

Report on the RF Testing of:

KYOCERA Corporation
Mobile Phone, Model: EB1190EM
FCC ID: JOYPC9699



In accordance with FCC Part 27 Subpart C, FCC Part 27 Subpart L, and FCC Part 27 Subpart H

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EXECUTIVE SUMMARY
A sample(s) of this product was tested and found to be compliant with FCC Part 27 Subpart C, FCC Part 27 Subpart L, and FCC Part 27 Subpart H.

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1 Summary of Test

1.1 Modification history of the test report

Document Number	Modification History	Issue Date
JPD-TR-24115-0	First Issue	Refer to the cover page

1.2 Standards

CFR47 FCC Part 27 Subpart C
 CFR47 FCC Part 27 Subpart L
 CFR47 FCC Part 27 Subpart H

1.3 Test methods

KDB 971168 D01 Power Meas License Digital Systems v03r01
 ANSI/TIA/EIA 603-E-2016
 ANSI C63.26-2015

1.4 Deviation from standards

None

1.5 List of applied test(s) of the EUT

Test item section	Test item	Condition	Result	Remark
2.1046	Conducted Output Power	Conducted	PASS	*1
27.50	Effective Radiated Power or Equivalent Isotropically Radiated Power	Radiated	PASS	-
27.50	Peak to Average Ratio	Conducted	PASS	-
2.1049	Occupied Bandwidth	Conducted	PASS	-
27.53 2.1051	Band Edge Spurious and Harmonic at Antenna Terminal	Conducted	PASS	-
27.53 2.1053	Radiated emissions and Harmonic Emissions	Radiated	PASS	-
27.54 2.1055	Frequency Stability	Conducted	PASS	-

*1: Refer to RF Exposure Report (Test Report_SAR)

1.6 Test information

None

1.7 Test set up

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1.8 Test period

16-April-2024 - 27-April-2024

2 Equipment Under Test

All information in this chapter was provided by the applicant.

2.1 EUT information

Applicant	KYOCERA Corporation Yokohama Office 2-1-1 Kagahara, Tsuzuki-ku Yokohama-shi, Kanagawa, Japan Phone: +81-45-943-6253 Fax: +81-45-943-6314
Equipment Under Test (EUT)	Mobile Phone
Model number	EB1190EM
Serial number	353343640000094, 353343640000102, 353343640000110
Trade name	Kyocera
Number of sample(s)	3
EUT condition	Pre-Production
Power rating	Battery: DC 3.87 V
Size	(W) 73.0 mm × (D) 157.0 mm × (H) 11.43 mm
Environment	Indoor and Outdoor use
Terminal limitation	-20°C to 60°C
Hardware version	DMT1
Software version	0.151BX.0025.a
Firmware version	Not applicable
RF Specification	
Frequency of Operation	Up Link WCDMA Band IV: 1712.4-1752.6 MHz LTE Band IV: 1710-1755 MHz LTE Band XII: 699-716 MHz LTE Band XL I: 2496-2690 MHz Down Link WCDMA Band IV: 2112.4-2152.6 MHz LTE Band IV: 2110-2155 MHz LTE Band XII: 729-746.0 MHz LTE Band XL I: 2496-2690 MHz
Modulation type	WCDMA Band IV: QPSK, 16QAM LTE Band IV: QPSK, 16QAM, 64QAM LTE Band XII: QPSK, 16QAM, 64QAM LTE Band XL I: QPSK, 16QAM, 64QAM



Emission designator	<p>WCDMA Band IV: 4M14F9W</p> <p>LTE Band IV:</p> <p>BW 1.4M QPSK: 1M10G7D, 16QAM: 1M10W7D, 64QAM: 1M10W7D</p> <p>BW 3M QPSK: 2M70G7D, 16QAM: 2M71W7D, 64QAM: 2M71W7D</p> <p>BW 5M QPSK: 4M52G7D, 16QAM: 4M50W7D, 64QAM: 4M50W7D</p> <p>BW 10M QPSK: 8M99G7D, 16QAM: 9M00W7D, 64QAM: 8M97W7D</p> <p>BW 15M QPSK: 13M5G7D, 16QAM: 13M5W7D, 64QAM: 13M5W7D</p> <p>BW 20M QPSK: 18M0G7D, 16QAM: 17M9W7D, 64QAM: 18M0W7D</p> <p>LTE Band XII:</p> <p>BW 1.4M QPSK: 1M10G7D, 16QAM: 1M09W7D, 64QAM: 1M10W7D</p> <p>BW 3M QPSK: 2M70G7D, 16QAM: 2M71W7D, 64QAM: 2M71W7D</p> <p>BW 5M QPSK: 4M51G7D, 16QAM: 4M49W7D, 64QAM: 4M52W7D</p> <p>BW 10M QPSK: 8M98G7D, 16QAM: 8M98W7D, 64QAM: 8M95W7D</p> <p>LTE Band XL I:</p> <p>BW 5M QPSK: 4M51G7D, 16QAM: 4M51W7D, 64QAM: 4M52W7D</p> <p>BW 10M QPSK: 9M01G7D, 16QAM: 9M01W7D, 64QAM: 8M99W7D</p> <p>BW 15M QPSK: 13M5G7D, 16QAM: 13M5W7D, 64QAM: 13M5W7D</p> <p>BW 20M QPSK: 18M0G7D, 16QAM: 18M0W7D, 64QAM: 18M0W7D</p>
Effective Radiated Power (E.R.P.)	LTE Band XII: 0.107 W (20.3 dBm)
Effective Radiated Power (E.I.R.P.)	<p>WCDMA Band IV: 0.214 W (23.3 dBm)</p> <p>LTE Band IV: 0.282 W (24.5 dBm)</p> <p>LTE Band XL I: 0.316 W (25.0 dBm)</p>
Antenna type	Internal antenna
Antenna gain	<p>WCDMA Band IV: 0.1 dBi</p> <p>LTE Band IV: 0.1 dBi</p> <p>LTE Band XII: -3.0 dBi</p> <p>LTE Band XL I: 1.5 dBi</p>

2.2 Modification to the EUT

The table below details modifications made to the EUT during the test project.

Modification State	Description of Modification	Modification fitted by	Date of Modification
Model: EB1190EM, Serial Number: 353343640000094, 353343640000102, 353343640000110			
0	As supplied by the applicant	Not Applicable	Not Applicable

2.3 Variation of family model(s)

2.3.1 List of family model(s)

EUT

Model number	EB1190EM *1	EB1201	EB1190	EB1190NC
Memory	expansion	standard	standard	standard
Camera	with	with	with	without
Fingerprint Sensor	with	with	without	without
NFC	with	with	without	without
size	73.0 × 157.0 × 11.43 [mm]			

*1:Tested model

2.3.2 Reason for selection of EUT

The applicant decided that the differences between the design had no EMC impact and selected EB1190EM with full function.

2.4 Description of test mode

The EUT had been tested under operating condition.
There are three channels have been tested as following:

Band	Modulation	Bandwidth [MHz]	Channel	Frequency [MHz]
WCDMA Band IV	QPSK	-	1312, 1413, 1513	1712.4, 1732.6, 1752.6
	16QAM	-	1312, 1413, 1513	1712.4, 1732.6, 1752.6
LTE Band IV	QPSK, 16QAM, 64QAM	1.4	19957, 20175, 20393	1710.7, 1732.5, 1754.3
		3	19965, 20175, 20385	1711.5, 1732.5, 1753.5
		5	19975, 20175, 20375	1712.5, 1732.5, 1752.5
		10	20000, 20175, 20350	1715.0, 1732.5, 1750.0
		15	20025, 20175, 20325	1717.5, 1732.5, 1747.5
		20	20050, 20175, 20300	1720.0, 1732.5, 1745.0
LTE Band XII	QPSK, 16QAM, 64QAM	1.4	23017, 23095, 23173	699.7, 707.5, 715.3
		3	23025, 23095, 23165	700.5, 707.5, 714.5
		5	23035, 23095, 23155	701.5, 707.5, 713.5
		10	23060, 23095, 23130	704.0, 707.5, 711.0
LTE Band X VII	QPSK, 16QAM, 64QAM	5	23755, 23790, 23825	701.5, 707.5, 713.5
		10	23780, 23790, 23800	709.0, 710.0, 711.0
LTE Band XL I	QPSK, 16QAM, 64QAM	5	39675, 40620, 41565	2498.5, 2593.0, 2687.5
		10	39700, 40620, 41540	2501.0, 2593.0, 2685.0
		15	39725, 40620, 41515	2503.5, 2593.0, 2682.5
		20	39750, 40620, 41490	2506.0, 2593.0, 2680.0

The field strength of spurious emissions was measured at each position of all three axis X, Y and Z to compare the level, and the maximum noise.

The worst emission was found in X-axis (WCDMA Band IV, LTE Band X VII, LTE Band XL I) and Z-axis (Other Bands) the worst case recorded.

Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports.

3 Configuration of Equipment

Numbers assigned to equipment on the diagram in “3.2 System configuration” correspond to the list in “3.1 Equipment used”.

This test configuration is based on the manufacture’s instruction.

Cabling and setup(s) were taken into consideration and test data was taken under worse case condition.

3.1 Equipment used

No.	Equipment	Company	Model No.	Serial No.	FCC ID/DoC	Comment
1	Mobile Phone	KYOCERA	EB1190EM	353343640000094, 353343640000102, 353343640000110	JOYPC9699	EUT

3.2 System configuration

1. Mobile Phone
(EUT)

4 Test Result

4.1 Effective Radiated Power or Equivalent Isotropically Radiated Power

4.1.1 Measurement procedure

[FCC 27.50]

<Step 1>

The EUT and support equipment are placed on a 1 meter x 1 meter surface, 0.8 meter height (Below 1GHz) or 0.6 meter x 0.6 meter surface, 1.5 meter height (Above 1GHz) styrene foam table. Radiated emission measurements are performed at 3 meter distance with the broadband antenna (Log periodic antenna). The antenna is positioned both the horizontal and vertical planes of polarization and height is varied 1 to 4 meters and stopped at height producing the maximum emission.

The bandwidth of the spectrum analyzer is set to 1 MHz. The turntable is rotated by 360 degrees and stopped at azimuth of producing the maximum emission.

<Step 2>

The substitution antenna is replaced by the transmitter antenna (EUT).

The frequency of the signal generator is adjusted to the measurement frequency.

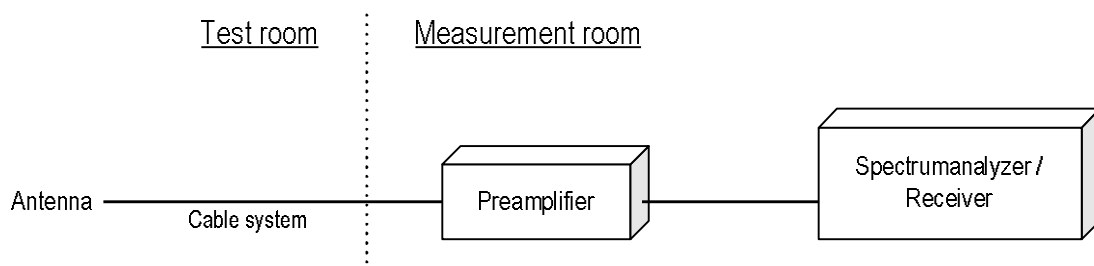
Level of the signal generator is adjusted to the level that is obtained from step 1, and record the emission level of signal generator.

The spectrum analyzer is set to;

- Span = 1.5 times the OBW
- RBW = 1-5% of the expected OBW, not to exceed 1 MHz
- VBW $\geq 3 \times$ RBW
- Number of sweep points $\geq 2 \times$ span / RBW
- Sweep time = auto-couple
- Detector = RMS (power averaging)
- If the EUT can be configured to transmit continuously (i.e., burst duty cycle $\geq 98\%$), then set the trigger to free run.
- If the EUT cannot be configured to transmit continuously (i.e., burst duty cycle $< 98\%$), then use a sweep trigger with the level set to enable triggering only on full power bursts and configure the EUT to transmit at full power for the entire duration of each sweep. Ensure that the sweep time is less than or equal to the transmission burst duration.
- Trace average at least 100 traces in power averaging (i.e., RMS) mode.
- Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function, with the band limits set equal to the OBW band edges.

If the instrument does not have a band power function, then sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

- Test configuration





4.1.2 Calculation method

Result (EIRP) = Ant. Input - Cable loss + Antenna Gain
 Margin = Limit – Result (EIRP)

Example:

Limit @ 1732.6MHz : 30.0 dBm
 Ant. Input = 25.5 dBm Cable loss = 0.7 dB Ant. Gain = -10.1 dB
 Result = 25.5 - 0.7 + (-10.1) = 14.7 dBm
 Margin = 30.0 – 14.7 = 15.3 dB

Result (ERP) = S.G Reading - Cable loss + Antenna Gain
 Margin = Limit – Result (ERP)

Example:

Limit @ 707.5 MHz : 34.7 dBm
 Ant. Input = 15.0 dBm Cable loss = 1.1 dB Ant. Gain = 8.0 dB
 Result = 15.0 – 1.1 + 8.0 = 21.9 dBm
 Margin = 34.7 – 21.9 = 8.1 dB

4.1.3 Limit

ERP: 3W (34.7 dBm)
 WCDMA Band IV, LTE Band IV: 1W (30 dBm)
 LTE Band XL I: 2W (33 dBm)

4.1.4 Test data

Date	: 26-April-2024		
Temperature	: 21.8 [°C]		
Humidity	: 38.8 [%]	Test engineer	: Tadahiro Seino
Test place	: 3m Semi-anechoic chamber		
Date	: 26~27-April-2024		
Temperature	: 22.8 [°C]		
Humidity	: 38.0 [%]	Test engineer	: Chiaki Kanno
Test place	: 3m Semi-anechoic chamber		

[WCDMA Band IV]

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	1712.4	-48.7	19.3	1.5	5.5	23.3	0.214	30.0	6.7
H	1732.6	-49.4	18.4	1.5	5.2	22.1	0.162	30.0	7.9
H	1752.6	-49.6	19.1	1.5	5.0	22.6	0.182	30.0	7.4

[LTE Band IV]**QPSK, BW 1.4MHz**

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	1710.7	-28.5	19.8	1.5	5.5	23.8	0.240	30.0	6.2
H	1732.5	-28.4	20.5	1.5	5.2	24.2	0.263	30.0	5.8
H	1754.3	-29.4	20.1	1.5	5.0	23.6	0.229	30.0	6.4

16QAM, BW 1.4MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	1710.7	-29.4	18.9	1.5	5.5	22.9	0.195	30.0	7.1
H	1732.5	-29.4	19.2	1.5	5.2	22.9	0.195	30.0	7.1
H	1754.3	-30.4	19.1	1.5	5.0	22.6	0.182	30.0	7.4

64QAM, BW 1.4MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	1710.7	-30.2	18.1	1.5	5.5	22.1	0.162	30.0	7.9
H	1732.5	-30.4	18.1	1.5	5.2	21.8	0.151	30.0	8.2
H	1754.3	-31.2	18.0	1.5	5.0	21.5	0.141	30.0	8.5

QPSK, BW 3MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	1711.5	-29.2	19.1	1.5	5.5	23.1	0.204	30.0	6.9
H	1732.5	-28.4	20.1	1.5	5.2	23.8	0.240	30.0	6.2
H	1753.5	-28.5	21.0	1.5	5.0	24.5	0.282	30.0	5.5

16QAM, BW 3MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	1711.5	-30.0	18.3	1.5	5.5	22.3	0.170	30.0	7.7
H	1732.5	-29.3	19.2	1.5	5.2	22.9	0.195	30.0	7.1
H	1753.5	-29.6	19.9	1.5	5.0	23.4	0.219	30.0	6.6

64QAM, BW 3MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	1711.5	-31.1	17.2	1.5	5.5	21.2	0.132	30.0	8.8
H	1732.5	-30.4	18.1	1.5	5.2	21.8	0.151	30.0	8.2
H	1753.5	-30.3	19.4	1.5	5.0	22.9	0.195	30.0	7.1

QPSK, BW 5MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	1712.5	-29.2	19.1	1.5	5.5	23.1	0.204	30.0	6.9
H	1732.5	-28.2	20.3	1.5	5.2	24.0	0.251	30.0	6.0
H	1752.5	-28.8	20.7	1.5	5.0	24.2	0.263	30.0	5.8

16QAM, BW 5MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	1712.5	-30.0	18.3	1.5	5.5	22.3	0.170	30.0	7.7
H	1732.5	-29.3	19.2	1.5	5.2	22.9	0.195	30.0	7.1
H	1752.5	-29.7	19.8	1.5	5.0	23.3	0.214	30.0	6.7

64QAM, BW 5MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	1712.5	-31.1	17.1	1.5	5.5	21.1	0.129	30.0	8.9
H	1732.5	-30.2	18.3	1.5	5.2	22.0	0.158	30.0	8.0
H	1752.5	-30.7	18.8	1.5	5.0	22.3	0.170	30.0	7.7

QPSK, BW 10MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	1715.0	-29.4	18.9	1.5	5.4	22.8	0.191	30.0	7.2
H	1732.5	-28.1	20.4	1.5	5.2	24.1	0.257	30.0	5.9
H	1750.0	-30.0	19.5	1.5	5.0	23.0	0.200	30.0	7.0

16QAM, BW 10MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	1715.0	-30.4	18.9	1.5	5.4	22.8	0.191	30.0	7.2
H	1732.5	-29.0	19.5	1.5	5.2	23.2	0.209	30.0	6.8
H	1750.0	-31.0	18.5	1.5	5.0	22.0	0.158	30.0	8.0

64QAM, BW 10MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	1715.0	-31.2	17.1	1.5	5.4	21.0	0.126	30.0	9.0
H	1732.5	-30.1	18.4	1.5	5.2	22.1	0.162	30.0	7.9
H	1750.0	-32.0	17.5	1.5	5.0	21.0	0.126	30.0	9.0

QPSK, BW 15MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	1717.5	-29.1	19.2	1.5	5.4	23.1	0.204	30.0	6.9
H	1732.5	-28.1	20.4	1.5	5.2	24.1	0.257	30.0	5.9
H	1747.5	-30.6	19.4	1.5	5.1	23.0	0.200	30.0	7.0

16QAM, BW 15MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	1717.5	-30.1	18.2	1.5	5.4	22.1	0.162	30.0	7.9
H	1732.5	-28.9	19.6	1.5	5.2	23.3	0.214	30.0	6.7
H	1747.5	-31.4	18.0	1.5	5.1	21.6	0.145	30.0	8.4

64QAM, BW 15MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	1717.5	-30.9	17.4	1.5	5.4	21.3	0.135	30.0	8.7
H	1732.5	-30.0	18.5	1.5	5.2	22.2	0.166	30.0	7.8
H	1747.5	-32.2	17.2	1.5	5.1	20.8	0.120	30.0	9.2

QPSK, BW 20MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	1720.0	-29.7	18.4	1.5	5.4	22.3	0.170	30.0	7.7
H	1732.5	-27.8	20.6	1.5	5.2	24.3	0.269	30.0	5.7
H	1745.0	-30.4	19.0	1.5	5.1	22.6	0.182	30.0	7.4

16QAM, BW 20MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	1720.0	-30.5	17.4	1.5	5.4	21.3	0.135	30.0	8.7
H	1732.5	-28.6	19.9	1.5	5.2	23.6	0.229	30.0	6.4
H	1745.0	-31.3	18.1	1.5	5.1	21.7	0.148	30.0	8.3

64QAM, BW 20MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	1720.0	-31.6	16.5	1.5	5.4	20.4	0.110	30.0	9.6
H	1732.5	-29.6	18.9	1.5	5.2	22.6	0.182	30.0	7.4
H	1745.0	-32.3	17.1	1.5	5.1	20.7	0.117	30.0	9.3

**[LTE Band XII]
QPSK, BW 1.4MHz**

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	699.7	-34.4	26.8	1.0	-5.7	20.2	0.105	34.77	14.6
H	707.5	-34.6	26.8	1.0	-5.7	20.1	0.102	34.77	14.7
H	715.3	-34.7	27.1	1.0	-5.8	20.3	0.107	34.77	14.5

16QAM, BW 1.4MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	699.7	-35.5	25.7	1.0	-5.7	19.1	0.081	34.77	15.7
H	707.5	-35.5	25.9	1.0	-5.7	19.2	0.083	34.77	15.6
H	715.3	-35.5	26.3	1.0	-5.8	19.5	0.089	34.77	15.3

64QAM, BW 1.4MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	699.7	-36.3	24.9	1.0	-5.7	18.3	0.068	34.77	16.5
H	707.5	-36.6	24.8	1.0	-5.7	18.1	0.065	34.77	16.7
H	715.3	-36.5	25.3	1.0	-5.8	18.5	0.071	34.77	16.3

QPSK, BW 3MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	700.5	-34.6	26.6	1.0	-5.7	19.9	0.098	34.77	14.9
H	707.5	-34.7	26.7	1.0	-5.7	20.0	0.100	34.77	14.8
H	714.5	-35.8	25.9	1.0	-5.8	19.2	0.083	34.77	15.6

16QAM, BW 3MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	700.5	-35.5	25.7	1.0	-5.7	19.0	0.079	34.77	15.8
H	707.5	-35.6	25.8	1.0	-5.7	19.1	0.081	34.77	15.7
H	714.5	-36.7	25.0	1.0	-5.8	18.3	0.068	34.77	16.5

64QAM, BW 3MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	700.5	-36.4	24.8	1.0	-5.7	18.1	0.065	34.77	16.7
H	707.5	-36.7	24.7	1.0	-5.7	18.0	0.063	34.77	16.8
H	714.5	-37.8	23.9	1.0	-5.8	17.2	0.052	34.77	17.6

QPSK, BW 5MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	701.5	-34.8	26.4	1.0	-5.7	19.7	0.093	34.77	15.1
H	707.5	-34.6	26.8	1.0	-5.7	20.1	0.102	34.77	14.7
H	713.5	-35.8	25.9	1.0	-5.8	19.2	0.083	34.77	15.6

16QAM, BW 5MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	701.5	-35.6	25.6	1.0	-5.7	18.9	0.078	34.77	15.9
H	707.5	-35.6	25.8	1.0	-5.7	19.1	0.081	34.77	15.7
H	713.5	-36.5	25.2	1.0	-5.8	18.5	0.071	34.77	16.3

64QAM, BW 5MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	701.5	-36.7	24.5	1.0	-5.7	17.8	0.060	34.77	17.0
H	707.5	-36.5	24.9	1.0	-5.7	18.2	0.066	34.77	16.6
H	713.5	-37.7	24.0	1.0	-5.8	17.3	0.054	34.77	17.5

QPSK, BW 10MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	704.0	-34.4	26.9	1.0	-5.7	20.2	0.105	34.77	14.6
H	707.5	-34.5	26.9	1.0	-5.7	20.2	0.105	34.77	14.6
H	711.0	-35.4	26.1	1.0	-5.8	19.4	0.087	34.77	15.4

16QAM, BW 10MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	704.0	-35.2	26.1	1.0	-5.7	19.4	0.087	34.77	15.4
H	707.5	-35.6	25.8	1.0	-5.7	19.1	0.081	34.77	15.7
H	711.0	-36.3	25.2	1.0	-5.8	18.5	0.071	34.77	16.3

64QAM, BW 10MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	704.0	-36.4	24.9	1.0	-5.7	18.2	0.066	34.77	16.6
H	707.5	-36.6	24.8	1.0	-5.7	18.1	0.065	34.77	16.7
H	711.0	-37.1	24.4	1.0	-5.8	17.7	0.059	34.77	17.1

**[LTE Band XL I]
QPSK, BW 5MHz**

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	2498.5	-34.7	20.8	1.8	6.0	25.0	0.316	33.0	8.0
H	2593.0	-35.3	20.0	1.8	6.0	24.2	0.263	33.0	8.8
H	2687.5	-38.1	17.2	1.9	6.6	21.9	0.155	33.0	11.1

16QAM, BW 5MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	2498.5	-35.4	20.1	1.8	6.0	24.3	0.269	33.0	8.7
H	2593.0	-36.1	19.2	1.8	6.0	23.4	0.219	33.0	9.6
H	2687.5	-39.1	16.2	1.9	6.6	20.9	0.123	33.0	12.1

64QAM, BW 5MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	2498.5	-36.5	19.0	1.8	6.0	23.2	0.209	33.0	9.8
H	2593.0	-37.1	18.2	1.8	6.0	22.4	0.174	33.0	10.6
H	2687.5	-39.9	15.4	1.9	6.6	20.1	0.102	33.0	12.9

QPSK, BW 10MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	2501.0	-36.3	19.2	1.8	6.0	23.4	0.219	33.0	9.6
H	2593.0	-37.4	17.9	1.8	6.0	22.1	0.162	33.0	10.9
H	2685.0	-39.5	15.8	1.9	6.6	20.5	0.112	33.0	12.5

16QAM, BW 10MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	2501.0	-37.0	18.5	1.8	6.0	22.7	0.186	33.0	10.3
H	2593.0	-38.3	17.0	1.8	6.0	21.2	0.132	33.0	11.8
H	2685.0	-40.4	14.9	1.9	6.6	19.6	0.091	33.0	13.4

64QAM, BW 10MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	2501.0	-38.1	17.4	1.8	6.0	21.6	0.145	33.0	11.4
H	2593.0	-39.3	16.0	1.8	6.0	20.2	0.105	33.0	12.8
H	2685.0	-41.5	13.8	1.9	6.6	18.5	0.071	33.0	14.5

QPSK, BW 15MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	2503.5	-36.3	19.2	1.8	6.0	23.4	0.219	33.0	9.6
H	2593.0	-37.9	17.4	1.8	6.0	21.6	0.145	33.0	11.4
H	2682.5	-40.2	15.1	1.9	6.6	19.8	0.095	33.0	13.2

16QAM, BW 15MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	2503.5	-37.3	18.2	1.8	6.0	22.4	0.174	33.0	10.6
H	2593.0	-38.8	16.4	1.8	6.0	20.6	0.115	33.0	12.4
H	2682.5	-41.1	14.1	1.9	6.6	18.8	0.076	33.0	14.2

64QAM, BW 15MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	2503.5	-38.0	17.5	1.8	6.0	21.7	0.148	33.0	11.3
H	2593.0	-39.8	15.5	1.8	6.0	19.7	0.093	33.0	13.3
H	2682.5	-42.0	13.2	1.9	6.6	17.9	0.062	33.0	15.1

QPSK, BW 20MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	2506.0	-37.4	18.1	1.8	6.0	22.3	0.170	33.0	10.7
H	2593.0	-37.5	17.8	1.8	6.0	22.0	0.158	33.0	11.0
H	2680.0	-39.0	16.2	1.9	6.6	20.9	0.123	33.0	12.1

16QAM, BW 20MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	2506.0	-38.3	17.2	1.8	6.0	21.4	0.138	33.0	11.6
H	2593.0	-38.3	17.0	1.8	6.0	21.2	0.132	33.0	11.8
H	2680.0	-39.9	15.3	1.9	6.6	20.0	0.100	33.0	13.0

64QAM, BW 20MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant. Gain [dBd]	Result [dBm]	Result [W]	Limit [dBm]	Margin [dB]
H	2506.0	-39.3	16.2	1.8	6.0	20.4	0.110	33.0	12.6
H	2593.0	-39.3	16.0	1.8	6.0	20.2	0.105	33.0	12.8
H	2680.0	-40.9	14.3	1.9	6.6	19.0	0.079	33.0	14.0

4.2 Peak to Average Ratio

4.2.1 Measurement procedure

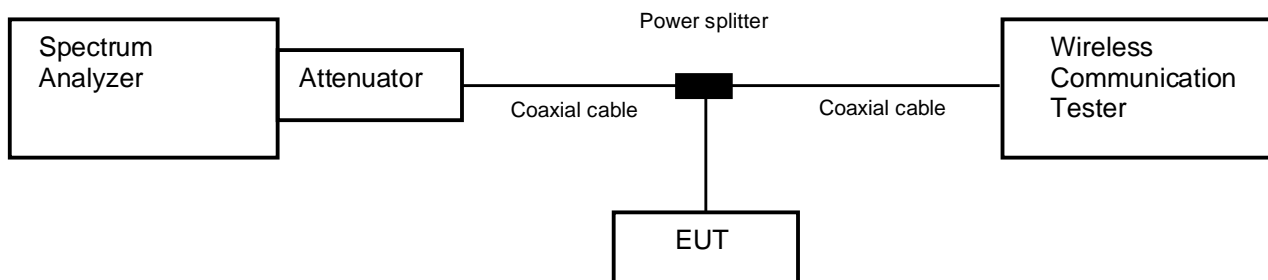
[FCC 27.50]

The peak to average ratio was measured with a spectrum analyzer connected to the antenna terminal.

The spectrum analyzer is set to;

- a) Power Stat CCDF mode
- b) Set resolution / measurement bandwidth \geq signal's occupied bandwidth.
- c) Set the number of counts to a value that stabilizes the measured CCDF curve.
- d) Set the measurement interval as follows:
 - 1) For continuous transmissions, set to 1ms.
 - 2) For burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst duration.
- e) Record the maximum PAPR level associated with a probability of 0.1%.

- Test configuration



4.2.2 Limit

13 dB or less

4.2.3 Measurement result

Date	: 16-April-2024	Test engineer	: <u>Kazunori Saito</u>
Temperature	: 22.8 [°C]		
Humidity	: 35.9 [%]		
Test place	: Shielded room No.3		
Date	: 17-April-2024	Test engineer	: <u>Kazunori Saito</u>
Temperature	: 18.5 [°C]		
Humidity	: 47.5 [%]		
Test place	: Shielded room No.3		
Date	: 18-April-2024	Test engineer	: <u>Kazunori Saito</u>
Temperature	: 19.6 [°C]		
Humidity	: 39.7 [%]		
Test place	: Shielded room No.3		
Date	: 22-April-2024	Test engineer	: <u>Kazunori Saito</u>
Temperature	: 19.9 [°C]		
Humidity	: 34.6 [%]		
Test place	: Shielded room No.3		
Date	: 24-April-2024	Test engineer	: <u>Kazunori Saito</u>
Temperature	: 23.5 [°C]		
Humidity	: 34.0 [%]		
Test place	: Shielded room No.3		



Band	Channel	Frequency [MHz]	Peak to Average Power Ratio [dB]	Limit [dB]
WCDMA Band IV	1312	1712.4	3.30	13.0
	1413	1732.6	3.54	
	1513	1752.6	3.25	

Band	Channel	Frequency [MHz]	Modulation	Bandwidth [MHz]	RB	Peak to Average Power Ratio [dB]	Limit [dB]
LTE Band IV	20175	1732.5	QPSK	1.4	6-0	5.80	13.0
				3	15-0	6.20	
				5	25-0	6.12	
				10	50-0	6.12	
				15	75-0	6.64	
				20	100-0	6.00	
			16QAM	1.4	6-0	6.43	
				3	15-0	6.67	
				5	25-0	6.96	
				10	50-0	6.93	
				15	75-0	7.07	
				20	100-0	6.90	
			64QAM	1.4	6-0	7.13	
				3	15-0	6.96	
				5	25-0	6.93	
				10	50-0	6.99	
				15	75-0	7.04	
				20	100-0	7.01	

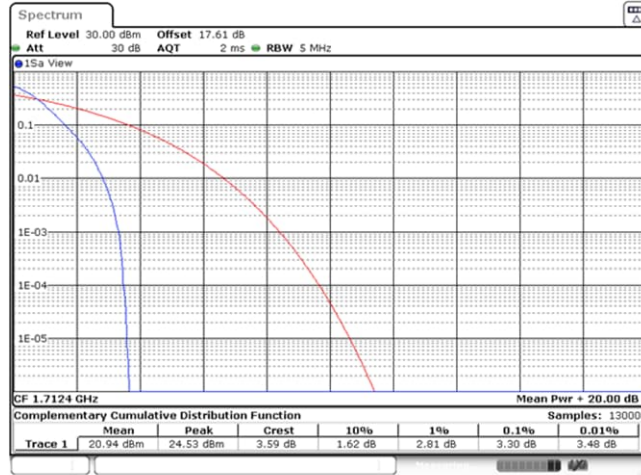
Band	Channel	Frequency [MHz]	Modulation	Bandwidth [MHz]	RB	Peak to Average Power Ratio [dB]	Limit [dB]
LTE Band XII	23095	707.5	QPSK	1.4	6-0	6.12	13.0
				3	15-0	5.71	
				5	25-0	5.74	
				10	50-0	5.65	
			16QAM	1.4	6-0	6.67	
				3	15-0	6.49	
				5	25-0	6.58	
				10	50-0	6.52	
			64QAM	1.4	6-0	6.87	
				3	15-0	6.52	
				5	25-0	6.49	
				10	50-0	6.70	



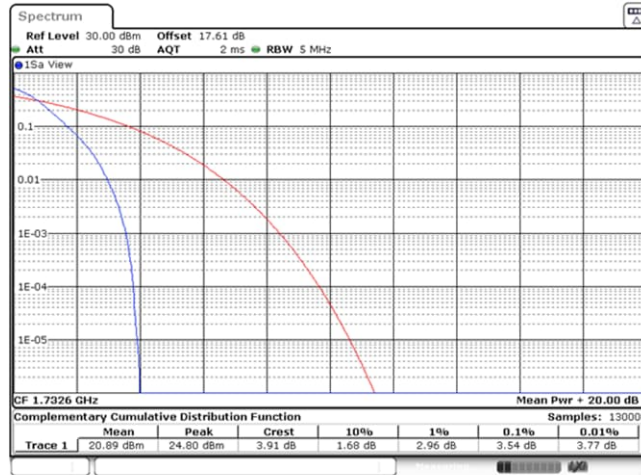
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LTE Band XL I	40620	2593	QPSK	5	25-0	5.45	13.0
				10	50-0	5.39	
				15	75-0	5.80	
				20	100-0	5.33	
			16QAM	5	25-0	6.17	
				10	50-0	6.20	
				15	75-0	6.35	
				20	100-0	6.14	
			64QAM	5	25-0	6.46	
				10	50-0	6.29	
				15	75-0	6.52	
				20	100-0	6.58	

4.2.4 Trace data

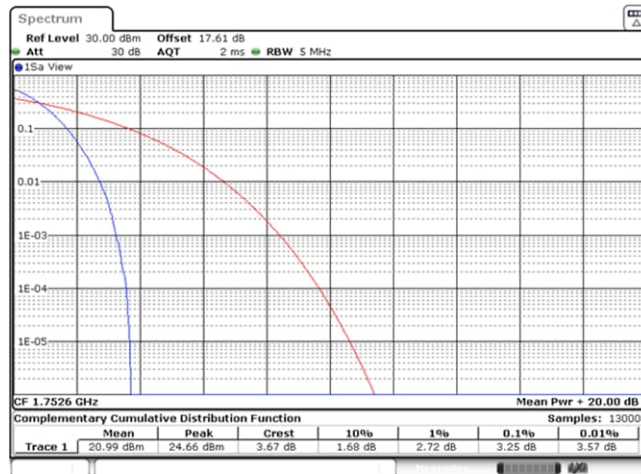
[WCDMA Band IV]
Channel: 1312



Channel: 1413

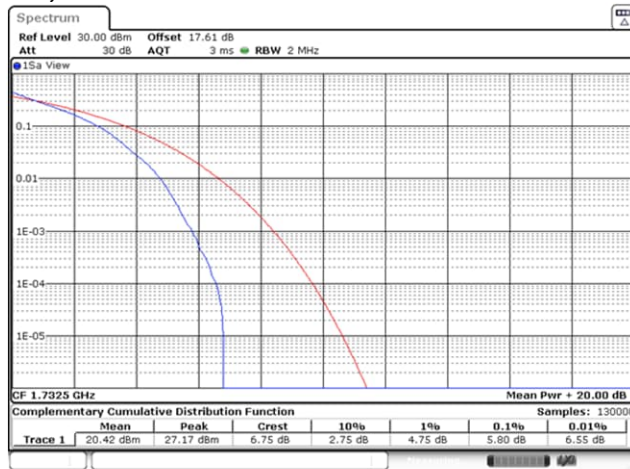


Channel: 1513

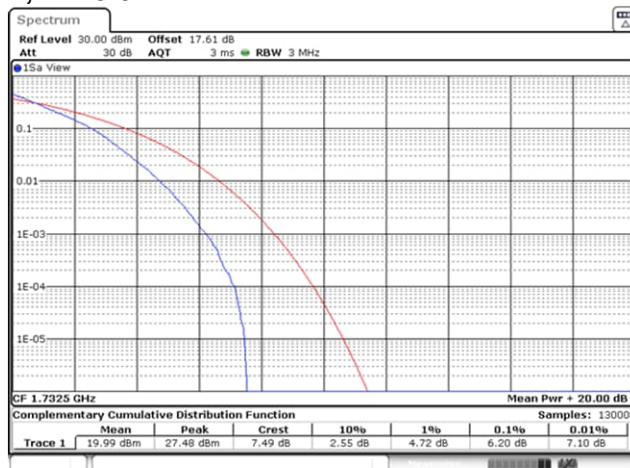


[LTE Band IV]

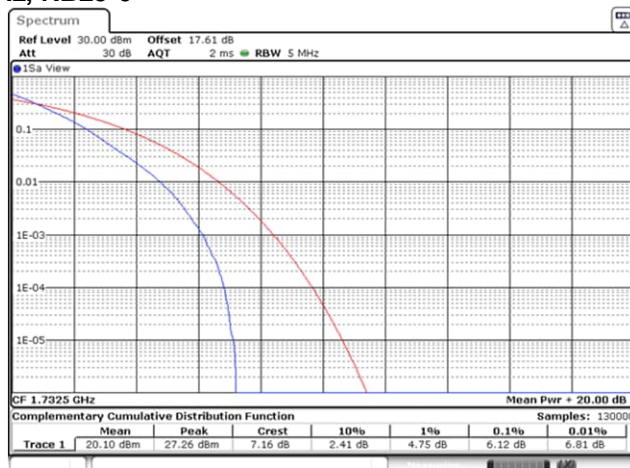
Channel: 20175
 QPSK, BW 1.4MHz, RB6-0



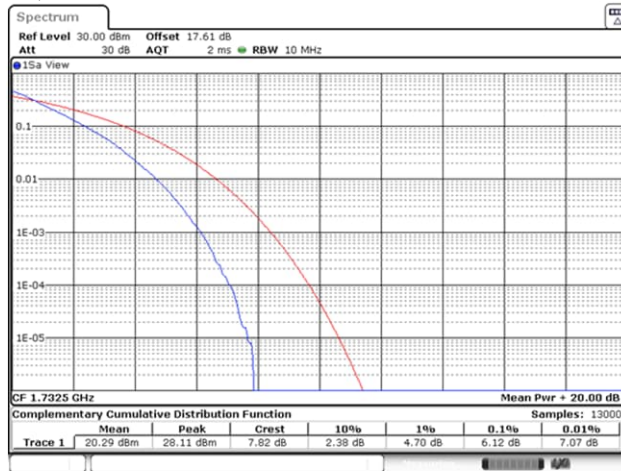
QPSK, BW 3MHz, RB15-0



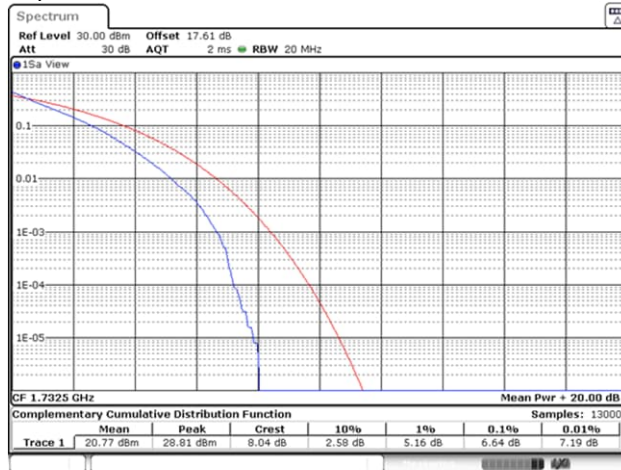
QPSK, BW 5MHz, RB25-0



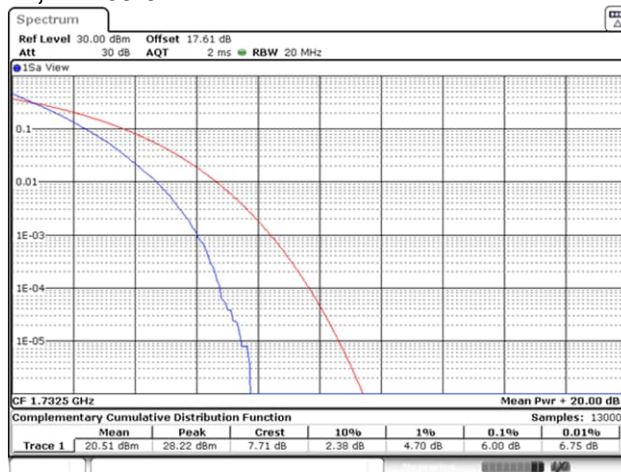
**Channel: 20175
QPSK, BW 10MHz, RB50-0**



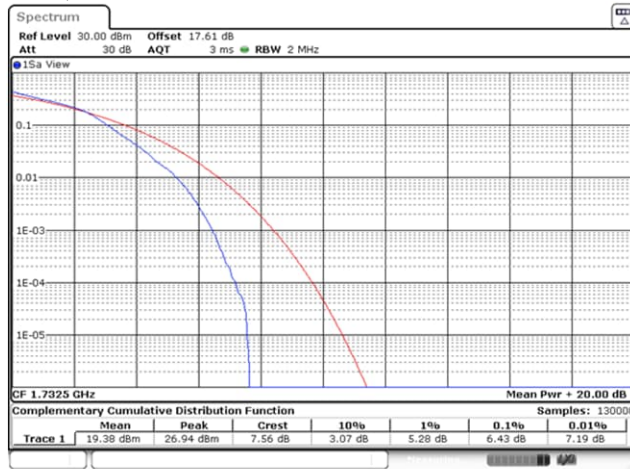
QPSK, BW 15MHz, RB75-0



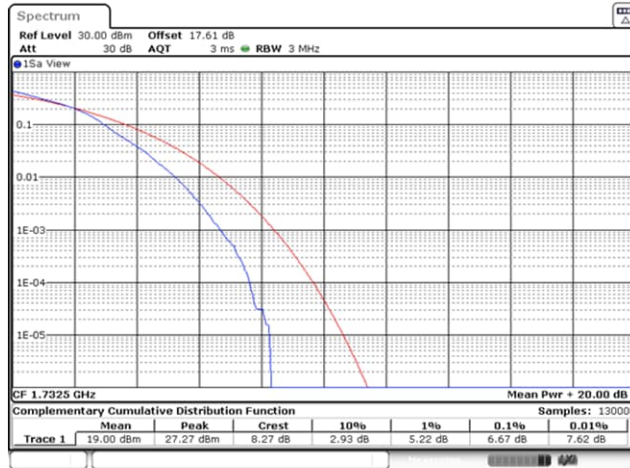
QPSK, BW 20MHz, RB100-0



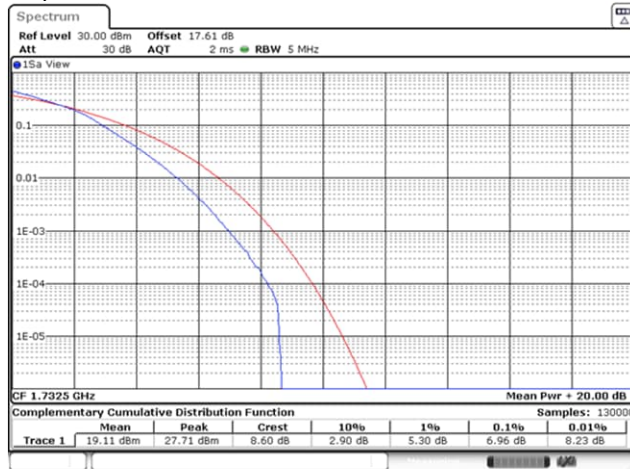
Channel: 20175
16QAM, BW 1.4MHz, RB6-0



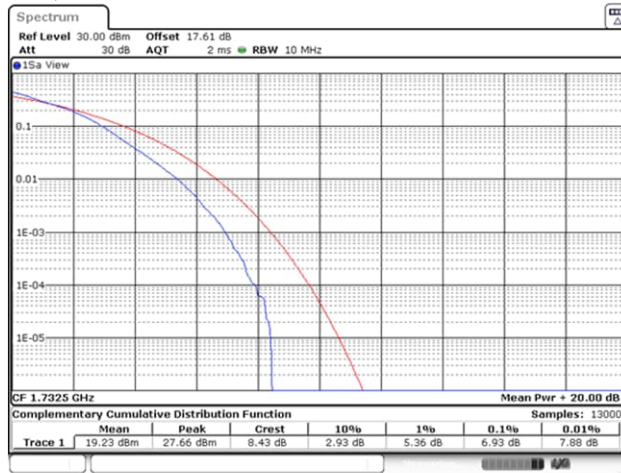
16QAM, BW 3MHz, RB15-0



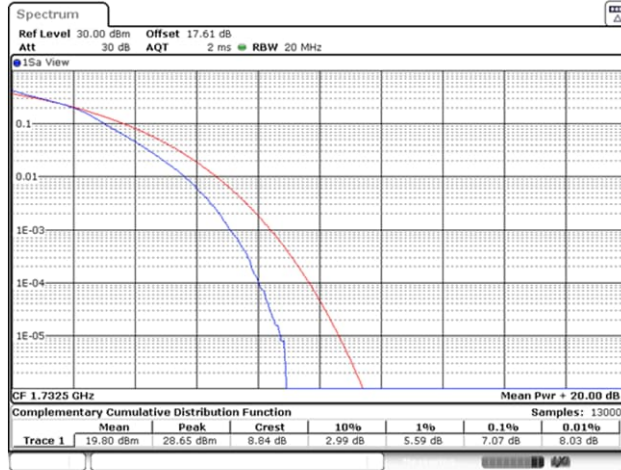
16QAM, BW 5MHz, RB25-0



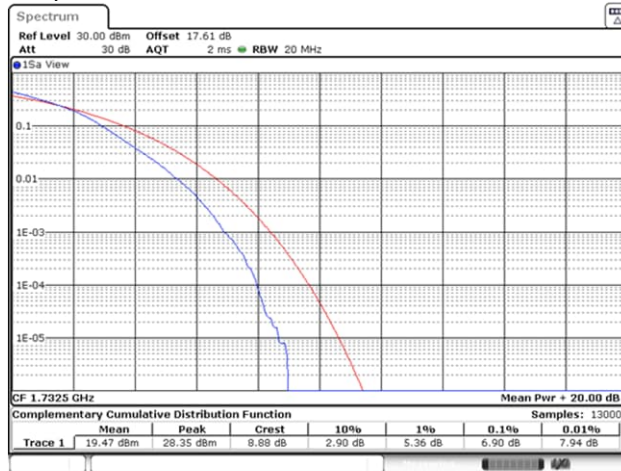
**Channel: 20175
16QAM, BW 10MHz, RB50-0**



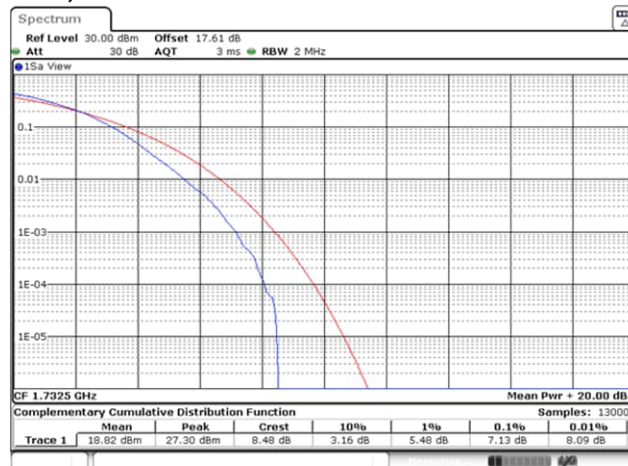
16QAM, BW 15MHz, RB75-0



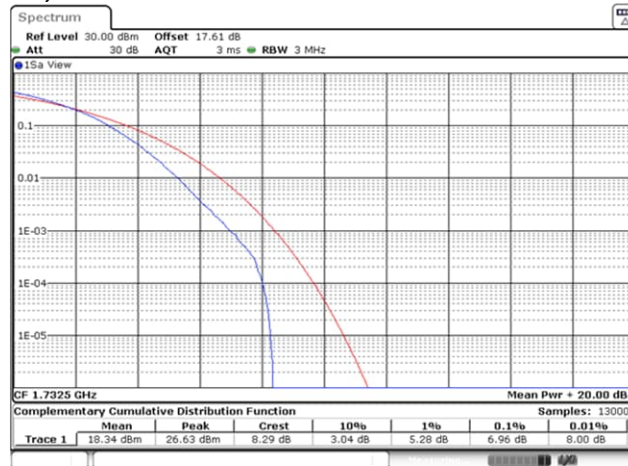
16QAM, BW 20MHz, RB100-0



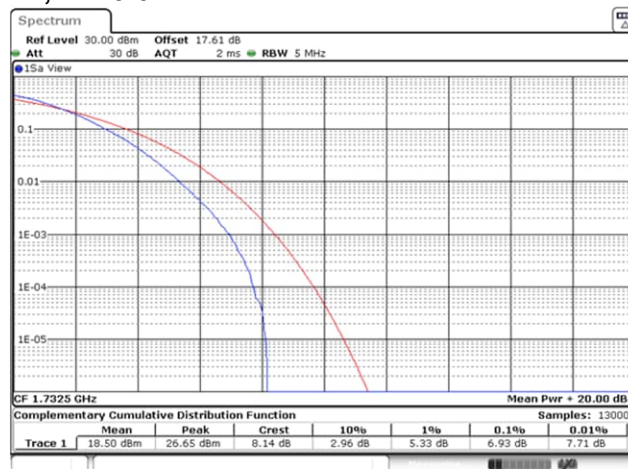
Channel: 20175
64QAM, BW 1.4MHz, RB6-0



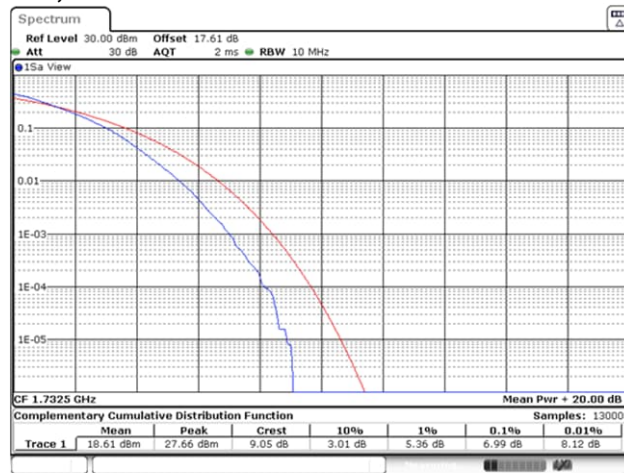
64QAM, BW 3MHz, RB15-0



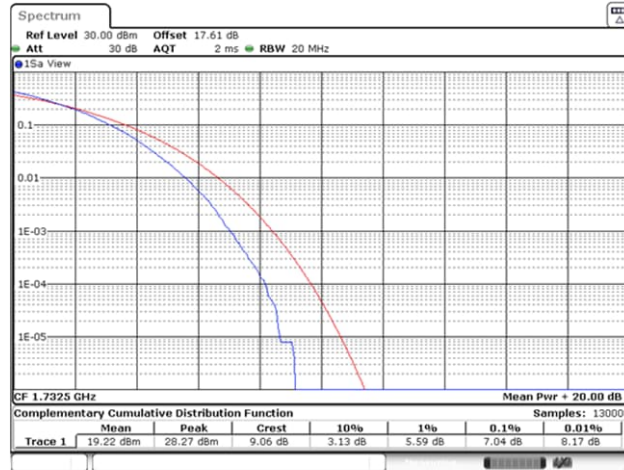
64QAM, BW 5MHz, RB25-0



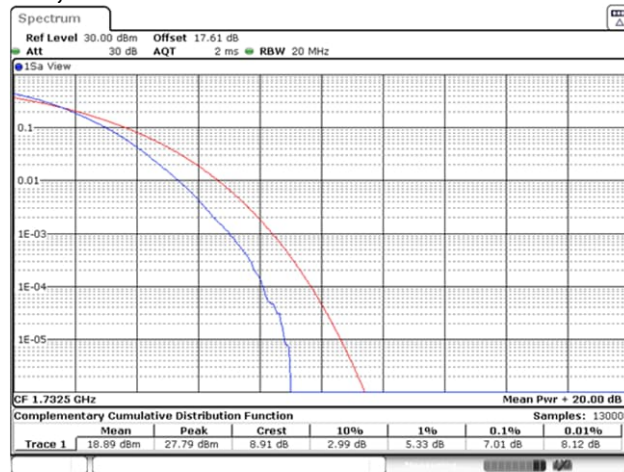
Channel: 20175
64QAM, BW 10MHz, RB50-0



64QAM, BW 15MHz, RB75-0



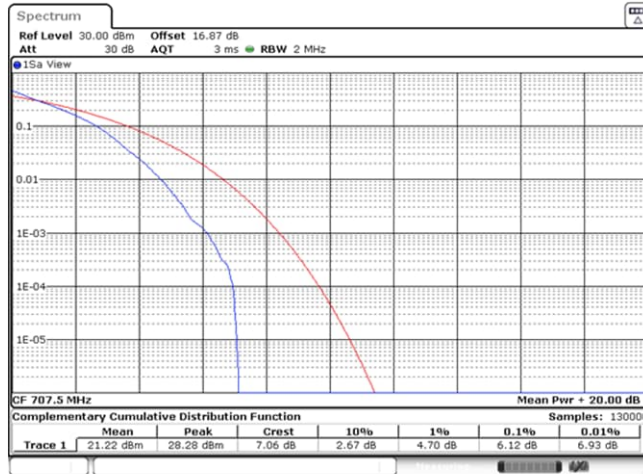
64QAM, BW 20MHz, RB100-0



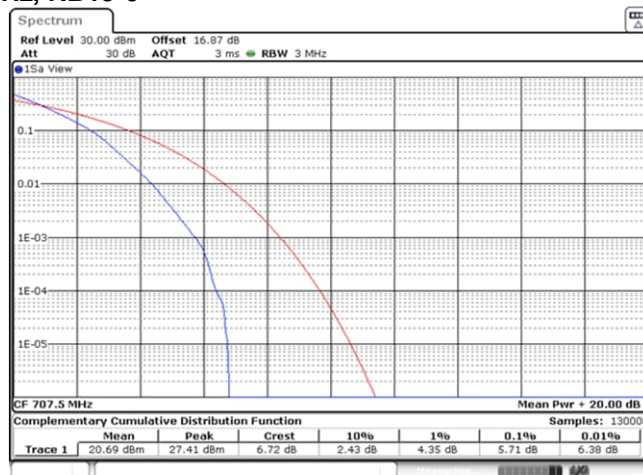
[LTE Band XII]

Channel: 23095

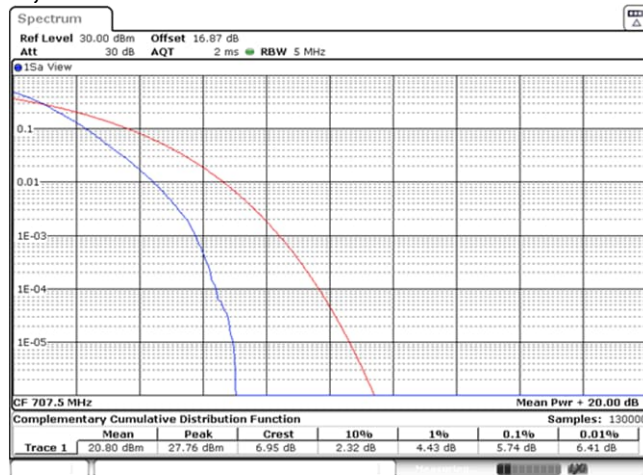
QPSK, BW 1.4MHz, RB6-0



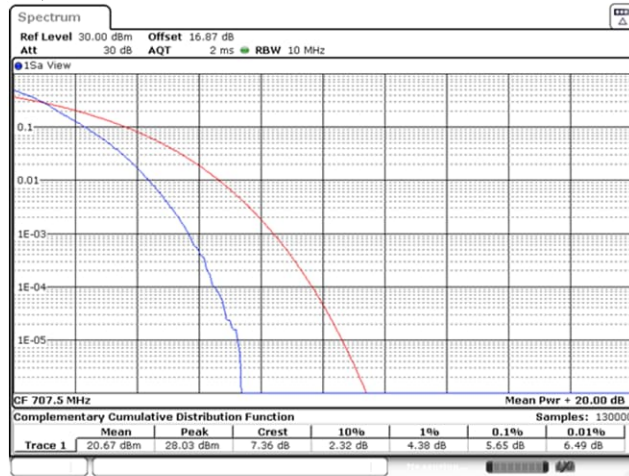
QPSK, BW 3MHz, RB15-0



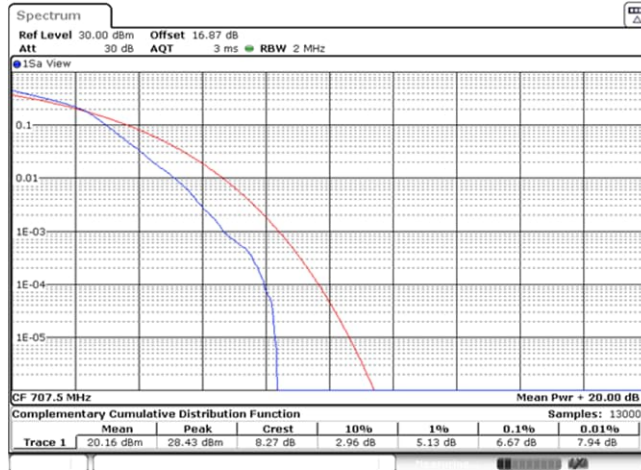
QPSK, BW 5MHz, RB25-0



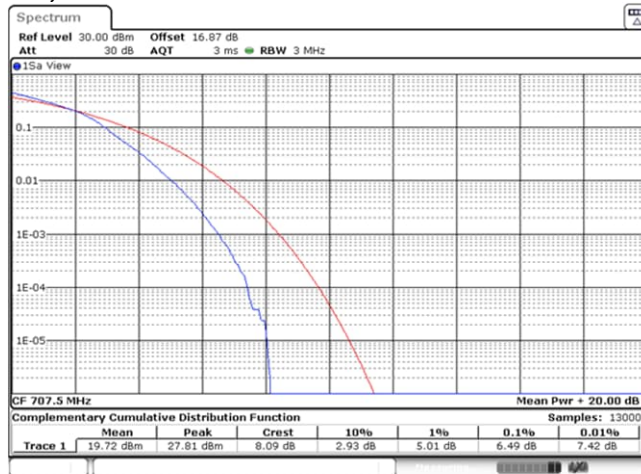
Channel: 23095
QPSK, BW 10MHz, RB50-0



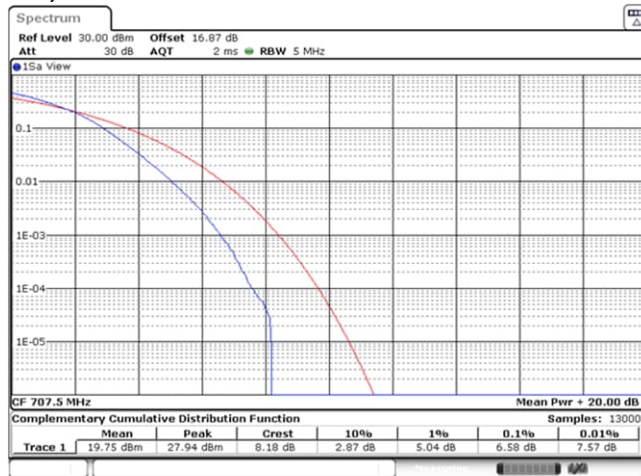
16QAM, BW 1.4MHz, RB6-0



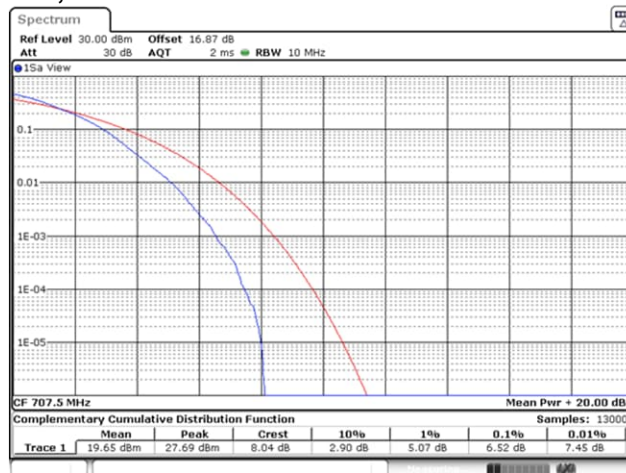
16QAM, BW 3MHz, RB15-0



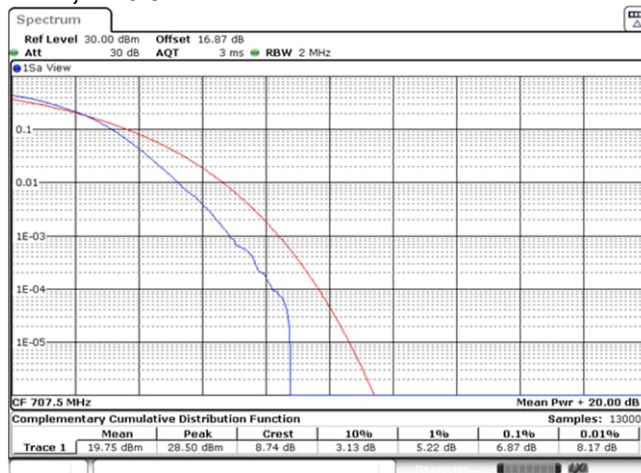
Channel: 23095
16QAM, BW 5MHz, RB25-0



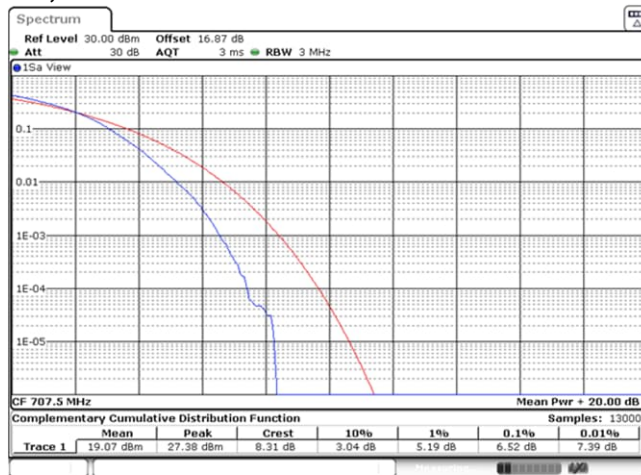
16QAM, BW 10MHz, RB50-0



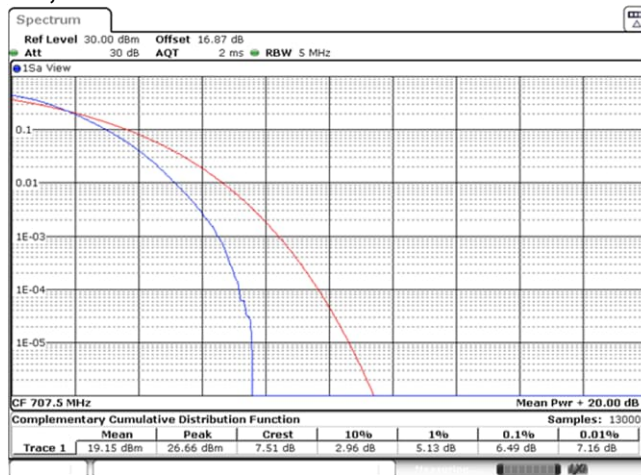
64QAM, BW 1.4MHz, RB6-0



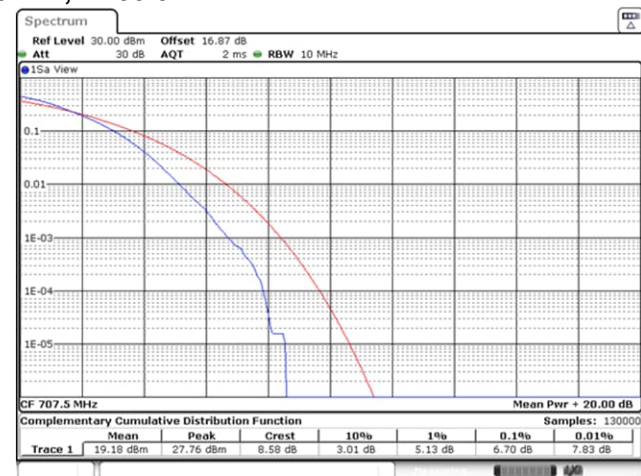
Channel: 23095
64QAM, BW 3MHz, RB15-0



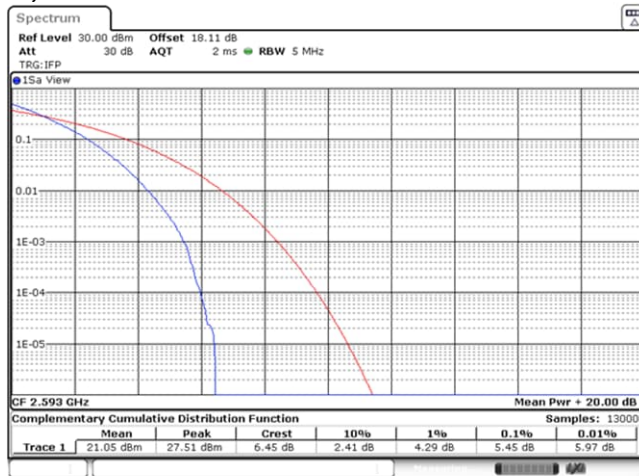
64QAM, BW 5MHz, RB25-0



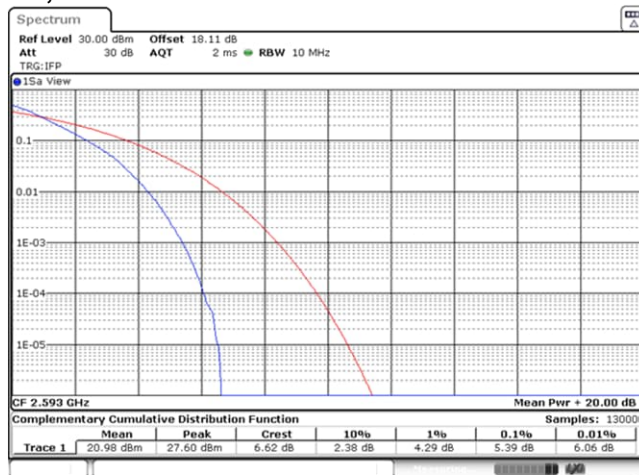
64QAM, BW 10MHz, RB50-0



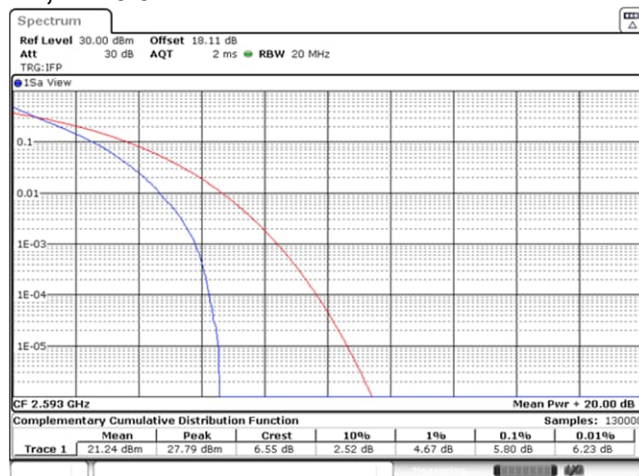
[LTE Band XL I]
 Channel: 40620
 QPSK, BW 5MHz, RB25-0



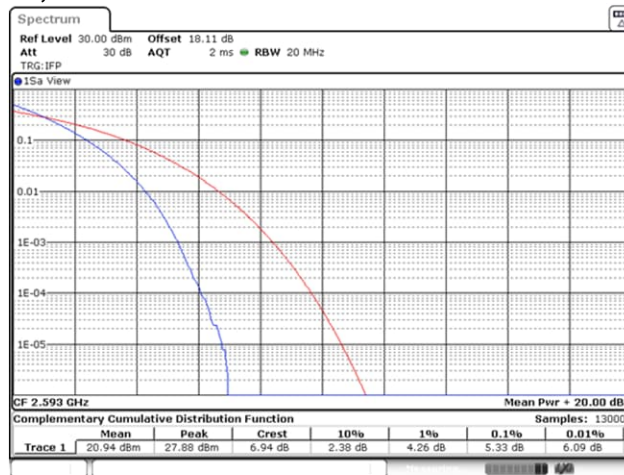
QPSK, BW 10MHz, RB50-0



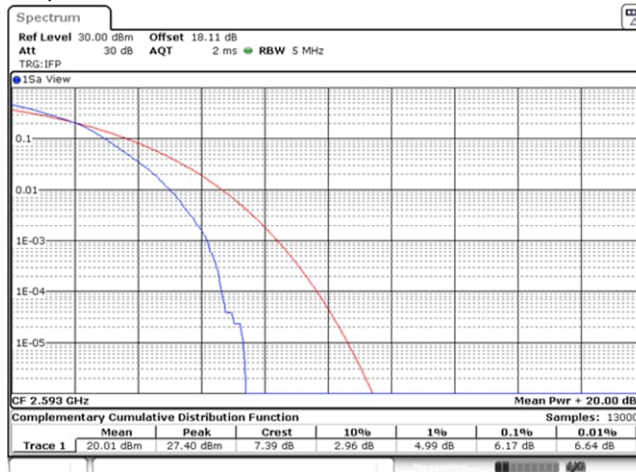
QPSK, BW 15MHz, RB75-0



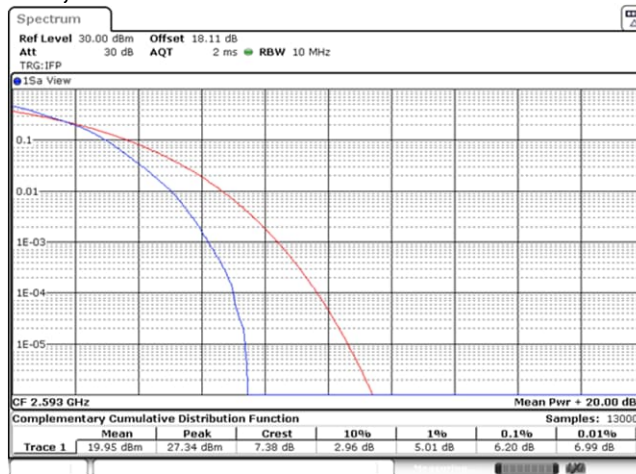
**Channel: 40620
QPSK, BW 20MHz, RB100-0**



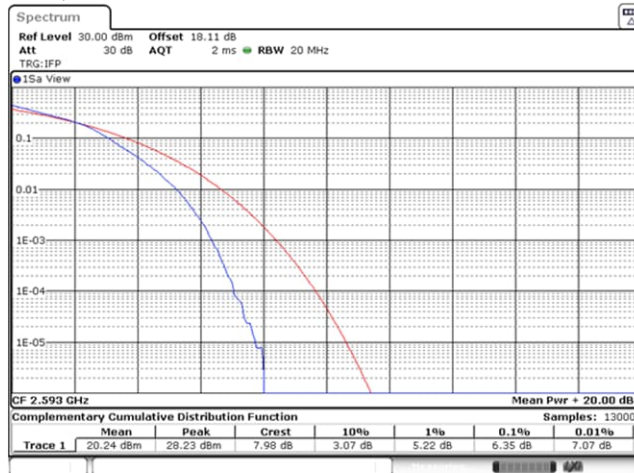
16QAM, BW 5MHz, RB25-0



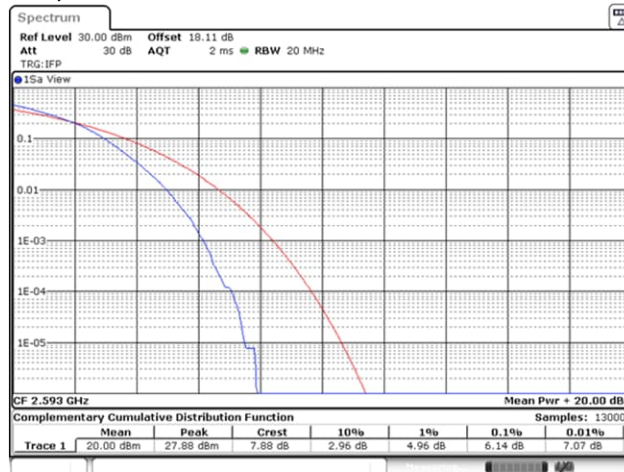
16QAM, BW 10MHz, RB50-0



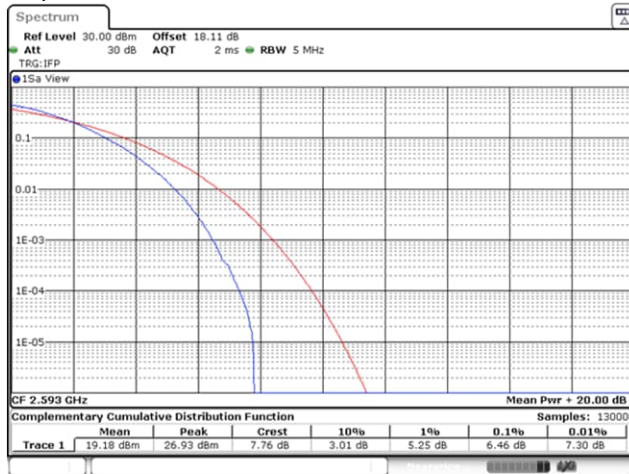
Channel: 40620
16QAM, BW 15MHz, RB75-0



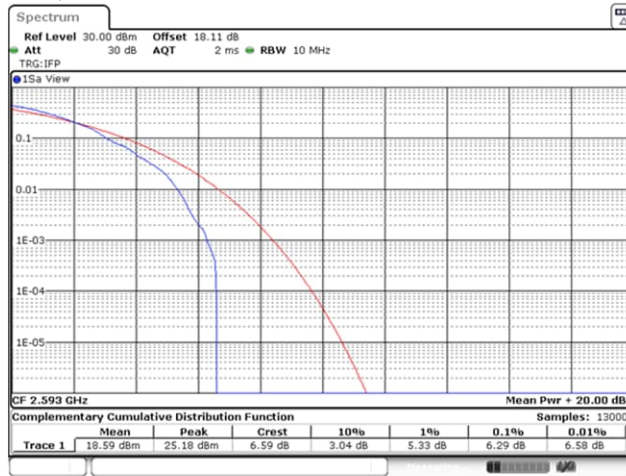
16QAM, BW 20MHz, RB100-0



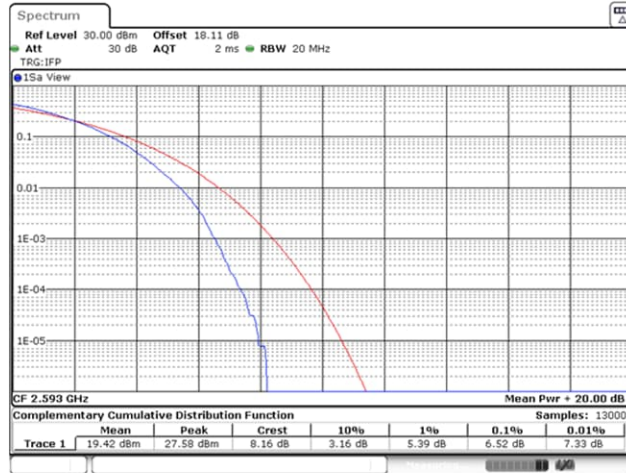
64QAM, BW 5MHz, RB25-0



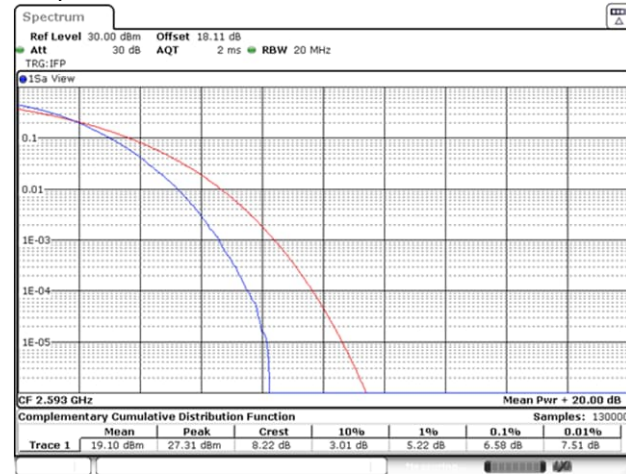
Channel: 40620
64QAM, BW 10MHz, RB50-0



64QAM, BW 15MHz, RB75-0



64QAM, BW 20MHz, RB100-0



4.3 Occupied Bandwidth

4.3.1 Measurement procedure

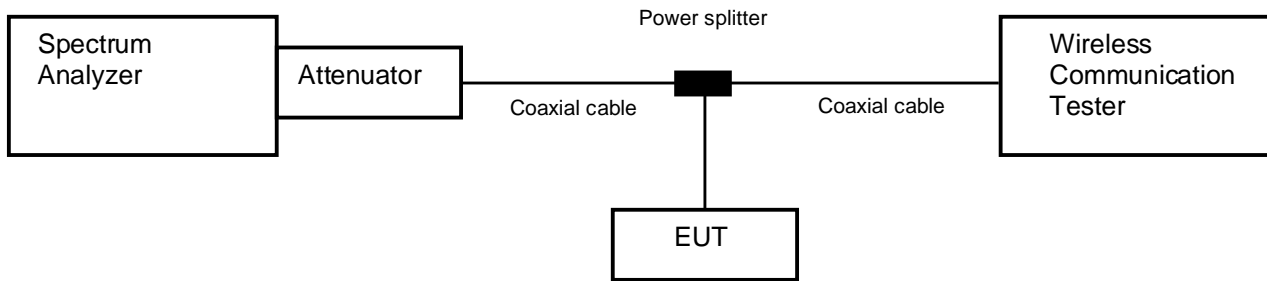
[FCC 2.1049]

The Occupied bandwidth was measured with a spectrum analyzer connected to the antenna terminal.

The spectrum analyzer is set to;

- a) RBW = 1-5% of the expected OBW & VBW ≥ 3 x RBW
- b) Detector = Peak
- c) Trace mode = Max hold
- d) Sweep time = auto-couple

- Test configuration



4.3.2 Limit

None

4.3.3 Measurement result

Date	: 17-April-2024		
Temperature	: 18.5 [°C]		
Humidity	: 47.5 [%]	Test engineer	: <u>Kazunori Saito</u>
Test place	: Shielded room No.3		
Date	: 18-April-2024		
Temperature	: 19.6 [°C]		
Humidity	: 39.7 [%]	Test engineer	: <u>Kazunori Saito</u>
Test place	: Shielded room No.3		
Date	: 19-April-2024		
Temperature	: 22.9 [°C]		
Humidity	: 29.7 [%]	Test engineer	: <u>Kazunori Saito</u>
Test place	: Shielded room No.3		
Date	: 22-April-2024		
Temperature	: 19.9 [°C]		
Humidity	: 34.6 [%]	Test engineer	: <u>Kazunori Saito</u>
Test place	: Shielded room No.3		
Date	: 24-April-2024		
Temperature	: 23.5 [°C]		
Humidity	: 34.0 [%]	Test engineer	: <u>Kazunori Saito</u>
Test place	: Shielded room No.3		



Band	Channel	Frequency [MHz]	Test Result [MHz]
WCDMA Band IV	1312	1712.4	4.1318
	1413	1732.6	4.1368
	1513	1752.6	4.1414

Band	Channel	Frequency [MHz]	Bandwidth [MHz]	Modulation	RB	Test Result [MHz]
LTE Band IV	20175	1732.5	1.4	QPSK	3-1	0.6103
					6-0	1.0958
				16QAM	3-1	0.6181
					6-0	1.1042
				64QAM	3-1	0.6074
					6-0	1.1010
			3	QPSK	8-4	1.5128
					15-0	2.7048
				16QAM	8-4	1.5265
					15-0	2.7073
				64QAM	8-4	1.5143
					15-0	2.7072
			5	QPSK	12-7	2.3064
					25-0	4.5165
				16QAM	12-7	2.3037
					25-0	4.5034
				64QAM	12-7	2.2976
					25-0	4.5035
			10	QPSK	25-12	4.6559
					50-0	8.9925
				16QAM	25-12	4.6547
					50-0	9.0038
				64QAM	25-12	4.6681
					50-0	8.9689
			15	QPSK	36-20	6.7025
					75-0	13.4973
				16QAM	36-20	6.7201
					75-0	13.5007
				64QAM	36-20	6.8079
					75-0	13.4597
			20	QPSK	50-24	9.2312
					100-0	17.9885
				16QAM	50-24	9.2148
					100-0	17.9480
				64QAM	50-24	9.1940
					100-0	17.9634



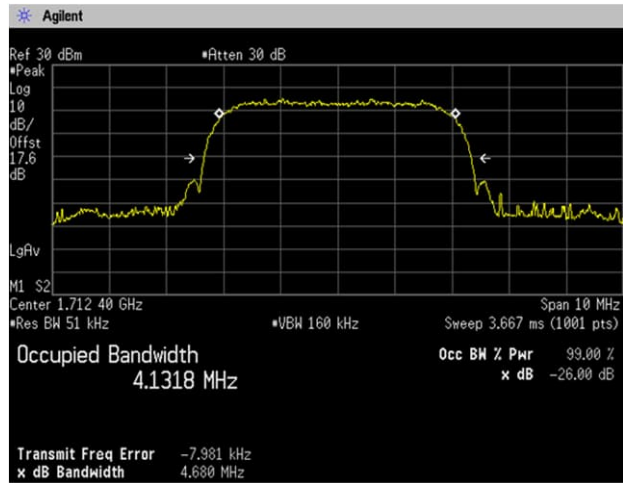
Band	Channel	Frequency [MHz]	Bandwidth [MHz]	Modulation	RB	Test Result [MHz]
LTE Band XII	23095	707.5	1.4	QPSK	3-1	0.6052
					6-0	1.0956
				16QAM	3-1	0.5943
					6-0	1.0884
				64QAM	3-1	0.5940
					6-0	1.0979
			3	QPSK	8-4	1.5295
					15-0	2.7039
				16QAM	8-4	1.5296
					15-0	2.7065
				64QAM	8-4	1.5089
					15-0	2.7137
			5	QPSK	12-7	2.2777
					25-0	4.5138
				16QAM	12-7	2.2980
					25-0	4.4918
				64QAM	12-7	2.2760
					25-0	4.5172
			10	QPSK	25-12	4.6316
					50-0	8.9773
				16QAM	25-12	4.6390
					50-0	8.9816
				64QAM	25-12	4.6399
					50-0	8.9529



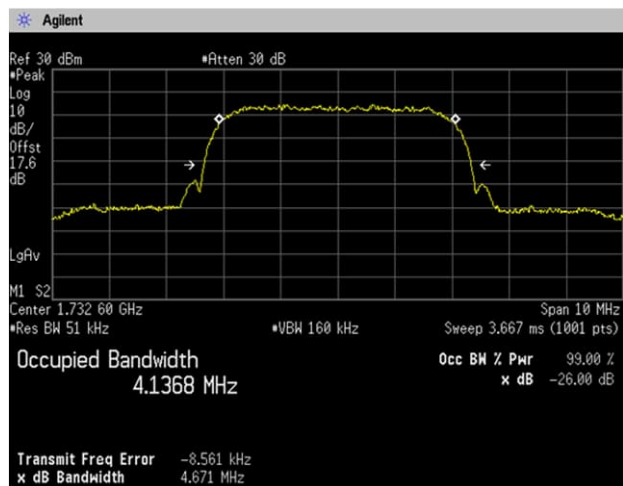
Band	Channel	Frequency [MHz]	Bandwidth [MHz]	Modulation	RB	Test Result [MHz]
LTE Band XL I	40620	2593	5	QPSK	12-7	2.3049
					25-0	4.5112
				16QAM	12-7	2.3305
					25-0	4.5110
				64QAM	12-7	2.2601
					25-0	4.5152
			10	QPSK	25-12	4.7121
					50-0	9.0069
				16QAM	25-12	4.6779
					50-0	9.0125
				64QAM	25-12	4.7055
					50-0	8.9935
			15	QPSK	36-20	6.8179
					75-0	13.5169
				16QAM	36-20	6.7756
					75-0	13.5179
				64QAM	36-20	6.8043
					75-0	13.4586
			20	QPSK	50-24	9.2517
					100-0	17.9821
				16QAM	50-24	9.2122
					100-0	17.9628
				64QAM	50-24	9.1567
					100-0	18.0420

4.3.4 Trace data

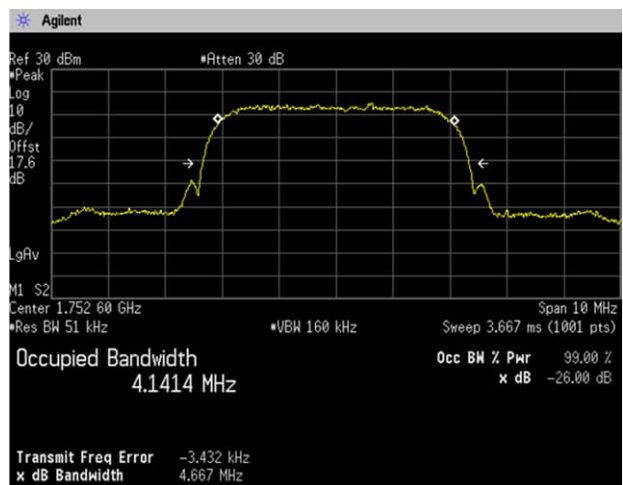
[WCDMA Band IV]
Channel: 1312



Channel: 1413



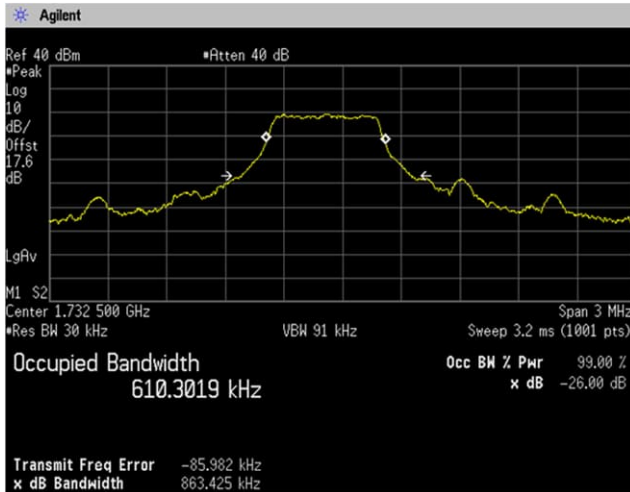
Channel: 1513



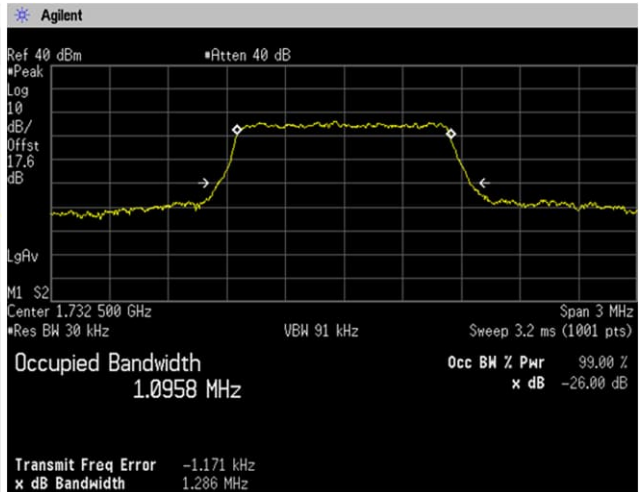


[LTE Band IV]
Channel: 20175

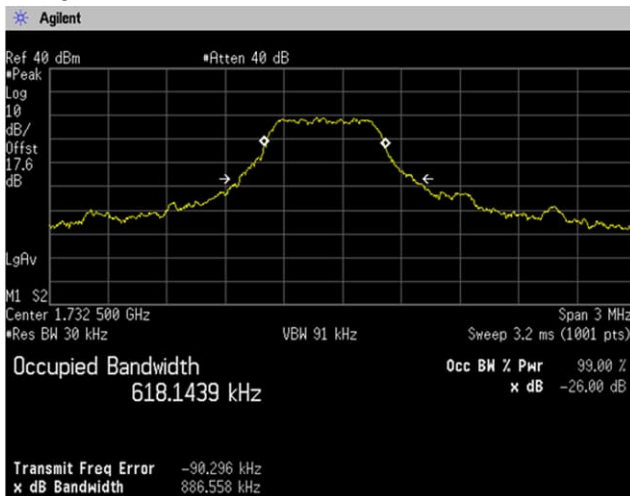
QPSK, BW 1.4MHz
RB3-1



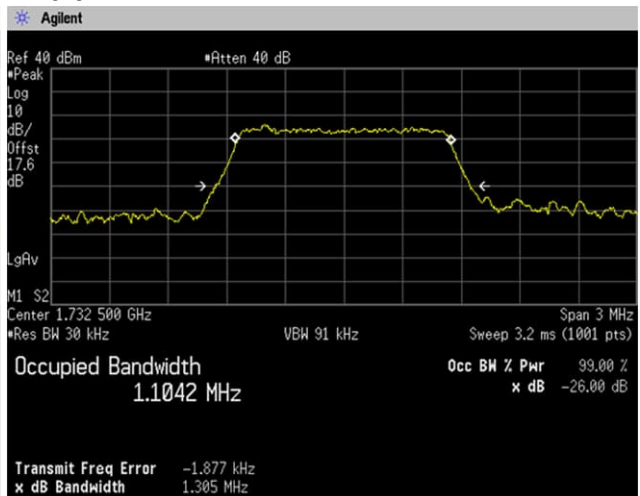
RB6-0



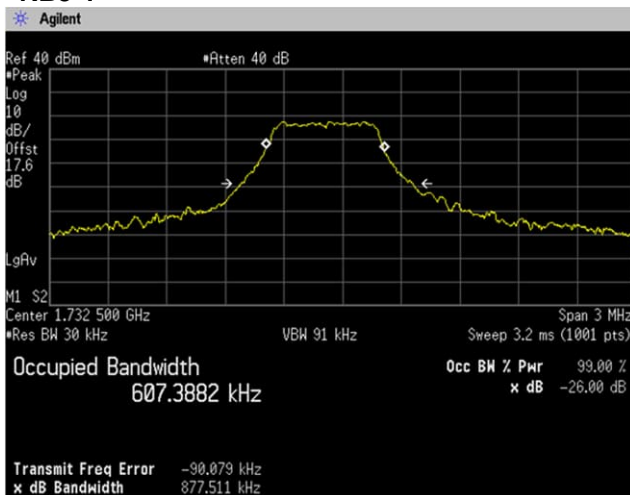
16QAM, BW 1.4MHz
RB3-1



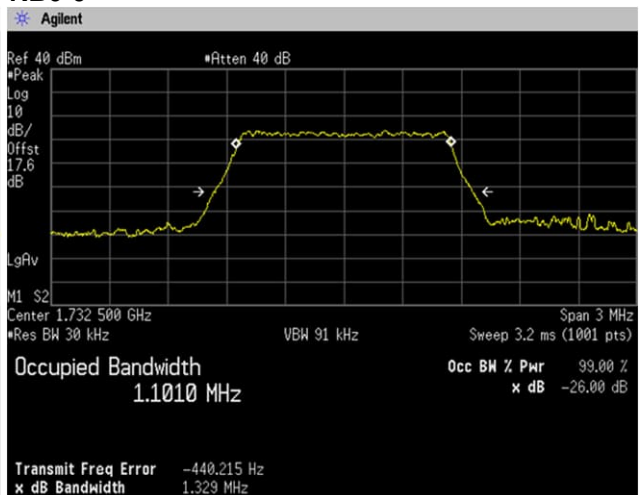
RB6-0



64QAM, BW 1.4MHz
RB3-1



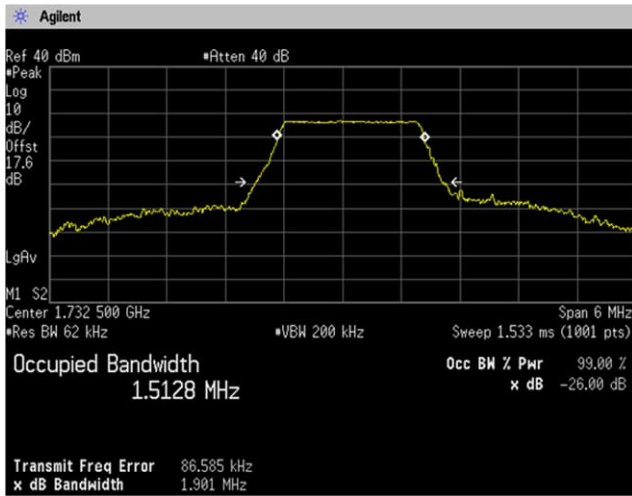
RB6-0



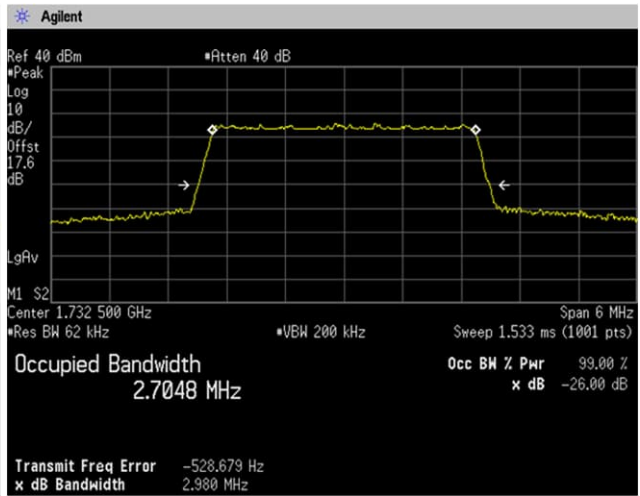


QPSK, BW 3MHz

RB8-4

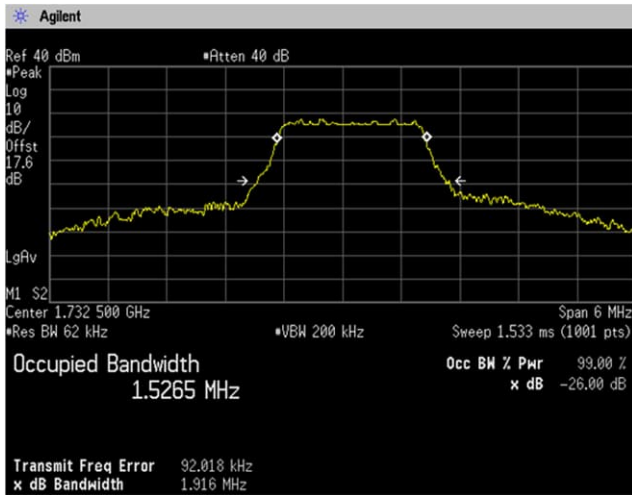


RB15-0

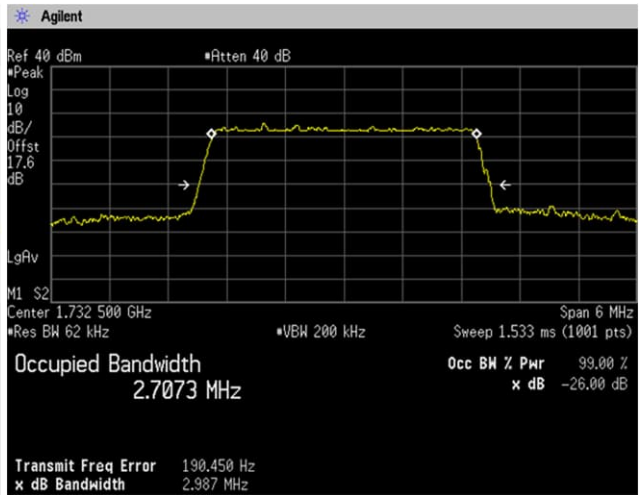


16QAM, BW 3MHz

RB8-4

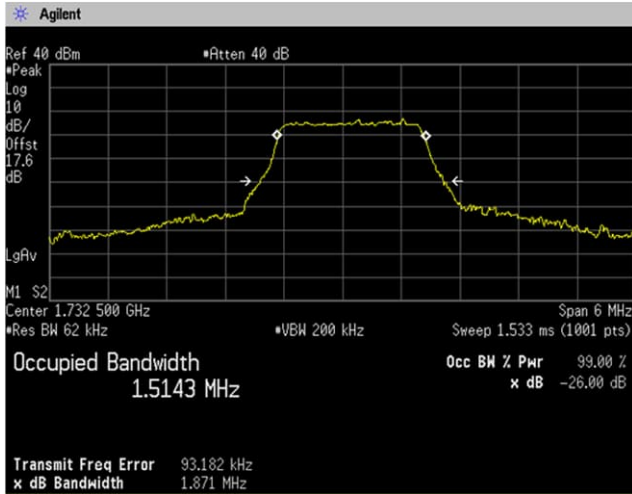


RB15-0

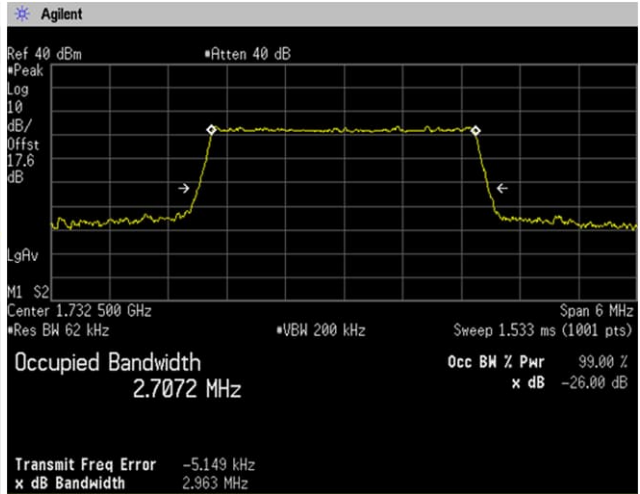


64QAM, BW 3MHz

RB8-4

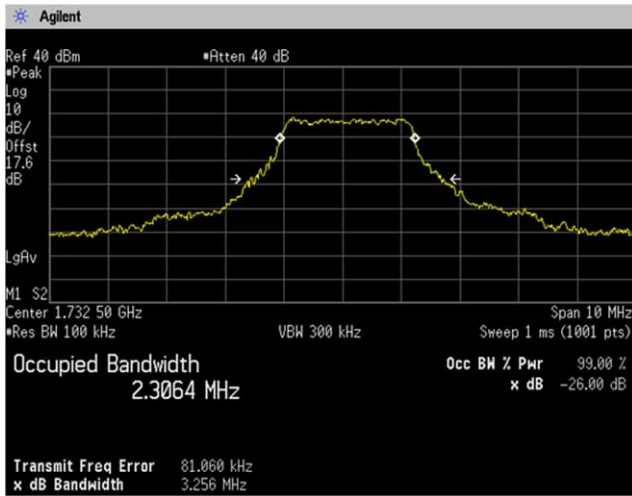


RB15-0





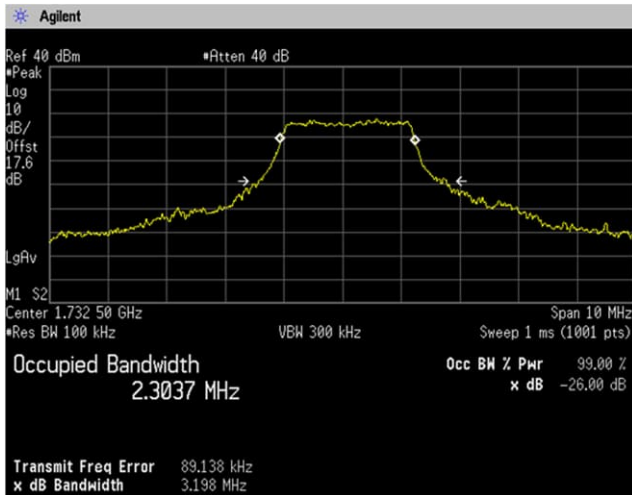
QPSK, BW 5MHz
RB12-7



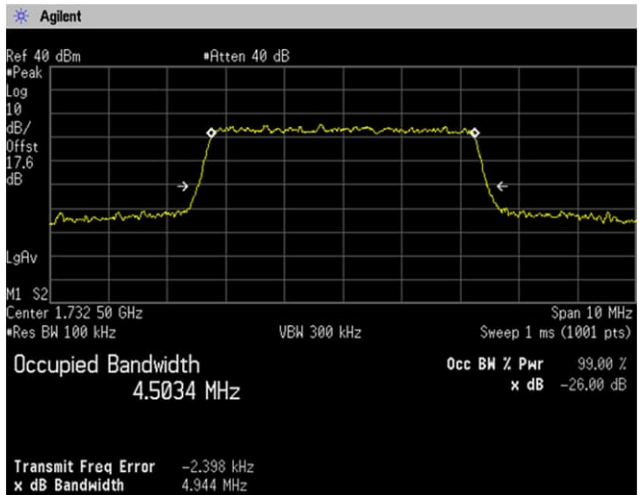
RB25-0



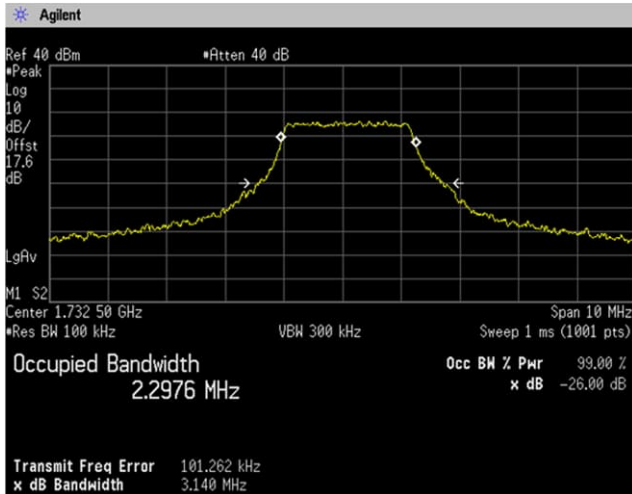
16QAM, BW 5MHz
RB12-7



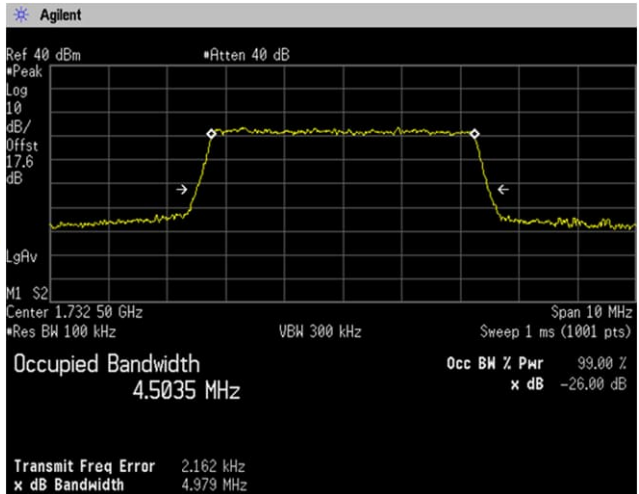
RB25-0



64QAM, BW 5MHz
RB12-7

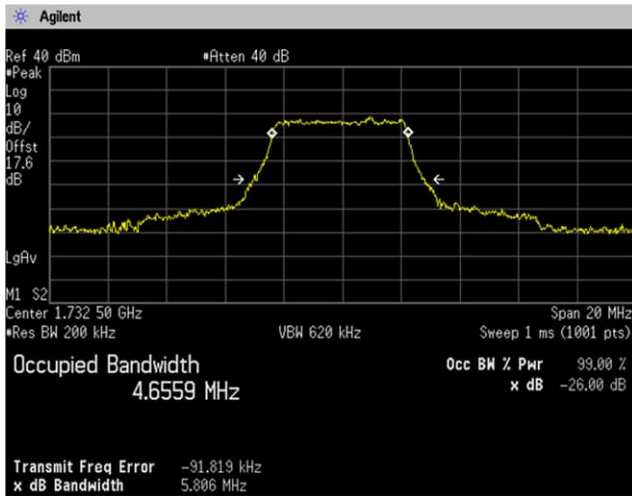


RB25-0

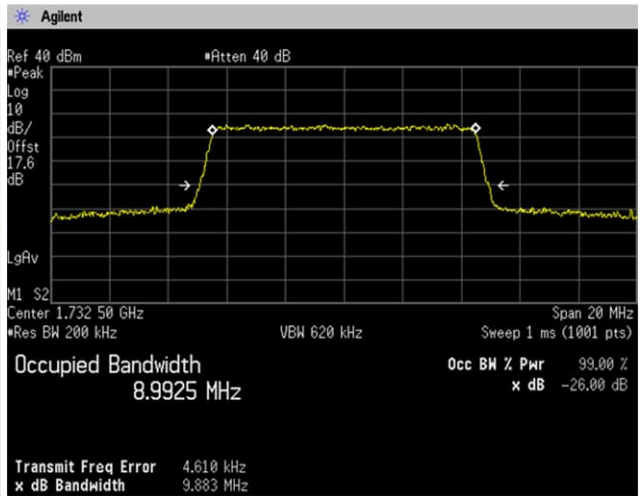




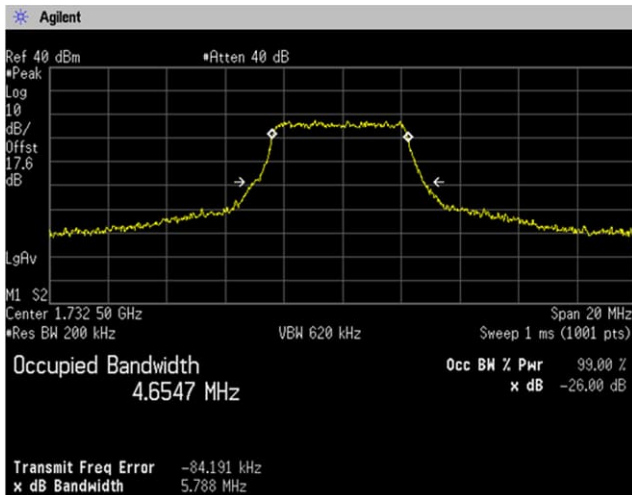
**QPSK, BW 10MHz
RB25-12**



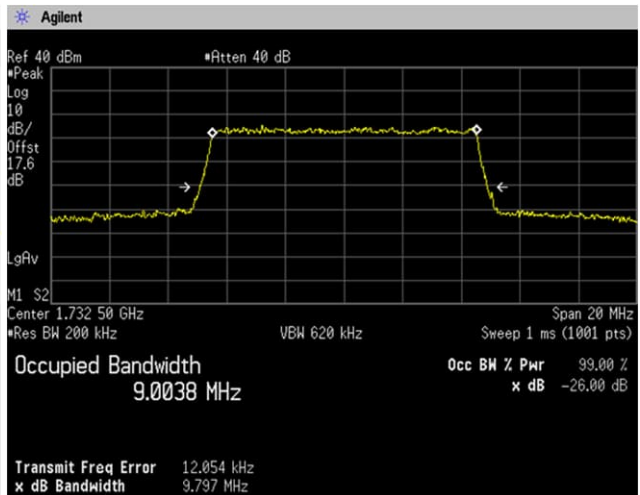
RB50-0



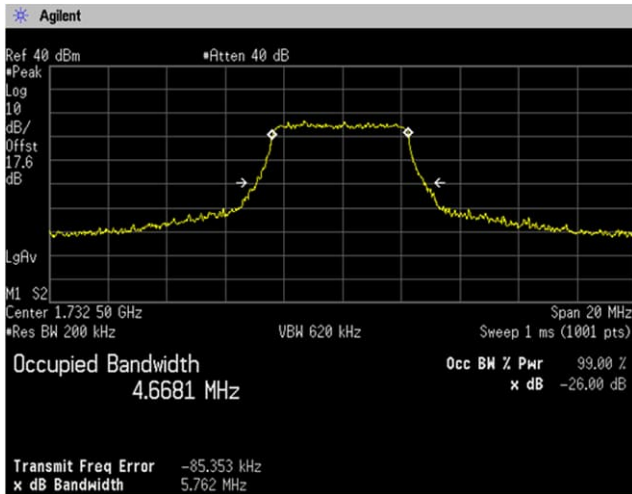
**16QAM, BW 10MHz
RB25-12**



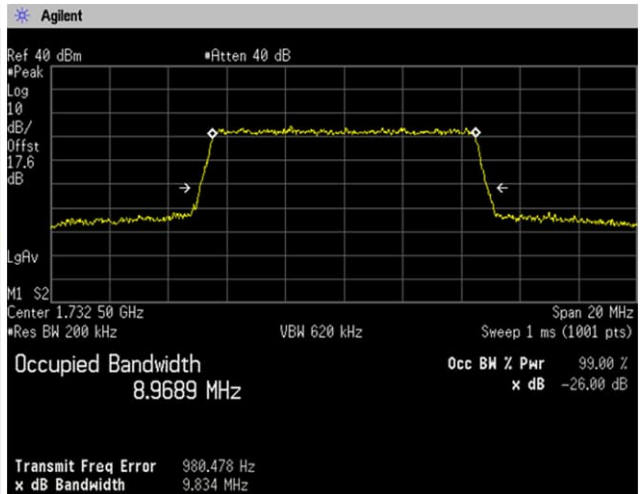
RB50-0



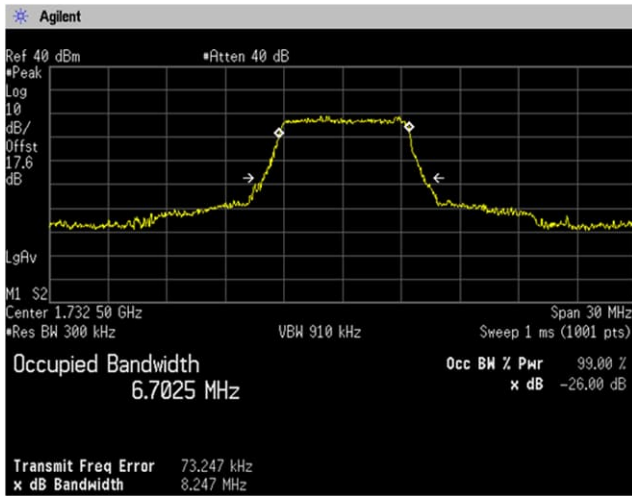
**64QAM, BW 10MHz
RB25-12**



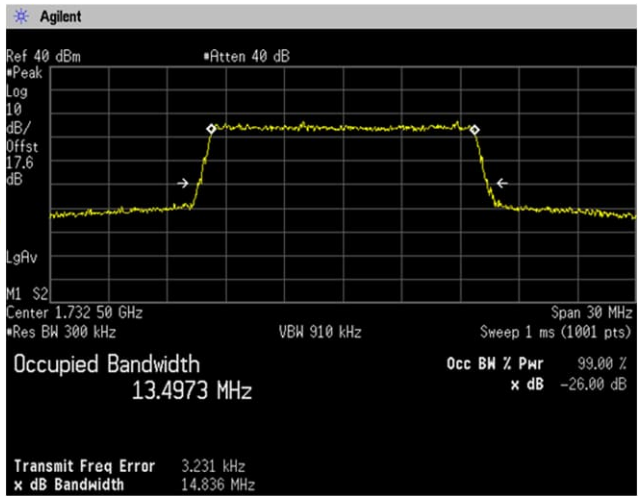
RB50-0



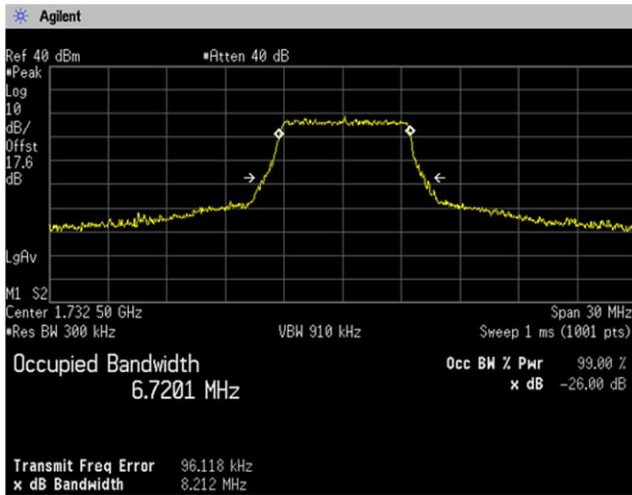
**QPSK, BW 15MHz
RB36-20**



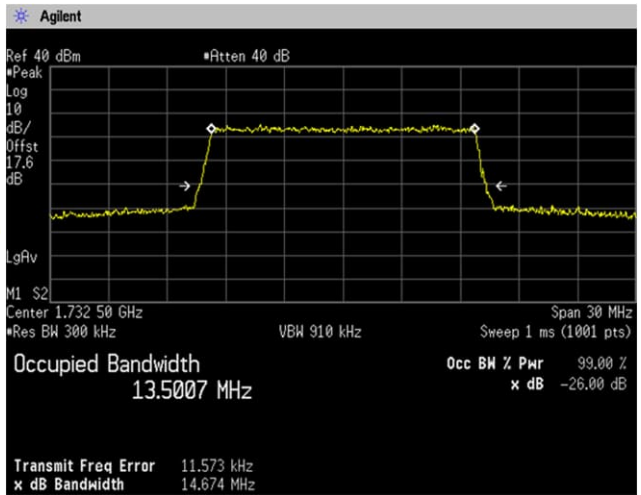
RB75-0



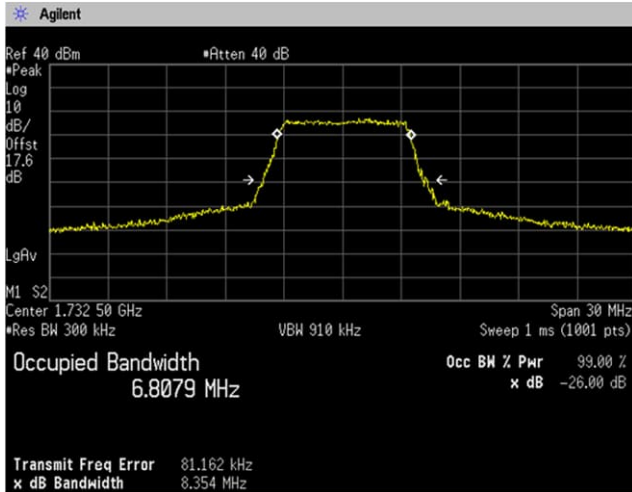
**16QAM, BW 15MHz
RB36-20**



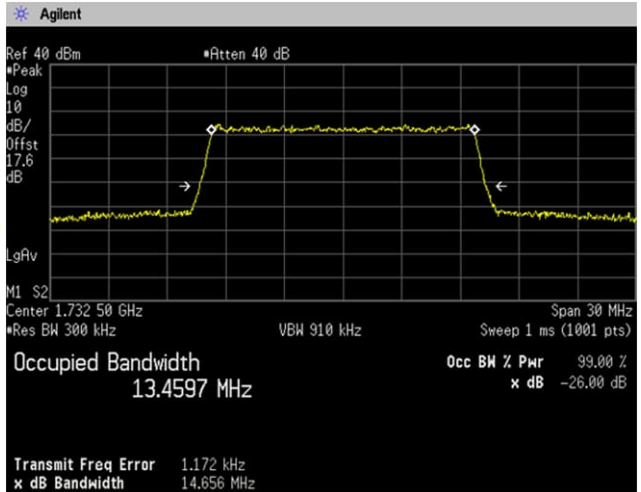
RB75-0



**64QAM, BW 15MHz
RB36-20**

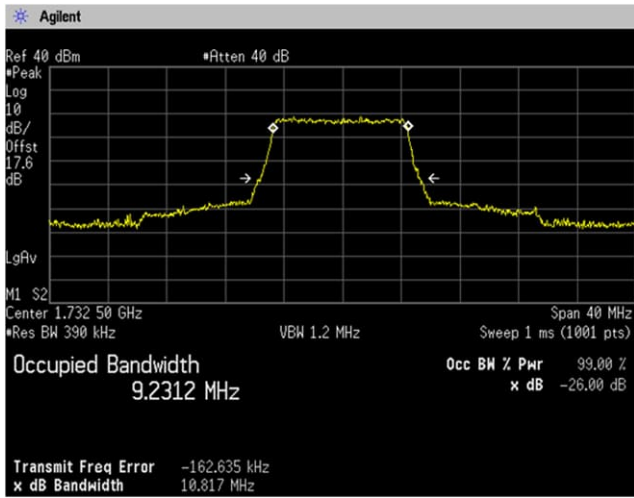


RB75-0

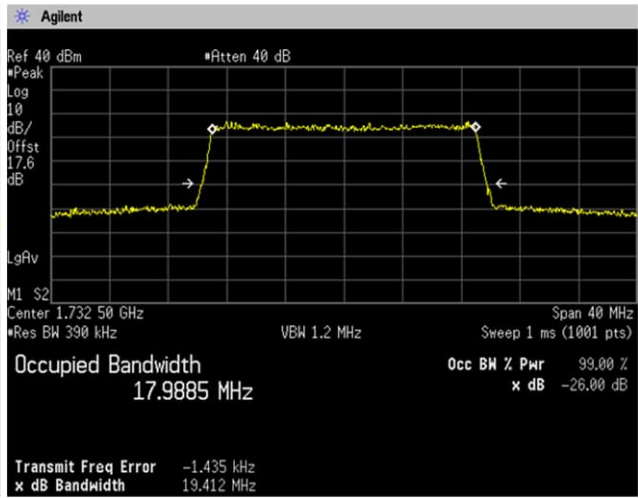




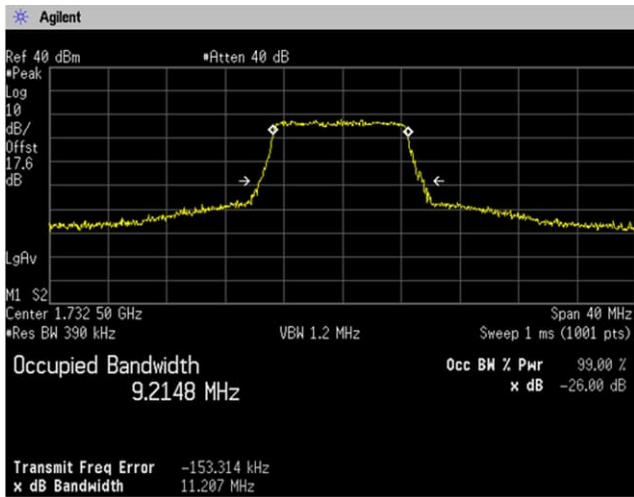
**QPSK, BW 20MHz
RB50-24**



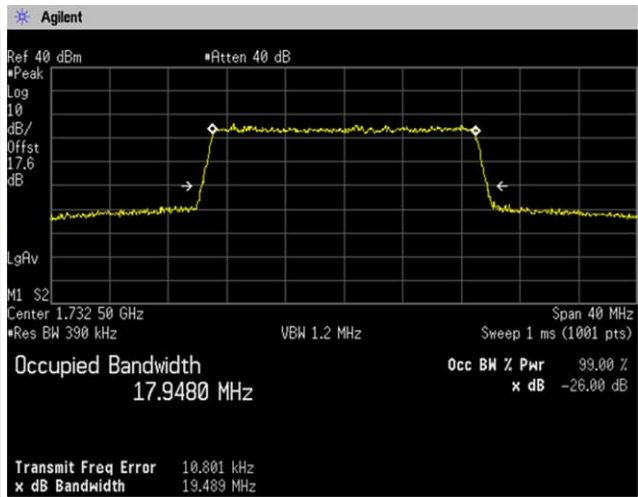
RB100-0



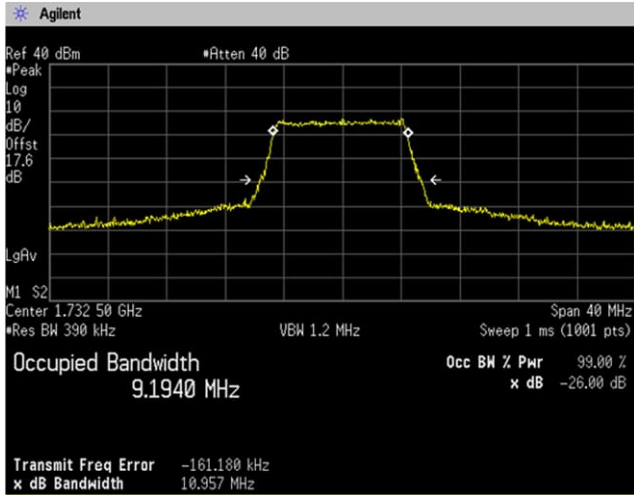
**16QAM, BW 20MHz
RB50-24**



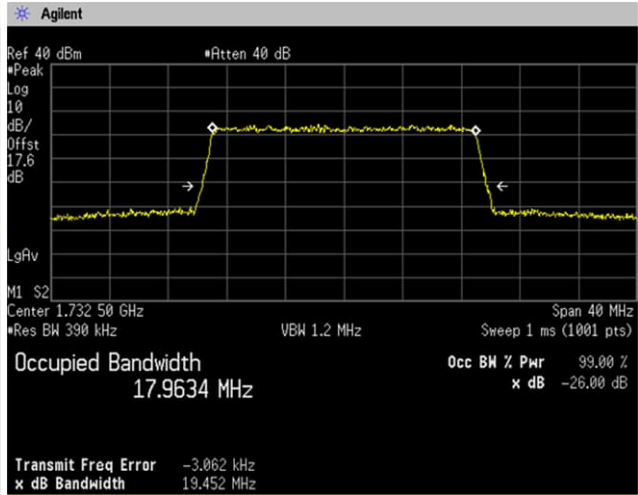
RB100-0



**64QAM, BW 20MHz
RB50-24**



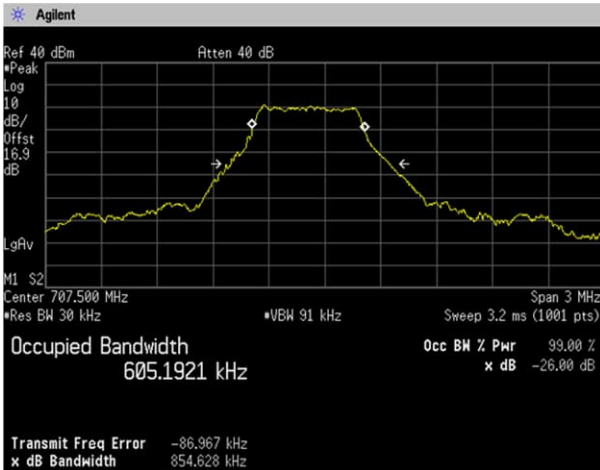
RB100-0



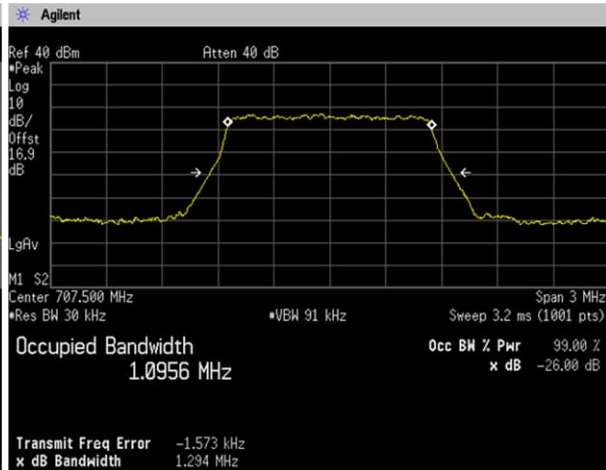
[LTE Band XII]
Channel: 23095

QPSK, BW 1.4MHz

RB3-1

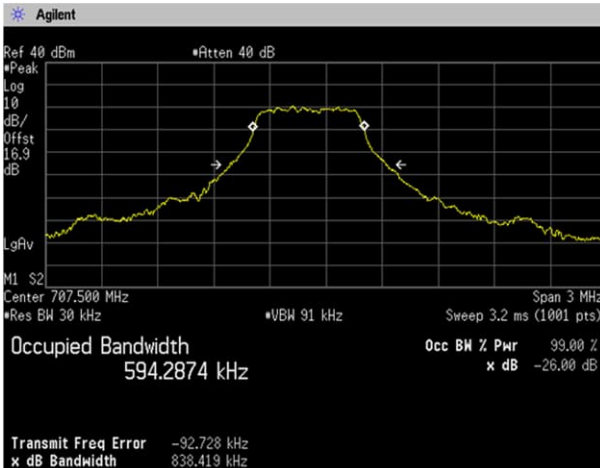


RB6-0

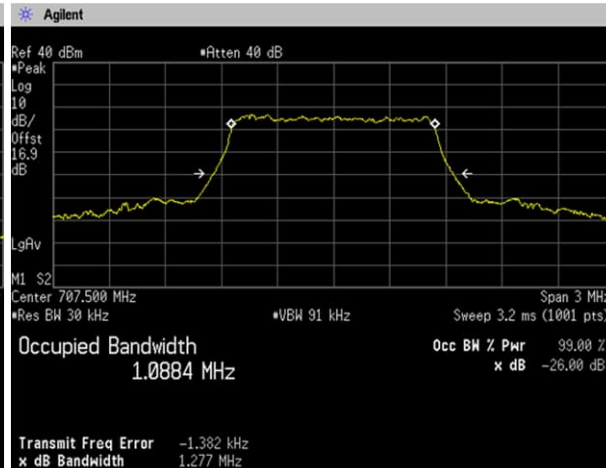


16QAM, BW 1.4MHz

RB3-1

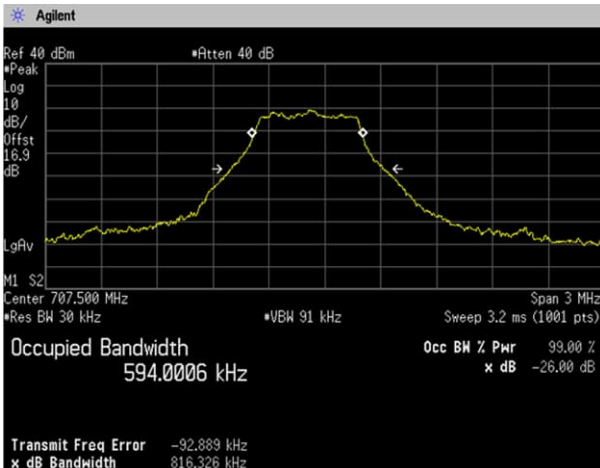


RB6-0

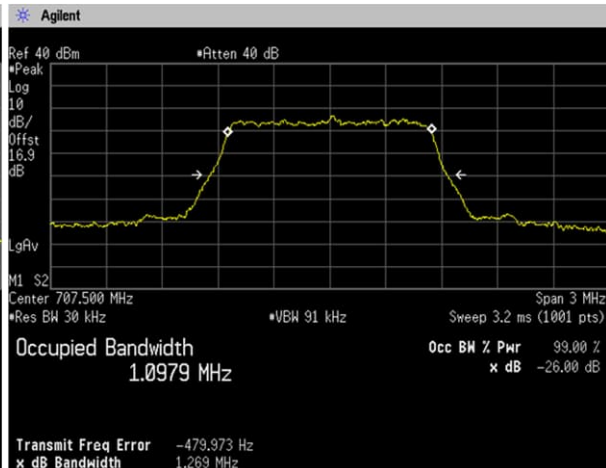


64QAM, BW 1.4MHz

RB3-1



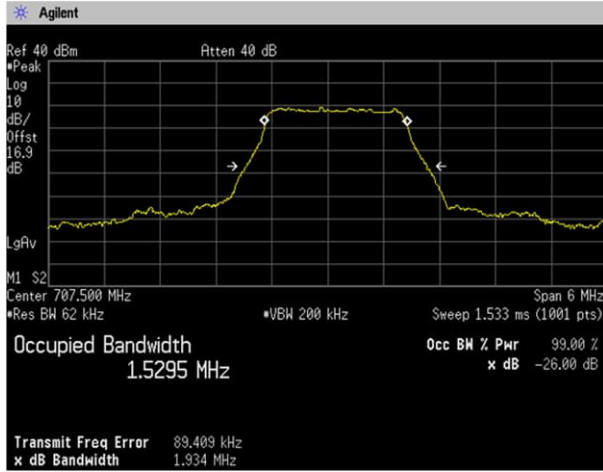
RB6-0



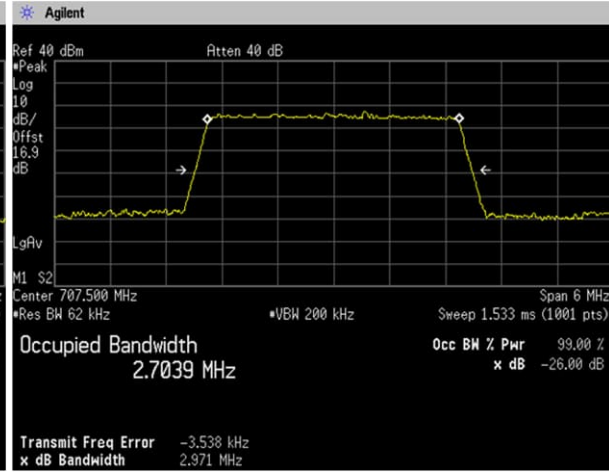
Channel: 23095

QPSK, BW 3MHz

RB8-4

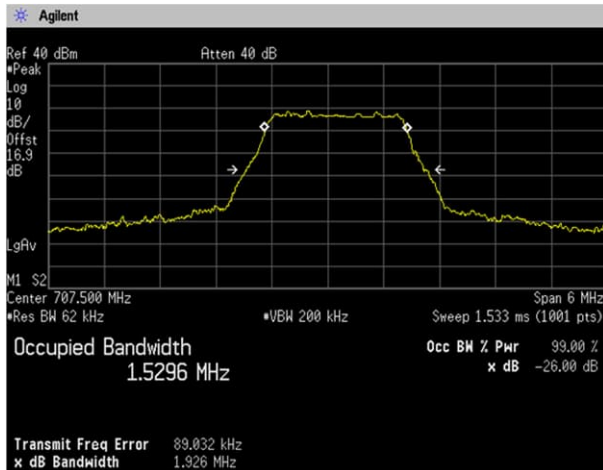


RB15-0

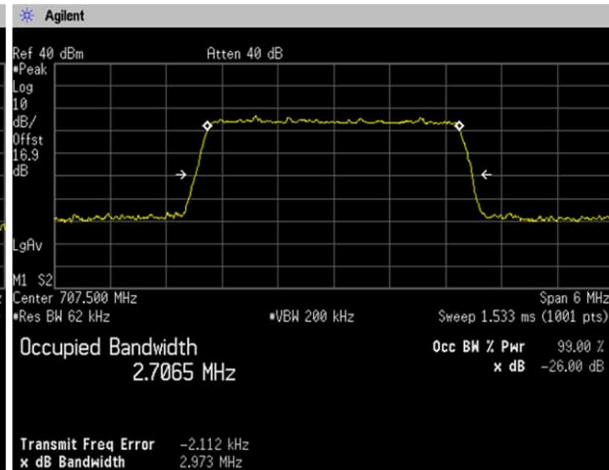


16QAM, BW 3MHz

RB8-4

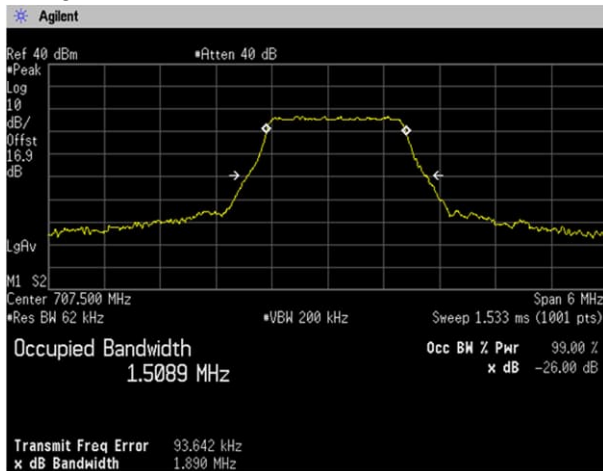


RB15-0

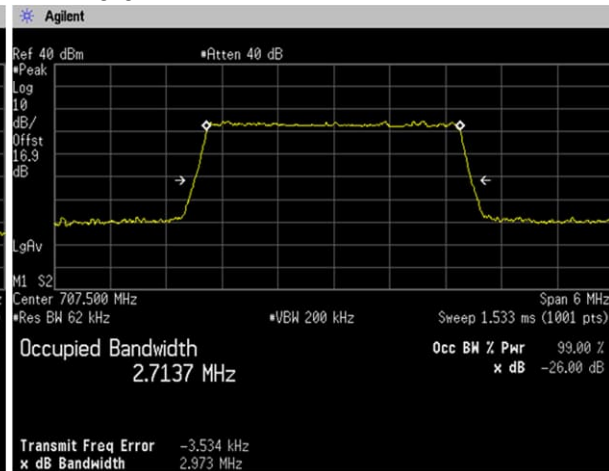


64QAM, BW 3MHz

RB8-4



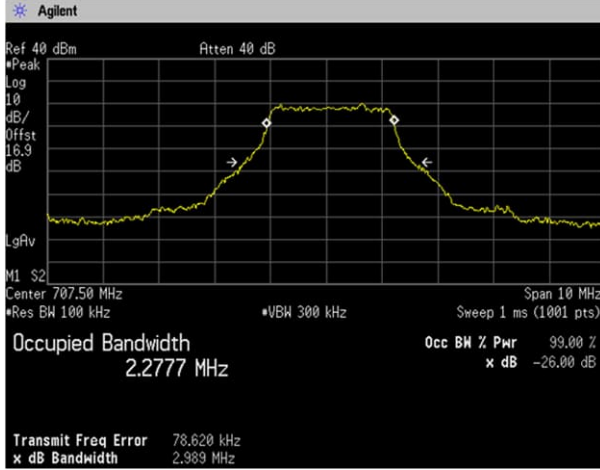
RB15-0



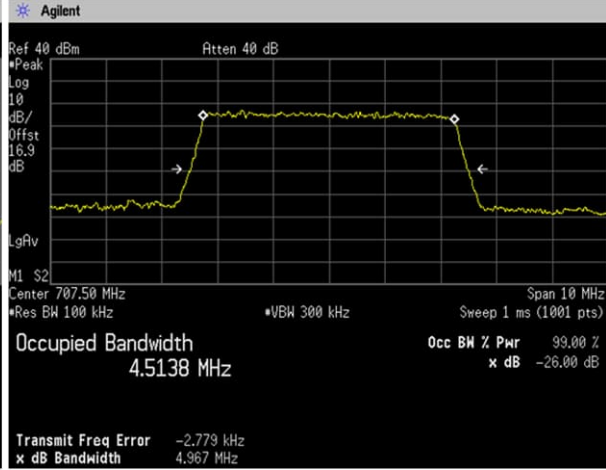
Channel: 23095

QPSK, BW 5MHz

RB12-7

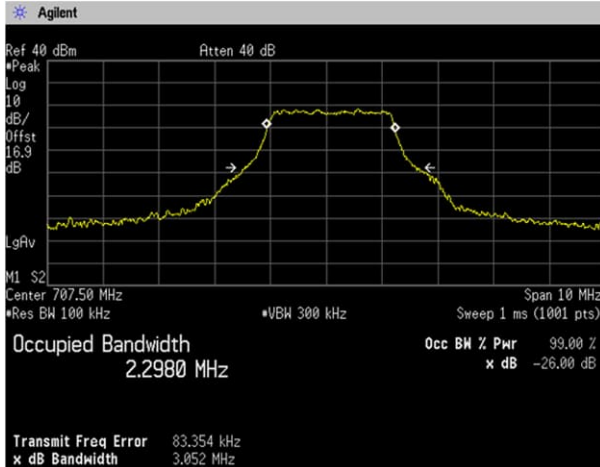


RB25-0

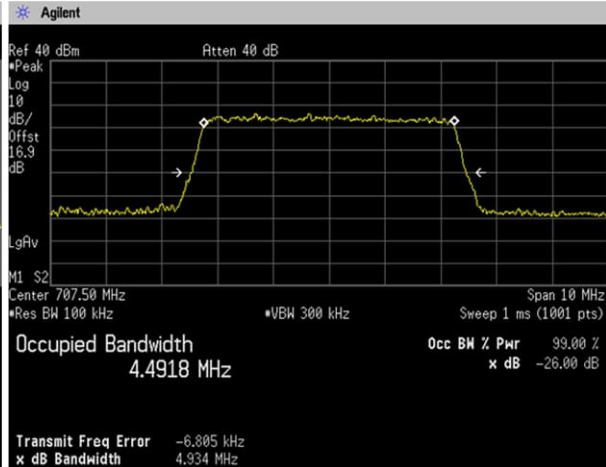


16QAM, BW 5MHz

RB12-7

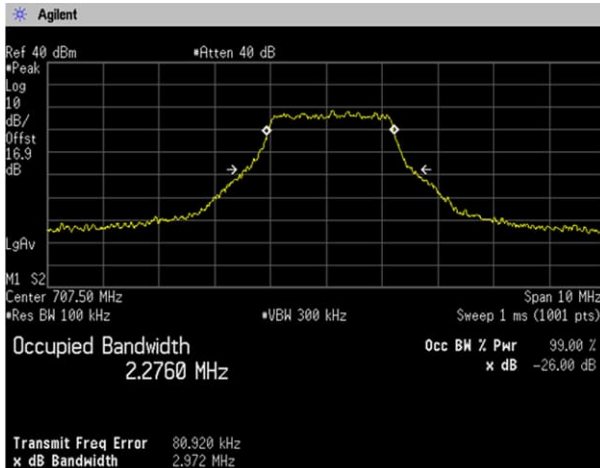


RB25-0

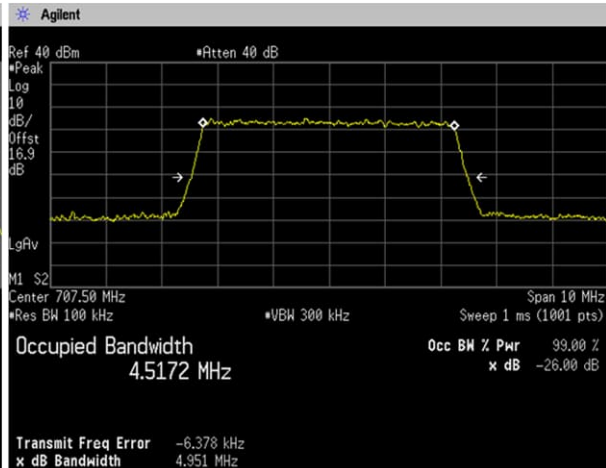


64QAM, BW 5MHz

RB12-7

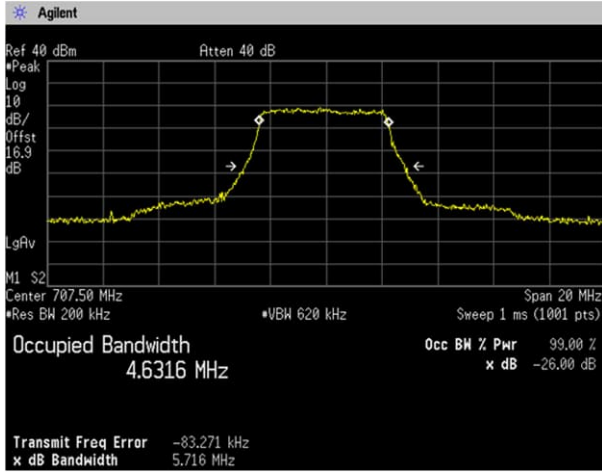


RB25-0

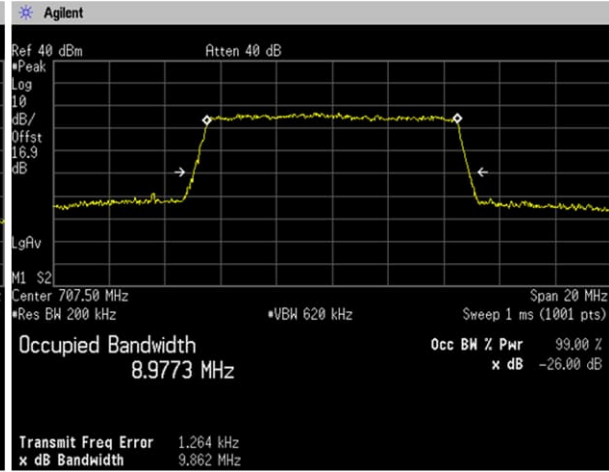


Channel: 23095

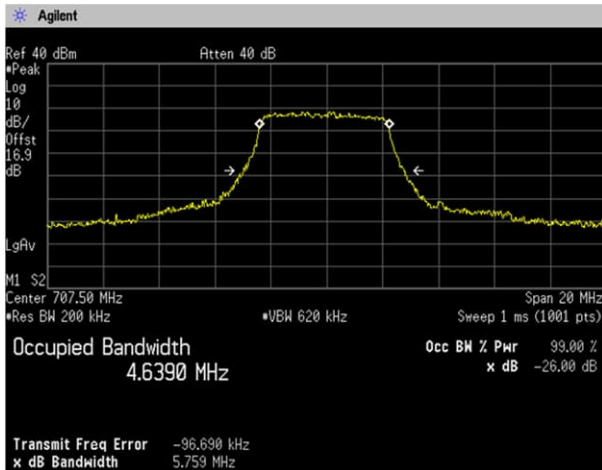
QPSK, BW 10MHz
RB25-12



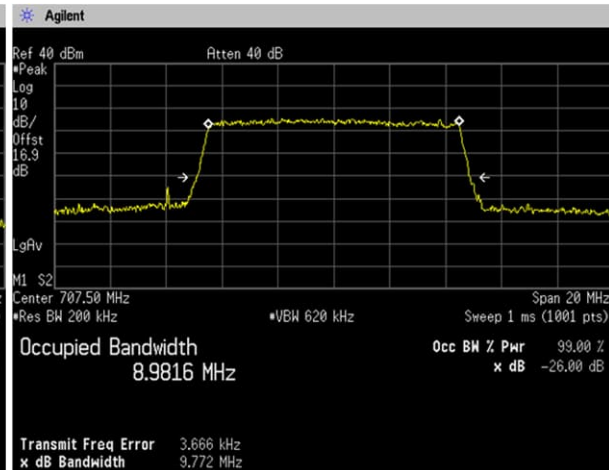
RB50-0



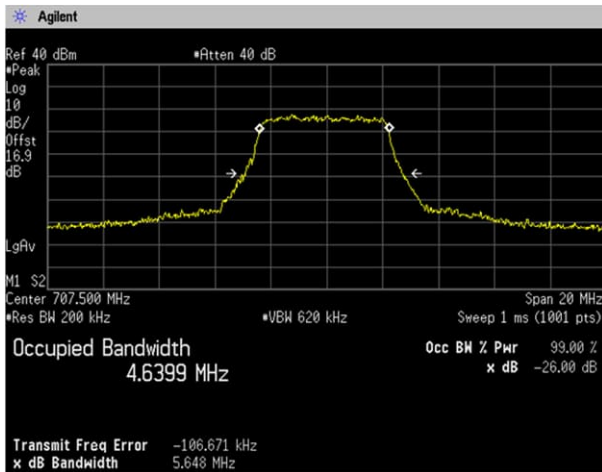
16QAM, BW 10MHz
RB25-12



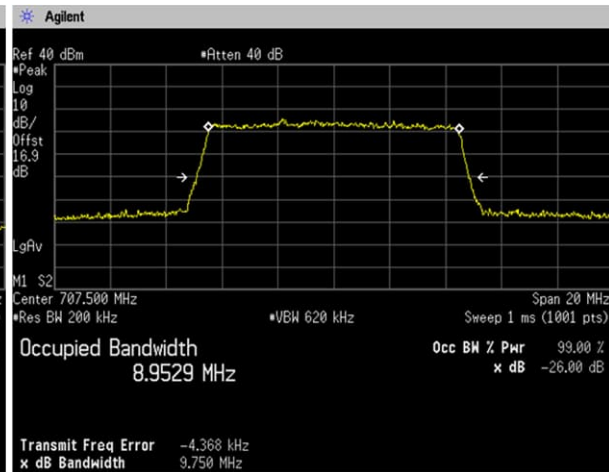
RB50-0



64QAM, BW 10MHz
RB25-12

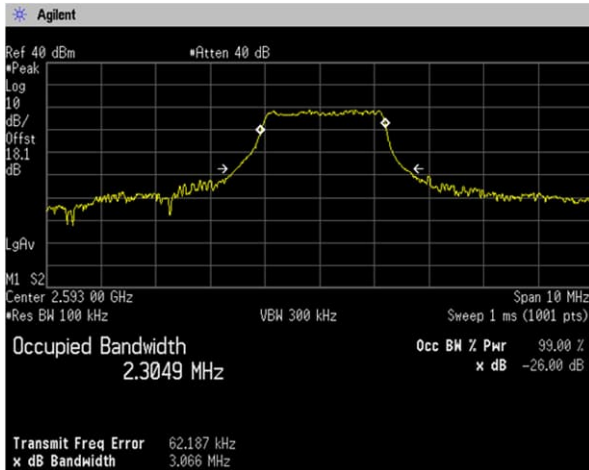


RB50-0

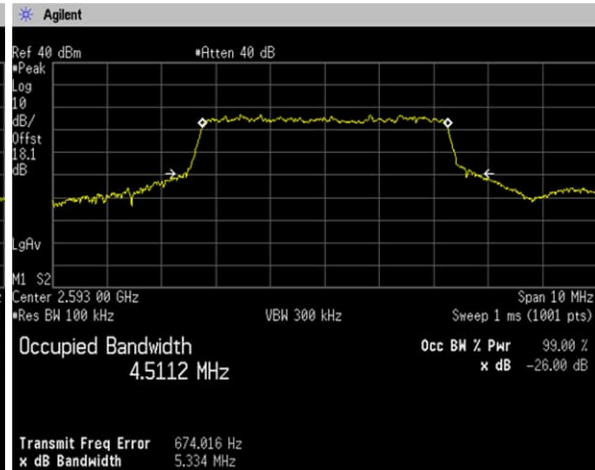


[LTE Band XL I]
Channel: 40620

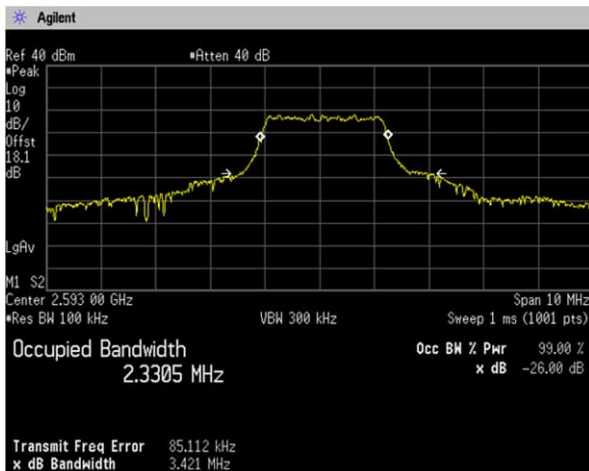
QPSK, BW 5MHz
RB12-7



RB25-0



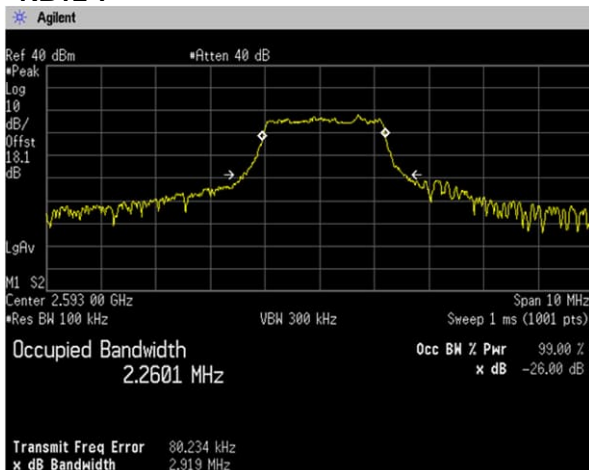
16QAM, BW 5MHz
RB12-7



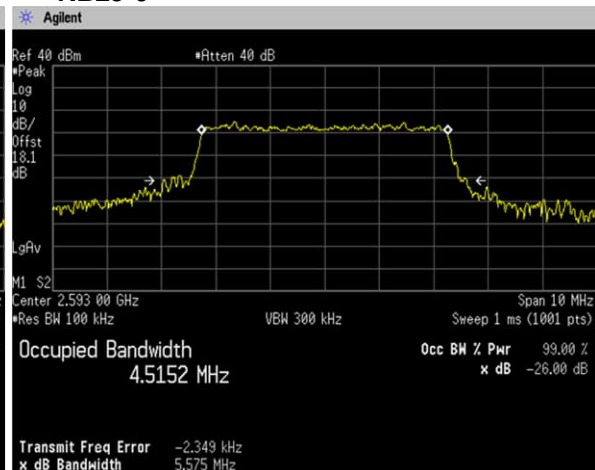
RB25-0



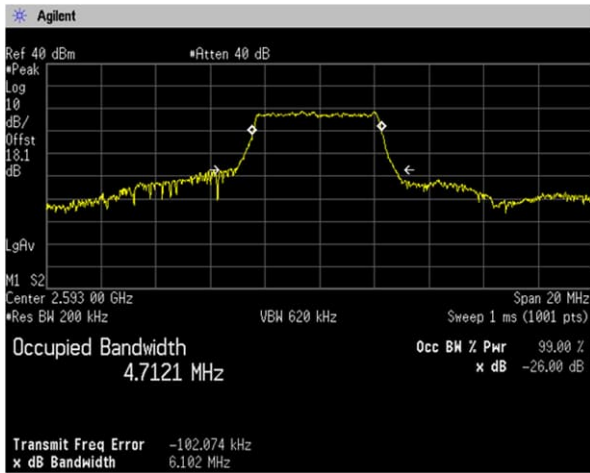
64QAM, BW 5MHz
RB12-7



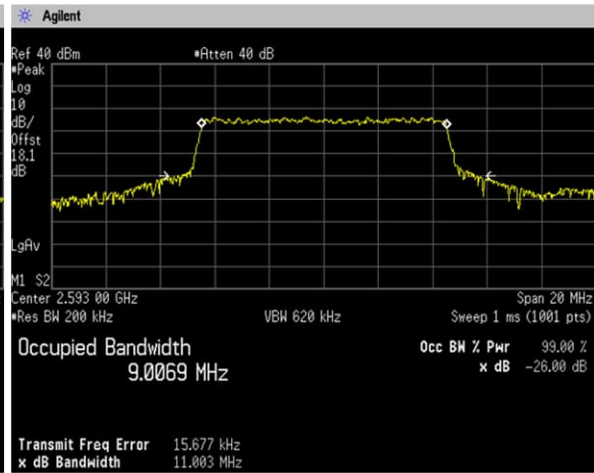
RB25-0



QPSK, BW 10MHz
RB25-12



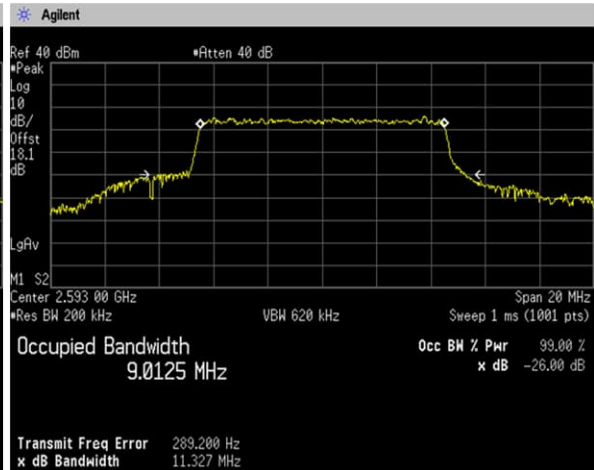
RB50-0



16QAM, BW 10MHz
RB25-12



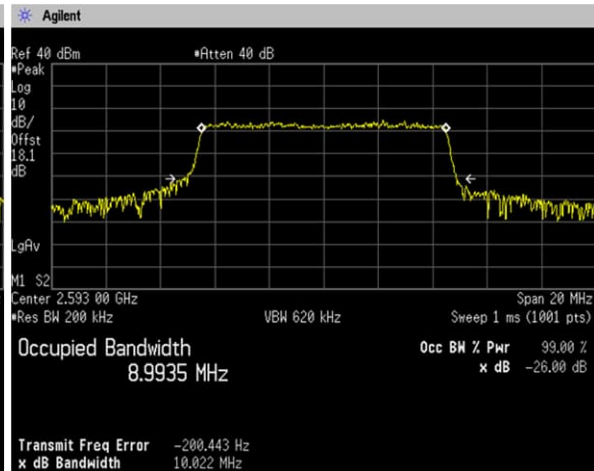
RB50-0



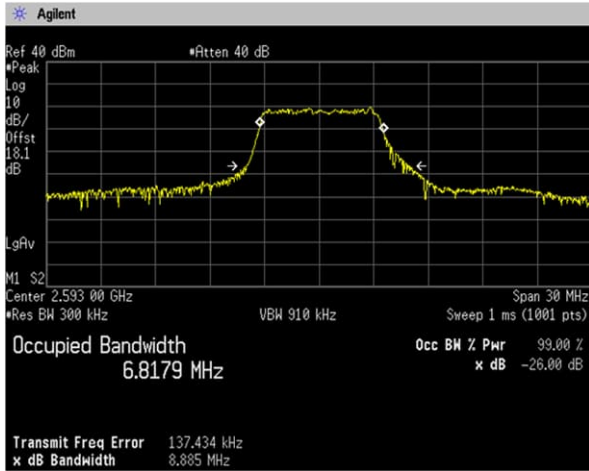
64QAM, BW 10MHz
RB25-12



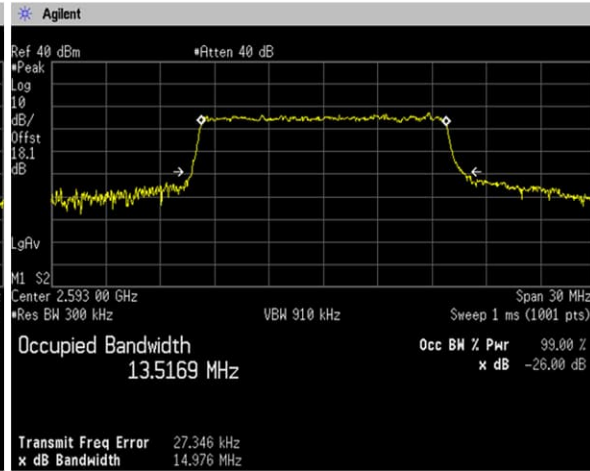
RB50-0



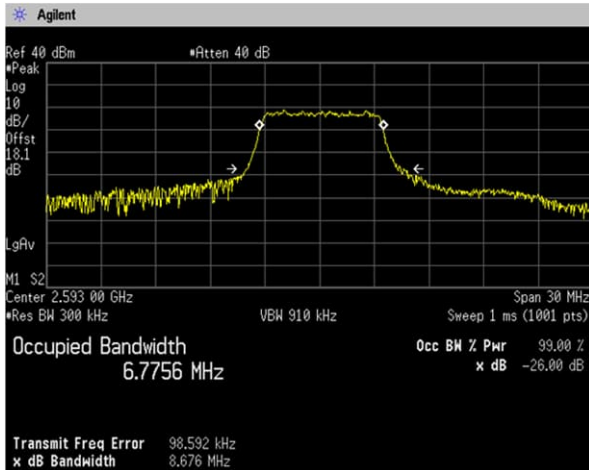
**QPSK, BW 15MHz
RB36-20**



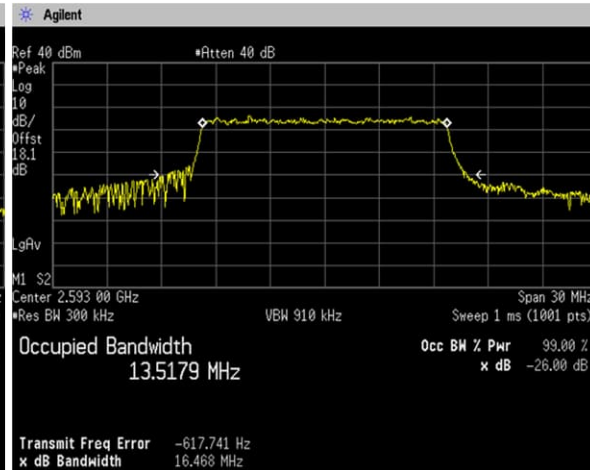
RB75-0



**16QAM, BW 15MHz
RB36-20**



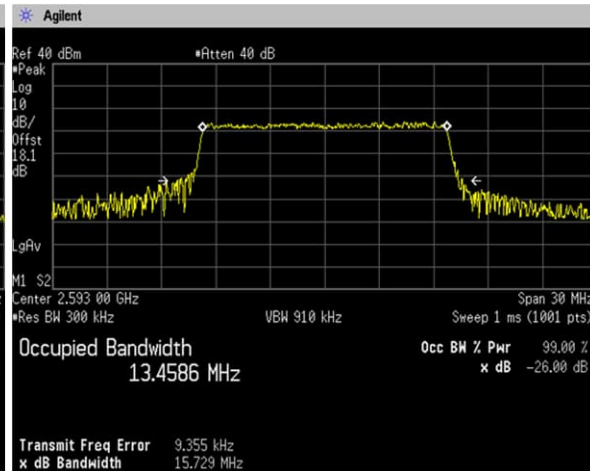
RB75-0



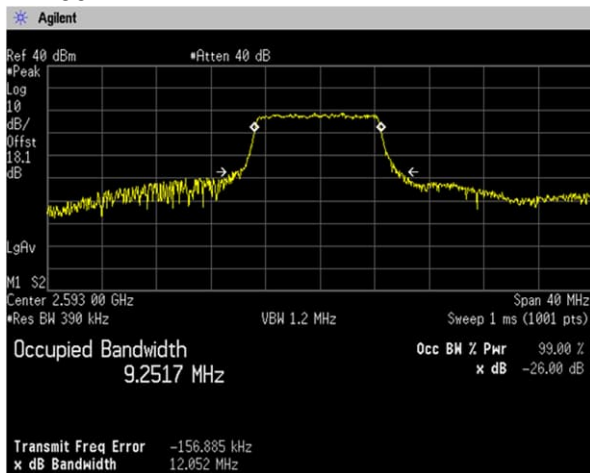
**64QAM, BW 15MHz
RB36-20**



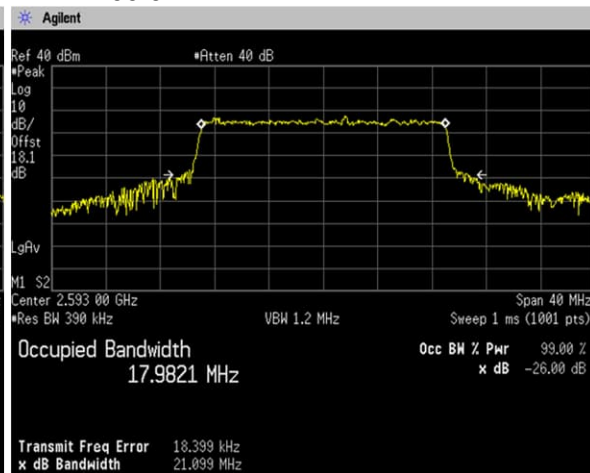
RB75-0



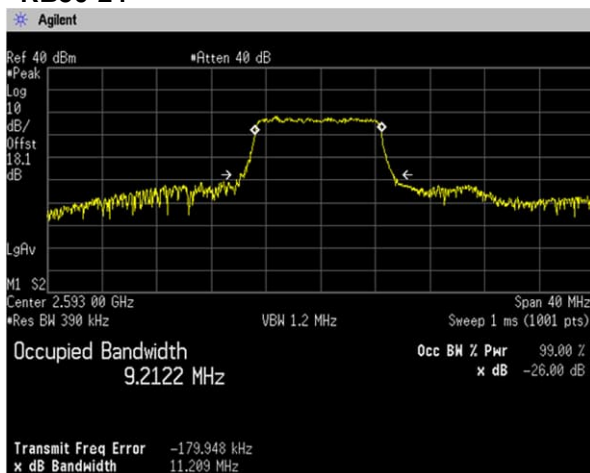
**QPSK, BW 20MHz
RB50-24**



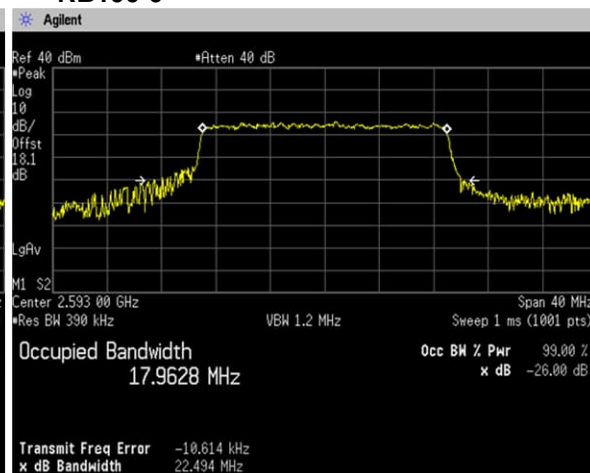
RB100-0



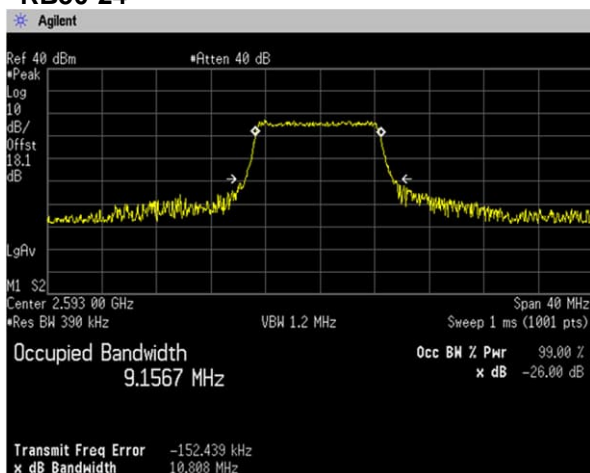
**16QAM, BW 20MHz
RB50-24**



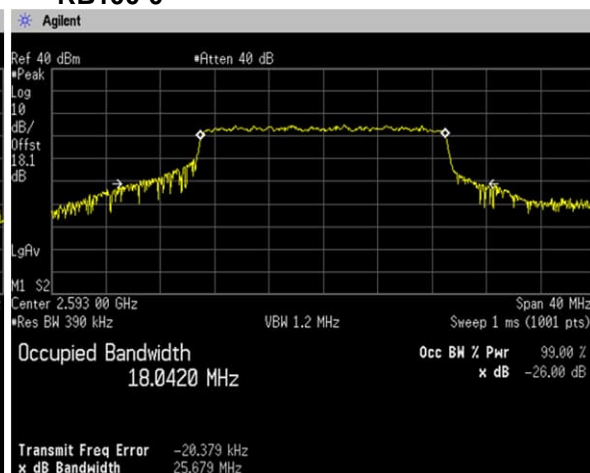
RB100-0



**64QAM, BW 20MHz
RB50-24**



RB100-0



4.4 Band Edge Spurious and Harmonic at Antenna Terminals

4.4.1 Measurement procedure

[FCC 27.53, 2.1051]

The band edge spurious and harmonic was measured with a spectrum analyzer connected to the antenna terminal.

The spectrum analyzer is set to;

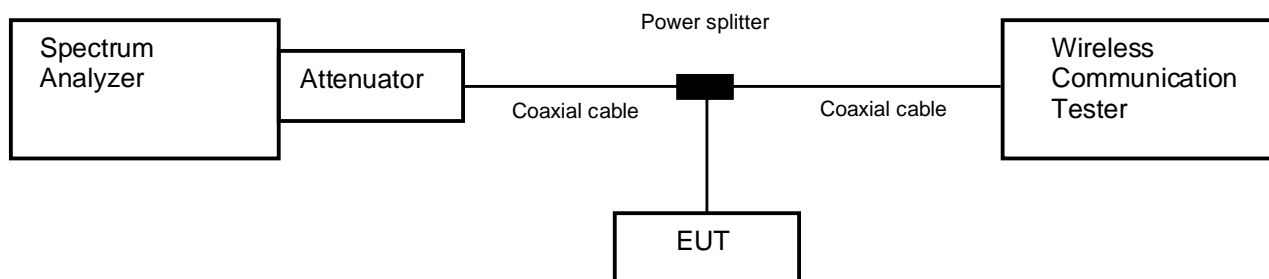
<Band Edge>

- Span was set large enough so as to capture all out of band emissions near the band edge
- RBW \geq 1% of the emission bandwidth or 2% of the emission bandwidth
- VBW \geq 3 x RBW
- Detector = RMS
- Trace mode = Max hold
- Sweep time = auto-couple
- Number of sweep point \geq 2 x span / RBW

<Spurious Emissions>

- RBW = 1MHz & VBW \geq 3 x RBW
- Detector = Peak
- Trace mode = Max hold
- Sweep time = auto-couple
- Number of sweep point \geq 2 x span / RBW

- Test configuration



4.4.2 Limit

(1) [27.53(c)]

For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;

(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;

(3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $76 + 10 \log (P)$ dB in a 6.25 kHz band segment, for base and fixed stations;

(4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $65 + 10 \log (P)$ dB in a 6.25 kHz band segment, for mobile and portable stations;

(2) [27.53(g)]

For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

(3) [27.53(h) (1)]

General protection levels. Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10} (P)$ dB.

(4) [27.53(m)(4)]

For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.



4.4.3 Measurement result

Date	: 16-April-2024	Test engineer	: <u>Kazunori Saito</u>
Temperature	: 22.8 [°C]		
Humidity	: 35.9 [%]		
Test place	: Shielded room No.3		
Date	: 17-April-2024	Test engineer	: <u>Kazunori Saito</u>
Temperature	: 18.5 [°C]		
Humidity	: 47.5 [%]		
Test place	: Shielded room No.3		
Date	: 18-April-2024	Test engineer	: <u>Kazunori Saito</u>
Temperature	: 19.6 [°C]		
Humidity	: 39.7 [%]		
Test place	: Shielded room No.3		
Date	: 22-April-2024	Test engineer	: <u>Kazunori Saito</u>
Temperature	: 19.9 [°C]		
Humidity	: 34.6 [%]		
Test place	: Shielded room No.3		
Date	: 24-April-2024	Test engineer	: <u>Kazunori Saito</u>
Temperature	: 23.5 [°C]		
Humidity	: 34.0 [%]		
Test place	: Shielded room No.3		

Band	Channel	Frequency [MHz]	Results	
WCDMA Band IV	1312	1712.4	See the trace data	PASS
	1513	1752.6	See the trace data	PASS

Band	Modulation	Bandwidth [MHz]	Channel	Frequency [MHz]	Results	
LTE Band IV	QPSK, 16QAM, 64QAM	1.4	19957	1710.7	See the trace data	PASS
			20393	1754.3	See the trace data	PASS
		3	19965	1711.5	See the trace data	PASS
			20385	1753.5	See the trace data	PASS
		5	19975	1712.5	See the trace data	PASS
			20375	1752.5	See the trace data	PASS
		10	20000	1715.0	See the trace data	PASS
			20350	1750.0	See the trace data	PASS
		15	20025	1717.5	See the trace data	PASS
			20325	1747.5	See the trace data	PASS
		20	20050	1720.0	See the trace data	PASS
			20300	1745.0	See the trace data	PASS

Band	Modulation	Bandwidth [MHz]	Channel	Frequency [MHz]	Results	
LTE Band XII	QPSK, 16QAM, 64QAM	1.4	23017	699.7	See the trace data	PASS
			23173	715.3	See the trace data	PASS
		3	23025	700.5	See the trace data	PASS
			23165	714.5	See the trace data	PASS
		5	23035	701.5	See the trace data	PASS
			23155	713.5	See the trace data	PASS
		10	23060	704.0	See the trace data	PASS
			23130	711.0	See the trace data	PASS

Band	Modulation	Bandwidth [MHz]	Channel	Frequency [MHz]	Results	
LTE Band XL I	QPSK, 16QAM, 64QAM	5	39675	2498.5	See the trace data	PASS
			41565	2687.5	See the trace data	PASS
		10	39700	2501.0	See the trace data	PASS
			41540	2685.0	See the trace data	PASS
		15	39725	2503.5	See the trace data	PASS
			41515	2682.5	See the trace data	PASS
		20	39750	2506.0	See the trace data	PASS
			41490	2680.0	See the trace data	PASS