

3.6 Conducted Spurious Emission Measurement

3.6.1 Description of Conducted Spurious Emission Measurement

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

For Band 7

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least $55 + 10 \log (P)$ dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 30MHz up to a frequency including its 10th harmonic.

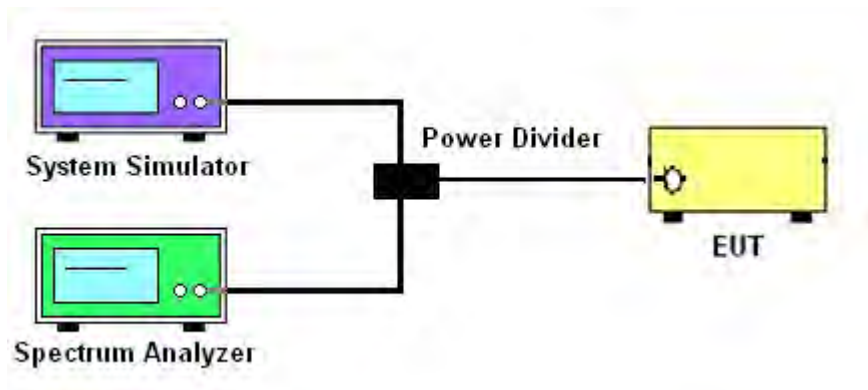
3.6.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.6.3 Test Procedures

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.
The path loss was compensated to the results for each measurement.
3. The middle channel for the highest RF power within the transmitting frequency was measured.
4. The conducted spurious emission for the whole frequency range was taken.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
7. The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)
 $= P(W) - [43 + 10\log(P)]$ (dB)
 $= [30 + 10\log(P)]$ (dBm) - $[43 + 10\log(P)]$ (dB)
 $= -13$ dBm.
8. For Band 7
The limit line is derived from $55 + 10\log(P)$ dB below the transmitter power P(Watts)
 $= P(W) - [55 + 10\log(P)]$ (dB)
 $= [30 + 10\log(P)]$ (dBm) - $[55 + 10\log(P)]$ (dB)
 $= -25$ dBm.

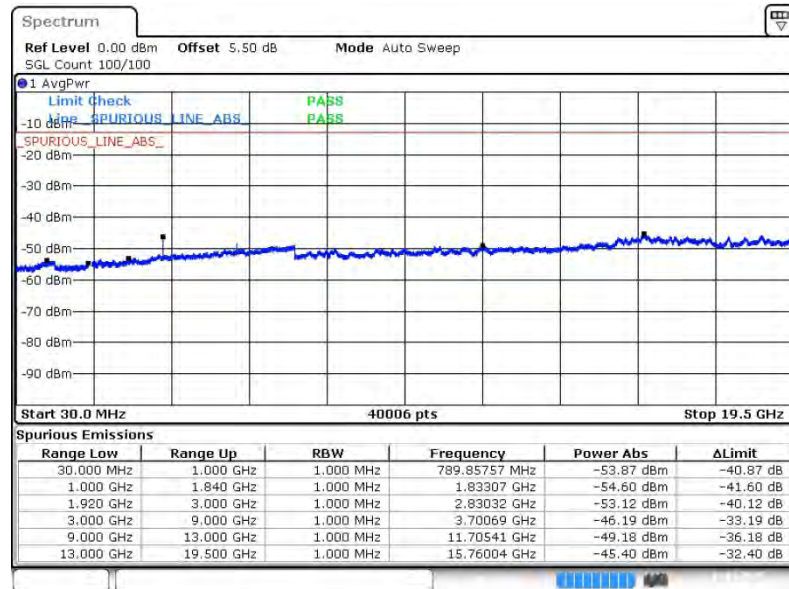
3.6.4 Test Setup



3.6.5 Test Result (Plots) of Conducted Spurious Emission

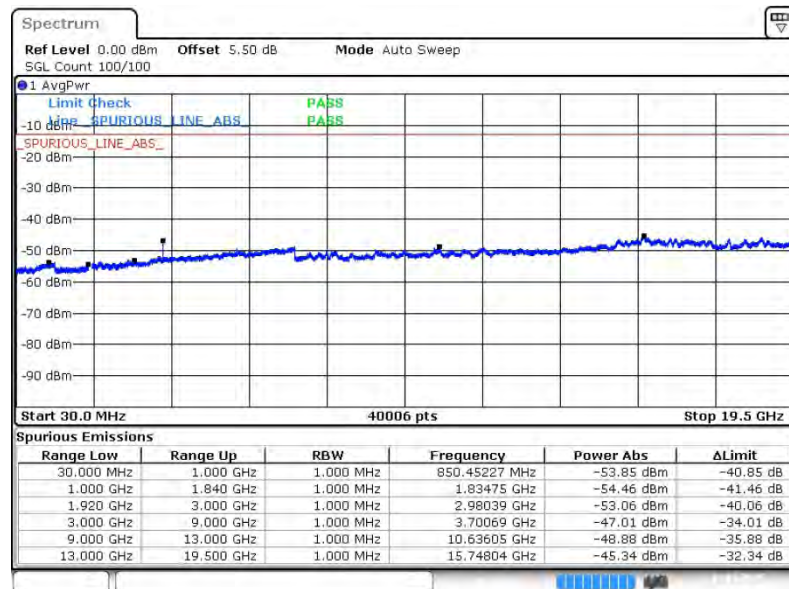
Band :	LTE Band 2	Channel :	CH18607 (Low)
Band Width :	1.4MHz		

QPSK (RB Size 1, RB Offset 2)



Date: 12 JAN 2015 22:34:09

16QAM (RB Size 1, RB Offset 0)

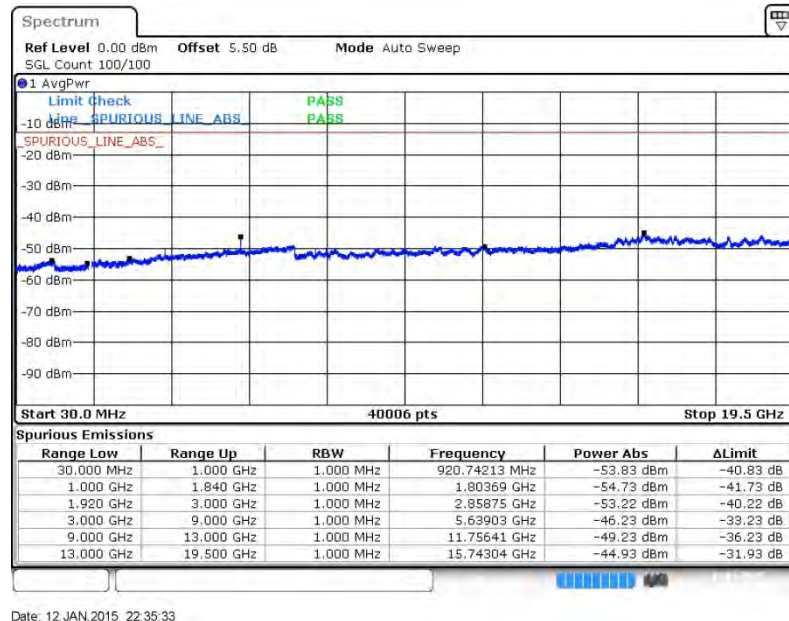


Date: 12 JAN 2015 22:31:59

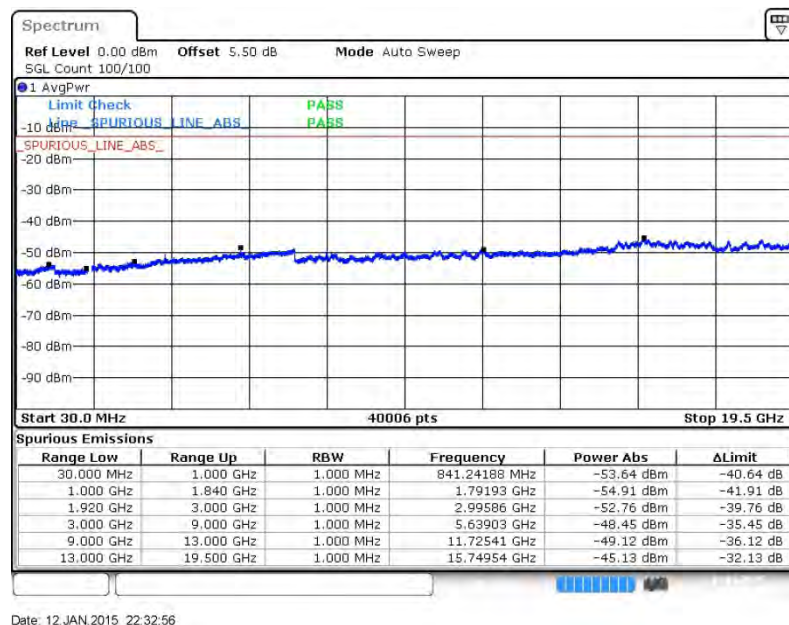


Band :	LTE Band 2	Channel :	CH18900 (Middle)
Band Width :	1.4MHz		

QPSK (RB Size 1, RB Offset 5)



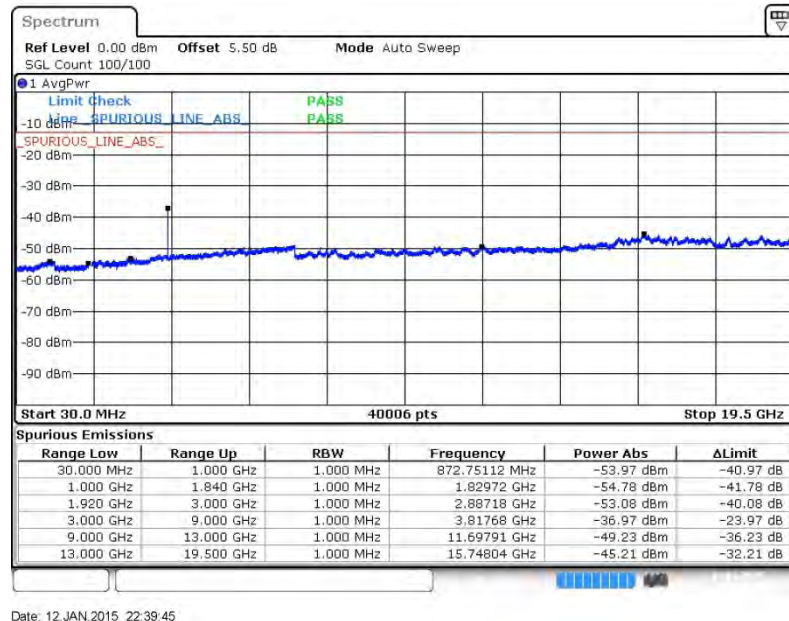
16QAM (RB Size 1, RB Offset 2)



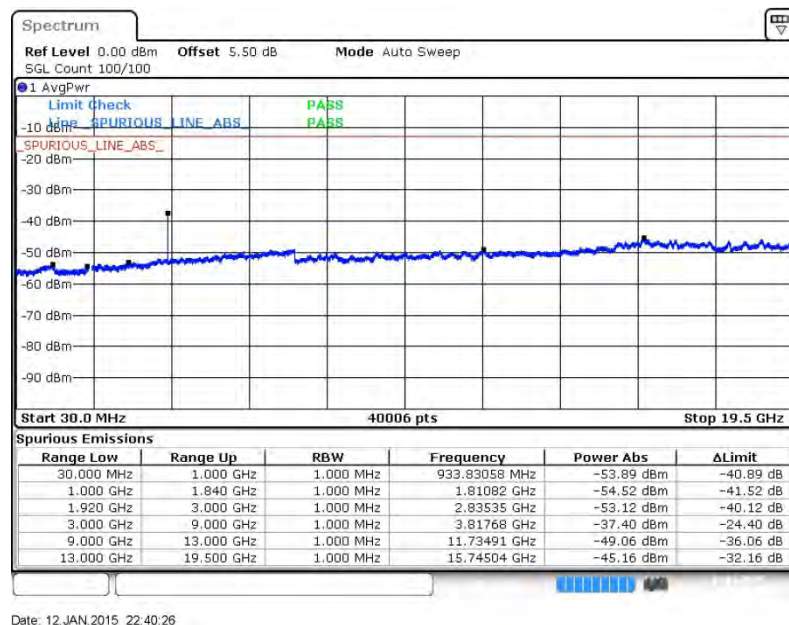


Band :	LTE Band 2	Channel :	CH19193 (High)
Band Width :	1.4MHz		

QPSK (RB Size 3, RB Offset 2)



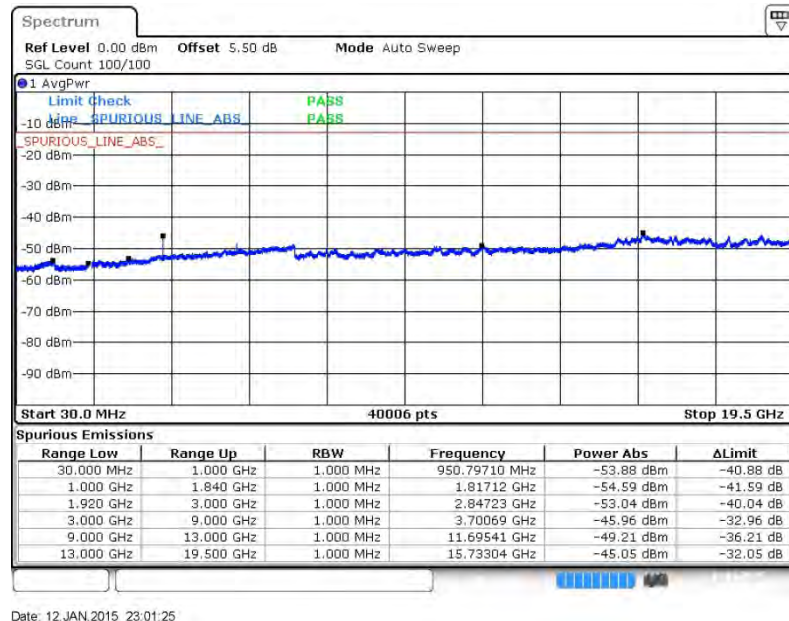
16QAM (RB Size 3, RB Offset 2)



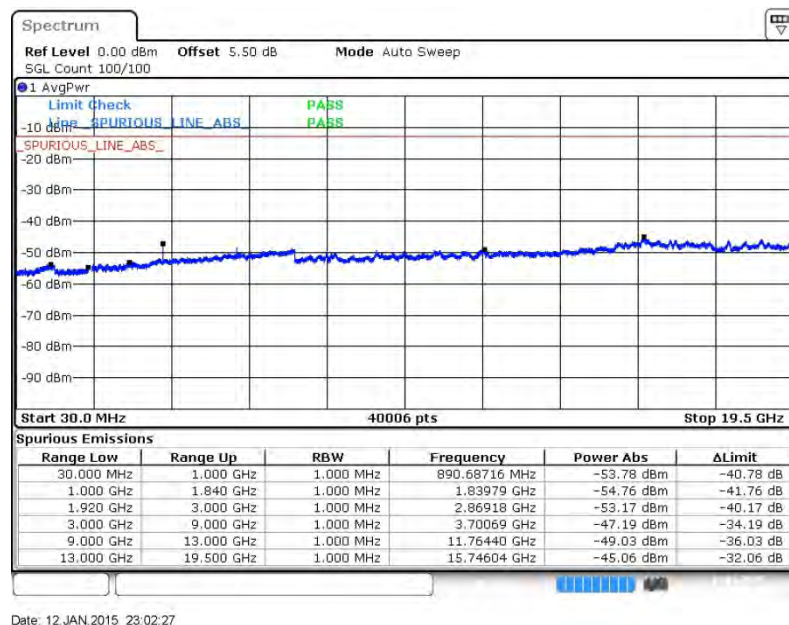


Band :	LTE Band 2	Channel :	CH18615 (Low)
Band Width :	3MHz		

QPSK (RB Size 1, RB Offset 7)



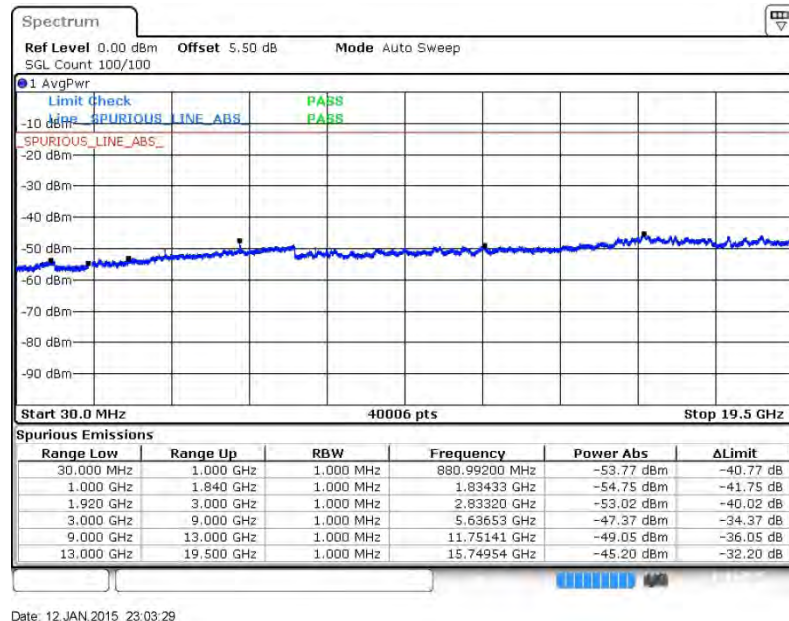
16QAM (RB Size 1, RB Offset 0)



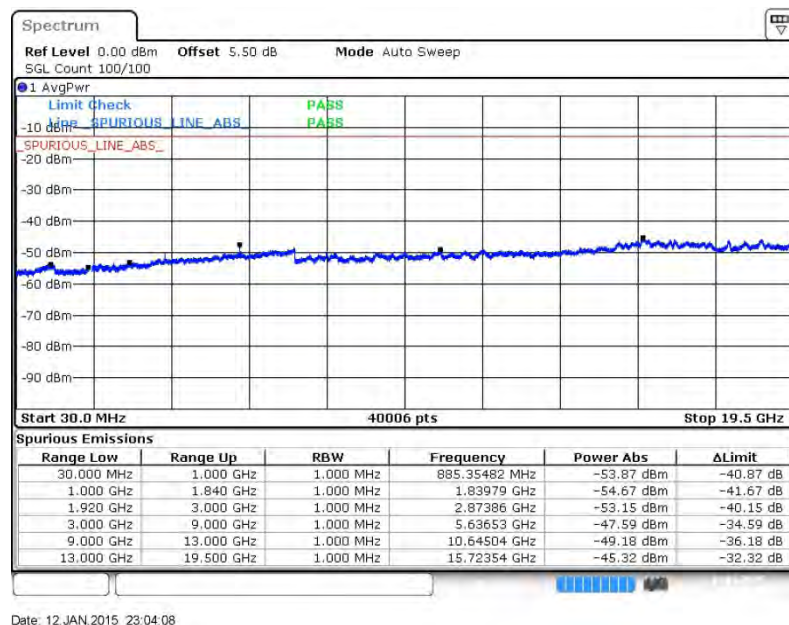


Band :	LTE Band 2	Channel :	CH18900 (Middle)
Band Width :	3MHz		

QPSK (RB Size 1, RB Offset 14)



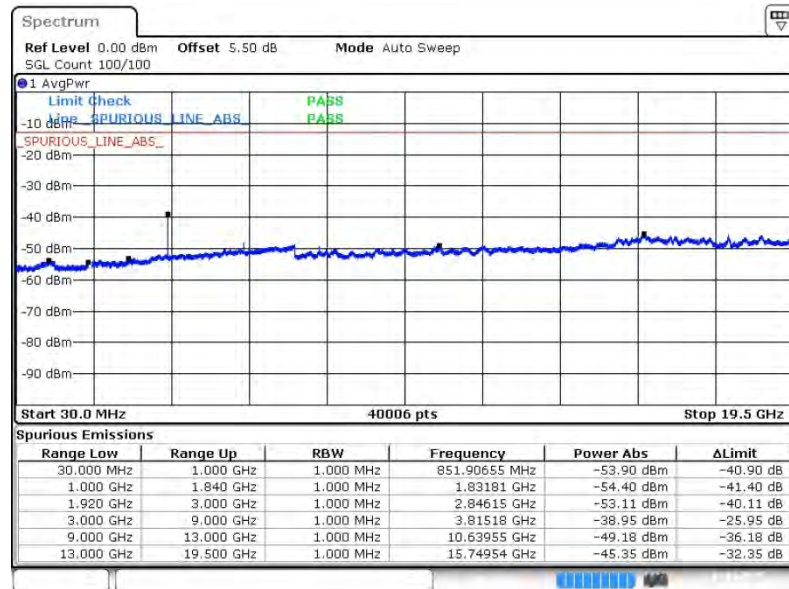
16QAM (RB Size 1, RB Offset 14)



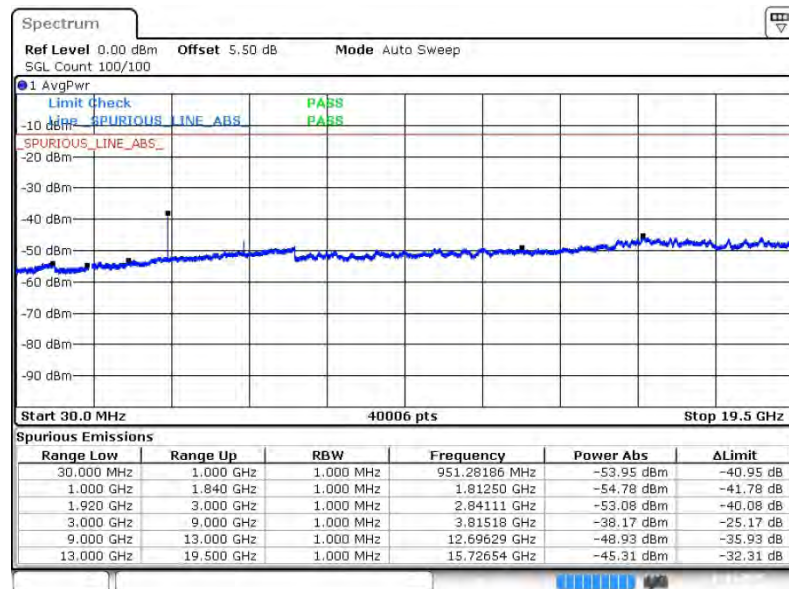


Band :	LTE Band 2	Channel :	CH19185 (High)
Band Width :	3MHz		

QPSK (RB Size 1, RB Offset 0)

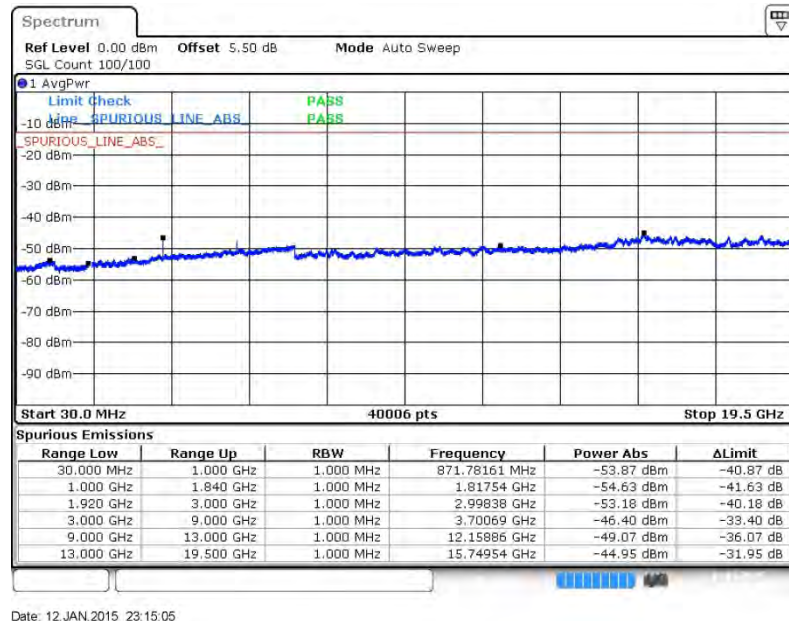
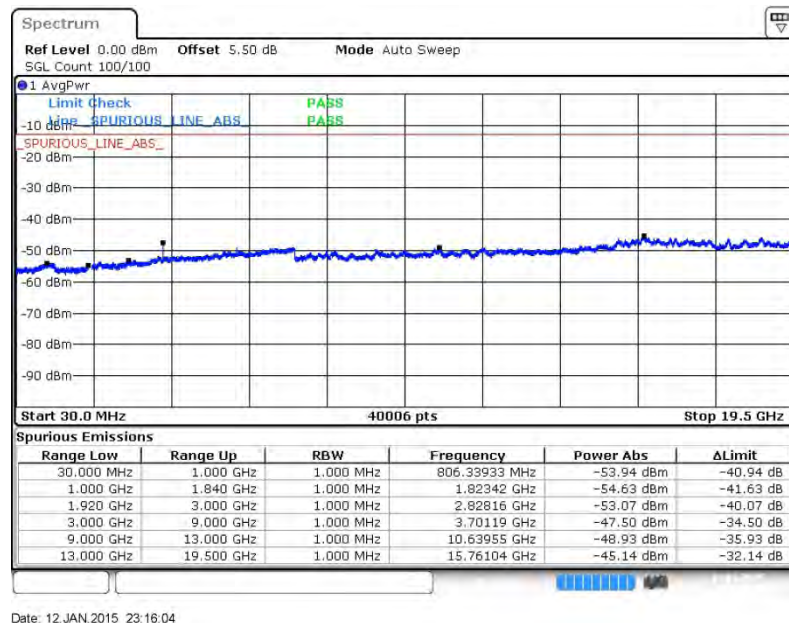


16QAM (RB Size 1, RB Offset 0)





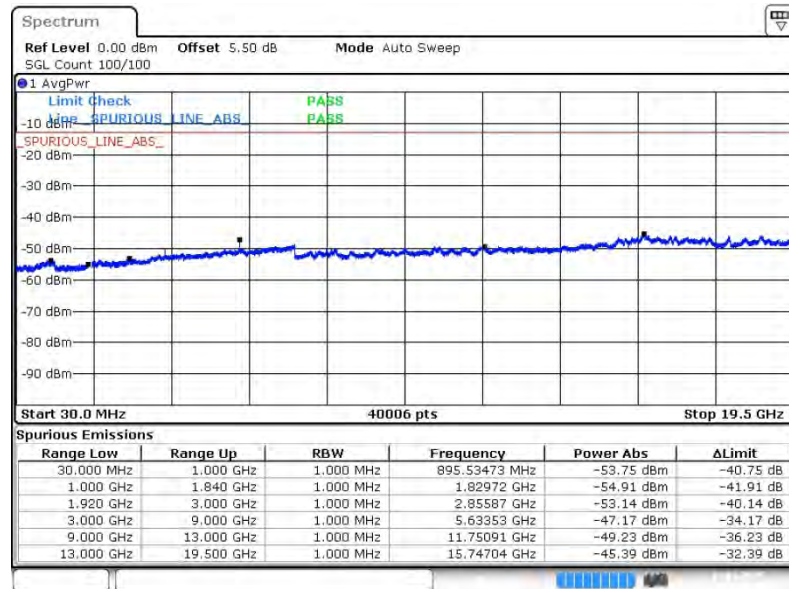
Band :	LTE Band 2	Channel :	CH18625 (Low)
Band Width :	5MHz		

QPSK (RB Size 1, RB Offset 0)**16QAM (RB Size 1, RB Offset 12)**

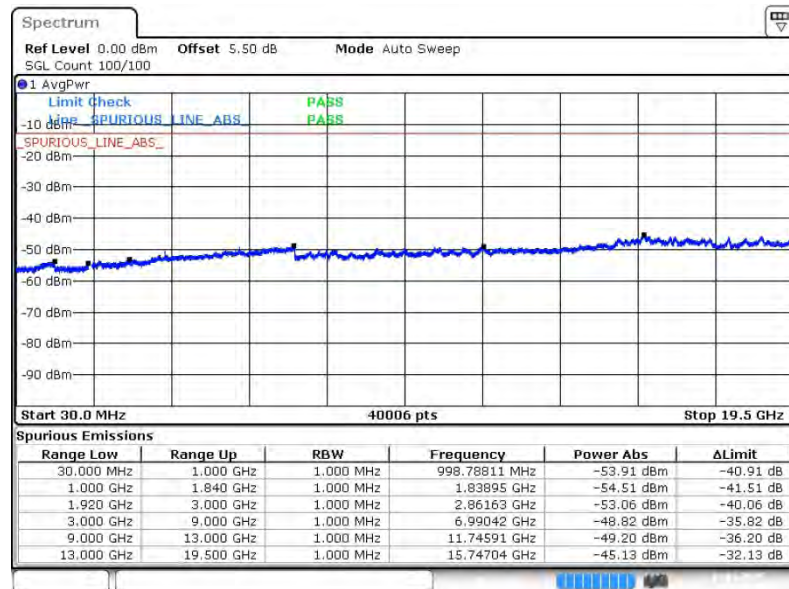


Band :	LTE Band 2	Channel :	CH18900 (Middle)
Band Width :	5MHz		

QPSK (RB Size 1, RB Offset 0)



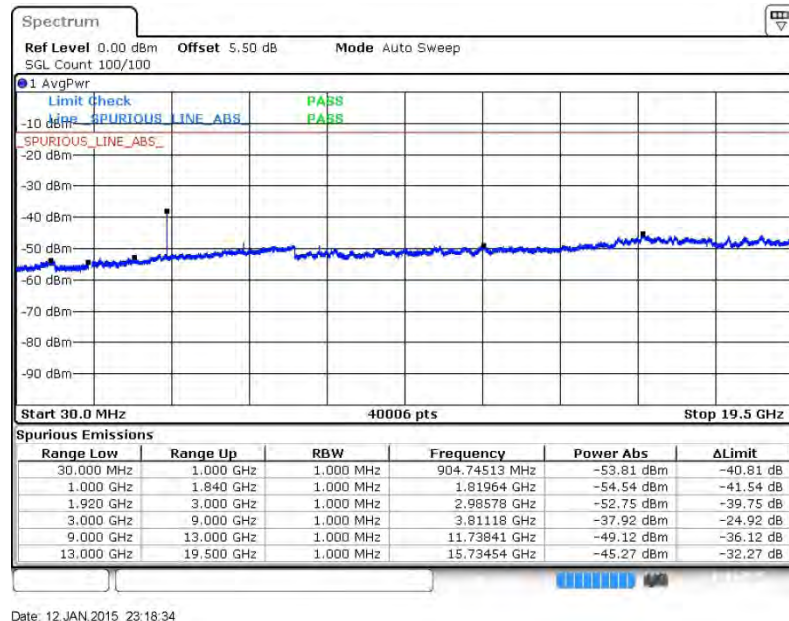
16QAM (RB Size 1, RB Offset 0)



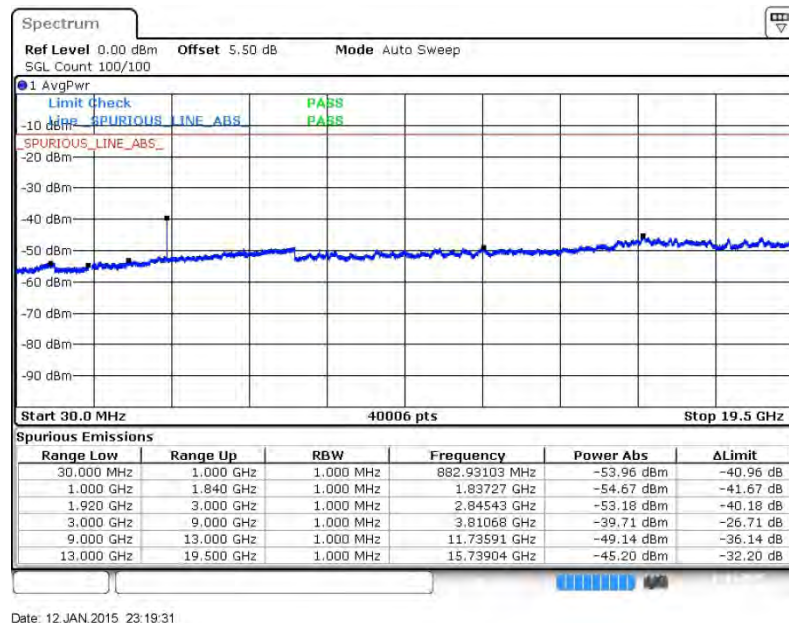


Band :	LTE Band 2	Channel :	CH19175 (High)
Band Width :	5MHz		

QPSK (RB Size 1, RB Offset 24)

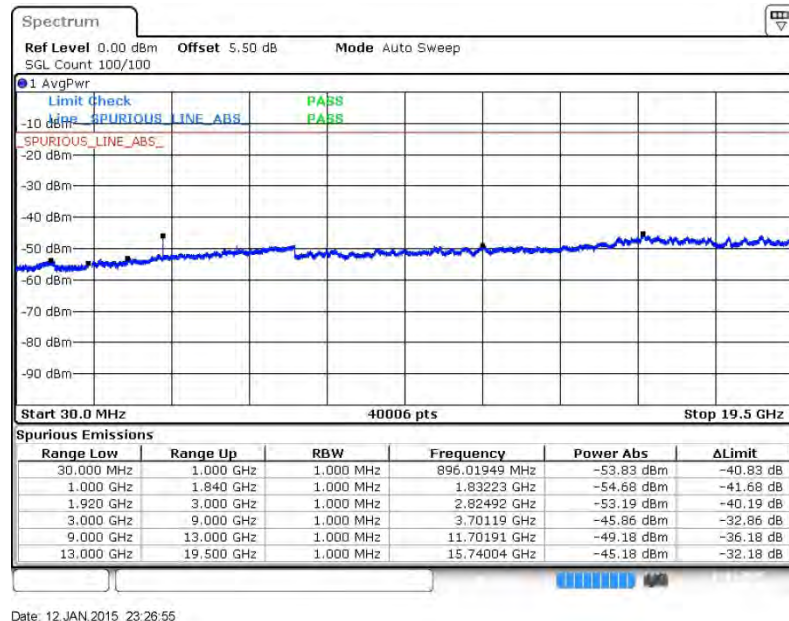


16QAM (RB Size 1, RB Offset 12)

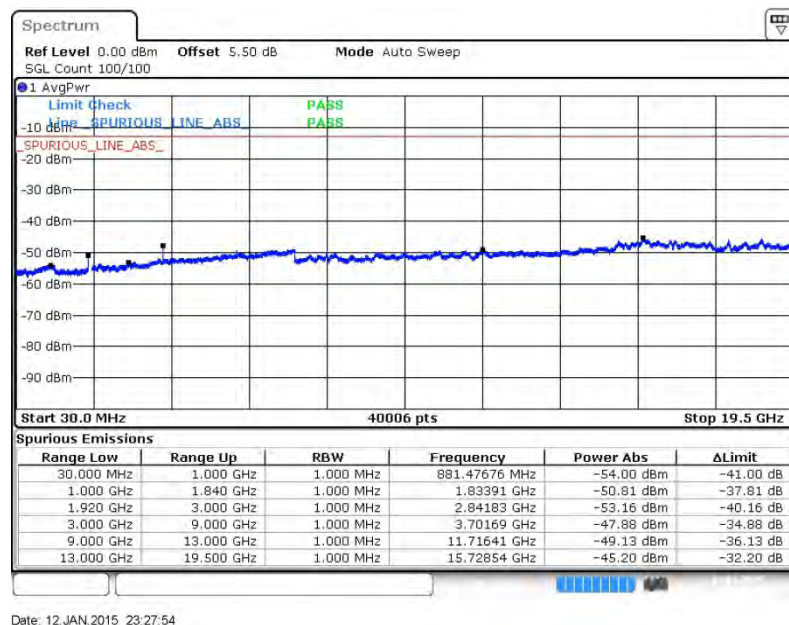


Band :	LTE Band 2	Channel :	CH18650 (Low)
Band Width :	10MHz		

QPSK (RB Size 1, RB Offset 0)



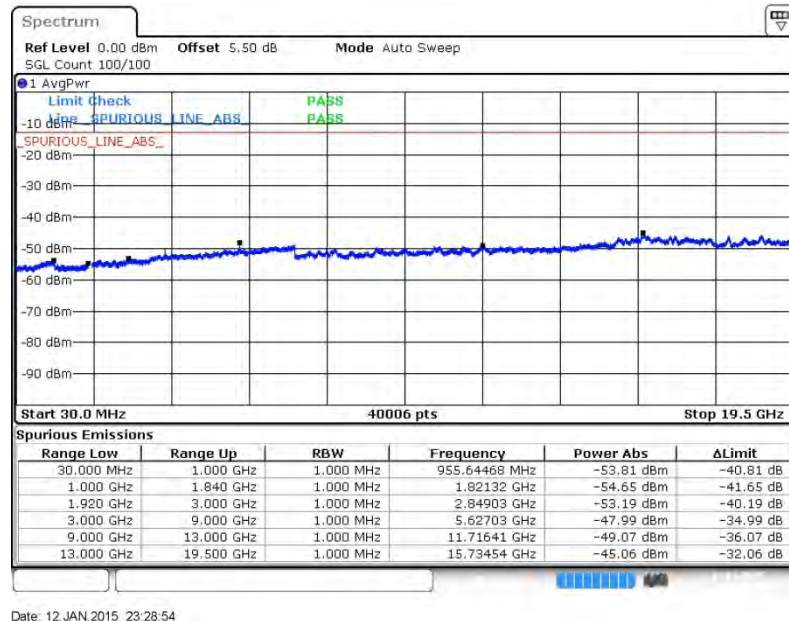
16QAM (RB Size 1, RB Offset 0)



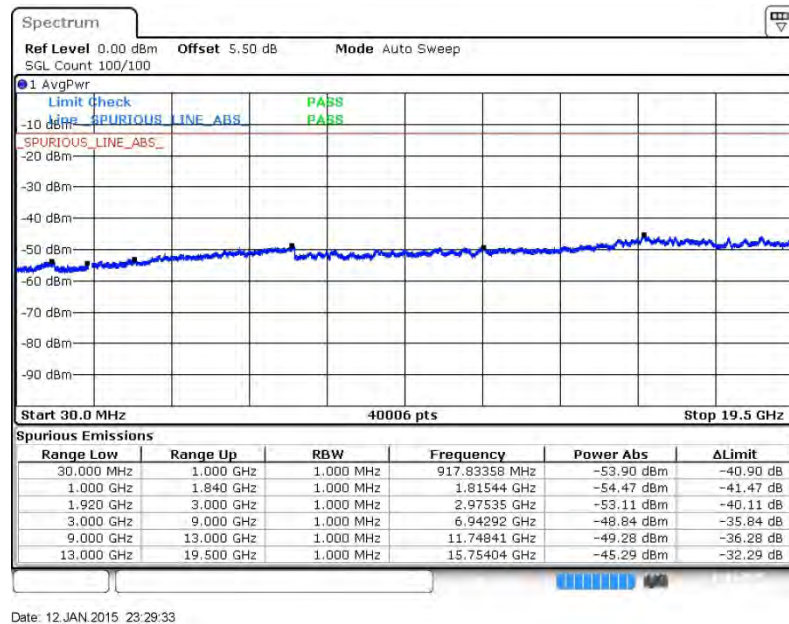


Band :	LTE Band 2	Channel :	CH18900 (Middle)
Band Width :	10MHz		

QPSK (RB Size 1, RB Offset 0)



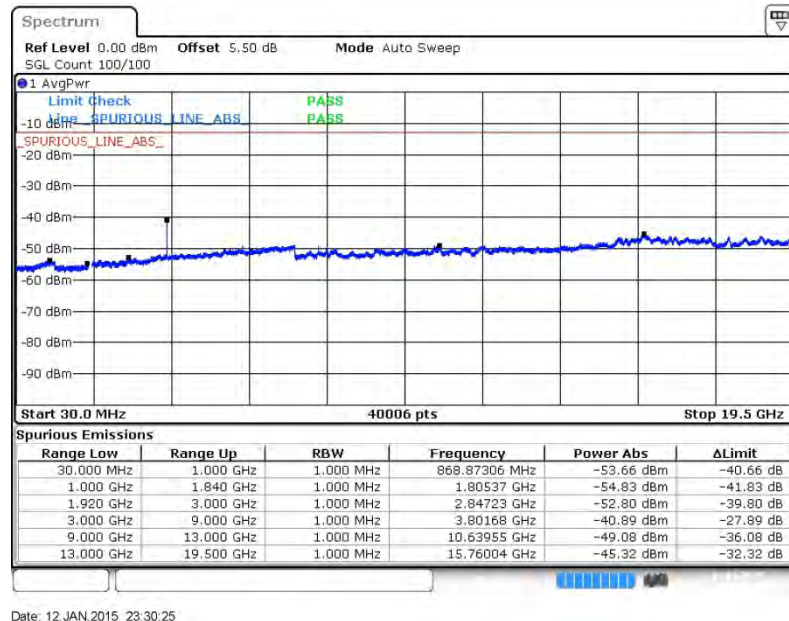
16QAM (RB Size 1, RB Offset 0)



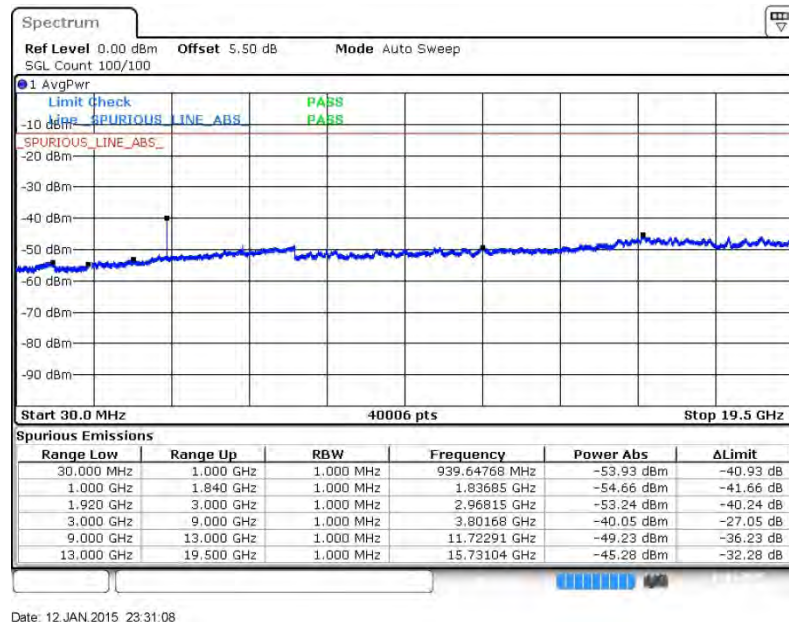


Band :	LTE Band 2	Channel :	CH19150 (High)
Band Width :	10MHz		

QPSK (RB Size 1, RB Offset 49)



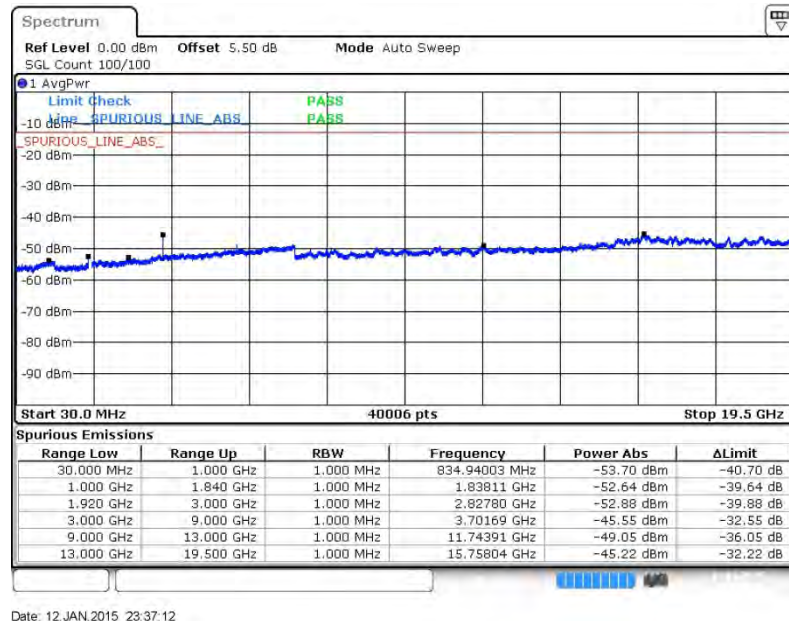
16QAM (RB Size 1, RB Offset 24)



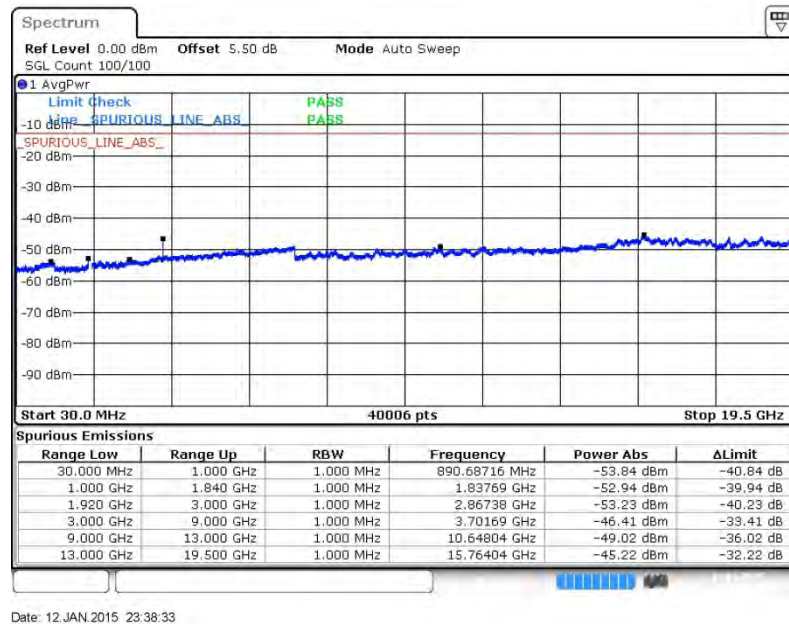


Band :	LTE Band 2	Channel :	CH18675 (Low)
Band Width :	15MHz		

QPSK (RB Size 1, RB Offset 0)



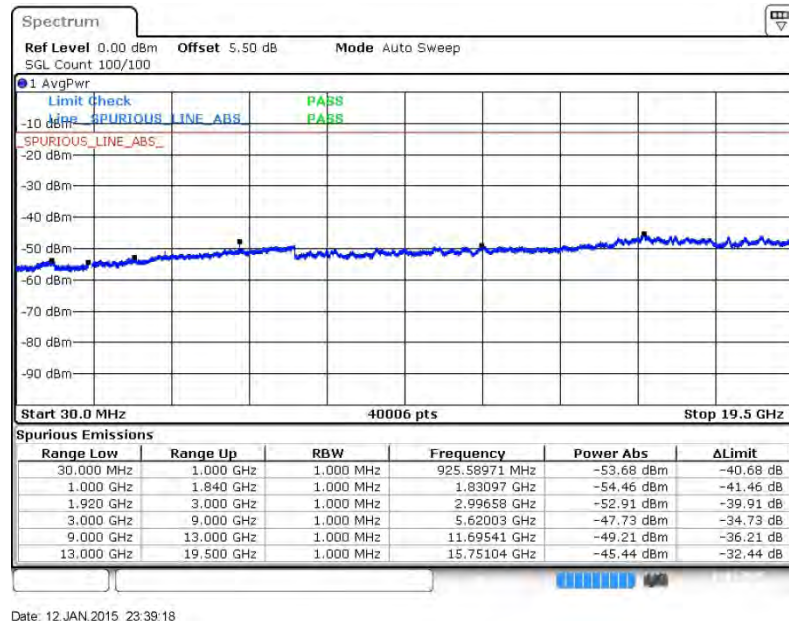
16QAM (RB Size 1, RB Offset 0)



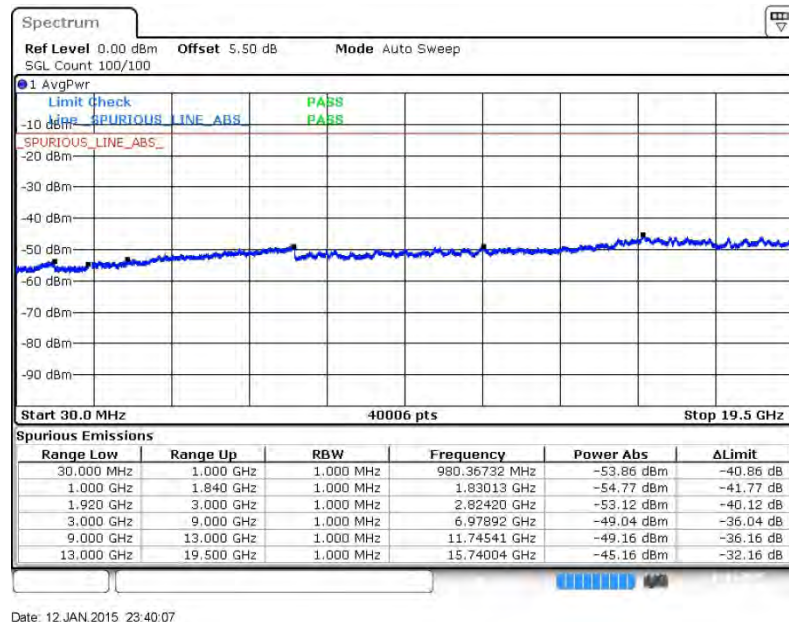


Band :	LTE Band 2	Channel :	CH18900 (Middle)
Band Width :	15MHz		

QPSK (RB Size 1, RB Offset 0)



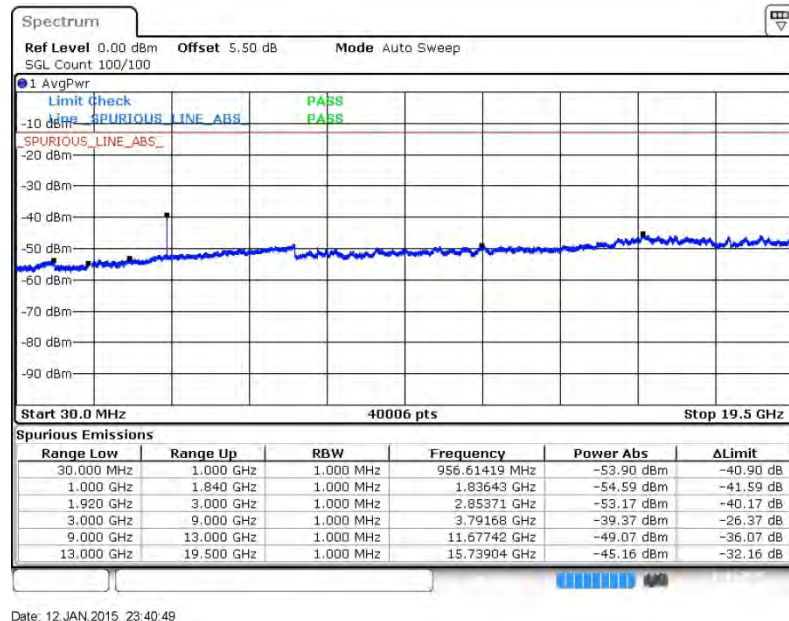
16QAM (RB Size 1, RB Offset 0)



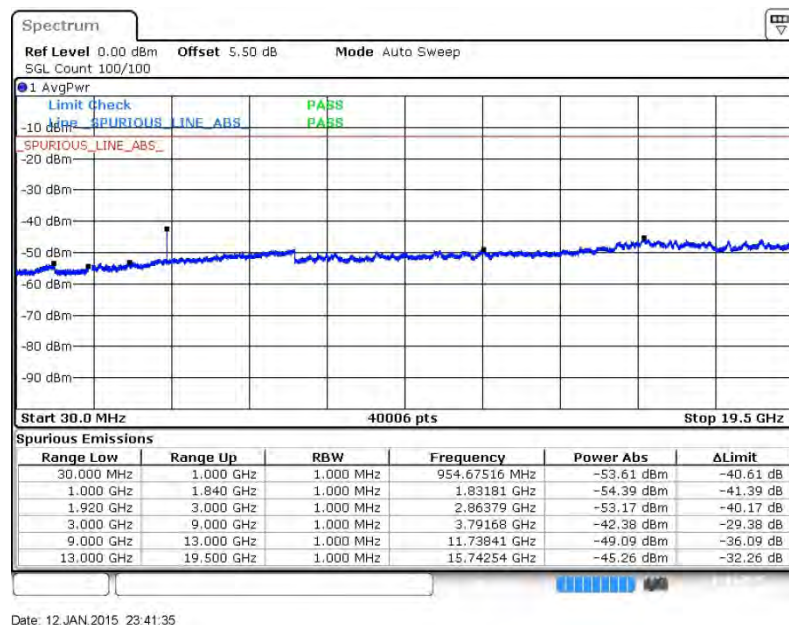


Band :	LTE Band 2	Channel :	CH19125 (High)
Band Width :	15MHz		

QPSK (RB Size 1, RB Offset 74)



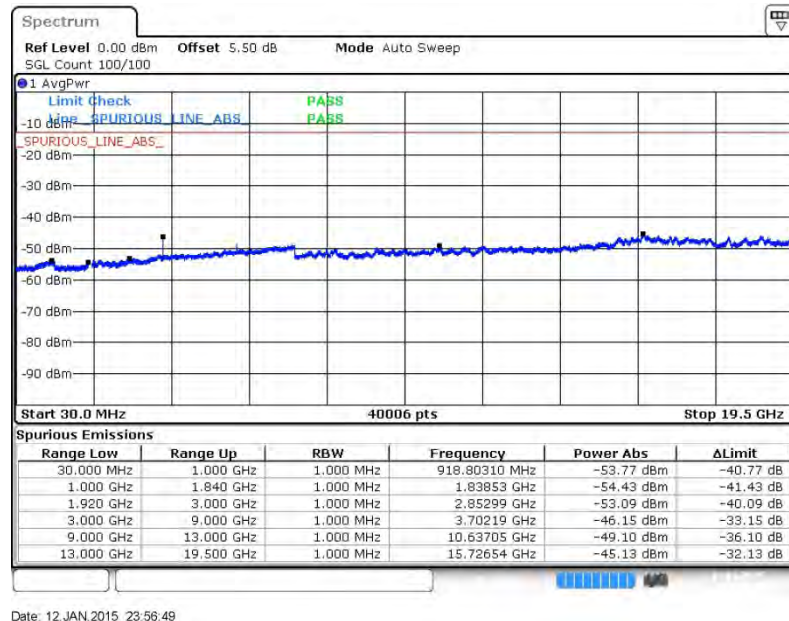
16QAM (RB Size 1, RB Offset 74)



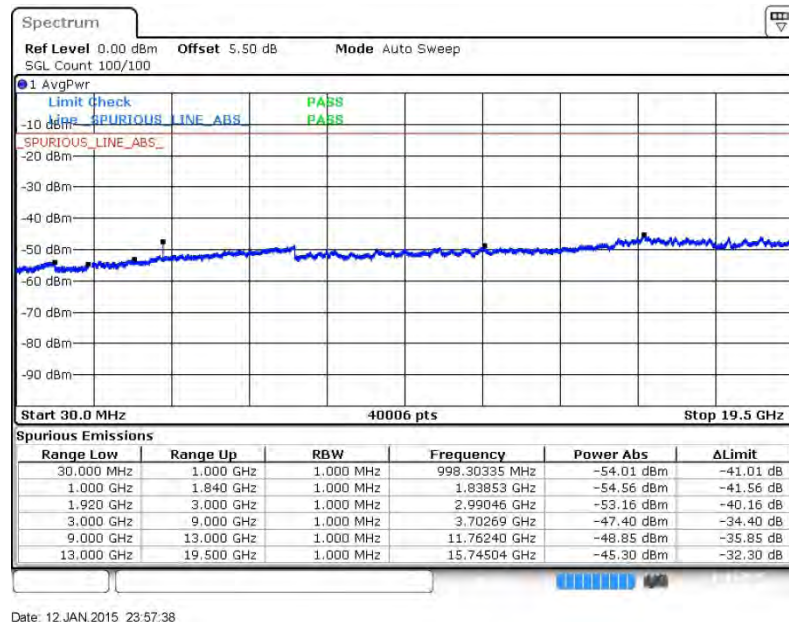


Band :	LTE Band 2	Channel :	CH18700 (Low)
Band Width :	20MHz		

QPSK (RB Size 1, RB Offset 0)



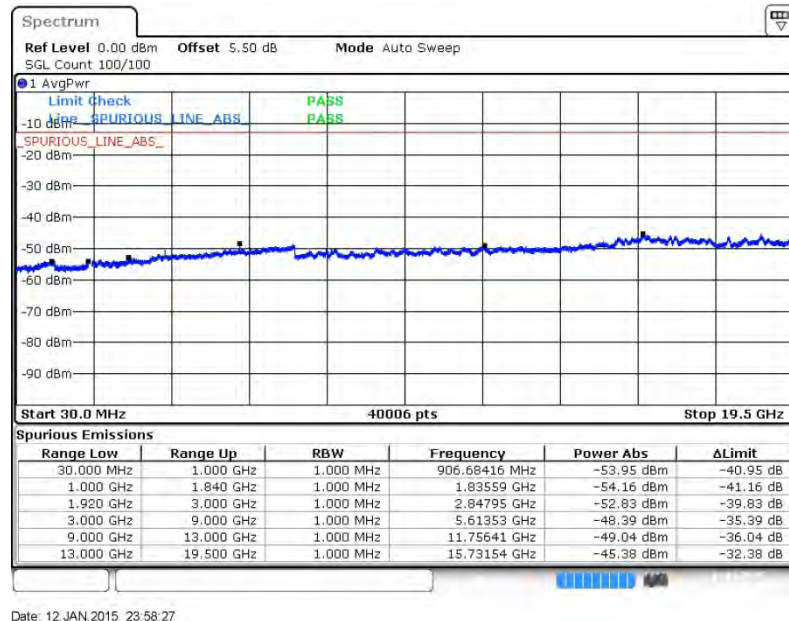
16QAM (RB Size 1, RB Offset 0)



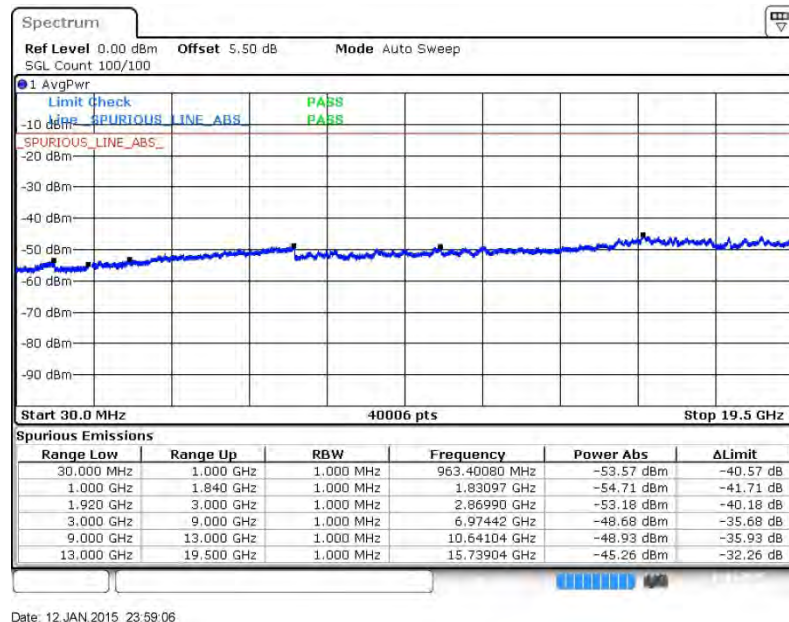


Band :	LTE Band 2	Channel :	CH18900 (Middle)
Band Width :	20MHz		

QPSK (RB Size 1, RB Offset 0)



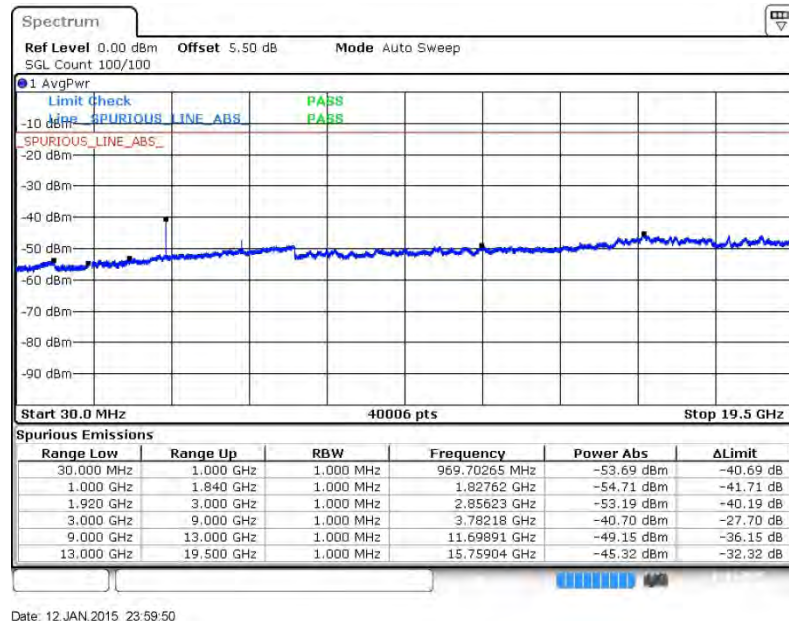
16QAM (RB Size 1, RB Offset 0)



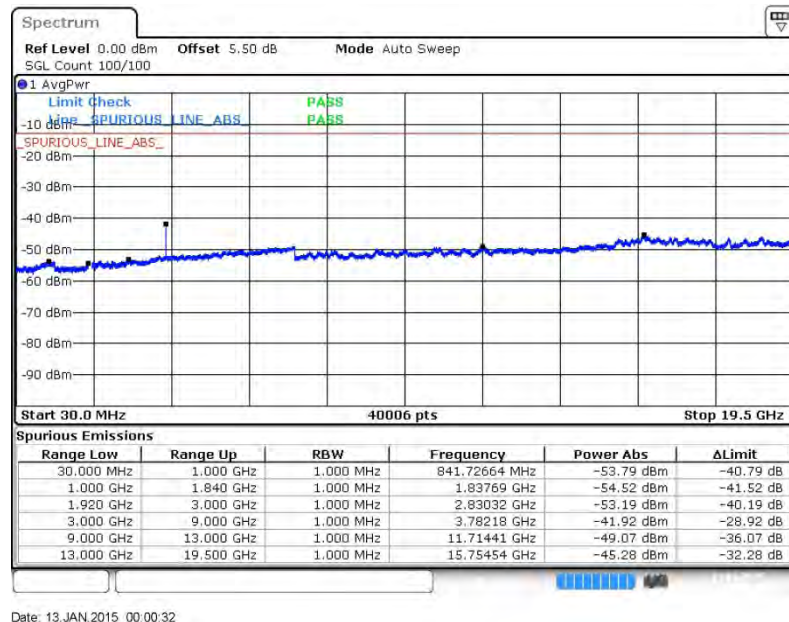


Band :	LTE Band 2	Channel :	CH19100 (High)
Band Width :	20MHz		

QPSK (RB Size 1, RB Offset 0)



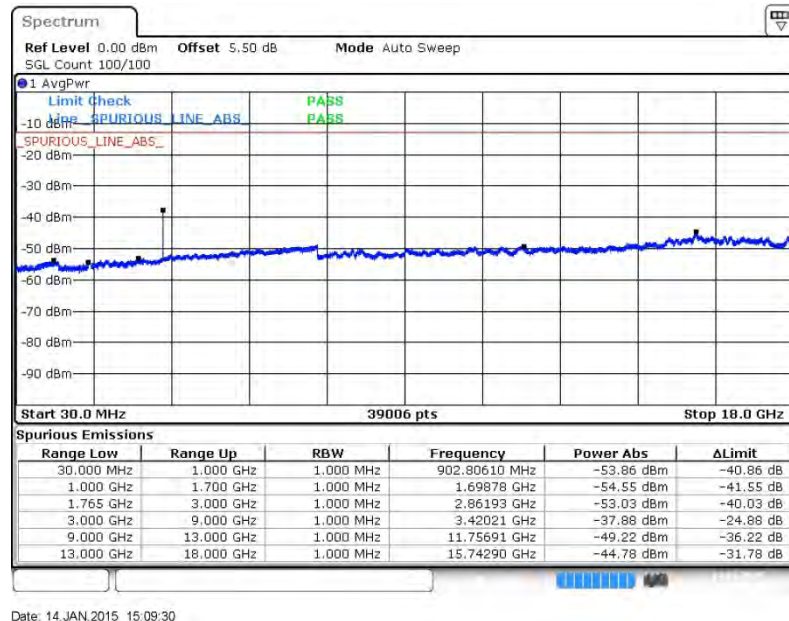
16QAM (RB Size 1, RB Offset 49)



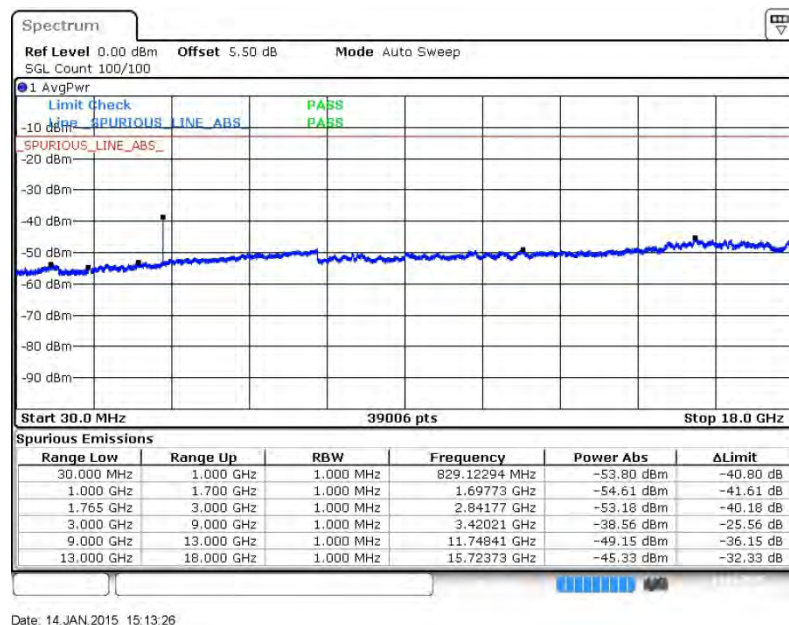


Band :	LTE Band 4	Channel :	CH19957 (Low)
Band Width :	1.4MHz		

QPSK (RB Size 3, RB Offset 0)



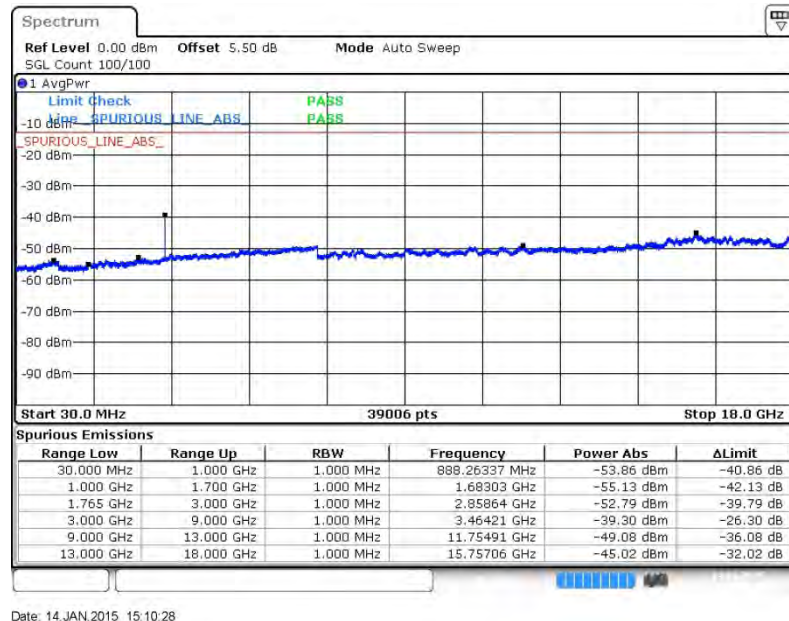
16QAM (RB Size 3, RB Offset 2)



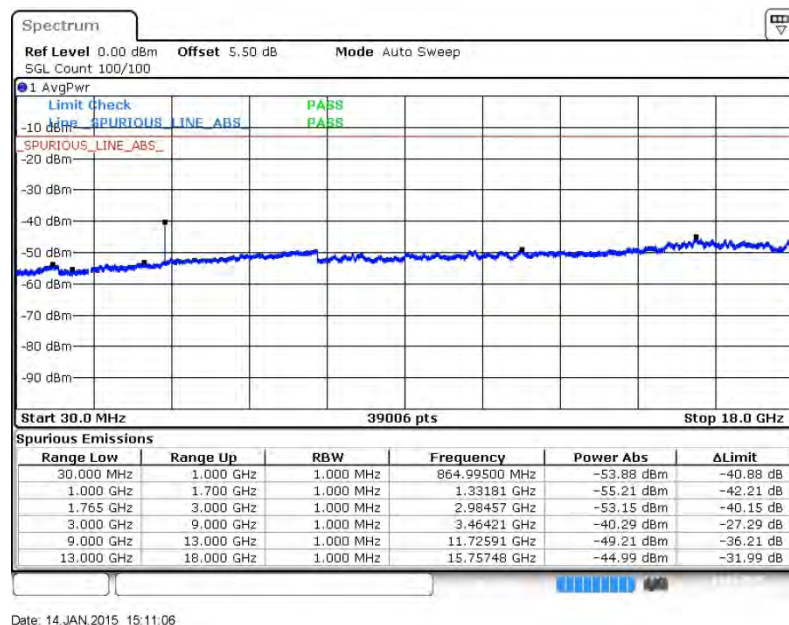


Band :	LTE Band 4	Channel :	CH20175 (Middle)
Band Width :	1.4MHz		

QPSK (RB Size 3, RB Offset 2)

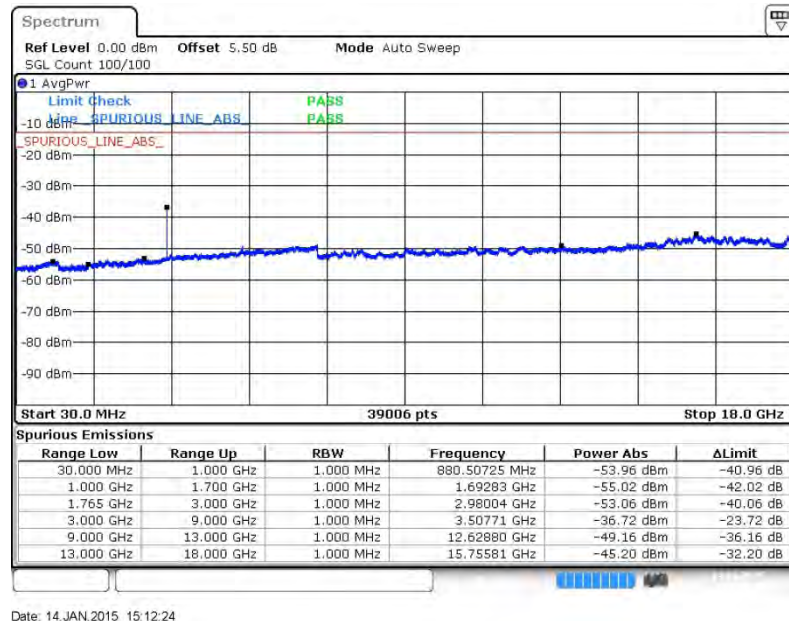
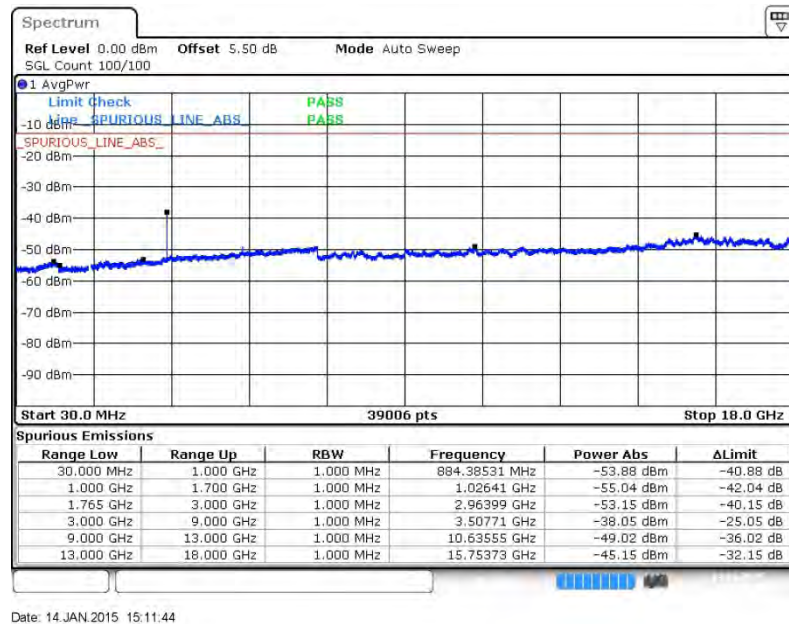


16QAM (RB Size 3, RB Offset 2)





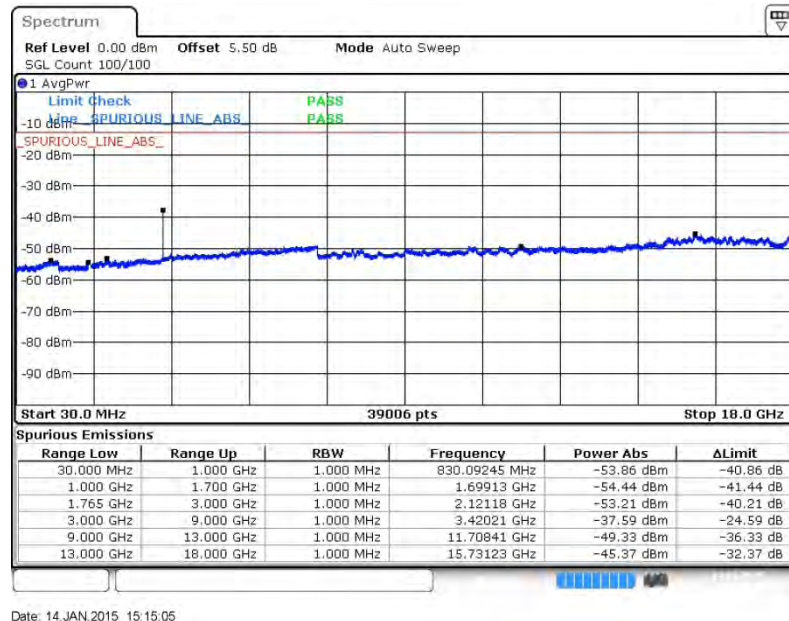
Band :	LTE Band 4	Channel :	CH20393 (High)
Band Width :	1.4MHz		

QPSK (RB Size 1, RB Offset 2)**16QAM (RB Size 3, RB Offset 2)**

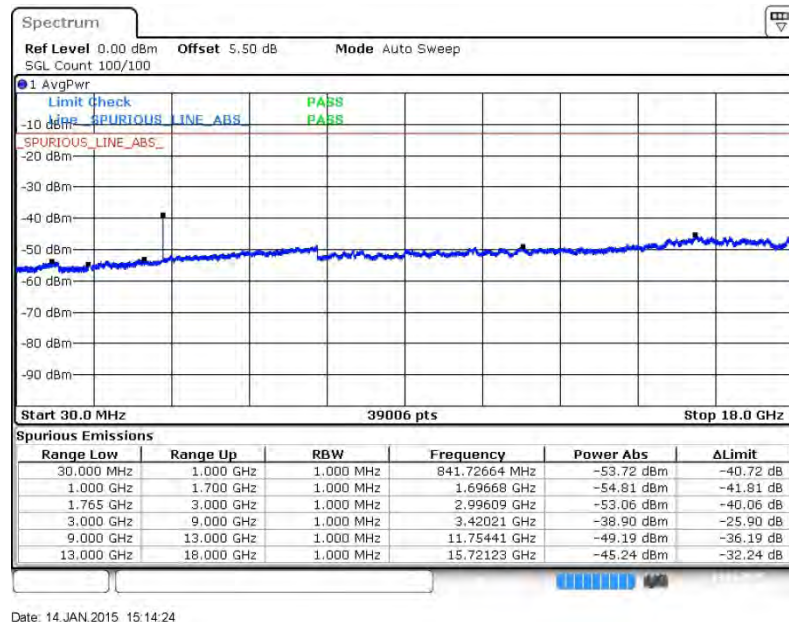


Band :	LTE Band 4	Channel :	CH19965 (Low)
Band Width :	3MHz		

QPSK (RB Size 1, RB Offset 0)



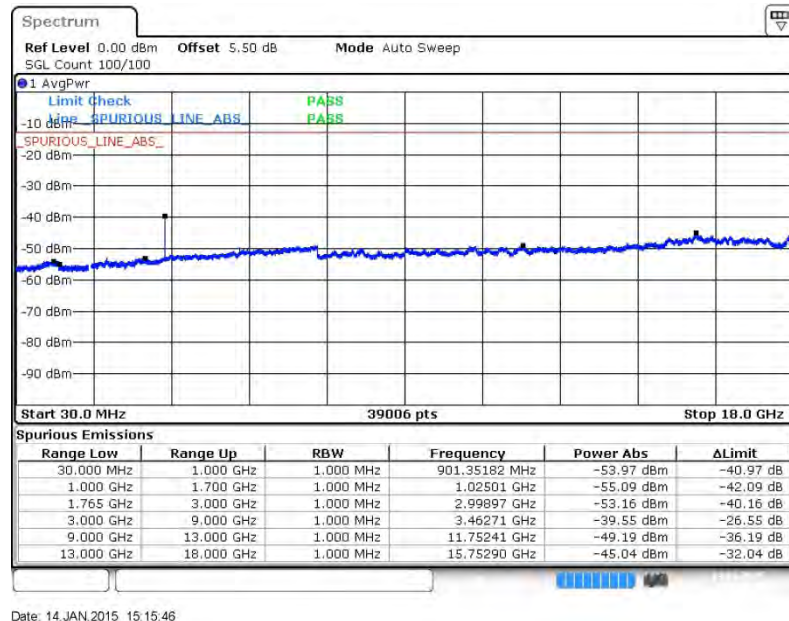
16QAM (RB Size 1, RB Offset 14)



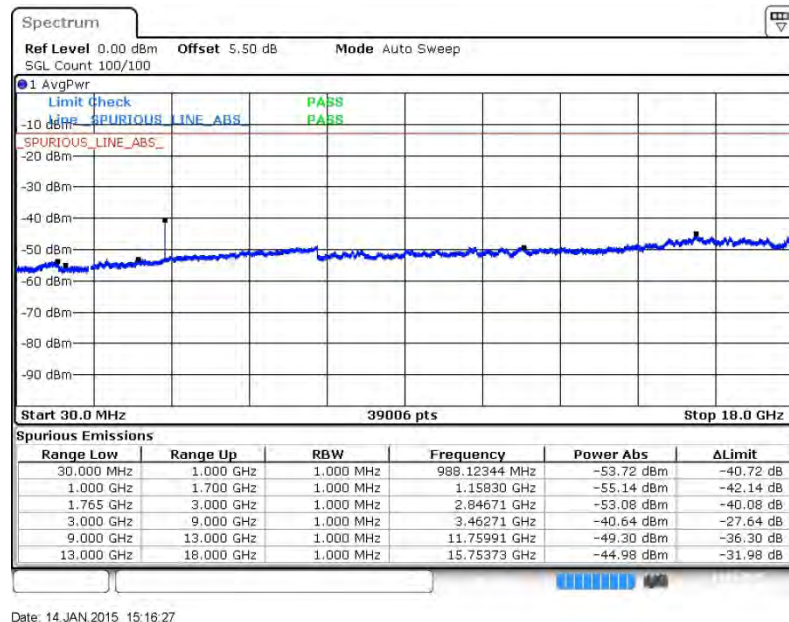


Band :	LTE Band 4	Channel :	CH20175 (Middle)
Band Width :	3MHz		

QPSK (RB Size 1, RB Offset 0)



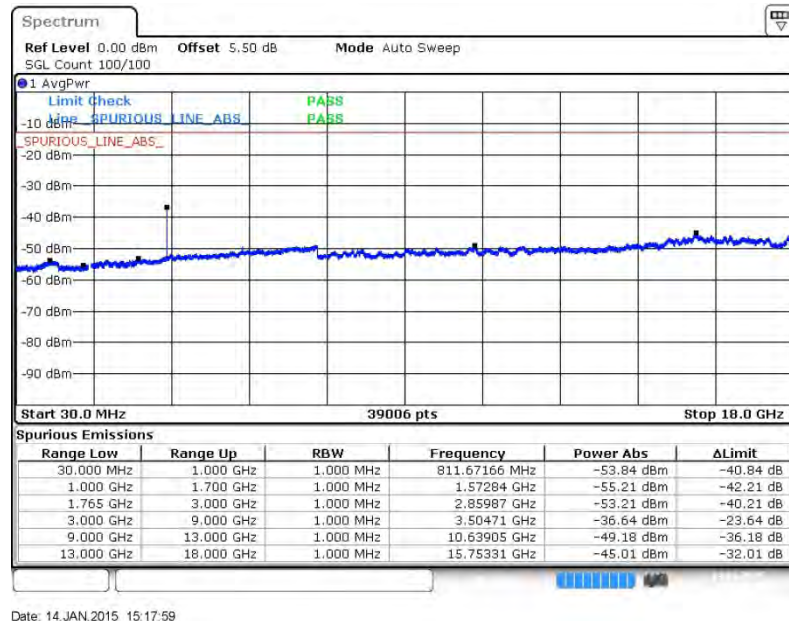
16QAM (RB Size 1, RB Offset 14)





Band :	LTE Band 4	Channel :	CH20385 (High)
Band Width :	3MHz		

QPSK (RB Size 1, RB Offset 7)



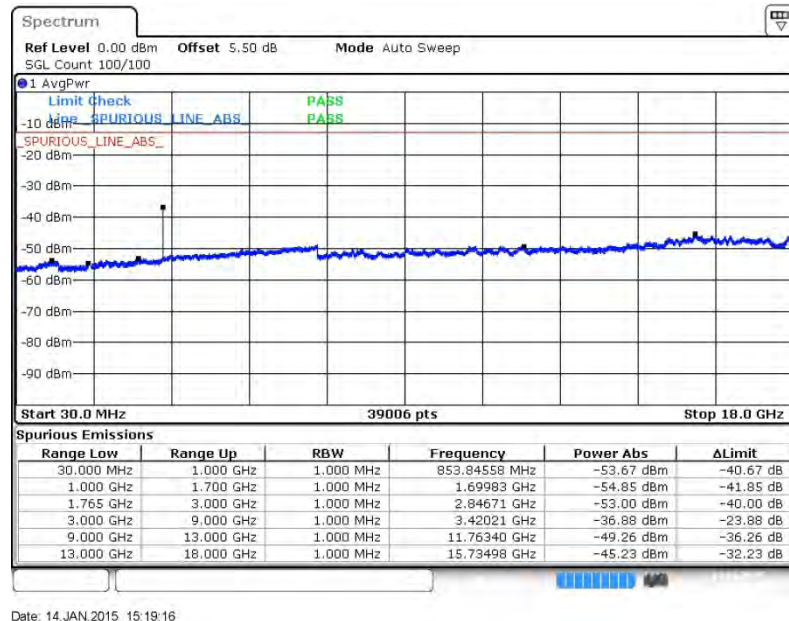
16QAM (RB Size 1, RB Offset 14)



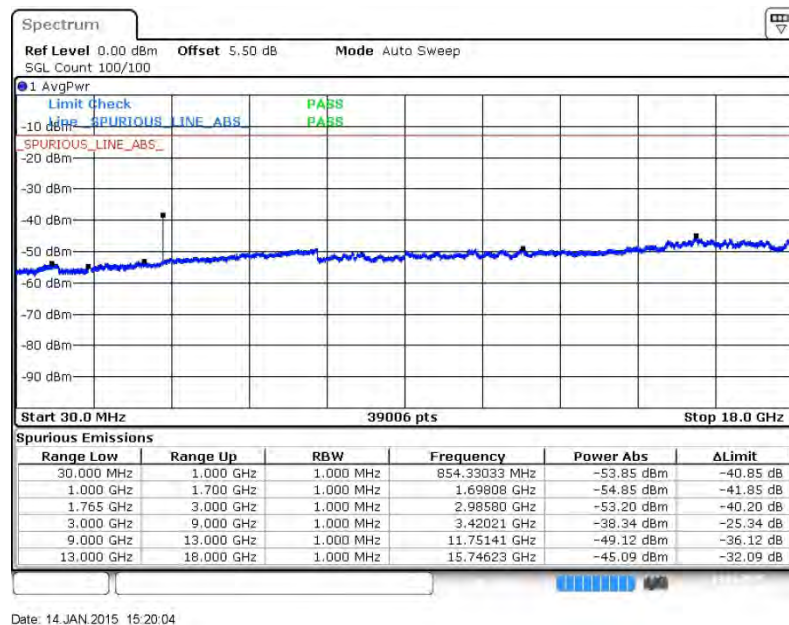


Band :	LTE Band 4	Channel :	CH19975 (Low)
Band Width :	5MHz		

QPSK (RB Size 1, RB Offset 12)



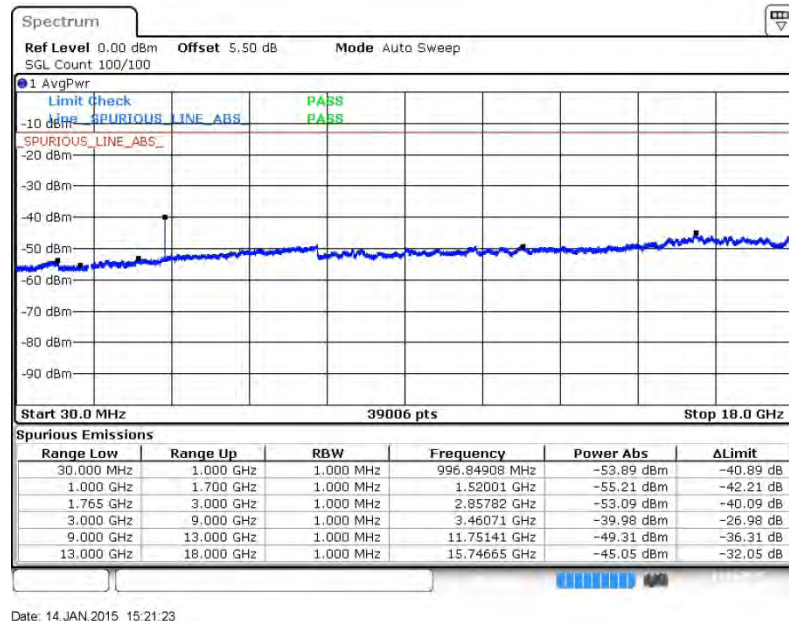
16QAM (RB Size 1, RB Offset 24)



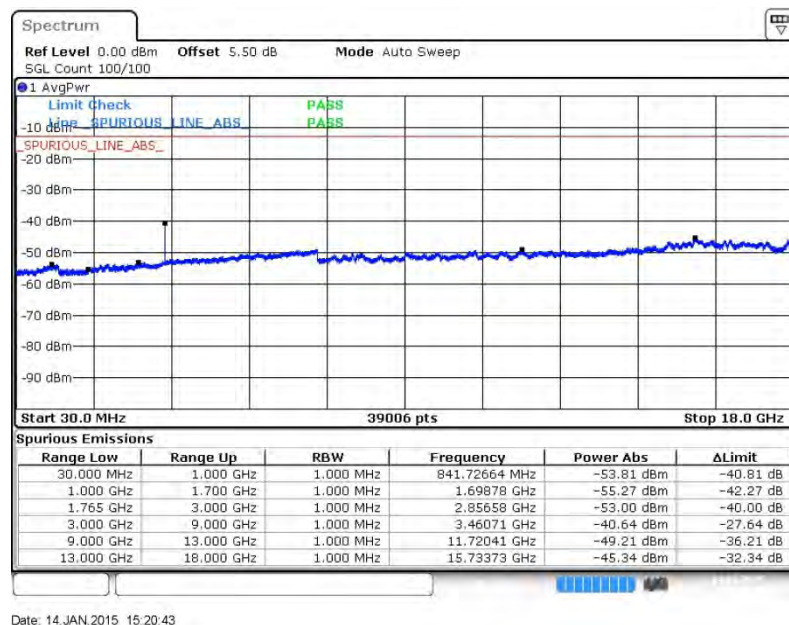


Band :	LTE Band 4	Channel :	CH20175 (Middle)
Band Width :	5MHz		

QPSK (RB Size 1, RB Offset 24)



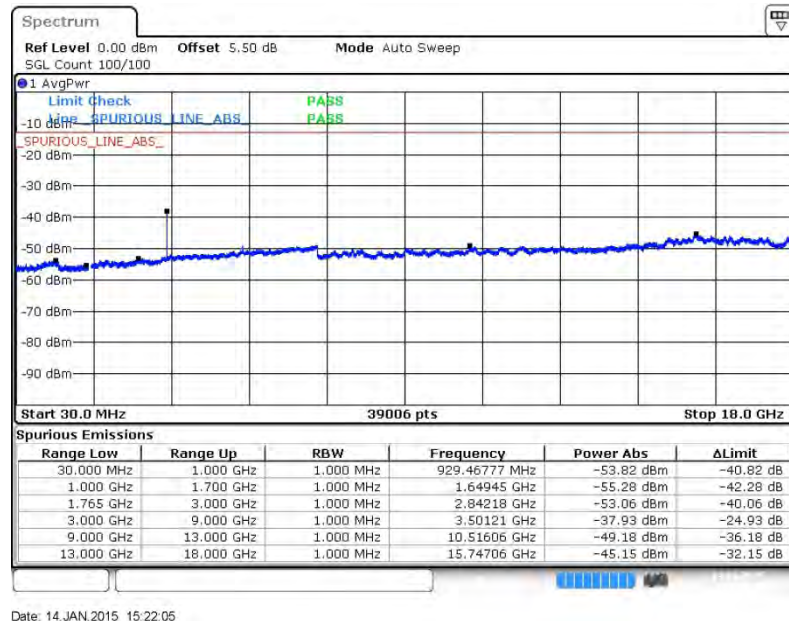
16QAM (RB Size 1, RB Offset 0)



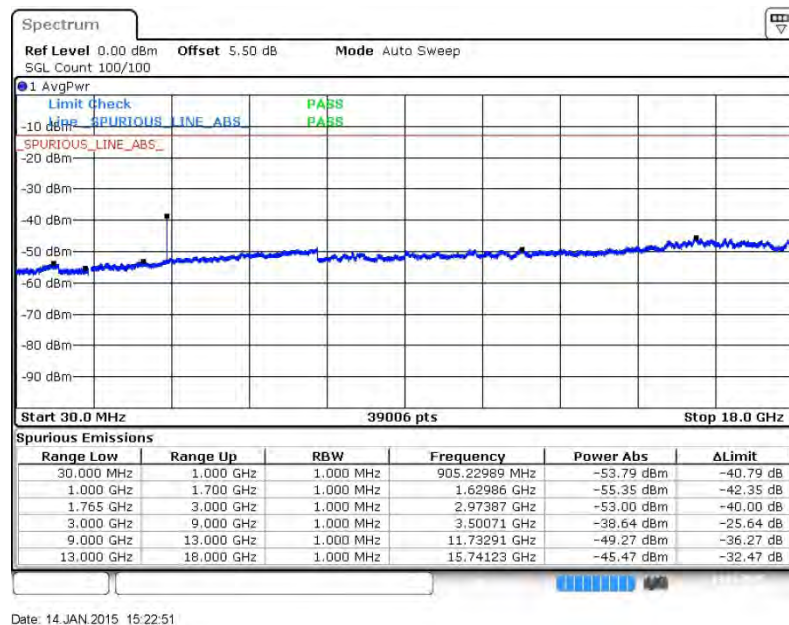


Band :	LTE Band 4	Channel :	CH20375 (High)
Band Width :	5MHz		

QPSK (RB Size 1, RB Offset 24)



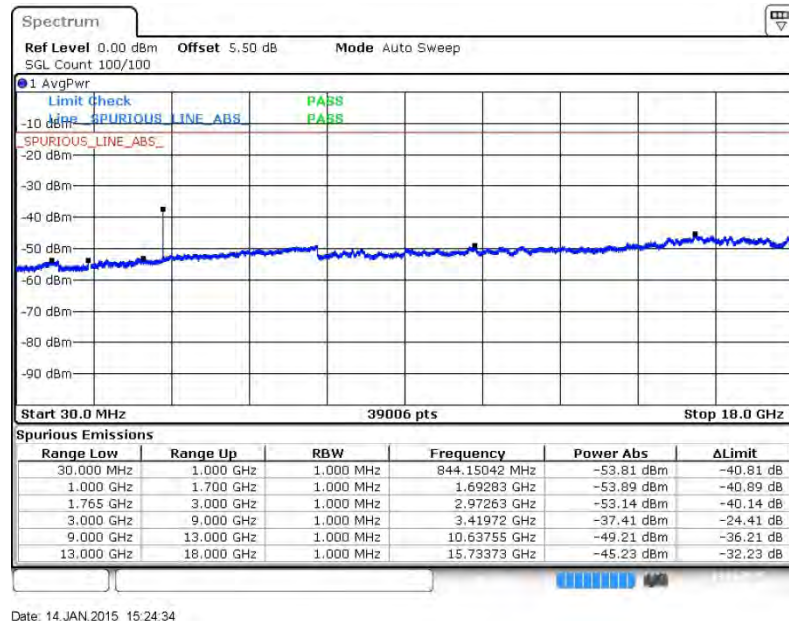
16QAM (RB Size 1, RB Offset 0)



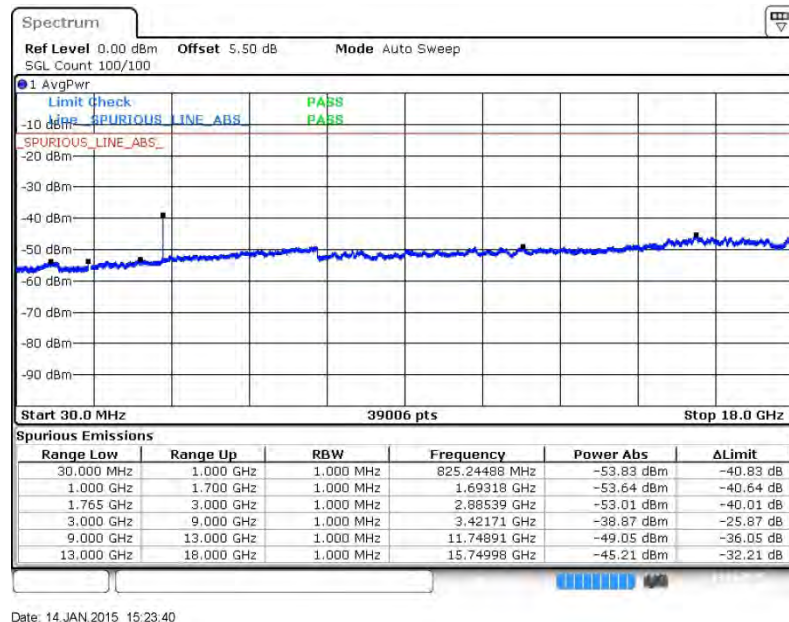


Band :	LTE Band 4	Channel :	CH20000 (Low)
Band Width :	10MHz		

QPSK (RB Size 1, RB Offset 24)

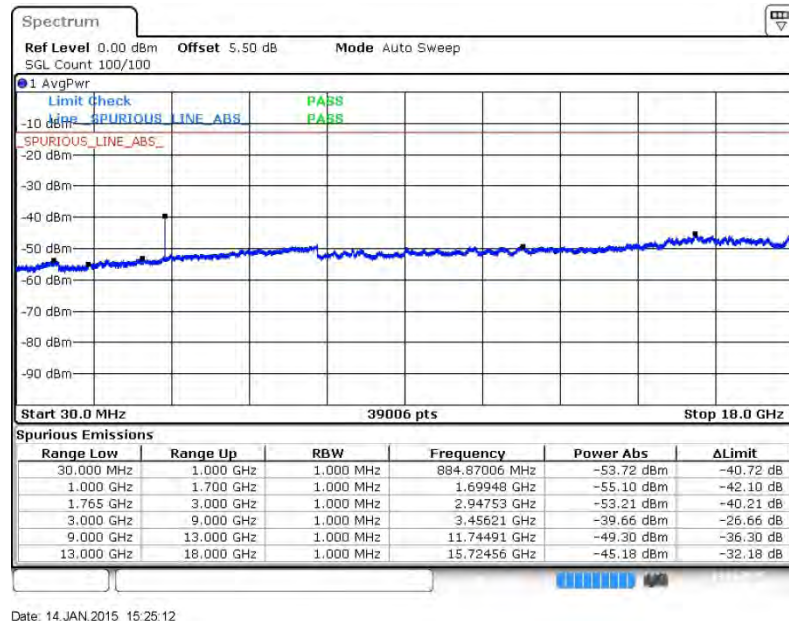
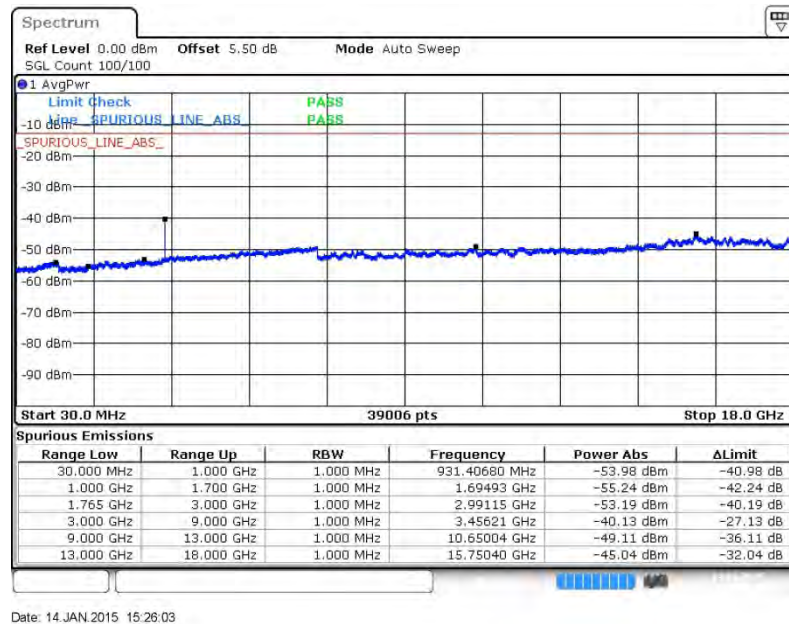


16QAM (RB Size 1, RB Offset 24)





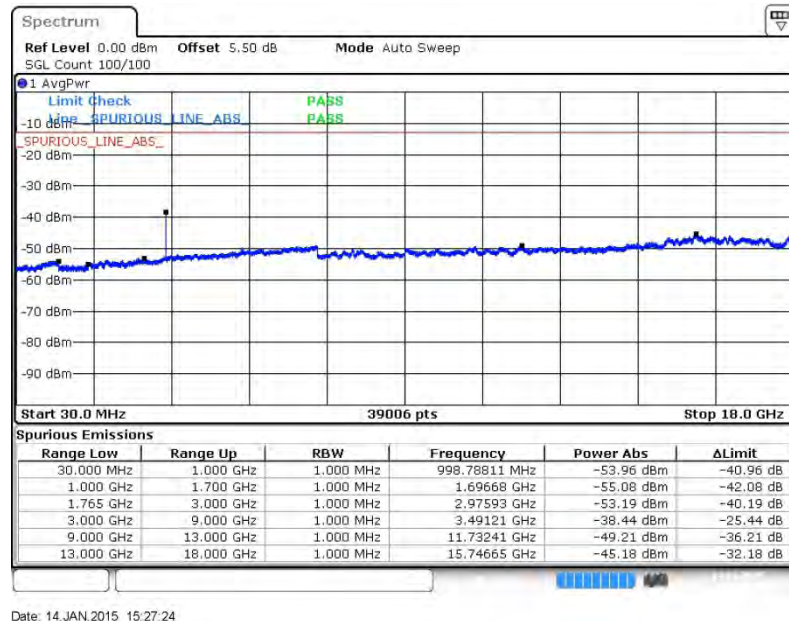
Band :	LTE Band 4	Channel :	CH20175 (Middle)
Band Width :	10MHz		

QPSK (RB Size 1, RB Offset 0)**16QAM (RB Size 1, RB Offset 0)**

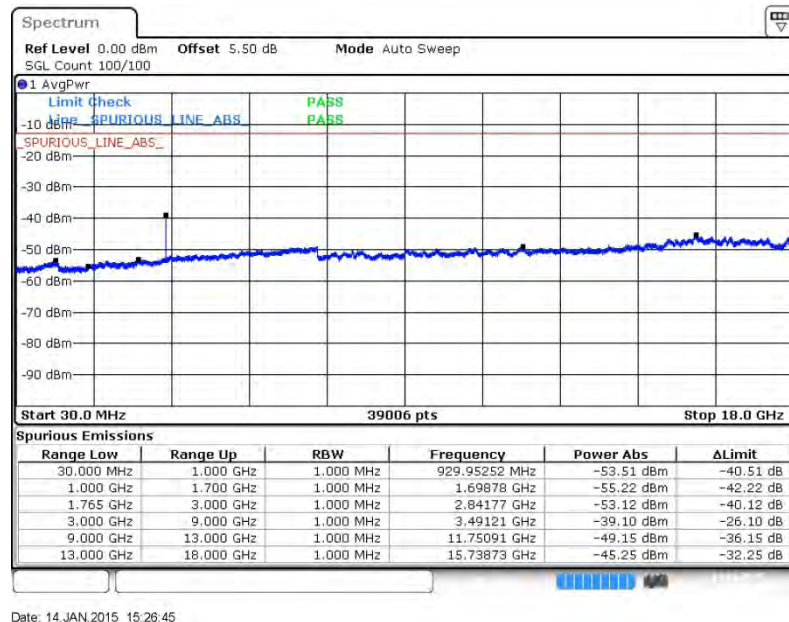


Band :	LTE Band 4	Channel :	CH20350 (High)
Band Width :	10MHz		

QPSK (RB Size 1, RB Offset 24)



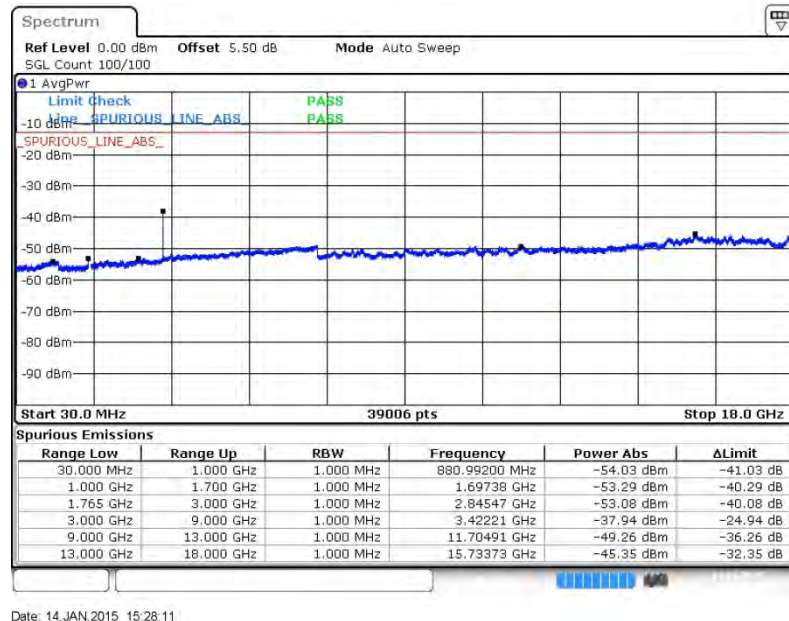
16QAM (RB Size 1, RB Offset 24)



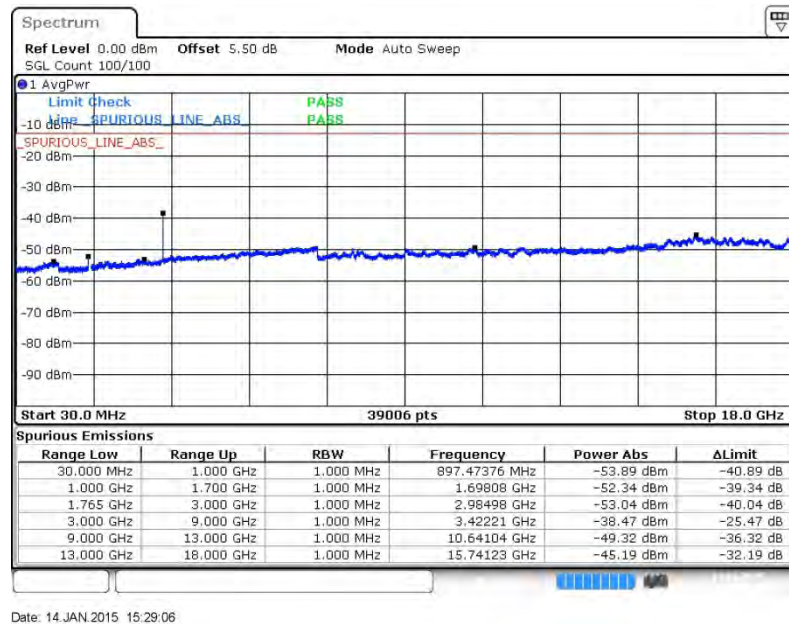


Band :	LTE Band 4	Channel :	CH20025 (Low)
Band Width :	15MHz		

QPSK (RB Size 1, RB Offset 74)

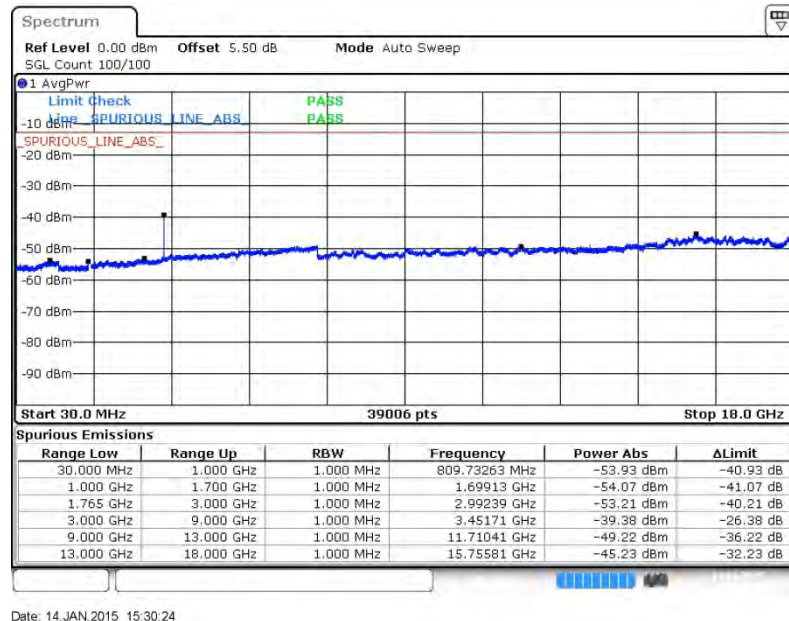
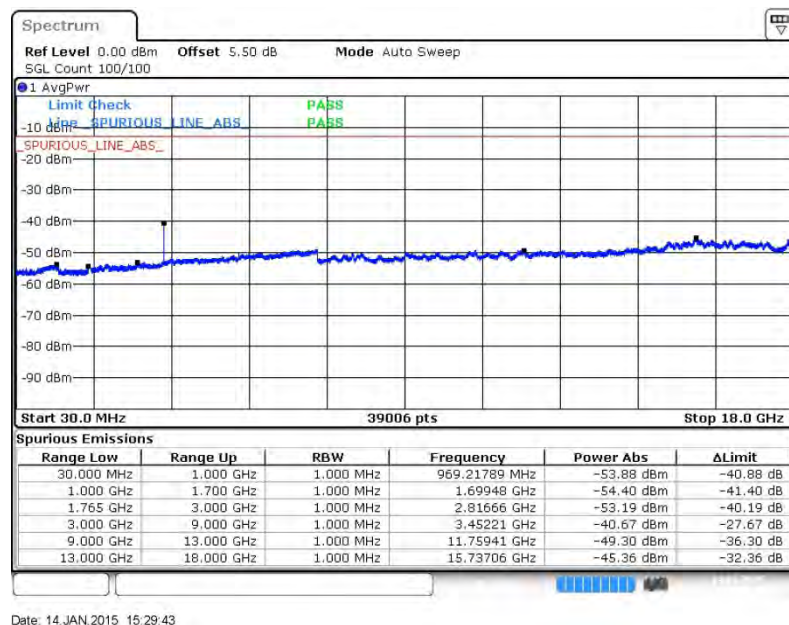


16QAM (RB Size 1, RB Offset 0)





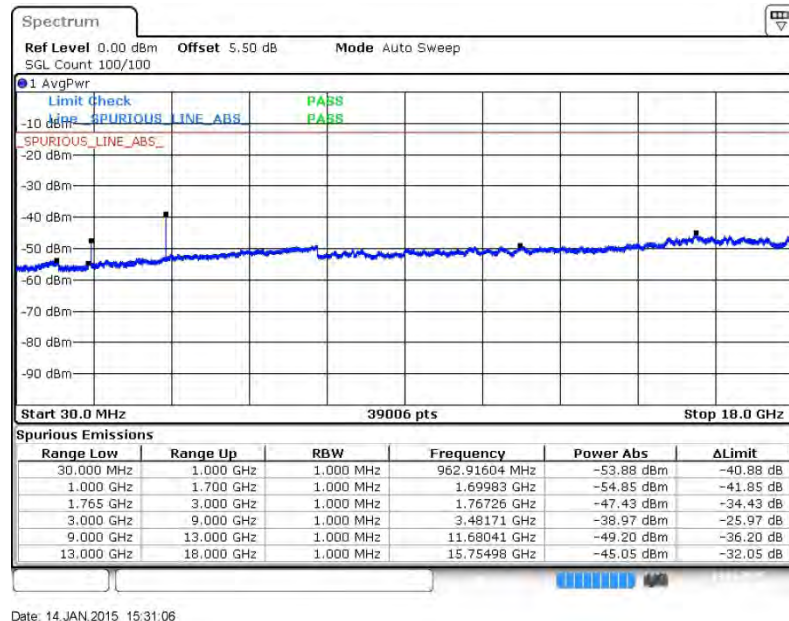
Band :	LTE Band 4	Channel :	CH20175 (Middle)
Band Width :	15MHz		

QPSK (RB Size 1, RB Offset 74)**16QAM (RB Size 1, RB Offset 0)**

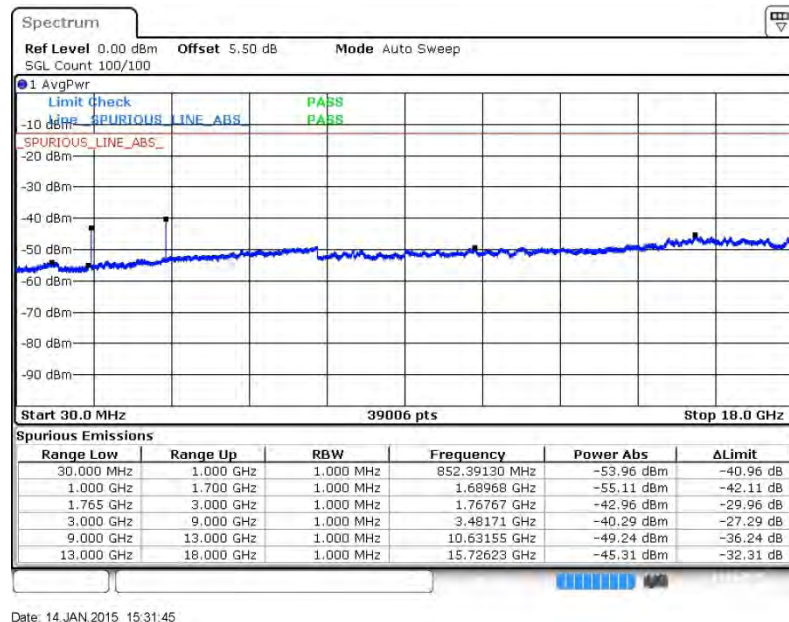


Band :	LTE Band 4	Channel :	CH20325 (High)
Band Width :	15MHz		

QPSK (RB Size 1, RB Offset 0)

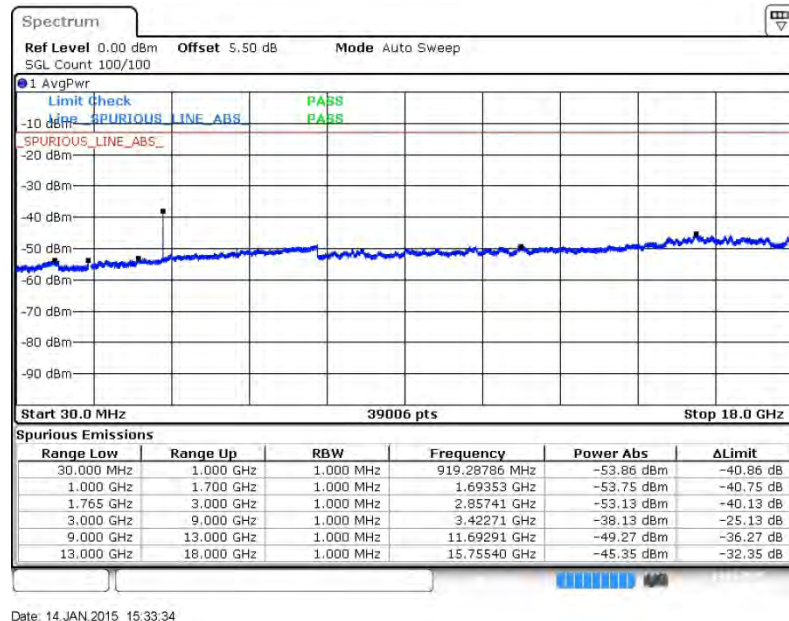
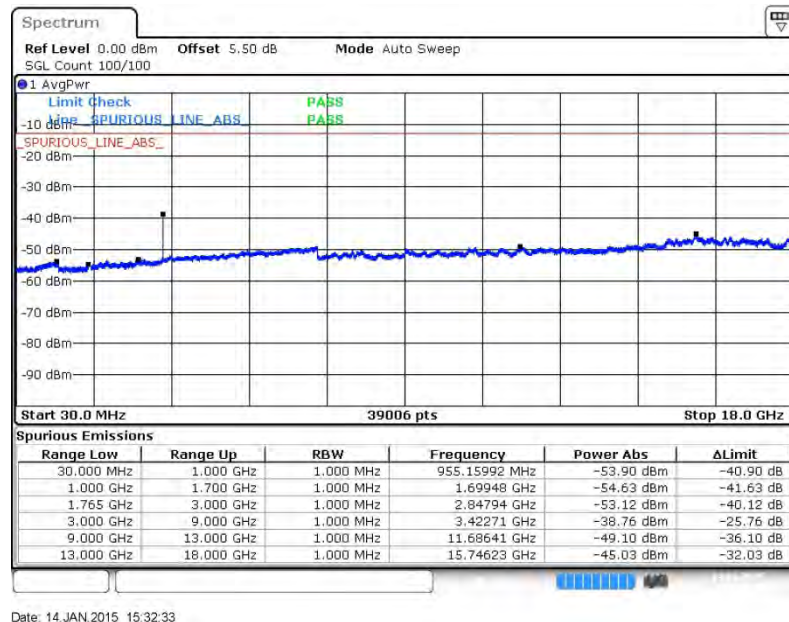


16QAM (RB Size 1, RB Offset 0)



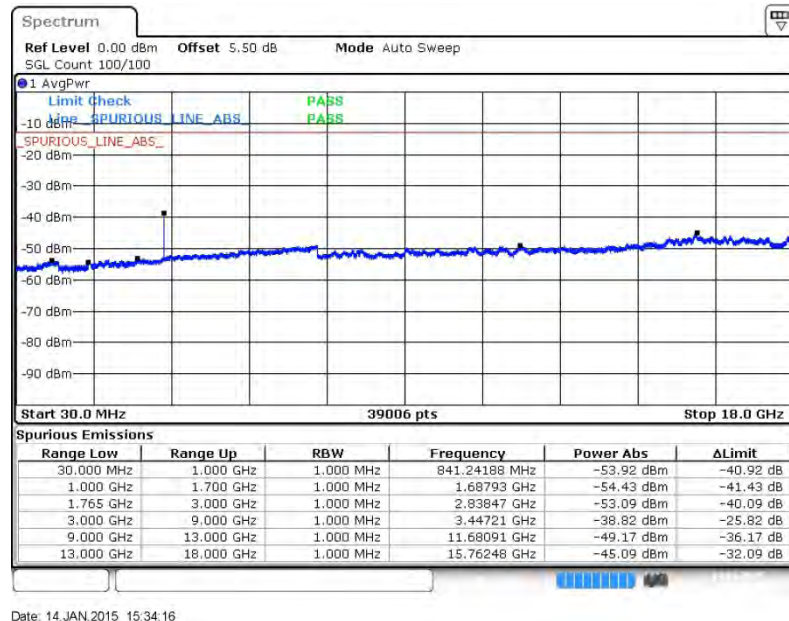
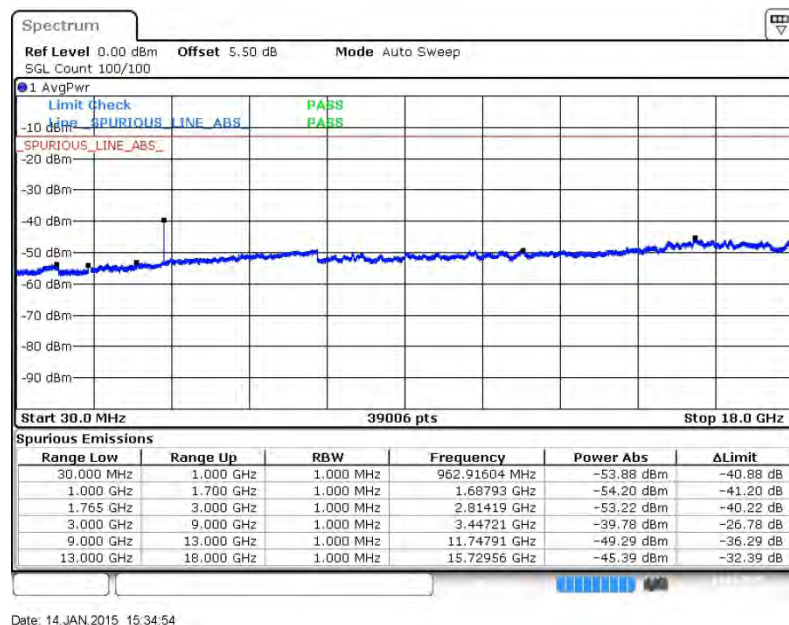


Band :	LTE Band 4	Channel :	CH20050 (Low)
Band Width :	20MHz		

QPSK (RB Size 1, RB Offset 0)**16QAM (RB Size 1, RB Offset 0)**



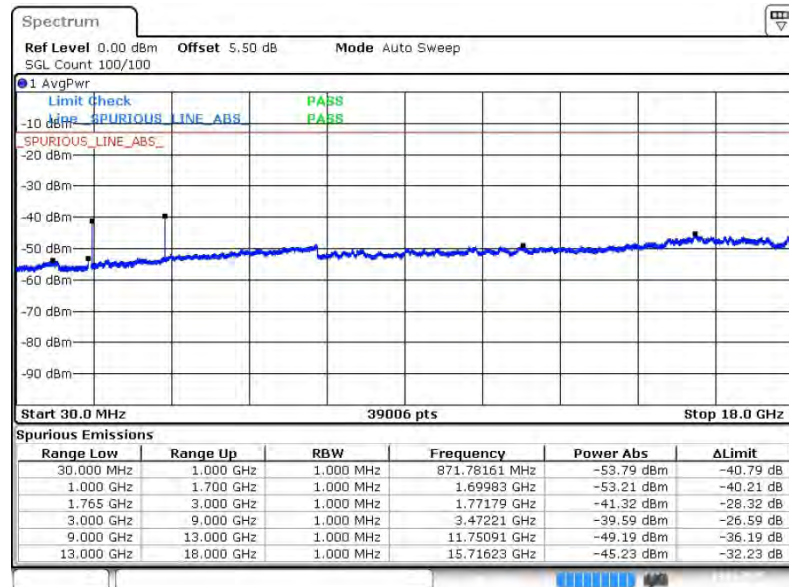
Band :	LTE Band 4	Channel :	CH20175 (Middle)
Band Width :	20MHz		

QPSK (RB Size 1, RB Offset 0)**16QAM (RB Size 1, RB Offset 0)**



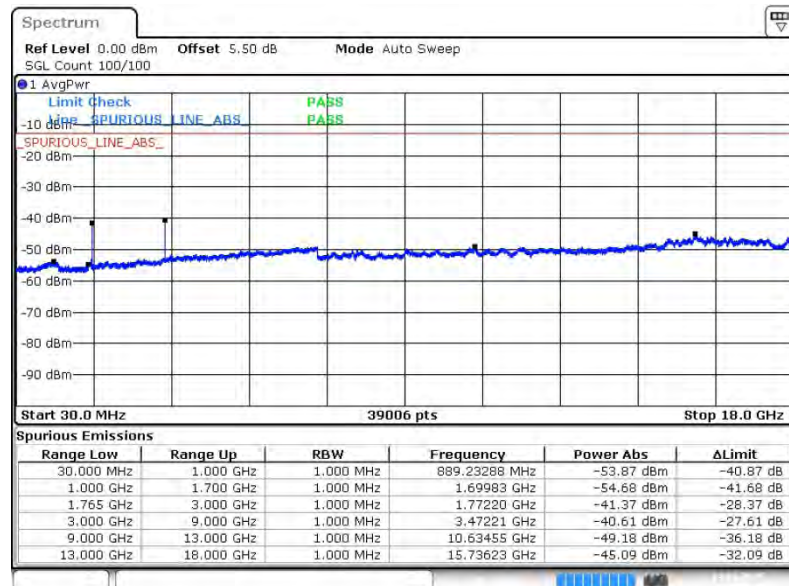
Band :	LTE Band 4	Channel :	CH20300 (High)
Band Width :	20MHz		

QPSK (RB Size 1, RB Offset 0)



Date: 14.JAN.2015 15:36:17

16QAM (RB Size 1, RB Offset 0)

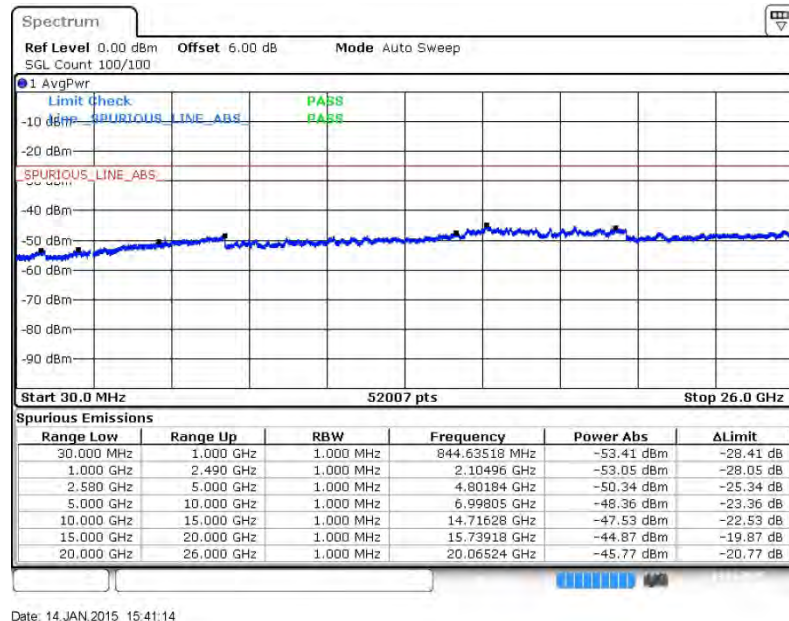


Date: 14.JAN.2015 15:35:40

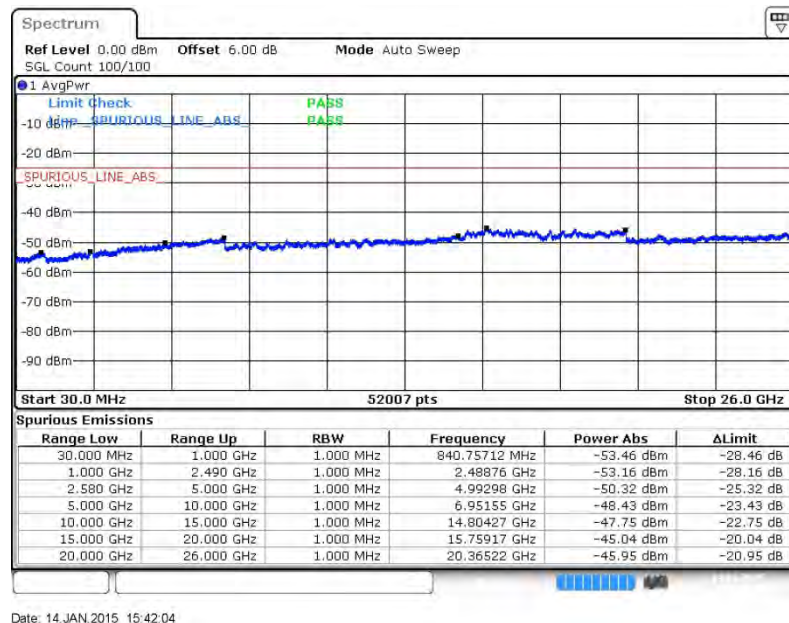


Band :	LTE Band 7	Channel :	CH20775 (Low)
Band Width :	5MHz		

QPSK (RB Size 1, RB Offset 12)



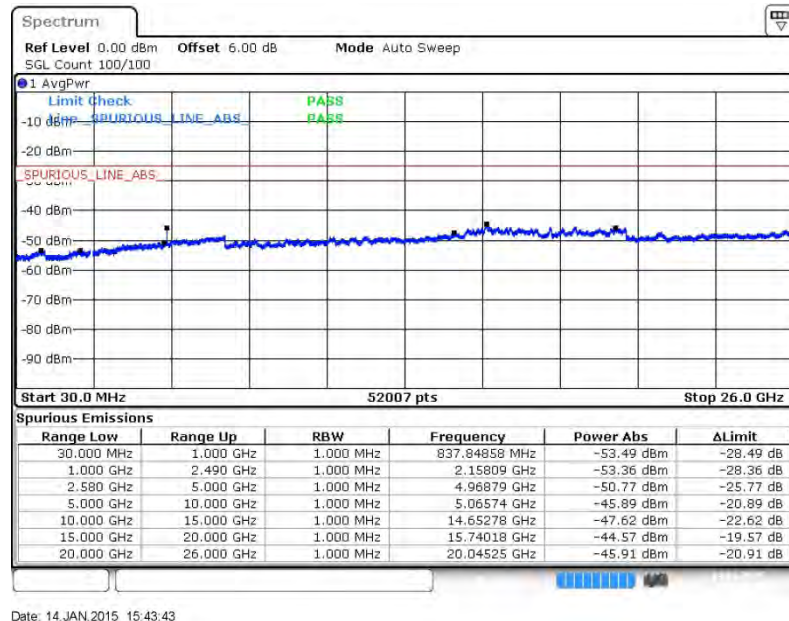
16QAM (RB Size 1, RB Offset 24)



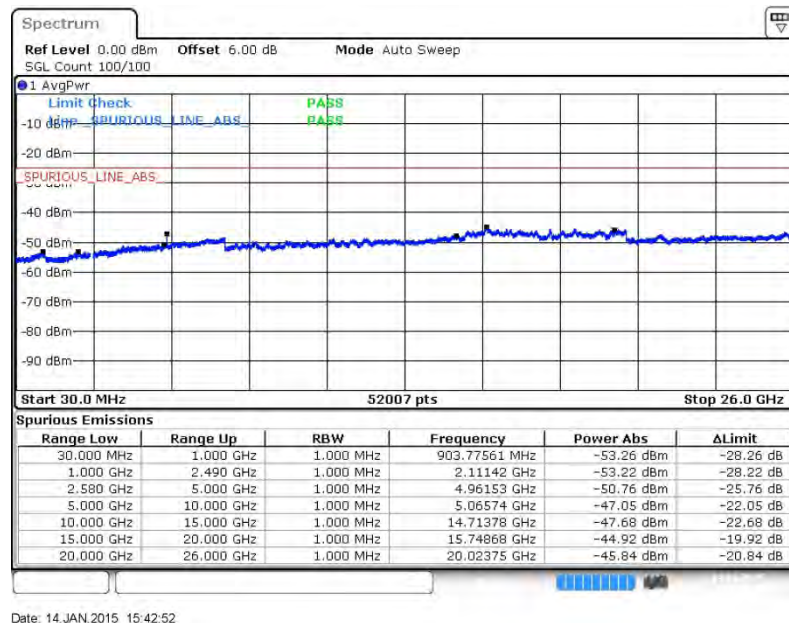


Band :	LTE Band 7	Channel :	CH21100 (Middle)
Band Width :	5MHz		

QPSK (RB Size 1, RB Offset 0)

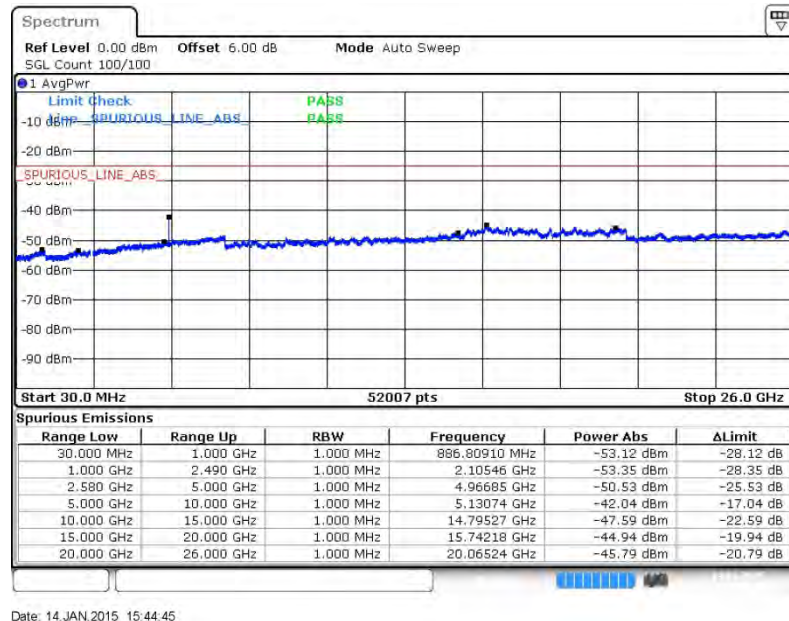
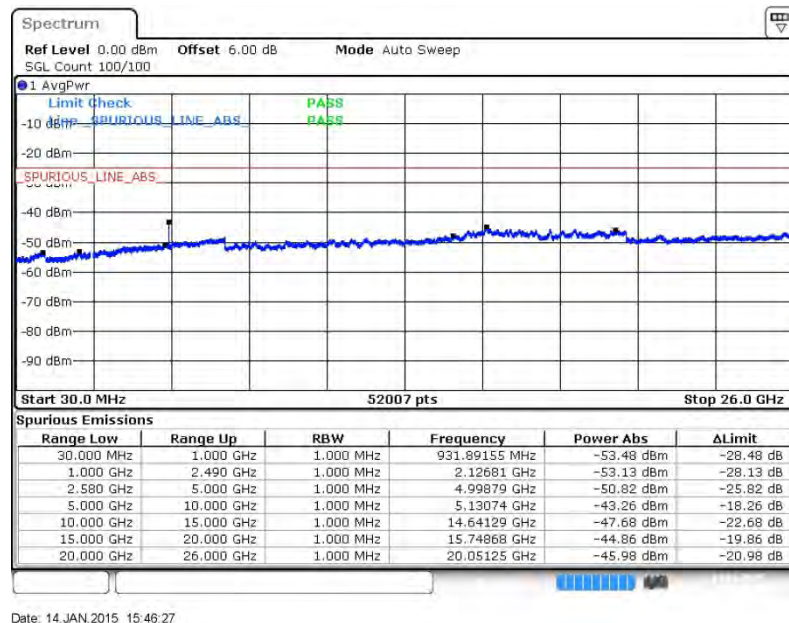


16QAM (RB Size 1, RB Offset 24)





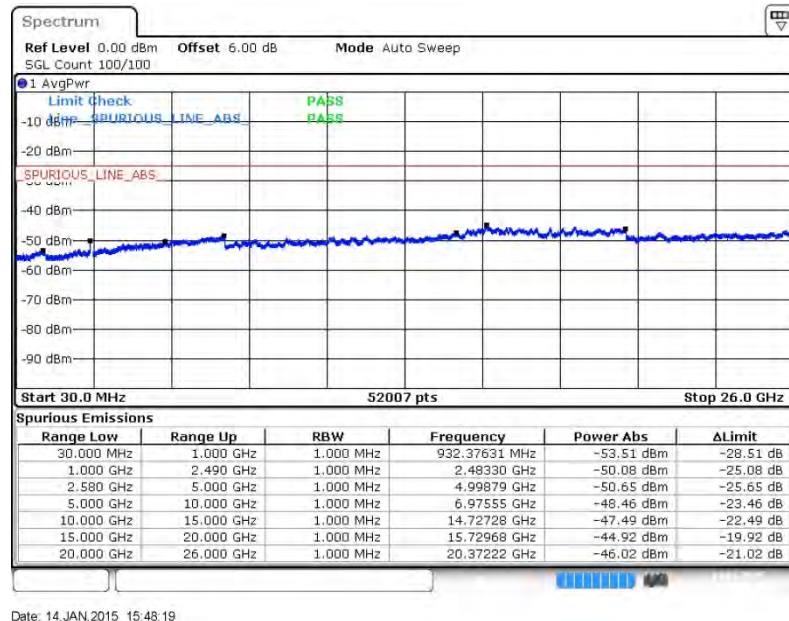
Band :	LTE Band 7	Channel :	CH21425 (High)
Band Width :	5MHz		

QPSK (RB Size 1, RB Offset 24)**16QAM (RB Size 1, RB Offset 0)**

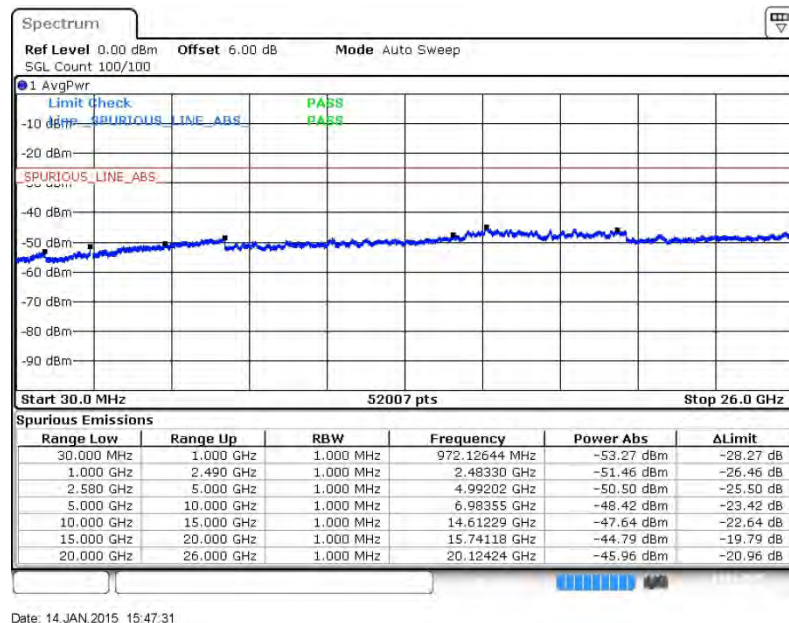


Band :	LTE Band 7	Channel :	CH20800 (Low)
Band Width :	10MHz		

QPSK (RB Size 1, RB Offset 24)

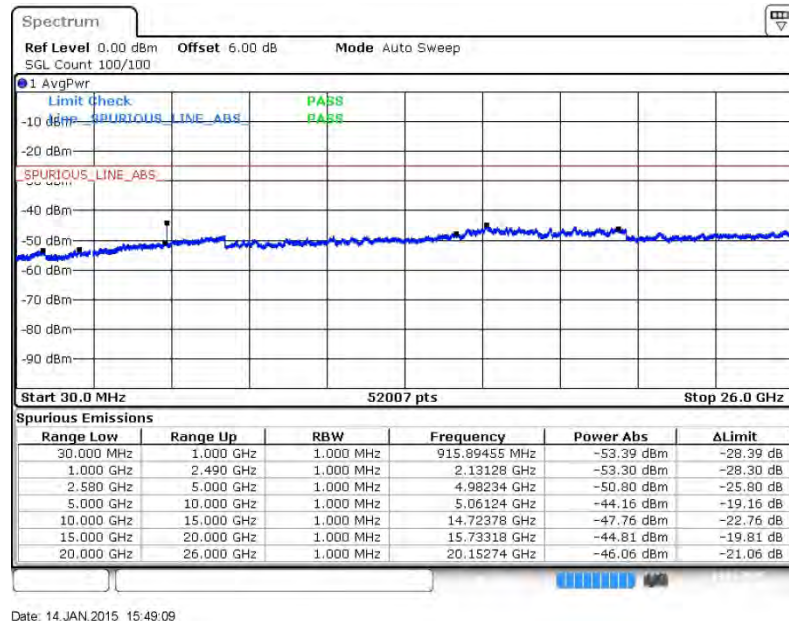
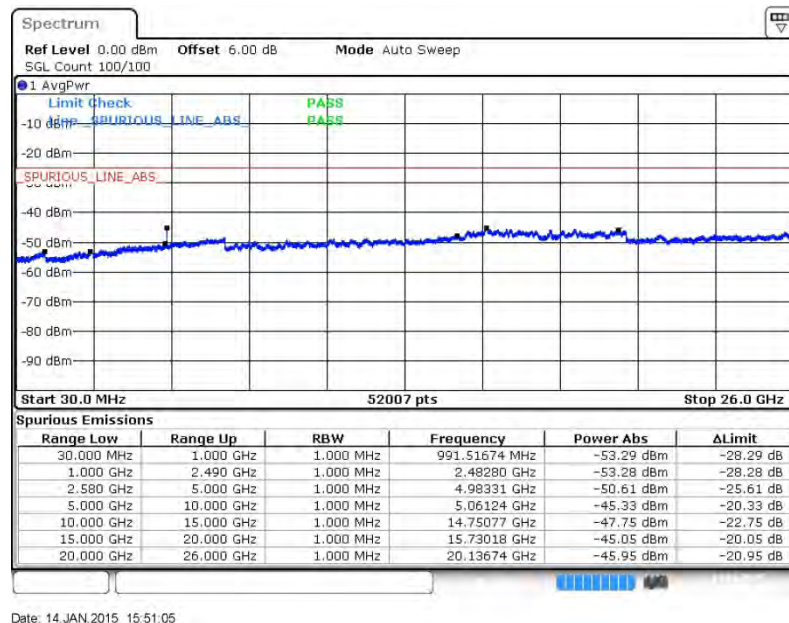


16QAM (RB Size 1, RB Offset 24)





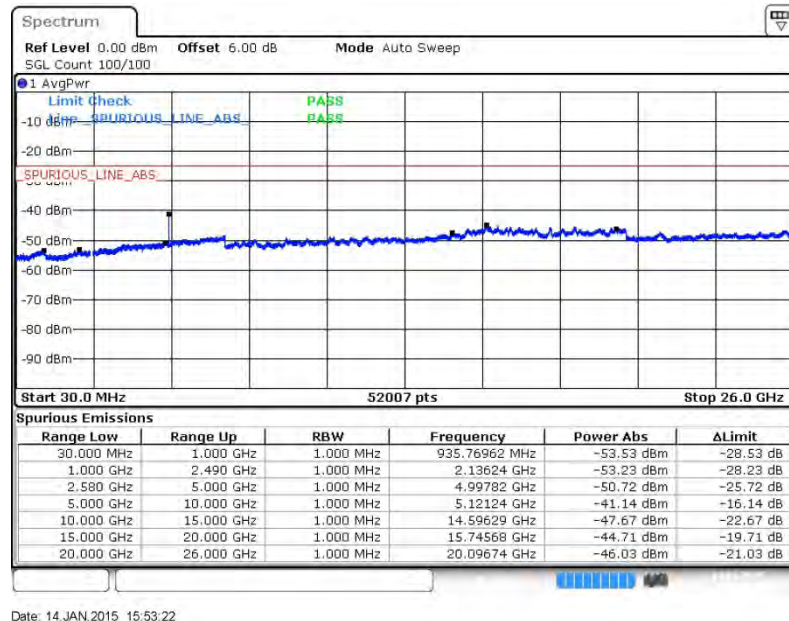
Band :	LTE Band 7	Channel :	CH21100 (Middle)
Band Width :	10MHz		

QPSK (RB Size 1, RB Offset 49)**16QAM (RB Size 1, RB Offset 49)**

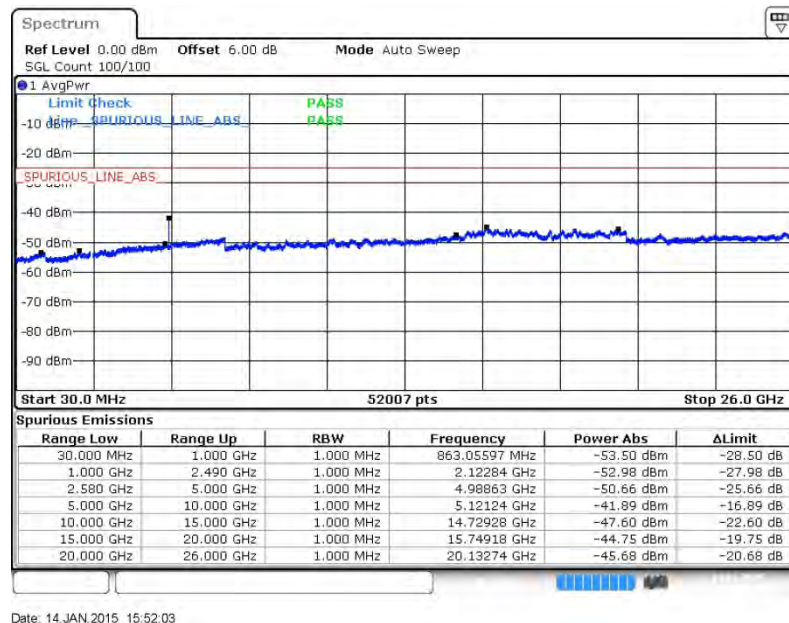


Band :	LTE Band 7	Channel :	CH21400 (High)
Band Width :	10MHz		

QPSK (RB Size 1, RB Offset 24)



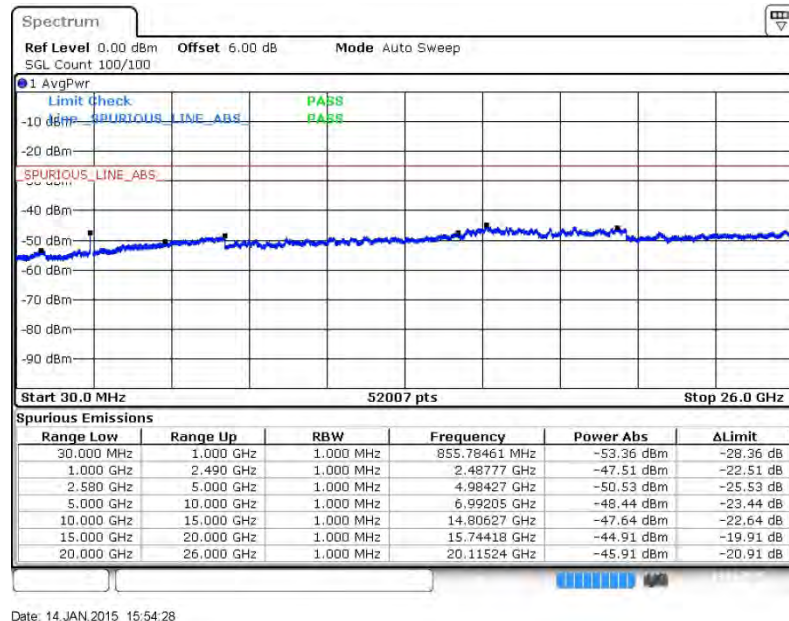
16QAM (RB Size 1, RB Offset 24)



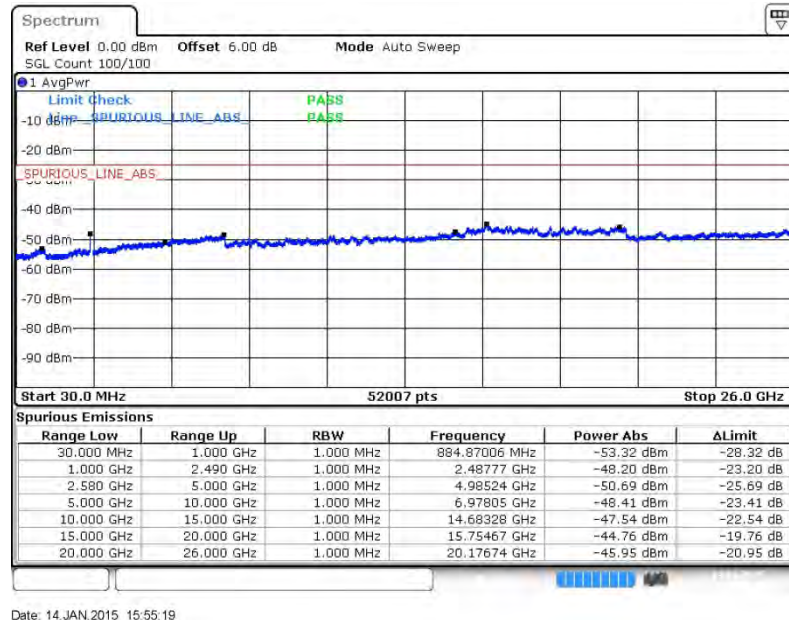


Band :	LTE Band 7	Channel :	CH20825 (Low)
Band Width :	15MHz		

QPSK (RB Size 1, RB Offset 37)



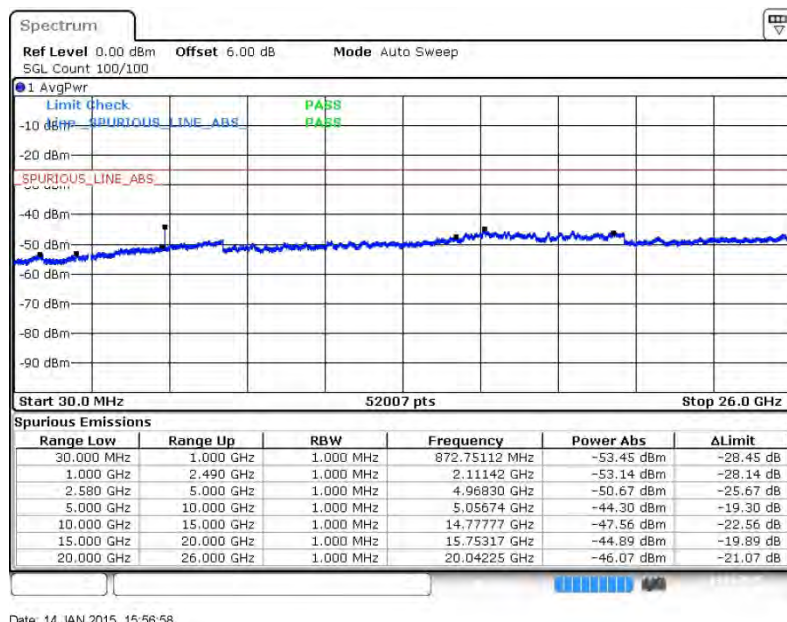
16QAM (RB Size 36, RB Offset 37)



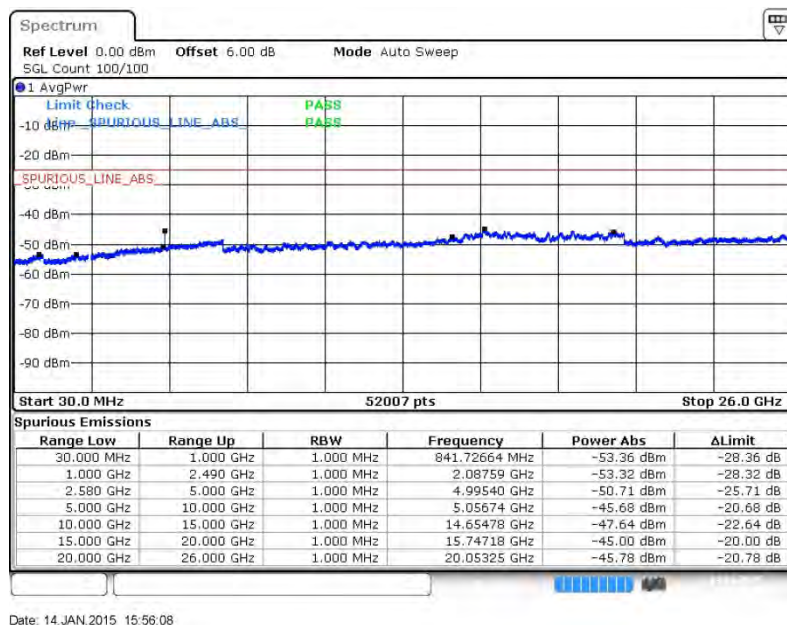


Band :	LTE Band 7	Channel :	CH21100 (Middle)
Band Width :	15MHz		

QPSK (RB Size 1, RB Offset 74)



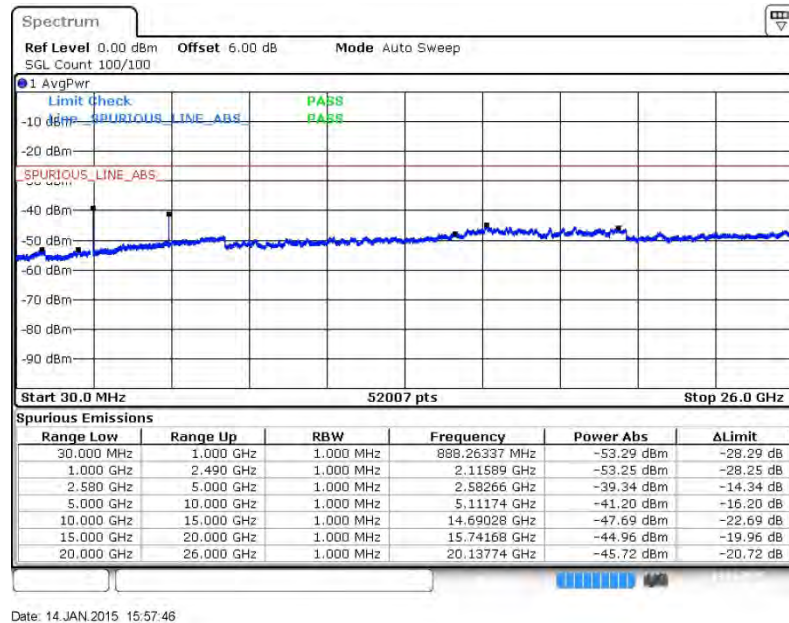
16QAM (RB Size 36, RB Offset 18)



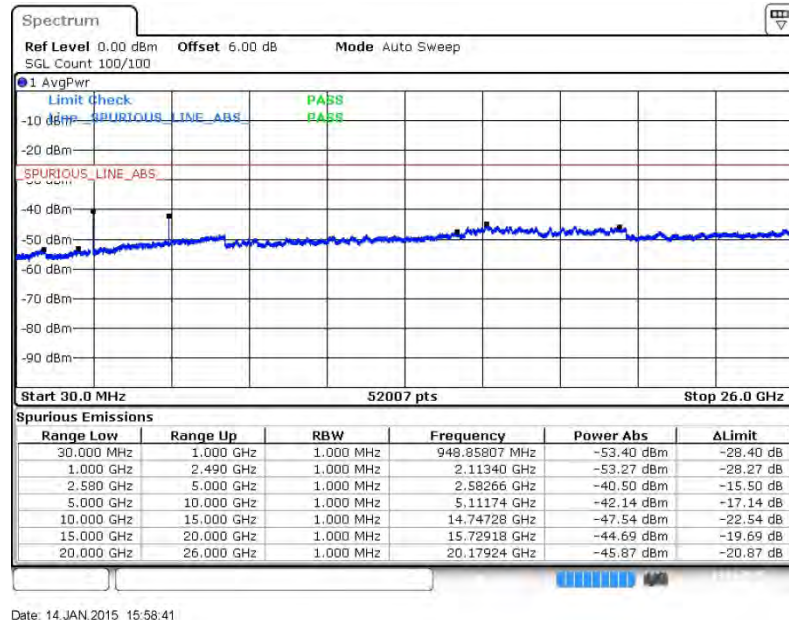


Band :	LTE Band 7	Channel :	CH21375 (High)
Band Width :	15MHz		

QPSK (RB Size 1, RB Offset 0)



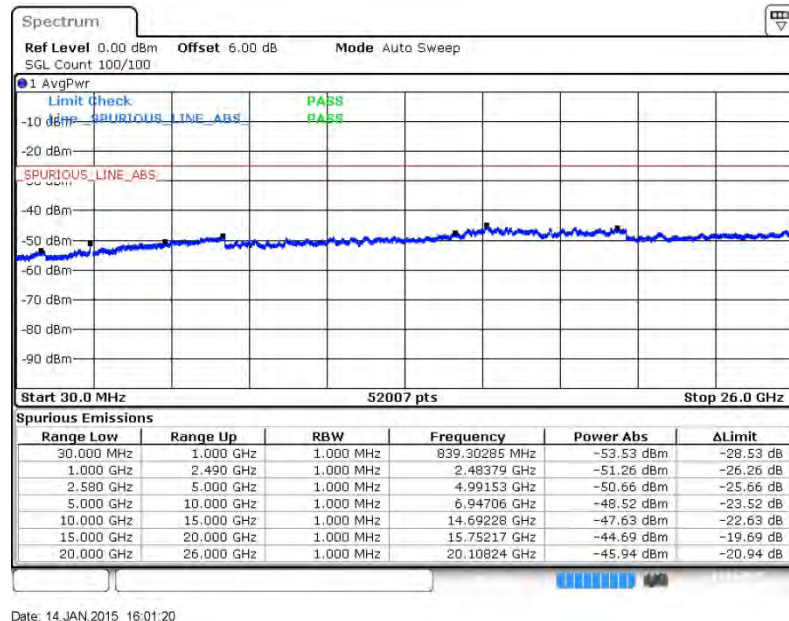
16QAM (RB Size 36, RB Offset 0)



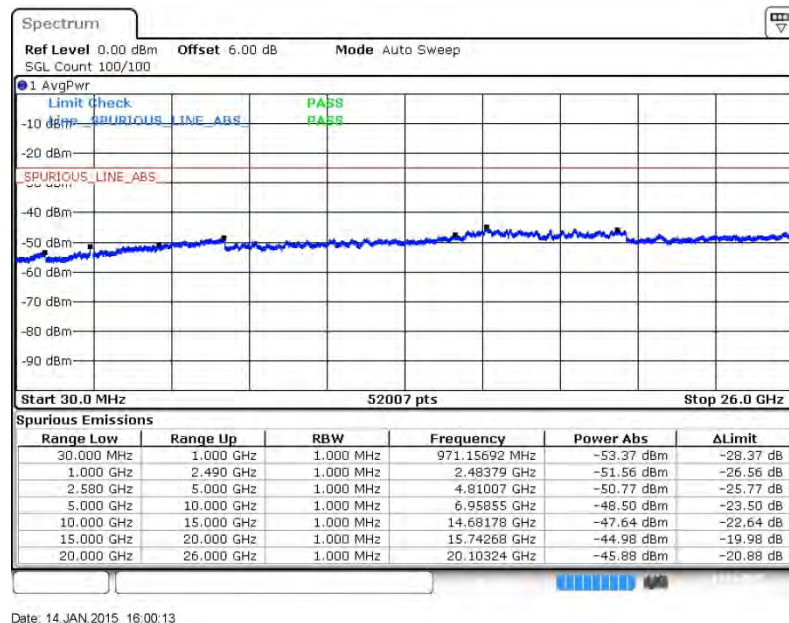


Band :	LTE Band 7	Channel :	CH20850 (Low)
Band Width :	20MHz		

QPSK (RB Size 1, RB Offset 0)



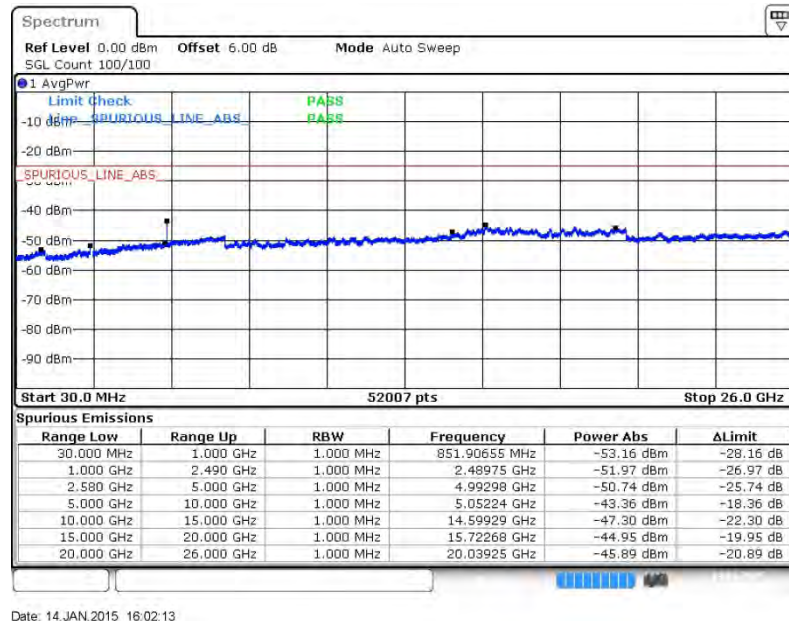
16QAM (RB Size 1, RB Offset 0)



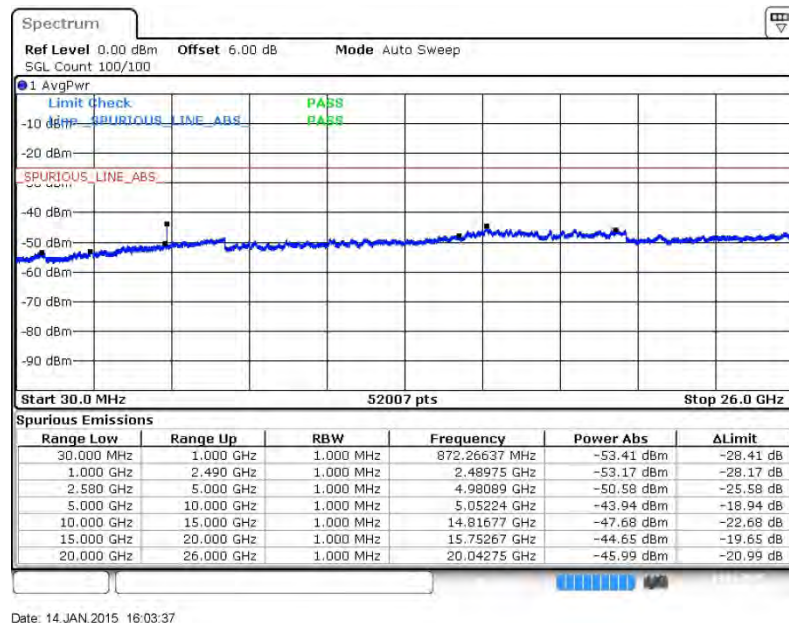


Band :	LTE Band 7	Channel :	CH21100 (Middle)
Band Width :	20MHz		

QPSK (RB Size 1, RB Offset 0)



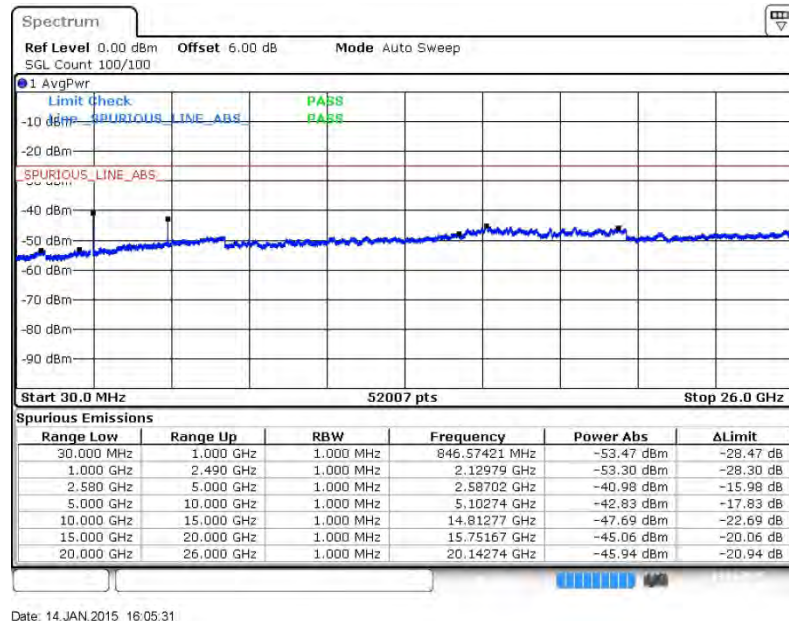
16QAM (RB Size 1, RB Offset 0)



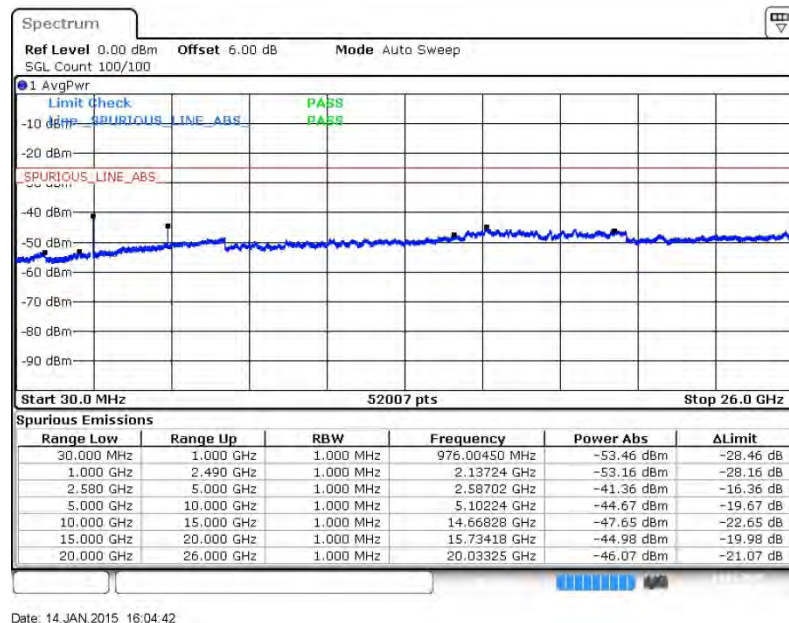


Band :	LTE Band 7	Channel :	CH21350 (High)
Band Width :	20MHz		

QPSK (RB Size 1, RB Offset 0)



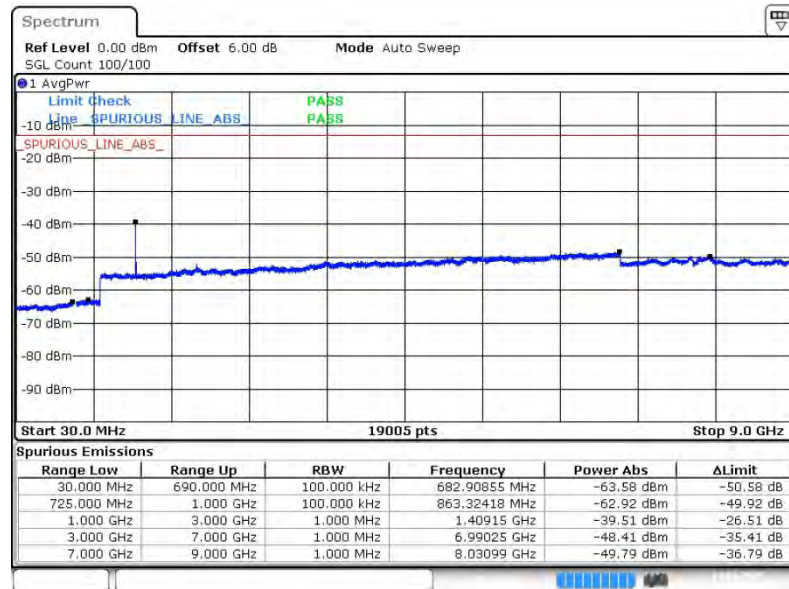
16QAM (RB Size 1, RB Offset 0)



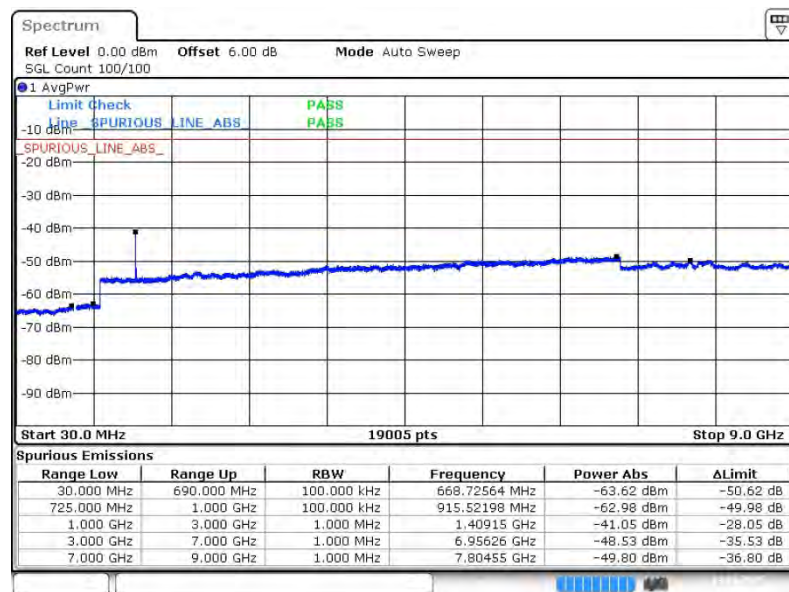


Band :	LTE Band 17	Channel :	CH23755 (Low)
Band Width :	5MHz		

QPSK (RB Size 1, RB Offset 0)



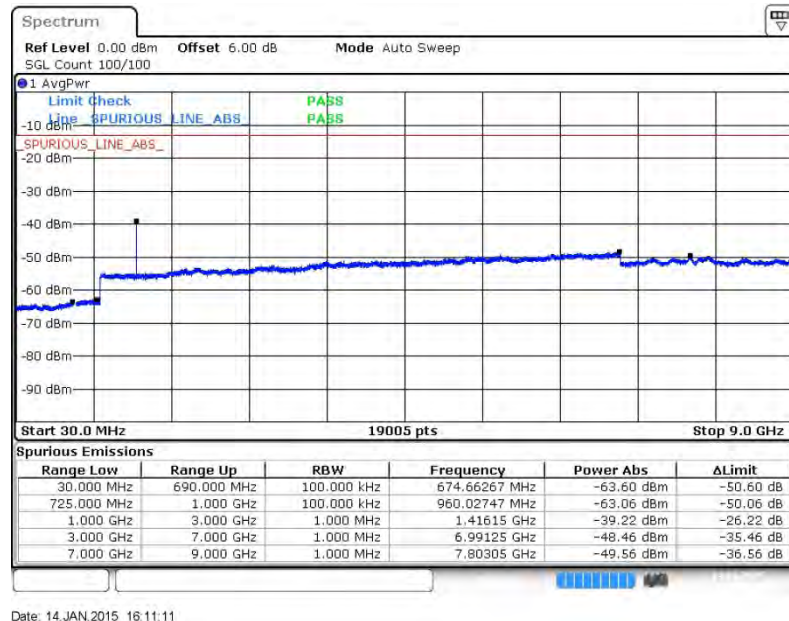
16QAM (RB Size 1, RB Offset 0)



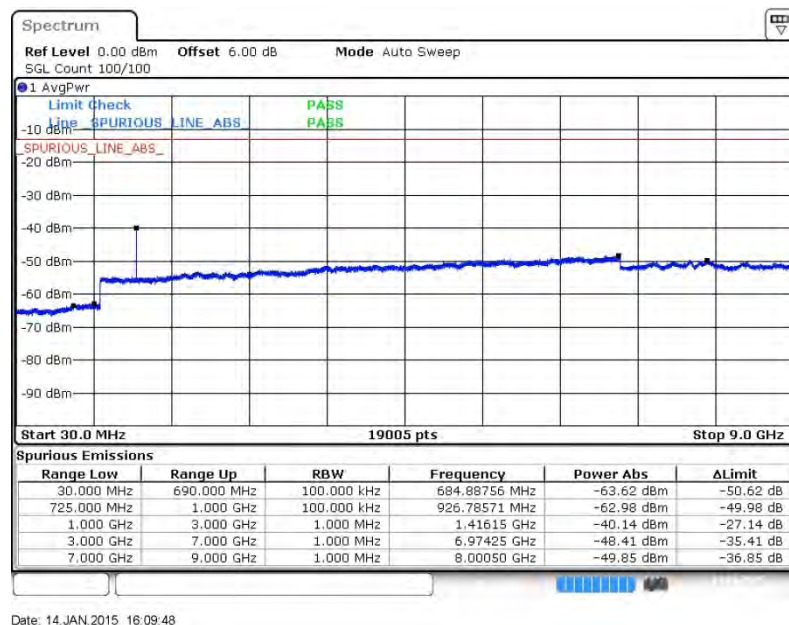


Band :	LTE Band 17	Channel :	CH23790 (Middle)
Band Width :	5MHz		

QPSK (RB Size 1, RB Offset 24)

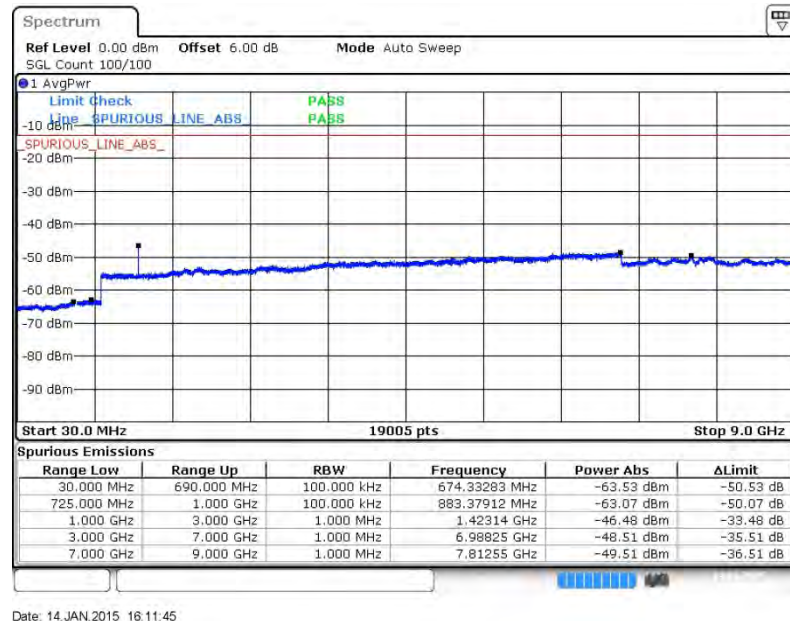


16QAM (RB Size 1, RB Offset 12)

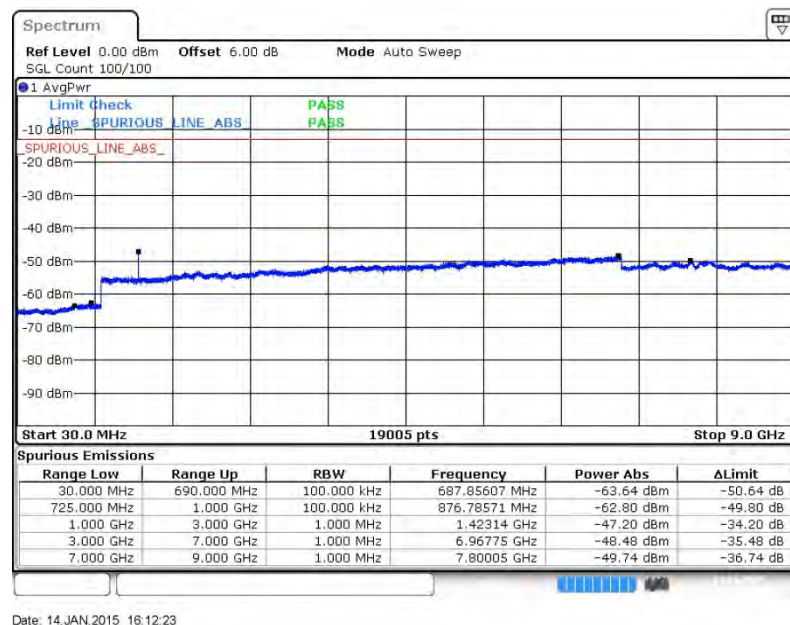


Band :	LTE Band 17	Channel :	CH23825 (High)
Band Width :	5MHz		

QPSK (RB Size 1, RB Offset 24)



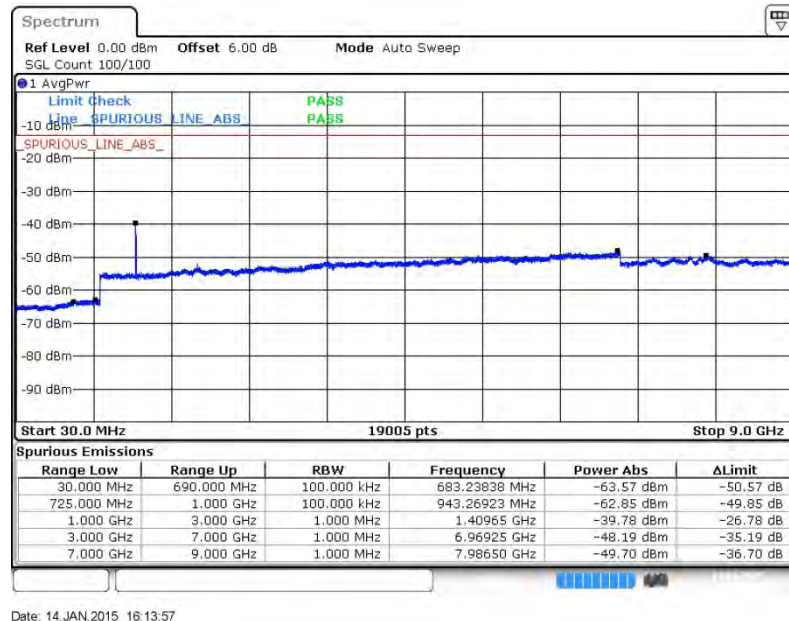
16QAM (RB Size 1, RB Offset 12)



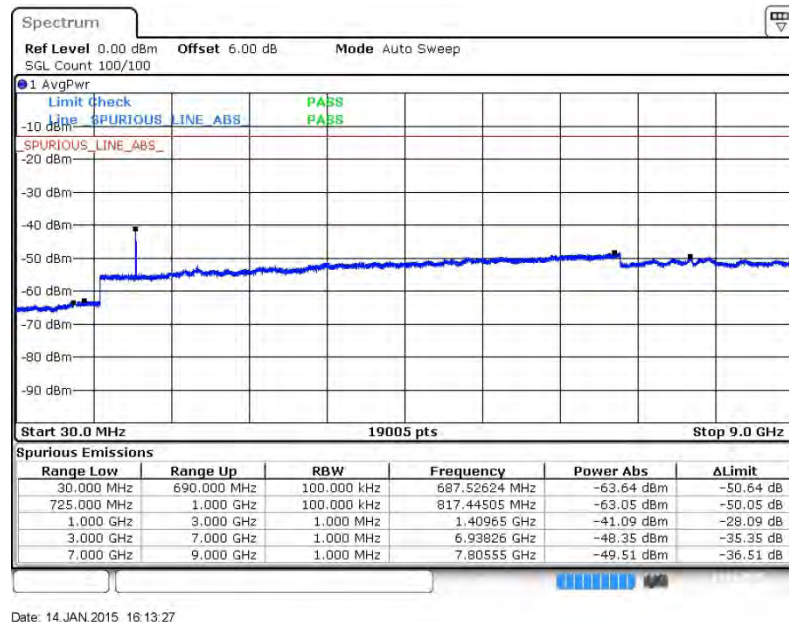


Band :	LTE Band 17	Channel :	CH23780 (Low)
Band Width :	10MHz		

QPSK (RB Size 1, RB Offset 0)

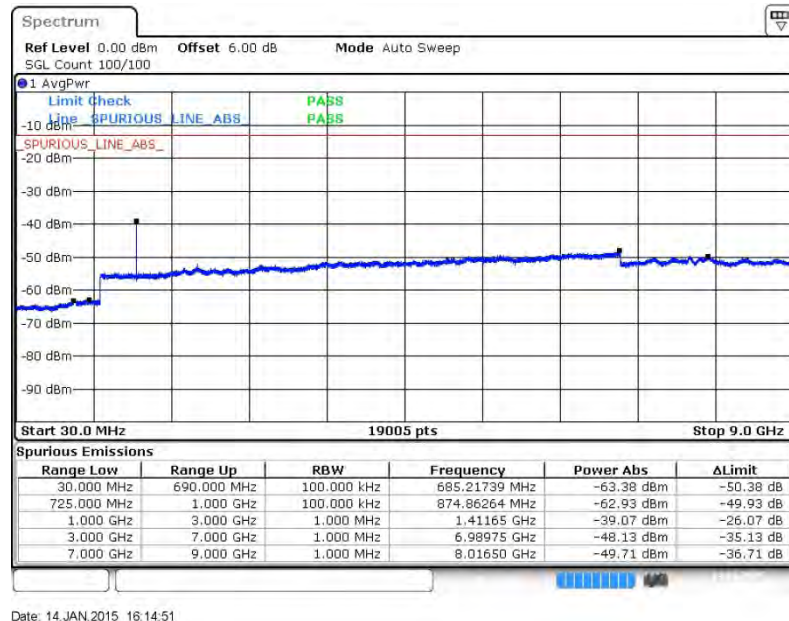
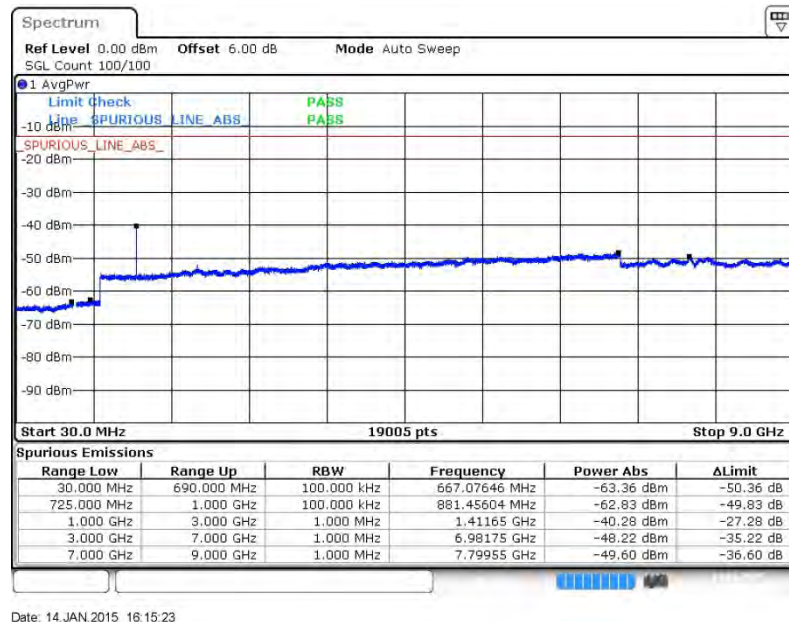


16QAM (RB Size 1, RB Offset 24)





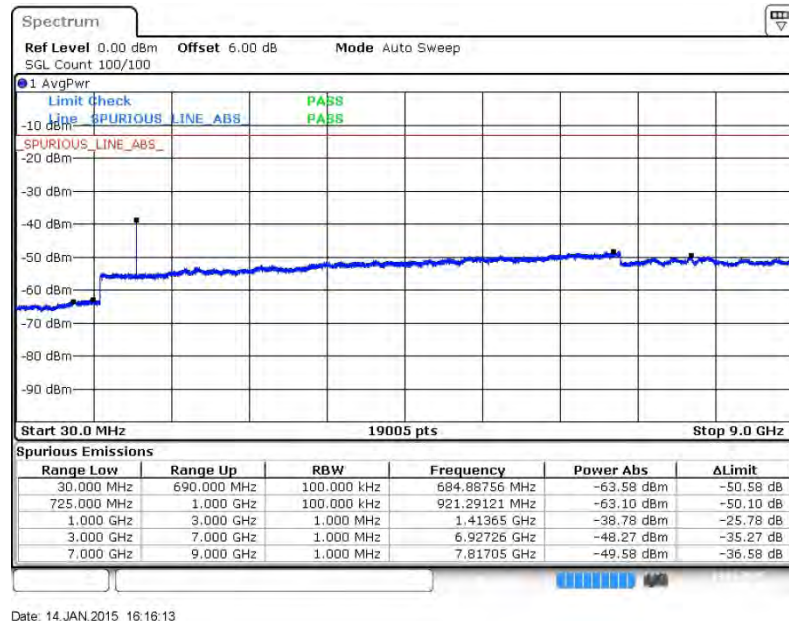
Band :	LTE Band 17	Channel :	CH23790 (Middle)
Band Width :	10MHz		

QPSK (RB Size 1, RB Offset 0)**16QAM (RB Size 1, RB Offset 49)**

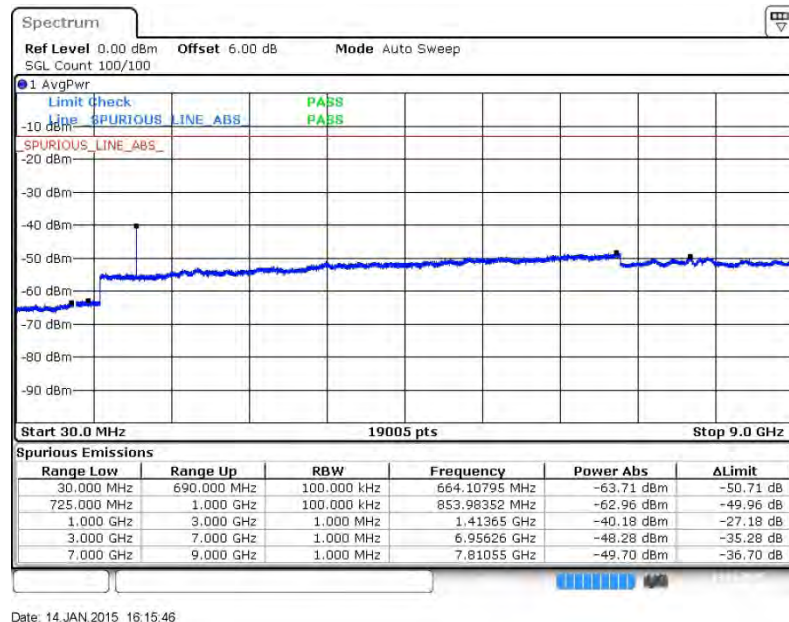


Band :	LTE Band 17	Channel :	CH23800 (High)
Band Width :	10MHz		

QPSK (RB Size 1, RB Offset 0)



16QAM (RB Size 1, RB Offset 24)



3.7 Radiated Spurious Emission Measurement

3.7.1 Description of Radiated Spurious Emission

The radiated spurious emission was measured by substitution method according to ANSI / TIA / EIA-603-C-2004. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB.

For Band 7

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $55 + 10 \log (P)$ dB.

For LTE Band 17

For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth.

The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

3.7.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.7.3 Test Procedures

1. The EUT was placed on a rotatable wooden table with 0.8 meter above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)

$$= P(W) - [43 + 10\log(P)] \text{ (dB)}$$

$$= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$$

$$= -13\text{dBm.}$$

For Band 7

The limit line is derived from $55 + 10\log(P)$ dB below the transmitter power P(Watts)

$$= P(W) - [55 + 10\log(P)] \text{ (dB)}$$

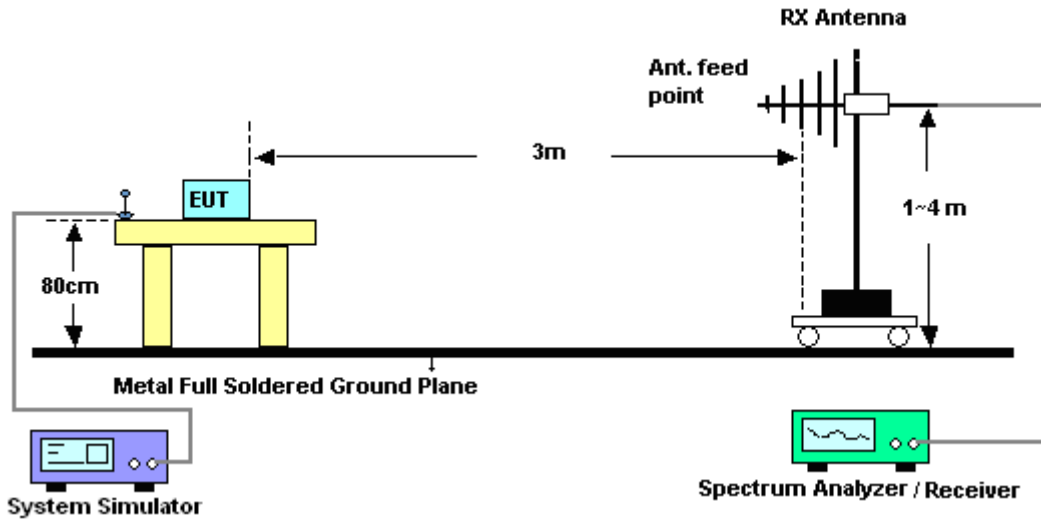
$$= [30 + 10\log(P)] \text{ (dBm)} - [55 + 10\log(P)] \text{ (dB)}$$

$$= -25\text{dBm.}$$

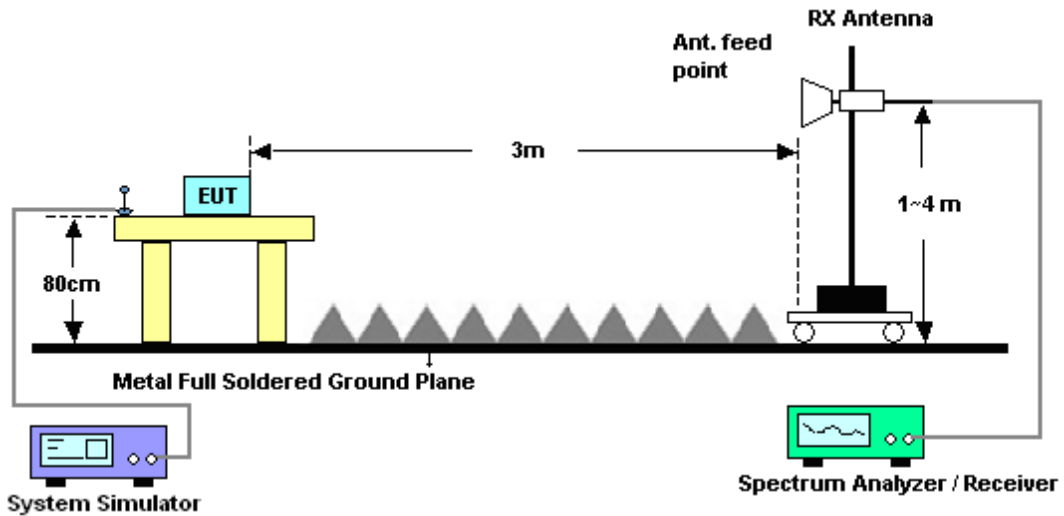
11. EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
12. ERP (dBm) = EIRP - 2.15

3.7.4 Test Setup

For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz





3.7.5 Test Result of Field Strength of Spurious Radiated

Band :	LTE Band 2					Temperature :	21~22°C		
Test Mode :	1.4MHz QPSK RB Size 1 Offset 0					Relative Humidity :	41~42%		
Test Engineer :	Jack Wang					Polarization :	Horizontal		
Remark :	Spurious emissions below 1GHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
3759	-48.71	-13	-35.71	-60.93	-52.29	3	6.58	H	Pass
5640	-29.88	-13	-16.88	-45.65	-35.25	3.84	9.21	H	Pass
7518	-49.52	-13	-36.52	-62.47	-56.19	4.43	11.10	H	Pass
9396	-53.32	-13	-40.32	-63.40	-61.01	4.92	12.62	H	Pass

Band :	LTE Band 2				Temperature :	21~22℃			
Test Mode :	1.4MHz QPSK RB Size 1 Offset 0				Relative Humidity :	41~42%			
Test Engineer :	Jack Wang				Polarization :	Vertical			
Remark :	Spurious emissions below 1GHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
3759	-43.36	-13	-30.36	-57.52	-46.94	3	6.58	V	Pass
5640	-19.65	-13	-6.65	-36.54	-25.02	3.84	9.21	V	Pass
7518	-55.05	-13	-42.05	-62.21	-61.72	4.43	11.10	V	Pass
9396	-37.04	-13	-24.04	-56.89	-44.74	4.92	12.62	V	Pass



Band :	LTE Band 2				Temperature :	21~22°C			
Test Mode :	3MHz QPSK RB Size 1 Offset 0				Relative Humidity :	41~42%			
Test Engineer :	Jack Wang				Polarization :	Horizontal			
Remark :	Spurious emissions below 1GHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
3756	-50.25	-13	-37.25	-61.56	-53.82	3	6.58	H	Pass
5637	-33.32	-13	-20.32	-48.49	-38.68	3.84	9.21	H	Pass
7515	-54.71	-13	-41.71	-62.57	-61.38	4.43	11.10	H	Pass
9393	-52.74	-13	-39.74	-62.82	-60.43	4.92	12.62	H	Pass
11277	-50.36	-13	-37.36	-64.96	-57.91	5.95	13.50	H	Pass
13155	-48.16	-13	-35.16	-65.69	-55.53	5.99	13.36	H	Pass

Band :	LTE Band 2				Temperature :	21~22°C			
Test Mode :	3MHz QPSK RB Size 1 Offset 0				Relative Humidity :	41~42%			
Test Engineer :	Jack Wang				Polarization :	Vertical			
Remark :	Spurious emissions below 1GHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
3756	-42.28	-13	-29.28	-56.98	-45.86	3	6.58	V	Pass
5637	-21.29	-13	-8.29	-38.14	-26.66	3.84	9.21	V	Pass
7515	-51.83	-13	-38.83	-60.54	-58.51	4.43	11.10	V	Pass
9393	-36.83	-13	-23.83	-56.77	-44.53	4.92	12.62	V	Pass
11277	-51.08	-13	-38.08	-64.97	-58.63	5.95	13.50	V	Pass
13152	-36.40	-13	-23.40	-60.62	-43.77	5.99	13.36	V	Pass



Band :	LTE Band 2					Temperature :	21~22°C		
Test Mode :	5MHz QPSK RB Size 1 Offset 0					Relative Humidity :	41~42%		
Test Engineer :	Jack Wang					Polarization :	Horizontal		
Remark :	Spurious emissions below 1GHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
3756	-48.42	-13	-35.42	-60.72	-52.00	3	6.58	H	Pass
5634	-33.54	-13	-20.54	-48.65	-38.91	3.84	9.21	H	Pass
7509	-55.06	-13	-42.06	-62.92	-61.73	4.43	11.10	H	Pass
9387	-53.25	-13	-40.25	-63.33	-60.94	4.92	12.62	H	Pass

Band :	LTE Band 2					Temperature :	21~22°C		
Test Mode :	5MHz QPSK RB Size 1 Offset 0					Relative Humidity :	41~42%		
Test Engineer :	Jack Wang					Polarization :	Vertical		
Remark :	Spurious emissions below 1GHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
3756	-41.33	-13	-28.33	-56.4	-44.91	3	6.58	V	Pass
5634	-19.33	-13	-6.33	-36.19	-24.70	3.84	9.21	V	Pass
7509	-55.97	-13	-42.97	-63.13	-62.64	4.43	11.10	V	Pass
9387	-34.83	-13	-21.83	-55.71	-42.52	4.92	12.62	V	Pass



Band :	LTE Band 2				Temperature :	21~22°C			
Test Mode :	10MHz QPSK RB Size 1 Offset 0				Relative Humidity :	41~42%			
Test Engineer :	Jack Wang				Polarization :	Horizontal			
Remark :	Spurious emissions below 1GHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
3750	-50.63	-13	-37.63	-61.73	-54.21	3	6.58	H	Pass
5628	-35.80	-13	-22.80	-50.28	-41.16	3.84	9.21	H	Pass
7500	-54.45	-13	-41.45	-62.31	-61.12	4.43	11.10	H	Pass
9375	-54.27	-13	-41.27	-64.35	-61.96	4.92	12.62	H	Pass
11250	-48.76	-13	-35.76	-63.36	-56.31	5.95	13.50	H	Pass
13125	-48.53	-13	-35.53	-66.06	-55.90	5.99	13.36	H	Pass

Band :	LTE Band 2				Temperature :	21~22°C			
Test Mode :	10MHz QPSK RB Size 1 Offset 0				Relative Humidity :	41~42%			
Test Engineer :	Jack Wang				Polarization :	Vertical			
Remark :	Spurious emissions below 1GHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
3750	-42.55	-13	-29.55	-57.14	-46.12	3	6.58	V	Pass
5628	-19.65	-13	-6.65	-36.54	-25.02	3.84	9.21	V	Pass
7500	-55.67	-13	-42.67	-62.83	-62.34	4.43	11.10	V	Pass
9378	-38.01	-13	-25.01	-57.51	-45.71	4.92	12.62	V	Pass
11250	-50.58	-13	-37.58	-64.47	-58.13	5.95	13.50	V	Pass
13128	-36.06	-13	-23.06	-60.39	-43.43	5.99	13.36	V	Pass



Band :	LTE Band 2					Temperature :	21~22°C		
Test Mode :	15MHz QPSK RB Size 1 Offset 0					Relative Humidity :	41~42%		
Test Engineer :	Jack Wang					Polarization :	Horizontal		
Remark :	Spurious emissions below 1GHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
3747	-48.32	-13	-35.32	-60.65	-51.90	3	6.58	H	Pass
5622	-34.74	-13	-21.74	-49.44	-40.11	3.84	9.21	H	Pass
7491	-54.76	-13	-41.76	-62.62	-61.43	4.43	11.10	H	Pass
9363	-53.75	-13	-40.75	-63.83	-61.44	4.92	12.62	H	Pass

Band :	LTE Band 2					Temperature :	21~22°C		
Test Mode :	15MHz QPSK RB Size 1 Offset 0					Relative Humidity :	41~42%		
Test Engineer :	Jack Wang					Polarization :	Vertical		
Remark :	Spurious emissions below 1GHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
3747	-42.56	-13	-29.56	-57.15	-46.14	3	6.58	V	Pass
5622	-19.81	-13	-6.81	-36.72	-25.18	3.84	9.21	V	Pass
7491	-55.23	-13	-42.23	-62.39	-61.90	4.43	11.10	V	Pass
9366	-38.90	-13	-25.90	-58.06	-46.60	4.92	12.62	V	Pass



Band :	LTE Band 2				Temperature :	21~22°C			
Test Mode :	20MHz QPSK RB Size 1 Offset 0				Relative Humidity :	41~42%			
Test Engineer :	Jack Wang				Polarization :	Horizontal			
Remark :	Spurious emissions below 1GHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit	Reading	Power	loss	Gain	(H/V)	
3741	-49.71	-13	-36.71	-61.36	-53.29	3	6.58	H	Pass
5616	-34.30	-13	-21.30	-49.17	-39.67	3.84	9.21	H	Pass
7479	-55.91	-13	-42.91	-63.77	-62.58	4.43	11.10	H	Pass
9351	-53.33	-13	-40.33	-63.41	-61.02	4.92	12.62	H	Pass

Band :	LTE Band 2	Temperature :	21~22°C						
Test Mode :	20MHz QPSK RB Size 1 Offset 0	Relative Humidity :	41~42%						
Test Engineer :	Jack Wang	Polarization :	Vertical						
Remark :	Spurious emissions below 1GHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
3741	-41.71	-13	-28.71	-56.63	-45.28	3	6.58	V	Pass
5616	-20.74	-13	-7.74	-37.63	-26.10	3.84	9.21	V	Pass
7479	-55.72	-13	-42.72	-62.88	-62.39	4.43	11.10	V	Pass
9354	-37.57	-13	-24.57	-57.23	-45.27	4.92	12.62	V	Pass



Band :	LTE Band 4					Temperature :	23~25°C		
Test Mode :	1.4MHz QPSK RB Size 1 Offset 0					Relative Humidity :	48~52%		
Test Engineer :	Leo Liao					Polarization :	Horizontal		
Remark :	Spurious emissions below 1GHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
3463.92	-53.54	-13	-40.54	-56.96	-61.57	1.17	9.20	H	Pass
5195.88	-30.52	-13	-17.52	-45.38	-39.68	1.34	10.50	H	Pass
6927.84	-53.10	-13	-40.10	-65.17	-61.23	1.67	9.80	H	Pass

Band :	LTE Band 4				Temperature :	23~25°C			
Test Mode :	1.4MHz QPSK RB Size 1 Offset 0				Relative Humidity :	48~52%			
Test Engineer :	Leo Liao				Polarization :	Vertical			
Remark :	Spurious emissions below 1GHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
			Limit	Reading	Power	loss	Gain		
(MHz)	(dBm)	(dBm)	(dB)	(dBm)	(dBm)	(dB)	(dBi)	(H/V)	
3463.92	-40.65	-13	-27.65	-47.97	-48.68	1.17	9.20	V	Pass
5195.88	-16.47	-13	-3.47	-34.58	-25.63	1.34	10.50	V	Pass
6927.84	-43.92	-13	-30.92	-57.93	-52.05	1.67	9.80	V	Pass



Band :	LTE Band 4	Temperature :	23~25℃						
Test Mode :	3MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%						
Test Engineer :	Leo Liao	Polarization :	Horizontal						
Remark :	Spurious emissions below 1GHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit	Reading	Power	loss	Gain		
(MHz)	(dBm)	(dBm)	(dB)	(dBm)	(dBm)	(dB)	(dBi)	(H/V)	
3462.48	-53.61	-13	-40.61	-57.03	-61.64	1.17	9.20	H	Pass
5193.72	-32.79	-13	-19.79	-47.24	-41.95	1.34	10.50	H	Pass
6924.96	-54.54	-13	-41.54	-66.61	-62.67	1.67	9.80	H	Pass

Band :	LTE Band 4					Temperature :	23~25°C		
Test Mode :	3MHz QPSK RB Size 1 Offset 0					Relative Humidity :	48~52%		
Test Engineer :	Leo Liao					Polarization :	Vertical		
Remark :	Spurious emissions below 1GHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
3462.48	-40.34	-13	-27.34	-47.66	-48.37	1.17	9.20	V	Pass
5193.72	-16.42	-13	-3.42	-34.55	-25.58	1.34	10.50	V	Pass
6924.96	-42.95	-13	-29.95	-56.96	-51.08	1.67	9.80	V	Pass



Band :	LTE Band 4	Temperature :	23~25℃						
Test Mode :	5MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%						
Test Engineer :	Leo Liao	Polarization :	Horizontal						
Remark :	Spurious emissions below 1GHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit	Reading	Power	loss	Gain		
(MHz)	(dBm)	(dBm)	(dB)	(dBm)	(dBm)	(dB)	(dBi)	(H/V)	
3460.68	-53.12	-13	-40.12	-56.54	-61.15	1.17	9.20	H	Pass
5191.02	-32.44	-13	-19.44	-46.89	-41.60	1.34	10.50	H	Pass
6921.36	-54.41	-13	-41.41	-66.48	-62.54	1.67	9.80	H	Pass

Band :	LTE Band 4					Temperature :	23~25°C		
Test Mode :	5MHz QPSK RB Size 1 Offset 0					Relative Humidity :	48~52%		
Test Engineer :	Leo Liao					Polarization :	Vertical		
Remark :	Spurious emissions below 1GHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
3460.68	-39.98	-13	-26.98	-47.32	-48.01	1.17	9.20	V	Pass
5191.02	-19.54	-13	-6.54	-37.22	-28.70	1.34	10.50	V	Pass
6921.36	-43.93	-13	-30.93	-57.94	-52.06	1.67	9.80	V	Pass



Band :	LTE Band 4	Temperature :	23~25℃						
Test Mode :	10MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%						
Test Engineer :	Leo Liao	Polarization :	Horizontal						
Remark :	Spurious emissions below 1GHz were found more than 20dB below limit line.								
Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
3456.18	-52.01	-13	-39.01	-55.43	-60.04	1.17	9.20	H	Pass
5184.27	-32.21	-13	-19.21	-46.66	-41.37	1.34	10.50	H	Pass
6912.36	-54.42	-13	-41.42	-66.49	-62.55	1.67	9.80	H	Pass

Band :	LTE Band 4					Temperature :	23~25°C		
Test Mode :	10MHz QPSK RB Size 1 Offset 0					Relative Humidity :	48~52%		
Test Engineer :	Leo Liao					Polarization :	Vertical		
Remark :	Spurious emissions below 1GHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
3456.18	-38.68	-13	-25.68	-46.51	-46.71	1.17	9.20	V	Pass
5184.27	-19.86	-13	-6.86	-37.47	-29.02	1.34	10.50	V	Pass
6912.36	-46.93	-13	-33.93	-60.94	-55.06	1.67	9.80	V	Pass



Band :	LTE Band 4	Temperature :	23~25℃						
Test Mode :	15MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%						
Test Engineer :	Leo Liao	Polarization :	Horizontal						
Remark :	Spurious emissions below 1GHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit	Reading	Power	loss	Gain	(H/V)	
3451.68	-52.37	-13	-39.37	-55.79	-60.40	1.17	9.20	H	Pass
5177.52	-35.54	-13	-22.54	-48.60	-44.70	1.34	10.50	H	Pass
6903.36	-54.53	-13	-41.53	-66.60	-62.66	1.67	9.80	H	Pass

Band :	LTE Band 4				Temperature :	23~25°C			
Test Mode :	15MHz QPSK RB Size 1 Offset 0				Relative Humidity :	48~52%			
Test Engineer :	Leo Liao				Polarization :	Vertical			
Remark :	Spurious emissions below 1GHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
			Limit	Reading	Power	loss	Gain		
(MHz)	(dBm)	(dBm)	(dB)	(dBm)	(dBm)	(dB)	(dBi)	(H/V)	
3451.68	-37.76	-13	-24.76	-45.88	-45.79	1.17	9.20	V	Pass
5177.52	-18.69	-13	-5.69	-36.55	-27.85	1.34	10.50	V	Pass
6903.36	-44.80	-13	-31.80	-58.81	-52.93	1.67	9.80	V	Pass



Band :	LTE Band 4	Temperature :	23~25℃						
Test Mode :	20MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%						
Test Engineer :	Leo Liao	Polarization :	Horizontal						
Remark :	Spurious emissions below 1GHz were found more than 20dB below limit line.								
Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
3447.18	-51.54	-13	-38.54	-54.96	-59.57	1.17	9.20	H	Pass
5170.77	-35.07	-13	-22.07	-48.26	-44.23	1.34	10.50	H	Pass
6894.36	-54.25	-13	-41.25	-66.32	-62.38	1.67	9.80	H	Pass

Band :	LTE Band 4	Temperature :	23~25°C						
Test Mode :	20MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%						
Test Engineer :	Leo Liao	Polarization :	Vertical						
Remark :	Spurious emissions below 1GHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit	Reading	Power	loss	Gain		
(MHz)	(dBm)	(dBm)	(dB)	(dBm)	(dBm)	(dB)	(dBi)	(H/V)	
3447.18	-37.58	-13	-24.58	-45.78	-45.61	1.17	9.20	V	Pass
5170.77	-19.87	-13	-6.87	-37.48	-29.03	1.34	10.50	V	Pass
6894.36	-46.47	-13	-33.47	-60.48	-54.60	1.67	9.80	V	Pass



Band :	LTE Band 7				Temperature :	21~22℃			
Test Mode :	5MHz QPSK RB Size 1 Offset 0				Relative Humidity :	41~42%			
Test Engineer :	Jack Wang				Polarization :	Horizontal			
Remark :	Spurious emissions below 1GHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
5066	-33.33	-25	-8.33	-48.86	-38.32	3.49	8.48	H	Pass
7601	-49.62	-25	-24.62	-60.53	-56.48	4.28	11.15	H	Pass
10128	-47.88	-25	-22.88	-64.73	-55.72	5.1	12.94	H	Pass

Band :	LTE Band 7					Temperature :	21~22°C		
Test Mode :	5MHz QPSK RB Size 1 Offset 0					Relative Humidity :	41~42%		
Test Engineer :	Jack Wang					Polarization :	Vertical		
Remark :	Spurious emissions below 1GHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
5066	-36.35	-25	-11.35	-51.49	-41.34	3.49	8.48	V	Pass
7598	-51.57	-25	-26.57	-62.14	-58.43	4.28	11.15	V	Pass
10128	-48.11	-25	-23.11	-64.74	-55.95	5.1	12.94	V	Pass



Band :	LTE Band 7	Temperature :	21~22℃						
Test Mode :	10MHz QPSK RB Size 1 Offset 0	Relative Humidity :	41~42%						
Test Engineer :	Jack Wang	Polarization :	Horizontal						
Remark :	Spurious emissions below 1GHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit	Reading	Power	loss	Gain		
(MHz)	(dBm)	(dBm)	(dB)	(dBm)	(dBm)	(dB)	(dBi)	(H/V)	
5060	-34.98	-25	-9.98	-50.10	-39.97	3.49	8.48	H	Pass
7595	-48.20	-25	-23.20	-59.58	-55.06	4.28	11.15	H	Pass
10124	-43.87	-25	-18.87	-61.28	-51.71	5.1	12.94	H	Pass

Band :	LTE Band 7				Temperature :	21~22°C			
Test Mode :	10MHz QPSK RB Size 1 Offset 0				Relative Humidity :	41~42%			
Test Engineer :	Jack Wang				Polarization :	Vertical			
Remark :	Spurious emissions below 1GHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
5060	-36.07	-25	-11.07	-51.25	-41.06	3.49	8.48	V	Pass
7589	-51.21	-25	-26.21	-61.78	-58.07	4.28	11.15	V	Pass
10124	-41.41	-25	-16.41	-59.97	-49.25	5.1	12.94	V	Pass



Band :	LTE Band 7					Temperature :	21~22°C		
Test Mode :	15MHz QPSK RB Size 1 Offset 0					Relative Humidity :	41~42%		
Test Engineer :	Jack Wang					Polarization :	Horizontal		
Remark :	Spurious emissions below 1GHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
5054	-34.98	-25	-9.98	-50.10	-39.97	3.49	8.48	H	Pass
7586	-48.30	-25	-23.30	-59.66	-55.16	4.28	11.15	H	Pass
10112	-47.62	-25	-22.62	-64.47	-55.46	5.1	12.94	H	Pass

Band :	LTE Band 7					Temperature :	21~22°C		
Test Mode :	15MHz QPSK RB Size 1 Offset 0					Relative Humidity :	41~42%		
Test Engineer :	Jack Wang					Polarization :	Vertical		
Remark :	Spurious emissions below 1GHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over Limit	SPA Reading	S.G. Power	TX Cable loss	TX Antenna Gain	Polarization	Result
(MHz)	(dBm)	(dBm)	(dB)	(dBm)	(dBm)	(dB)	(dBi)	(H/V)	
5054	-36.68	-25	-11.68	-51.77	-41.67	3.49	8.48	V	Pass
7583	-51.35	-25	-26.35	-61.92	-58.21	4.28	11.15	V	Pass
10112	-47.81	-25	-22.81	-64.44	-55.65	5.1	12.94	V	Pass



Band :	LTE Band 7	Temperature :	21~22℃						
Test Mode :	20MHz QPSK RB Size 1 Offset 0	Relative Humidity :	41~42%						
Test Engineer :	Jack Wang	Polarization :	Horizontal						
Remark :	Spurious emissions below 1GHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit	Reading	Power	loss	Gain	(H/V)	
5051	-35.44	-25	-10.44	-50.40	-40.43	3.49	8.48	H	Pass
7580	-48.78	-25	-23.78	-60.05	-55.65	4.28	11.15	H	Pass
10100	-47.16	-25	-22.16	-64.01	-55.00	5.1	12.94	H	Pass

Band :	LTE Band 7				Temperature :	21~22°C			
Test Mode :	20MHz QPSK RB Size 1 Offset 0				Relative Humidity :	41~42%			
Test Engineer :	Jack Wang				Polarization :	Vertical			
Remark :	Spurious emissions below 1GHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	(dBm)	loss (dB)	Gain (dBi)	(H/V)	
5051	-36.50	-25	-11.50	-51.62	-41.49	3.49	8.48	V	Pass
7574	-52.71	-25	-27.71	-63.28	-59.57	4.28	11.15	V	Pass
10100	-48.69	-25	-23.69	-65.32	-56.53	5.1	12.94	V	Pass



Band :	LTE Band 17				Temperature :	23~25°C			
Test Mode :	5MHz QPSK RB Size 1 Offset 0				Relative Humidity :	48~52%			
Test Engineer :	Leo Liao				Polarization :	Horizontal			
Remark :	Spurious emissions below 1GHz were found more than 20dB below limit line.								
Frequency	ERP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
1415.68	-34.37	-13	-21.37	-51.14	-37.30	0.78	5.86	H	Pass
2123.58	-39.93	-13	-26.93	-55.19	-42.53	1	5.75	H	Pass
2831.36	-49.53	-13	-36.53	-59.89	-53.83	1.05	7.50	H	Pass
3539.22	-47.37	-13	-34.37	-62.00	-52.02	1.21	8.01	H	Pass
4247.06	-48.85	-13	-35.85	-66.94	-54.18	1.35	8.83	H	Pass
4954.9	-49.77	-13	-36.77	-67.67	-55.79	1.48	9.65	H	Pass

Band :	LTE Band 17					Temperature :	23~25°C		
Test Mode :	5MHz QPSK RB Size 1 Offset 0					Relative Humidity :	48~52%		
Test Engineer :	Leo Liao					Polarization :	Vertical		
Remark :	Spurious emissions below 1GHz were found more than 20dB below limit line.								
Frequency	ERP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
1415.68	-32.57	-13	-19.57	-46.51	-35.50	0.78	5.86	V	Pass
2123.58	-32.57	-13	-19.57	-45.68	-35.17	1.00	5.75	V	Pass
2831.36	-37.76	-13	-24.76	-51.73	-42.06	1.05	7.50	V	Pass
3539.22	-35.23	-13	-22.23	-52.03	-39.88	1.21	8.01	V	Pass
4247.06	-41.31	-13	-28.31	-59.54	-46.64	1.35	8.83	V	Pass
4954.9	-46.46	-13	-33.46	-64.04	-52.48	1.48	9.65	V	Pass



Band :	LTE Band 17					Temperature :	23~25°C		
Test Mode :	5MHz QPSK RB Size 1 Offset 0					Relative Humidity :	48~52%		
Test Engineer :	Leo Liao					Polarization :	Horizontal		
Remark :	Spurious emissions below 1GHz were found more than 20dB below limit line.								
Frequency	ERP	Limit	Over Limit	SPA Reading	S.G. Power	TX Cable loss	TX Antenna Gain	Polarization	Result
(MHz)	(dBm)	(dBm)	(dB)	(dBm)	(dBm)	(dB)	(dBi)	(H/V)	
1411.18	-34.85	-13	-21.85	-51.58	-37.78	0.78	5.86	H	Pass
2116.77	-40.06	-13	-27.06	-55.31	-42.66	1	5.75	H	Pass
2822.36	-50.40	-13	-37.40	-60.76	-54.70	1.05	7.50	H	Pass
3527.95	-47.75	-13	-34.75	-62.38	-52.40	1.21	8.01	H	Pass
4233.54	-48.23	-13	-35.23	-66.32	-53.56	1.35	8.83	H	Pass
4939.13	-49.50	-13	-36.50	-67.40	-55.52	1.48	9.65	H	Pass

Band :	LTE Band 17					Temperature :	23~25°C		
Test Mode :	5MHz QPSK RB Size 1 Offset 0					Relative Humidity :	48~52%		
Test Engineer :	Leo Liao					Polarization :	Vertical		
Remark :	Spurious emissions below 1GHz were found more than 20dB below limit line.								
Frequency	ERP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
1411.18	-32.65	-13	-19.65	-46.57	-35.58	0.78	5.86	V	Pass
2116.77	-33.16	-13	-20.16	-46.24	-35.76	1.00	5.75	V	Pass
2822.36	-39.34	-13	-26.34	-53.12	-43.64	1.05	7.50	V	Pass
3527.95	-35.92	-13	-22.92	-52.98	-40.57	1.21	8.01	V	Pass
4233.54	-47.05	-13	-34.05	-64.30	-52.38	1.35	8.83	V	Pass
4939.13	-44.04	-13	-31.04	-61.62	-50.06	1.48	9.65	V	Pass

3.8 Frequency Stability Measurement

3.8.1 Description of Frequency Stability Measurement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ ($\pm 2.5\text{ppm}$) of the center frequency.

3.8.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

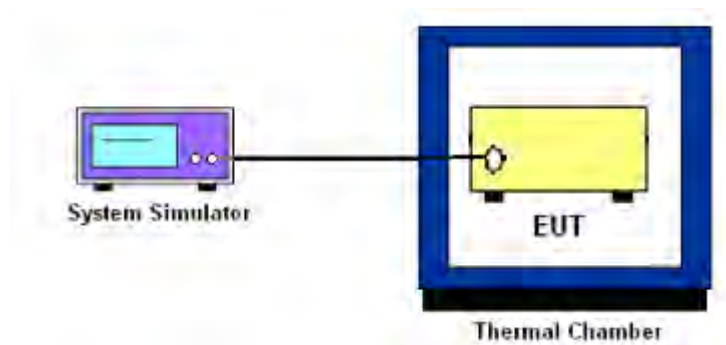
3.8.3 Test Procedures for Temperature Variation

1. The EUT was set up in the thermal chamber and connected with the system simulator.
2. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
3. With power OFF, the temperature was raised in 10°C step up to 50°C . The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

3.8.4 Test Procedures for Voltage Variation

1. The EUT was placed in a temperature chamber at $25\pm 5^{\circ}\text{C}$ and connected with the system simulator.
2. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value measured at the input to the EUT.
3. The variation in frequency was measured for the worst case.

3.8.5 Test Setup



3.8.6 Test Result of Temperature Variation (FCC)

Band :	LTE Band 2 (QPSK)	Limit (ppm) :	within authorized band
Temperature (°C)	BW 10MHz	Result	
	Deviation (ppm)		
50	0.0053	PASS	
40	0.0009		
30	0.0009		
20(Ref.)	0.0000		
10	0.0007		
0	0.0010		
-10	0.0012		
-20	0.0020		
-30	0.0001		

Note: The frequency fundamental emissions stay within the authorized frequency block based on the frequency deviation measured is small.

Band :	LTE Band 4 (QPSK)	Limit (ppm) :	within authorized band
Temperature (°C)	BW 10MHz	Result	
	Deviation (ppm)		
50	0.0009	PASS	
40	0.0002		
30	0.0075		
20(Ref.)	0.0000		
10	0.0103		
0	0.0012		
-10	0.0100		
-20	0.0013		
-30	0.0023		

Note: The frequency fundamental emissions stay within the authorized frequency block based on the frequency deviation measured is small.

Band :	LTE Band 7 (QPSK)	Limit (ppm) :	within authorized band
Temperature (°C)	BW 10MHz	Result	
	Deviation (ppm)		
50	0.0372	PASS	
40	0.0064		
30	0.0047		
20(Ref.)	0.0000		
10	0.0007		
0	0.0011		
-10	0.0058		
-20	0.0056		
-30	0.0001		

Note: The frequency fundamental emissions stay within the authorized frequency block based on the frequency deviation measured is small.

Band :	LTE Band 17 (QPSK)	Limit (ppm) :	within authorized band
Temperature (°C)	BW 10MHz	Result	
	Deviation (ppm)		
50	0.0025	PASS	
40	0.0034		
30	0.0024		
20(Ref.)	0.0000		
10	0.0038		
0	0.0046		
-10	0.0023		
-20	0.0013		
-30	0.0039		

Note: The frequency fundamental emissions stay within the authorized frequency block based on the frequency deviation measured is small.

3.8.7 Test Result of Voltage Variation (FCC)

Band	Bandwidth	Voltage (Volt)	Deviation (ppm)	Limit (ppm)	Result
LTE Band 2	10M	4.35	0.0009	(Note 3.)	PASS
		Normal	0.0010		
		3.60	0.0004		
LTE Band 4	10M	4.35	0.0086	(Note 3.)	PASS
		Normal	0.0114		
		3.60	0.0012		
LTE Band 7	10M	4.35	0.0007	(Note 3.)	PASS
		Normal	0.0005		
		3.60	0.0062		
LTE Band 17	10M	4.35	0.0056	(Note 3.)	PASS
		Normal	0.0014		
		3.60	0.0042		

Remark:

1. Normal Voltage = 3.80V.
2. The manufacturer declared that the EUT could work properly between voltage 3.60V ~ 4.35V.
3. The frequency fundamental emissions stay within the authorized frequency block based on the frequency deviation measured is small.



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV30	101338	9kHz~30GHz	May 04, 2014	Dec. 12, 2014~ Jan. 14, 2015	May 03, 2015	Conducted (TH01-KS)
Thermal Chamber	Ten Billion	TTC-B3S	TBN-960502	-40~+150°C	Oct. 25, 2014	Dec. 12, 2014~ Jan. 14, 2015	Oct. 24, 2015	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESCI	100534	9kHz~3GHz	Oct. 25, 2014	Jan. 15, 2015~ Jan. 16, 2015	Oct. 24, 2015	Radiation (03CH01-KS)
Spectrum Analyzer	R&S	FSP30	101399	9kHz~30GHz	May 04, 2014	Jan. 15, 2015~ Jan. 16, 2015	May 03, 2015	Radiation (03CH01-KS)
Bilog Antenna	TeseQ	CBL6112D	37879	30Mhz-2Ghz	Sep. 13, 2014	Jan. 15, 2015~ Jan. 16, 2015	Sep. 12, 2015	Radiation (03CH01-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Nov. 08, 2014	Jan. 15, 2015~ Jan. 16, 2015	Nov. 07, 2015	Radiation (03CH01-KS)
Active Horn Antenna	com-power	AHA-118	701030	1GHz~18GHz	Nov. 08, 2014	Jan. 15, 2015~ Jan. 16, 2015	Nov. 07, 2015	Radiation (03CH01-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA17024 9	15GHz~40GHz	Mar. 10, 2014	Jan. 15, 2015~ Jan. 16, 2015	Mar. 09, 2015	Radiation (03CH01-KS)
Amplifier	com-power	PA-103A	161073	1MHz~1GHz	May 04, 2014	Jan. 15, 2015~ Jan. 16, 2015	May 03, 2015	Radiation (03CH01-KS)
Amplifier	Agilent	8449B	3008A02371	1GHz~26.5GHz	Oct. 28, 2014	Jan. 15, 2015~ Jan. 16, 2015	Oct. 27, 2015	Radiation (03CH01-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Jan. 15, 2015~ Jan. 16, 2015	NCR	Radiation (03CH01-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Jan. 15, 2015~ Jan. 16, 2015	NCR	Radiation (03CH01-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Jan. 15, 2015~ Jan. 16, 2015	NCR	Radiation (03CH01-KS)
ESCIO TEST Receiver	R&S	ESCI	100724	9kHz~3GHz	Feb. 21, 2014	Jan. 15, 2015	Feb. 20, 2015	Radiation (03CH01-SZ)
Spectrum Analyzer	Agilent Technologies	N9038A	MY5226018 5	20Hz~26.5GHz	May 26, 2014	Jan. 15, 2015	May 25, 2015	Radiation (03CH01-SZ)
Bilog Antenna	TESEQ	CBL 6112D	37877	30MHz~2GHz	Oct. 15, 2014	Jan. 15, 2015	Oct. 14, 2015	Radiation (03CH01-SZ)
Double Ridge Horn Antenna	ETS Lindgren	3117	00119436	1GHz~18GHz	Oct. 15, 2014	Jan. 15, 2015	Oct. 14, 2015	Radiation (03CH01-SZ)
Double Ridged Horn Antenna	COM-POWER	AH-840	101073	18GHz~40GHz	Jun. 09, 2014	Jan. 15, 2015	Jun. 08, 2015	Radiation (03CH01-SZ)
Amplifier	ADVANTEST	BB525C	E9007003	9kHz~3000MHz	Feb. 21, 2014	Jan. 15, 2015	Feb. 20, 2015	Radiation (03CH01-SZ)
Amplifier	Yiai	AV3860B	04030	2GHz~26.5GHz	May 08, 2014	Jan. 15, 2015	May 07, 2015	Radiation (03CH01-SZ)
AC Source(AVR)	Chroma	61601	6160100019 85	100Vac~250Vac	Mar. 25, 2014	Jan. 15, 2015	Mar. 24, 2015	Radiation (03CH01-SZ)
Turn Table	EM Electronics	EM 1000	N/A	0~360 degree	NCR	Jan. 15, 2015	NCR	Radiation (03CH01-SZ)
Antenna Mast	EM Electronics	EM 1000	N/A	1 m~4 m	NCR	Jan. 15, 2015	NCR	Radiation (03CH01-SZ)



Spectrum Analyzer	R&S	FSP 7	100818	9kHz~7GHz	Jul. 17, 2014	Jan. 10, 2015	Jul. 16, 2015	ERP/EIRP (OTA02-SZ)
Quad-Ridged Horn	ETS-Lindgren	3164-08	00102954	700MHz~10000M Hz	N/A	Jan. 10, 2015	N/A	ERP/EIRP (OTA02-SZ)
Multi-Devices Controller	ETS-Lindgren	2090-OPT1	00108147	N/A	N/A	Jan. 10, 2015	N/A	ERP/EIRP (OTA02-SZ)
Switch Control Mainframe	Agilent	3499A	MY4200545 1	N/A	N/A	Jan. 10, 2015	N/A	ERP/EIRP (OTA02-SZ)



5 Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz) for 03CH01-KS

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.5dB
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz) for 03CH01-SZ

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	3.9dB
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