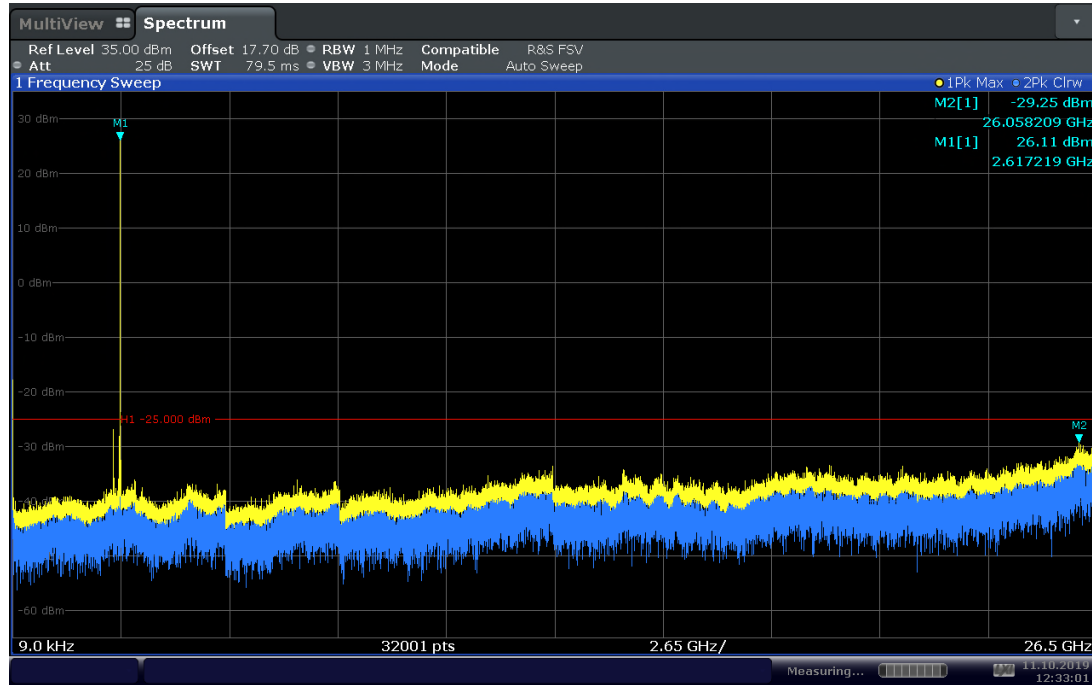
12:26:48 11.10.2019

LTE Band 38 / 5 MHz BW / QPSK / Mid Channel 2595 MHz



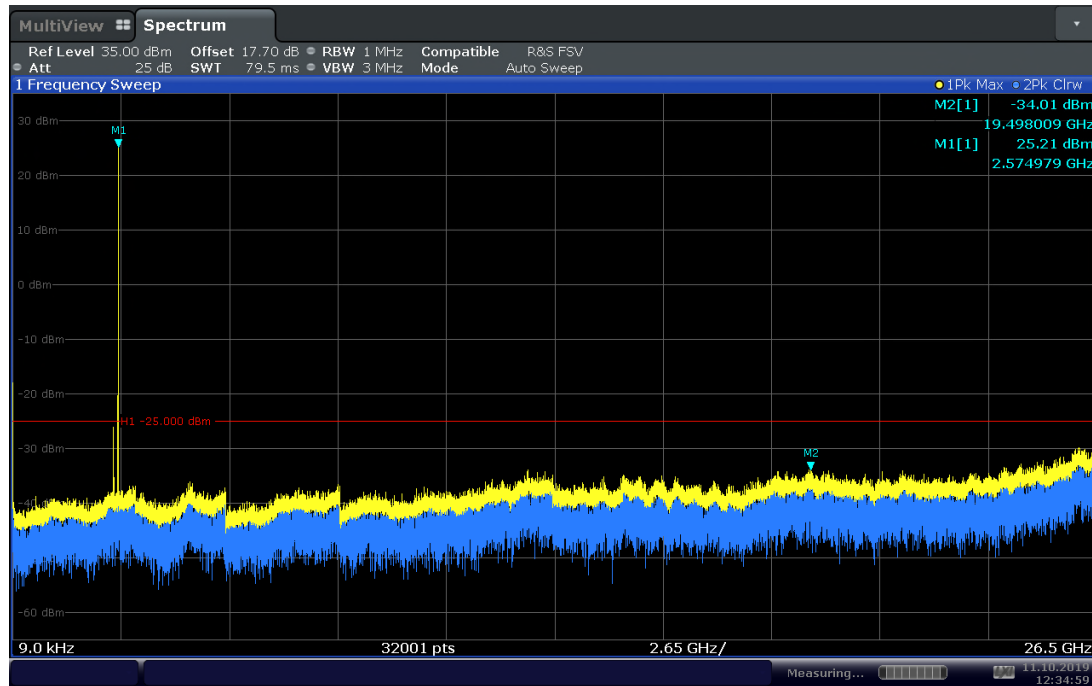
12:28:47 11.10.2019

LTE Band 38 / 5 MHz BW / QPSK / High Channel 2617.5 MHz



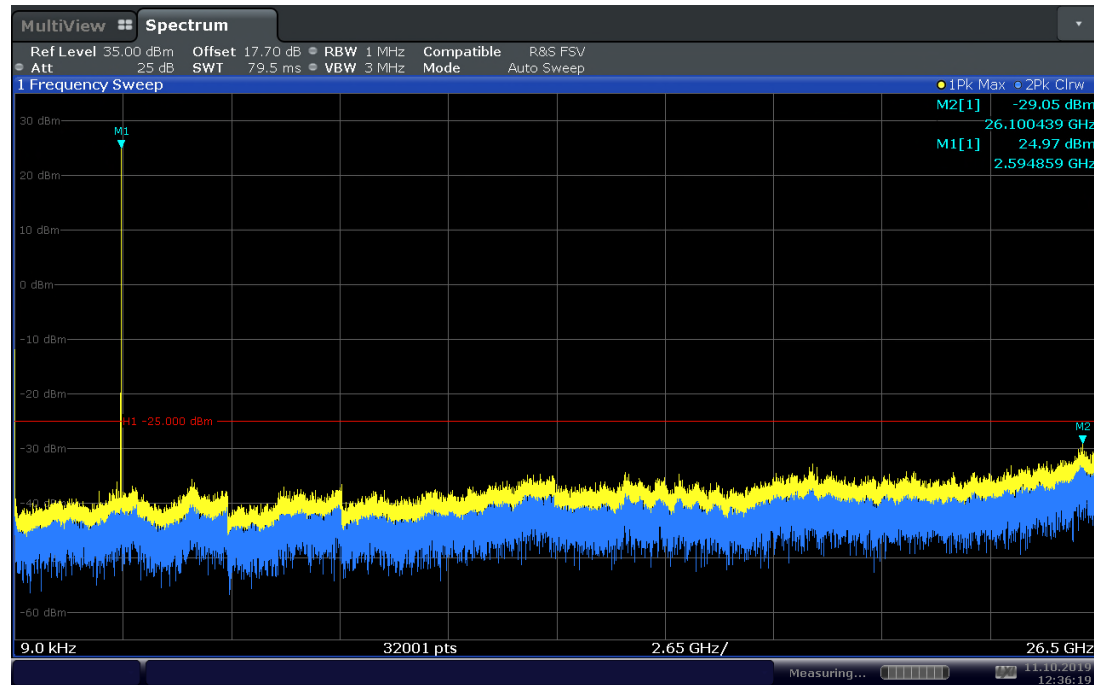
12:33:02 11.10.2019

LTE Band 38 / 10 MHz BW / QPSK / Low Channel 2575 MHz



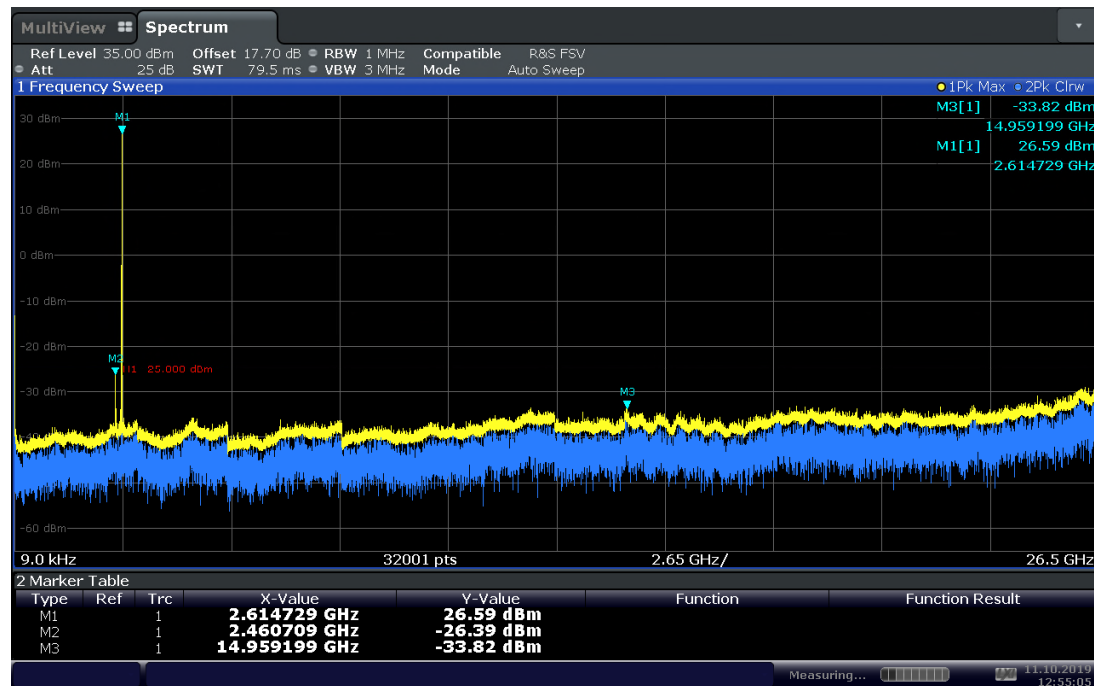
12:35:00 11.10.2019

LTE Band 38 / 10 MHz BW / QPSK / Mid Channel 2595 MHz



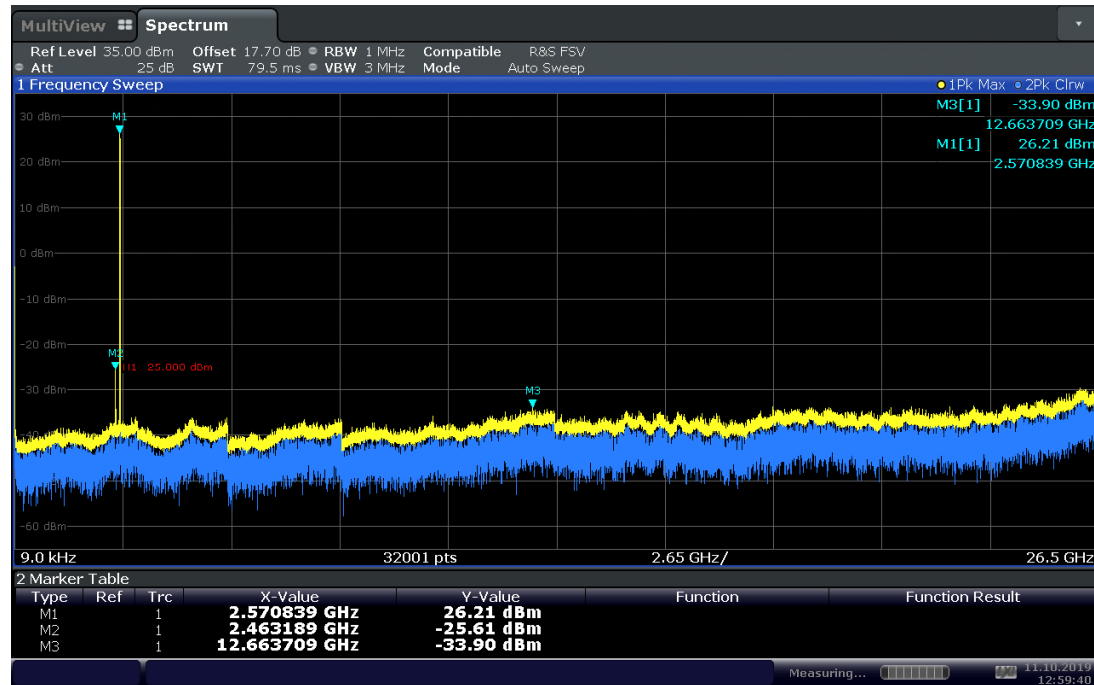
12:36:19 11.10.2019

LTE Band 38 / 10 MHz BW / QPSK / High Channel 2615 MHz



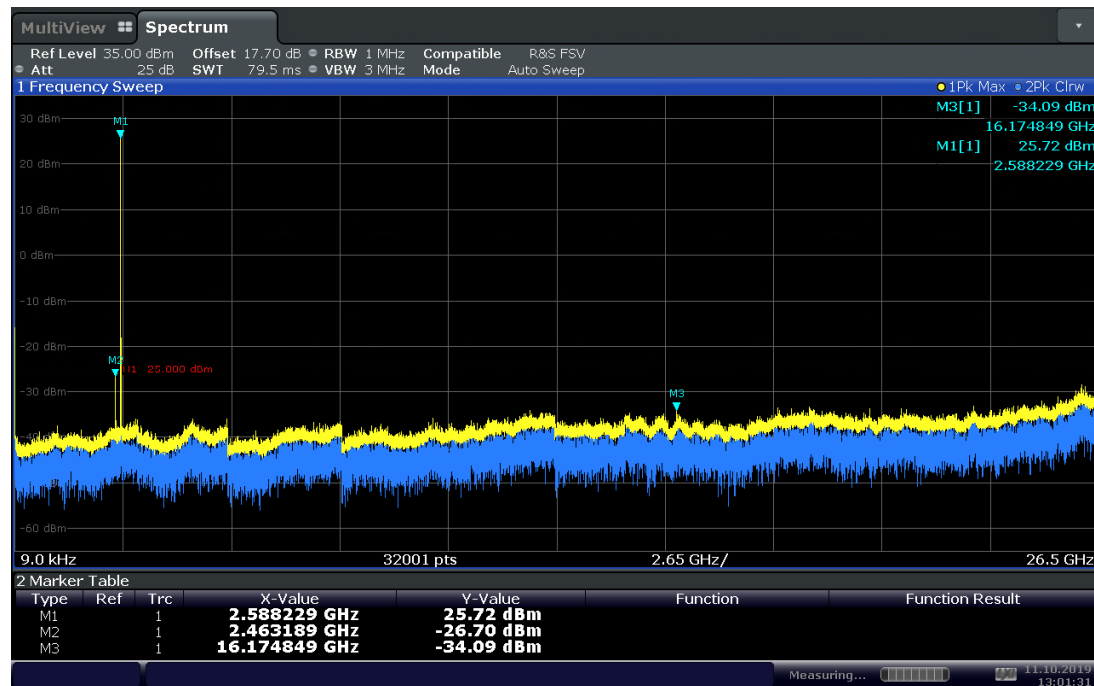
12:55:05 11.10.2019

LTE Band 38 / 15 MHz BW / QPSK / Low Channel 2577.5 MHz



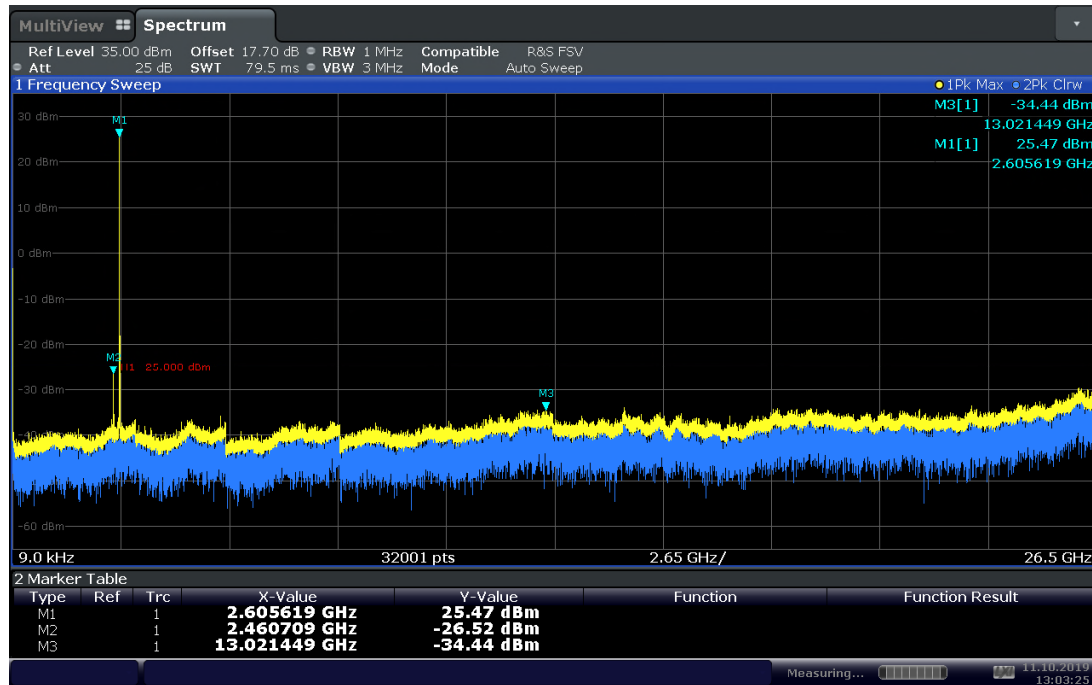
12:59:41 11.10.2019

LTE Band 38 / 15 MHz BW / QPSK / Mid Channel 2595 MHz



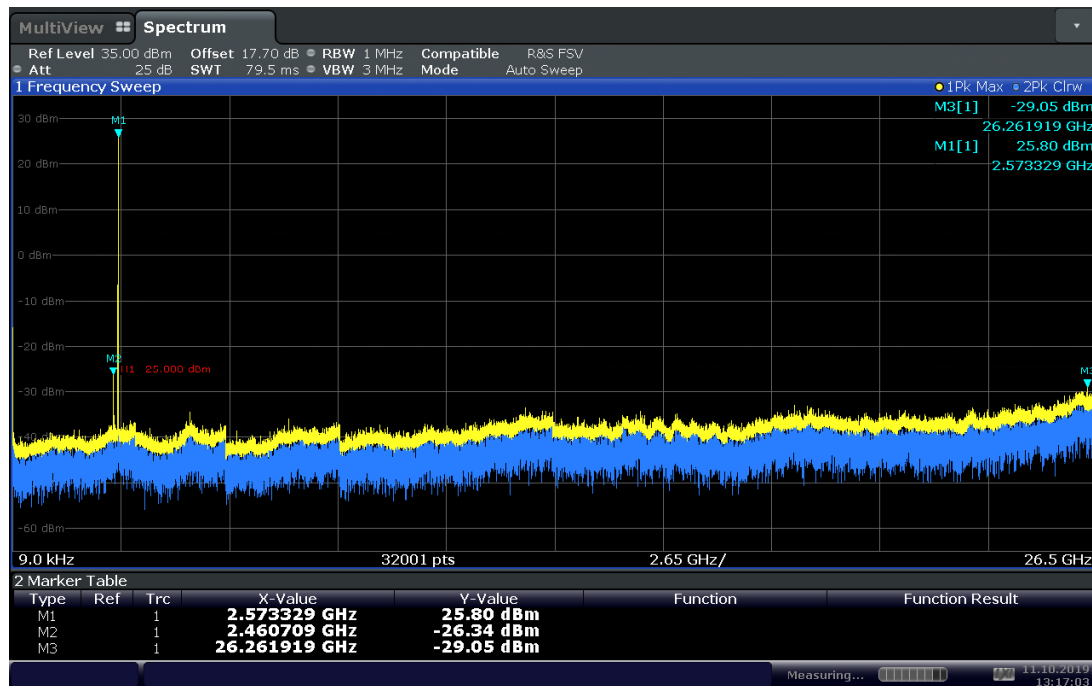
13:01:32 11.10.2019

LTE Band 38 / 15 MHz BW / QPSK / High Channel 2612.5 MHz



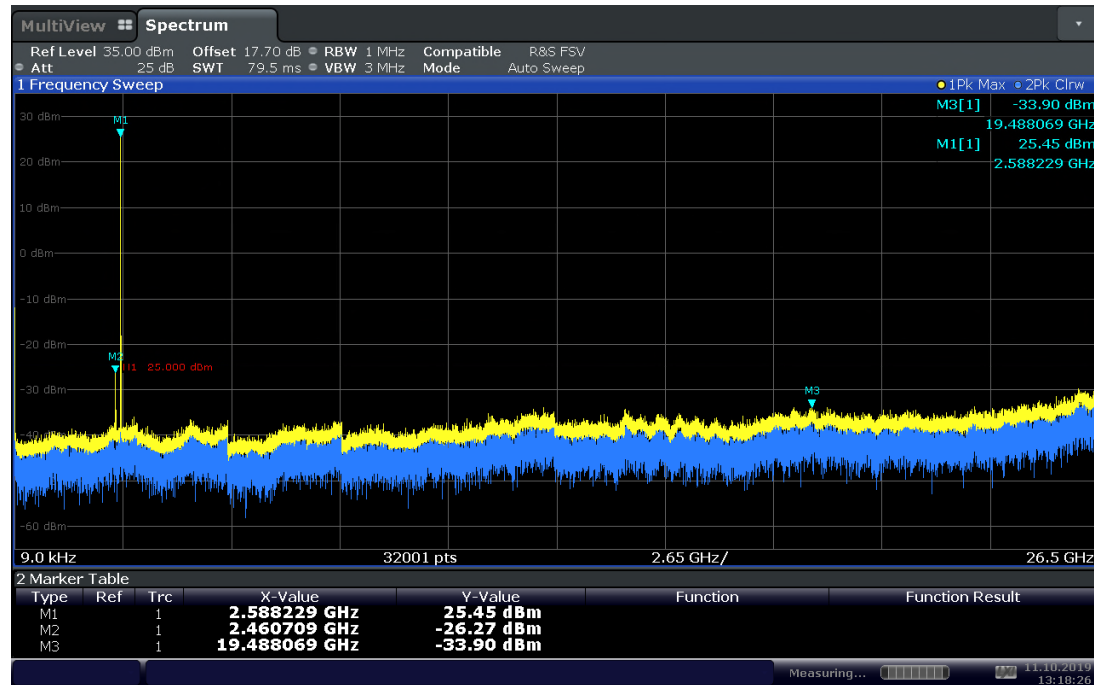
13:03:25 11.10.2019

LTE Band 38 / 20 MHz BW / QPSK / Low Channel 2580 MHz



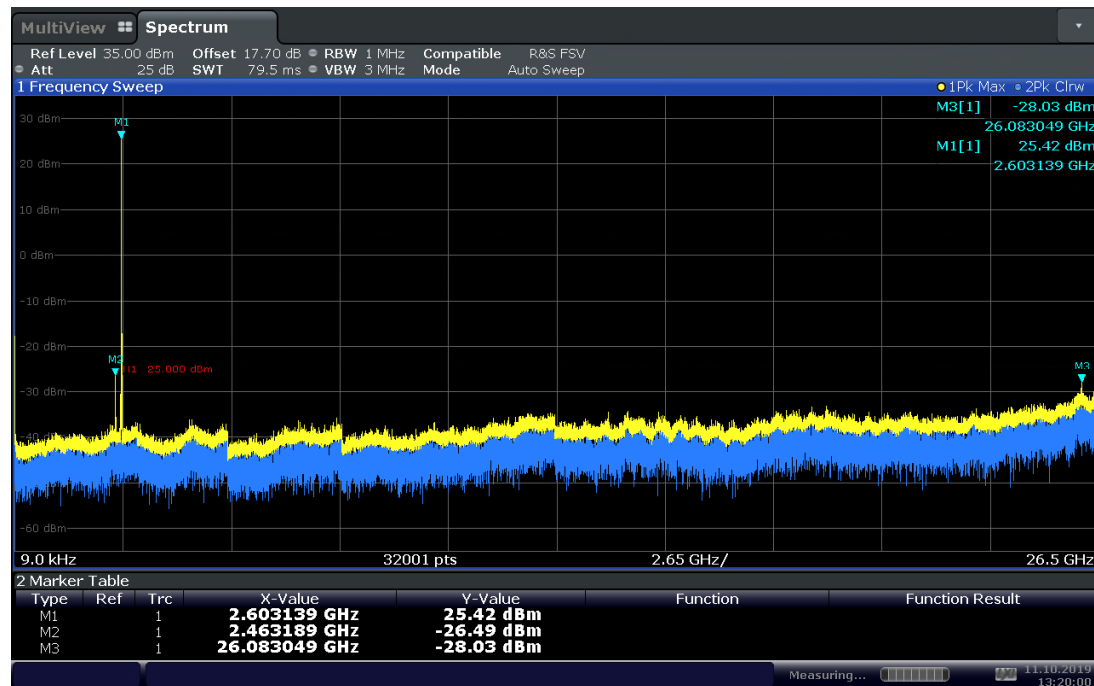
13:17:03 11.10.2019

LTE Band 38 / 20 MHz BW / QPSK / Mid Channel 2595 MHz



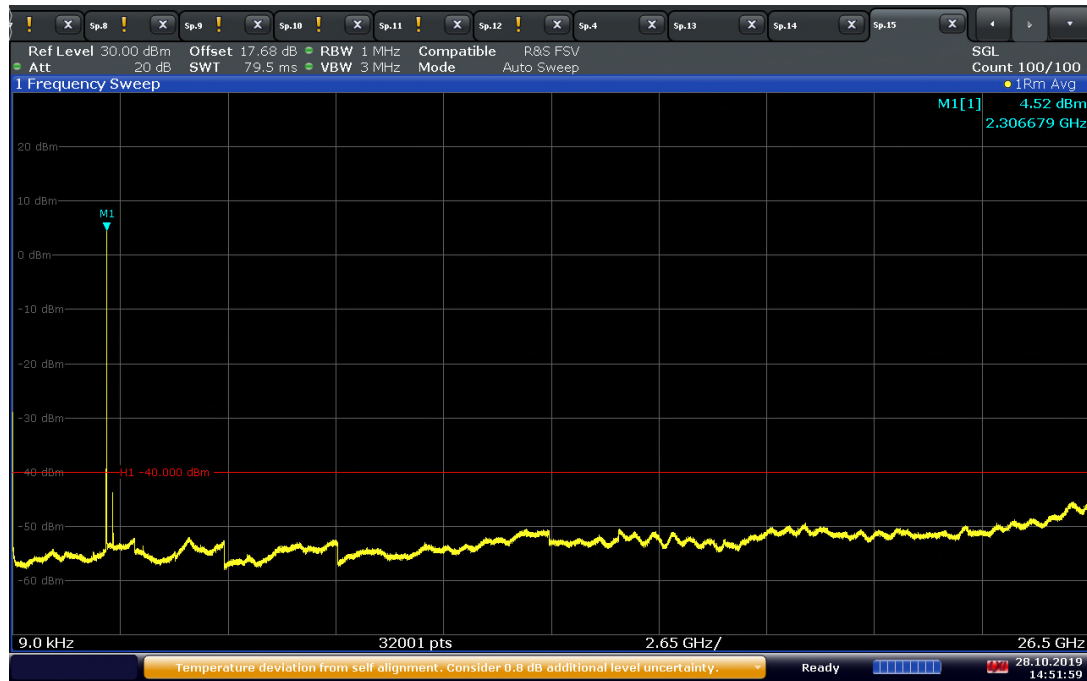
13:18:26 11.10.2019

LTE Band 38 / 20 MHz BW / QPSK / High Channel 2610 MHz



13:20:00 11.10.2019

LTE Band 40 (2305-2315 MHz Range) / 5 MHz BW / QPSK / Low Channel 2307.5 MHz



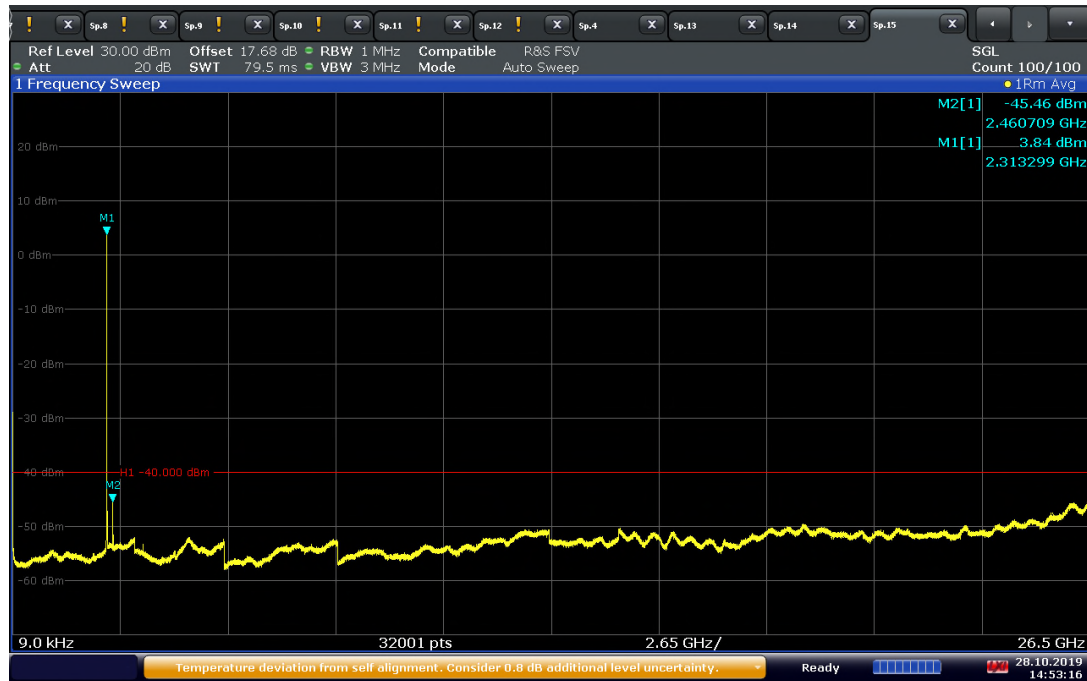
14:52:00 28.10.2019

LTE Band 40 (2305-2315 MHz Range) / 5 MHz BW / QPSK / Mid Channel 2310 MHz



14:52:37 28.10.2019

LTE Band 40 (2305-2315 MHz Range) / 5 MHz BW / QPSK / High Channel 2312.5 MHz



14:53:17 28.10.2019

LTE Band 40 (2305-2315 MHz Range) / 10 MHz BW / QPSK / Mid Channel 2310 MHz



14:54:08 28.10.2019

LTE Band 40 (2350-2360 MHz Range) / 5 MHz BW / QPSK / Low Channel 2352.5 MHz



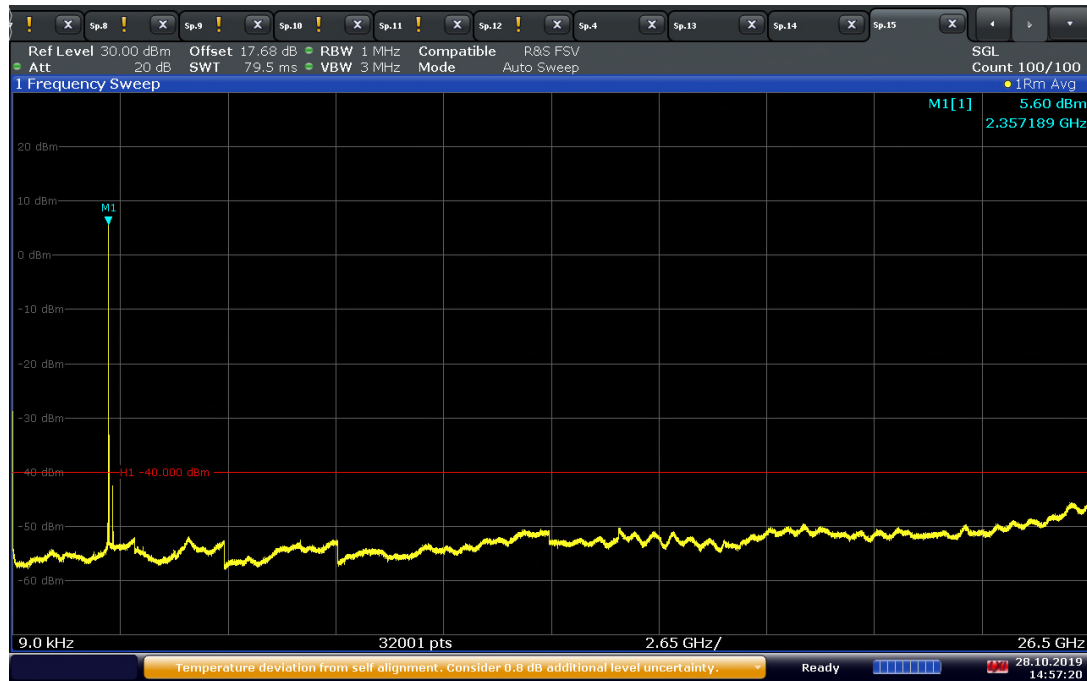
14:54:57 28.10.2019

LTE Band 40 (2350-2360 MHz Range) / 5 MHz BW / QPSK / Mid Channel 2355 MHz



14:55:49 28.10.2019

LTE Band 40 (2350-2360 MHz Range) / 5 MHz BW / QPSK / High Channel 2357.5 MHz



14:57:20 28.10.2019

LTE Band 40 (2350-2360 MHz Range) / 10 MHz BW / QPSK / Mid Channel 2355 MHz



14:58:17 28.10.2019

2.7 FIELD STRENGTH OF SPURIOUS RADIATION

2.7.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1053
FCC 47 CFR Part 27, Clause 27.53(a)(4)
FCC 47 CFR Part 27, Clause 27.53(m)(4)
RSS-195, Clause 5.6
RSS-199, Clause 4.5

2.7.2 Standard Applicable

FCC 47 CFR Part 27.53(a):

For mobile and portable stations operating in the 2305–2315 MHz and 2350–2360 MHz bands:

- (i) By a factor of not less than: $43 + 10 \log (P)$ dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation, not less than $55 + 10 \log (P)$ dB on all frequencies between 2320 and 2324 MHz and on all frequencies between 2341 and 2345 MHz, not less than $61 + 10 \log (P)$ dB on all frequencies between 2324 and 2328 MHz and on all frequencies between 2337 and 2341 MHz, and not less than $67 + 10 \log (P)$ dB on all frequencies between 2328 and 2337 MHz;
- (ii) By a factor of not less than $43 + 10 \log (P)$ dB on all frequencies between 2300 and 2305 MHz, $55 + 10 \log (P)$ dB on all frequencies between 2296 and 2300 MHz, $61 + 10 \log (P)$ dB on all frequencies between 2292 and 2296 MHz, $67 + 10 \log (P)$ dB on all frequencies between 2288 and 2292 MHz, and $70 + 10 \log (P)$ dB below 2288 MHz;
- (iii) By a factor of not less than $43 + 10 \log (P)$ dB on all frequencies between 2360 and 2365 MHz, and not less than $70 + 10 \log (P)$ dB above 2365 MHz.

FCC 47 CFR Part 27.53(m):

For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section.

In addition, the attenuation factor shall not be less than $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

RSS-195, Clause 5.6:

The power of any emission outside the frequency range(s) in which the equipment operates shall be attenuated below the transmitter power, P(dBW), by the amount indicated in Table 2, where p is the transmitter output power measured in watts.

Table 2 — Unwanted Emissions for Mobile, Portable and Low-Power Fixed Subscriber Equipment

Frequency (MHz)	Attenuation (dB)
<2200	$43 + 10 \log_{10}(p)$
2200 - 2288	$70 + 10 \log_{10}(p)$
2288 - 2292	$67 + 10 \log_{10}(p)$
2292 - 2296	$61 + 10 \log_{10}(p)$
2296 - 2300	$55 + 10 \log_{10}(p)$
2300 - 2305	$43 + 10 \log_{10}(p)$
2305 - 2320	$43 + 10 \log_{10}(p)^{\text{Note}}$
2320 - 2324	$55 + 10 \log_{10}(p)$
2324 - 2328	$61 + 10 \log_{10}(p)$
2328 - 2337	$67 + 10 \log_{10}(p)$
2337 - 2341	$61 + 10 \log_{10}(p)$
2341 - 2345	$55 + 10 \log_{10}(p)$
2345 - 2360	$43 + 10 \log_{10}(p)^{\text{Note}}$
2360 - 2365	$43 + 10 \log_{10}(p)$
2365 - 2395	$70 + 10 \log_{10}(p)$
>2395	$43 + 10 \log_{10}(p)$

Note: Measured at the edges of the highest and lowest frequency range(s) in which the equipment is designed to operate. See Section 5.2 for the permitted frequency ranges for various equipment types.

RSS-199, Clause 4.5:

In the 1 MHz band immediately outside and adjacent to the channel edge, the unwanted emission power shall be measured with a resolution bandwidth of at 1% of the occupied bandwidth for base station and fixed subscriber equipment, and 2% for mobile subscriber equipment. Beyond the 1 MHz band, a resolution bandwidth of 1 MHz shall be used.

(b) for mobile subscriber equipment, the power of any unwanted emissions measured as above shall be attenuated (in dB) below the transmitter power, P (dBW), by at least:

(i) $40 + 10 \log_{10} p$ from the channel edges to 5 MHz away.

(ii) $43 + 10 \log_{10} p$ between 5 MHz and X MHz from the channel edges, and

(iii) $55 + 10 \log_{10} p$ at X MHz and beyond from the channel edges

Note: X is 6 MHz or the equipment occupied bandwidth, whichever is greater

2.7.3 Equipment Under Test and Modification State

Serial No: FJ220819C00056 / Test Configuration B

2.7.4 Date of Test/Initial of test personnel who performed the test

September 25 to October 14, 2019 / AC

2.7.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.7.6 Environmental Conditions/ Test Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

Ambient Temperature	24.7 - 25.9 °C
Relative Humidity	49.7 - 57.2 %
ATM Pressure	98.7 - 99.1 kPa

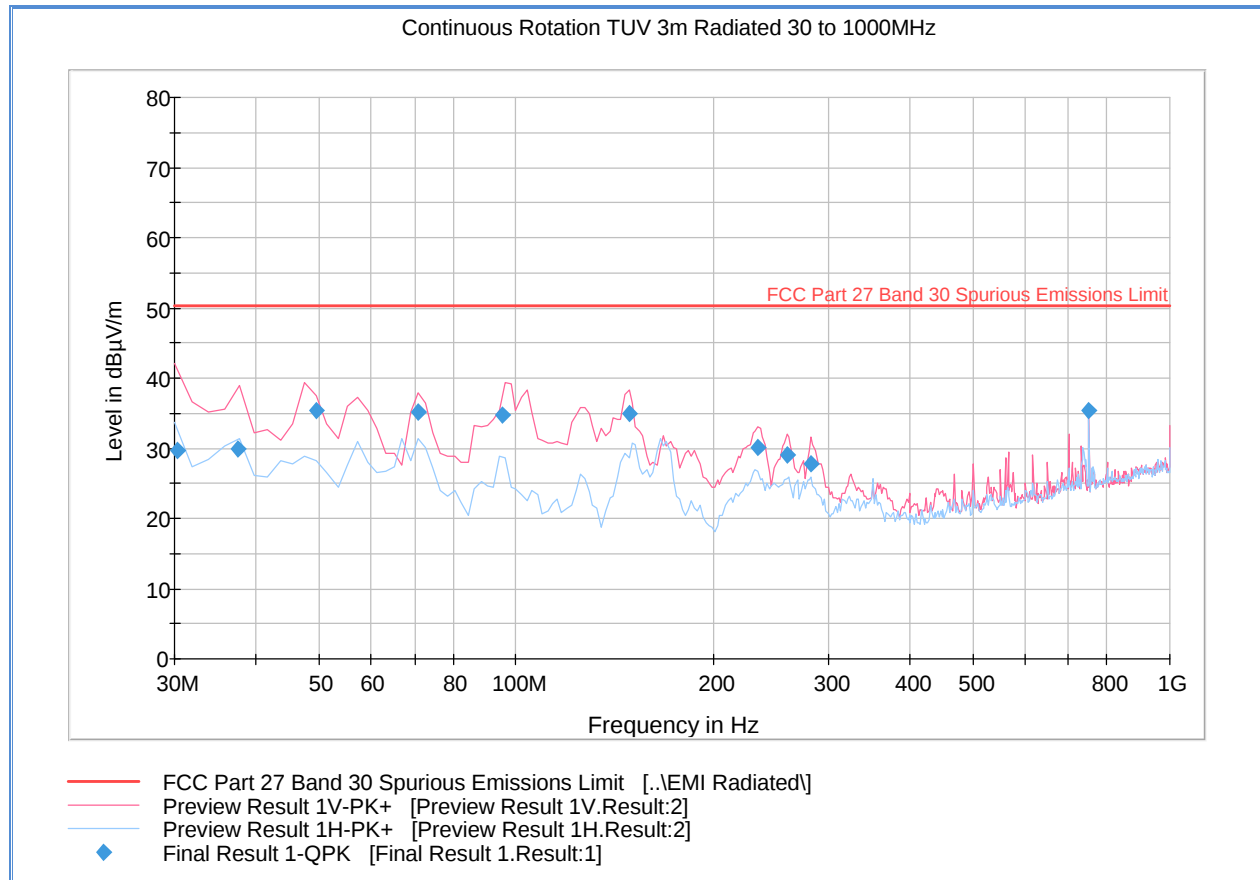
2.7.7 Additional Observations

- This is a radiated test using substitution method as per Unwanted Emissions: Radiated Spurious method of measurement of ANSI/TIA/EIA-603-C 2004, August 17, 2004.
- This is cabinet spurious emissions testing. Main antenna port was terminated during the test. Fundamental frequency measurement will be ignored for this test.
- Emissions within 6dB of the limit will be proven by substitution method.
- Only the worst case configuration presented in this test report.
- Only noise floor measurements observed above 18GHz.
- Measurement was done using EMC32 automated software. Reported level is the actual level with all the correction factors factored in. Correction Factor column is for informational purposes only.

2.7.8 Test Results

Compliant. See attached plots.

2.7.9 Radiated Emission Test Results Below 1GHz – Worst Case LTE Band 30_Low Channel 2307.5 MHz



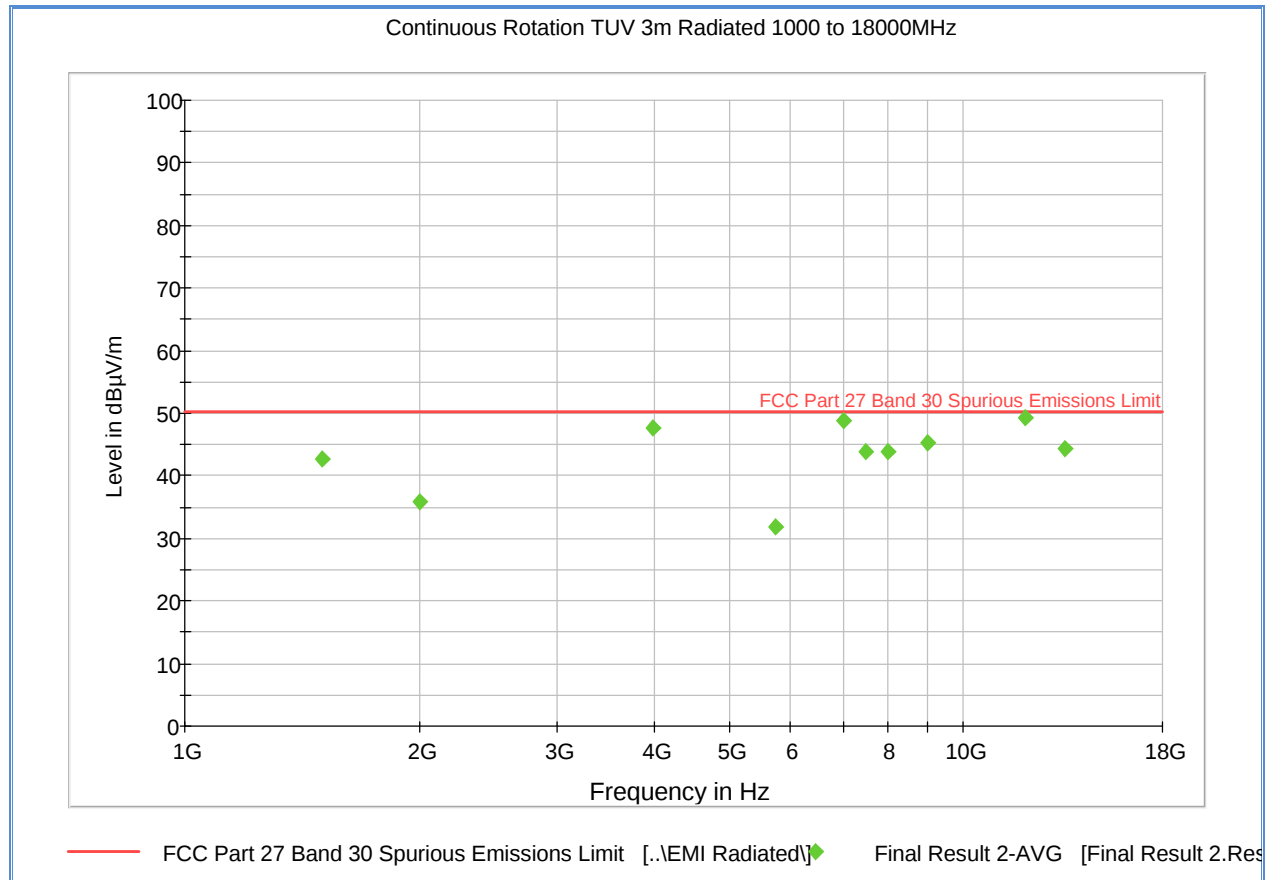
Quasi Peak Data

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
30.240000	29.7	1000.0	120.000	100.0	V	109.0	-8.4	20.5	50.2
37.455551	29.9	1000.0	120.000	100.0	V	174.0	-13.5	20.4	50.2
49.494990	35.3	1000.0	120.000	100.0	V	194.0	-15.4	14.9	50.2
70.861643	35.2	1000.0	120.000	100.0	V	30.0	-18.0	15.0	50.2
95.012184	34.7	1000.0	120.000	100.0	V	86.0	-14.1	15.5	50.2
149.137154	34.8	1000.0	120.000	100.0	V	203.0	-14.1	15.4	50.2
233.932104	30.1	1000.0	120.000	100.0	V	117.0	-10.3	20.1	50.2
259.922645	29.0	1000.0	120.000	100.0	V	131.0	-9.3	21.2	50.2
282.465411	27.8	1000.0	120.000	100.0	V	130.0	-9.3	22.4	50.2
749.982365	35.5	1000.0	120.000	150.0	V	93.0	1.6	14.8	50.2

Substitution Data

Frequency (MHz)	Field Strength @ 3 meters (dBµV/m)	Cable Loss (dB)	Substitution Antenna Gain (dBi)	Signal Generator Level (dBm)	Substitution Data SGL+AG+CL (dBm)	Limit (dBm)	Compliance

2.7.10 Radiated Emission Test Results Above 1GHz – LTE Band 30_Low Channel 2307.5 MHz



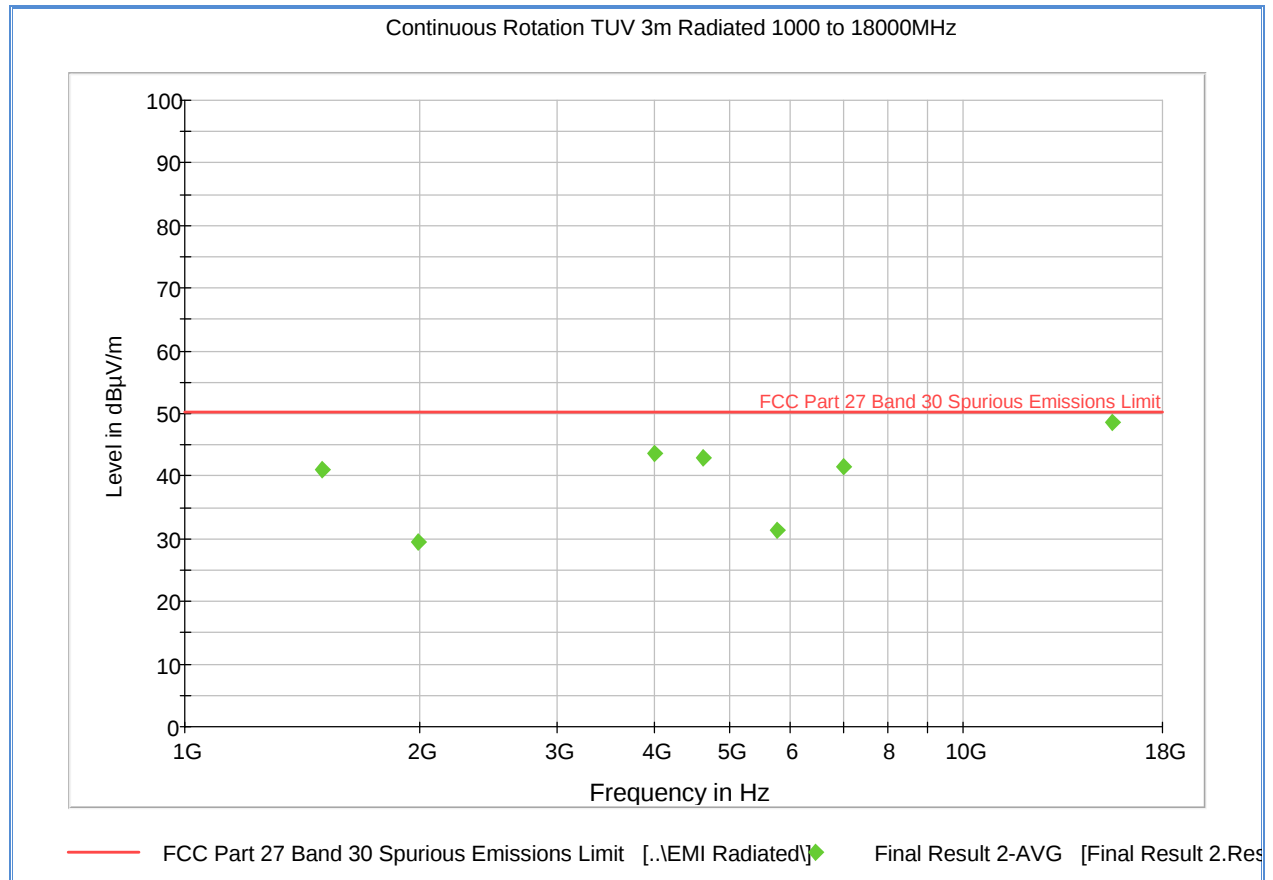
Average Data

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1500.000000	42.8	1000.0	1000.000	104.8	V	215.0	-6.1	7.4	50.2
2000.000000	35.8	1000.0	1000.000	165.6	V	350.0	-2.2	14.4	50.2
3999.766667	47.6	1000.0	1000.000	152.7	V	12.0	2.5	2.6	50.2
5743.800000	31.7	1000.0	1000.000	302.2	H	303.0	5.3	18.5	50.2
7000.066667	48.7	1000.0	1000.000	269.3	H	-8.0	6.7	1.5	50.2
7499.866667	43.9	1000.0	1000.000	184.6	H	54.0	6.8	6.3	50.2
7999.866667	43.9	1000.0	1000.000	103.7	V	40.0	6.9	6.3	50.2
9000.000000	45.3	1000.0	1000.000	294.3	H	339.0	7.6	4.9	50.2
11999.966667	49.4	1000.0	1000.000	200.5	H	144.0	13.5	0.8	50.2
13499.900000	44.3	1000.0	1000.000	252.4	H	29.0	14.2	6.0	50.2

Substitution Data

Frequency (MHz)	Field Strength @ 3 meters (dBµV/m)	Cable Loss (dB)	Substitution Antenna Gain (dBi)	Signal Generator Level (dBm)	Substitution Data SGL+AG+CL (dBm)	Limit (dBm)	Compliance
3999.766667	47.6	-3.3	9.4	-53.5	-47.4	-45	Yes
7000.066667	48.7	-7.1	12	-51.5	-46.6	-45	Yes
9000.000000	45.3	-8.4	11.5	-53.0	-49.9	-45	Yes
11999.966667	49.4	-10.6	12.7	-48.0	-45.9	-45	Yes

2.7.11 Radiated Emission Test Results Above 1GHz – LTE Band 30_Mid Channel 2310 MHz



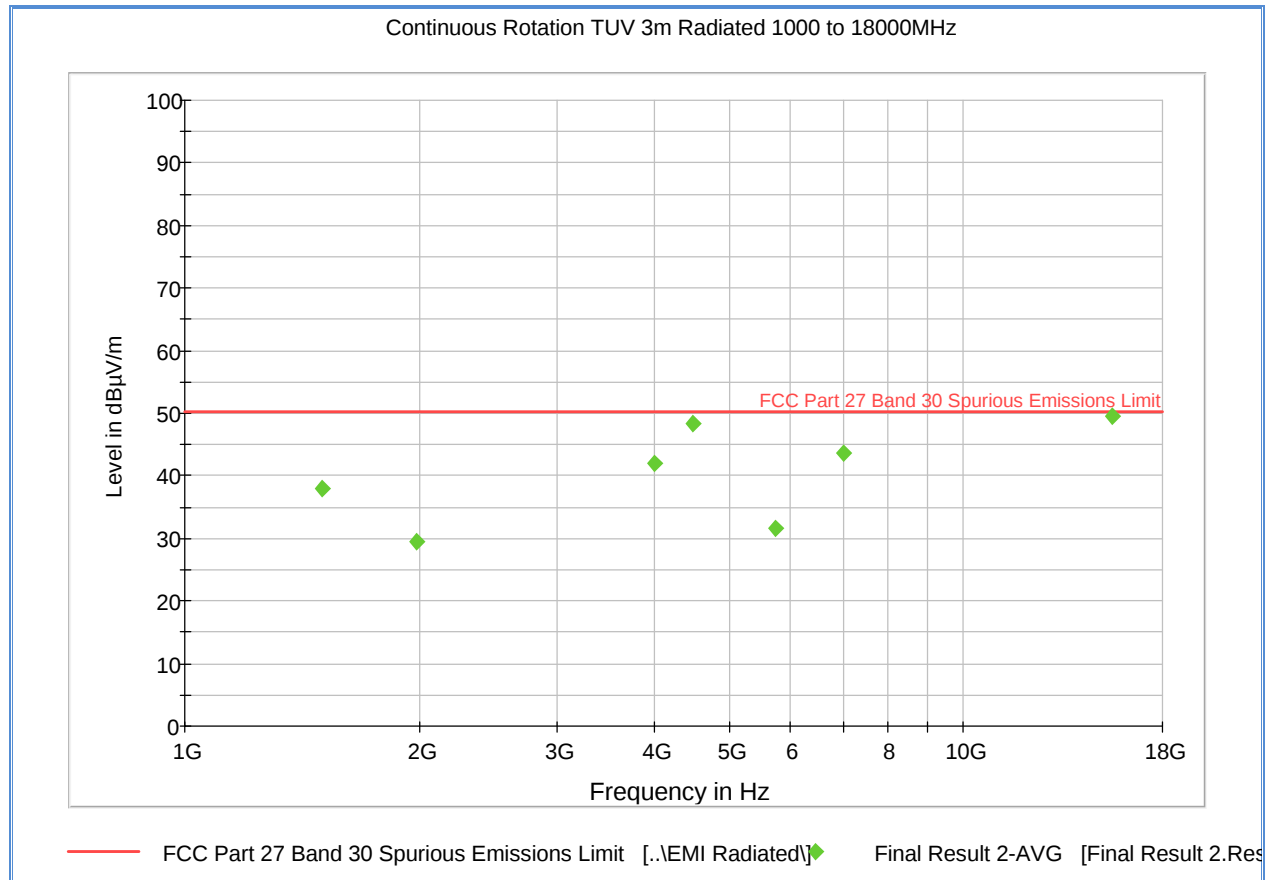
Average Data

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1500.000000	41.1	1000.0	1000.000	131.7	H	346.0	-6.1	9.1	50.2
1989.266667	29.4	1000.0	1000.000	305.2	H	177.0	-2.3	20.8	50.2
4000.133333	43.6	1000.0	1000.000	188.5	H	37.0	2.5	6.6	50.2
4620.266667	43.0	1000.0	1000.000	103.7	V	11.0	3.6	7.2	50.2
5751.133333	31.5	1000.0	1000.000	147.7	H	180.0	5.3	18.8	50.2
7000.066667	41.6	1000.0	1000.000	395.0	V	76.0	6.7	8.7	50.2
15499.833333	48.6	1000.0	1000.000	403.0	H	55.0	16.1	1.6	50.2

Substitution Data

Frequency (MHz)	Field Strength @ 3 meters (dBµV/m)	Cable Loss (dB)	Substitution Antenna Gain (dBi)	Signal Generator Level (dBm)	Substitution Data SGL+AG+CL (dBm)	Limit (dBm)	Compliance
15499.833333	48.6	-13.8	15.6	-48.5	-46.7	-45	Yes

2.7.12 Radiated Emission Test Results Above 1GHz – LTE Band 30_High Channel 2312.5 MHz



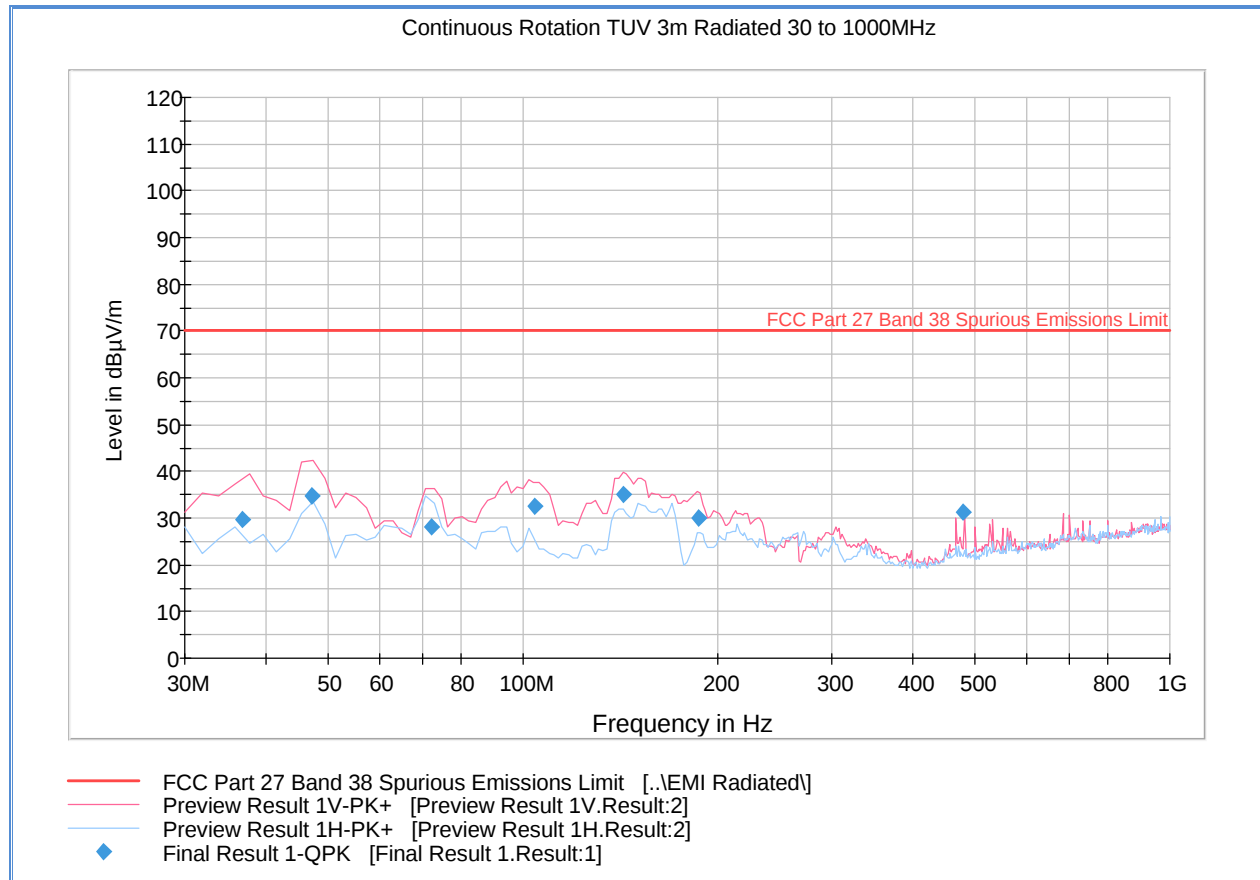
Average Data

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1500.000000	37.9	1000.0	1000.000	327.2	H	32.0	-6.1	12.4	50.2
1987.500000	29.6	1000.0	1000.000	311.2	V	188.0	-2.3	20.6	50.2
4000.133333	42.1	1000.0	1000.000	352.7	V	-1.0	2.5	8.1	50.2
4499.933333	48.4	1000.0	1000.000	120.7	V	-1.0	3.7	1.9	50.2
5743.233333	31.7	1000.0	1000.000	112.7	H	-10.0	5.3	18.5	50.2
7000.066667	43.7	1000.0	1000.000	315.2	V	55.0	6.7	6.5	50.2
15500.066667	49.6	1000.0	1000.000	394.0	V	54.0	16.1	0.6	50.2

Substitution Data

Frequency (MHz)	Field Strength @ 3 meters (dBµV/m)	Cable Loss (dB)	Substitution Antenna Gain (dBi)	Signal Generator Level (dBm)	Substitution Data SGL+AG+CL (dBm)	Limit (dBm)	Compliance
4499.933333	48.4	-3.8	11	-54.0	-46.8	-45	Yes
15500.066667	49.6	-13.8	16.2	-48.0	-45.6	-45	Yes

2.7.13 Radiated Emission Test Results Below 1GHz – Worst Case LTE Band 38_Low Channel 2595 MHz



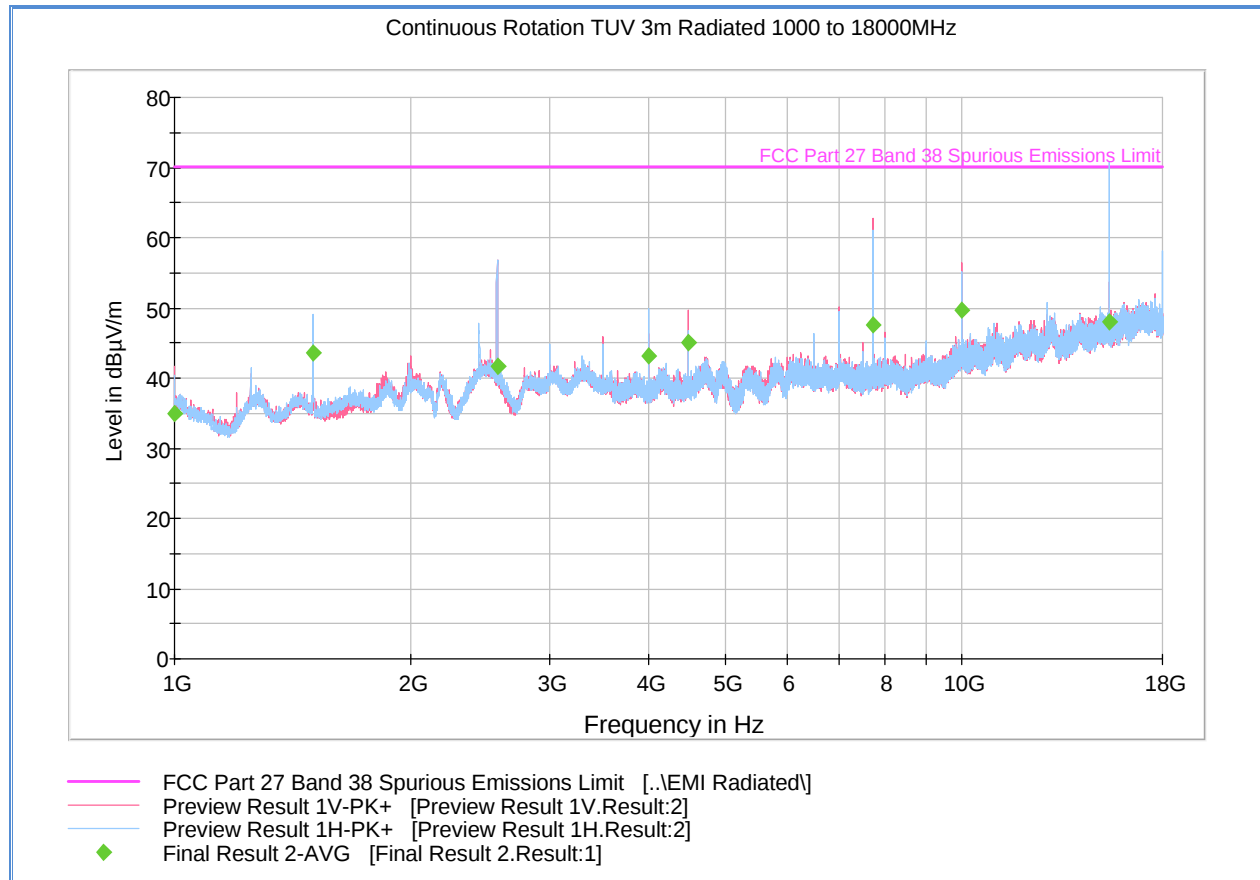
Quasi Peak Data

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
36.735551	29.6	1000.0	120.000	100.0	V	242.0	-10.7	40.6	70.2
47.094990	34.6	1000.0	120.000	138.0	V	219.0	-14.2	35.6	70.2
72.245531	28.0	1000.0	120.000	100.0	V	229.0	-17.2	42.2	70.2
104.483848	32.4	1000.0	120.000	100.0	V	117.0	-13.2	37.8	70.2
142.665491	35.1	1000.0	120.000	106.0	V	247.0	-14.0	35.1	70.2
186.711022	30.1	1000.0	120.000	100.0	V	-8.0	-11.3	40.1	70.2
479.981964	31.3	1000.0	120.000	100.0	V	121.0	-1.9	38.9	70.2

Substitution Data

Frequency (MHz)	Field Strength @ 3 meters (dBµV/m)	Cable Loss (dB)	Substitution Antenna Gain (dBi)	Signal Generator Level (dBm)	Substitution Data SGL+AG+CL (dBm)	Limit (dBm)	Compliance

2.7.14 Radiated Emission Test Results Above 1GHz – LTE Band 38_Low Channel 2580 MHz



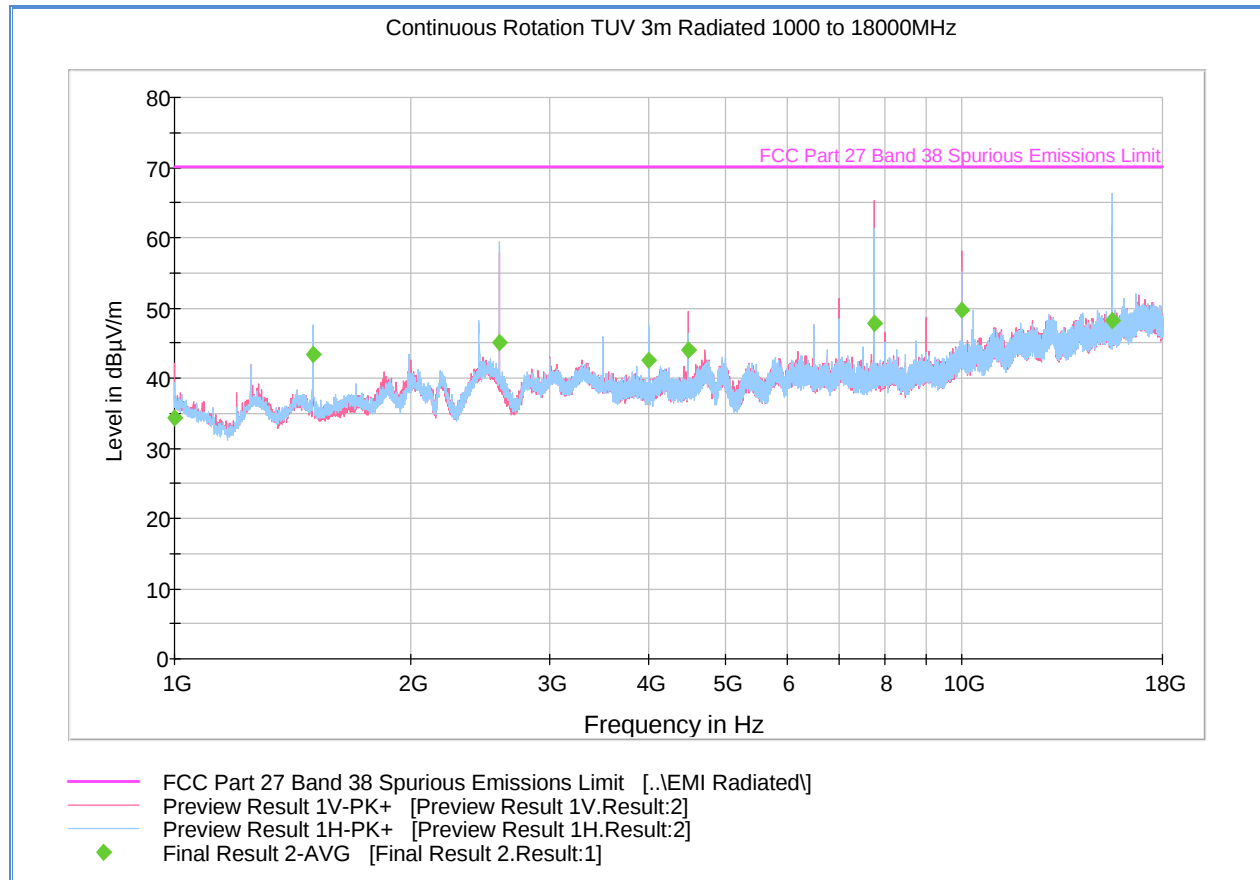
Average Data

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1000.000000	34.9	1000.0	1000.000	150.7	V	195.0	-6.9	35.3	70.2
1500.000000	43.6	1000.0	1000.000	179.5	H	49.0	-6.1	26.6	70.2
2571.000000	41.6	1000.0	1000.000	150.7	V	295.0	-0.3	28.6	70.2
4000.133333	43.2	1000.0	1000.000	213.4	H	68.0	2.5	27.0	70.2
4499.933333	45.0	1000.0	1000.000	142.7	V	-7.0	3.7	25.2	70.2
7713.100000	47.5	1000.0	1000.000	204.5	V	0.0	7.2	22.7	70.2
10000.000000	49.8	1000.0	1000.000	250.5	V	67.0	9.6	20.4	70.2
15426.566667	48.0	1000.0	1000.000	174.6	H	273.0	16.1	22.2	70.2

Substitution Data

Frequency (MHz)	Field Strength @ 3 meters (dBµV/m)	Cable Loss (dB)	Substitution Antenna Gain (dBi)	Signal Generator Level (dBm)	Substitution Data SGL+AG+CL (dBm)	Limit (dBm)	Compliance

2.7.15 Radiated Emission Test Results Above 1GHz – LTE Band 38_Mid Channel 2595 MHz



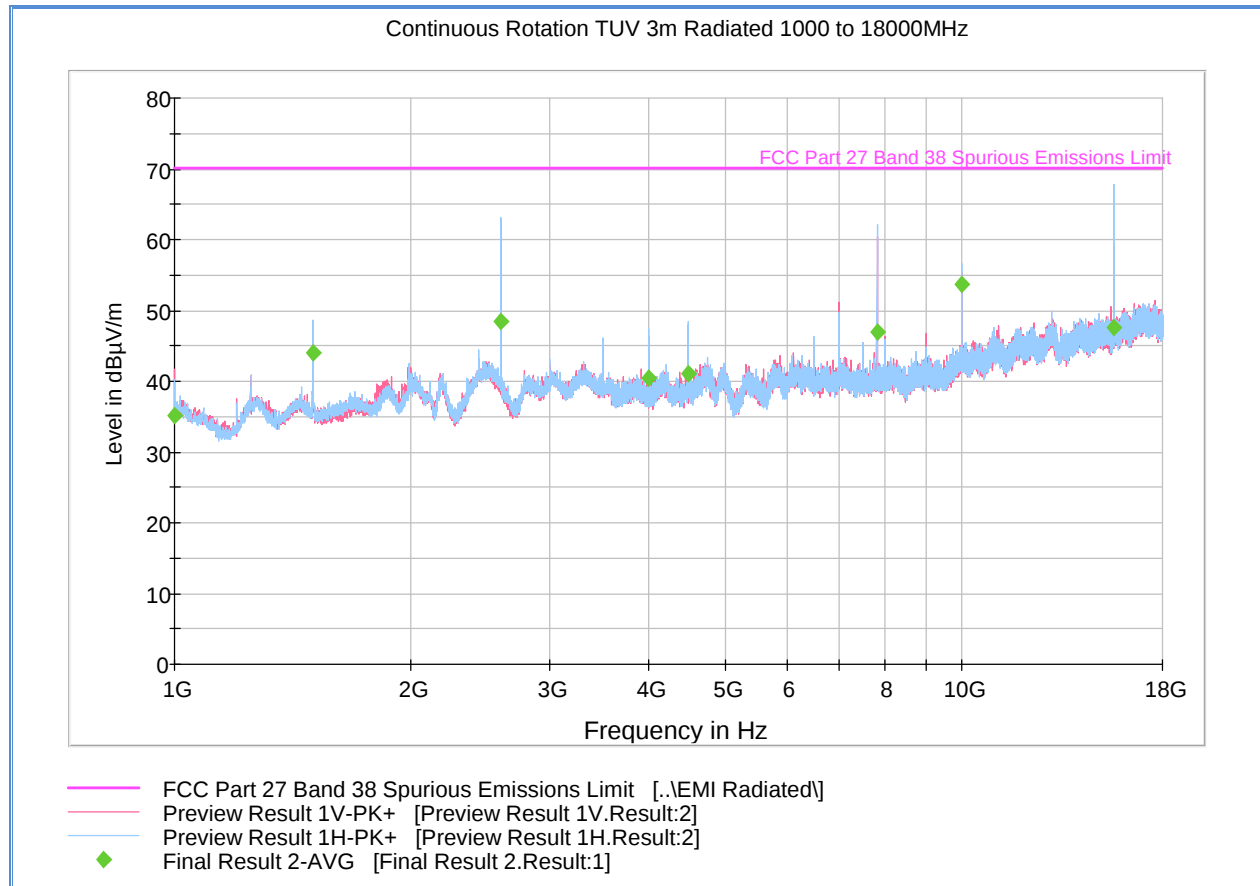
Average Data

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1000.000000	34.4	1000.0	1000.000	167.6	V	182.0	-6.9	35.8	70.2
1500.000000	43.4	1000.0	1000.000	138.7	H	150.0	-6.1	26.8	70.2
2585.933333	45.1	1000.0	1000.000	149.6	H	289.0	-0.3	25.1	70.2
4000.166667	42.6	1000.0	1000.000	201.3	H	64.0	2.5	27.6	70.2
4499.933333	44.0	1000.0	1000.000	196.5	V	350.0	3.7	26.2	70.2
7758.266667	47.8	1000.0	1000.000	191.5	V	-4.0	7.1	22.4	70.2
10000.000000	49.7	1000.0	1000.000	250.5	V	67.0	9.6	20.5	70.2
15516.666667	48.1	1000.0	1000.000	163.6	H	262.0	16.1	22.1	70.2

Substitution Data

Frequency (MHz)	Field Strength @ 3 meters (dBµV/m)	Cable Loss (dB)	Substitution Antenna Gain (dBi)	Signal Generator Level (dBm)	Substitution Data SGL+AG+CL (dBm)	Limit (dBm)	Compliance

2.7.16 Radiated Emission Test Results Above 1GHz – LTE Band 38_High Channel 2610 MHz



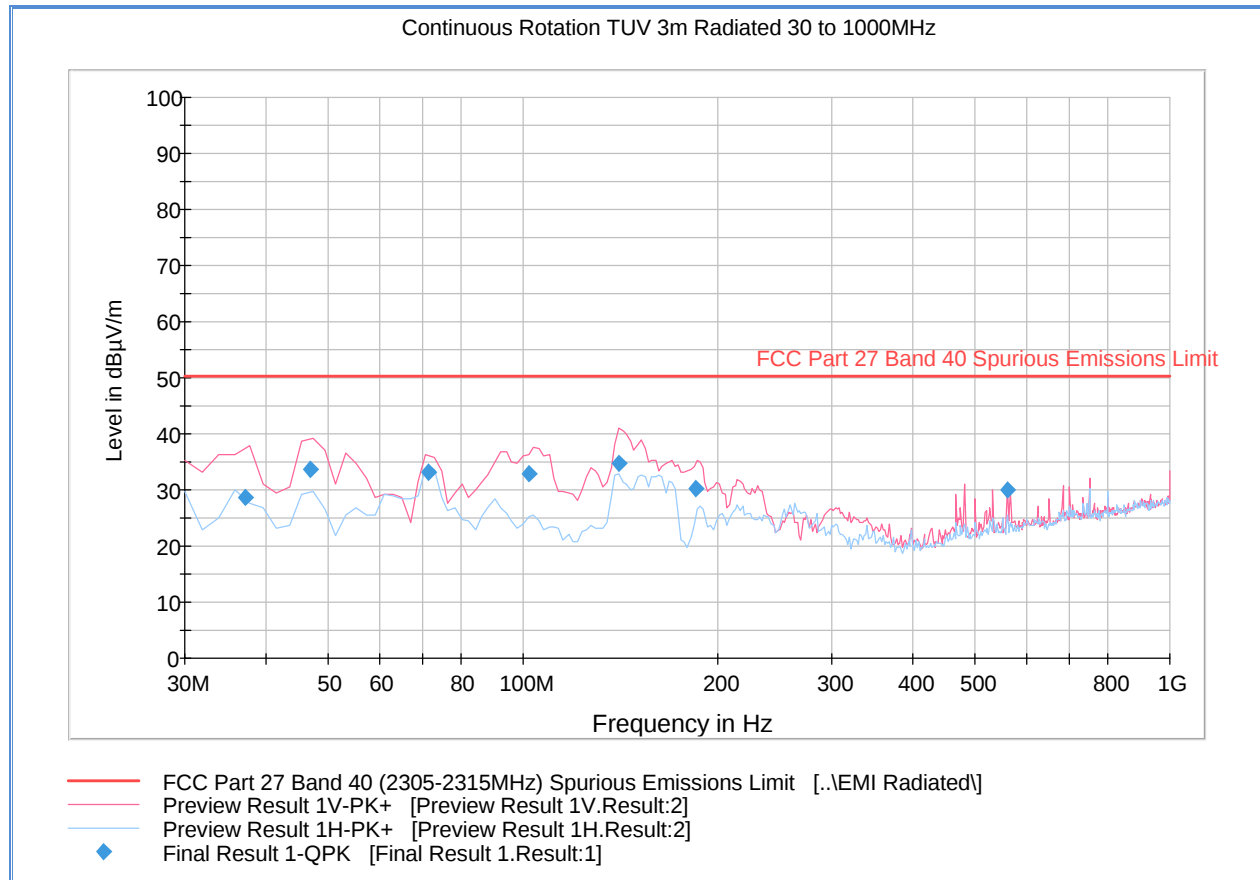
Average Data

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1000.000000	35.2	1000.0	1000.000	163.6	V	93.0	-6.9	35.0	70.2
1500.000000	43.9	1000.0	1000.000	200.5	H	49.0	-6.1	26.3	70.2
2601.033333	48.5	1000.0	1000.000	176.6	H	227.0	-0.3	21.7	70.2
4000.133333	40.4	1000.0	1000.000	250.5	H	303.0	2.5	29.8	70.2
4499.933333	41.0	1000.0	1000.000	159.6	H	36.0	3.7	29.2	70.2
7803.233333	46.9	1000.0	1000.000	181.6	H	8.0	7.1	23.3	70.2
10000.000000	53.7	1000.0	1000.000	250.5	H	41.0	9.6	16.5	70.2
15606.366667	47.7	1000.0	1000.000	153.7	H	252.0	16.3	22.5	70.2

Substitution Data

Frequency (MHz)	Field Strength @ 3 meters (dBµV/m)	Cable Loss (dB)	Substitution Antenna Gain (dBi)	Signal Generator Level (dBm)	Substitution Data SGL+AG+CL (dBm)	Limit (dBm)	Compliance

2.7.17 Radiated Emission Test Results Below 1GHz – Worst Case LTE Band 40_Low Channel 2307.5 MHz



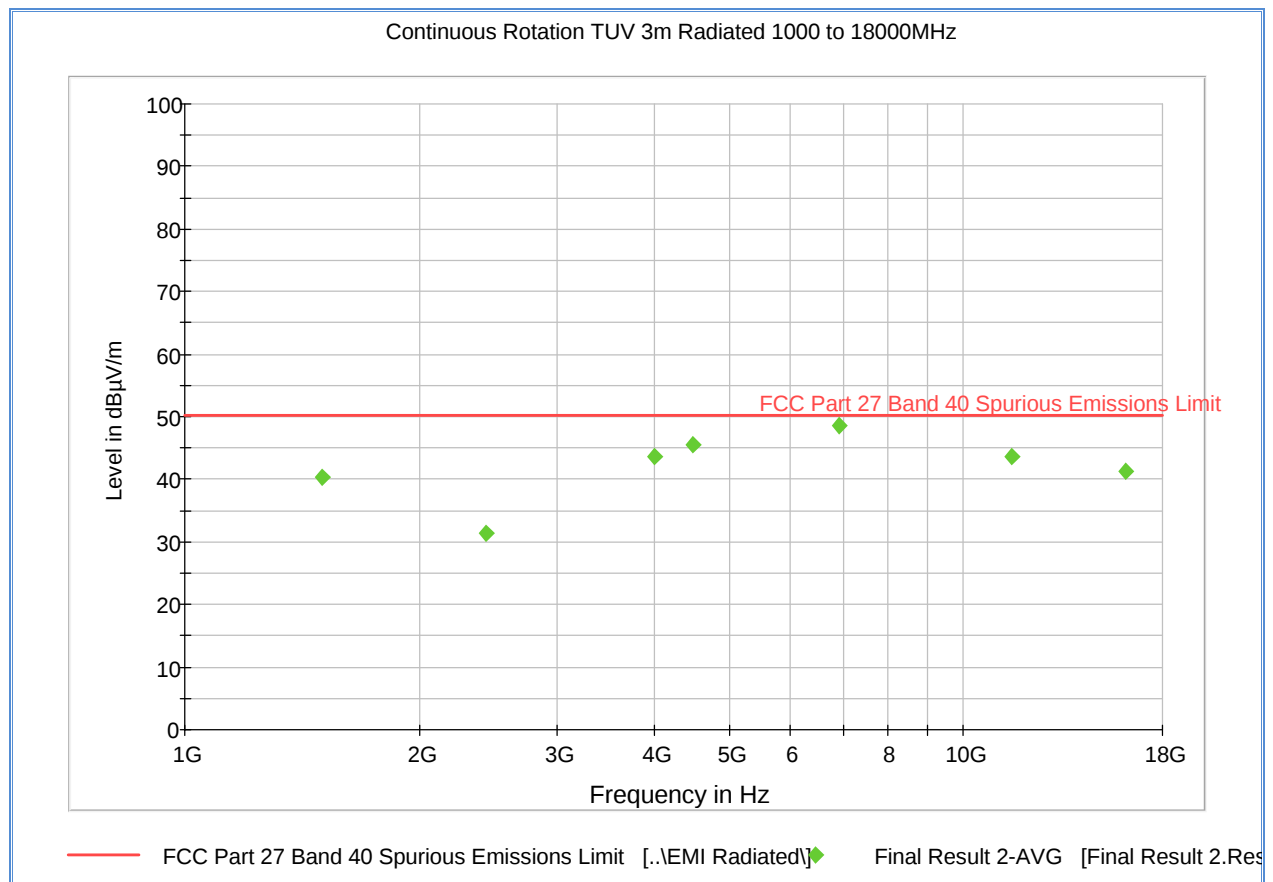
Quasi Peak Data

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
37.215551	28.8	1000.0	120.000	100.0	V	269.0	-10.9	21.4	50.2
47.014990	33.7	1000.0	120.000	116.0	V	36.0	-14.2	16.5	50.2
71.341643	33.2	1000.0	120.000	100.0	V	69.0	-17.2	17.0	50.2
101.987735	32.9	1000.0	120.000	100.0	V	86.0	-13.2	17.3	50.2
141.041603	34.7	1000.0	120.000	100.0	V	216.0	-14.1	15.5	50.2
185.191022	30.2	1000.0	120.000	100.0	V	350.0	-11.3	20.0	50.2
560.001363	30.1	1000.0	120.000	100.0	V	137.0	-1.0	20.1	50.2

Substitution Data

Frequency (MHz)	Field Strength @ 3 meters (dBµV/m)	Cable Loss (dB)	Substitution Antenna Gain (dBi)	Signal Generator Level (dBm)	Substitution Data SGL+AG+CL (dBm)	Limit (dBm)	Compliance

2.7.18 Radiated Emission Test Results Above 1GHz – LTE Band 40 (2305-2315MHz Range)_Low Channel 2307.5 MHz



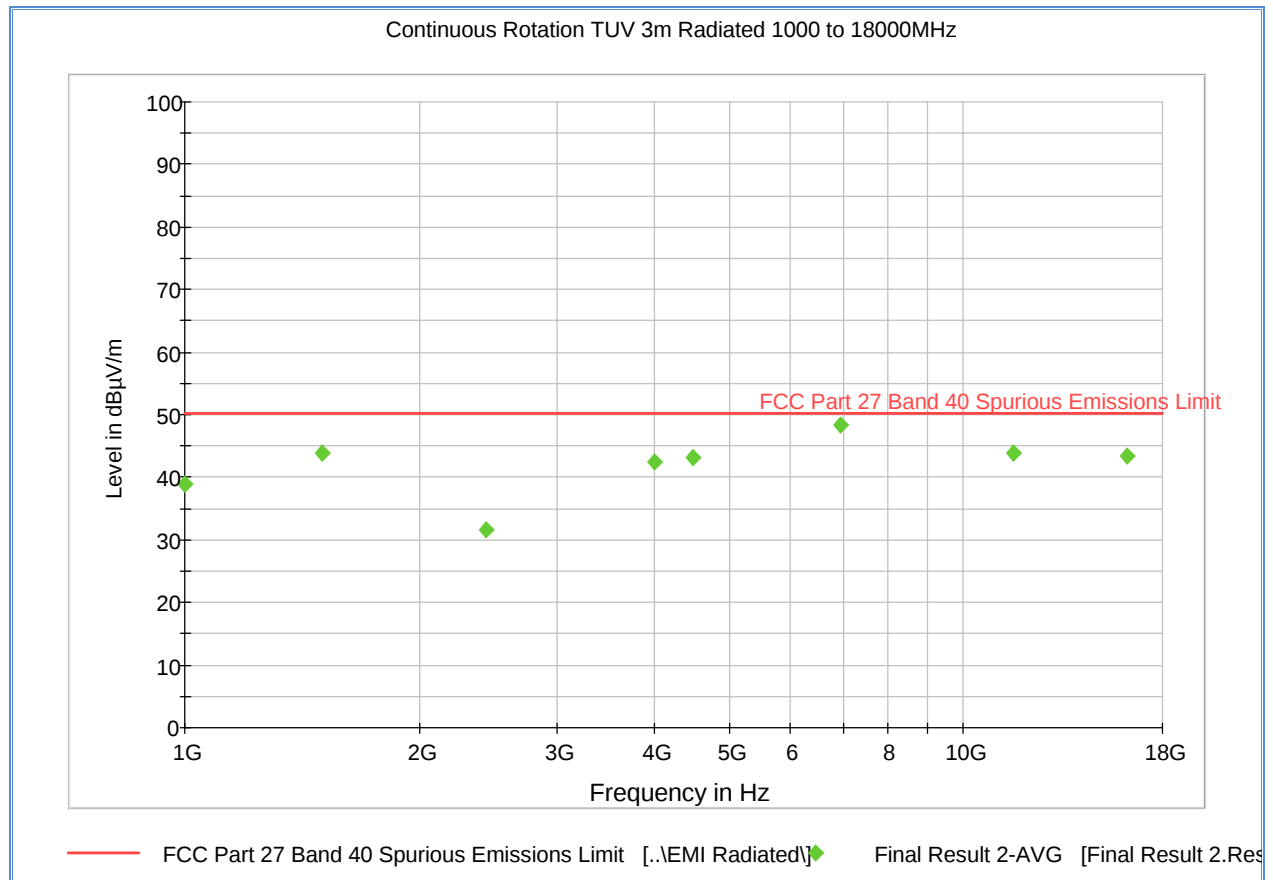
Average Data

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1500.000000	40.3	1000.0	1000.000	176.6	H	206.0	-6.1	9.9	50.2
2435.966667	31.5	1000.0	1000.000	341.2	H	227.0	-0.7	18.7	50.2
4000.133333	43.6	1000.0	1000.000	215.5	H	69.0	2.5	6.6	50.2
4499.933333	45.4	1000.0	1000.000	103.7	V	0.0	3.7	4.8	50.2
6923.000000	48.6	1000.0	1000.000	225.4	V	23.0	6.7	1.6	50.2
11538.500000	43.6	1000.0	1000.000	132.7	H	225.0	12.9	6.6	50.2
16153.600000	41.3	1000.0	1000.000	384.1	V	338.0	16.7	8.9	50.2

Substitution Data

Frequency (MHz)	Field Strength @ 3 meters (dBµV/m)	Cable Loss (dB)	Substitution Antenna Gain (dBi)	Signal Generator Level (dBm)	Substitution Data SGL+AG+CL (dBm)	Limit (dBm)	Compliance
4499.933333	45.4	-3.8	11.0	-57.0	-49.8	-45	Yes
6923.000000	48.6	-7.1	11.9	-51.5	-46.7	-45	Yes

2.7.19 Radiated Emission Test Results Above 1GHz – LTE Band 40 (2305-2315MHz Range)_Mid Channel 2310 MHz



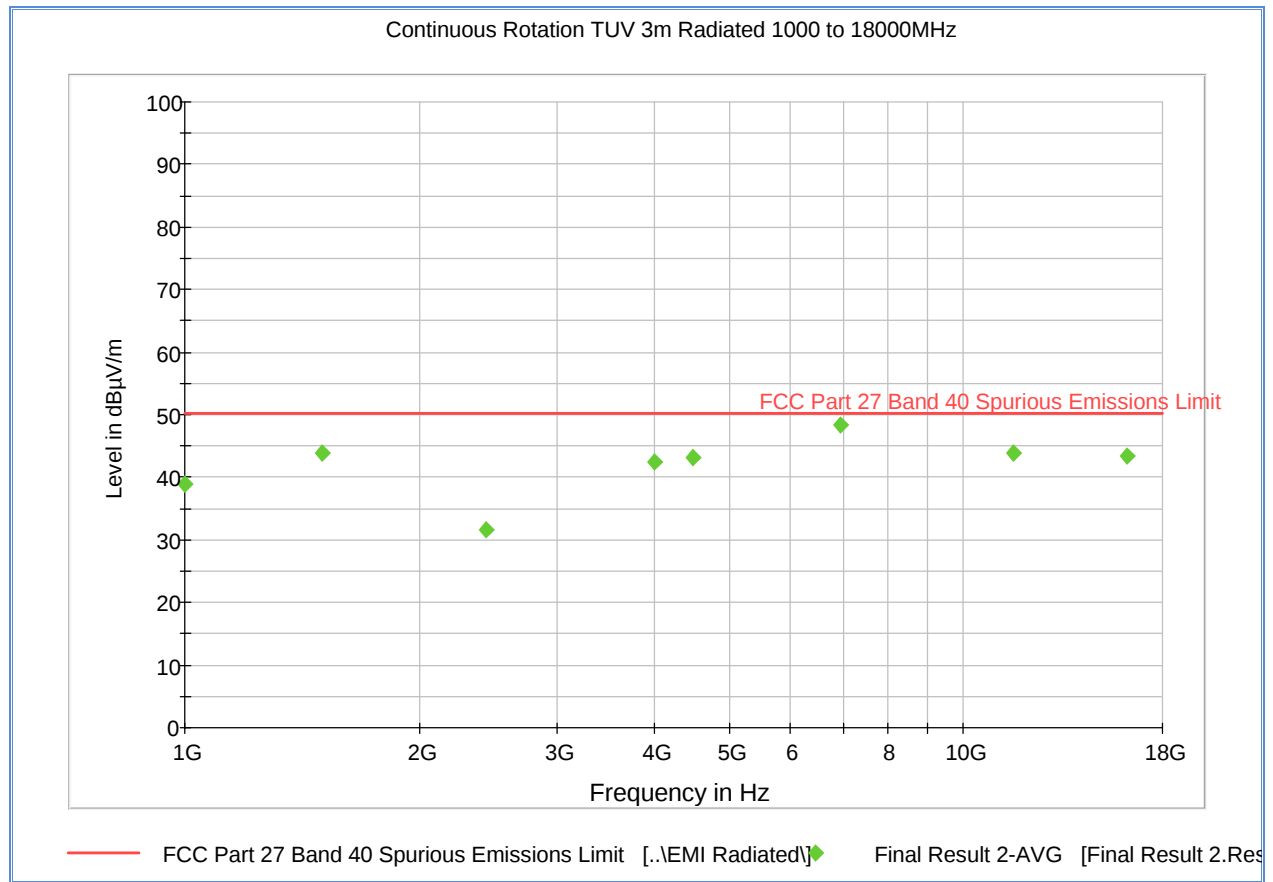
Average Data

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1000.000000	39.0	1000.0	1000.000	103.7	V	106.0	-6.9	11.2	50.2
1500.000000	43.8	1000.0	1000.000	194.5	H	48.0	-6.1	6.4	50.2
2438.566667	31.6	1000.0	1000.000	151.6	H	15.0	-0.7	18.6	50.2
4000.133333	42.5	1000.0	1000.000	199.5	H	72.0	2.5	7.7	50.2
4499.933333	43.1	1000.0	1000.000	200.5	V	182.0	3.7	7.1	50.2
6937.900000	48.5	1000.0	1000.000	192.5	V	-15.0	6.7	1.7	50.2
11563.433333	43.8	1000.0	1000.000	103.7	H	224.0	12.8	6.4	50.2
16188.900000	43.4	1000.0	1000.000	139.7	H	120.0	16.7	6.8	50.2

Substitution Data

Frequency (MHz)	Field Strength @ 3 meters (dBµV/m)	Cable Loss (dB)	Substitution Antenna Gain (dBi)	Signal Generator Level (dBm)	Substitution Data SGL+AG+CL (dBm)	Limit (dBm)	Compliance
6937.900000	48.5	-7.1	11.9	-51.5	-46.7	-45	Yes

2.7.20 Radiated Emission Test Results Above 1GHz – LTE Band 40 (2305-2315MHz Range)_High Channel 2312.5 MHz



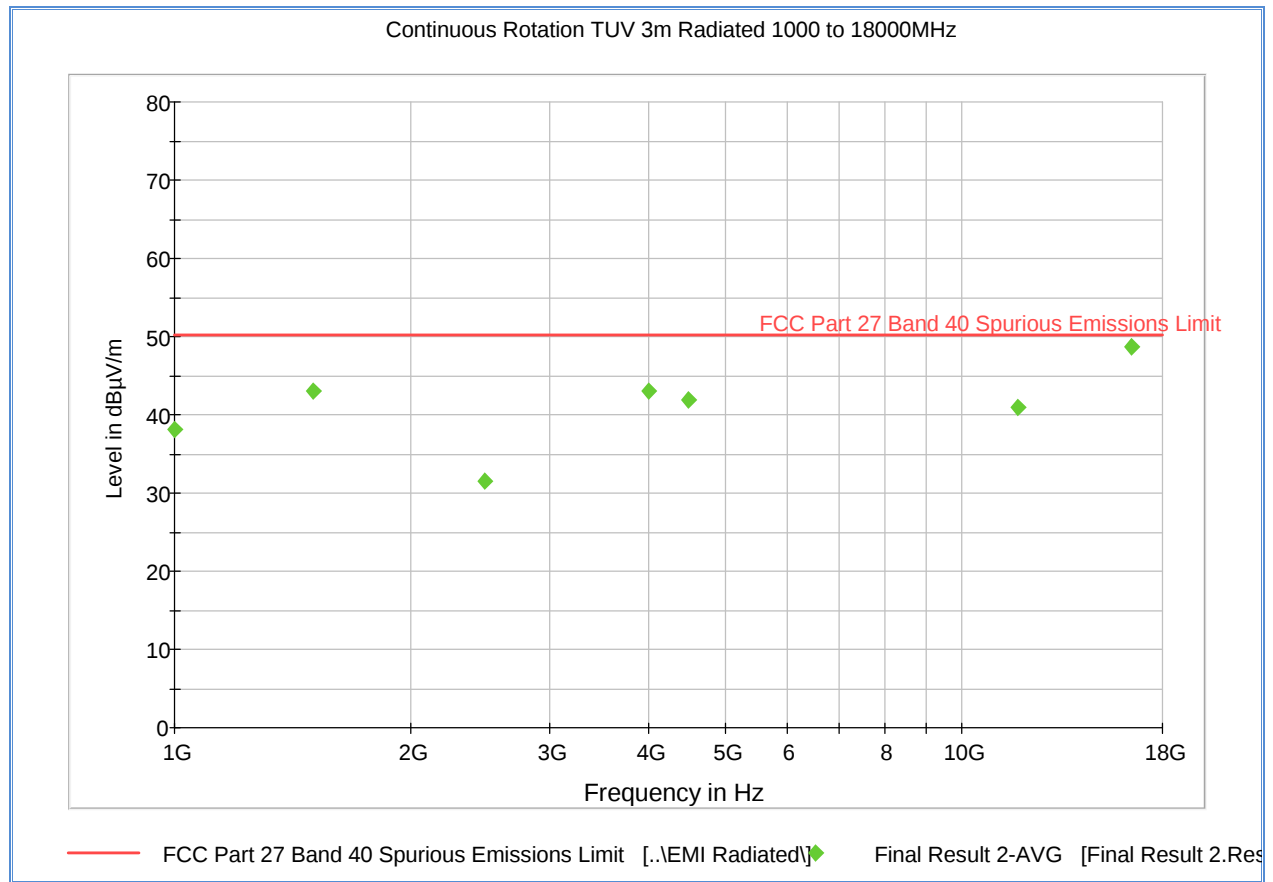
Average Data

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1000.000000	38.5	1000.0	1000.000	103.7	V	106.0	-6.9	11.7	50.2
1500.000000	42	1000.0	1000.000	194.5	H	48.0	-6.1	8.2	50.2
2438.566667	30.6	1000.0	1000.000	151.6	H	15.0	-0.7	19.6	50.2
4000.133333	41.6	1000.0	1000.000	199.5	H	72.0	2.5	8.6	50.2
4499.933333	42.3	1000.0	1000.000	200.5	V	182.0	3.7	7.9	50.2
6937.900000	47.5	1000.0	1000.000	192.5	V	-15.0	6.7	2.7	50.2
11563.433333	42.6	1000.0	1000.000	103.7	H	224.0	12.8	7.6	50.2
16188.900000	43	1000.0	1000.000	139.7	H	120.0	16.7	7.2	50.2

Substitution Data

Frequency (MHz)	Field Strength @ 3 meters (dBµV/m)	Cable Loss (dB)	Substitution Antenna Gain (dBi)	Signal Generator Level (dBm)	Substitution Data SGL+AG+CL (dBm)	Limit (dBm)	Compliance
6937.900000	47.5	-7.1	11.9	-51.5	-46.7	-45	Yes

2.7.21 Radiated Emission Test Results Above 1GHz – LTE Band 40 (2350-2360MHz Range)_Low Channel 2352.5 MHz



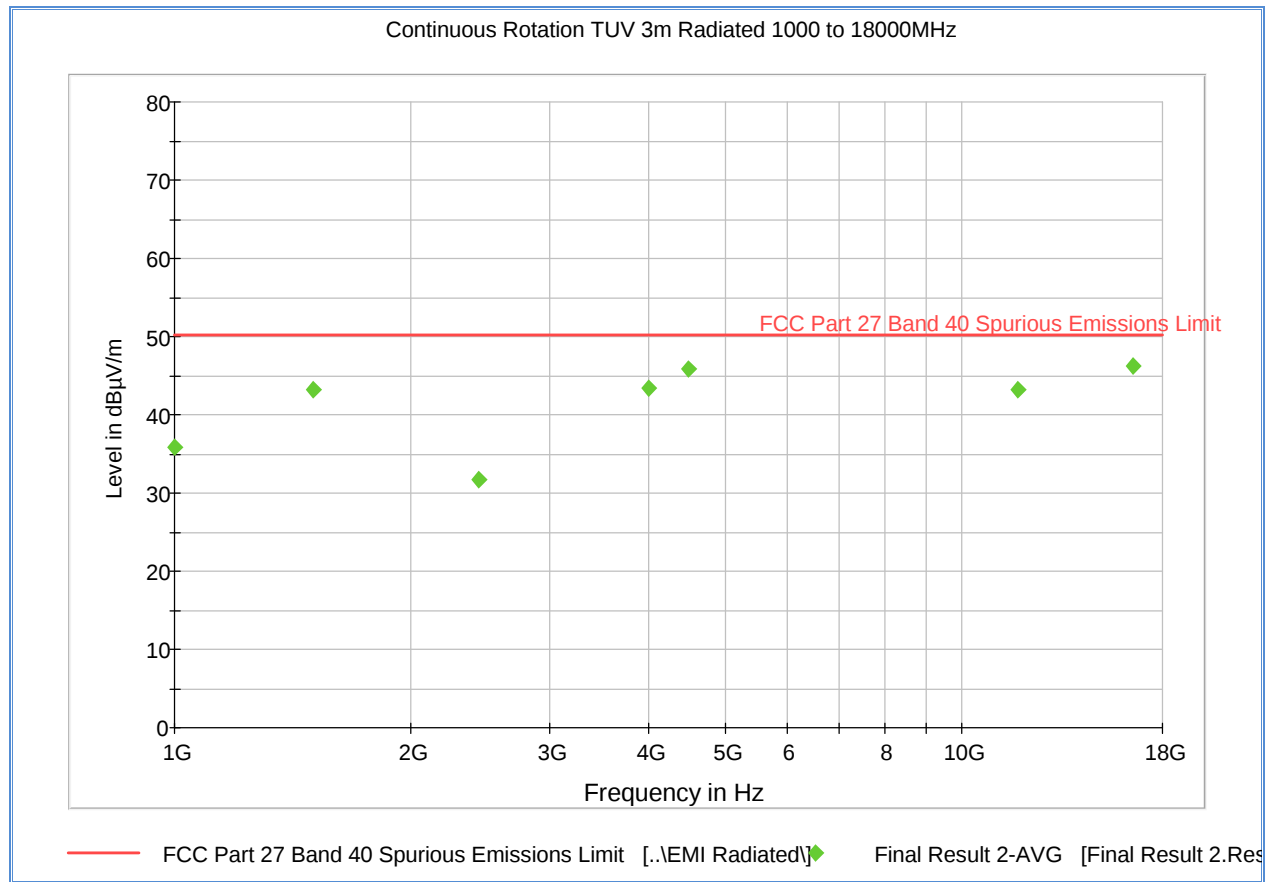
Average Data

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1000.000000	38.1	1000.0	1000.000	120.7	V	105.0	-6.9	12.1	50.2
1500.000000	42.9	1000.0	1000.000	222.4	H	44.0	-6.1	7.3	50.2
2479.533333	31.6	1000.0	1000.000	230.4	V	223.0	-0.5	18.6	50.2
4000.133333	43.0	1000.0	1000.000	204.5	H	66.0	2.5	7.2	50.2
4499.933333	41.9	1000.0	1000.000	204.5	V	159.0	3.7	8.3	50.2
11763.466667	40.9	1000.0	1000.000	231.4	H	188.0	13.0	9.3	50.2
16468.666667	48.7	1000.0	1000.000	191.5	H	287.0	17.2	1.5	50.2

Substitution Data

Frequency (MHz)	Field Strength @ 3 meters (dBµV/m)	Cable Loss (dB)	Substitution Antenna Gain (dBi)	Signal Generator Level (dBm)	Substitution Data SGL+AG+CL (dBm)	Limit (dBm)	Compliance
16468.666667	48.7	-14.7	15.7	-47.5	-46.5	-45	Yes

2.7.22 Radiated Emission Test Results Above 1GHz – LTE Band 40 (2350-2360MHz Range)_Mid Channel 2355 MHz



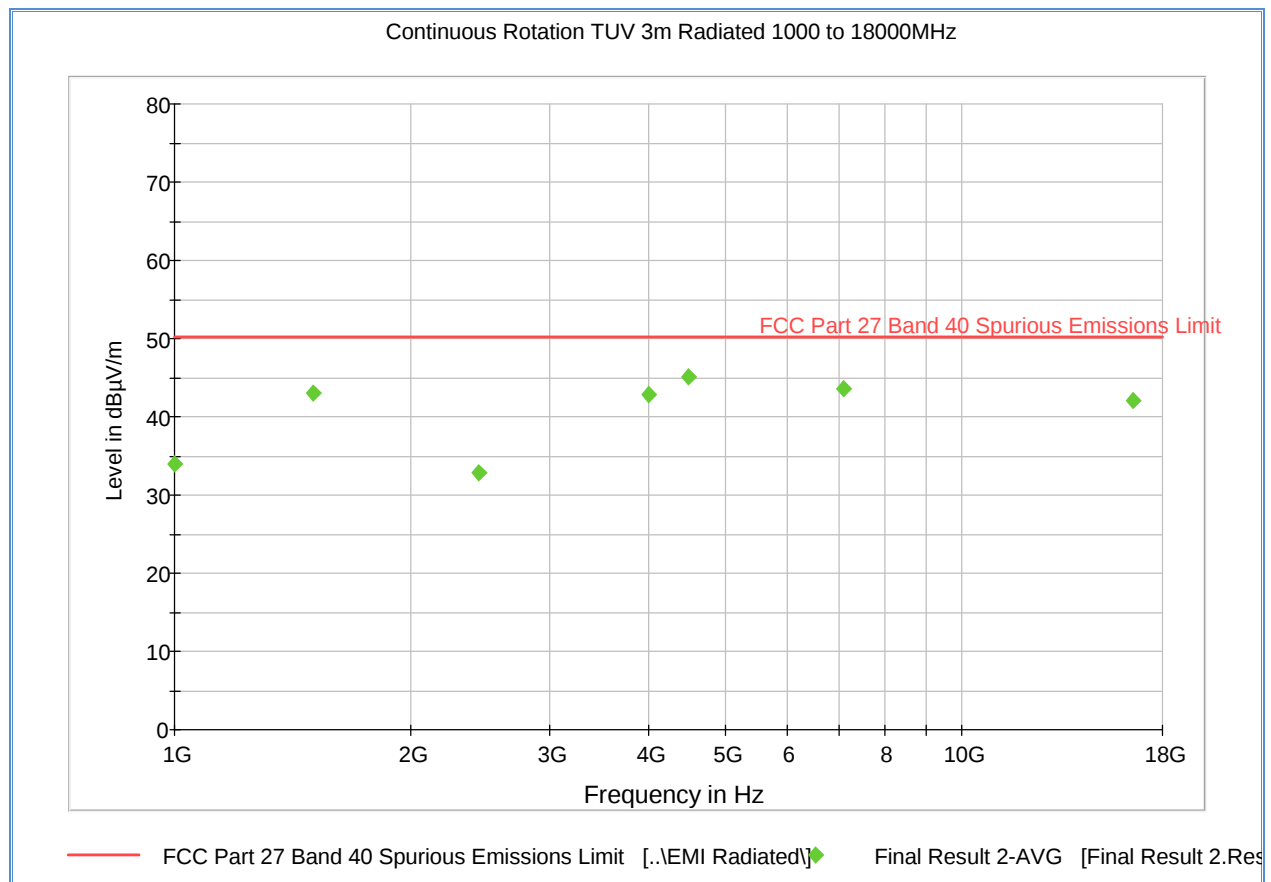
Average Data

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1000.000000	35.9	1000.0	1000.000	187.5	H	183.0	-6.9	14.3	50.2
1500.000000	43.2	1000.0	1000.000	227.4	H	44.0	-6.1	7.0	50.2
2440.033333	31.7	1000.0	1000.000	155.6	H	57.0	-0.7	18.5	50.2
4000.133333	43.3	1000.0	1000.000	232.4	H	65.0	2.5	6.9	50.2
4499.933333	45.9	1000.0	1000.000	162.6	H	37.0	3.7	4.3	50.2
11776.133333	43.3	1000.0	1000.000	162.6	V	331.0	13.1	6.9	50.2
16485.833333	46.3	1000.0	1000.000	181.6	V	160.0	17.3	3.9	50.2

Substitution Data

Frequency (MHz)	Field Strength @ 3 meters (dBµV/m)	Cable Loss (dB)	Substitution Antenna Gain (dBi)	Signal Generator Level (dBm)	Substitution Data SGL+AG+CL (dBm)	Limit (dBm)	Compliance
4499.933333	45.9	-3.8	11.0	-56.5	-49.3	-45	Yes
16485.833333	46.3	-14.7	15.7	-50.0	-49.0	-45	Yes

2.7.23 Radiated Emission Test Results Above 1GHz – LTE Band 40 (2350-2360MHz Range)_High Channel 2357.5 MHz



Average Data

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1000.000000	33.9	1000.0	1000.000	103.7	H	309.0	-6.9	16.3	50.2
1500.000000	43.0	1000.0	1000.000	154.6	H	147.0	-6.1	7.2	50.2
2438.200000	32.8	1000.0	1000.000	201.3	H	33.0	-0.7	17.4	50.2
4000.133333	42.9	1000.0	1000.000	201.3	H	63.0	2.5	7.4	50.2
4499.933333	45.1	1000.0	1000.000	143.7	V	354.0	3.7	5.1	50.2
7065.233333	43.6	1000.0	1000.000	195.5	V	-15.0	6.9	6.6	50.2
16484.366667	42.0	1000.0	1000.000	200.5	H	296.0	17.2	8.2	50.2

Substitution Data

Frequency (MHz)	Field Strength @ 3 meters (dBµV/m)	Cable Loss (dB)	Substitution Antenna Gain (dBi)	Signal Generator Level (dBm)	Substitution Data SGL+AG+CL (dBm)	Limit (dBm)	Compliance
4499.933333	45.1	-3.8	11.0	-57.5	-50.3	-45	Yes

2.8 FREQUENCY STABILITY

2.8.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1055
FCC 47 CFR Part 27, Clause 27.54
RSS-195, Clause 5.4
RSS-199, Clause 4.3

2.8.2 Standard Applicable

FCC Part 27, Clause 27.54:

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

RSS-195, Clause 5.4:

The applicant shall ensure frequency stability by showing that the occupied bandwidth is maintained within the range of the operating frequency blocks when testing under the temperature and supply voltage variations specified for the frequency stability measurement in RSS-Gen.

RSS-199, Clause 4.3:

The transmitter frequency stability limit shall be determined as follows:

- (a) The frequency offset shall be measured according to the procedure described in RSS-Gen and recorded;
- (b) Using a resolution bandwidth equal to that permitted within the 1 MHz band immediately outside the channel edge, as found in section 4.5, reference points will be selected at the unwanted emission limits, which comply with the attenuation specified in section 4.5 for the type of device under test, on the emission mask of the lowerest and highest channels. The frequency points shall be recorded as f_L and f_H respectively.

The applicant shall ensure compliance with frequency stability requirements by showing that f_L minus the frequency offset and f_H plus the frequency offset is within the frequency range in which the equipment is designed to operate.

2.8.3 Equipment Under Test and Modification State

Serial No: FJ220819C00056 / Test Configuration A

2.8.4 Date of Test/Initial of test personnel who performed the test

October 09 and 10, 2019 / AC

2.8.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.



2.8.6 Environmental Conditions/ Test Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

Ambient Temperature	23.5 - 25.6°C
Relative Humidity	40.6 - 47.6%
ATM Pressure	98.9 - 99.1 kPa

2.8.7 Additional Observations

- This is a conducted test. The EUT was operated at 3.7VDC nominal voltage and was placed in the temperature chamber for this evaluation. The EUT was controlled by a CMW500 and utilizing a spectrum analyzer for measurement.
- Test performed in 5 MHz Bandwidth Middle channel as the representative configuration.
- Measurement was done using the CMW 500 measurement function.
- The EUT was tested over the temperature -30°C to +50°C in 10°C steps and allowed to sit for 1 hour to allow the equipment and chamber temperature to stabilize. The measurements were then performed.
- Voltage variation was also performed at voltage 3.3VDC and higher 4.3VDC of the nominal voltage at 20°C.

2.8.8 Test Results

LTE Band 30 – QPSK 5 MHz BW-Middle Channel 2310 MHz				
Voltage (VDC)	Temperature (°C)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)*
3.7	-30	-24.44	-0.011	± 0.1
	-20	-24.44	-0.011	± 0.1
	-10	27.13	0.012	± 0.1
	0	32.62	0.014	± 0.1
	+10	-25.50	-0.011	± 0.1
	+20	-22.01	-0.010	± 0.1
	+30	15.96	0.007	± 0.1
	+40	19.56	0.008	± 0.1
	+50	19.16	0.008	± 0.1
3.3	20	15.60	0.007	± 0.1
4.3		20.05	0.009	± 0.1

LTE Band 38 – QPSK 5 MHz BW-Middle Channel 2595 MHz				
Voltage (VDC)	Temperature (°C)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)*
3.7	-30	-24.24	-0.009	± 0.1
	-20	-24.83	-0.010	± 0.1
	-10	-33.54	-0.013	± 0.1
	0	-29.05	-0.011	± 0.1
	+10	-24.24	-0.009	± 0.1
	+20	-26.27	-0.010	± 0.1
	+30	-25.65	-0.010	± 0.1
	+40	-23.68	-0.009	± 0.1
	+50	-24.05	-0.009	± 0.1
3.3	20	-24.08	-0.009	± 0.1
4.3		-15.31	-0.006	± 0.1

*Limit for LTE Band 30 and 38 is according to 3GPP TS 36 010 V14.4.0

The frequency stability of the EUT is sufficient to keep it within the authorised frequency ranges at any temperature interval and voltage variations across the measured range.

LTE Band 40 – QPSK 5 MHz BW-Middle Channel 2310 MHz				
Voltage (VDC)	Temperature (°C)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)*
3.7	-30	-20.64	-0.009	± 0.1
	-20	-28.08	-0.012	± 0.1
	-10	-46.87	-0.020	± 0.1
	0	-21.74	-0.009	± 0.1
	+10	-31.75	-0.014	± 0.1
	+20	-37.60	-0.016	± 0.1
	+30	-38.26	-0.017	± 0.1
	+40	-32.54	-0.014	± 0.1
	+50	-38.47	-0.017	± 0.1
3.3	20	-31.88	-0.014	± 0.1
4.3		-25.29	-0.011	± 0.1

LTE Band 40 – QPSK 5 MHz BW-Middle Channel 2355 MHz				
Voltage (VDC)	Temperature (°C)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)*
3.7	-30	-30.21	-0.013	± 0.1
	-20	-30.89	-0.013	± 0.1
	-10	-49.03	-0.021	± 0.1
	0	58.97	0.025	± 0.1
	+10	-33.38	-0.014	± 0.1
	+20	-45.05	-0.019	± 0.1
	+30	-37.67	-0.016	± 0.1
	+40	-27.37	-0.012	± 0.1
	+50	-33.97	-0.014	± 0.1
3.3	20	-29.46	-0.013	± 0.1
4.3		-25.93	-0.011	± 0.1

*Limit for LTE Band 40 is according to 3GPP TS 36 010 V14.4.0

The frequency stability of the EUT is sufficient to keep it within the authorised frequency ranges at any temperature interval and voltage variations across the measured range.

2.8.9 Sample Test plot

CMW 500 V 3.7.120 - LTE Measurement - V3.7.60 - TX Measurement

Multi Evaluation PRACH SRS

FDD Freq.: 2310.0 MHz Ref. Level: 41.00 dBm BW: 5.0 MHz CP: Normal Meas Subfr/Slot: 0 / All

TX Measurement

	Current	Average	Extreme	StdDev
EVM RMS [%] I/h	3.70	3.67	3.90	0.02
EVM Peak [%] I/h	25.93	23.15	27.79	3.01
EVM DMRS [%] I/h	2.54	2.53	3.21	0.06
MErr RMS [%] I/h	3.26	3.24	3.40	0.03
MErr Peak [%] I/h	-25.34	22.66	-26.57	2.77
MErr DMRS [%] I/h	2.06	2.04	2.35	0.03
PhErr RMS [°] I/h	1.01	1.00	1.17	0.02
PhErr Peak [°] I/h	5.57	5.55	-8.26	0.54
PhErr DMRS [°] I/h	0.85	0.85	1.37	0.05
IQ Offset [dBc]	-54.22	-52.96	-49.66	1.06
IQ Gain Imbalance [dB]	-0.05	-0.05	-0.08	0.01
IQ Quadrature Error [°]	0.14	0.07	0.22	0.07
Freq Error [Hz]	-3.41	-5.33	-22.01	2.22
Timing Error [Ts]	2.20	2.28	7.16	0.15
OBW [MHz]	4.44	4.45	4.45	0.01
	Current	Average	Min	Max
TX Power [dBm]	28.79	28.79	28.65	28.85
Peak Power [dBm]	33.88	33.77	32.87	34.03
RB Power [dBm]	14.84	14.84	14.70	14.90

Statistic Count: 20 / 20 Out of Tolerance: 0.00 % Detected Modulation: QPSK Detected Channel Type: PUSCH View Filter Throughput: 100.0 %

PS: Connection Established RRC State: Connected

LTE Band 30_Middle Channel @20°C

CMW 500 V 3.7.120 - LTE Measurement - V3.7.60 - TX Measurement

Multi Evaluation PRACH SRS

FDD Freq.: 2595.0 MHz Ref. Level: 35.00 dBm BW: 5.0 MHz CP: Normal Meas Subfr/Slot: 0 / All

TX Measurement

Detected Allocation NoRB: 25 OffsetRB: 0

	Current	Average	Extreme	StdDev
EVM RMS [%] I/h	3.72	3.93	4.77	0.34
EVM Peak [%] I/h	24.49	28.22	85.27	22.07
EVM DMRS [%] I/h	2.50	2.76	2.94	0.09
MErr RMS [%] I/h	3.29	3.49	4.10	0.26
MErr Peak [%] I/h	-23.37	27.92	-75.87	19.21
MErr DMRS [%] I/h	2.08	2.26	2.31	0.06
PhErr RMS [°] I/h	1.00	1.06	1.80	0.27
PhErr Peak [°] I/h	-5.68	7.96	-47.95	14.96
PhErr DMRS [°] I/h	0.79	0.90	1.08	0.05
IQ Offset [dBc]	-45.43	-45.33	-44.24	0.35
IQ Gain Imbalance [dB]	-0.08	-0.09	-0.11	0.01
IQ Quadrature Error [°]	0.13	-0.04	0.18	0.09
Freq Error [Hz]	-9.34	-6.17	-24.83	3.41
Timing Error [Ts]	-42.84	-40.20	-43.24	2.38
OBW [MHz]	4.44	4.45	4.47	0.01
	Current	Average	Min	Max
TX Power [dBm]	26.55	26.52	26.39	26.56
Peak Power [dBm]	31.31	31.31	30.80	31.56

Statistic Count: 20 / 20 Out of Tolerance: 0.00 % Detected Modulation: QPSK Detected Channel Type: PUSCH View Filter Throughput: 100.0 %

PS: Connection Established RRC State: Connected

LTE Band 38_Middle Channel @20°C

CMW 500 V 3.7.120 - LTE Measurement - V3.7.60 - TX Measurement

Multi EvaluationPRACHSRS

FDD Freq.: 2310.0 MHz Ref. Level: 35.00 dBm BW: 5.0 MHz CP: Normal Meas Subfr./Slot: 0 / All

TX Measurement

Detected Allocation	NoRB:		25OffsetRB:		0			
	Current	Average	Extreme	StdDev				
EVM RMS [%] I/h	3.42	3.54	3.84	3.58	4.39	3.83	0.31	0.13
EVM Peak [%] I/h	23.32	23.35	47.10	26.06	81.17	31.47	21.92	3.00
EVM DMRS [%] I/h	2.28	2.20	2.34	2.44	2.64	2.96	0.12	0.17
MErr RMS [%] I/h	2.87	3.01	3.27	3.05	3.62	3.28	0.27	0.13
MErr Peak [%] I/h	-23.23	-23.25	45.12	26.01	-72.82	-31.42	19.36	3.00
MErr DMRS [%] I/h	1.87	1.84	1.87	1.94	2.09	2.11	0.11	0.05
PhErr RMS [°] I/h	1.07	1.08	1.24	1.09	1.69	1.16	0.20	0.03
PhErr Peak [°] I/h	5.39	-8.41	14.94	7.72	-41.64	-10.34	12.56	1.20
PhErr DMRS [°] I/h	0.74	0.69	0.80	0.84	1.11	1.24	0.06	0.13
IQ Offset [dBc]	-56.46	-52.67	-50.24					1.50
IQ Gain Imbalance [dB]	-0.06	-0.07	-0.09					0.01
IQ Quadrature Error [°]	-0.25	-0.34	-0.44					0.06
Freq Error [Hz]	-0.64	-7.17	-37.60					6.04
Timing Error [Ts]	-43.08	-40.94	-43.65					2.32
OBW [MHz]	4.44	4.45	4.47					0.01
	Current	Average	Min	Max				StdDev
TX Power [dBm]	25.68	25.66	25.54	25.71				0.02
Peak Power [dBm]	30.66	30.72	30.08	31.41				0.70

Statistic Count 20 / 20 Out of Tolerance 0.00 % Detected Modulation QPSK Detected Channel Type PUSCH View Filter Throughput 100.0 %

PS: Connection Established RRC State: Connected

LTE Band 40(2305-2315 MHz Range)_Middle Channel @20°C

CMW 500 V 3.7.120 - LTE Measurement - V3.7.60 - TX Measurement

Multi EvaluationPRACHSRS

FDD Freq.: 2355.0 MHz Ref. Level: 35.00 dBm BW: 5.0 MHz CP: Normal Meas Subfr./Slot: 0 / All

TX Measurement

Detected Allocation	NoRB:		25OffsetRB:		0			
	Current	Average	Extreme	StdDev				
EVM RMS [%] I/h	3.61	4.73	3.29	4.11	3.72	5.19	0.21	0.63
EVM Peak [%] I/h	25.35	86.23	22.24	62.00	25.96	108.24	2.14	34.71
EVM DMRS [%] I/h	2.30	2.96	2.10	2.36	2.91	3.17	0.20	0.35
MErr RMS [%] I/h	3.16	4.22	2.82	3.58	3.21	4.55	0.22	0.61
MErr Peak [%] I/h	-25.13	-78.53	21.90	57.17	-25.76	-98.09	2.13	31.68
MErr DMRS [%] I/h	1.89	2.26	1.63	1.80	2.14	2.40	0.20	0.30
PhErr RMS [°] I/h	1.01	1.59	0.98	1.77	1.21	3.81	0.03	0.66
PhErr Peak [°] I/h	4.97	-45.21	4.80	40.98	7.33	152.52	0.63	35.03
PhErr DMRS [°] I/h	0.74	1.09	0.75	0.87	1.42	1.44	0.08	0.13
IQ Offset [dBc]	-60.12	-55.06	-50.18					3.06
IQ Gain Imbalance [dB]	-0.10	-0.07	-0.10					0.02
IQ Quadrature Error [°]	-0.19	-0.22	-0.33					0.05
Freq Error [Hz]	-11.23	-16.92	-45.05					6.46
Timing Error [Ts]	-5.70	-5.05	-6.57					0.82
OBW [MHz]	4.45	4.45	4.45					0.01
	Current	Average	Min	Max				StdDev
TX Power [dBm]	25.89	25.89	25.78	25.97				0.02
Peak Power [dBm]	31.02	30.85	30.10	31.39				0.37

Statistic Count20 / 20Out of Tolerance0.00 %Detected ModulationQPSKDetected Channel TypePUSCHView Filter Throughput100.0 %

PS: Connection Established
RRC State: Connected

LTE Band 40(2350-2360 MHz Range)_Middle Channel @20°C



SECTION 3

TEST EQUIPMENT USED

3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

ID Number (SDGE/SDRB/ FRGE)	Test Equipment	Type	Serial Number	Manufacturer	Cal Date	Cal Due Date
Antenna Conducted Port Setup						
7662	P-Series Power Meter	N1911A	MY45100951	Agilent	06/28/19	06/28/20
7605	50MHz-18GHz Wideband Power Sensor	N1921A	MY51100054	Agilent	07/24/19	07/24/20
7582	Signal/Spectrum Analyzer	FSW26	101614	Rhode & Schwarz	01/07/19	01/07/20
40813	Wideband Radio Communication Tester	CMW500	145913-RH	Rhode & Schwarz	04/22/19	04/22/20
41535	10dB Attenuator with Blue RF Cable	8772	606-10-1F4/DR and W17.02	MECA	08/16/19	08/16/20
8801	Power Divider	1506A	RR003	Aeroflex Weinschel	Verified by 7608 and 7582	
43135	RF Cable	SMA Cable	JX50013-48	RF Precision Cables	09/09/19	09/09/20
7608	Vector Signal Generator	SMBV100A	259021	Rhode & Schwarz	10/10/19	10/10/21
6006	Spectrum Analyzer (9kHz – 6GHz)	FSL6	100346	Rhode & Schwarz	05/23/19	05/23/20
Radiated Test Setup						
7582	Signal/Spectrum Analyzer	FSW26	101614	Rhode & Schwarz	01/07/19	01/07/20
7608	Vector Signal Generator	SMBV100A	259021	Rhode & Schwarz	10/10/19	10/10/21
1033	Bilog Antenna	3142C	00044556	EMCO	09/05/19	09/05/21
7575	Double-ridged waveguide horn antenna	3117	00155511	EMCO	06/16/18	06/16/20
1016	Pre-amplifier	PAM-0202	187	PAM	03/08/19	03/08/20
8921	High-frequency cable	SucoFlex 100 SX	N/A	Suhner	Verified by 7608 and 7582	
8923	High-frequency cable	Micropore 19057793	N/A	United Microwave Products	Verified by 7608 and 7582	
1040	EMI Test Receiver	ESIB40	100292	Rhode & Schwarz	10/11/19	10/11/20
7620	EMI Test Receiver	ESU	100399	Rhode & Schwarz	10/18/19	10/18/20
8628	Pre-amplifier	QLJ 01182835-JO	8986002	QuinStar Technologies Inc.	03/07/19	03/07/20
40813	Wideband Radio Communication Tester	CMW500	145913-RH	Rhode & Schwarz	04/22/19	04/22/20
Miscellaneous						
43003	True RMS Multimeter	85 III	96880143	Fluke	10/07/19	10/07/20
7579	Temperature Chamber	115	151617	TestQuity	09/09/19	09/09/20
7619	Temp & Humidity Sensor	iBTHX-W	15050268	Omega	06/18/19	06/18/20
—	Test Software	EMC32	V8.53	Rhode & Schwarz	N/A	

3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:

3.2.1 Conducted Antenna Port Measurement

	Input Quantity (Contribution) X_i	Value	Prob. Dist.	Divisor	$u_i(x)$	$u_i(x)^2$
1	Receiver reading	0.10 dB	Normal, k=1	1.000	0.10	0.01
2	Cable attenuation	1.00 dB	Normal, k=2	2.000	0.50	0.25
3	Receiver sinewave accuracy	0.08 dB	Normal, k=2	2.000	0.04	0.00
4	Receiver pulse amplitude	0.00 dB	Rectangular	1.732	0.00	0.00
5	Receiver pulse repetition rate	0.00 dB	Rectangular	1.732	0.00	0.00
6	Noise floor proximity	0.00 dB	Rectangular	1.732	0.00	0.00
7	Frequency interpolation	0.10 dB	Rectangular	1.732	0.06	0.00
8	Mismatch	0.07 dB	U-shaped	1.414	0.05	0.00
		Combined standard uncertainty	Normal	0.52	dB	
		Expanded uncertainty	Normal, k=2	1.03	dB	

3.2.2 Radiated Emission Measurement 30 MHz – 1000 MHz at a distance of 3 m

	Input Quantity (Contribution) X_i	Value	Prob. Dist.	Divisor	$u_i(x)$	$u_i(x)^2$
1	Receiver reading	0.10 dB	Normal, k=1	1.000	0.10	0.01
2	Attenuation: antenna-receiver	0.20 dB	Normal, k=2	2.000	0.10	0.01
3	Antenna factor AF	0.75 dB	Normal, k=2	2.000	0.38	0.14
4	Receiver sinewave accuracy	0.45 dB	Normal, k=2	2.000	0.23	0.05
5	Receiver pulse amplitude	1.50 dB	Rectangular	1.732	0.87	0.75
6	Receiver pulse repetition rate	1.50 dB	Rectangular	1.732	0.87	0.75
7	Noise floor proximity	0.50 dB	Rectangular	1.732	0.29	0.08
8	Mismatch: antenna-receiver	0.95 dB	U-shaped	1.414	0.67	0.45
9	AF frequency interpolation	0.30 dB	Rectangular	1.732	0.17	0.03
10	AF height deviations	0.10 dB	Rectangular	1.732	0.06	0.00
11	Directivity difference at 3 m	3.12 dB	Rectangular	1.732	1.80	3.24
12	Phase center location at 3 m	1.00 dB	Rectangular	1.732	0.58	0.33
13	Cross-polarization	0.90 dB	Rectangular	1.732	0.52	0.27
14	Balance	0.00 dB	Rectangular	1.732	0.00	0.00
15	Site imperfections	3.76 dB	Triangular	2.449	1.54	2.36
16	Separation distance at 3 m	0.30 dB	Rectangular	1.732	0.17	0.03
17	Effect of setup table material	0.77 dB	Rectangular	1.732	0.44	0.20
18	Table height at 3 m	0.10 dB	Normal, k=2	2.000	0.05	0.00
19	Near-field effects	0.00 dB	Triangular	2.449	0.00	0.00
20	Effect of ambient noise on OATS	0.00 dB				0.00
		Combined standard uncertainty	Normal	2.95	dB	
		Expanded uncertainty	Normal, k=2	5.90	dB	

3.2.3 Radiated Emission Measurements Above 1GHz at a distance of 3 m

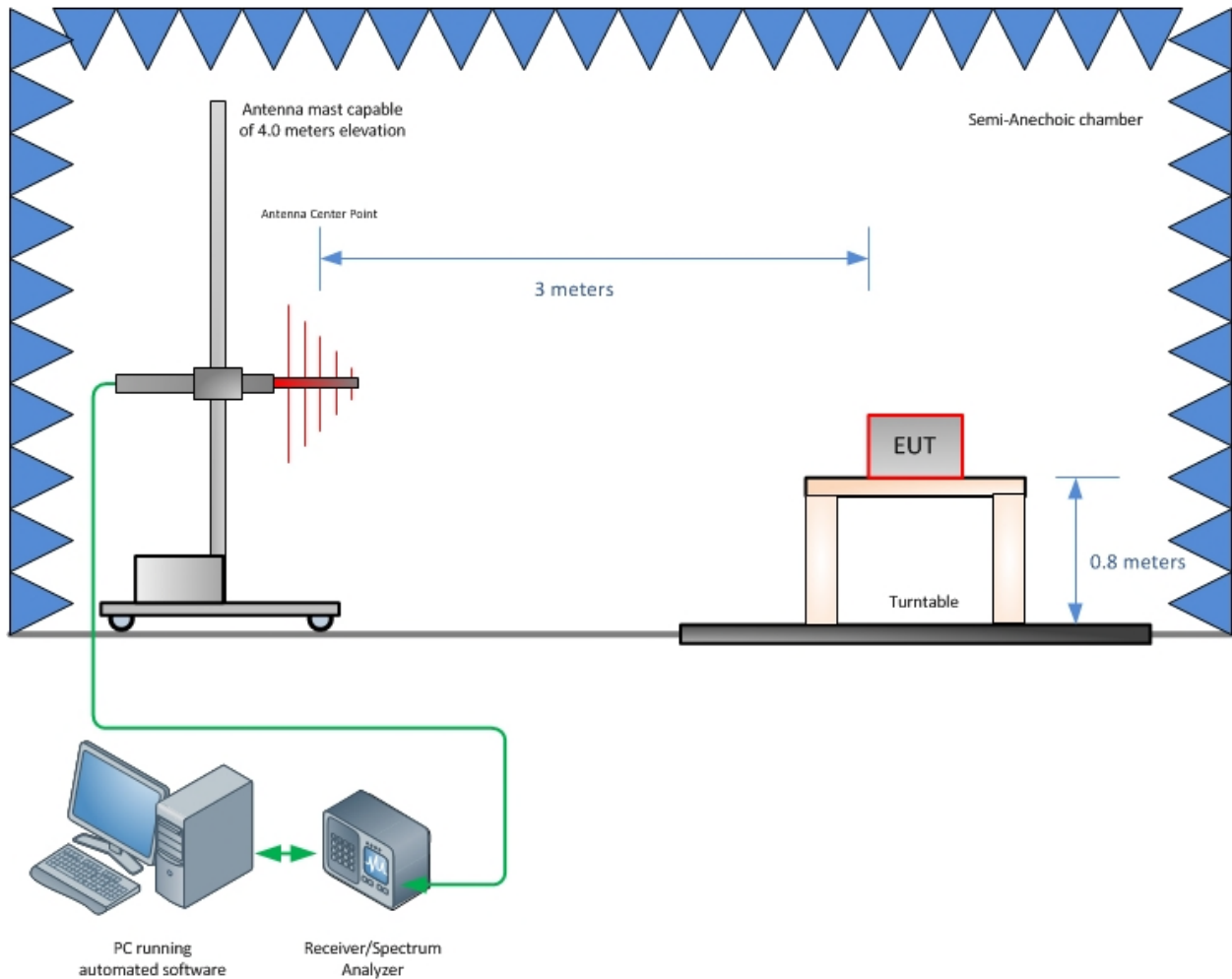
	Input Quantity (Contribution) X_i	Value	Prob. Dist.	Divisor	$u_i(x)$	$u_i(x)^2$
1	Receiver reading	0.10 dB	Normal, k=1	1.000	0.10	0.01
2	Attenuation: antenna-receiver	0.30 dB	Normal, k=2	2.000	0.15	0.02
3	Preamplifier Gain	0.20 dB	Normal, k=2	2.000	0.10	0.01
4	Antenna factor AF	0.37 dB	Normal, k=2	2.000	0.19	0.03
5	Sinewave accuracy	0.57 dB	Normal, k=2	2.000	0.29	0.08
6	Instability of preamp gain	1.21 dB	Rectangular	1.732	0.70	0.49
7	Noise floor proximity	0.70 dB	Rectangular	1.732	0.40	0.16
8	Mismatch: antenna-preamplifier	1.41 dB	U-shaped	1.414	1.00	0.99
9	Mismatch: preamplifier-receiver	1.30 dB	U-shaped	1.414	0.92	0.85
10	AF frequency interpolation	0.30 dB	Rectangular	1.732	0.17	0.03
11	Directivity difference at 3 m	1.50 dB	Rectangular	1.732	0.87	0.75
12	Phase center location at 3 m	0.30 dB	Rectangular	1.732	0.17	0.03
13	Cross-polarization	0.90 dB	Rectangular	1.732	0.52	0.27
14	Site imperfections VSWR (Method 2)	3.00 dB	Triangular	2.449	1.22	1.50
15	Effect of setup table material	1.50 dB	Rectangular	1.732	0.87	0.75
16	Separation distance at 3 m	0.30 dB	Rectangular	1.732	0.17	0.03
17	Table height at 3 m	0.00 dB	Normal, k=2	2.000	0.00	0.00
Combined standard uncertainty			Normal	2.45	dB	
Expanded uncertainty			Normal, k=2	4.90	dB	



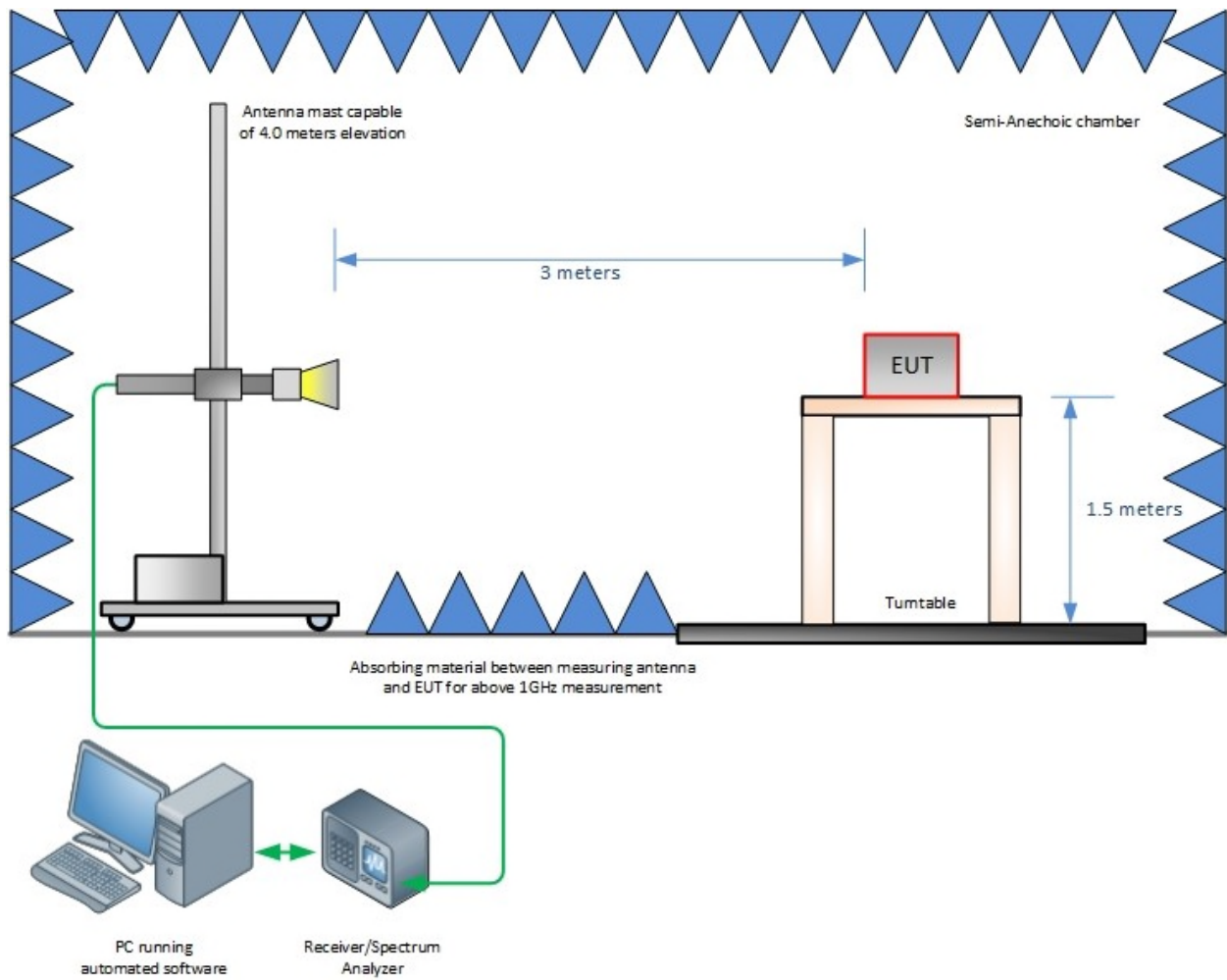
SECTION 4

DIAGRAM OF TEST SETUP

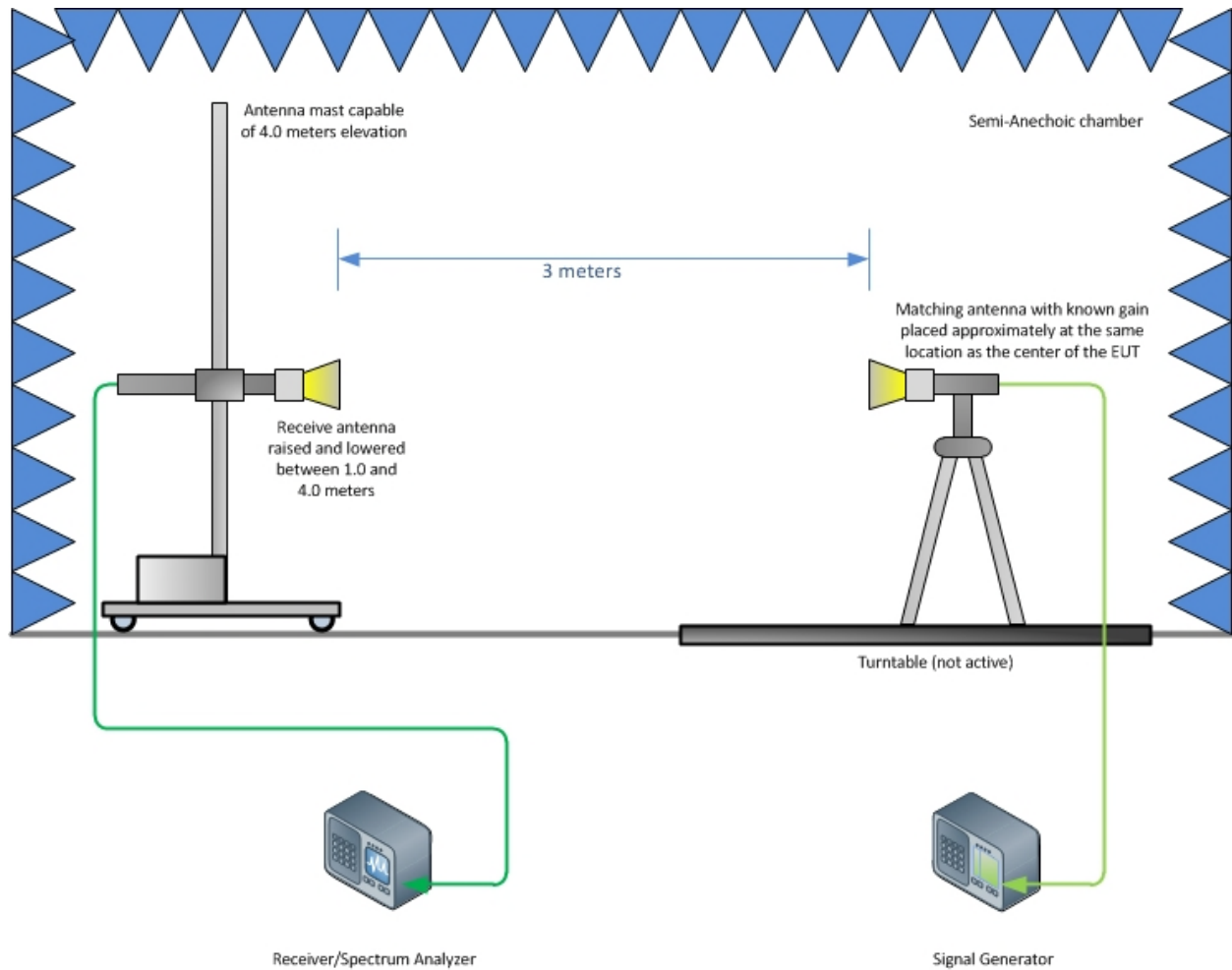
4.1 TEST SETUP DIAGRAM



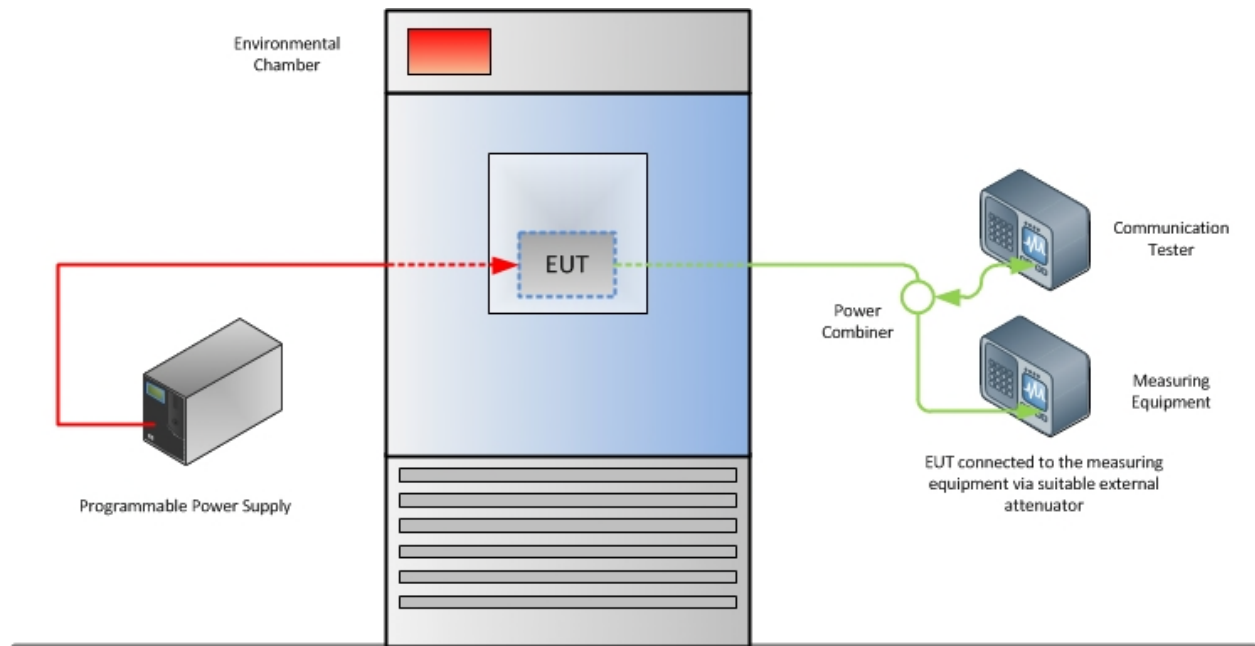
Radiated Emission Test Setup (Below 1GHz)



Radiated Emission Test Setup (Above 1GHz)



Substitution Test Method (Above 1GHz)



Frequency Stability Test Configuration



SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

TÜV SÜD America Inc.'s reports apply only to the specific sample tested under stated test conditions. It is the manufacturer's responsibility to assure the continued compliance of production units of this model. TÜV SÜD America, Inc. shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV SÜD America, Inc.'s issued reports.

This report is the confidential property of the client. As a mutual protection to our clients, the public and TÜV SÜD America, Inc., extracts from the test report shall not be reproduced, except in full without TÜV SÜD America, Inc.'s written approval.

This report must not be used to claim product certification, approval, or endorsement by A2LA, NIST, or any agency of the federal government.

TÜV SÜD America, Inc. and its professional staff hold government and professional organization certifications for AAMI, ACIL, AEA, ANSI, IEEE, A2LA, NIST and VCCI.

