

Port C, Channel Position B, 15.0MHz

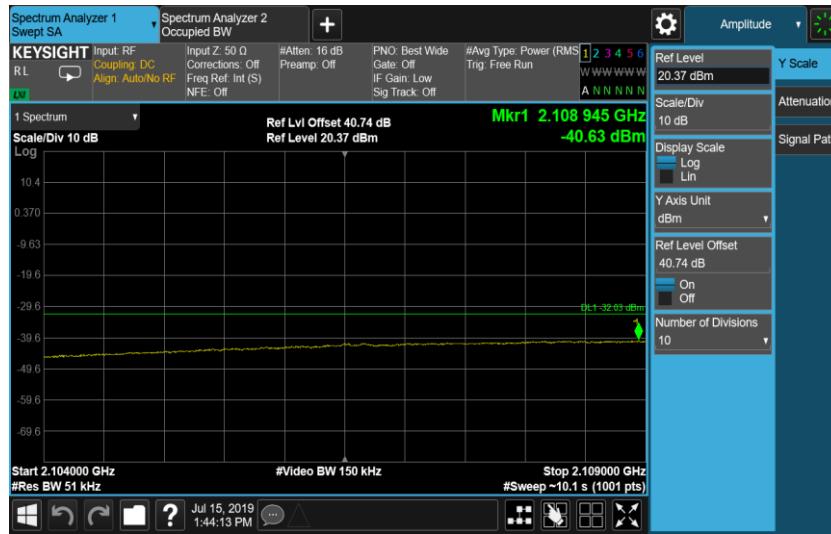


Port C, Channel Position T, 15.0MHz





Port C, Channel Position B, 20.0MHz



Port C, Channel Position T, 20.0MHz



A.4 Conducted Spurious Emission

A.4.1 Reference

FCC CFR 47 Part 2, Clause 2.1051

FCC CFR 47 Part 27, Clause 27.53(m)

A.4.2 Method of measurement

In accordance with FCC rules, 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.

The spurious emissions from the antenna terminal were measured. The transmitter output power was attenuated using an attenuator and the frequency spectrum investigated from 3KHz to 20GHz. The resolution bandwidth of 1MHz was employed for frequency band 3KHz to 20GHz. The spectrum analyzer detector was set to RMS.

For MIMO mode configurations, the limit was adjusted with a correction of -6.02dB [10Log4] by using the Measure and Add 10Log(N) dB technique according to FCC KDB 662911 D01 Multiple Transmitter Output accounting for simultaneous transmission from antenna ports RF A,B,C and D. Then the limit was adjust to -19.02dBm.

A.4.3 Measurement limit

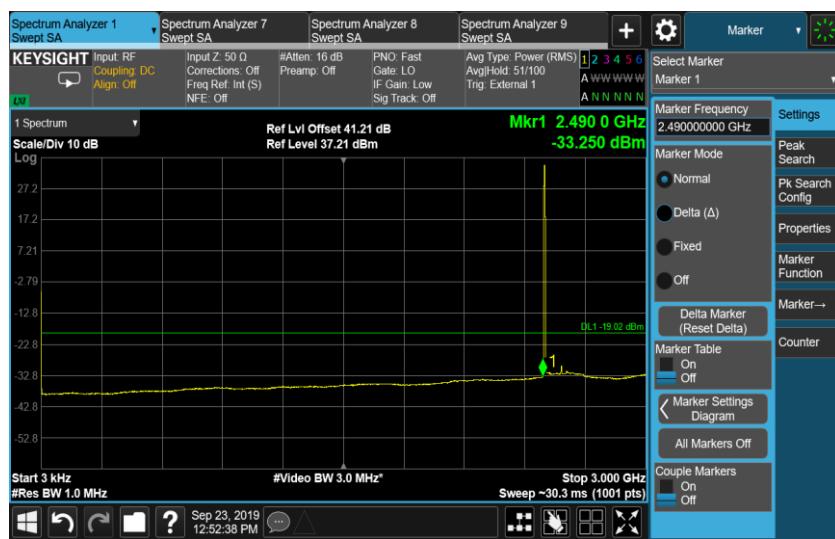
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10\log(P)$ dB.

A.4.4 Measurement results

Configuration LTE-MIMO-1C 16QAM

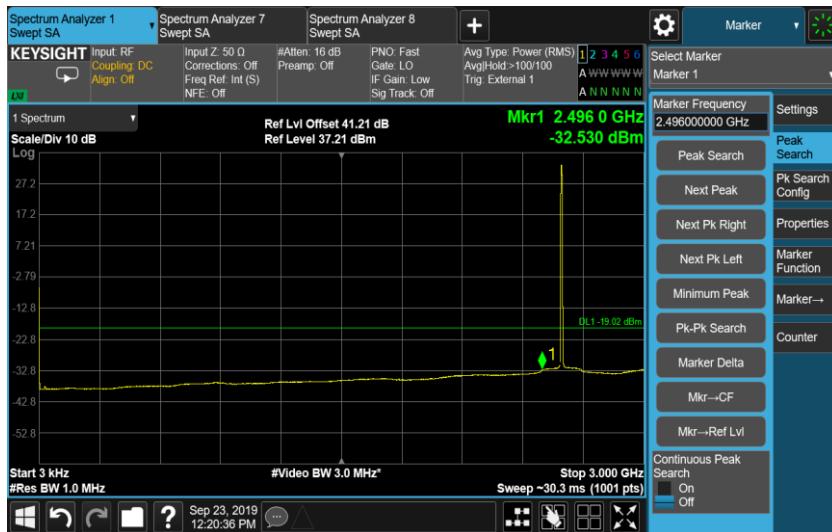
Channel Bandwidth	RBW (MHz)	Limit (dBm)
5.0 MHz	1.0	-19.02
15.0 MHz	1.0	-19.02
20.0 MHz	1.0	-19.02

Port C, Channel Position B 5.0 MHz



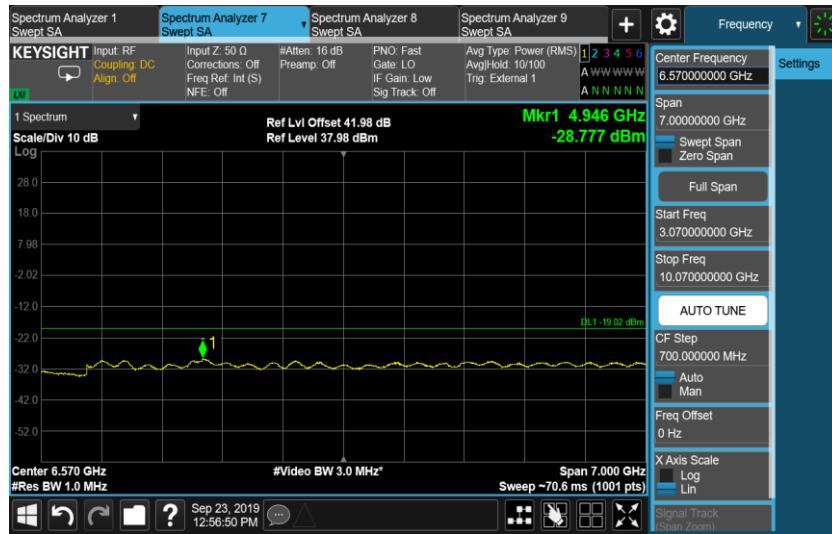


Port C, Channel Position M 5.0 MHz



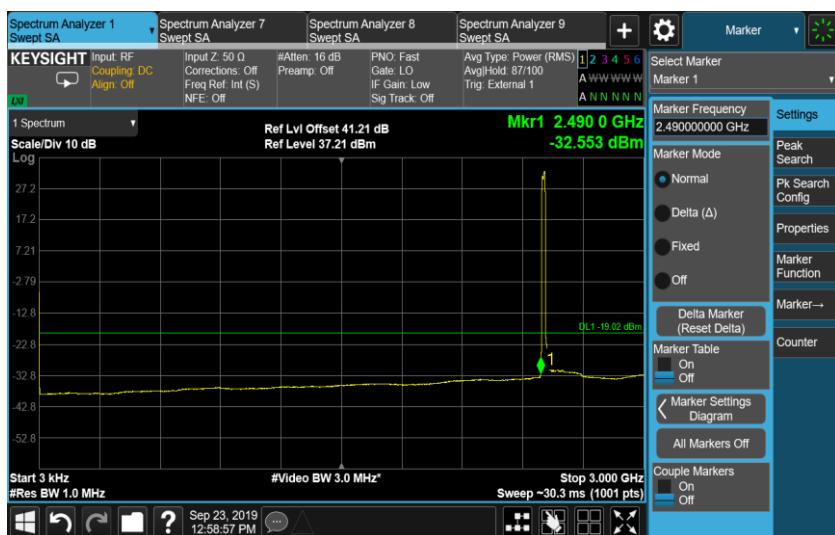


Port C, Channel Position T 5.0 MHz



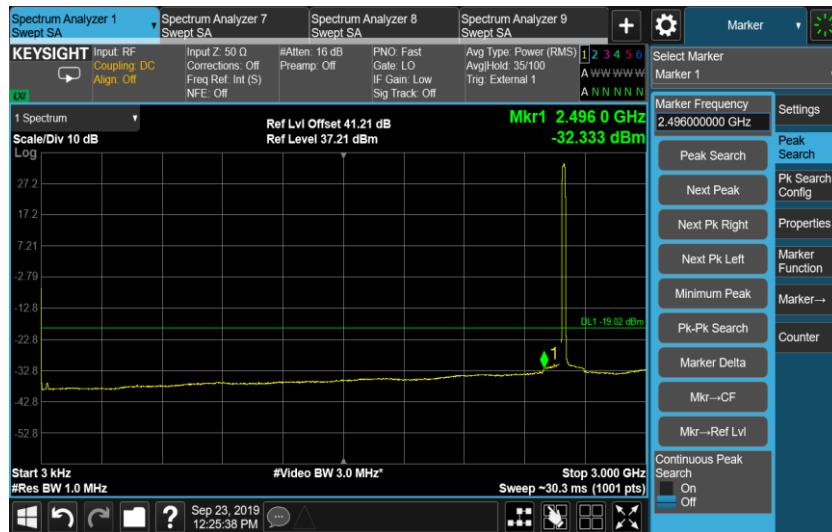


Port C, Channel Position B 15.0 MHz





Port C, Channel Position M 15.0 MHz



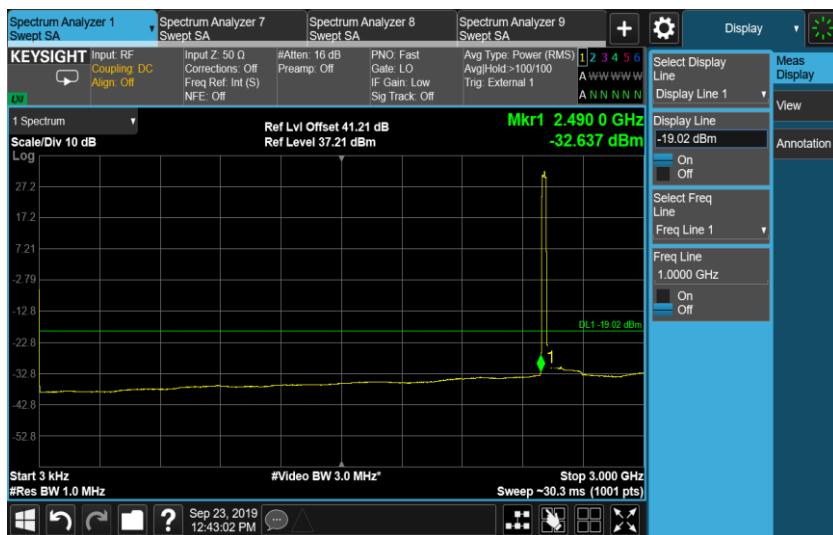


Port C, Channel Position T 15.0 MHz



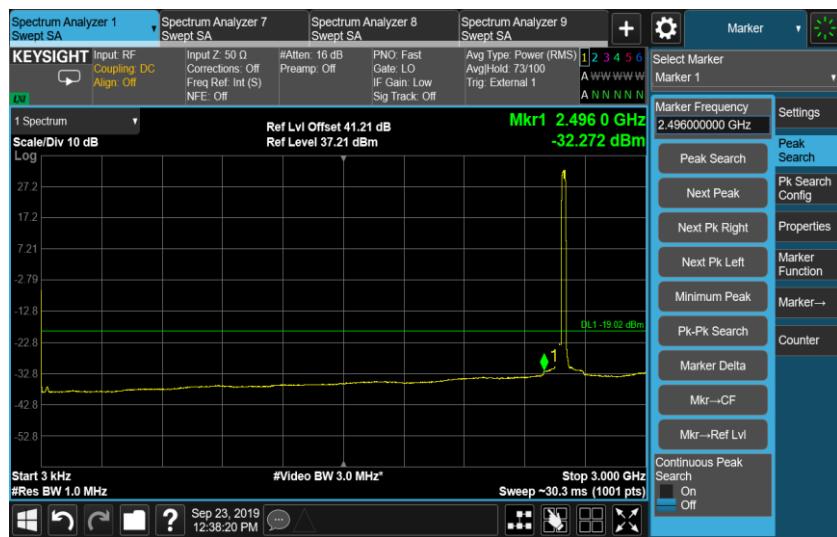


Port C, Channel Position B 20.0 MHz



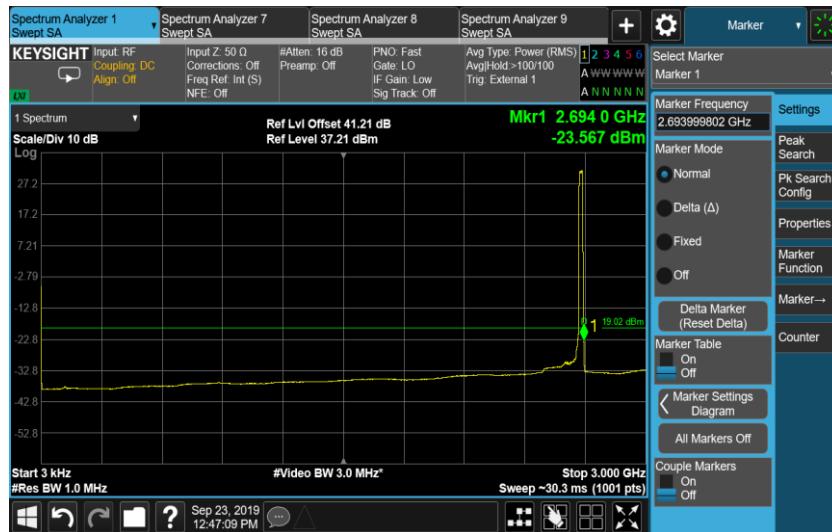


Port C, Channel Position M 20.0 MHz





Port C, Channel Position T 20.0 MHz

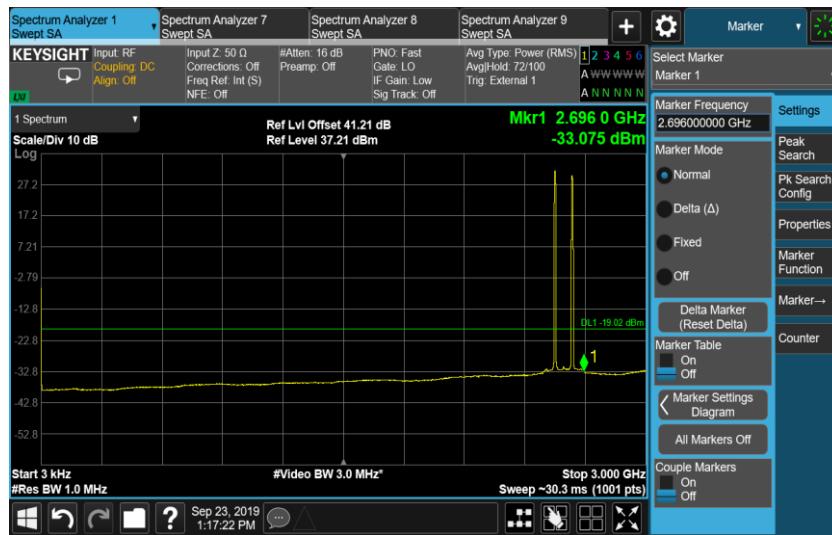




Configuration LTE-MIMO-2C 16QAM

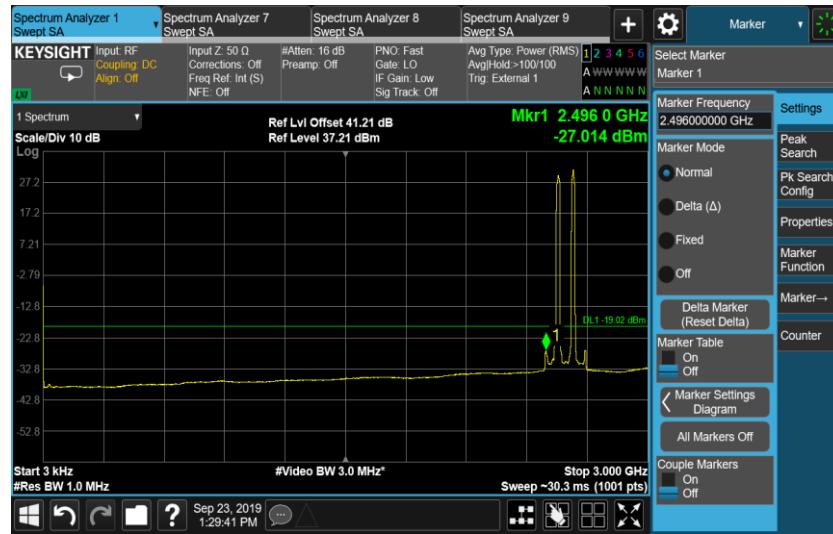
Channel Bandwidth	RBW (MHz)	Limit (dBm)
5.0 MHz	1.0	-19.02
15.0 MHz	1.0	-19.02
20.0 MHz	1.0	-19.02

Port C, Channel Position M 5.0 MHz



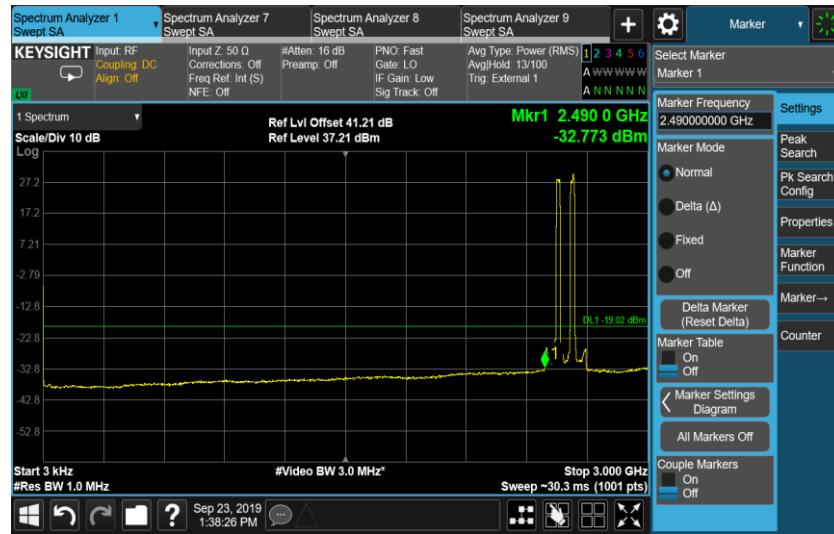


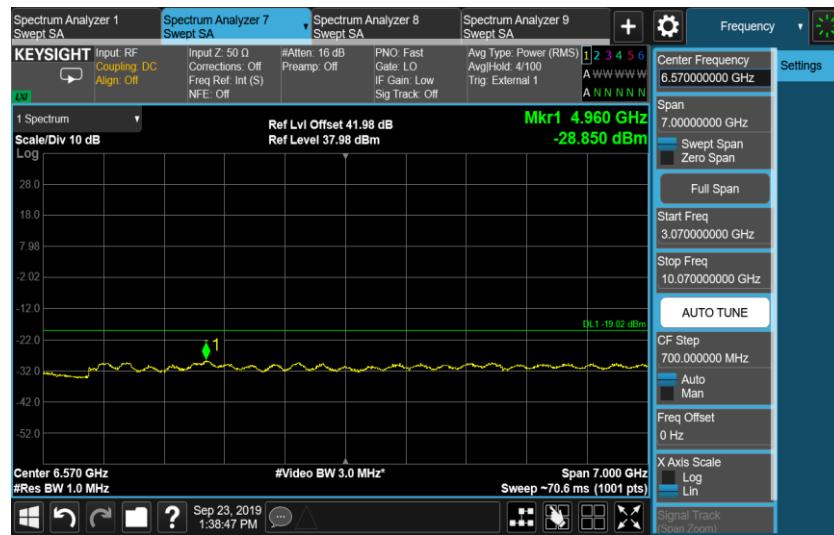
Port C, Channel Position M 15.0 MHz





Port C, Channel Position M 20.0 MHz





A.5 Radiated Spurious Emission

A.5.1 Reference

FCC CFR 47 Part 2, Clause 2.1053

FCC CFR 47 Part 27, Clause 27.53 (m)

A.5.2 Method of measurement

The measurements procedures in TIA-603-E: 2016 are used. This measurement is carried out in semi-anechoic chamber.

A preliminary profile of the Spurious Radiated Emissions was obtained by operating the EUT on a remotely controlled turntable within the chamber. Measurements of emissions from the EUT were obtained with the measurement antenna in both horizontal and vertical polarisations.

Emissions identified within the range 30MHz to 30GHz were then formally measured using a peak detector as the worst case.

The limits for outside a licensee's frequency band(s) of operation the power of the spurious emissions have been calculated, as shown below using the following formula:

Field Strength of Carrier - $(43 + 10\log(P)) \text{ dB}$

Where:

Field Strength is measured in $\text{dB}\mu\text{V/m}$

P is measured Transmitter Power in Watts

The EUT was measured with the antenna height varied between 1 and 4 m with the turntable rotated between 0 and 360 degrees. The emission of any outside a licensee's frequencies within 20dB of the limit were measured with the substitution method used according to the standard.

The measurements were performed at a 3m distance unless otherwise stated.

A.5.3 Measurement limit

The field strength of the carrier has been calculated assuming that the power is to be fed to a half-wave tuned dipoles as per 2.1053 (a).

$$E_{(\text{V/m})} = (30 \times G_i \times P_o)^{0.5} / d$$

Where

G_i is the antenna gain of ideal half-wave dipoles,

P_o is the power out of the transceiver in W,

d is the measurement distance in meter.

Therefore at 3m measurement distance the field strength using the lowest transceiver output power would be:

$$E_{(\text{V/m})} = (30 \times 1.64 \times 16.56)^{0.5} / 3 = 9.51\text{V/m} = 139.57 \text{ dB}\mu\text{V/m}$$

As per 24.238 (a) the spurious emission must be attenuated by $43 + 10\log(P_o)$ dB this gives:

$$43 + 10\log(16.56) = 55.19 \text{ dB}$$

Therefore the limit at 3m measurement distance is:

$$139.57 - 55.19 = 84.4 \text{ dB}\mu\text{V/m}$$

These limits have been used to determine Pass or Fail for the harmonics measured and detailed in the following results.

A.5.4 Measurement results

Configuration LTE-MIMO-1C

Maximum Output Power 46.02 dBm, 5MHz, QPSK;

Channel Position	Channel Frequencies
Channel Position B	2498.5MHz
Channel Position M	2593.0MHz
Channel Position T	2687.5MHz

No emissions were detected within 20dB of the limit.

Configuration LTE-MIMO-1C

Maximum Output Power 46.02 dBm, 5MHz, 256QAM;

Channel Position	Channel Frequencies
Channel Position B	2498.5MHz
Channel Position M	2593.0MHz
Channel Position T	2687.5MHz

No emissions were detected within 20dB of the limit.

Configuration LTE-MIMO-1C

Maximum Output Power 49.03 dBm, 15MHz, 16QAM;

Channel Position	Channel Frequencies
Channel Position B	2503.5MHz
Channel Position M	2593.0MHz
Channel Position T	2682.5MHz

No emissions were detected within 20dB of the limit.

Configuration LTE-MIMO-1C

Maximum Output Power 49.03 dBm, 20MHz, QPSK;

Channel Position	Channel Frequencies
Channel Position B	2506.0MHz
Channel Position M	2593.0MHz
Channel Position T	2680.0MHz

No emissions were detected within 20dB of the limit.

Configuration LTE-MIMO-2C

Maximum Output Power 46.02 dBm, 5MHz, QPSK;

Channel Position	Channel Frequencies
Channel Position B	2498.5MHz+2583.5MHz
Channel Position M	2550.5MHz+2635.5MHz
Channel Position T	2602.5MHz+2687.5MHz

No emissions were detected within 20dB of the limit.

Configuration LTE-MIMO-2C

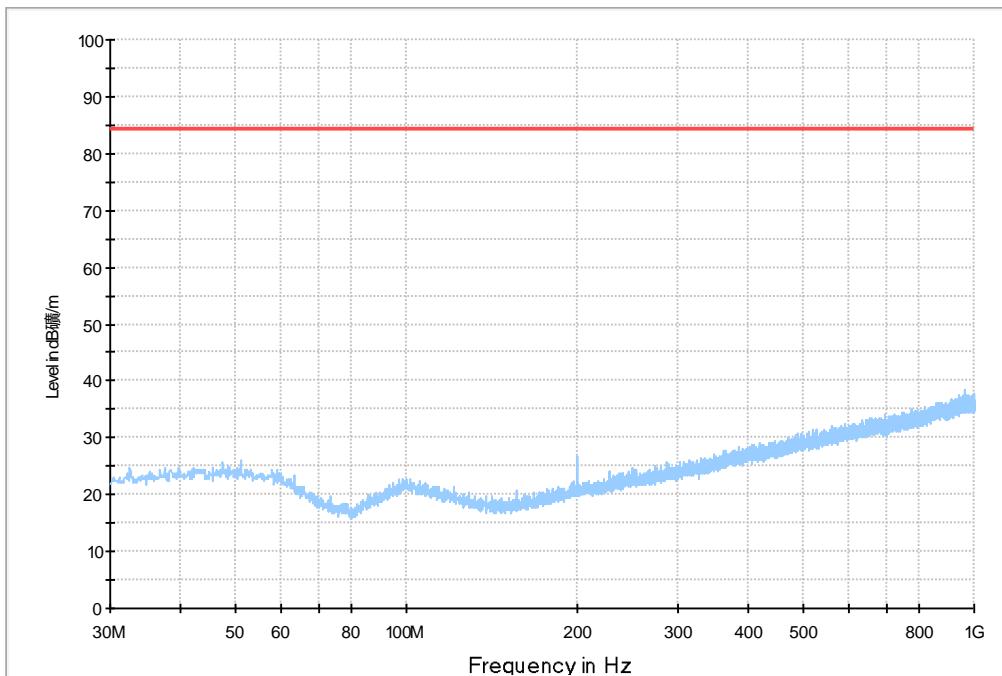
Maximum Output Power 46.02 dBm, 20MHz, 256QAM ;

Channel Position	Channel Frequencies
Channel Position B	2506MHz+2576MHz
Channel Position M	2558MHz+2628MHz
Channel Position T	2610MHz+2680MHz

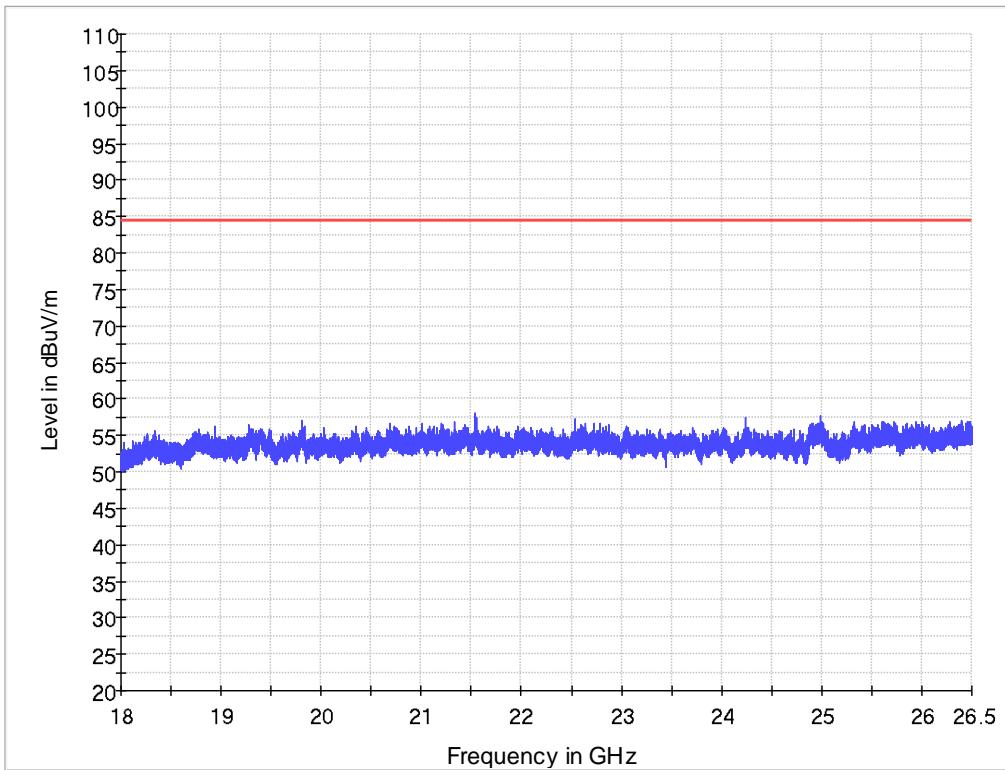
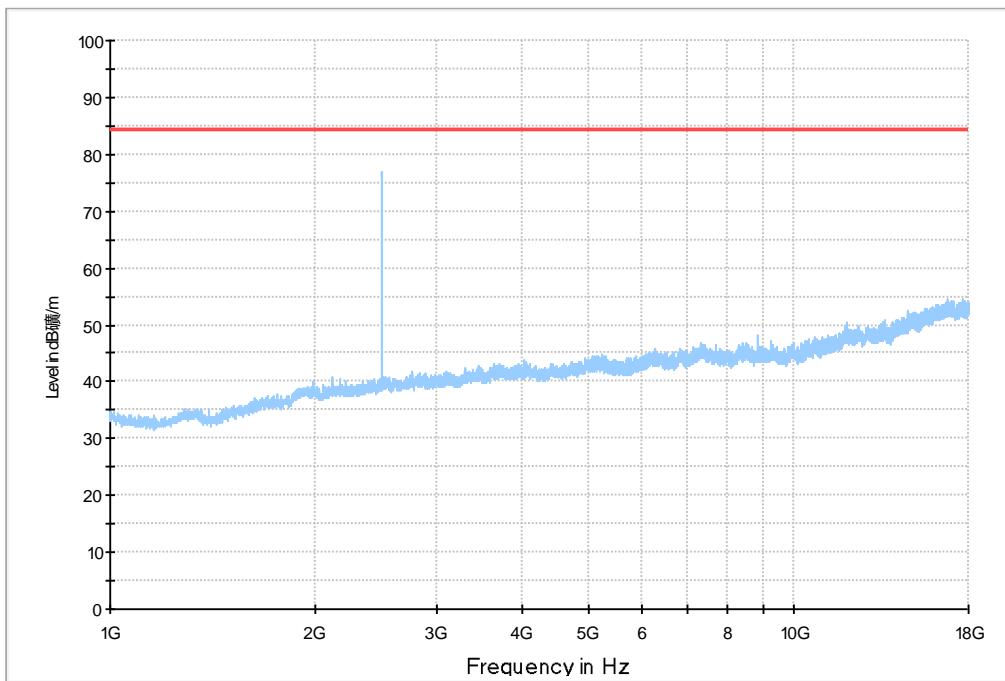
No emissions were detected within 20dB of the limit.

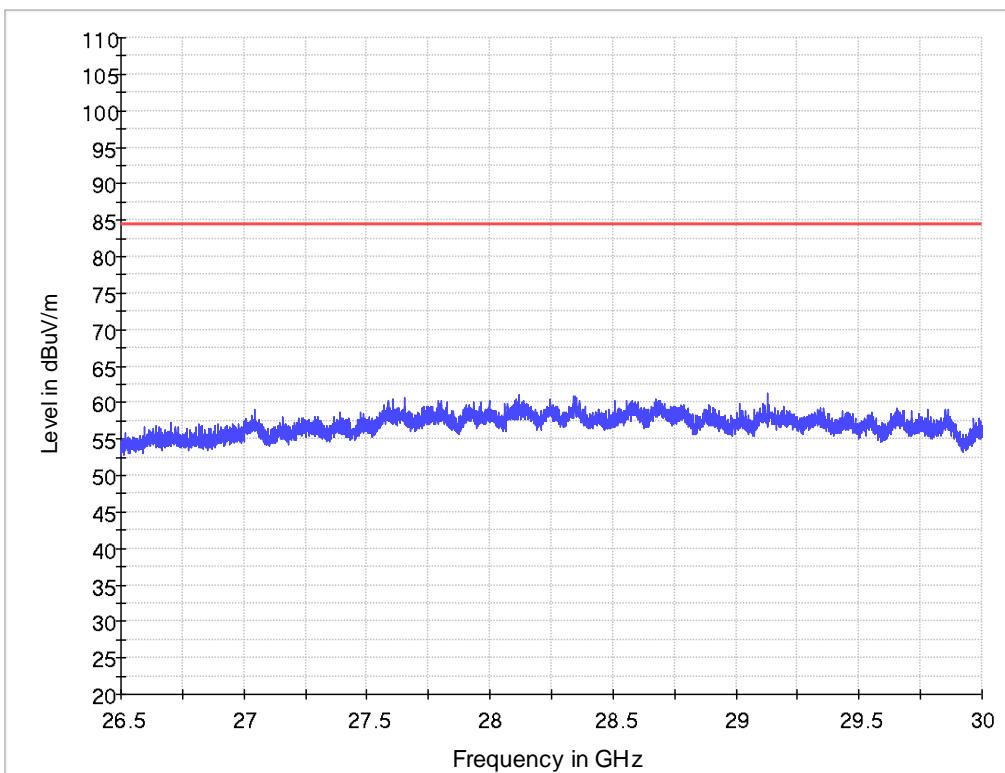
Final Results

RSE_Erisson_30M-1G_FCC



RSE_Erisson_1-18G_FCC





A.6 Frequency Stability

A.6.1 Reference

FCC CFR 47 Part 27, Clause 27.54

A.6.2 Method of measurement

Temperature Variation

The EUT was tested over the temperature range -30°C to +50°C in 10°C steps with -48V DC Power Supply. At each temperature step, the Base Station was configured to transmit an [RAT]* at maximum power on the bottom, middle and top channel of the operating band. After achieving thermal balance, the averages of 200 transmission bursts were measured and the result recorded.

Voltage Variation

The EUT was tested at the supplied voltages varied from 85 to 115 percent of the nominal values of -48V DC. At +20°C, the Base Station was configured to transmit an [RAT]* at maximum power on the bottom, middle and top channel of the operating band. The average of 200 transmission bursts was measured and the result recorded.

[RAT]*:

LTE (20.0 MHz) - Single Carrier with 16QAM modulation

A.6.3 Measurement limit

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

A.6.4 Measurement results

Frequency Error – Temperature Variation

Configuration LTE-MIMO-1C, 16QAM, Port C, Channel Bandwidth 20MHz

Maximum Output Power 43.0dBm per port

Supply Voltage DC(V)	Temperature	Frequency Stability (Hz)		
		Channel position B	Channel position M	Channel position T
-48	-30	-3.29	-2.70	-2.25
	-20	2.15	-2.54	-2.08
	-10	-2.01	-2.74	2.09
	0	-2.22	-2.62	-2.01
	10	-3.04	-2.67	-3.54
	20	-2.57	-2.45	-3.17
	30	-2.40	-2.55	-3.1
	40	-3.14	1.53	-2.78
	50	-5.58	-2.27	-5.07

Frequency Error – Voltage Variation

Configuration LTE-MIMO-1C, 16QAM, Port C, Channel Bandwidth 20MHz

Maximum Output Power 43.0dBm per port

Supply Voltage DC(V)	Temperature(°C)	Frequency Stability (Hz)		
		Channel position B	Channel position M	Channel position T
-40.8	20	-1.58	2.39	-3.24
-48	20	-2.19	-3.71	-3.61
-55.2	20	-3.22	-2.68	-3.32

ANNEX B: Accreditation Certificate



END OF REPORT