PART 2

Clause 24.238(a) Spurious emissions at antenna terminal

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

Frequency, MHz	Attenuation below carrier, dBc	ERP of spurious, dBm
30–10th harmonic	43 + 10 Log(P)	-13

(b) *Measurement procedure.* Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (*i.e.* 1 MHz or 1 percent of emission bandwidth, as specified).

Test date: 2010-09-23

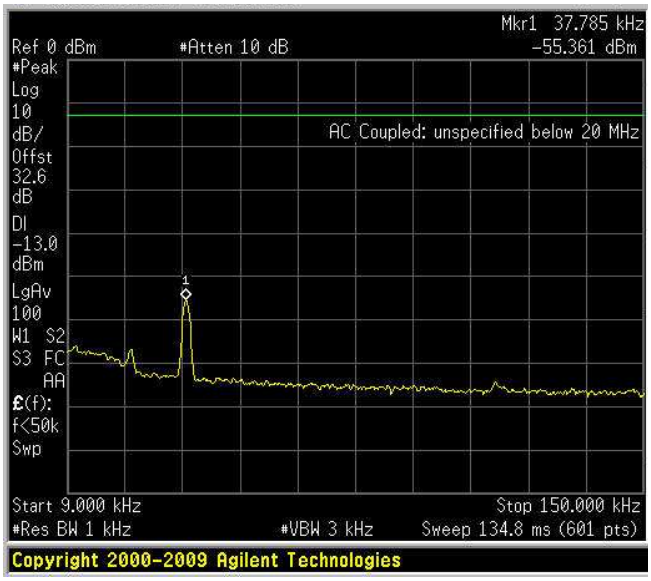
Test results: Pass

Special notes

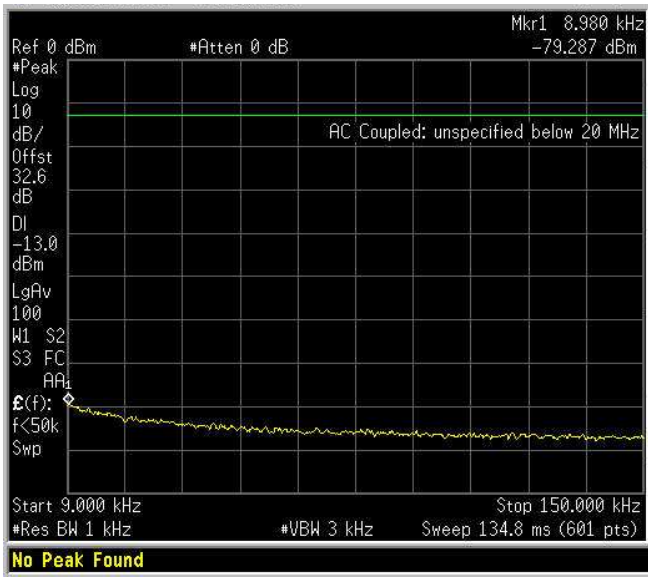
- The spectrum was searched from 30 MHz up to 10th harmonic
- Only the worst data presented in the test report.

Clause 24.238 Out of band spurious emissions at antenna terminal,

Downlink – 30 kHz TDMA
9 kHz – 150 kHz

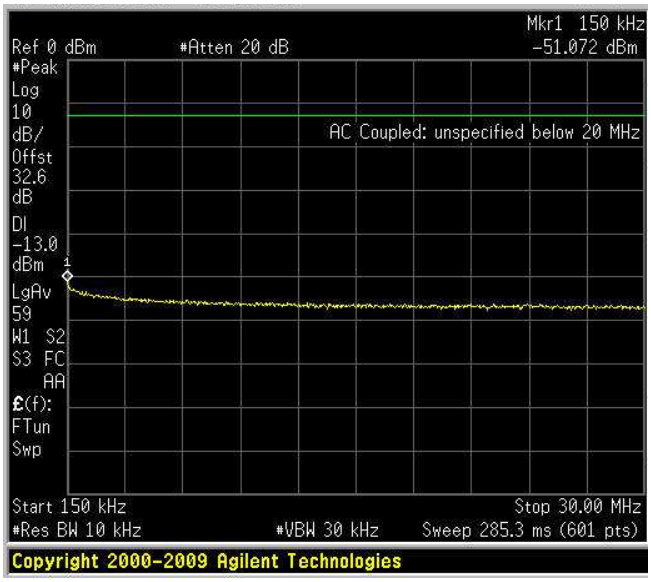


Uplink – 30 kHz TDMA
9 kHz – 150 kHz

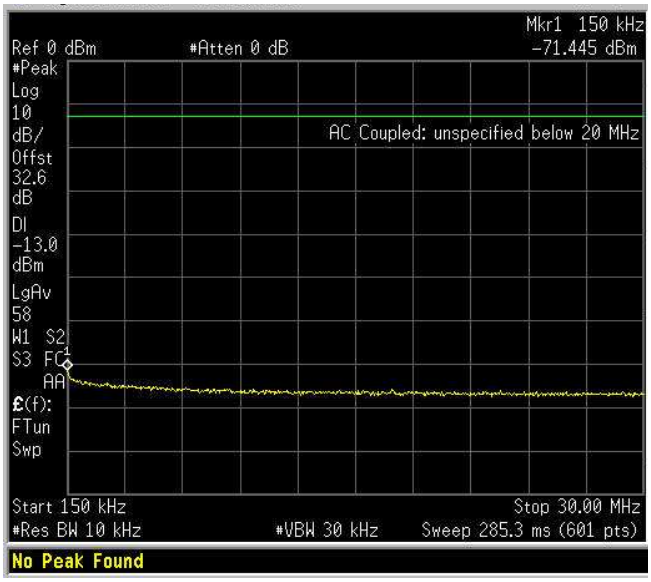


Test data continued

Spurious Emissions at Antenna Terminals
Downlink – 30 kHz TDMA
150 kHz – 30MHz

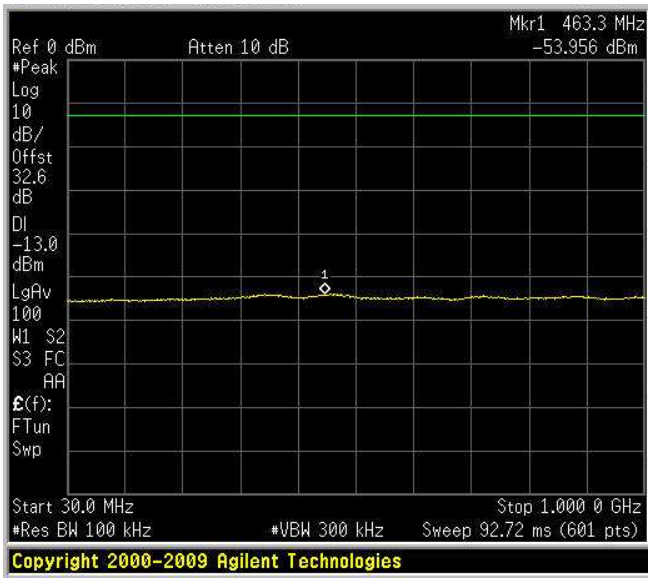


Spurious Emissions at Antenna Terminals
Uplink – 30 kHz TDMA
150 kHz – 30MHz

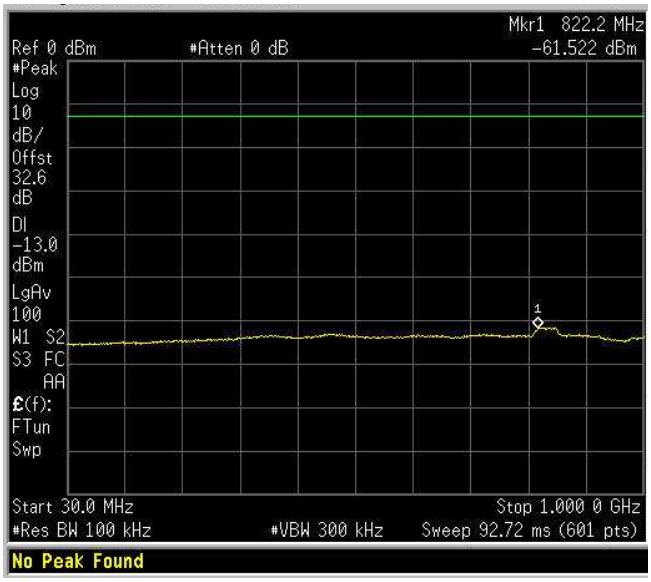


Test data continued

Spurious Emissions at Antenna Terminals
Downlink – 30 kHz TDMA
30MHz – 1 GHz

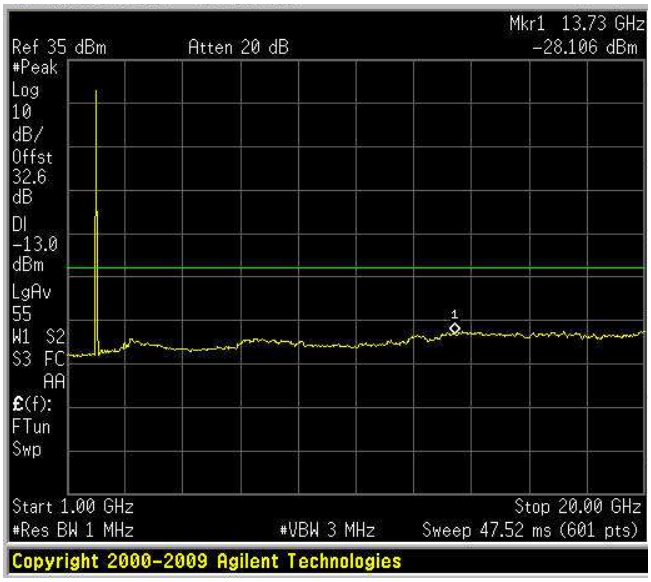


Spurious Emissions at Antenna Terminals
Uplink – 30 kHz TDMA
30MHz – 1 GHz

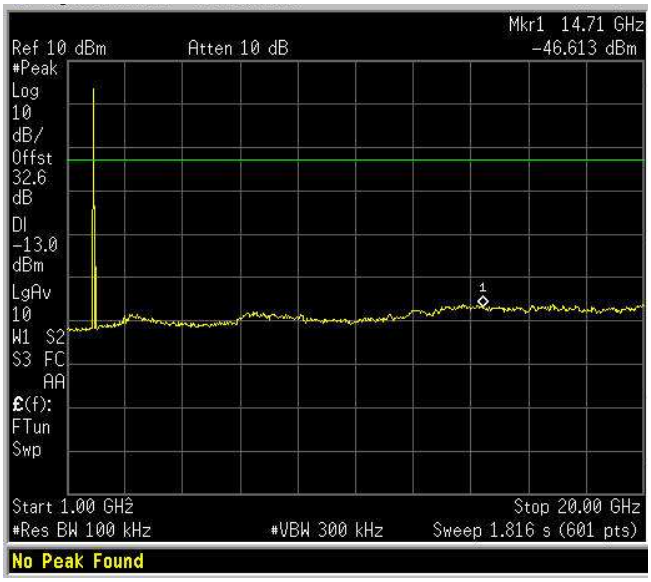


Test data continued

Spurious Emissions at Antenna Terminals
Downlink – 30 kHz TDMA
1-20 GHz

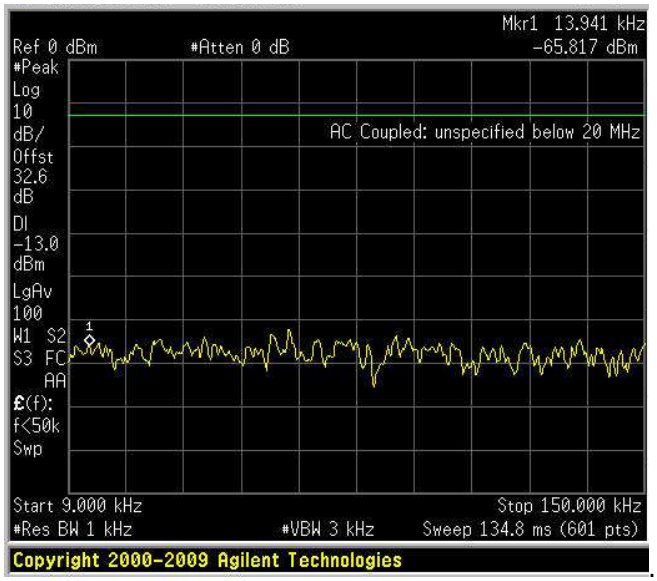


Spurious Emissions at Antenna Terminals
Uplink – 30 kHz TDMA
1-20 GHz

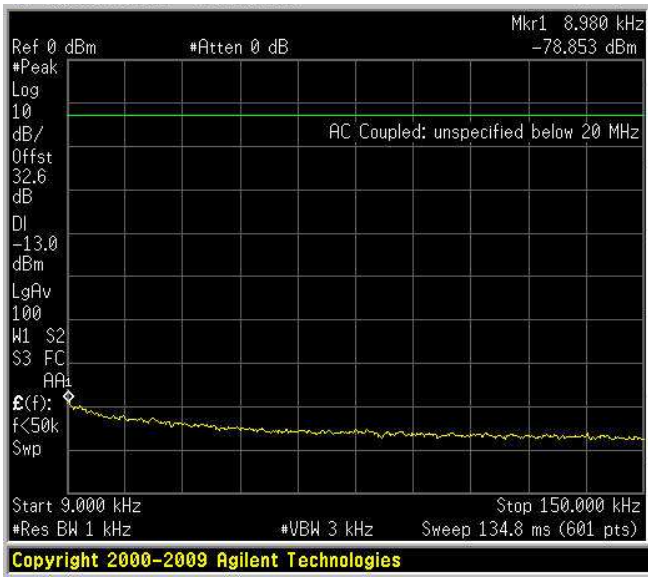


Clause 24.238 Out of band spurious emissions at antenna terminal,

Downlink – 1,4 QAM
9 kHz – 150 kHz



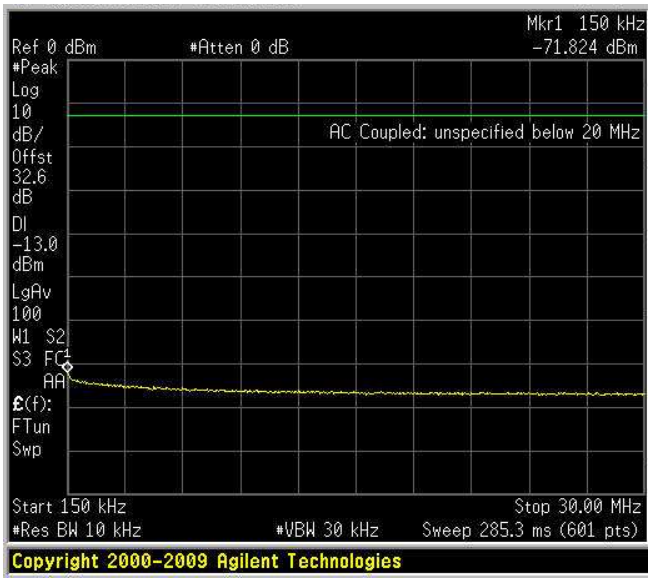
Uplink – 1,4 QAM
9 kHz – 150 kHz



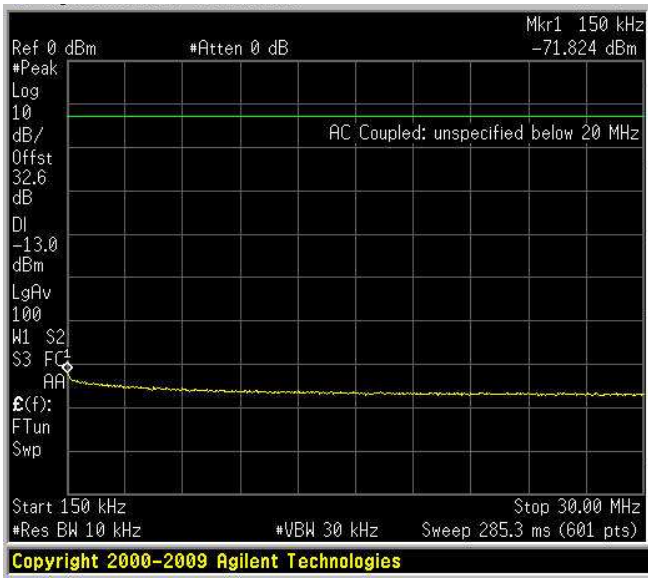
Only 1,4 QAM 9kHz-150kHz spurious emission plots are included here, other modulations spurious emission plots are negligible and the same.

Test data continued

Spurious Emissions at Antenna Terminals
Downlink – 1,4 QAM
150 kHz – 30MHz



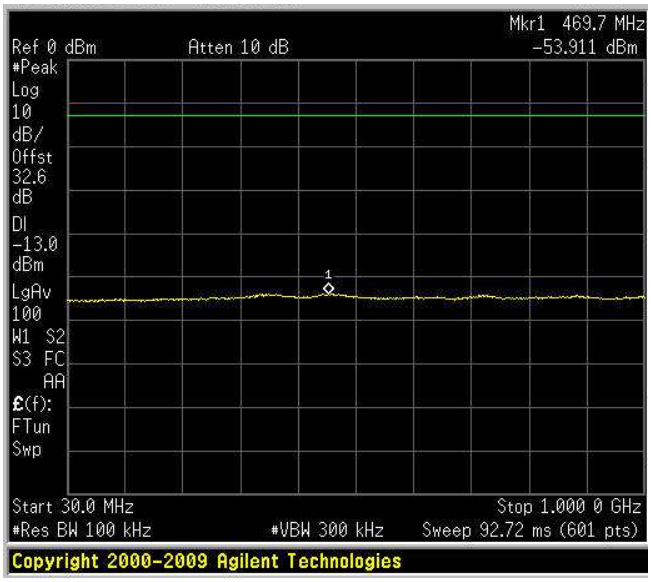
Spurious Emissions at Antenna Terminals
Uplink – 1,4 QAM
150 kHz – 30MHz



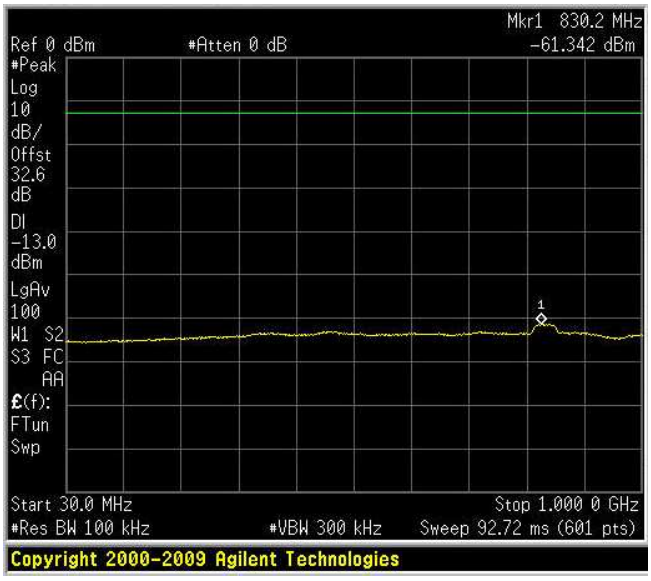
Only 1,4 QAM 150kHz-30MHz spurious emission plots are included here, other modulations spurious emission plots are negligible and the same.

Test data continued

Spurious Emissions at Antenna Terminals
Downlink – 1,4 QAM
30MHz – 1 GHz



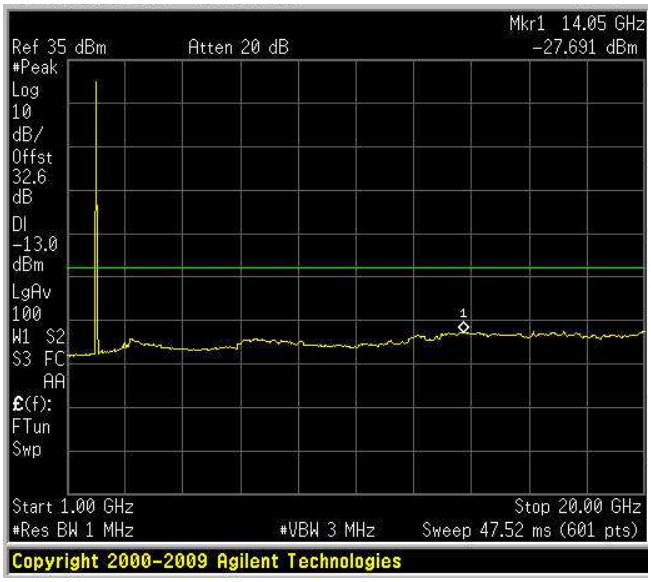
Spurious Emissions at Antenna Terminals
Uplink – 1,4 QAM
30MHz – 1 GHz



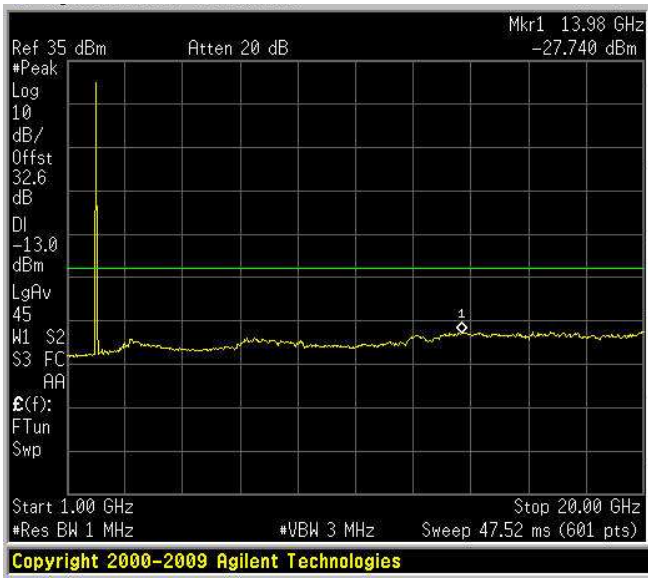
Only 1,4 QAM 30MHz – 1GHz spurious emission plots are included here, other modulations spurious emission plots are negligible and the same.

Test data continued

Spurious Emissions at Antenna Terminals
Downlink – 1,4 QAM
1-20 GHz

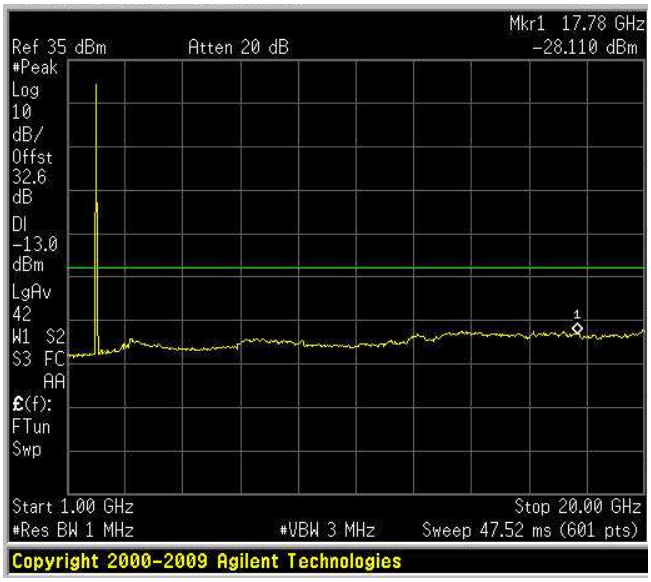


Spurious Emissions at Antenna Terminals
Downlink – 1,4 QPSK
1-20 GHz

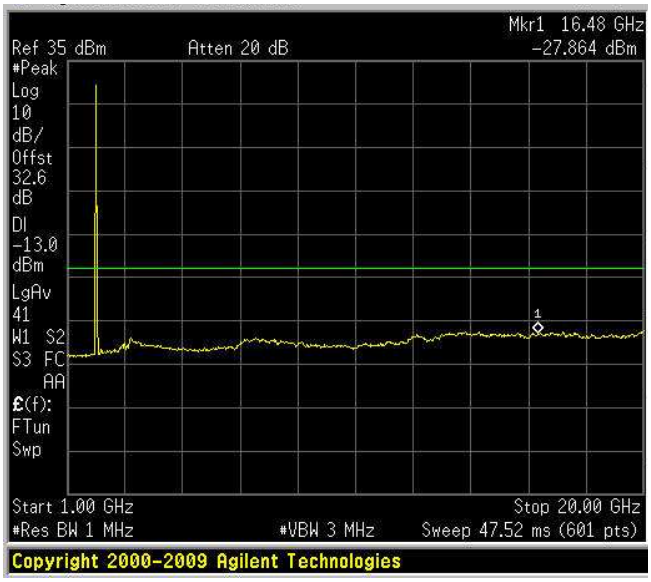


Test data continued

Spurious Emissions at Antenna Terminals
Downlink – 3 QAM
1-20 GHz

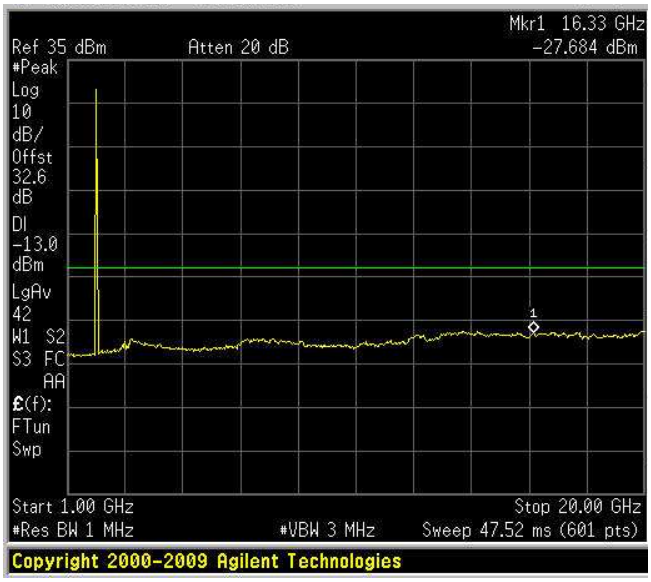


Spurious Emissions at Antenna Terminals
Downlink – 3 QPSK
1-20 GHz

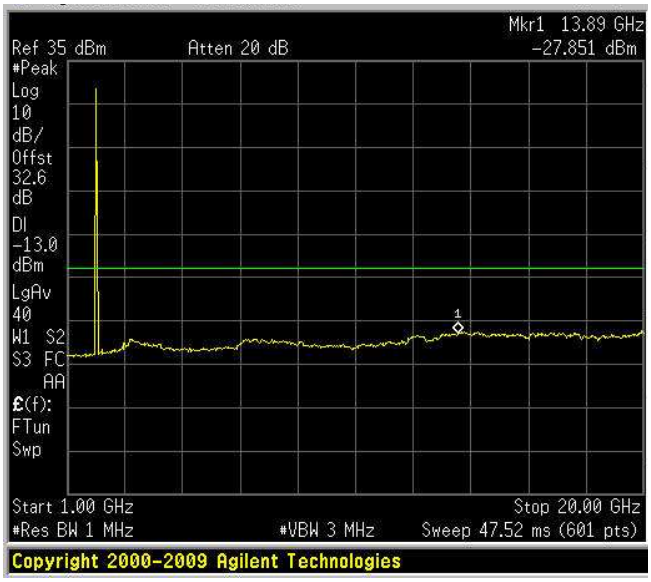


Test data continued

Spurious Emissions at Antenna Terminals
Downlink – 5 QAM
1-20 GHz

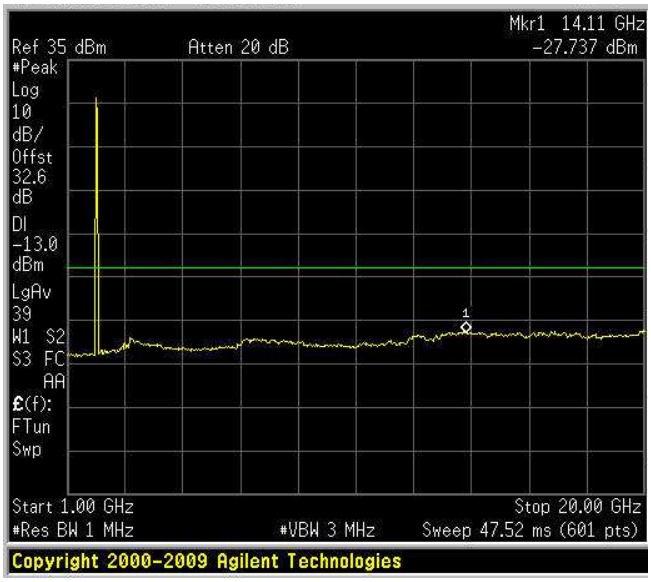


Spurious Emissions at Antenna Terminals
Downlink – 5 QPSK
1-20 GHz

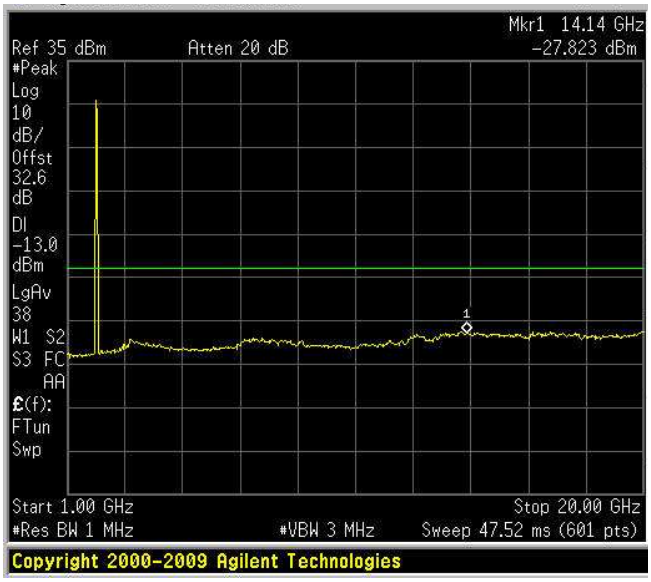


Test data continued

Spurious Emissions at Antenna Terminals
Downlink – 10 QAM
1-20 GHz

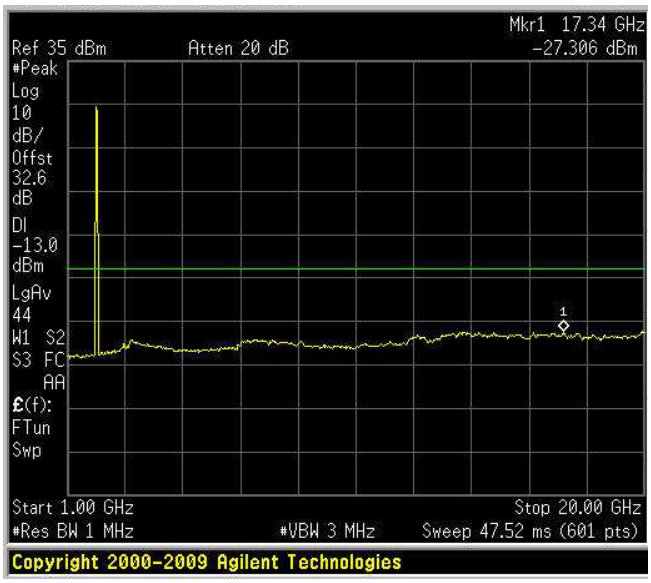


Spurious Emissions at Antenna Terminals
Downlink – 10 QPSK
1-20 GHz

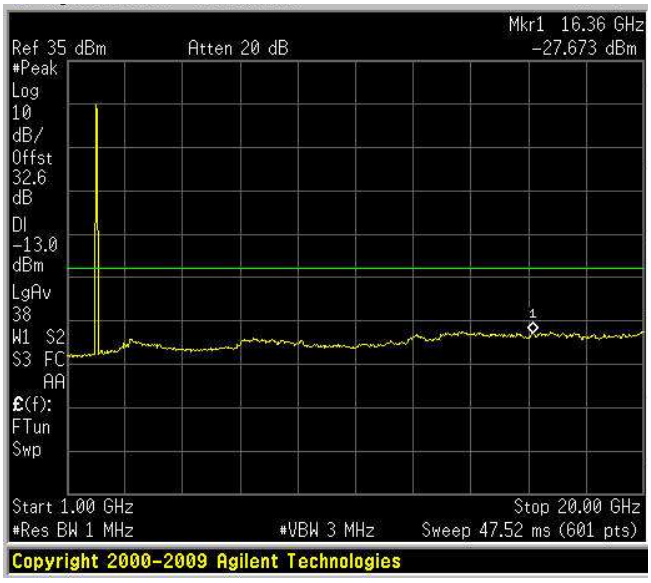


Test data continued

Spurious Emissions at Antenna Terminals
Downlink – 15 QAM
1-20 GHz

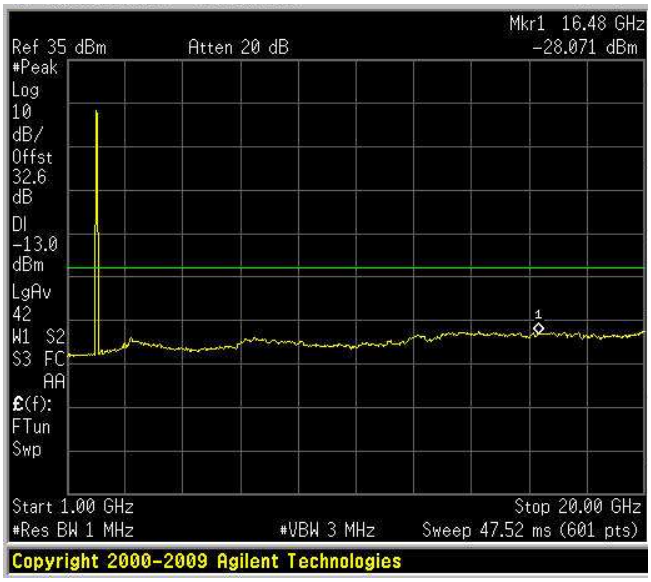


Spurious Emissions at Antenna Terminals
Downlink – 15 QPSK
1-20 GHz

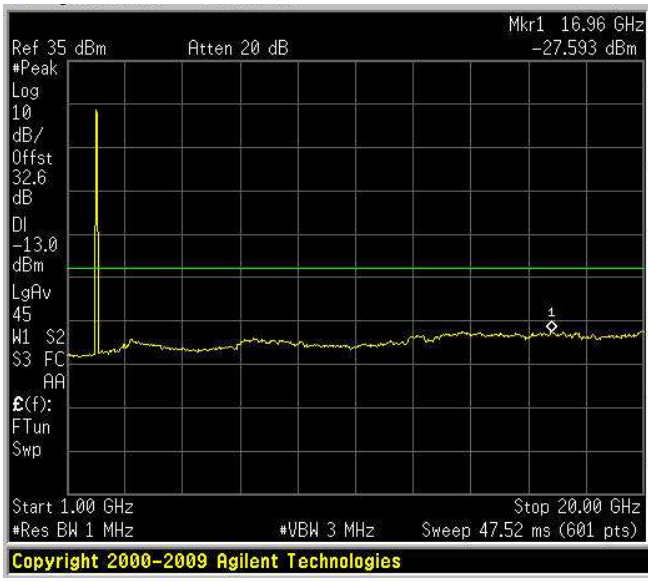


Test data continued

Spurious Emissions at Antenna Terminals
Downlink – 20 QAM
1-20 GHz

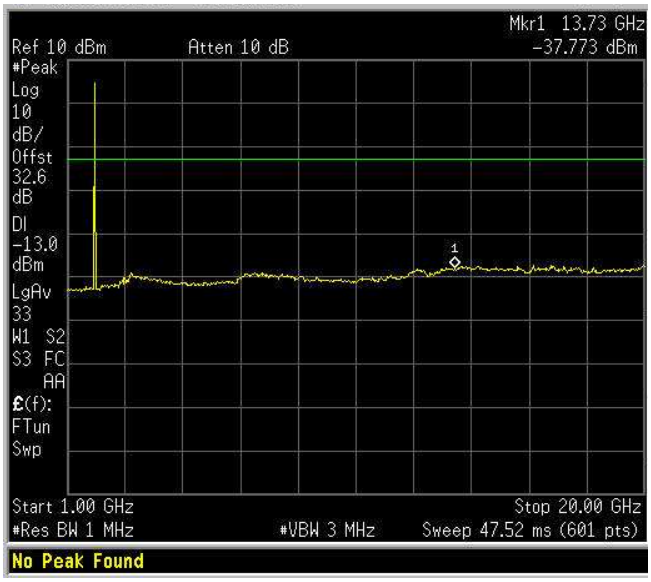


Spurious Emissions at Antenna Terminals
Downlink – 20 QPSK
1-20 GHz

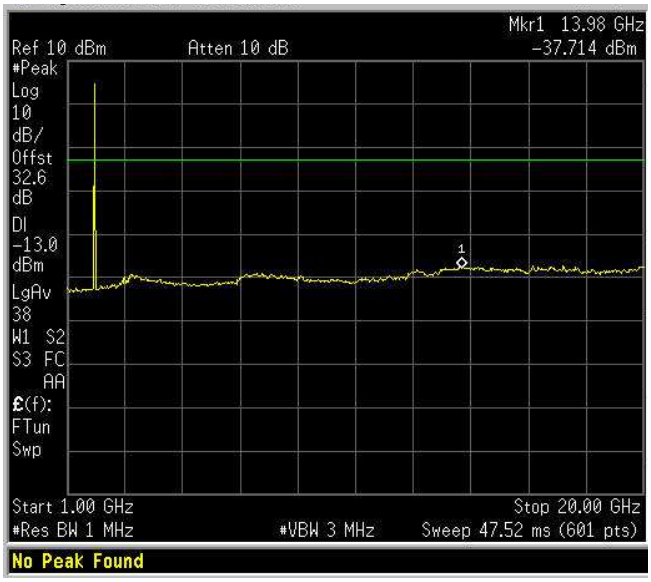


Test data continued

Spurious Emissions at Antenna Terminals
Uplink – 1,4 QAM
1-20 GHz

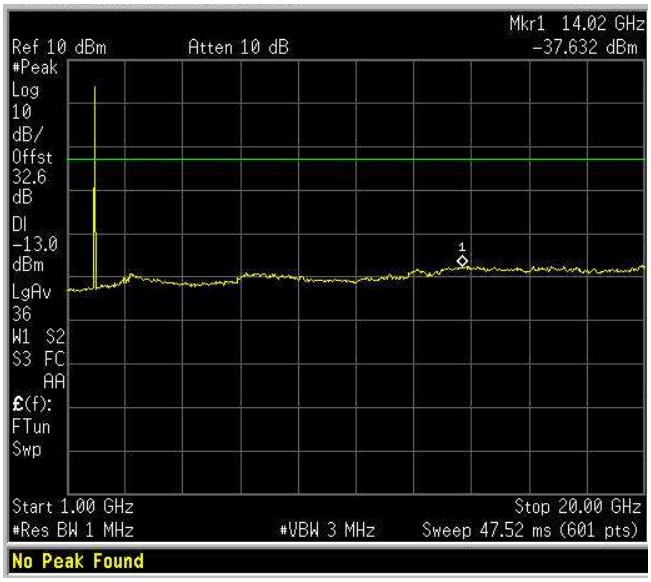


Spurious Emissions at Antenna Terminals
Uplink – 1,4 QPSK
1-20 GHz

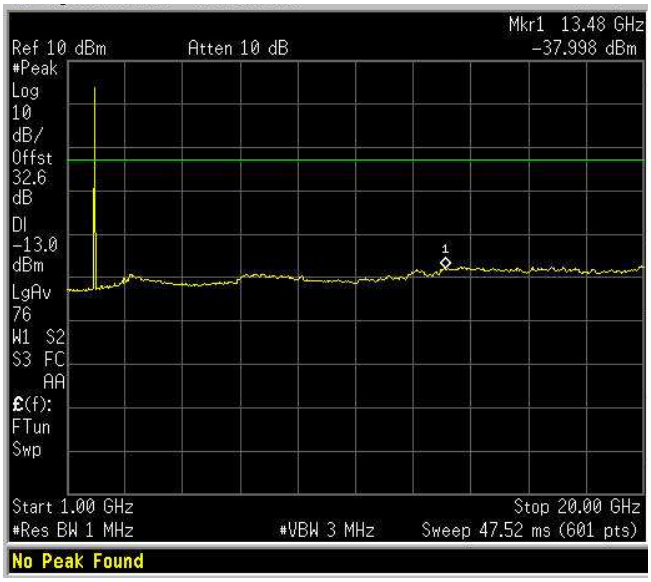


Test data continued

Spurious Emissions at Antenna Terminals
Uplink – 3 QAM
1-20 GHz

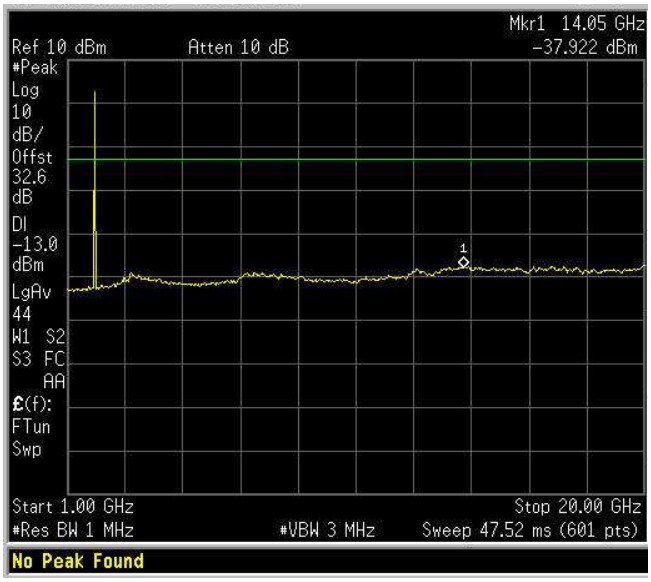


Spurious Emissions at Antenna Terminals
Uplink – 3 QPSK
1-20 GHz

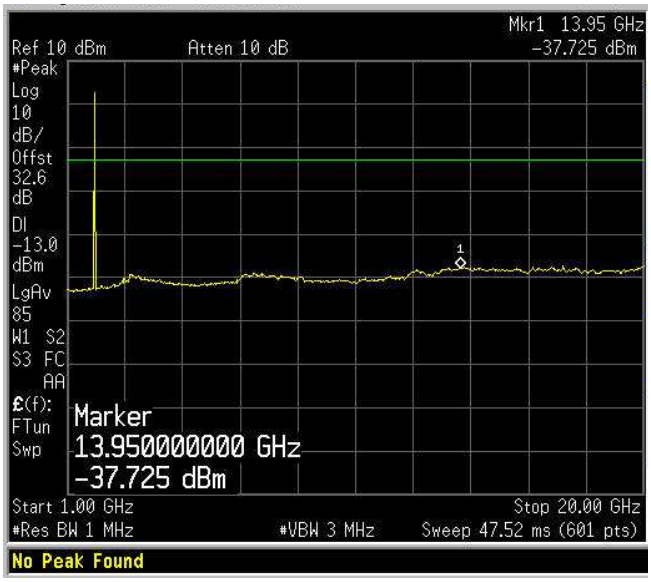


Test data continued

Spurious Emissions at Antenna Terminals
Uplink – 5 QAM
1-20 GHz

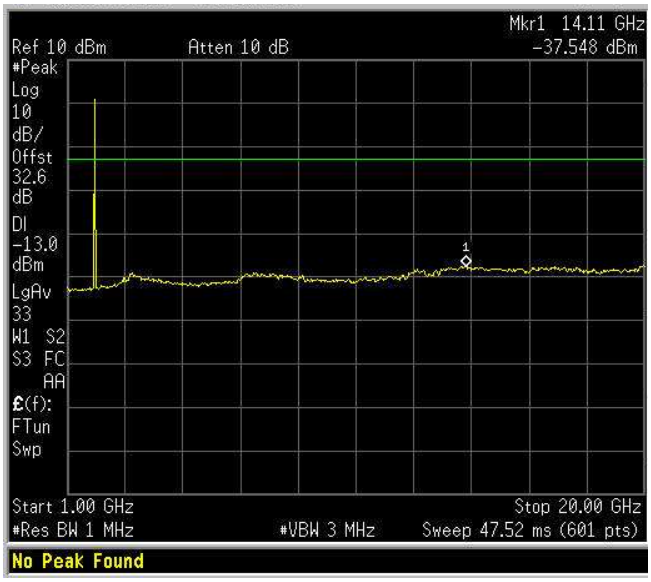


Spurious Emissions at Antenna Terminals
Uplink – 5 QPSK
1-20 GHz

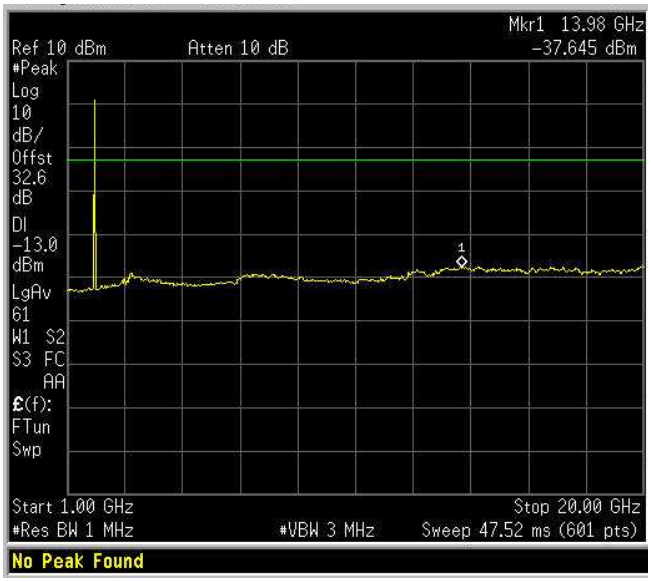


Test data continued

Spurious Emissions at Antenna Terminals
Uplink – 10 QAM
1-20 GHz

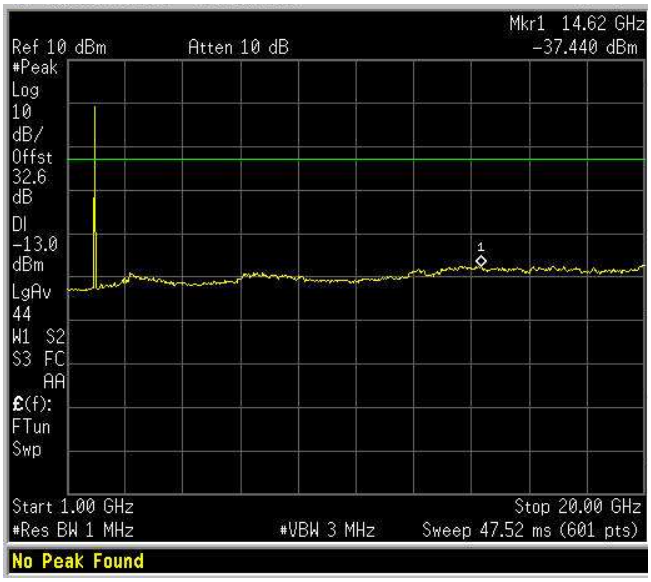


Spurious Emissions at Antenna Terminals
Uplink – 10 QPSK
1-20 GHz

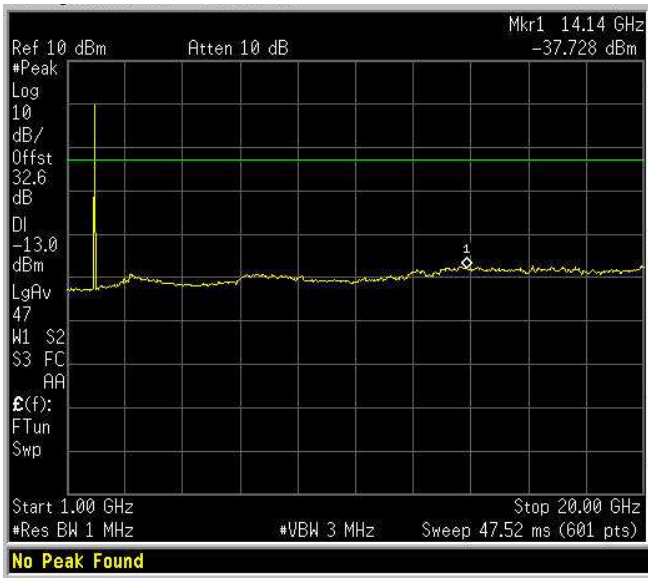


Test data continued

Spurious Emissions at Antenna Terminals
Uplink – 15 QAM
1-20 GHz

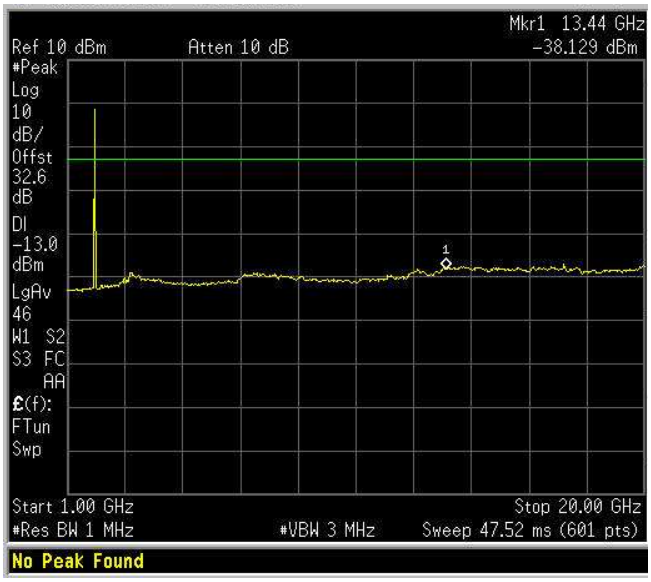


Spurious Emissions at Antenna Terminals
Uplink – 15 QPSK
1-20 GHz

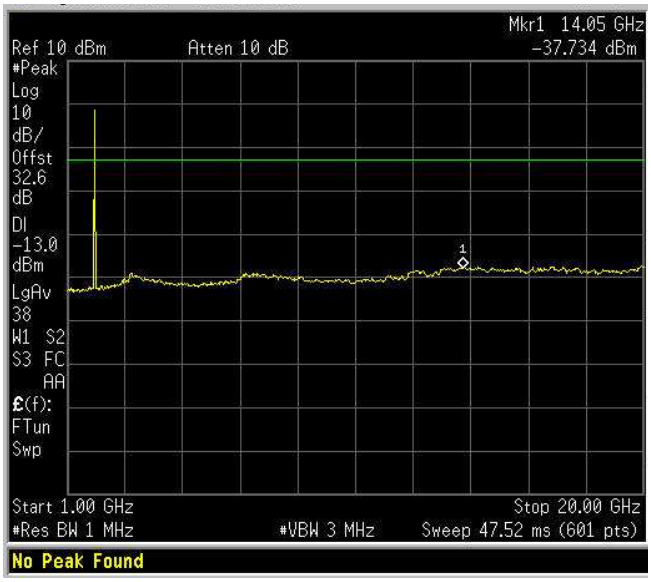


Test data continued

Spurious Emissions at Antenna Terminals
Uplink – 20 QAM
1-20 GHz

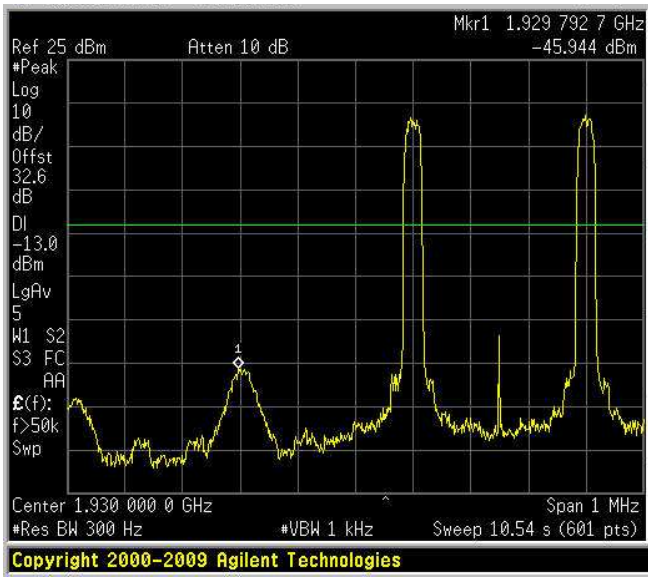


Spurious Emissions at Antenna Terminals
Uplink – 20 QPSK
1-20 GHz

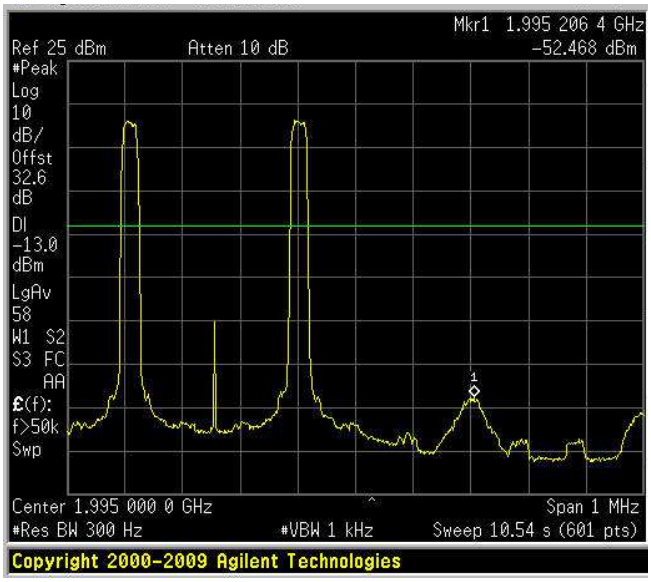


Test data, continued band edges Inter modulation

Downlink – 30 kHz TDMA
LOW BAND EDGE

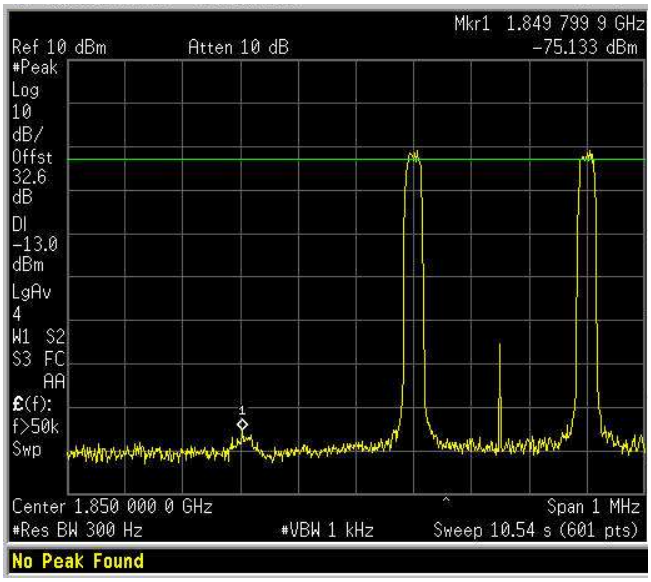


Downlink – 30 kHz TDMA
HIGH BAND EDGE

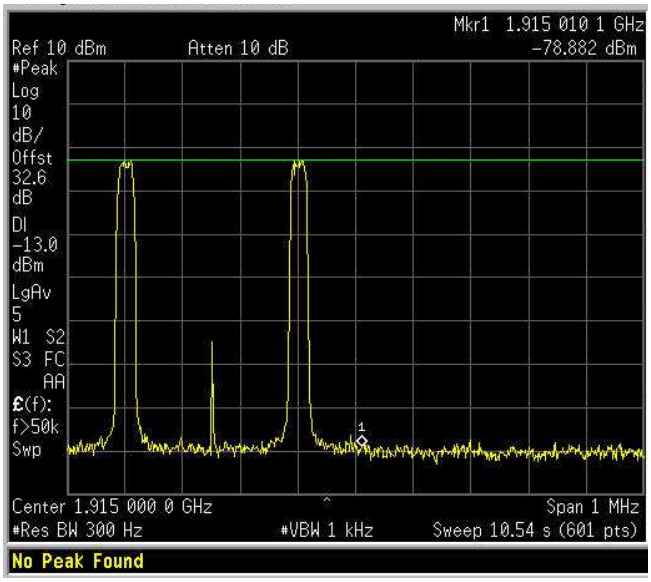


Test data, continued band edges:

Uplink – 30 kHz TDMA
LOW BAND EDGE

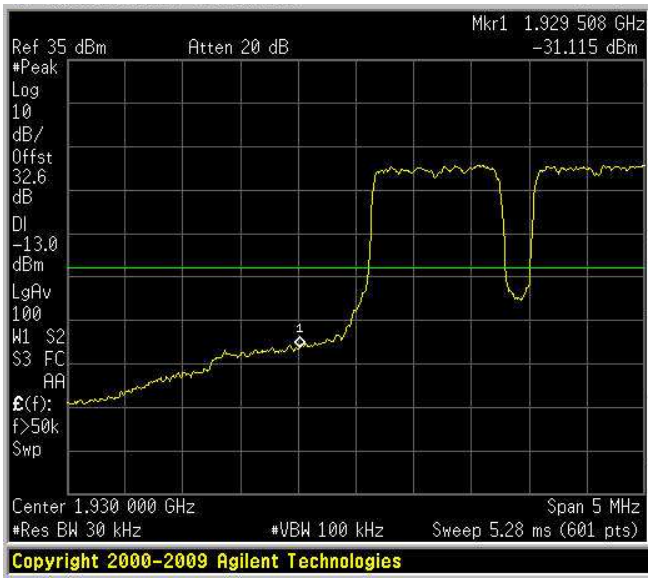


Uplink – 30 kHz TDMA
HIGH BAND EDGE

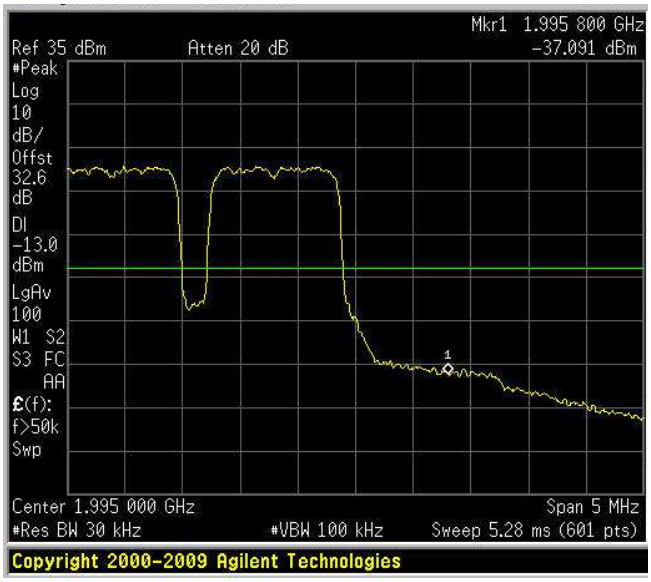


Test data, continued band edges Inter modulation :

Downlink – 1.4 QAM
LOW BAND EDGE

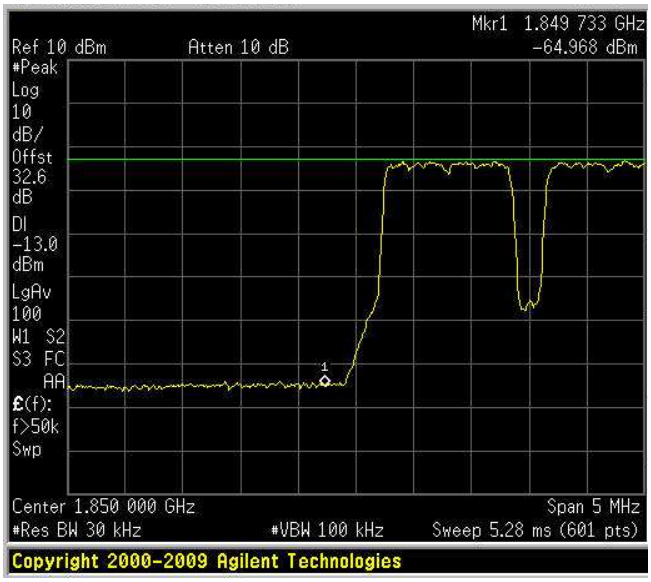


Downlink – 1.4 QAM
HIGH BAND EDGE

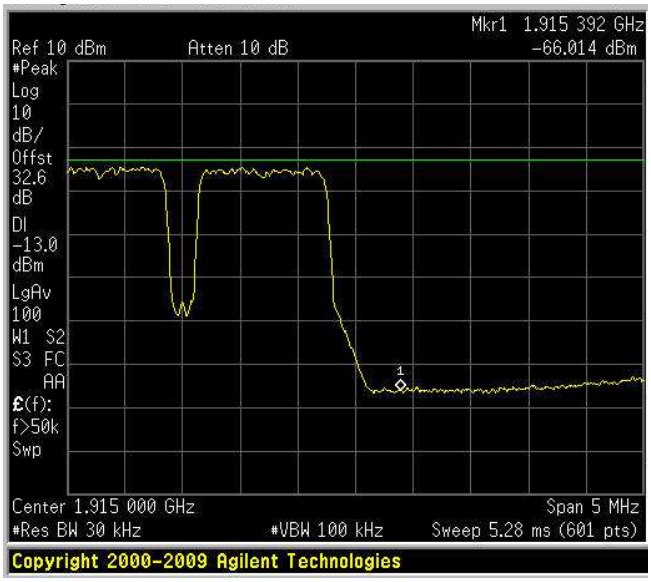


Test data, continued band edges:

Uplink – 1.4 QAM
LOW BAND EDGE

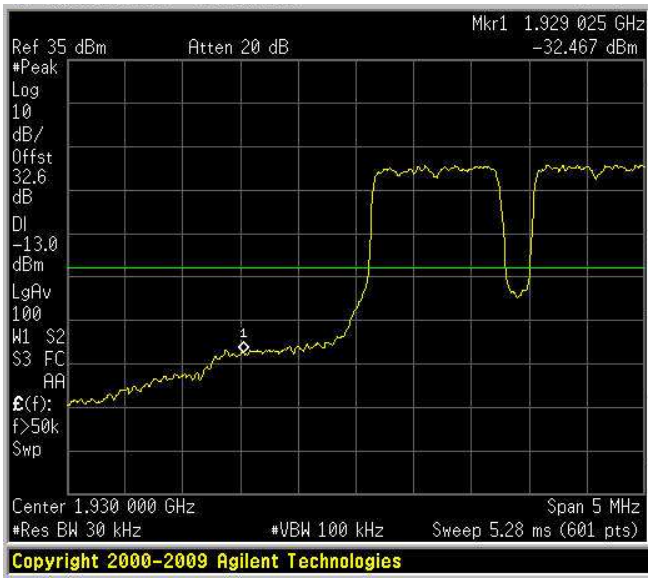


Uplink – 1.4 QAM
HIGH BAND EDGE

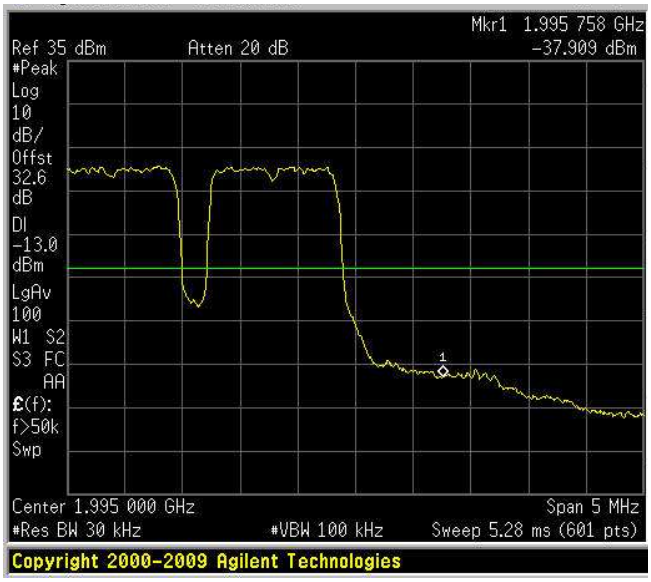


Test data, continued band edges:

Downlink – 1.4 QPSK
LOW BAND EDGE

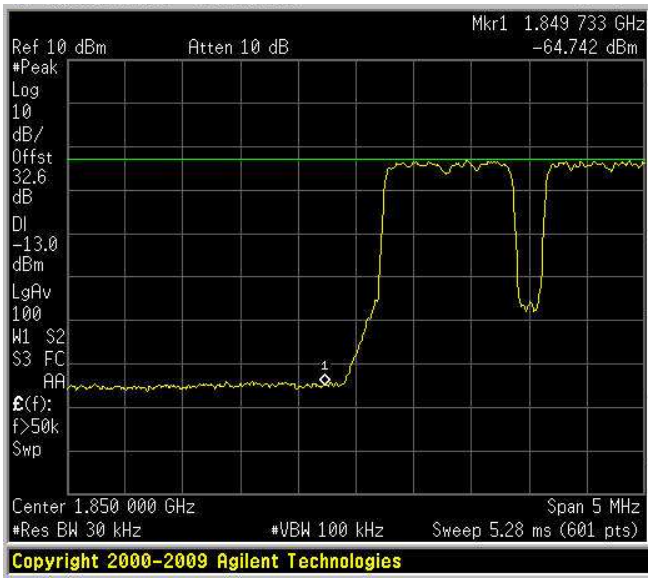


Downlink – 1.4 QPSK
HIGH BAND EDGE

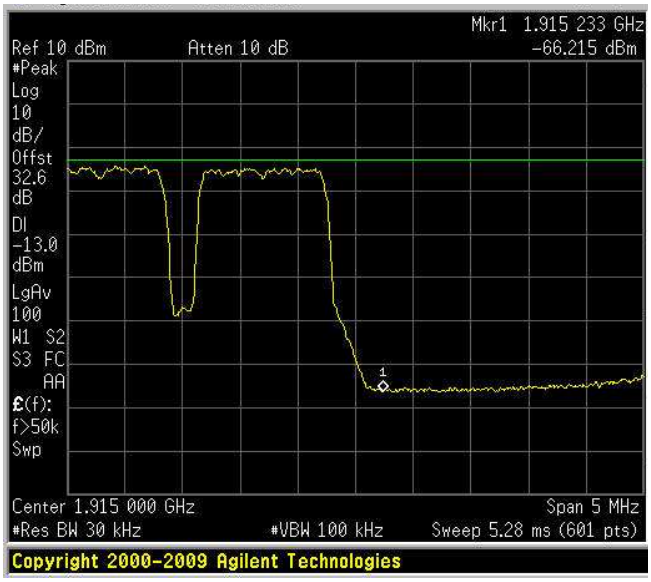


Test data, continued band edges:

Uplink – 1.4 QPSK
LOW BAND EDGE

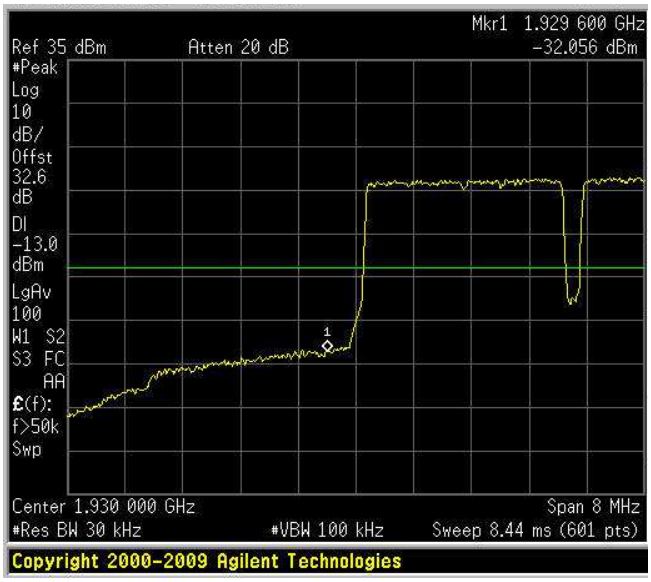


Uplink – 1.4 QPSK
HIGH BAND EDGE

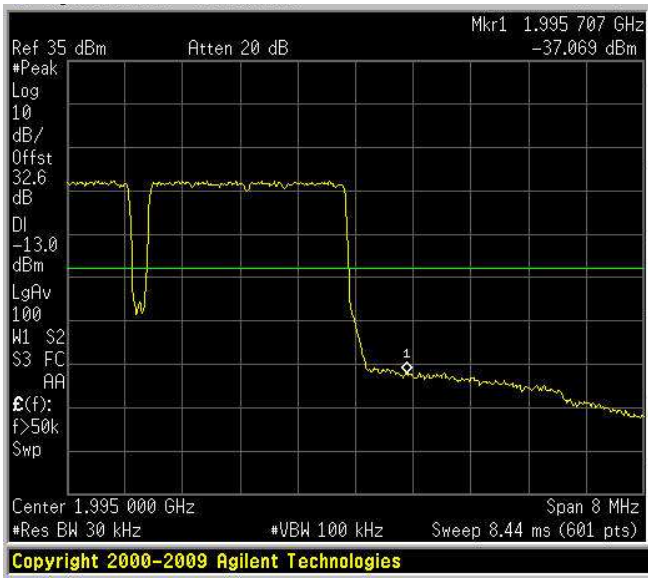


Test data, continued band edges:

Downlink – 3 QAM
LOW BAND EDGE

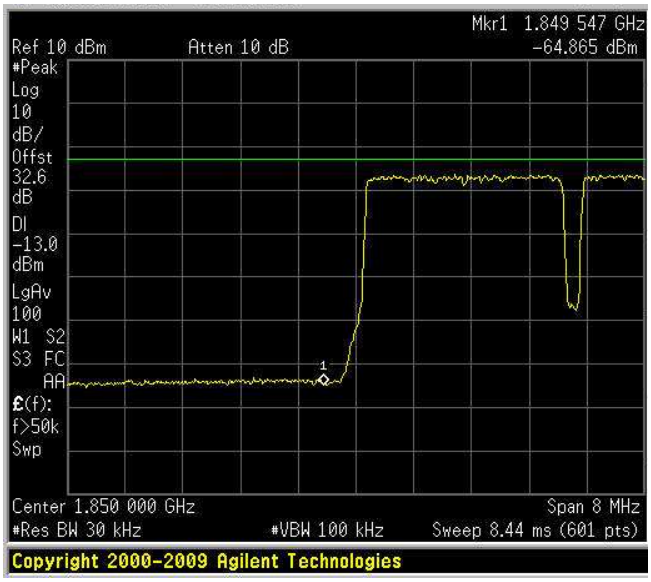


Downlink – 3 QAM
HIGH BAND EDGE

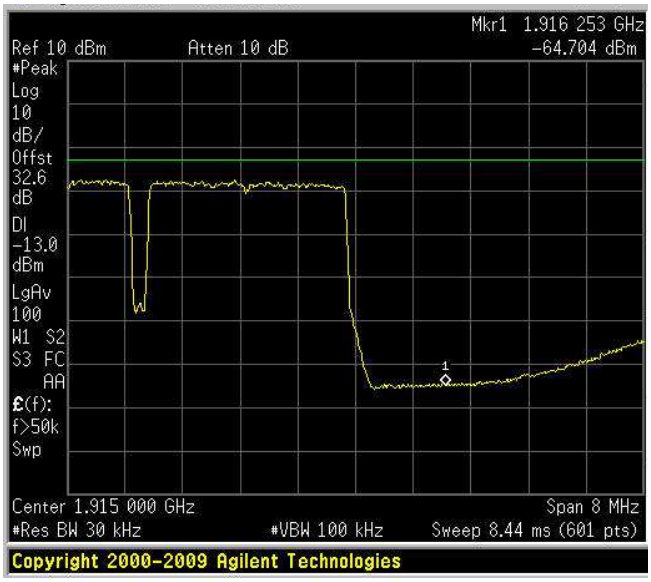


Test data, continued band edges:

Uplink – 3 QAM
LOW BAND EDGE

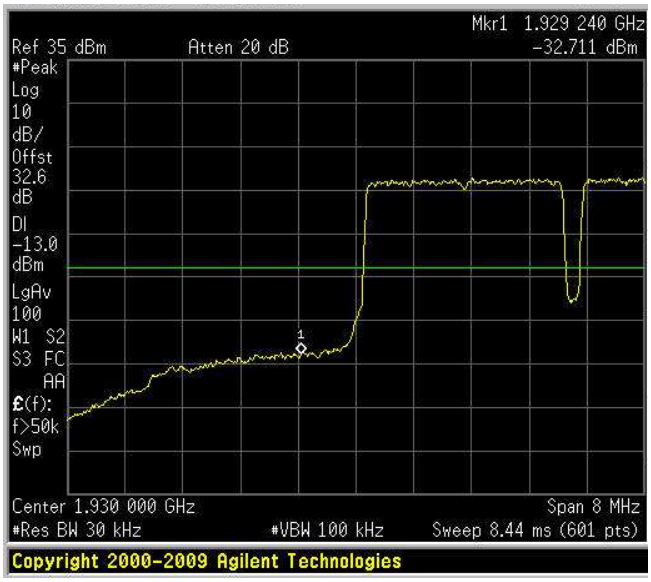


Uplink – 3 QAM
HIGH BAND EDGE

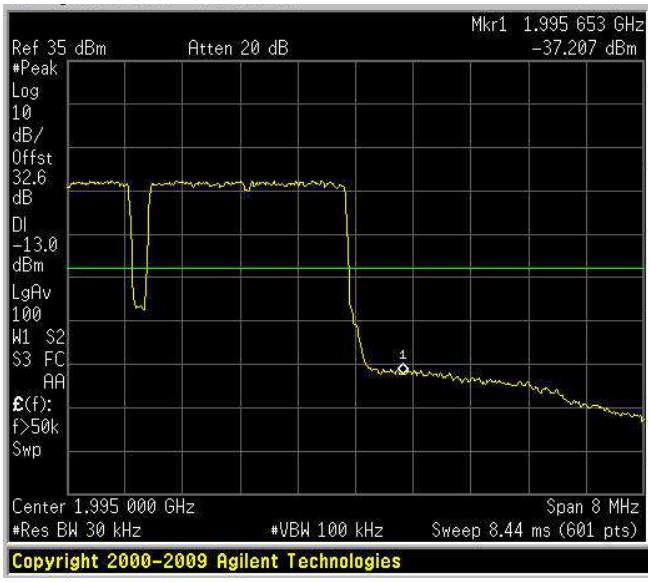


Test data, continued band edges:

Downlink – 3 QPSK
LOW BAND EDGE

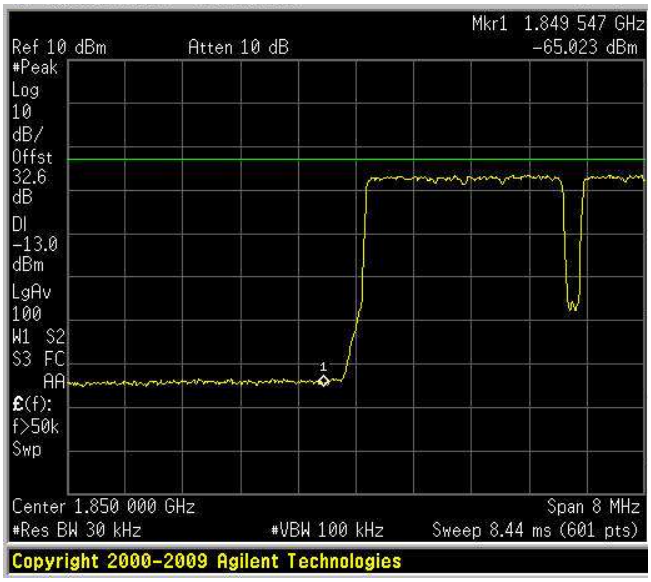


Downlink – 3 QPSK
HIGH BAND EDGE

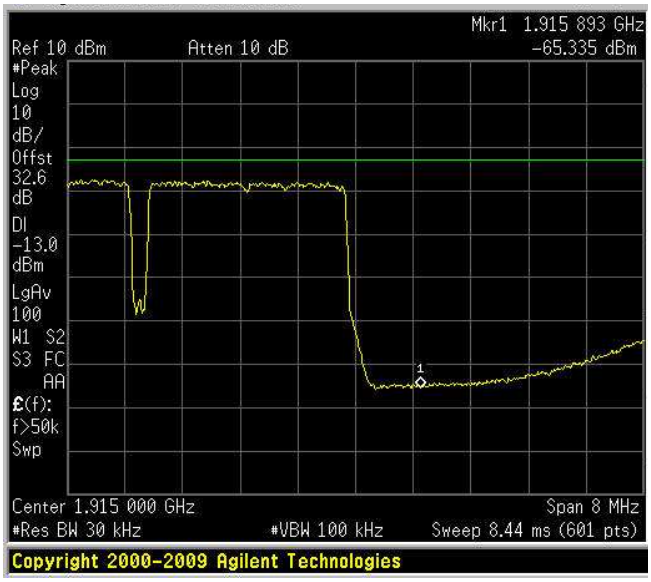


Test data, continued band edges:

Uplink – 3 QPSK
LOW BAND EDGE

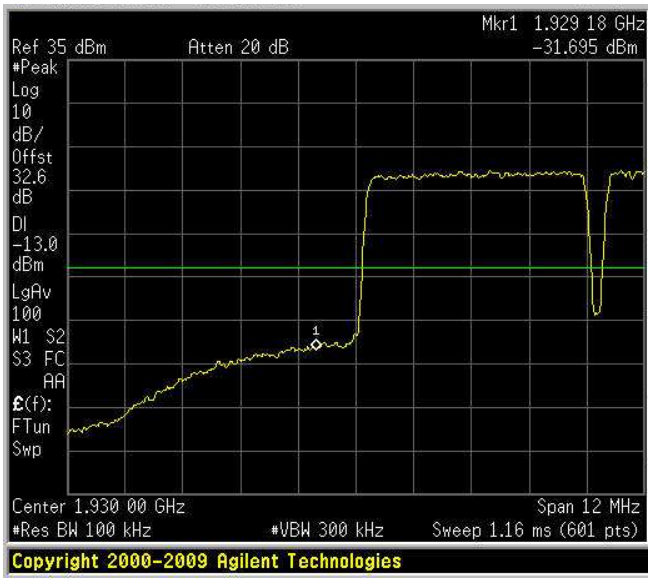


Uplink – 3 QPSK
HIGH BAND EDGE

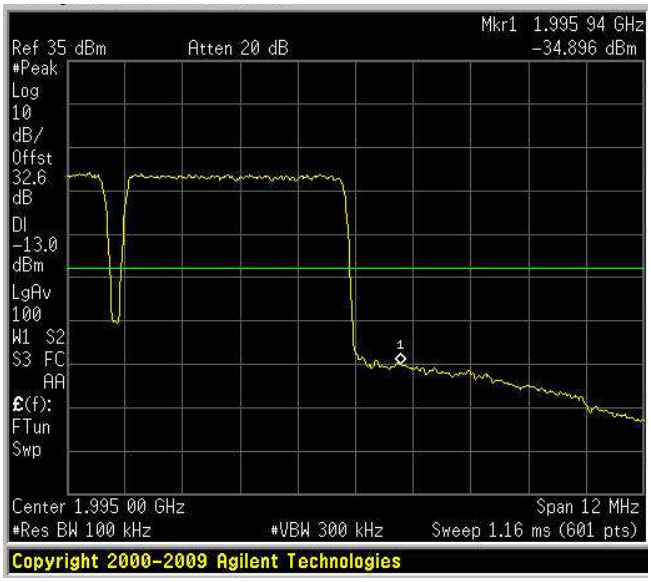


Test data, continued band edges:

Downlink – 5 QAM
LOW BAND EDGE

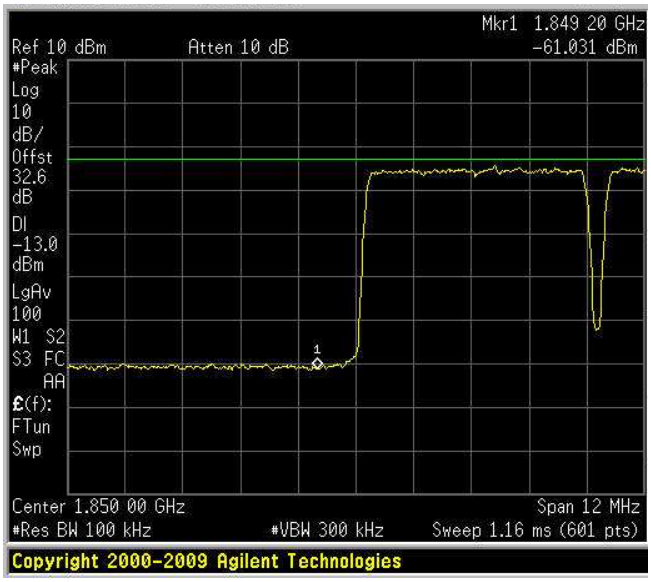


Downlink – 5 QAM
HIGH BAND EDGE

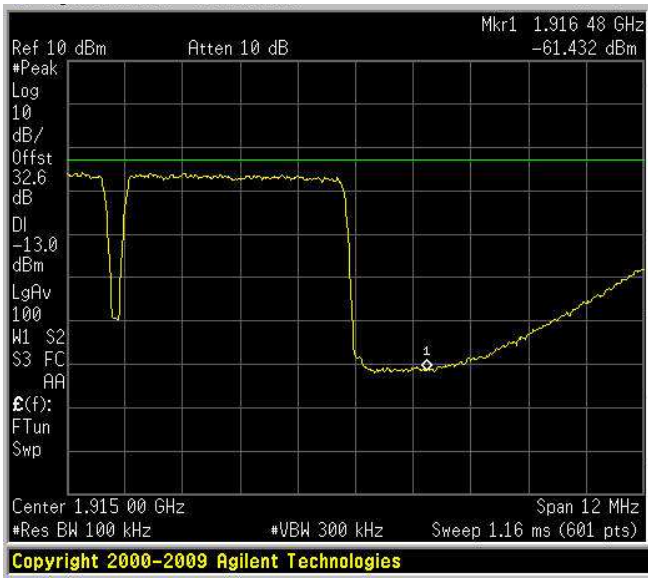


Test data, continued band edges:

Uplink – 5 QAM
LOW BAND EDGE

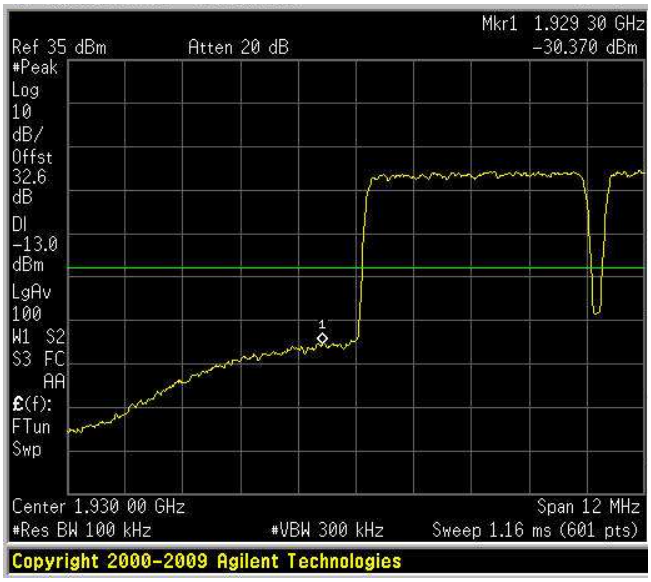


Uplink – 5 QAM
HIGH BAND EDGE

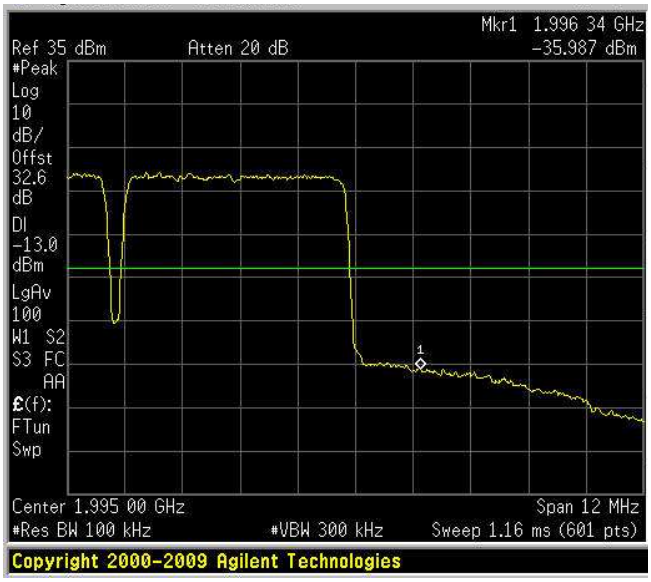


Test data, continued band edges:

Downlink – 5 QPSK
LOW BAND EDGE

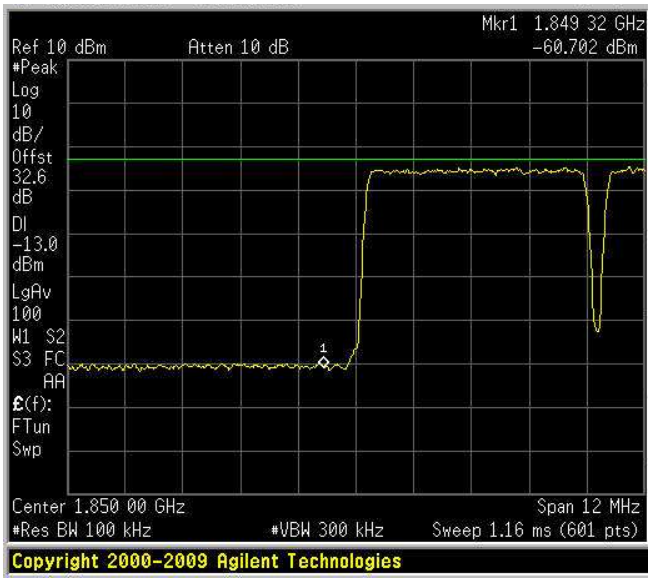


Downlink – 5 QPSK
HIGH BAND EDGE

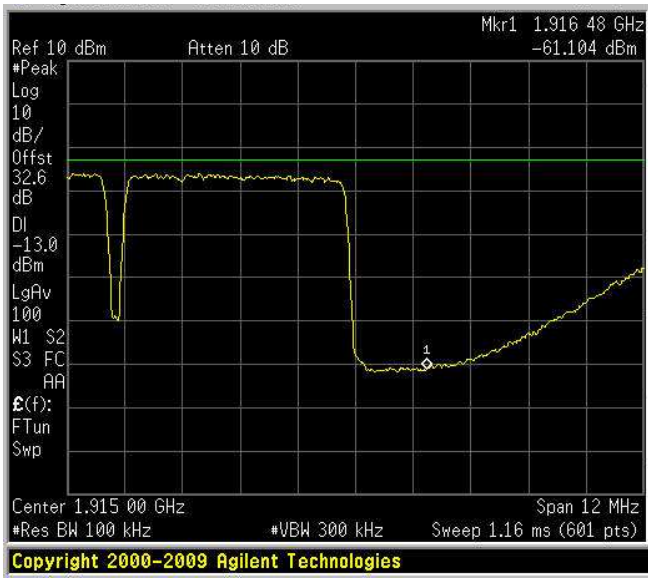


Test data, continued band edges:

Uplink – 5 QPSK
LOW BAND EDGE

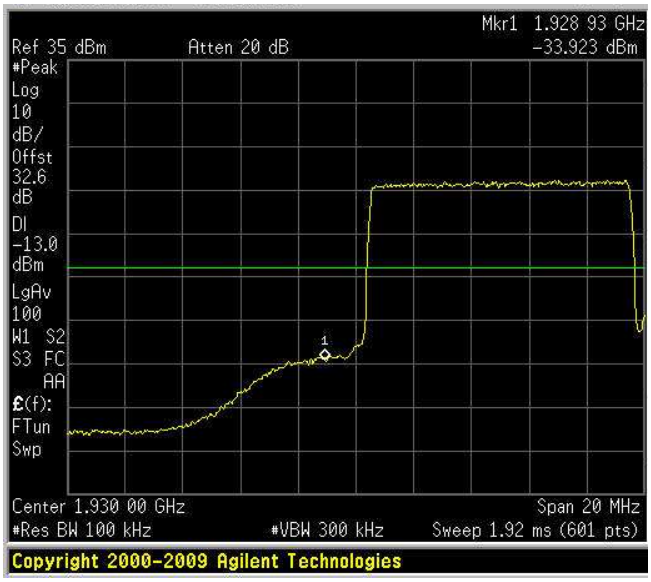


Uplink – 5 QPSK
HIGH BAND EDGE

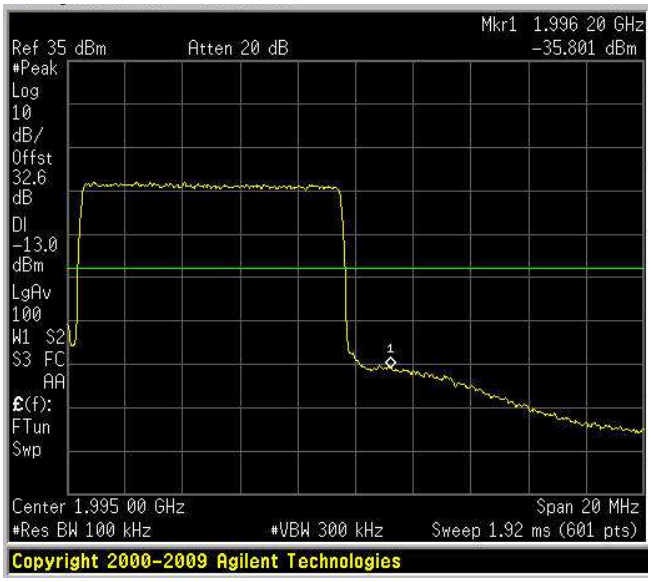


Test data, continued band edges:

Downlink – 10 QAM
LOW BAND EDGE

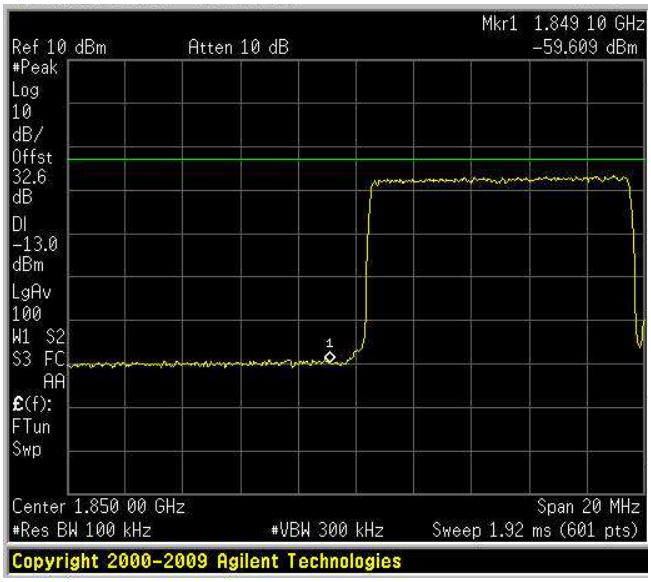


Downlink – 10 QAM
HIGH BAND EDGE

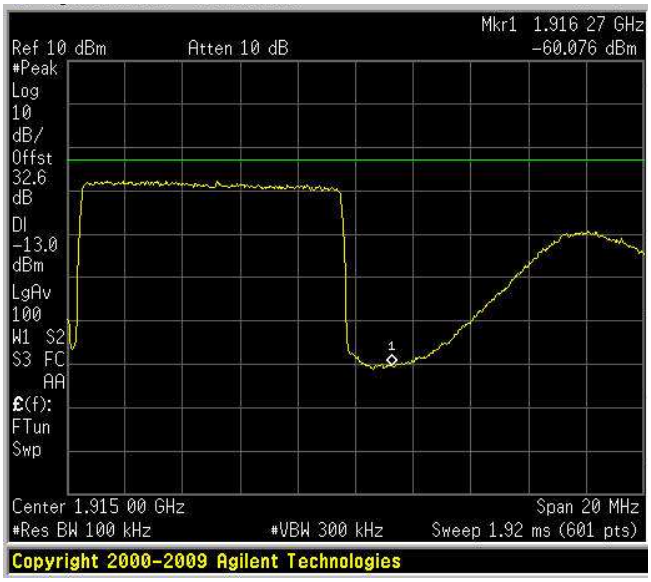


Test data, continued band edges:

Uplink – 10 QAM
LOW BAND EDGE

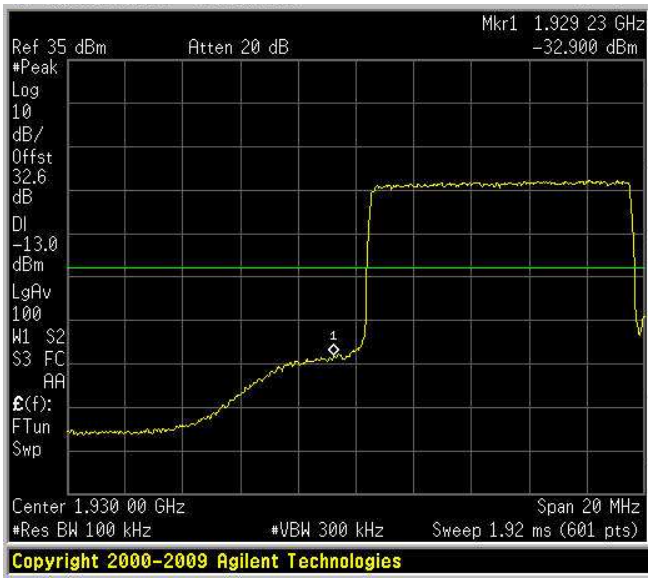


Uplink – 10 QAM
HIGH BAND EDGE

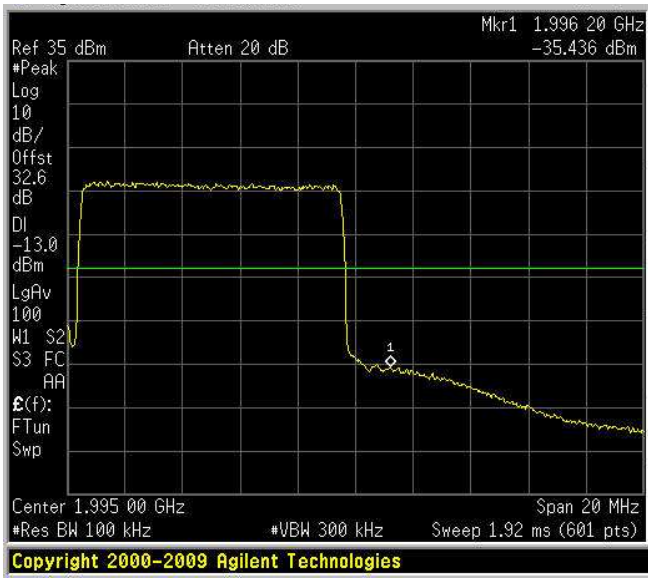


Test data, continued band edges:

Downlink – 10 QPSK
LOW BAND EDGE

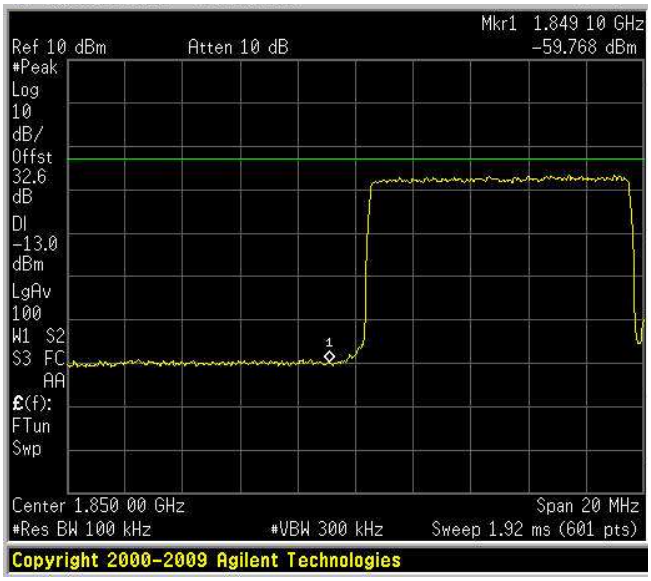


Downlink – 10 QPSK
HIGH BAND EDGE

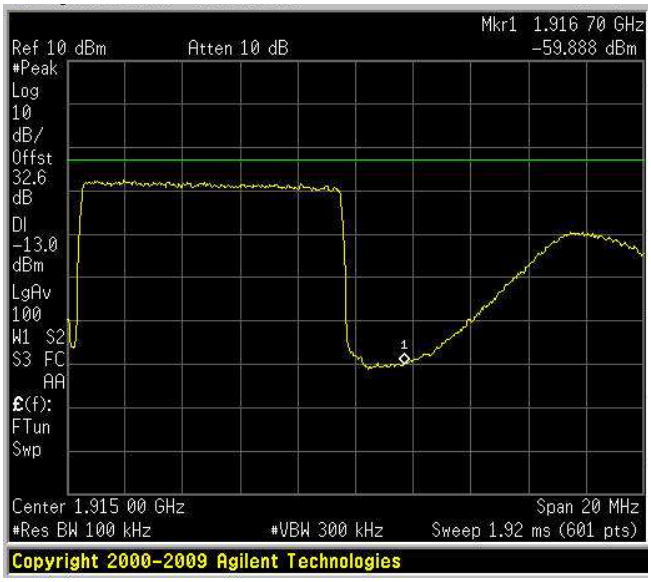


Test data, continued band edges:

Uplink – 10 QPSK
LOW BAND EDGE

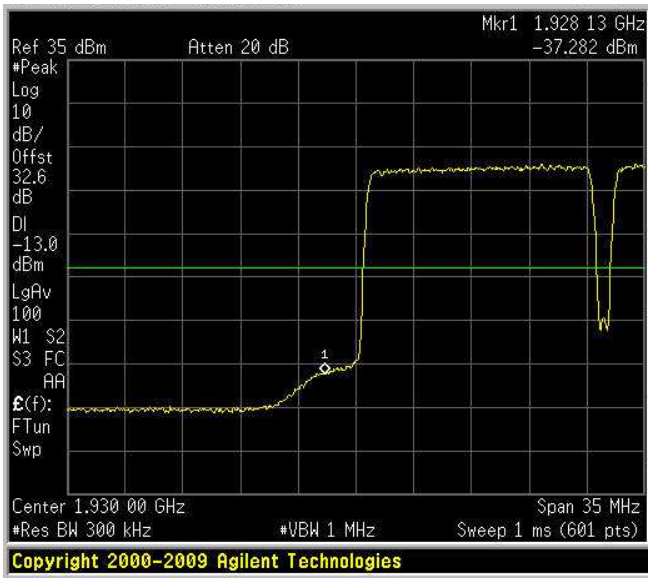


Uplink – 10 QPSK
HIGH BAND EDGE

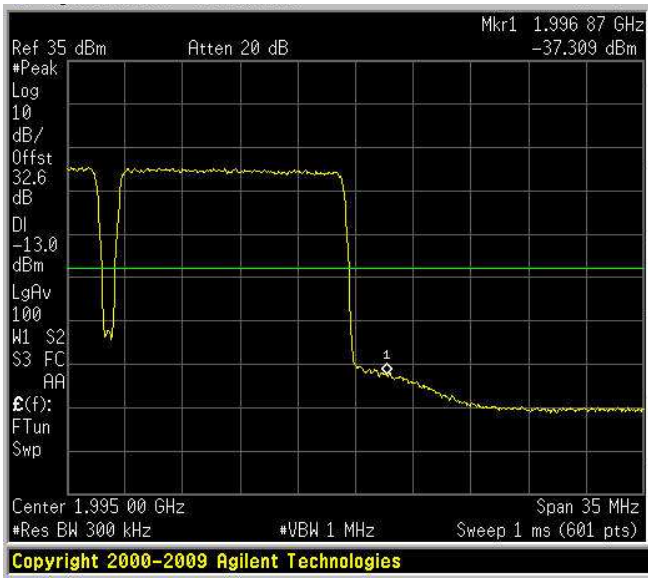


Test data, continued band edges:

Downlink – 15 QAM
LOW BAND EDGE

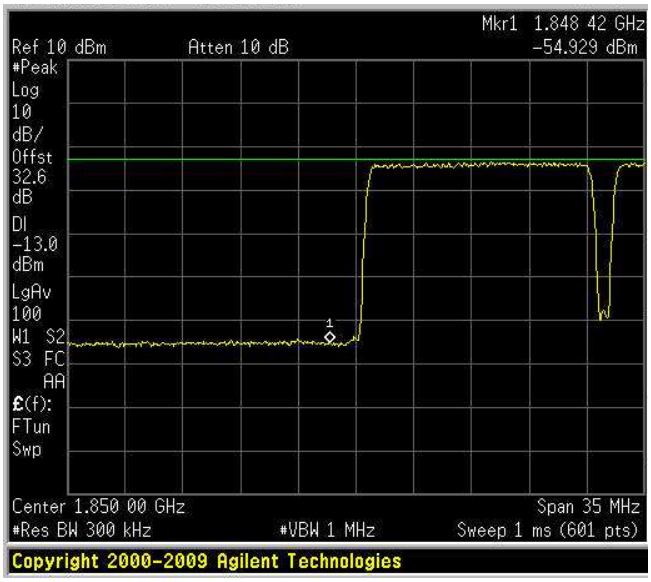


Downlink – 15 QAM
HIGH BAND EDGE



Test data, continued band edges:

Uplink – 15 QAM
LOW BAND EDGE



Uplink – 15 QAM
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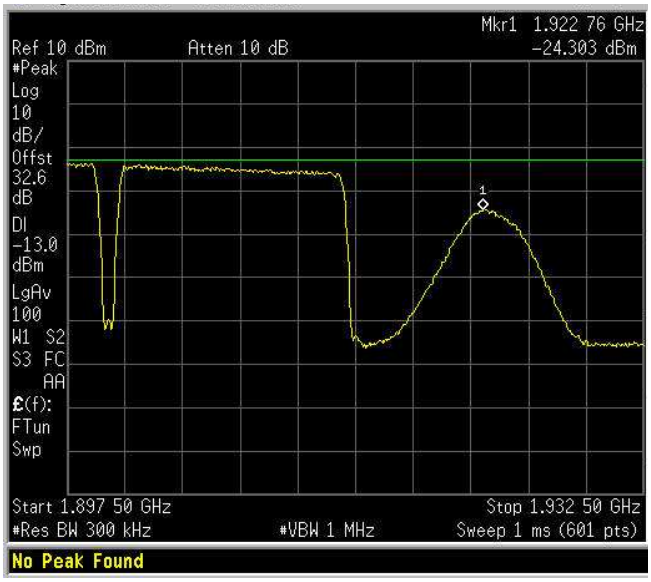
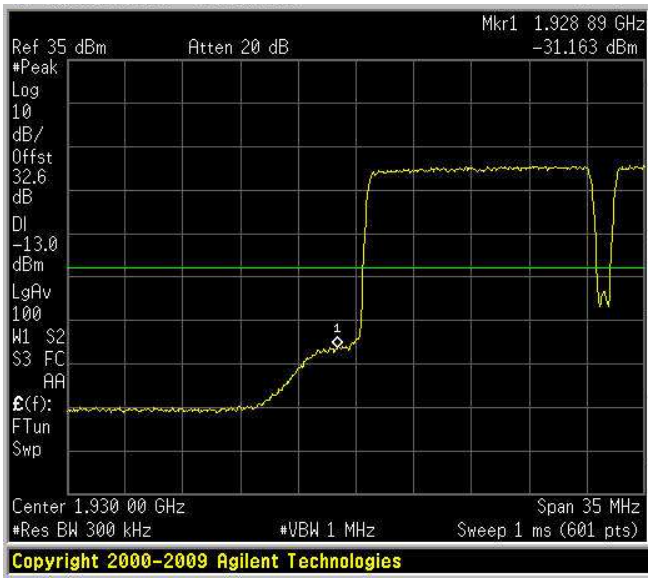
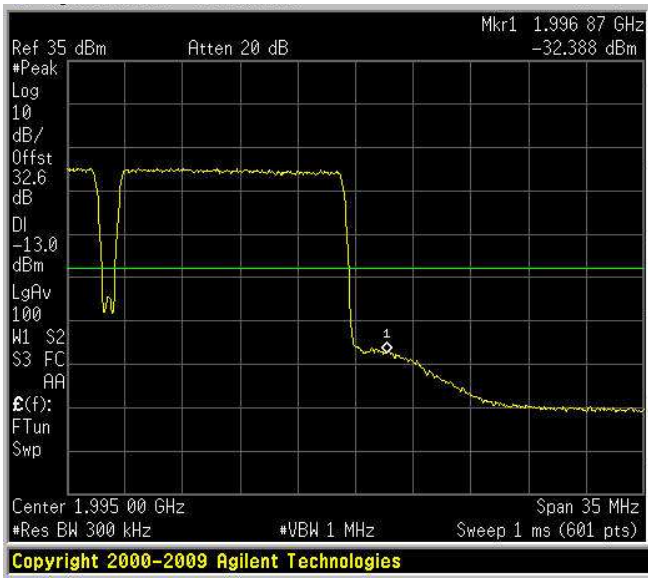


Test data, continued band edges:

Downlink – 15 QPSK
LOW BAND EDGE

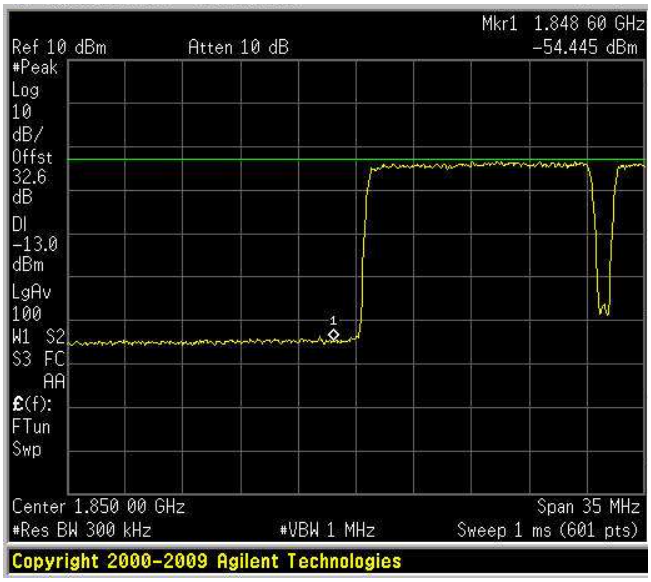


Downlink – 15 QPSK
HIGH BAND EDGE

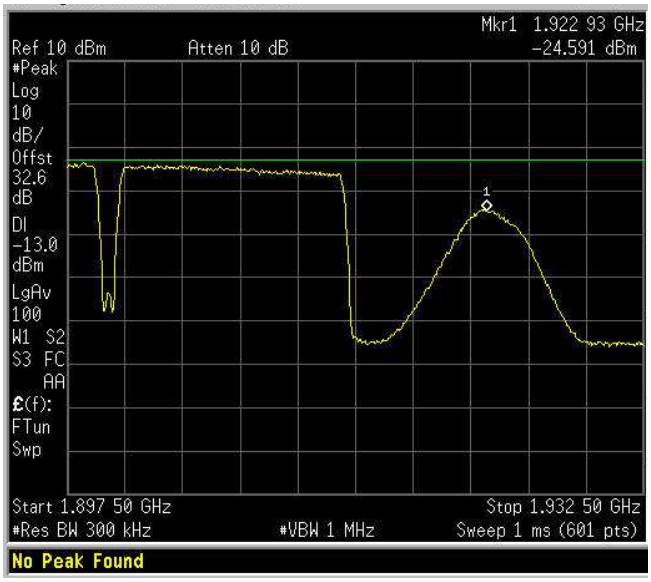


Test data, continued band edges:

Uplink – 15 QPSK
LOW BAND EDGE

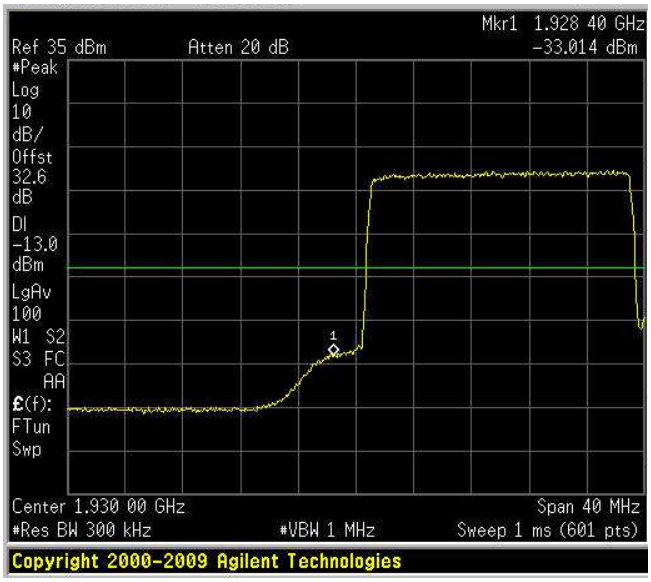


Uplink – 15 QPSK
HIGH BAND EDGE

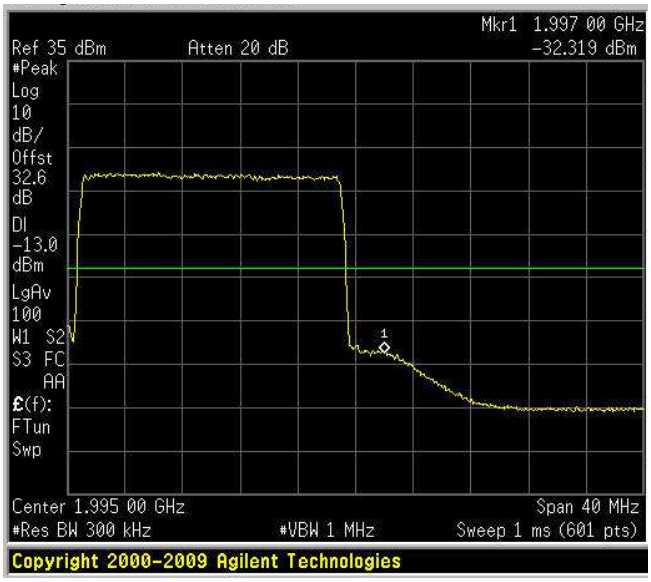


Test data, continued band edges:

Downlink – 20 QAM
LOW BAND EDGE

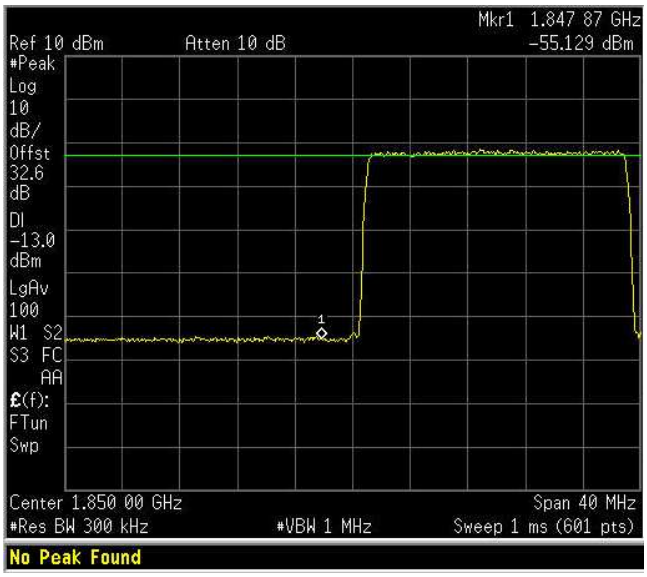


Downlink – 20 QAM
HIGH BAND EDGE

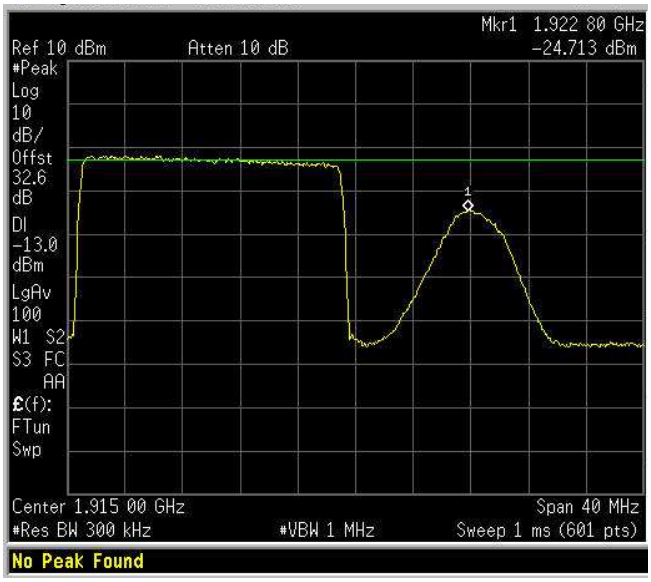


Test data, continued band edges:

Uplink – 20 QAM
LOW BAND EDGE

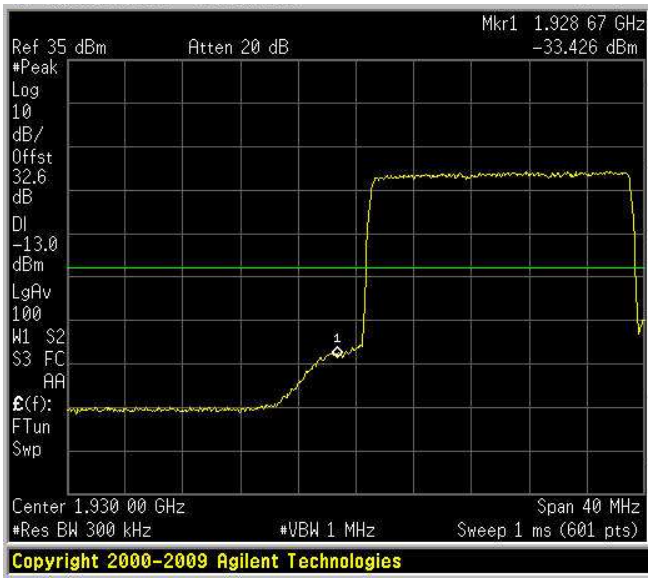


Uplink – 20 QAM
HIGH BAND EDGE

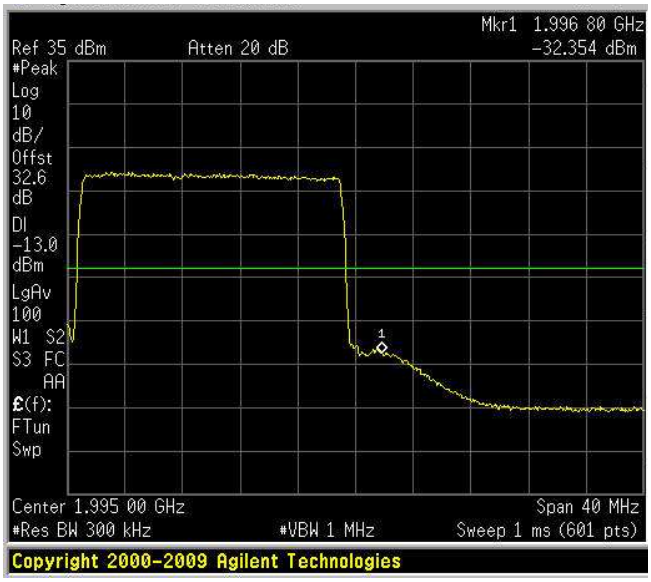


Test data, continued band edges:

Downlink – 20 QPSK
LOW BAND EDGE

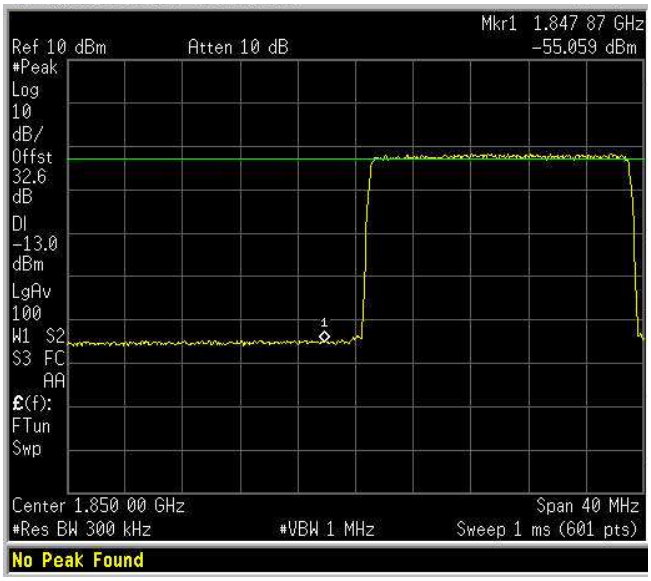


Downlink – 20 QPSK
HIGH BAND EDGE

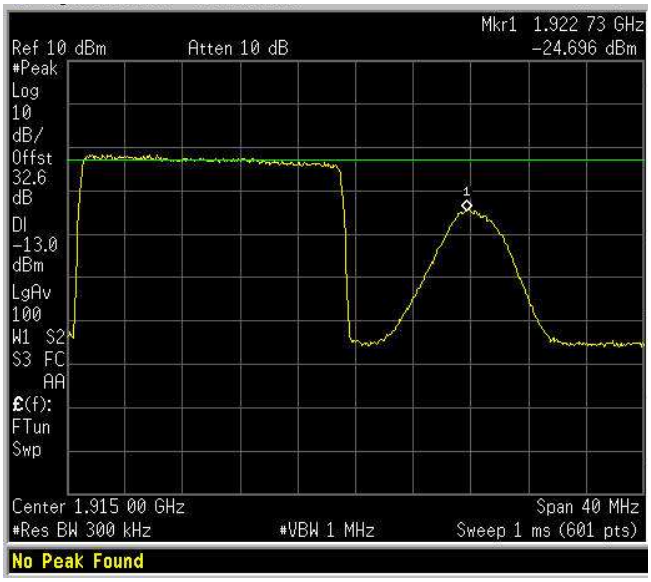


Test data, continued band edges:

Uplink – 20 QPSK
LOW BAND EDGE



Uplink – 20 QPSK
HIGH BAND EDGE



Clause 24.238(a) Field strength of spurious radiation

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

Frequency, MHz	Attenuation below carrier, dBc	ERP of spurious, dBm	Equivalent field strength limit* at 3 m, dBµV/m
30–10th harmonic	43 + 10 Log(P)	-13	84.4

* - Equivalent field strength limit was calculated from maximum allowed ERP of spurious as follows:

$E = \sqrt{\frac{30 \times P \times 1.64}{r}}$, where *P* is ERP in W, 1.64 is numeric gain of ideal dipole and *r* is antenna to EUT distance in m.

(b) *Measurement procedure.* Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (*i.e.* 1 MHz or 1 percent of emission bandwidth, as specified).

Test date: --

Test results: Pass: See test report 131640-2TRFEMC

Special notes

- The spectrum was searched from 30 MHz up to 10th harmonic
- The EUT was measured on three orthogonal axis.
- All measurements were performed at a distance of 3 m.
- Only the worst data presented in the test report.
- The EUT's antenna port was terminated with 50 Ω termination.

Clause 24.235 Frequency stability

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Assigned frequency, MHz	Limits
1850.2	26 dBc points including frequency drift shall remain within the authorized frequency block
1880.0	
1909.8	

Test date: --

Test results: NOT APPLICABLE (Modulation & frequency conversion circuitry not in use)

Special notes

The resolution bandwidth was set to 100 kHz, video bandwidth was set to 100 kHz

Clause 24.235 Frequency stability, continued

Test data

Conditions	Frequency (Hz)	Maximum drift (Hz)
+50 °C, Nominal power		
+40 °C, Nominal power		
+30 °C, Nominal power		
+20 °C, +10% power		
+20 °C, Nominal power		*Reference*
+20 °C, −10% power		
+10 °C, Nominal power		
0 °C, Nominal power		
−10 °C, Nominal power		
−20 °C, Nominal power		

Clause Para NO. 2-11-04/EAB/RF Filter Frequency Response

Test date: 2009-09-28, t.r 131640-2TRFEMC.

Test results: Pass, see previous test report 131640-2TRFEMC

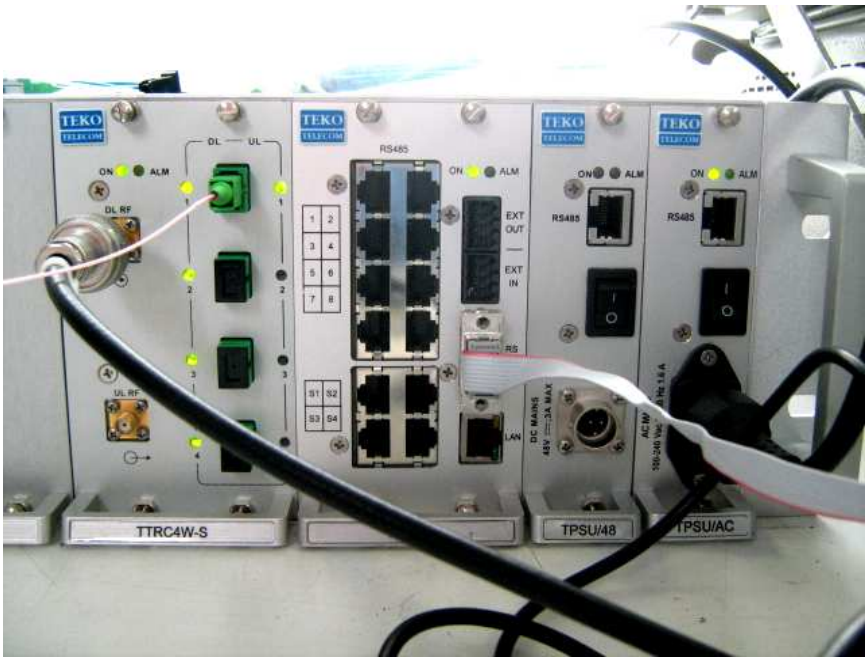
Photo Set up

Photo EUT

REMOTE

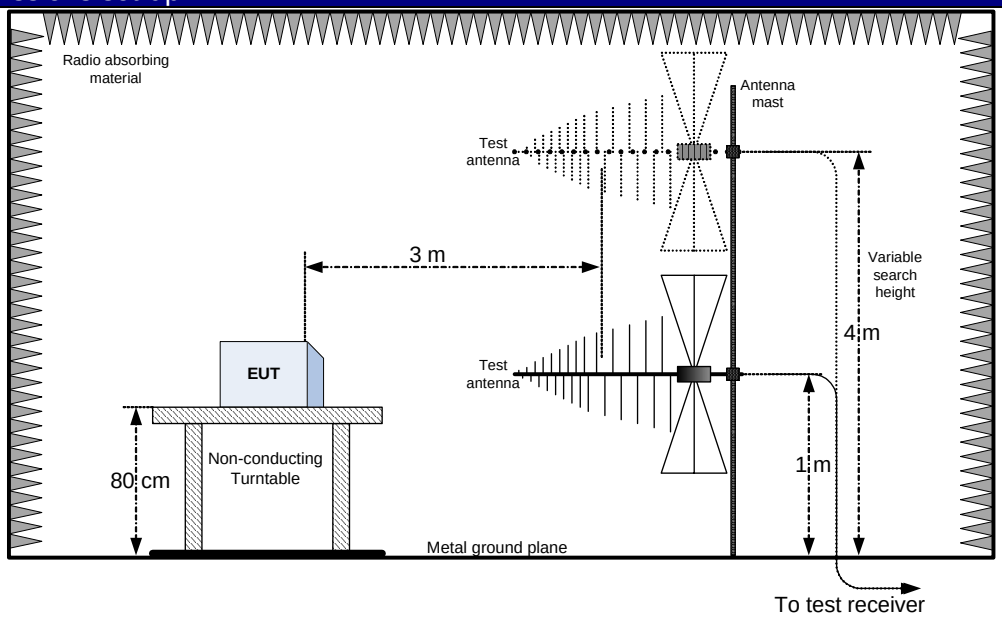
MASTER


28V ⎓ ; 10A MAX
+ −
RS485


TEKO
DL
UL
ON
ALM
DL RF
UL RF
RS485
EXT OUT
EXT IN
LAN
TTRC4W-S
TPSU/48
TPSU/AC

Appendix B: Block diagrams of test set-ups

Radiated emissions set-up



Substitution method set-up