Report on the RF Testing of:

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

In accordance with FCC Part 24 Subpart E

Prepared for: KYOCERA Corporation
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COMMERCIAL-IN-CONFIDENCE

Document Number: JPD-TR-24114-0

SIGNATURE			
NAME	**JOB TITLE**	**RESPONSIBLE FOR**	**ISSUE DATE**
Hiroaki Suzuki	Deputy Manager of RF Group	Approved Signatory	2024.07.01

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD Japan Ltd. document control rules.

EXECUTIVE SUMMARY - Result: Complied
A sample(s) of this product was tested and the result above was confirmed in accordance with FCC Part 24 Subpart E.

Certificate #3686.03

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Contents

1 Summary of Test

1.1 Modification history of the test report

Document Number	Modification History	Issue Date
JPD-TR-24114-0	First Issue	Refer to the cover page

1.2 Standards

CFR47 FCC Part 24 Subpart E

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
24.232(c)	Equivalent Isotropic Radiated Power	Radiated	PASS	-
24.232(d)	Peak to Average Ratio	Conducted	PASS	-
24.238(a) 2.1049	Occupied Bandwidth	Conducted	PASS	-
24.238(a) 2.1051	Band Edge Spurious and Harmonic at Antenna Terminal	Conducted	PASS	-
24.238(a) 2.1053	Radiated emissions and Harmonic Emissions	Radiated	PASS	-
24.235 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

Table-top

1.8 Test period

19-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 3.8 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 GSM1900: 1850.2-1909.8 MHz WCDMA Band II: 1852.4-1907.6MHz LTE Band II: 1850.0-1910.0MHz Down Link GSM1900: 1930.2-1989.8 MHz WCDMA Band II: 1932.4-1987.6MHz LTE Band II: 1930.0-1990.0MHz
Modulation type	GSM1900: GMSK WCDMA Band II: QPSK, 16QAM LTE Band II: QPSK, 16QAM, 64QAM
Emission designator	GSM1900: 244KGXW WCDMA Band II: 4M14F9W LTE Band II: BW 1.4M QPSK: 1M09G7D, 16QAM: 1M10W7D, 64QAM: 1M09W7D BW 3M QPSK: 2M71G7D, 16QAM: 2M71W7D, 64QAM: 2M72W7D BW 5M QPSK: 4M53G7D, 16QAM: 4M50W7D, 64QAM: 4M50W7D BW 10M QPSK: 8M83G7D, 16QAM: 9M01W7D, 64QAM: 8M97W7D BW 15M QPSK: 13M5G7D, 16QAM: 13M5W7D, 64QAM: 13M4W7D BW 20M QPSK: 18M0G7D, 16QAM: 18M0W7D, 16QAM: 17M9W7D

Equivalent Isotropic Radiated Power (E.I.R.P)	GSM1900: 1.072W (30.3dBm) WCDMA Band II: 0.229W (23.6dBm) LTE Band II: 0.355W (25.5dBm)
Antenna type	Internal antenna
Antenna gain	GSM1900: 0.1 dBi WCDMA Band II: 0.1 dBi LTE Band II: 0.1 dBi

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]
GSM1900	GMSK	-	512, 661, 810	1850.2, 1880.0, 1909.8
WCDMA Band II	QPSK	-	9262, 9400, 9538	1852.4, 1880.0, 1907.6
	16QAM	-	9262, 9400, 9538	1852.4, 1880.0, 1907.6
LTE Band II	QPSK, 16QAM, 64QAM	1.4	18607, 18900, 19193	1850.7, 1880.0, 1909.3
		3	18615, 18900, 19185	1851.5, 1880.0, 1908.5
		5	18625, 18900, 19175	1852.5, 1880.0, 1907.5
		10	18650, 18900, 19150	1855.0, 1880.0, 1905.0
		15	18675, 18900, 19125	1857.5, 1880.0, 1902.5
		20	18700, 18900, 19100	1860.0, 1880.0, 1900.0

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 and 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

4 Test Result

4.1 Equivalent Isotropic Radiated Power

4.1.1 Measurement procedure

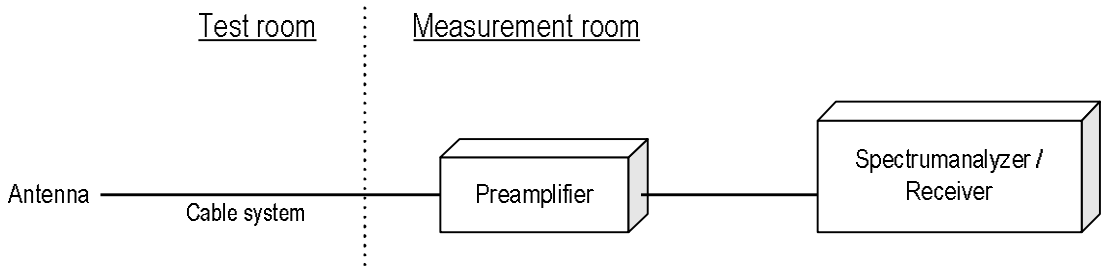
[FCC 24.232(c)]

<Step 1>
The EUT and support equipment are placed on 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 (double ridged guide 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;
a) Span = 1.5 times the OBW
b) RBW = 1-5% of the expected OBW, not to exceed 1 MHz
c) VBW ≥ 3 x RBW
d) Number of sweep points ≥ 2 x span / RBW
e) Sweep time = auto-couple
f) Detector = RMS (power averaging)
g) If the EUT can be configured to transmit continuously (i.e., burst duty cycle ≥ 98%), then set the trigger to free run.
h) 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.
i) Trace average at least 100 traces in power averaging (i.e., RMS) mode.
j) 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 @ 1880 MHz : 33.0 dBm
Ant. Input = 25.0 dBm Cable loss = 1.1dB Ant. Gain = 4.7 dBi
Result = 25.0 - 1.1 + 4.7 = 28.6 dBm
Margin = 33.0 - 28.6 = 4.4 dB

4.1.3 Limit

2 W (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 : 22.7 [˚C]
Humidity : 38.0 [%] Test engineer : Chiaki Kanno
Test place : 3m Semi-anechoic chamber

[GSM1900]

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	1850.2	-51.4	26.8	1.6	5.0	30.3	1.072	33.0	2.7
H	1880.0	-52.3	26.6	1.6	4.6	29.6	0.912	33.0	3.4
H	1909.8	-53.7	26.7	1.6	4.2	29.3	0.851	33.0	3.7

[WCDMA Band II]

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	1852.4	-49.8	20.2	1.6	5.0	23.6	0.229	33.0	9.4
H	1880.0	-51.0	18.6	1.6	4.6	21.6	0.145	33.0	11.4
H	1907.6	-51.5	19.4	1.6	4.2	22.1	0.162	33.0	10.9

[LTE Band II]
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	1850.7	-28.7	22.1	1.6	5.0	25.5	0.355	33.0	7.5
H	1880.0	-29.3	21.0	1.6	4.6	24.0	0.251	33.0	9.0
H	1909.3	-32.4	19.3	1.6	4.2	21.9	0.155	33.0	11.1

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	1850.7	-30.8	19.8	1.6	5.0	23.2	0.209	33.0	9.8
H	1880.0	-31.0	19.1	1.6	4.6	22.1	0.162	33.0	10.9
H	1909.3	-33.1	18.4	1.6	4.2	21.0	0.126	33.0	12.0

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	1850.7	-31.5	19.0	1.6	5.0	22.4	0.174	33.0	10.6
H	1880.0	-32.1	18.2	1.6	4.6	21.2	0.132	33.0	11.8
H	1909.3	-33.7	17.8	1.6	4.2	20.4	0.110	33.0	12.6

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	1851.5	-29.5	21.0	1.6	5.0	24.4	0.275	33.0	8.6
H	1880.0	-29.9	20.1	1.6	4.6	23.1	0.204	33.0	9.9
H	1908.5	-31.6	19.9	1.6	4.2	22.5	0.178	33.0	10.5

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	1851.5	-30.6	19.6	1.6	5.0	23.0	0.200	33.0	10.0
H	1880.0	-31.0	19.0	1.6	4.6	22.0	0.158	33.0	11.0
H	1908.5	-32.6	18.8	1.6	4.2	21.4	0.138	33.0	11.6

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	1851.5	-31.2	18.9	1.6	5.0	22.3	0.170	33.0	10.7
H	1880.0	-32.0	17.8	1.6	4.6	20.8	0.120	33.0	12.2
H	1908.5	-33.6	17.7	1.6	4.2	20.3	0.107	33.0	12.7

[LTE Band II]
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	1852.5	-29.2	21.2	1.6	5.0	24.6	0.288	33.0	8.4
H	1880.0	-29.6	20.0	1.6	4.6	23.0	0.200	33.0	10.0
H	1907.5	-31.3	20.2	1.6	4.2	22.9	0.195	33.0	10.1

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	1852.5	-30.0	20.4	1.6	5.0	23.8	0.240	33.0	9.2
H	1880.0	-30.4	19.4	1.6	4.6	22.4	0.174	33.0	10.6
H	1907.5	-32.3	19.0	1.6	4.2	21.7	0.148	33.0	11.3

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	1852.5	-31.0	19.4	1.6	5.0	22.8	0.191	33.0	10.2
H	1880.0	-31.4	18.4	1.6	4.6	21.4	0.138	33.0	11.6
H	1907.5	-33.1	19.1	1.6	4.2	21.8	0.151	33.0	11.2

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	1855.0	-29.5	21.4	1.6	4.9	24.8	0.302	33.0	8.2
H	1880.0	-29.7	20.1	1.6	4.6	23.1	0.204	33.0	9.9
H	1905.0	-31.2	20.2	1.6	4.2	22.9	0.195	33.0	10.1

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	1855.0	-30.5	20.3	1.6	4.9	23.7	0.234	33.0	9.3
H	1880.0	-30.5	19.3	1.6	4.6	22.3	0.170	33.0	10.7
H	1905.0	-32.2	19.0	1.6	4.2	21.7	0.148	33.0	11.3

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	1855.0	-31.2	19.6	1.6	4.9	23.0	0.200	33.0	10.0
H	1880.0	-31.6	18.2	1.6	4.6	21.2	0.132	33.0	11.8
H	1905.0	-33.2	17.9	1.6	4.2	20.6	0.115	33.0	12.4

[LTE Band II]
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	1857.5	-29.2	21.7	1.6	4.9	25.0	0.316	33.0	8.0
H	1880.0	-29.8	19.9	1.6	4.6	22.9	0.195	33.0	10.1
H	1902.5	-31.9	19.1	1.6	4.2	21.8	0.151	33.0	11.2

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	1857.5	-30.2	20.6	1.6	4.9	23.9	0.245	33.0	9.1
H	1880.0	-30.6	19.1	1.6	4.6	22.1	0.162	33.0	10.9
H	1902.5	-32.7	18.1	1.6	4.2	20.8	0.120	33.0	12.2

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	1857.5	-30.9	19.8	1.6	4.9	23.1	0.204	33.0	9.9
H	1880.0	-31.6	18.1	1.6	4.6	21.1	0.129	33.0	11.9
H	1902.5	-33.7	17.0	1.6	4.2	19.7	0.093	33.0	13.3

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	1860.0	-29.9	21.2	1.6	4.9	24.5	0.282	33.0	8.5
H	1880.0	-30.0	19.7	1.6	4.6	22.7	0.186	33.0	10.3
H	1900.0	-31.2	19.4	1.6	4.2	22.1	0.162	33.0	10.9

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	1860.0	-30.8	20.2	1.6	4.9	23.5	0.224	33.0	9.5
H	1880.0	-30.8	18.9	1.6	4.6	21.9	0.155	33.0	11.1
H	1900.0	-31.9	18.6	1.6	4.2	21.3	0.135	33.0	11.7

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	1860.0	-31.6	19.4	1.6	4.9	22.7	0.186	33.0	10.3
H	1880.0	-31.8	17.9	1.6	4.6	20.9	0.123	33.0	12.1
H	1900.0	-32.8	17.6	1.6	4.2	20.3	0.107	33.0	12.7

4.2 Peak to Average Ratio

4.2.1 Measurement procedure

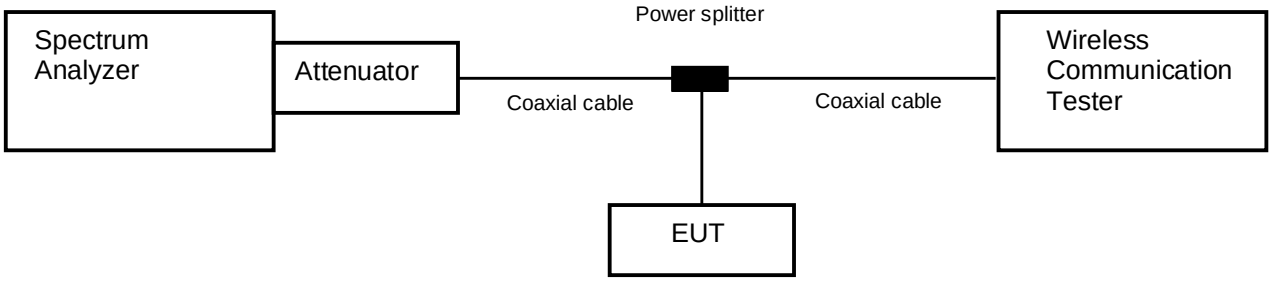
[FCC 24.232(d)]

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 ≥ 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 : 19-April-2024
Temperature : 22.9 [˚C]
Humidity : 29.7 [%] Test engineer :
Test place : Shielded room No.4 Kazunori Saito

Date : 23-April-2024
Temperature : 23.0 [˚C]
Humidity : 36.2 [%] Test engineer :
Test place : Shielded room No.4 Kazunori Saito

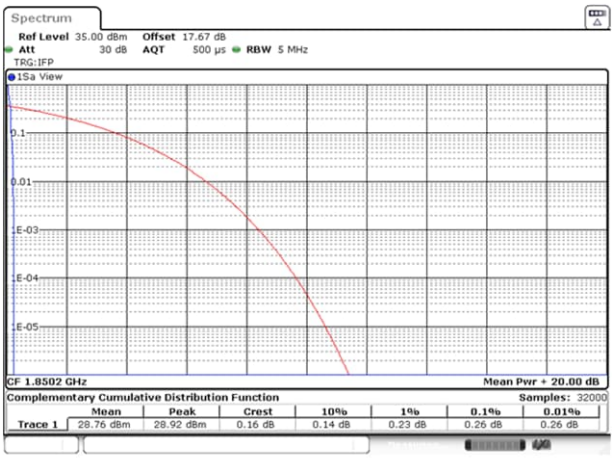
Band	Channel	Frequency [MHz]	Peak to Average Power Ratio [dB]	Limit [dB]
GSM1900	512	1850.2	0.26	13.0
	661	1880.0	0.17	
	810	1909.8	0.20	
WCDMA Band II	9262	1852.4	3.68	13.0
	9400	1880.0	3.51	
	9538	1907.6	3.71	

Band	Channel	Frequency [MHz]	Modulation	Bandwidth [MHz]	RB	Peak to Average Power Ratio [dB]	Limit [dB]
LTE Band II	18900	1880.0	QPSK	1.4	6-0	6.17	13.0
				3	15-0	5.94	
				5	25-0	6.12	
				10	50-0	5.94	
				15	75-0	6.49	
				20	100-0	5.86	
			16QAM	1.4	6-0	6.93	
				3	15-0	6.75	
				5	25-0	6.75	
				10	50-0	6.84	
				15	75-0	6.93	
				20	100-0	6.84	
			64QAM	1.4	6-0	7.13	
				3	15-0	7.04	
				5	25-0	7.07	
				10	50-0	7.10	
				15	75-0	7.16	
				20	100-0	7.04	

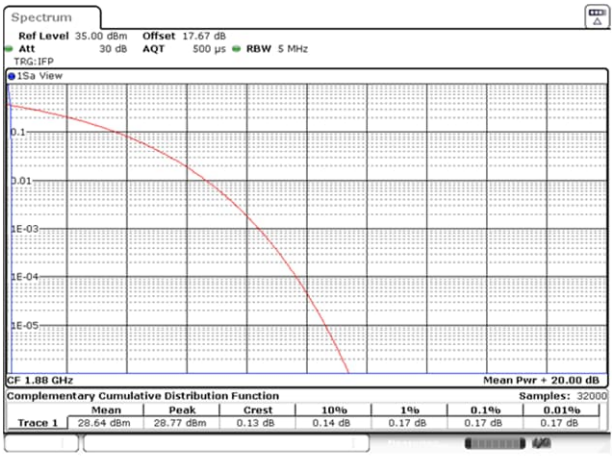
4.2.4 Trace data

[GSM1900]

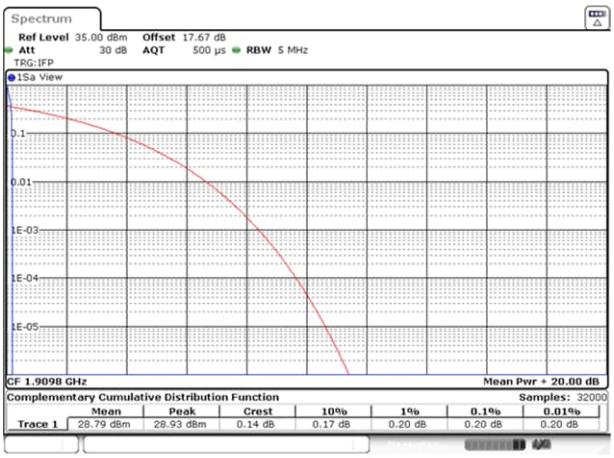
Channel: 512



Channel: 661

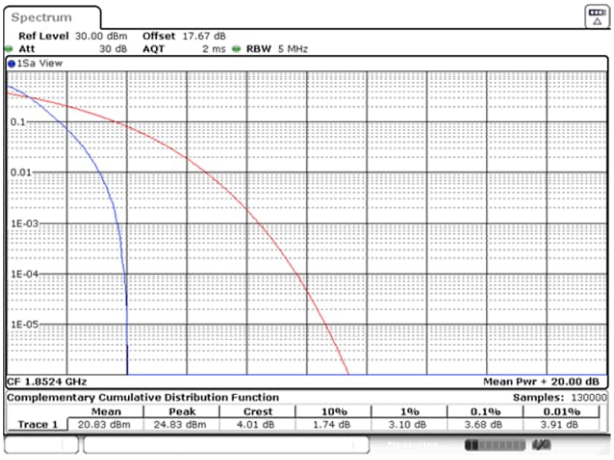


Channel: 810

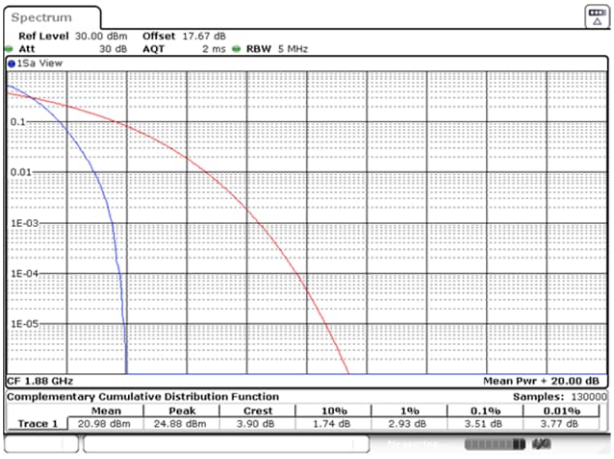


[WCDMA Band II]

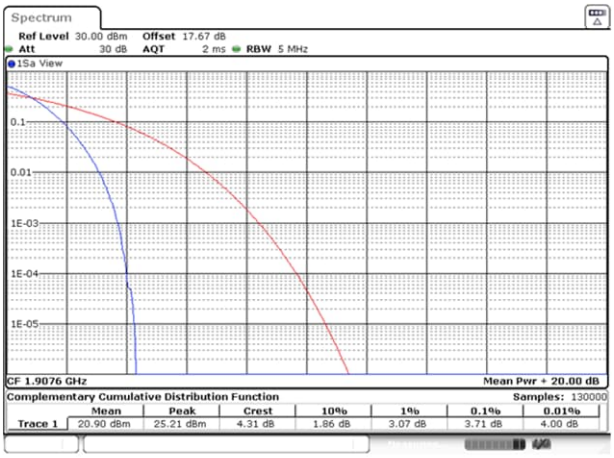
Channel: 9262



Channel: 9400



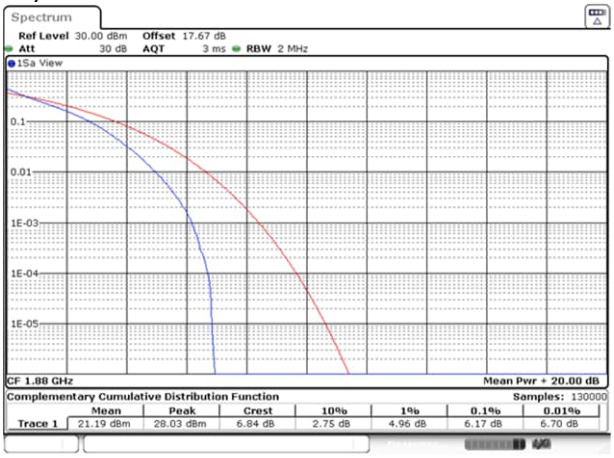
Channel: 9538



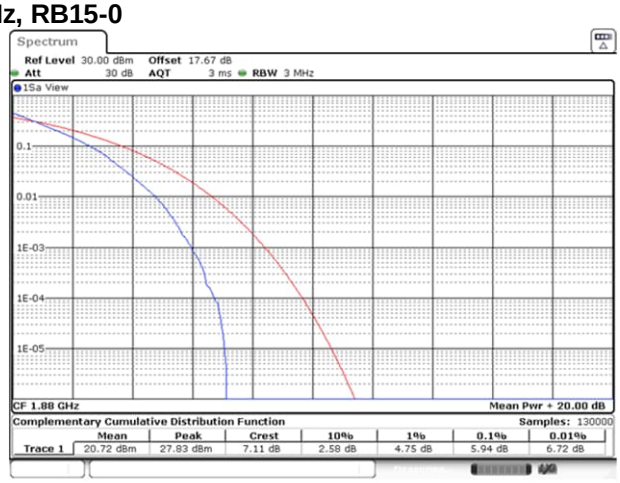
[LTE Band II]

Channel: 18900

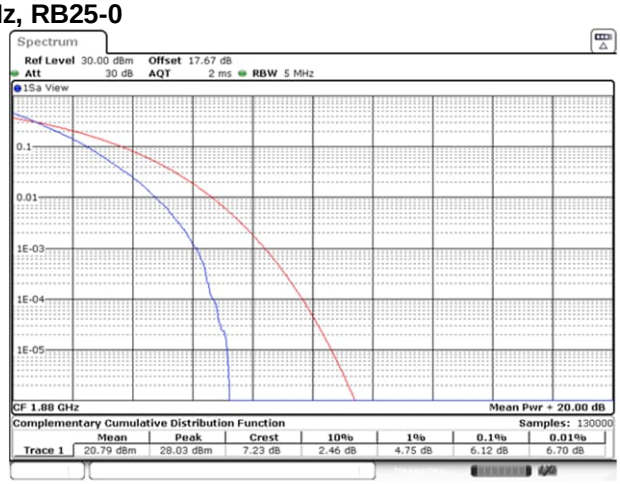
QPSK, BW 1.4MHz, RB6-0



QPSK, BW 3MHz, RB15-0

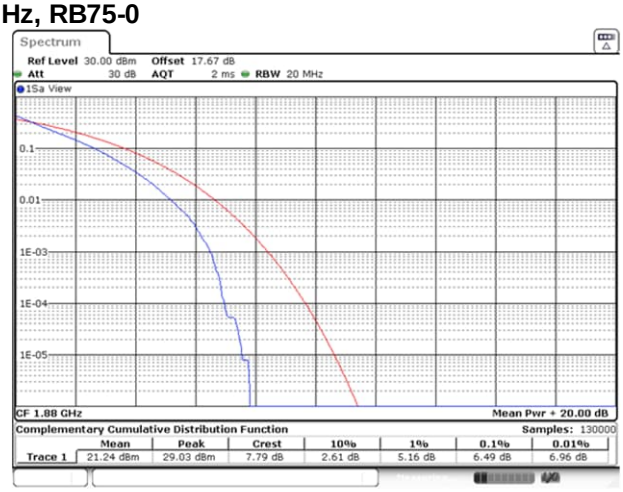


QPSK, BW 5MHz, RB25-0

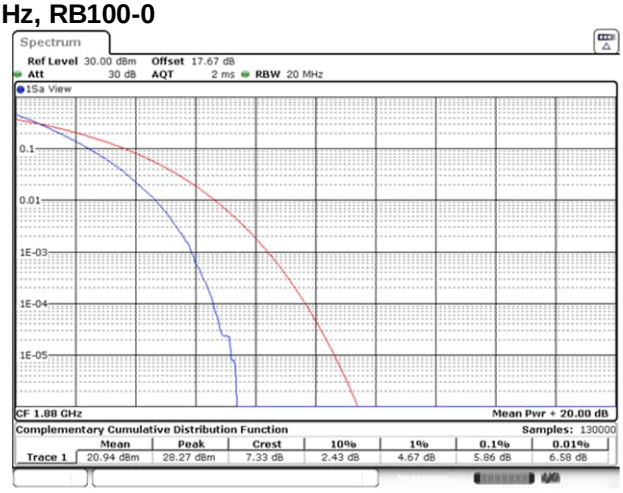


Channel: 18900
QPSK, BW 10MHz, RB50-0

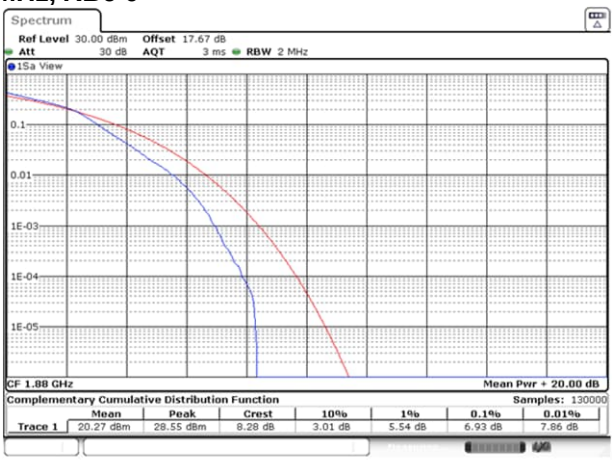
QPSK, BW 15MHz, RB75-0



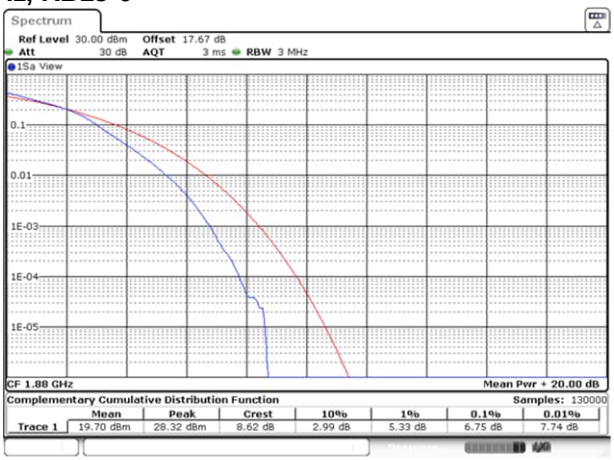
QPSK, BW 20MHz, RB100-0



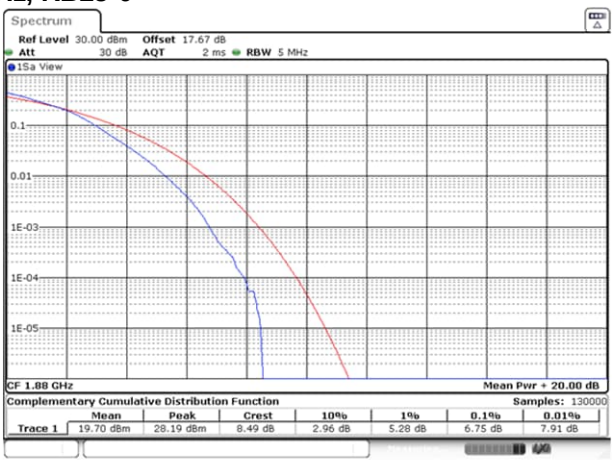
Channel: 18900
16QAM, BW 1.4MHz, RB6-0



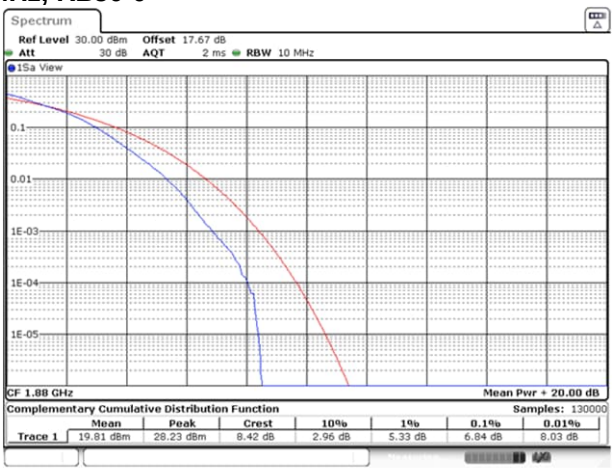
16QAM, BW 3MHz, RB15-0



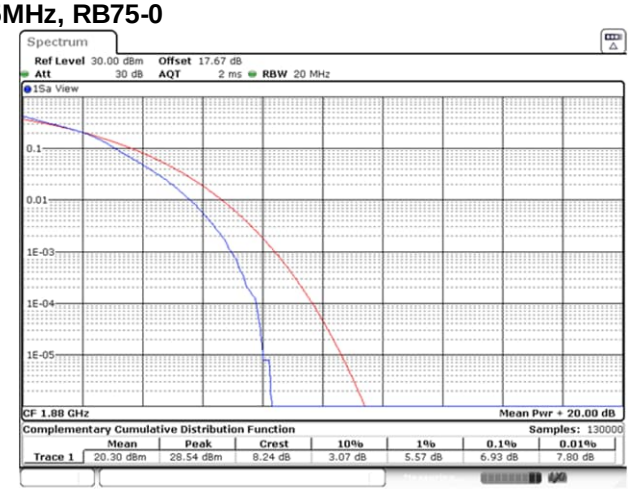
16QAM, BW 5MHz, RB25-0



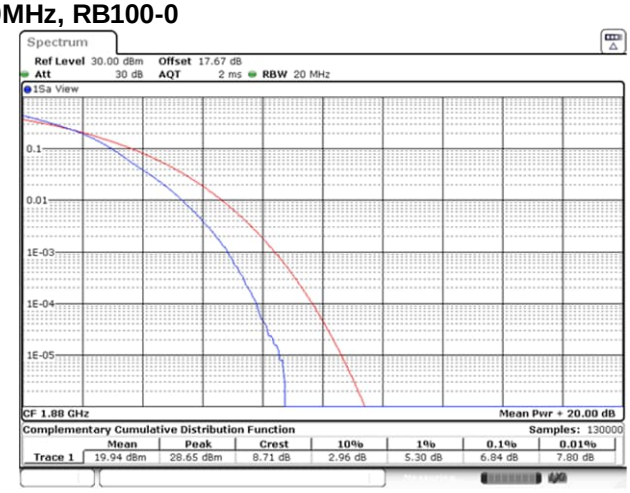
Channel: 18900
16QAM, BW 10MHz, RB50-0



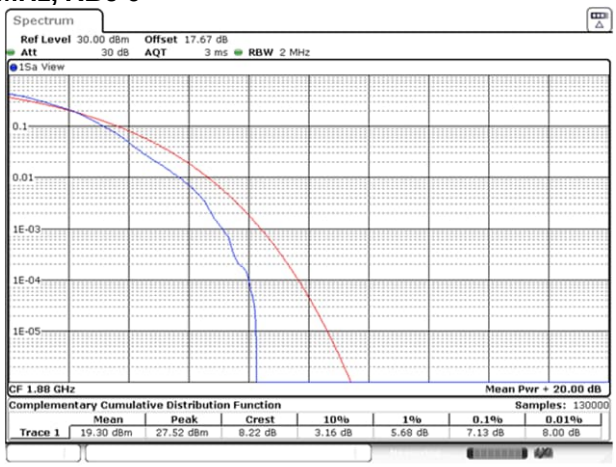
16QAM, BW 15MHz, RB75-0



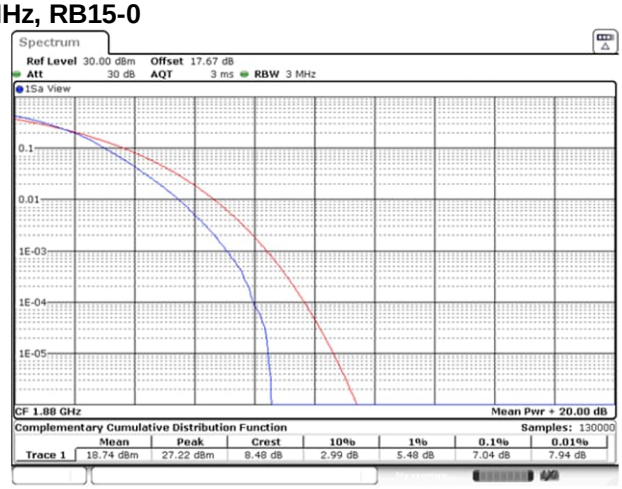
16QAM, BW 20MHz, RB100-0



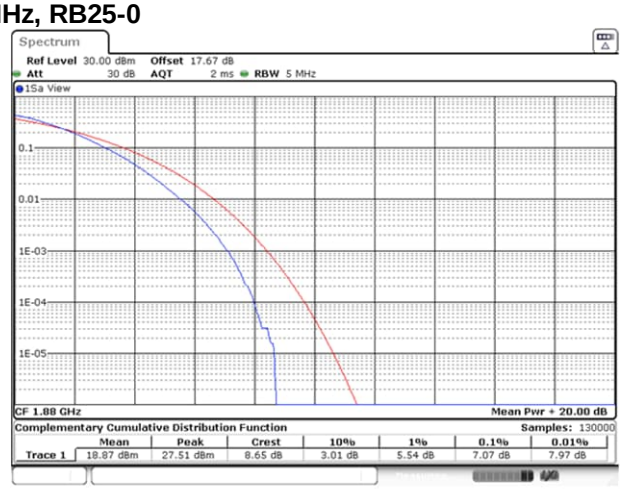
Channel: 18900
64QAM, BW 1.4MHz, RB6-0



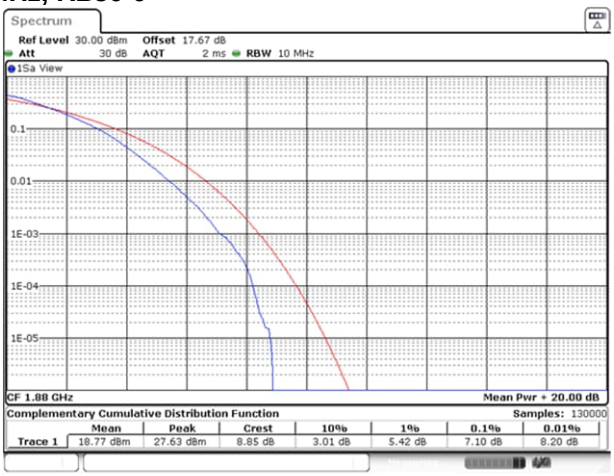
64QAM, BW 3MHz, RB15-0



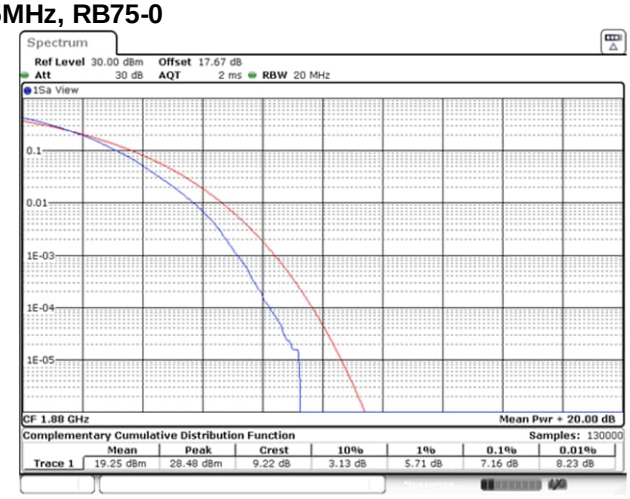
64QAM, BW 5MHz, RB25-0



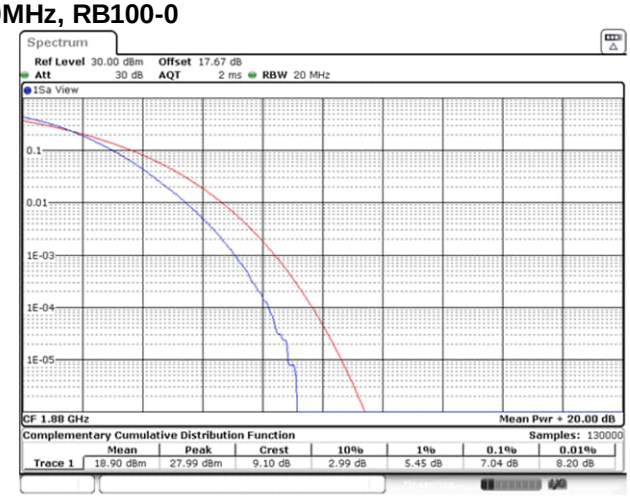
Channel: 18900
64QAM, BW 10MHz, RB50-0



64QAM, BW 15MHz, RB75-0



64QAM, BW 20MHz, RB100-0



4.3 Occupied Bandwidth

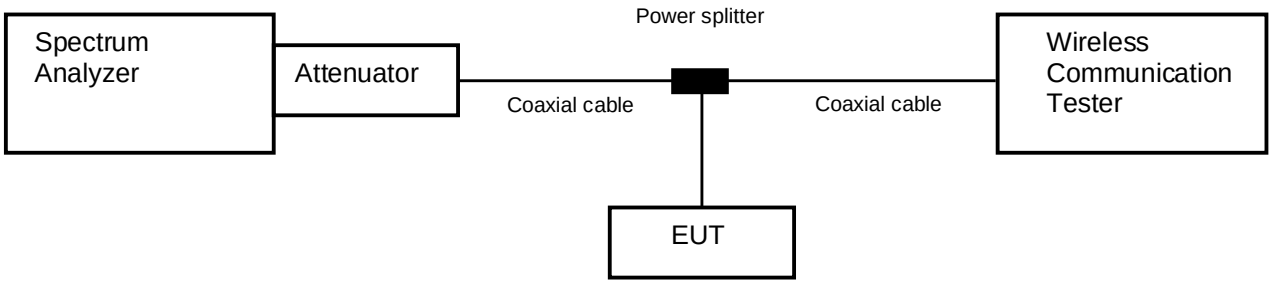
4.3.1 Measurement procedure

[FCC 24.238(a), 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 : 22-April-2024
Temperature : 19.9 [˚C]
Humidity : 34.6 [%] Test engineer :
Test place : Shielded room No.4 Kazunori Saito

Date : 23-April-2024
Temperature : 23.0 [˚C]
Humidity : 36.2 [%] Test engineer :
Test place : Shielded room No.4 Kazunori Saito

Band	Channel	Frequency [MHz]	Test Result [kHz]
GSM1900	512	1850.2	244.2931
	661	1880.0	243.8126
	810	1909.8	241.6065

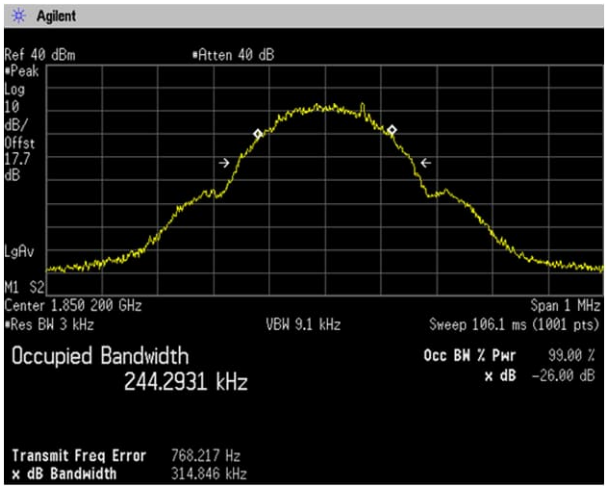
Band	Channel	Frequency [MHz]	Test Result [kHz]
WCDMA Band II	9262	1852.4	4139.9
	9400	1880.0	4141.7
	9538	1907.6	4140.7

Band	Channel	Frequency [MHz]	Bandwidth [MHz]	Modulation	RB	Test Result [MHz]
LTE Band II	18900	1880.0	1.4	QPSK	3-1	0.0000
					6-0	1.0941
				16QAM	3-1	0.6109
					6-0	1.1009
				64QAM	3-1	0.5998
					6-0	1.0905
			3	QPSK	8-4	1.5099
					15-0	2.7067
				16QAM	8-4	1.5320
					15-0	2.7134
				64QAM	8-4	1.5258
					15-0	2.7175
			5	QPSK	12-7	2.3370
					25-0	4.5257
				16QAM	12-7	2.3008
					25-0	4.4991
				64QAM	12-7	2.2958
					25-0	4.4992
			10	QPSK	25-12	4.6530
					50-0	8.8310
				16QAM	25-12	4.6535
					50-0	9.0061
				64QAM	25-12	4.6528
					50-0	8.9672
			15	QPSK	36-20	6.7581
					75-0	13.4825
				16QAM	36-20	6.7159
					75-0	13.4859
				64QAM	36-20	6.7152
					75-0	13.4340
			20	QPSK	50-24	9.2052
					100-0	17.9585
				16QAM	50-24	9.2152
					100-0	18.0098
				64QAM	50-24	9.1816
					100-0	17.9154

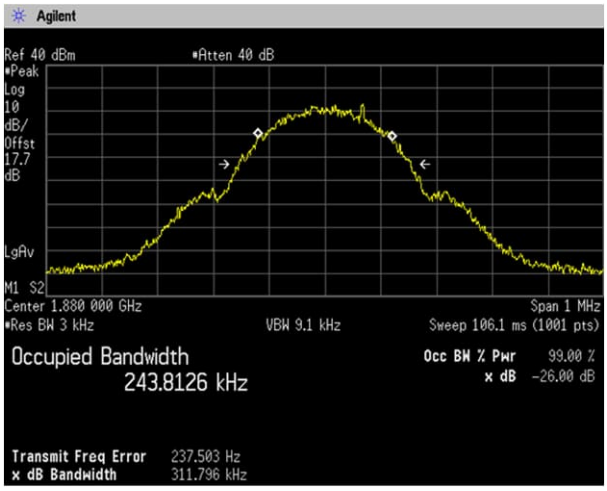
4.3.4 Trace data

[GSM1900]

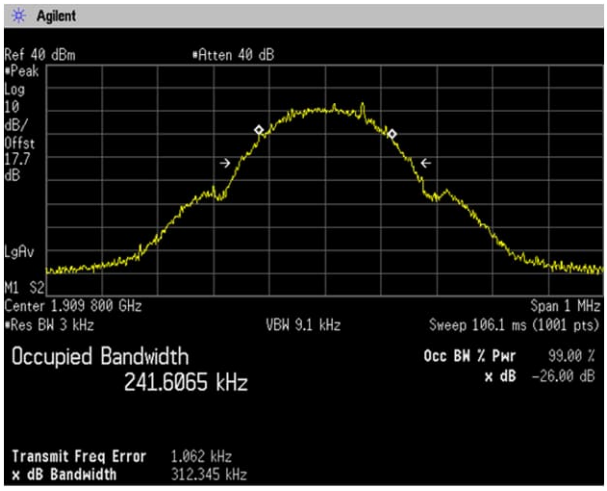
Channel: 512



Channel: 661

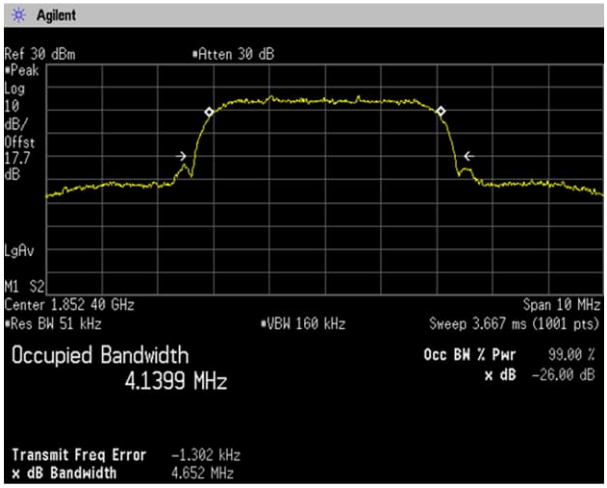


Channel: 810

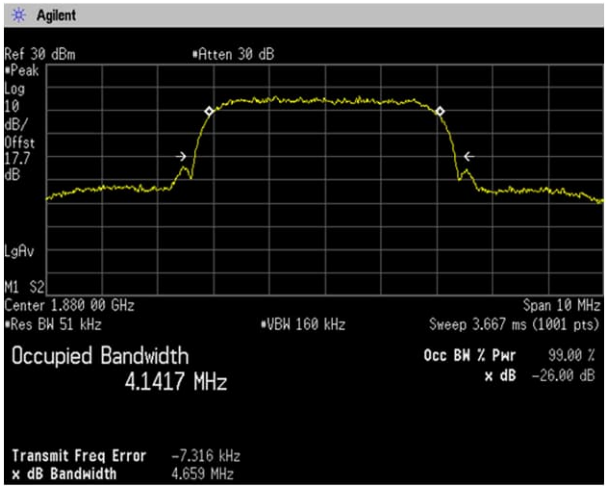


[WCDMA Band II]

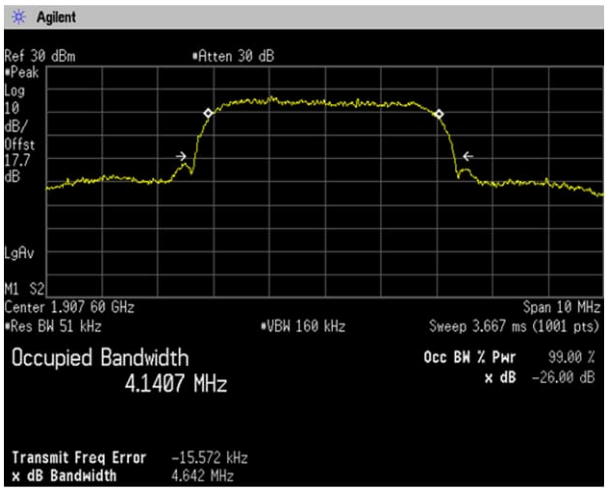
Channel: 9262



Channel: 9400



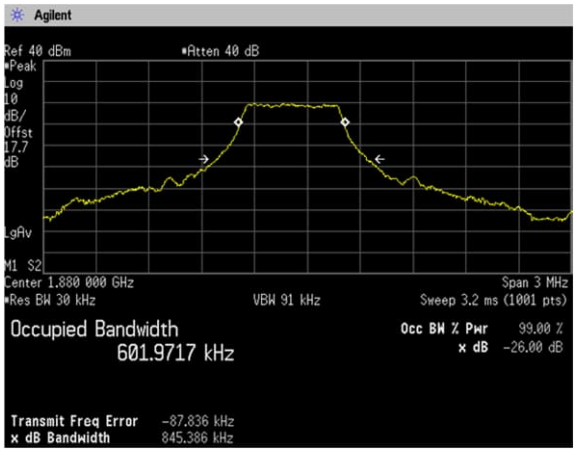
Channel: 9538



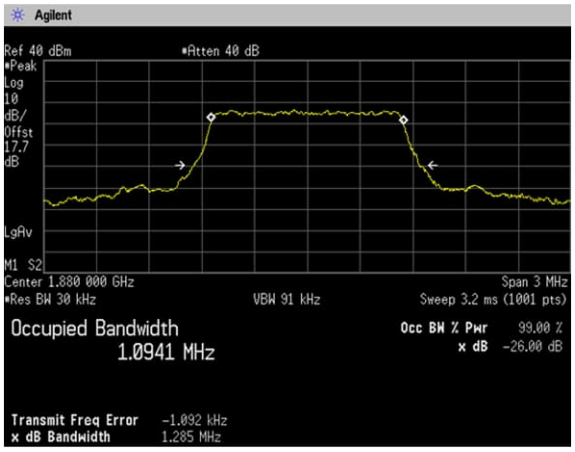
[LTE Band II]
Channel: 18900

QPSK, BW 1.4MHz

RB3-1

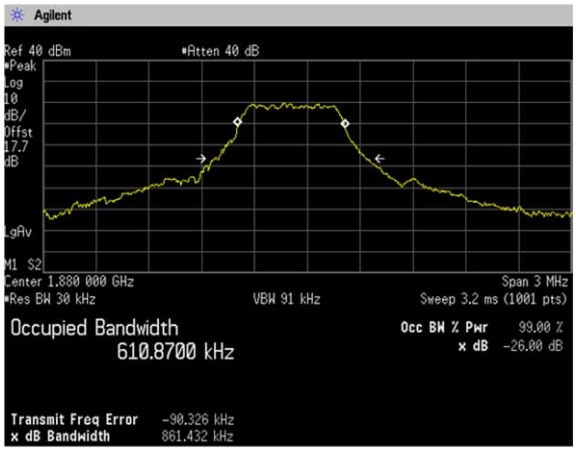


RB6-0

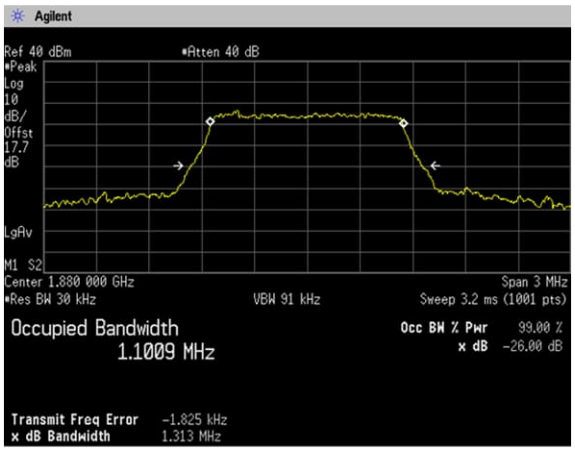


16QAM, BW 1.4MHz

RB3-1

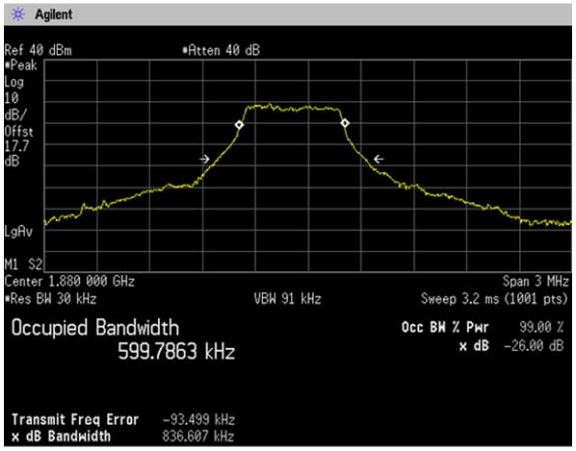


RB6-0

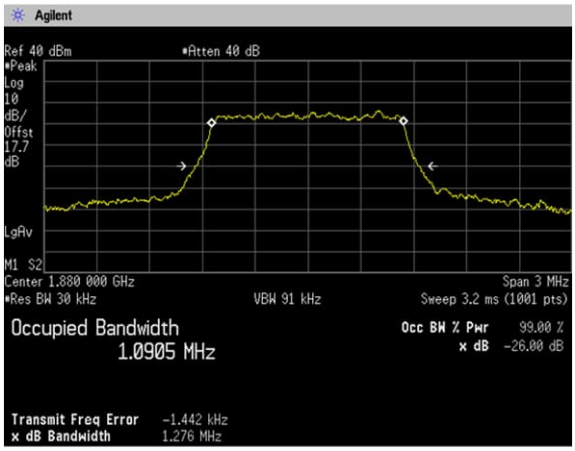


64QAM, BW 1.4MHz

RB3-1

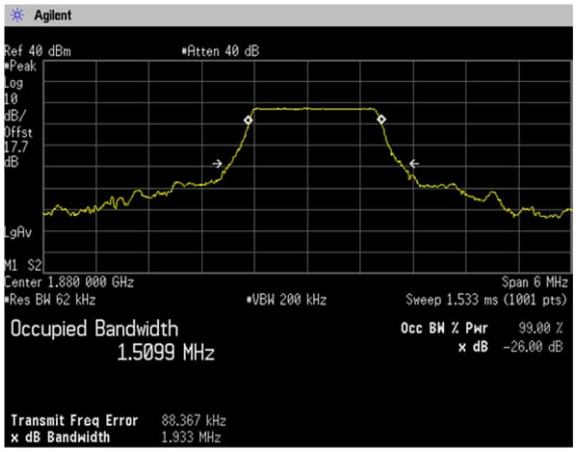


RB6-0

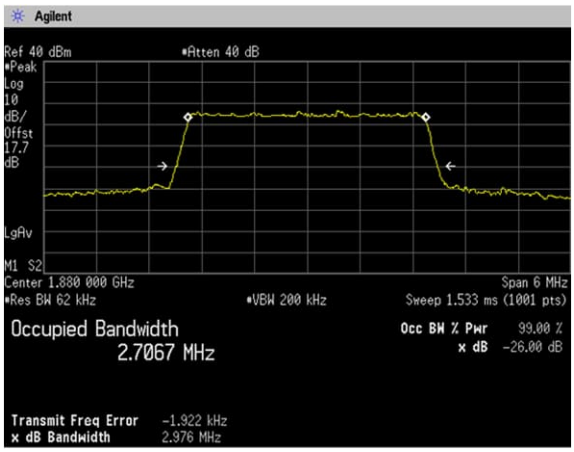


QPSK, BW 3MHz

RB8-4

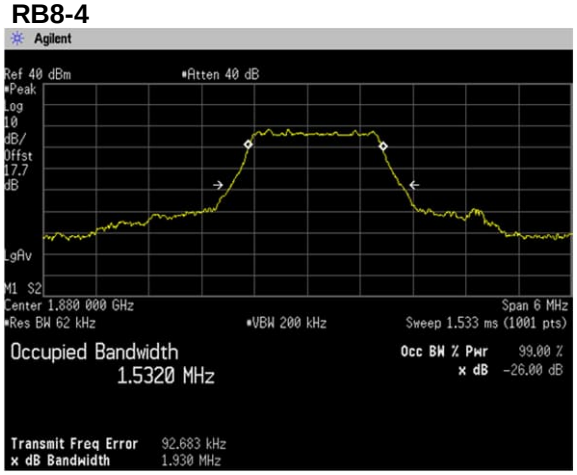


RB15-0

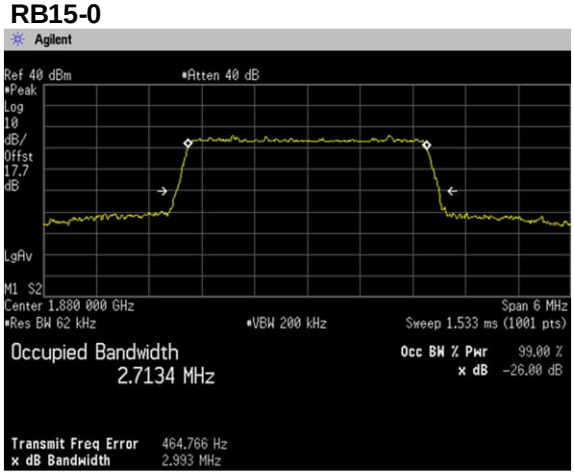


16QAM, BW 3MHz

RB8-4

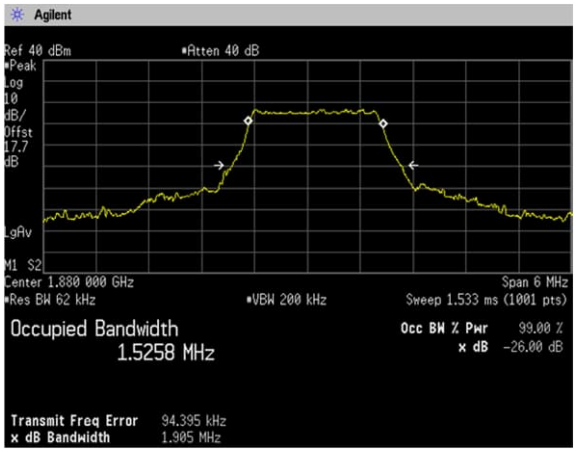


RB15-0

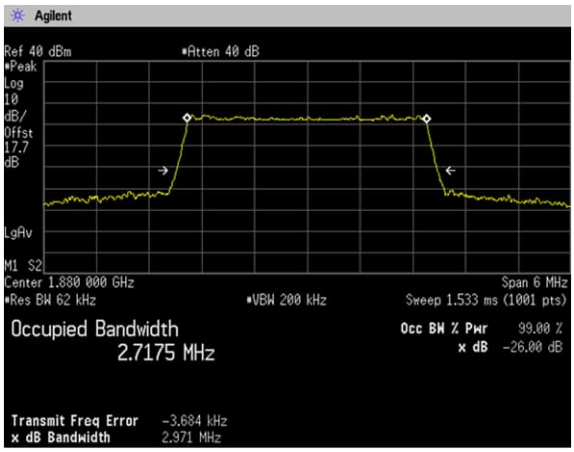


64QAM, BW 3MHz

RB8-4

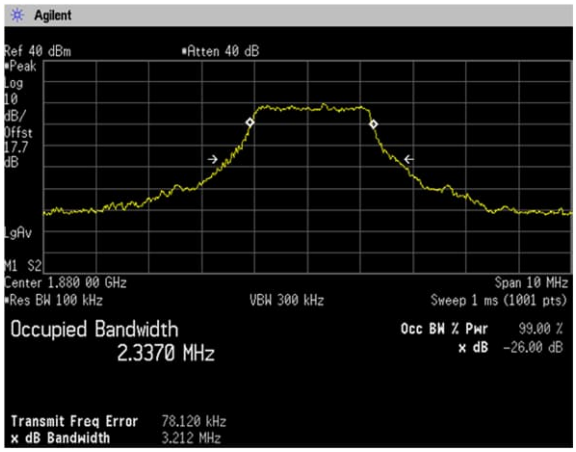


RB15-0

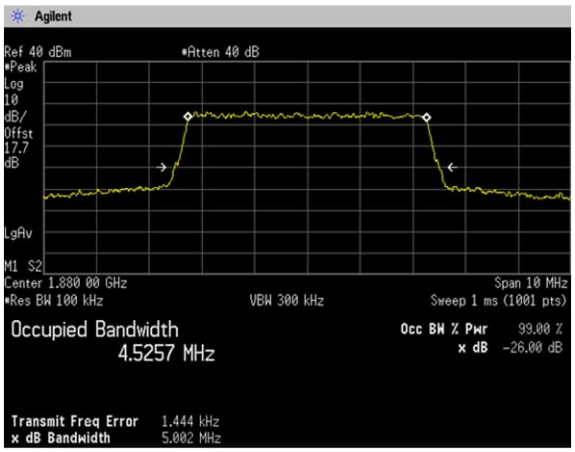


QPSK, BW 5MHz

RB12-7

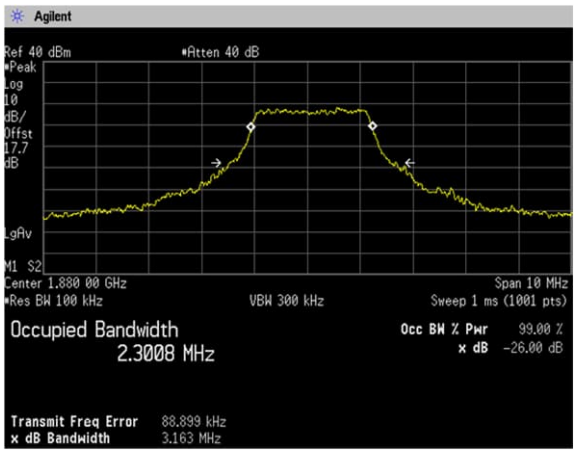


RB25-0

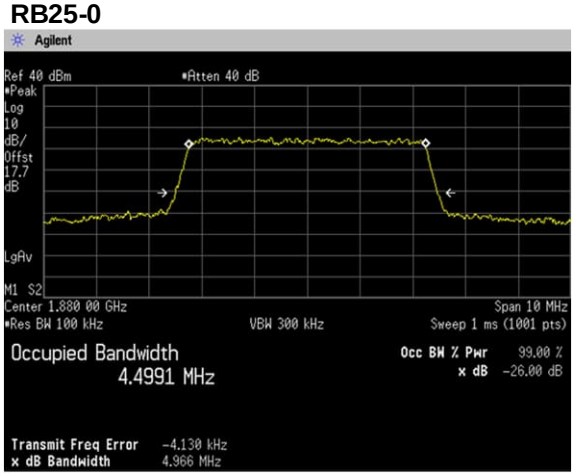


16QAM, BW 5MHz

RB12-7

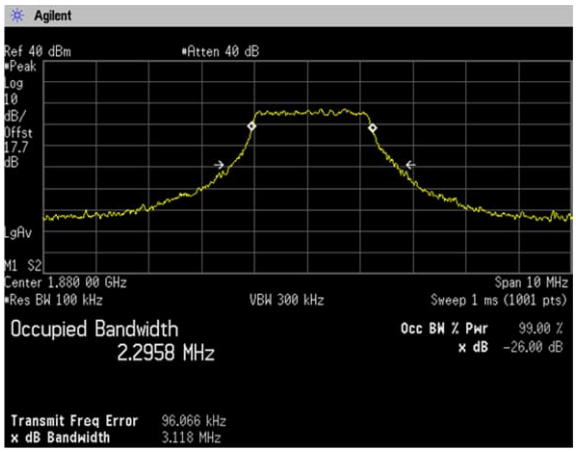


RB25-0

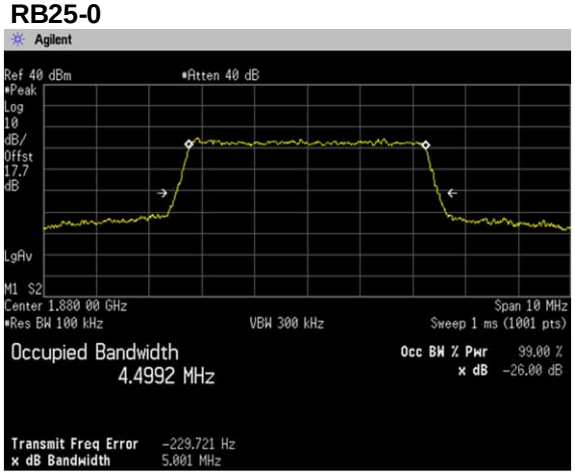


64QAM, BW 5MHz

RB12-7

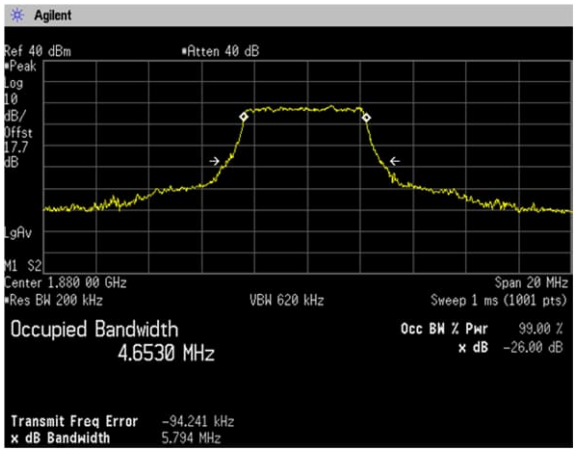


RB25-0

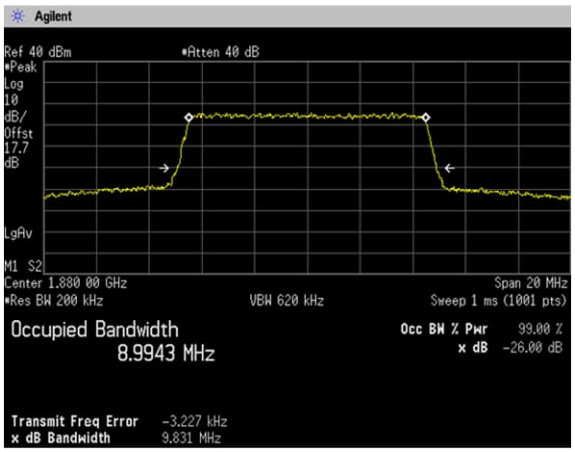


QPSK, BW 10MHz

RB25-12

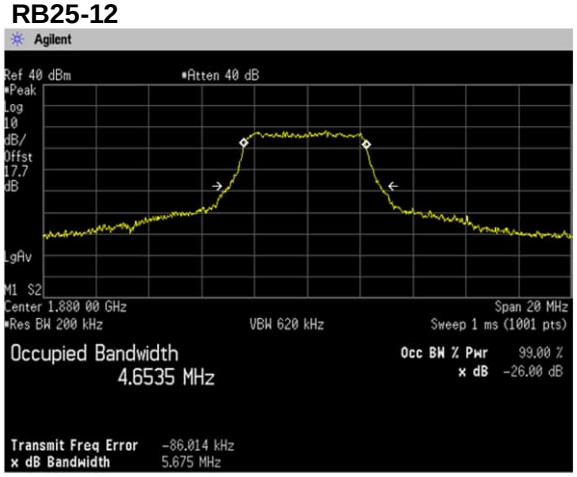


RB50-0

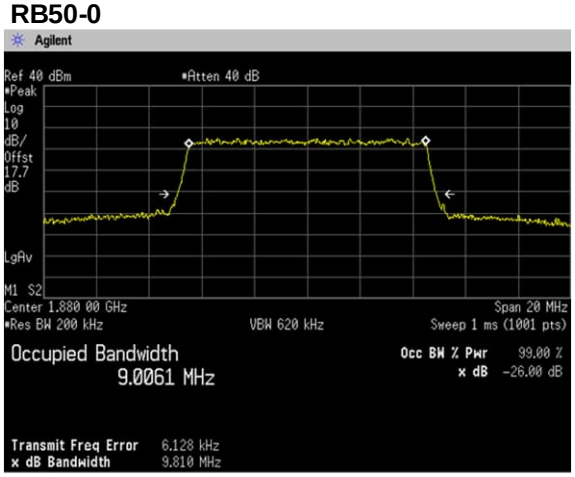


16QAM, BW 10MHz

RB25-12

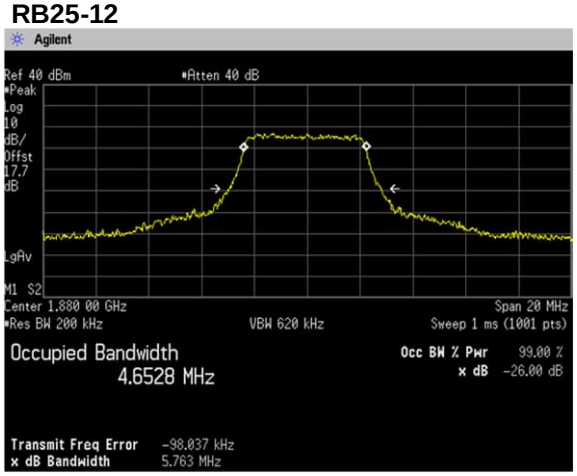


RB50-0

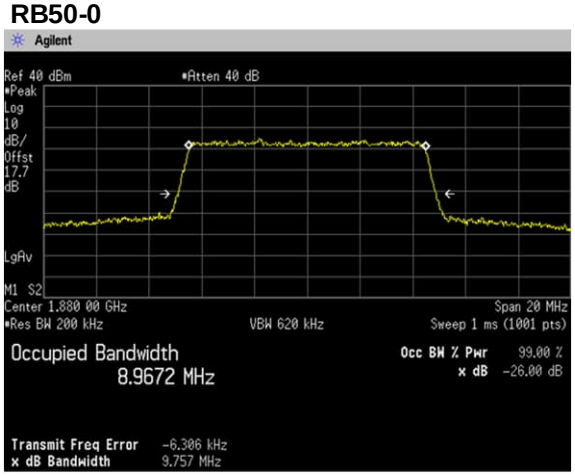


64QAM, BW 10MHz

RB25-12

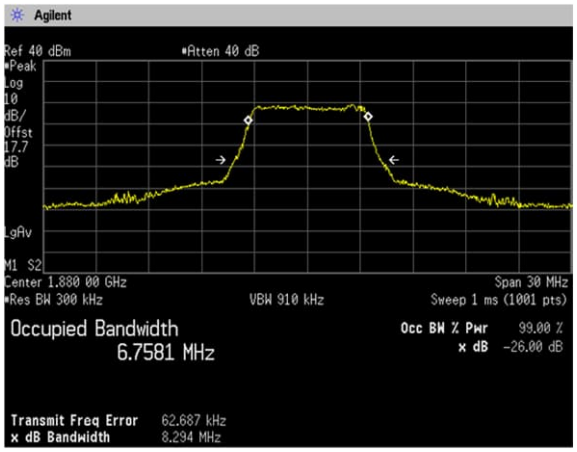


RB50-0

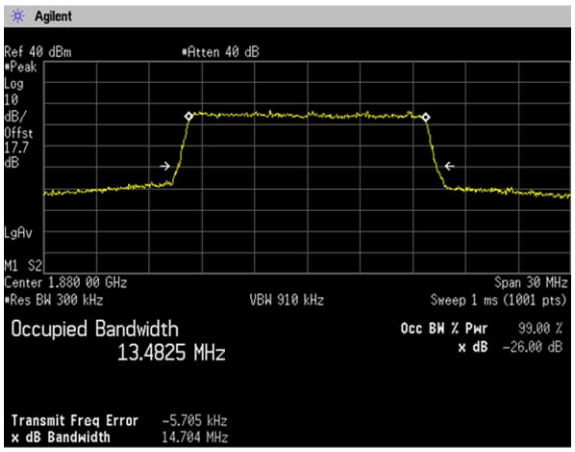


QPSK, BW 15MHz

RB36-20

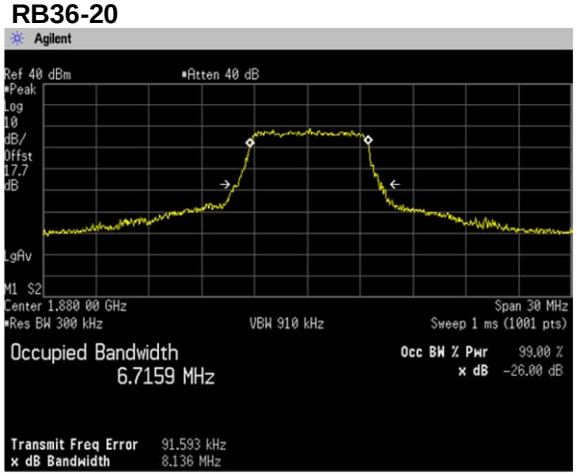


RB75-0

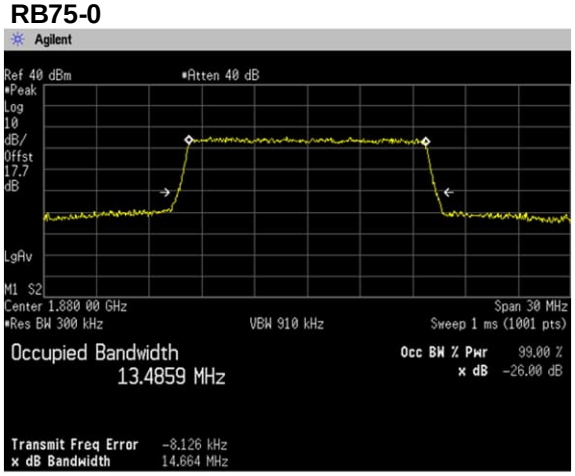


16QAM, BW 15MHz

RB36-20

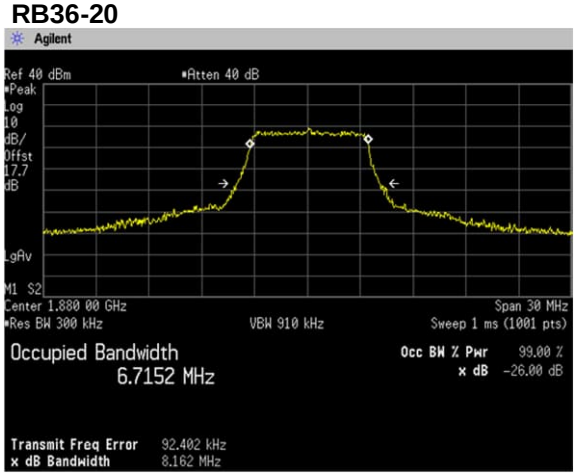


RB75-0

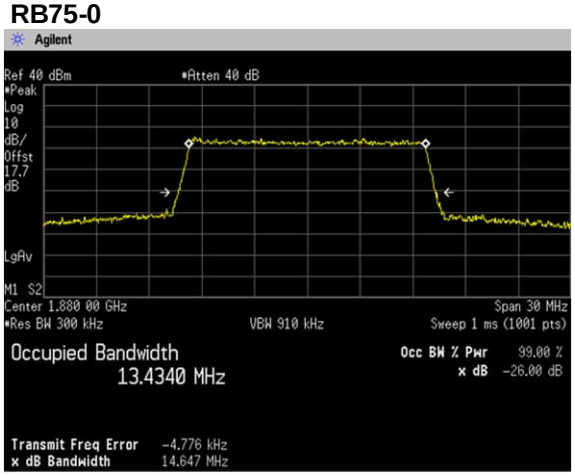


64QAM, BW 15MHz

RB36-20

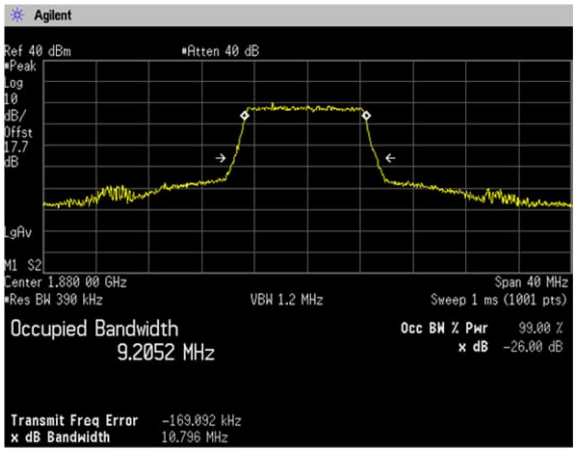


RB75-0

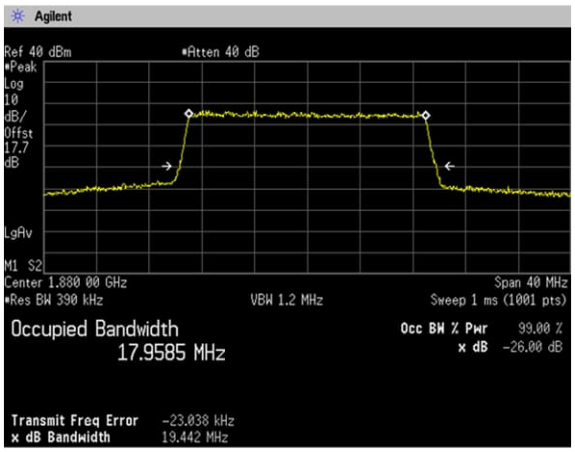


QPSK, BW 20MHz

RB50-24

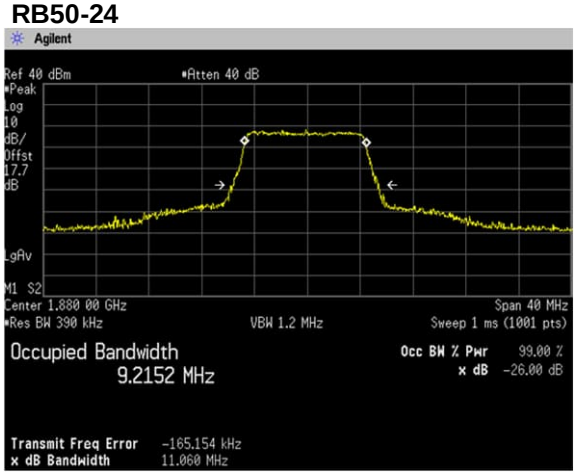


RB100-0

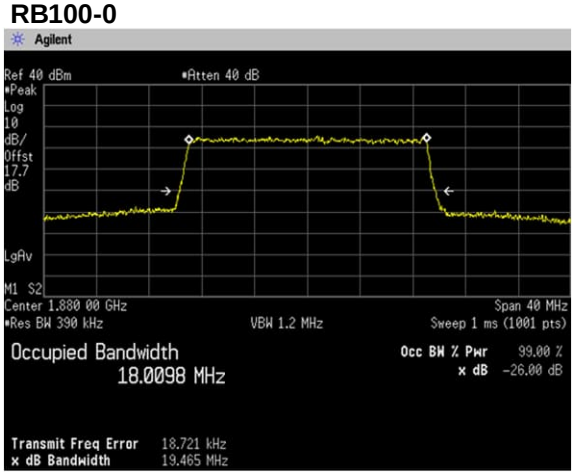


16QAM, BW 20MHz

RB50-24

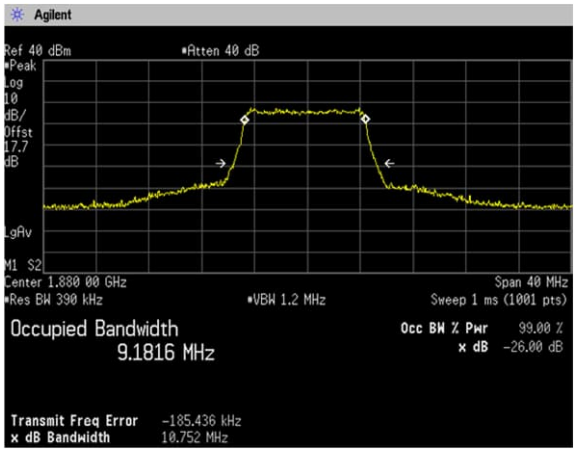


RB100-0

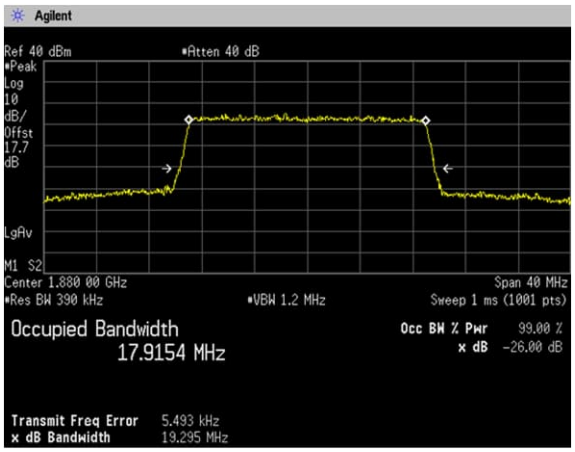


64QAM, BW 20MHz

RB50-24



RB100-0



4.4 Band Edge Spurious and Harmonic at Antenna Terminals

4.4.1 Measurement procedure

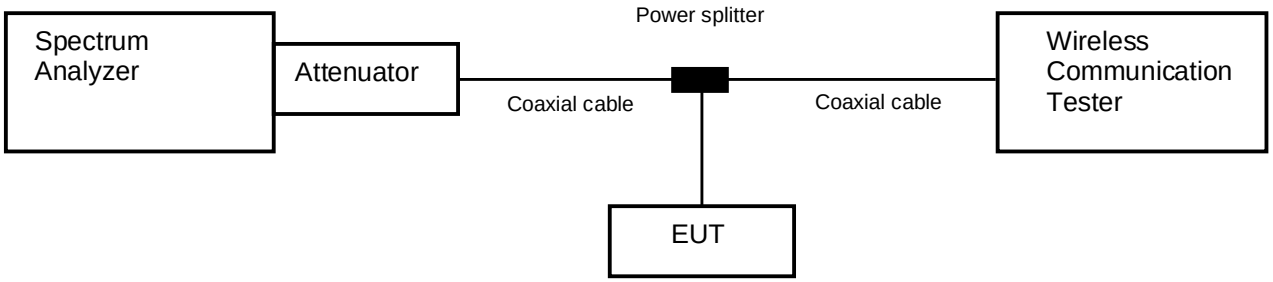
[FCC 24.238(a), 2.1051]

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>
a) Span was set large enough so as to capture all out of band emissions near the band edge
b) RBW ≥ 1% of the emission bandwidth or 2% of the emission bandwidth
c) VBW ≥ 3 x RBW
d) Detector = RMS
e) Trace mode = Max hold
f) Sweep time = auto-couple
g) Number of sweep point ≥ 2 x span / RBW

<Spurious Emissions>
a) RBW = 1MHz & VBW ≥ 3 x RBW
b) Detector = Peak
c) Trace mode = Max hold
d) Sweep time = auto-couple
e) Number of sweep point ≥ 2 x span / RBW

- Test configuration



4.4.2 Limit

-13 dBm or less

4.4.3 Measurement result

Date : 22-April-2024
Temperature : 19.9 [˚C]
Humidity : 34.6 [%] Test engineer :
Test place : Shielded room No.4 Kazunori Saito

Date : 23-April-2024
Temperature : 23.0 [˚C]
Humidity : 36.2 [%] Test engineer :
Test place : Shielded room No.4 Kazunori Saito

Date : 24-April-2024
Temperature : 23.5 [˚C]
Humidity : 34.0 [%] Test engineer :
Test place : Shielded room No.4 Kazunori Saito

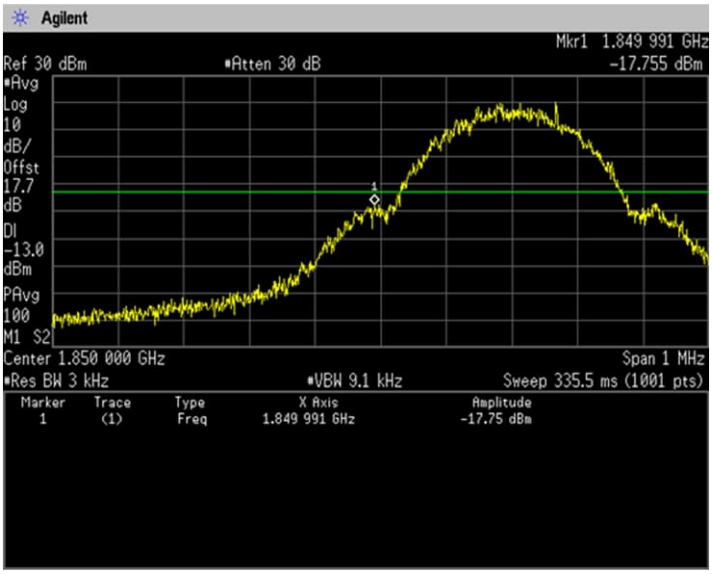
Band	Channel	Frequency [MHz]	Limit [dBm]	Results	
GSM1900	512	1850.2	-13.0	See the trace data	PASS
	810	1909.8	-13.0	See the trace data	PASS
WCDMA Band II	9262	1852.4	-13.0	See the trace data	PASS
	9538	1907.6	-13.0	See the trace data	PASS

Band	Modulation	Bandwidth [MHz]	Channel	Frequency [MHz]	Limit [dBm]	Results	
LTE Band II	QPSK, 16QAM, 64QAM	1.4	18607	1850.7	-13.0	See the trace data	PASS
			19193	1909.3	-13.0	See the trace data	PASS
		3	18615	1851.5	-13.0	See the trace data	PASS
			19185	1908.5	-13.0	See the trace data	PASS
		5	18625	1852.5	-13.0	See the trace data	PASS
			19175	1907.5	-13.0	See the trace data	PASS
		10	18650	1855.0	-13.0	See the trace data	PASS
			19150	1905.0	-13.0	See the trace data	PASS
		15	18675	1857.5	-13.0	See the trace data	PASS
			19125	1902.5	-13.0	See the trace data	PASS
		20	18700	1860.0	-13.0	See the trace data	PASS
			19100	1900.0	-13.0	See the trace data	PASS

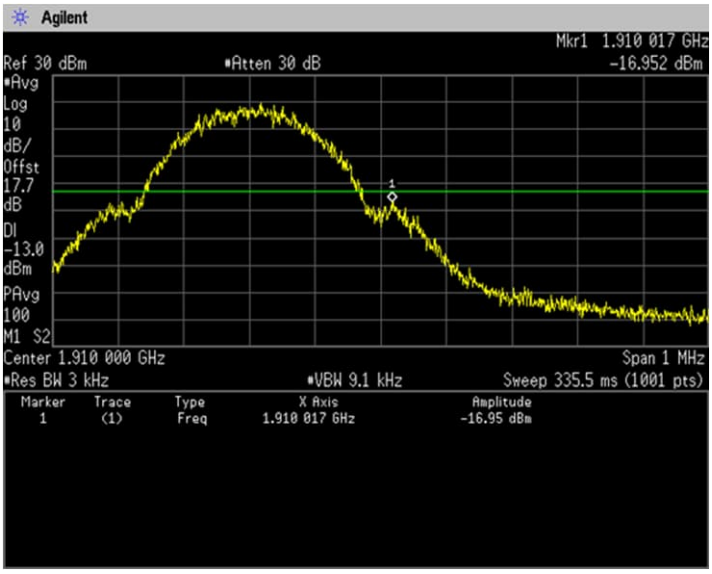
4.4.4 Trace data

[GSM1900]
(Band Edge)

Channel: 512



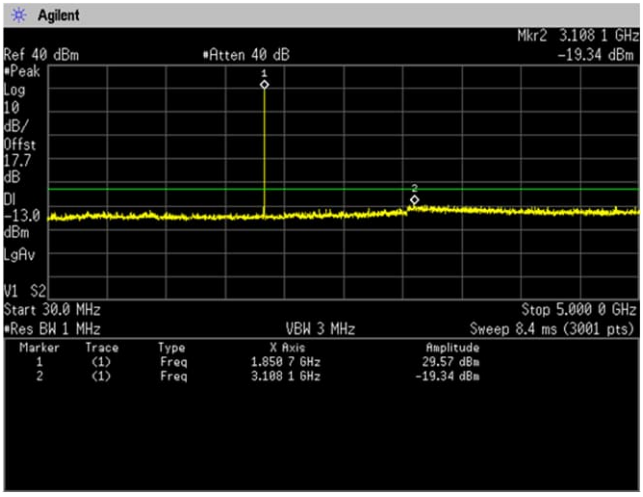
Channel: 810



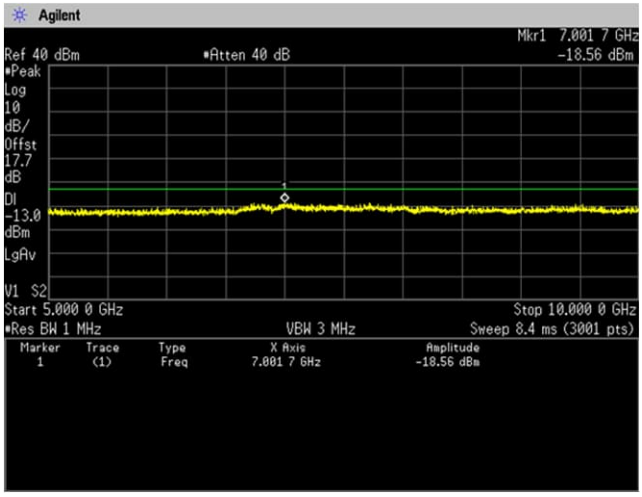
(Spurious Emissions)
Note: Conducted spurious test was measured in the worst case of conducted output power.

Channel: 512

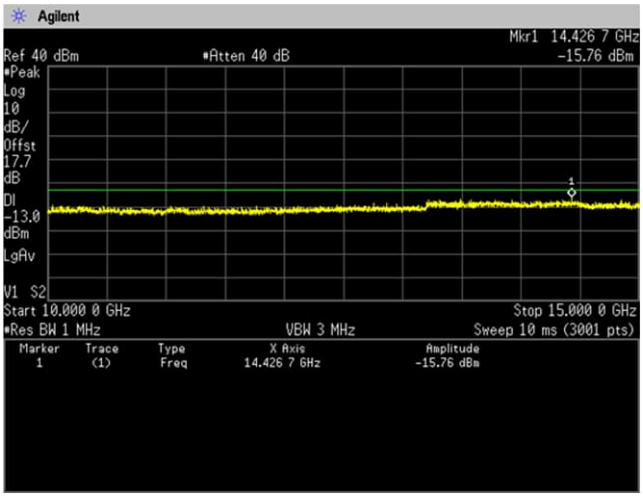
30MHz-5GHz



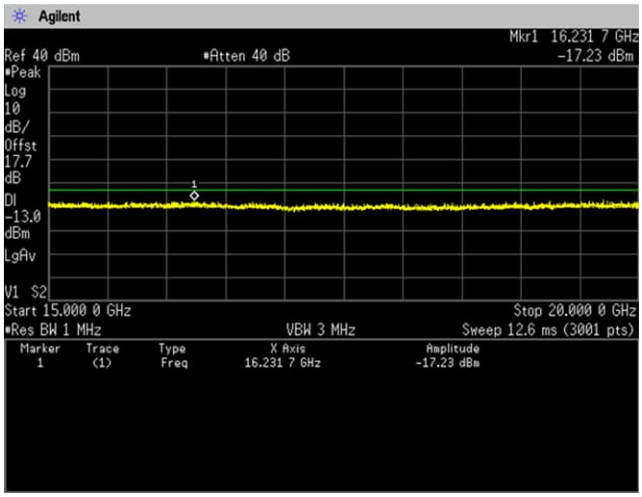
5GHz-10GHz



10GHz-15GHz

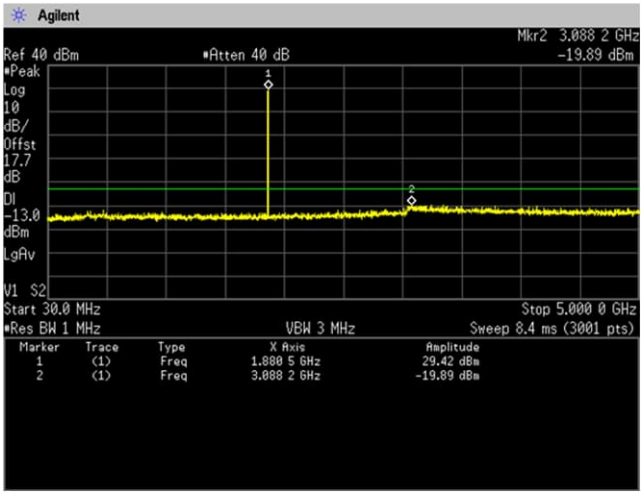


15GHz-20GHz

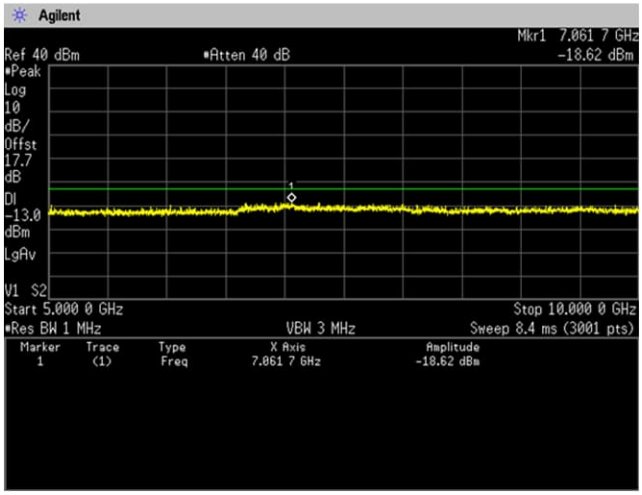


Channel: 661

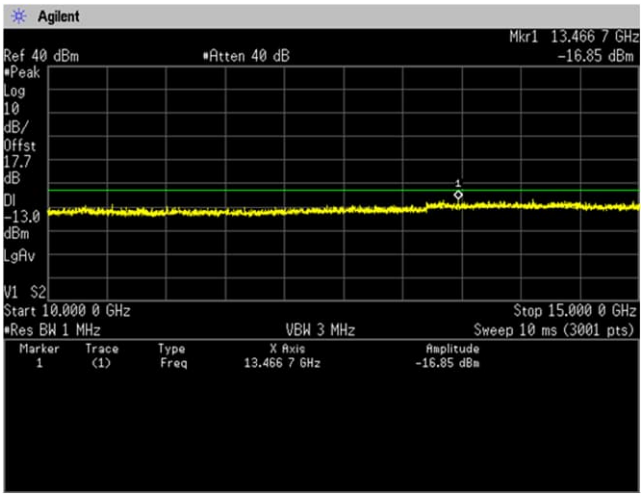
30MHz-5GHz



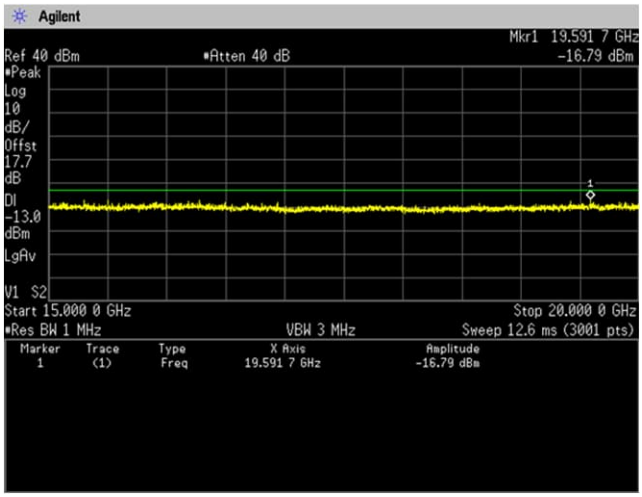
5GHz-10GHz



10GHz-15GHz

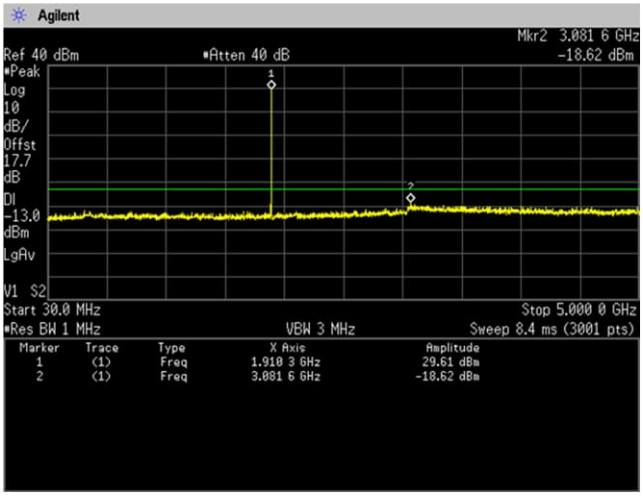


15GHz-20GHz

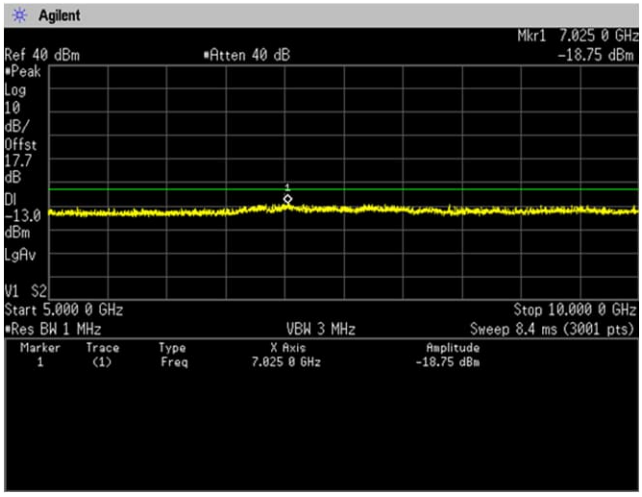


Channel: 810

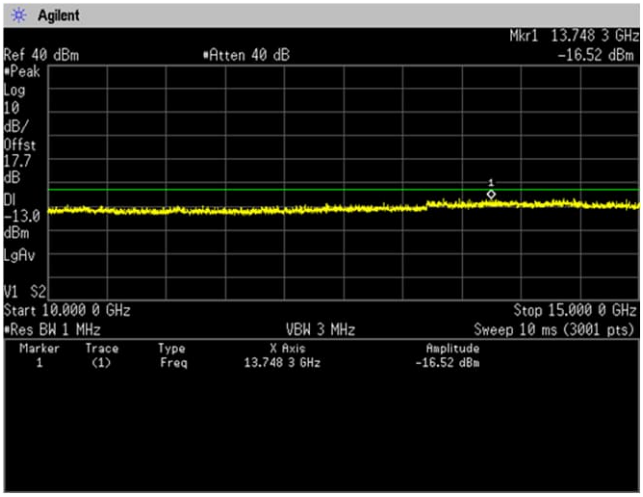
30MHz-5GHz



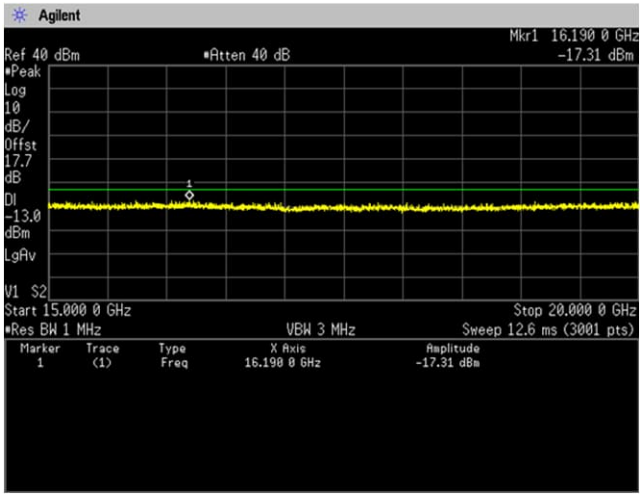
5GHz-10GHz



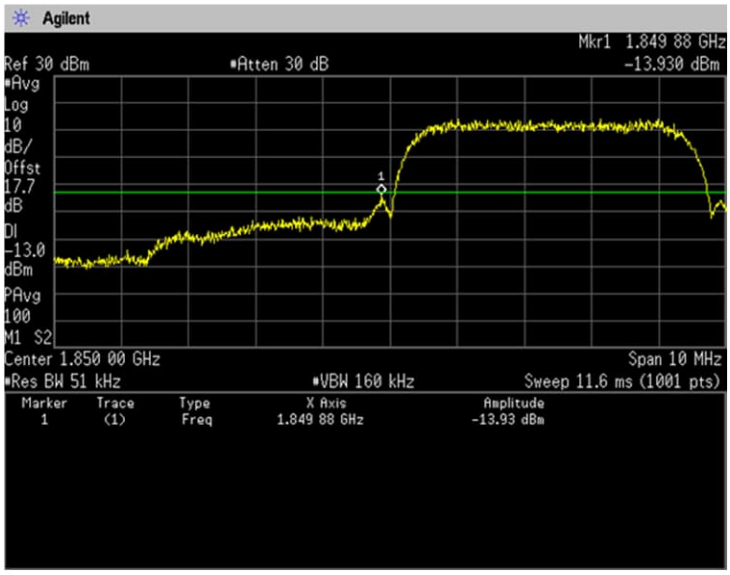
10GHz-15GHz

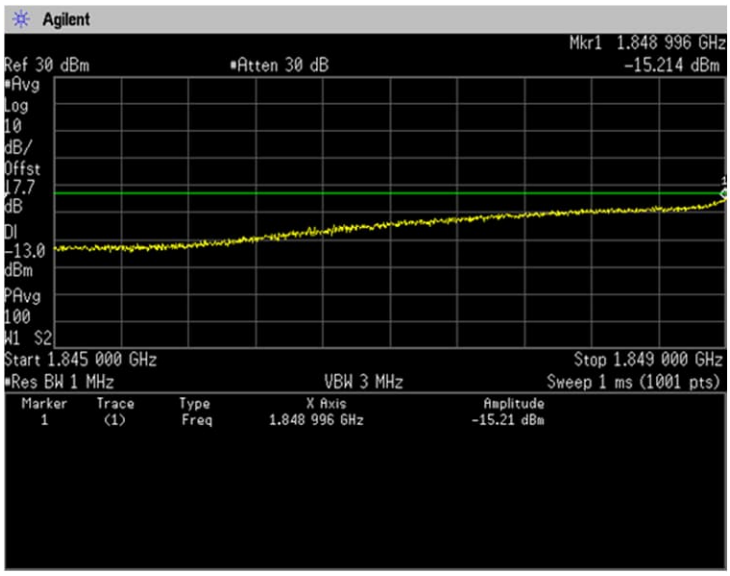


15GHz-20GHz

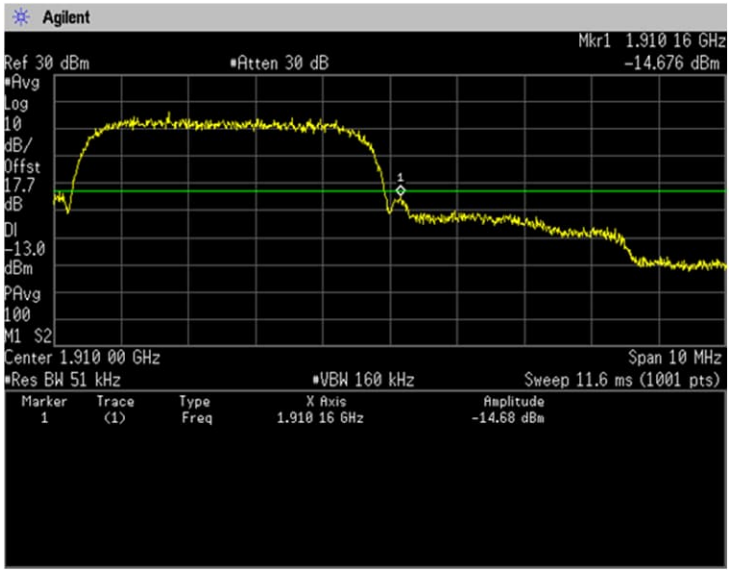


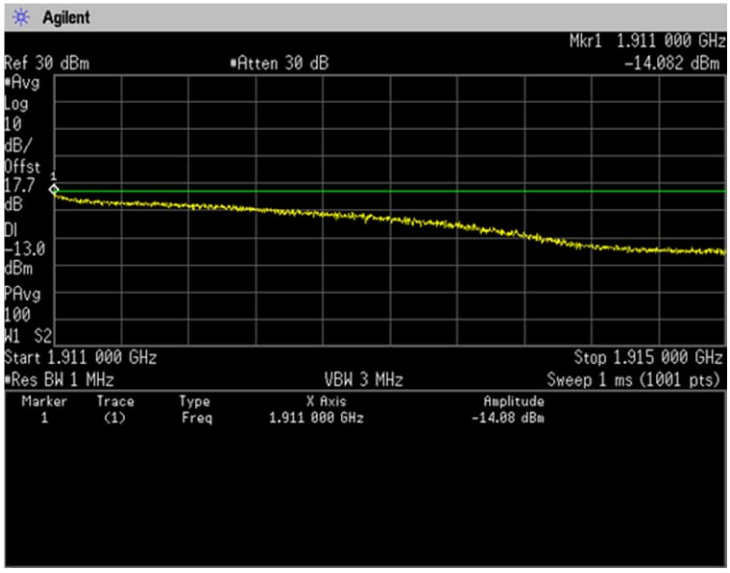
[WCDMA Band II]
(Band Edge)
Channel: 9262





Channel: 9538

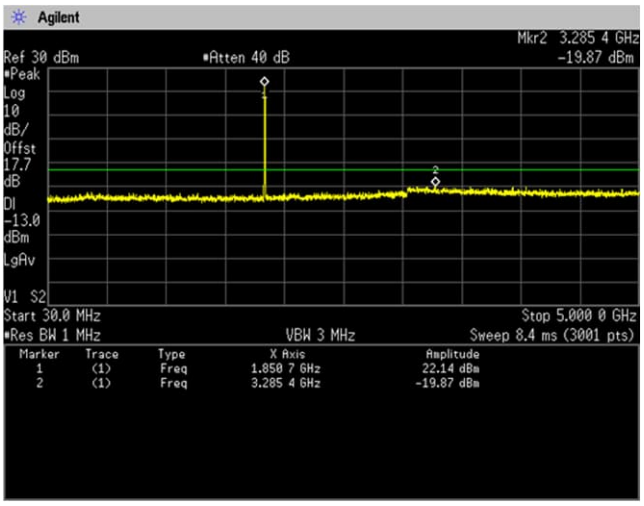




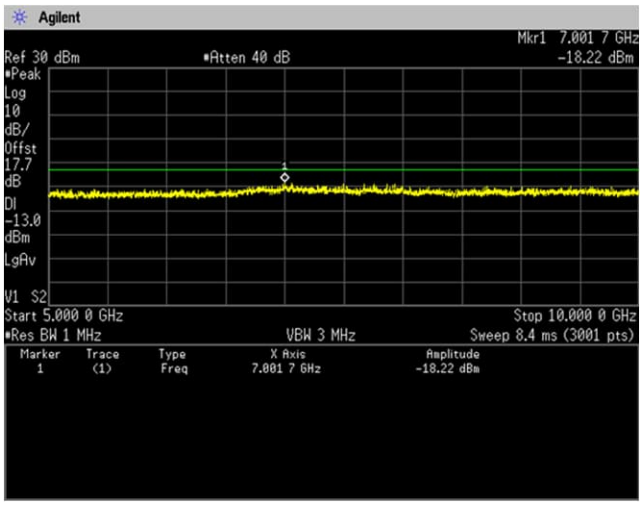
(Spurious Emissions)
Note: Conducted spurious test was measured in the worst case of conducted output power.

Channel: 9262

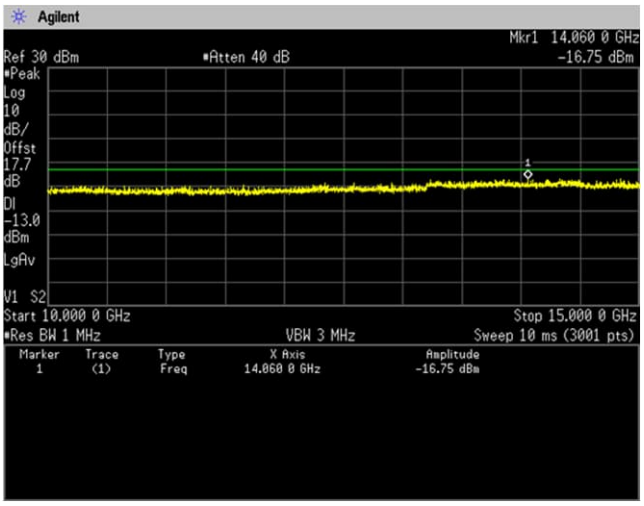
30MHz-5GHz



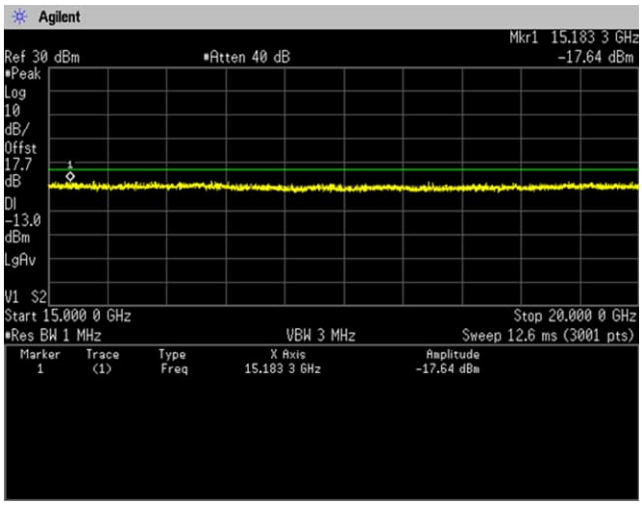
5GHz-10GHz



10GHz-15GHz

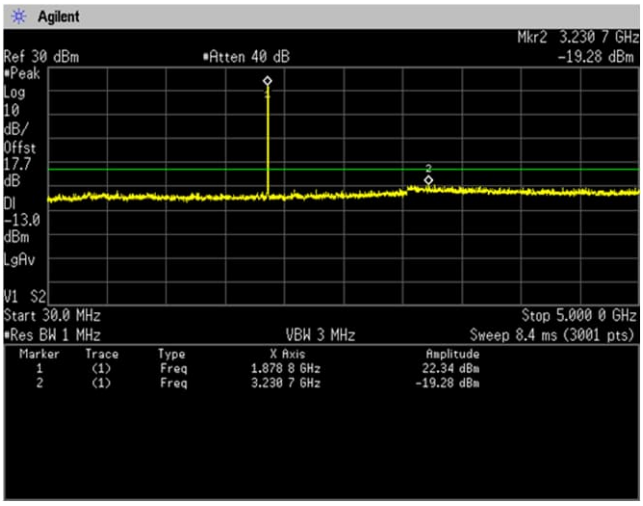


15GHz-20GHz

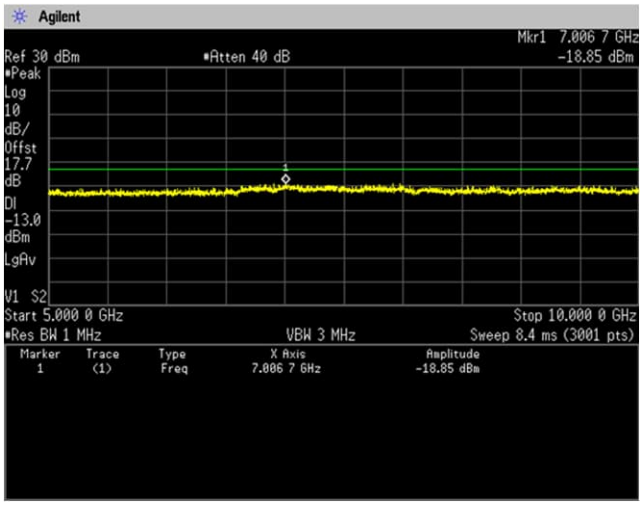


Channel: 9400

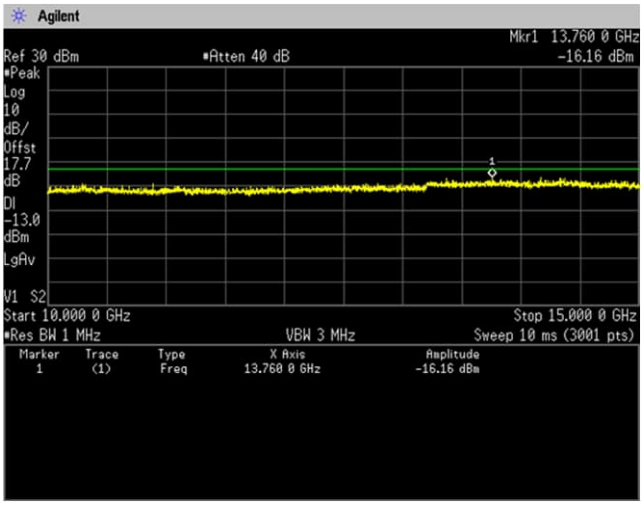
30MHz-5GHz



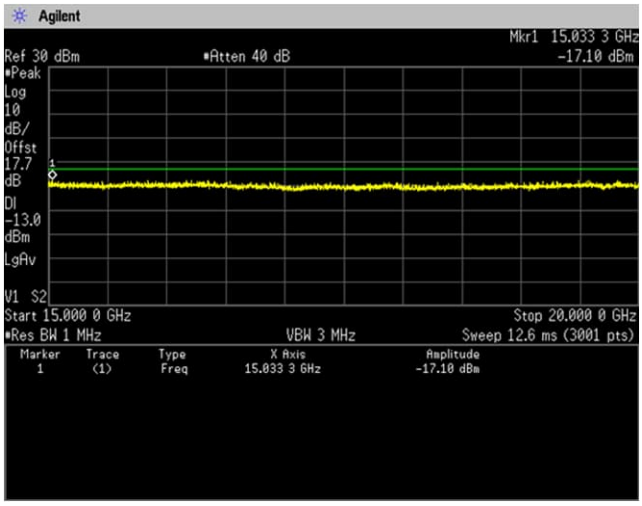
5GHz-10GHz



10GHz-15GHz

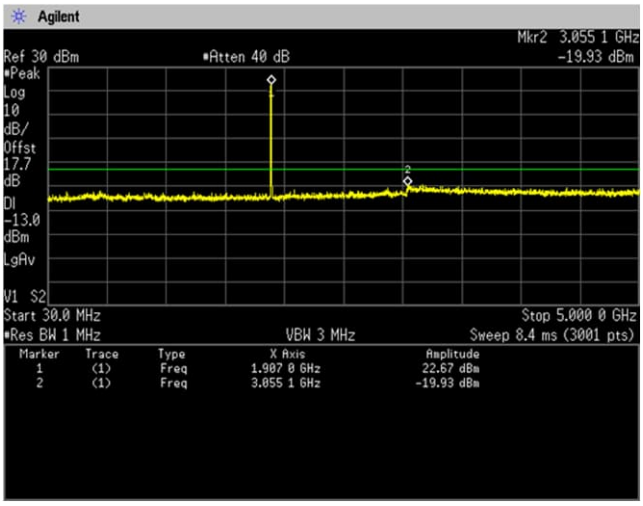


15GHz-20GHz

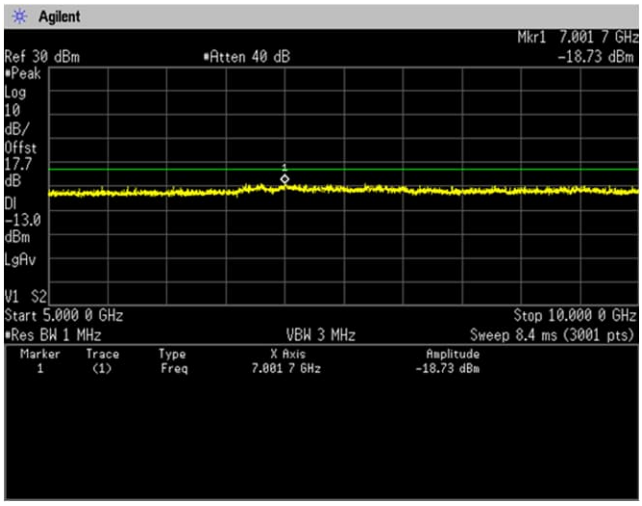


Channel: 9538

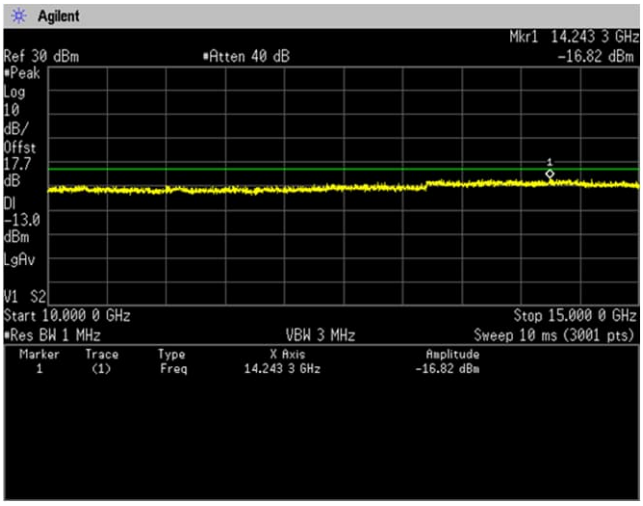
30MHz-5GHz



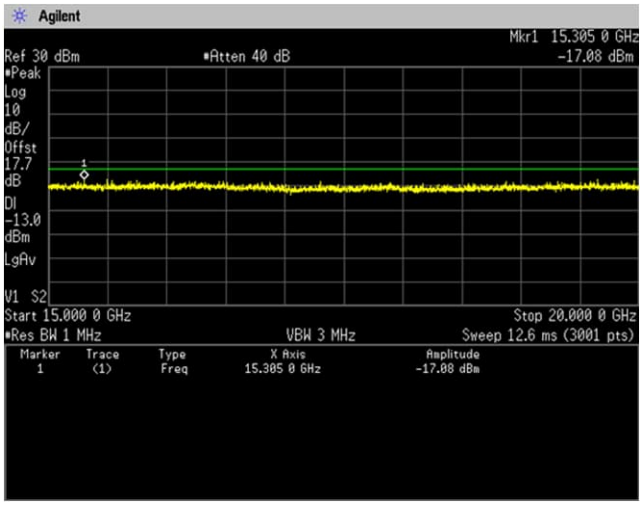
5GHz-10GHz



10GHz-15GHz

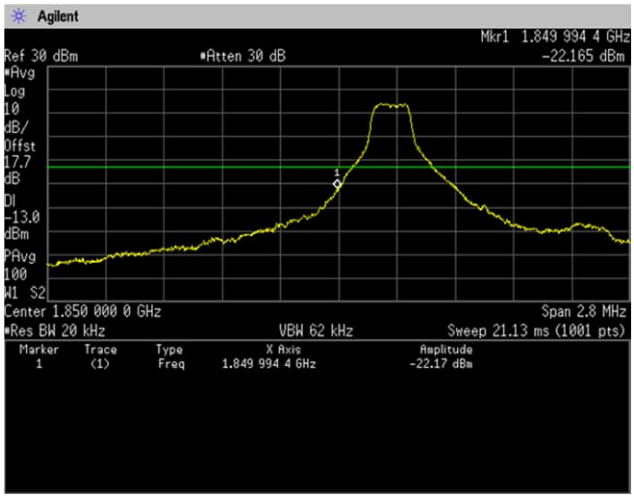


15GHz-20GHz

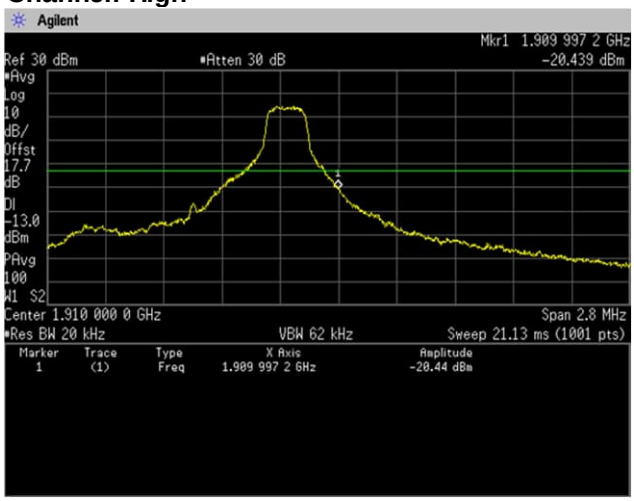


[LTE Band II]
(Band Edge)

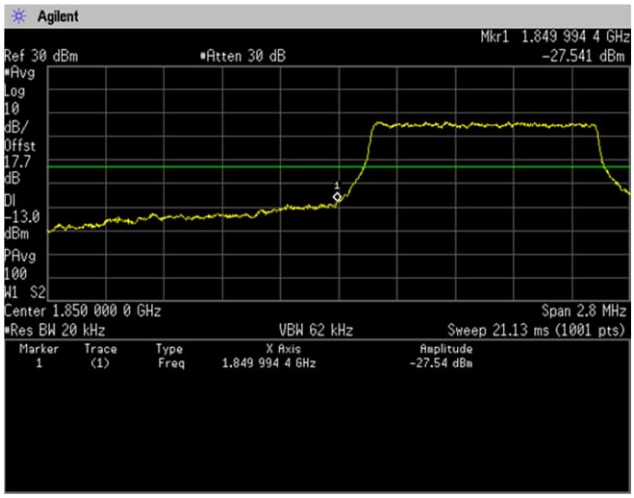
QPSK, BW 1.4MHz, RB1-0
Channel: Low



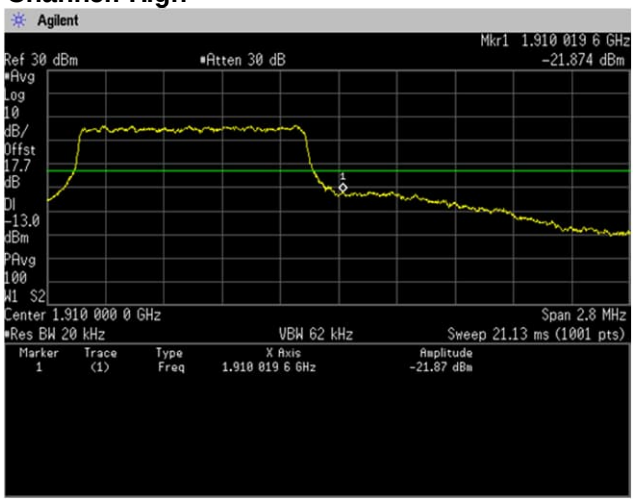
RB1-5
Channel: High



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

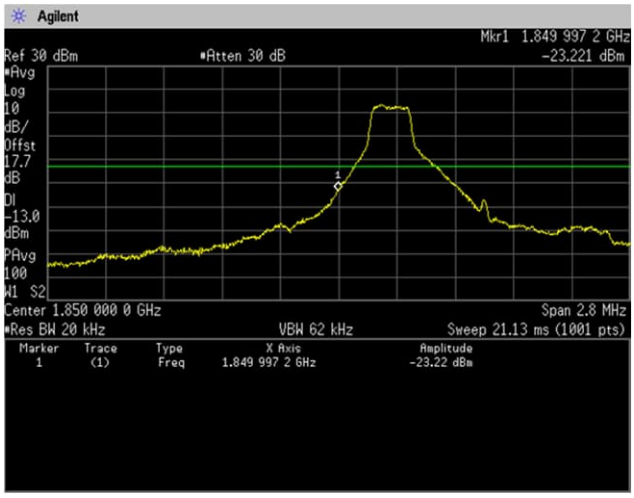


Channel: High

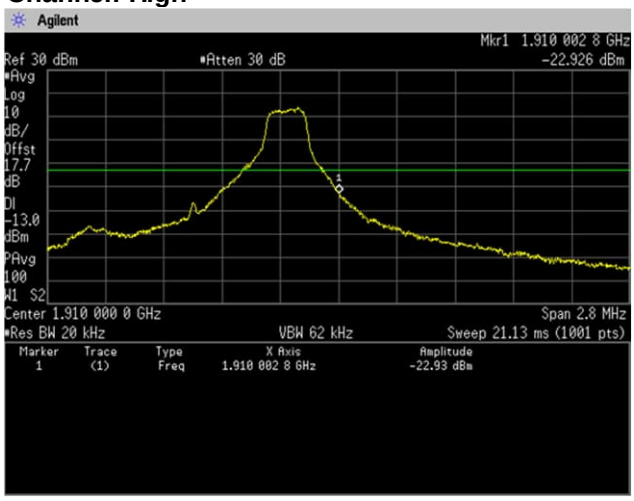


[LTE Band II]
(Band Edge)

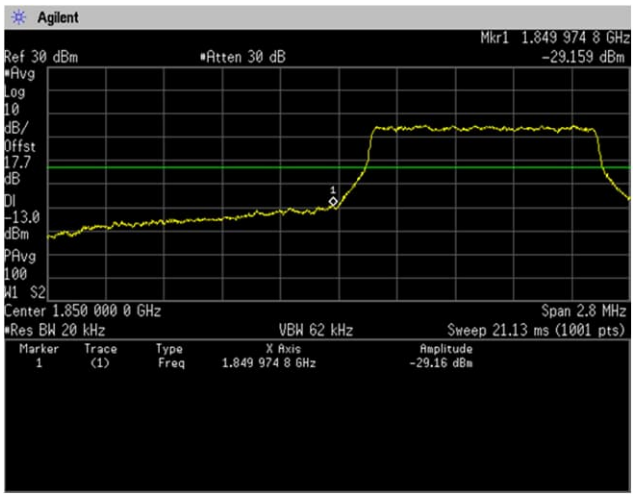
16QAM, BW 1.4MHz, RB1-0
Channel: Low



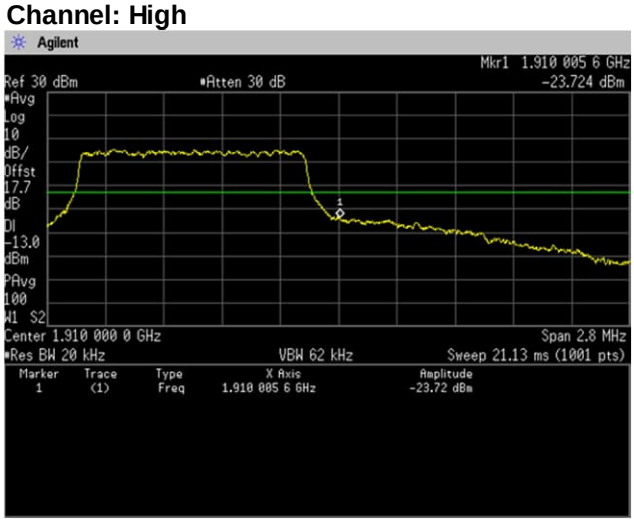
RB1-5
Channel: High



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

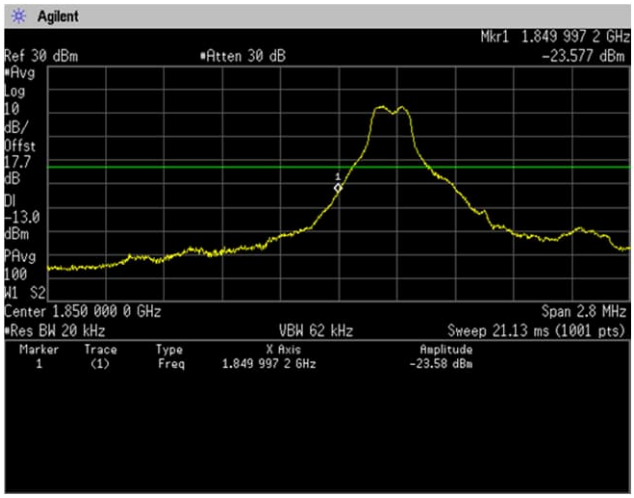


Channel: High

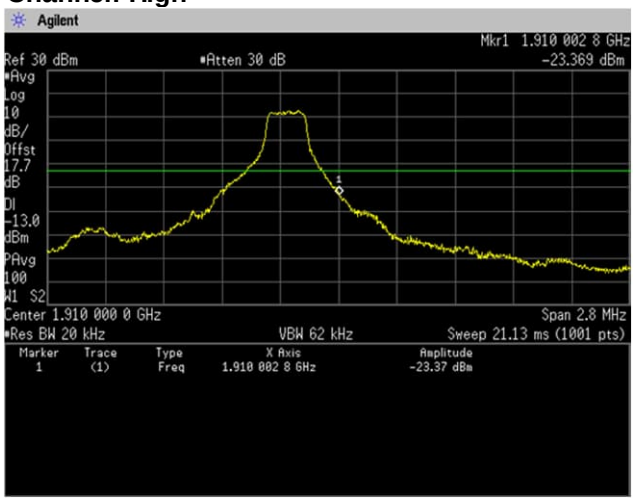


[LTE Band II]
(Band Edge)

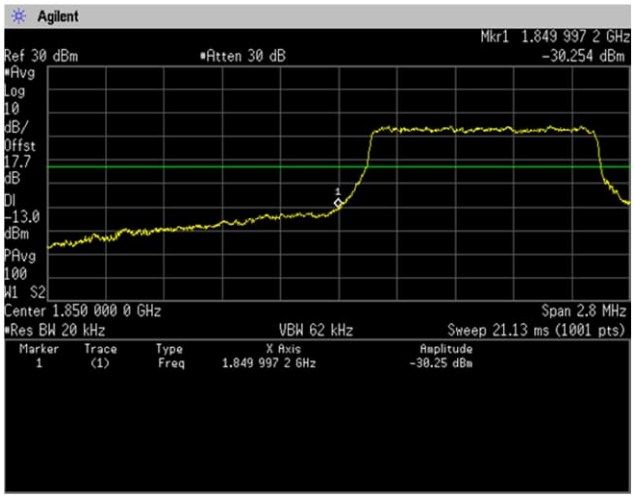
64QAM, BW 1.4MHz, RB1-0
Channel: Low



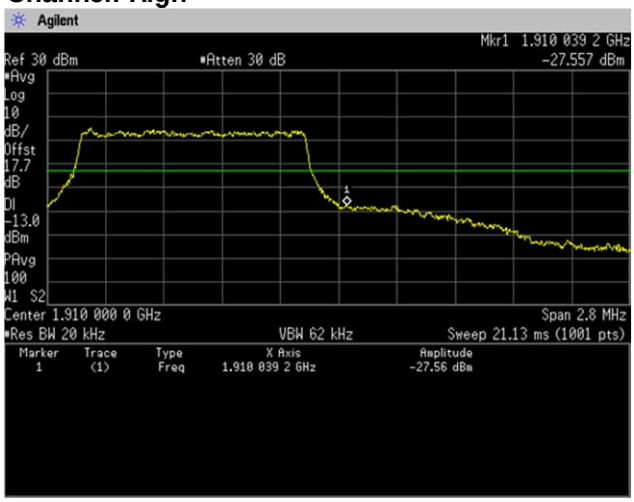
RB1-5
Channel: High



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

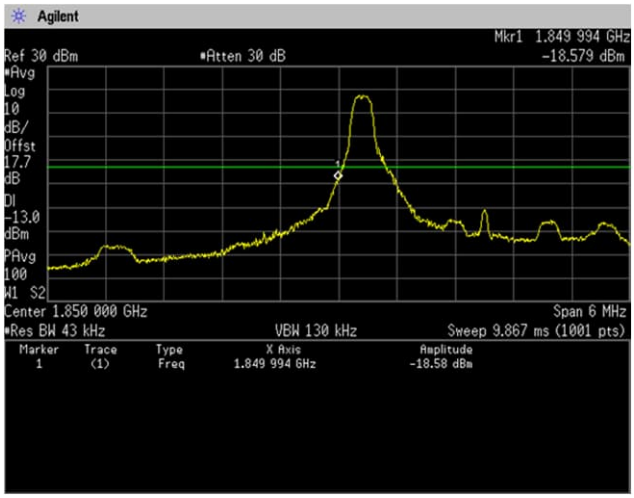


Channel: High

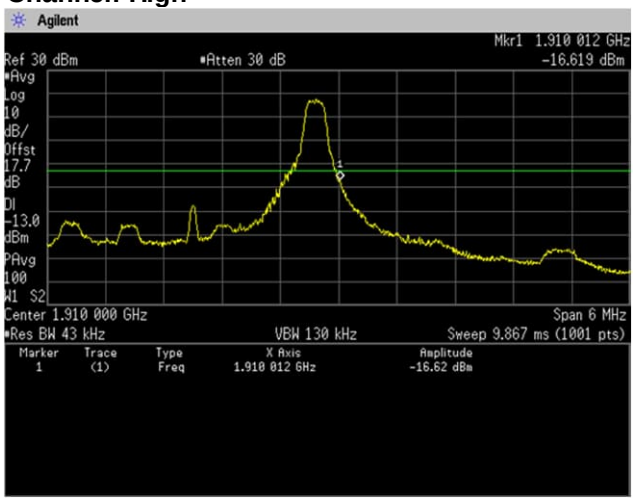


[LTE Band II]
(Band Edge)

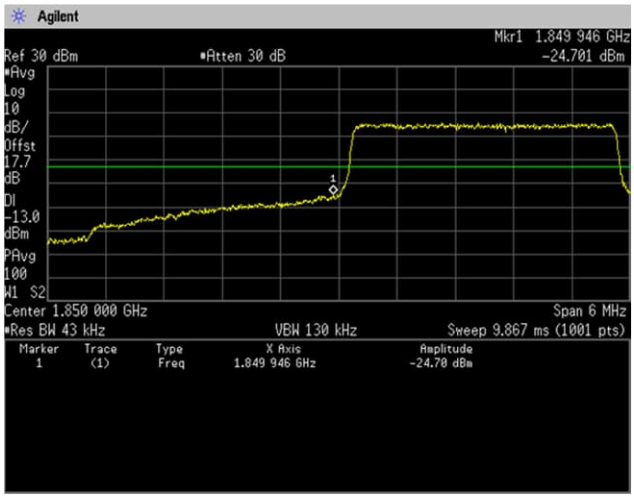
QPSK, BW 3MHz, RB1-0
Channel: Low



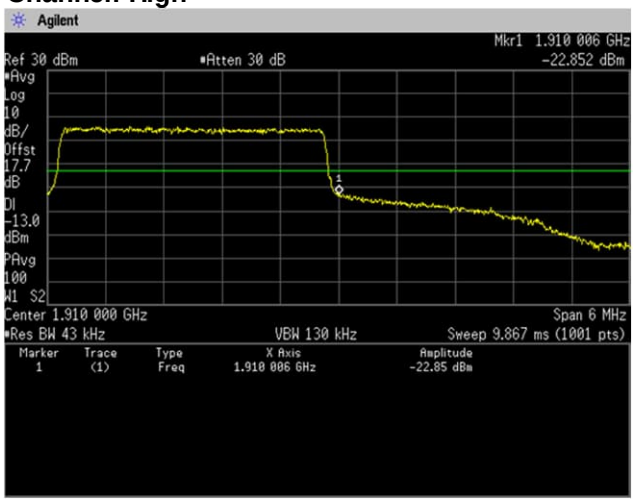
RB1-14
Channel: High



QPSK, BW 3MHz, RB15-0
Channel: Low

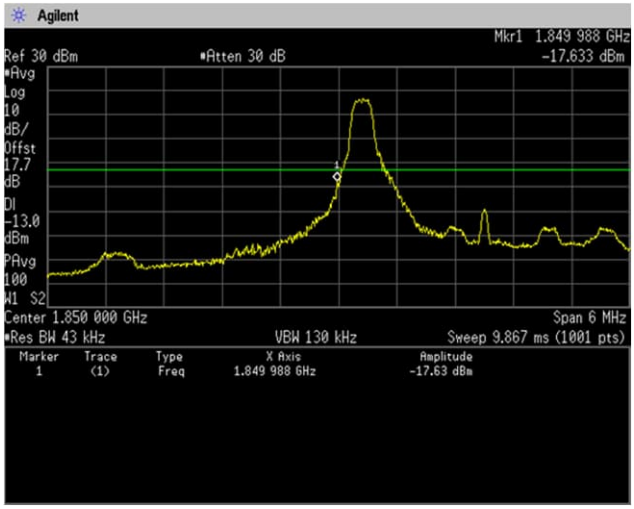


Channel: High

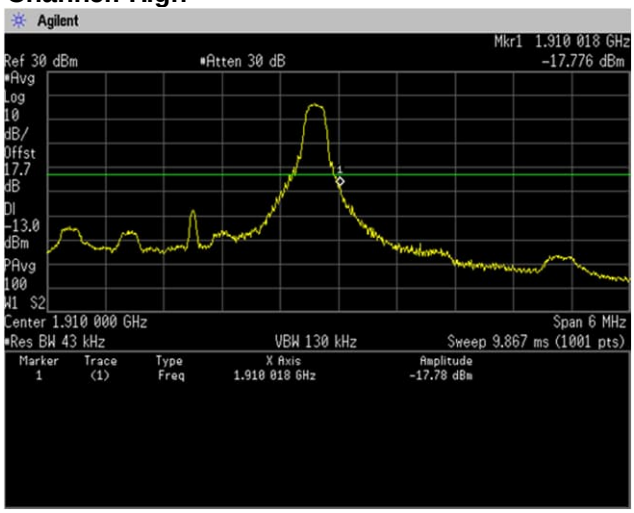


[LTE Band II]
(Band Edge)

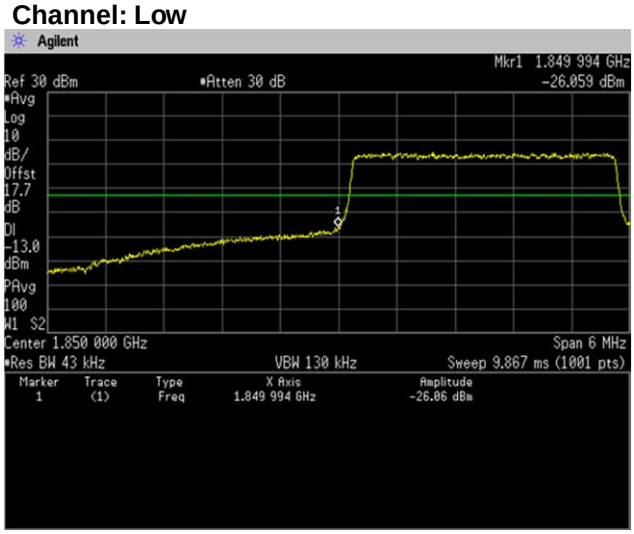
16QAM, BW 3MHz, RB1-0
Channel: Low



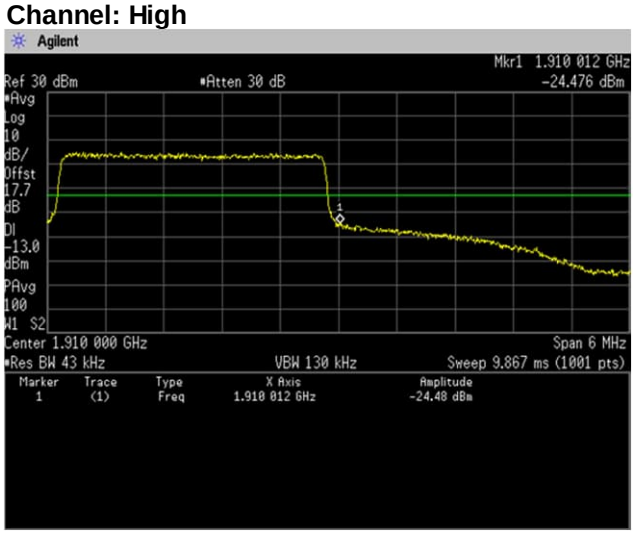
RB1-14
Channel: High



16QAM, BW 3MHz, RB15-0
Channel: Low

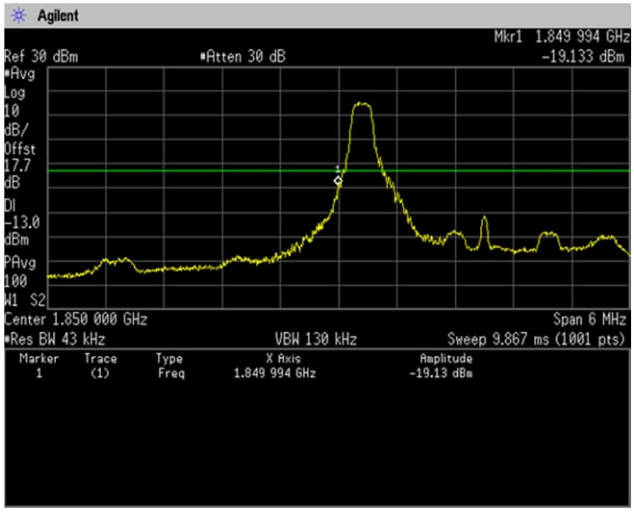


Channel: High

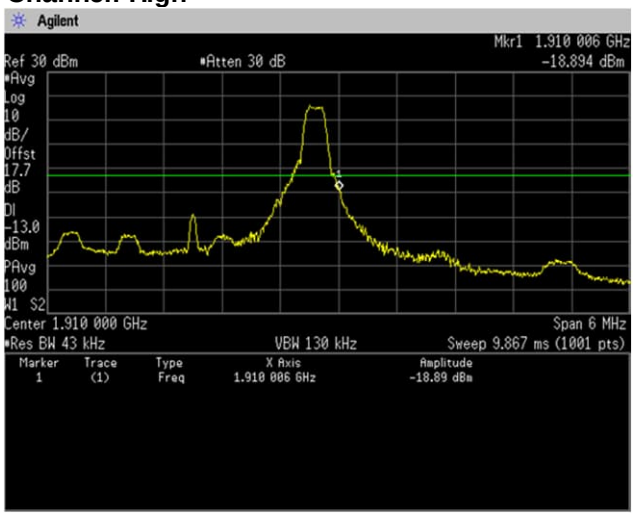


[LTE Band II]
(Band Edge)

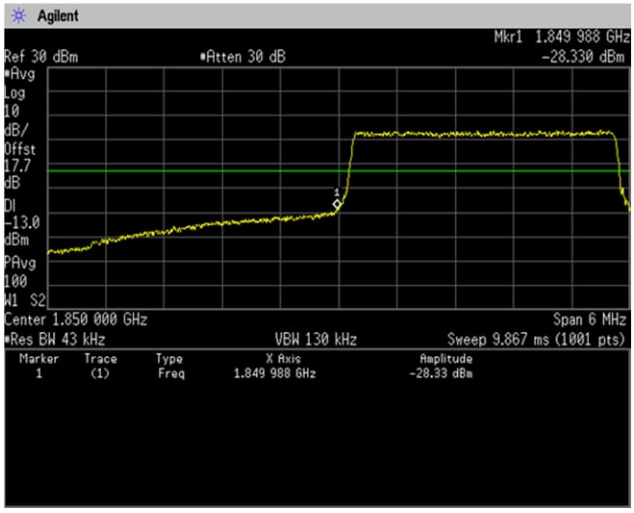
64QAM, BW 3MHz, RB1-0
Channel: Low



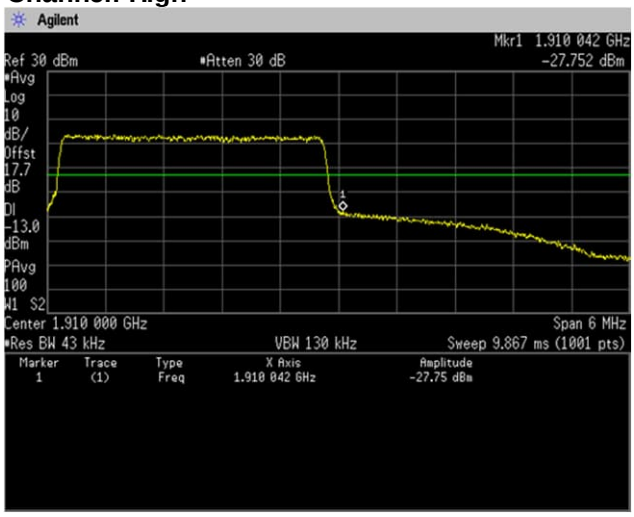
RB1-14
Channel: High



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

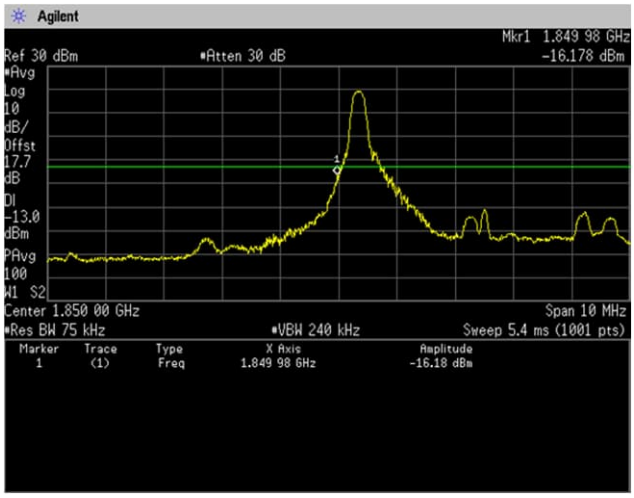


Channel: High

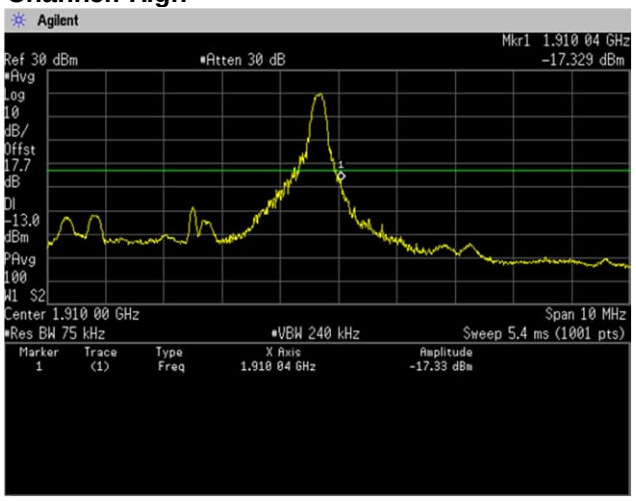


[LTE Band II]
(Band Edge)

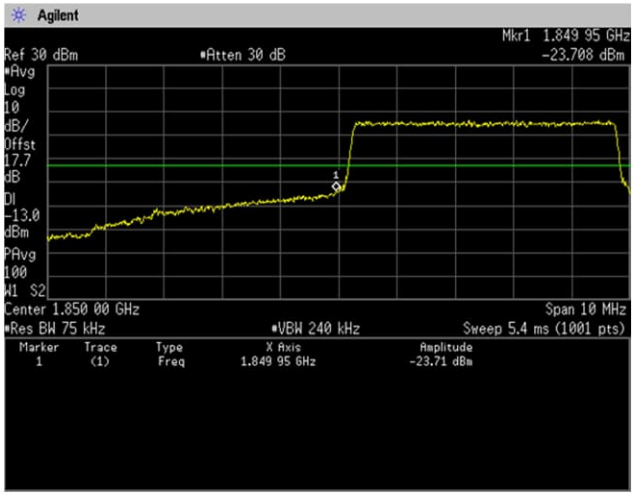
QPSK, BW 5MHz, RB1-0
Channel: Low



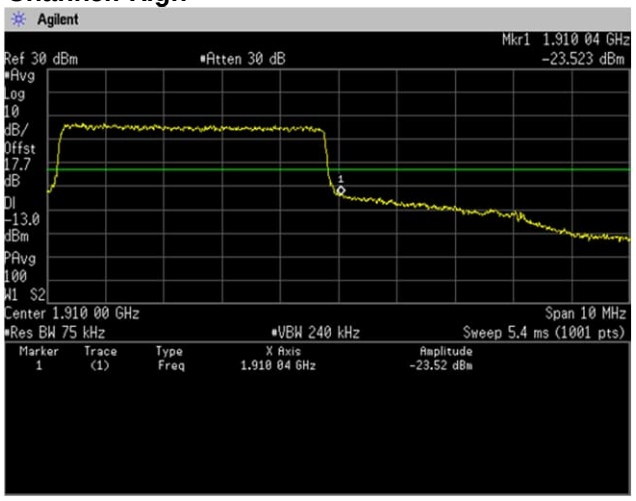
RB1-24
Channel: High



QPSK, BW 5MHz, RB25-0
Channel: Low

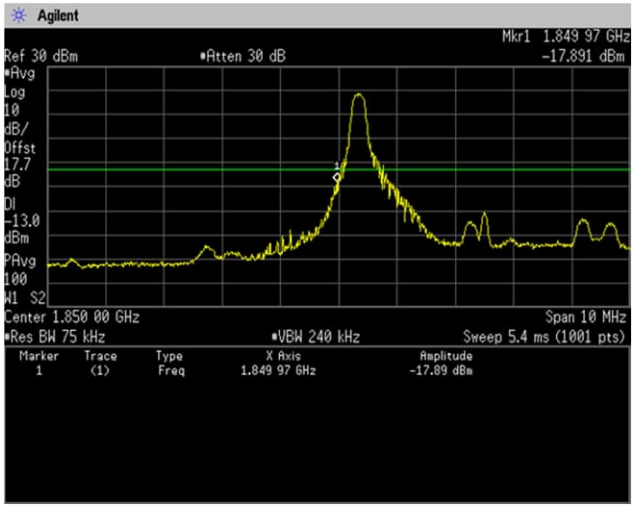


Channel: High

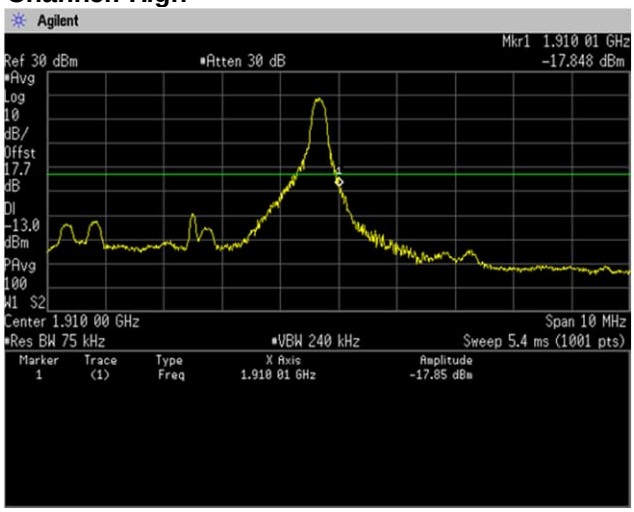


[LTE Band II]
(Band Edge)

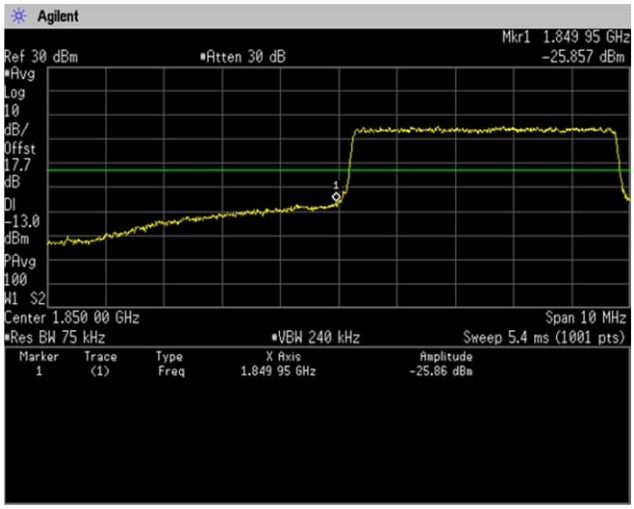
16QAM, BW 5MHz, RB1-0
Channel: Low



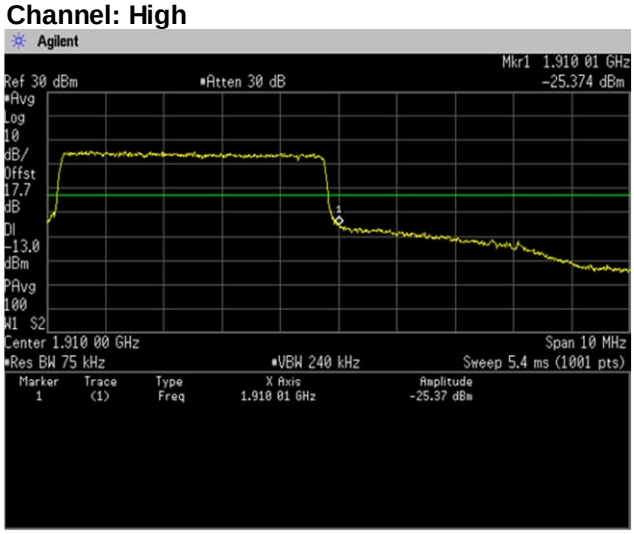
RB1-24
Channel: High



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

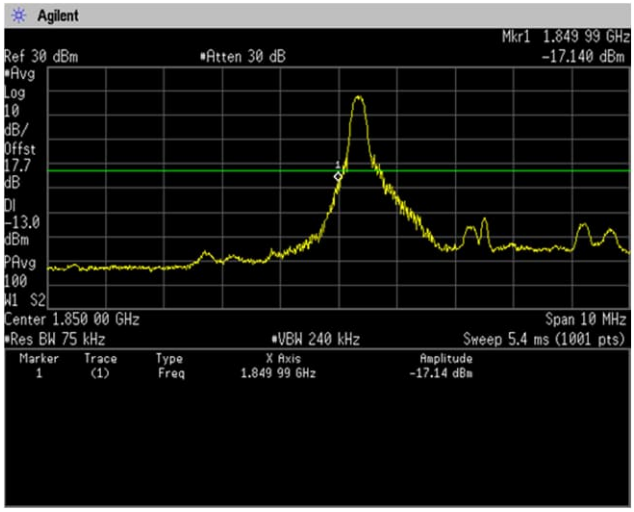


Channel: High

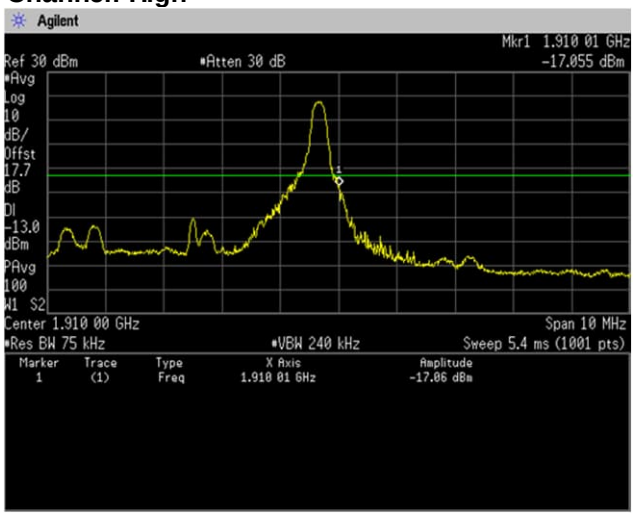


[LTE Band II]
(Band Edge)

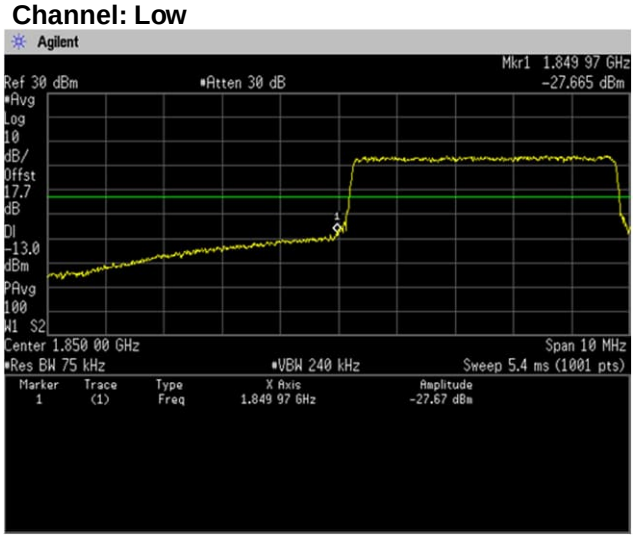
64QAM, BW 5MHz, RB1-0
Channel: Low



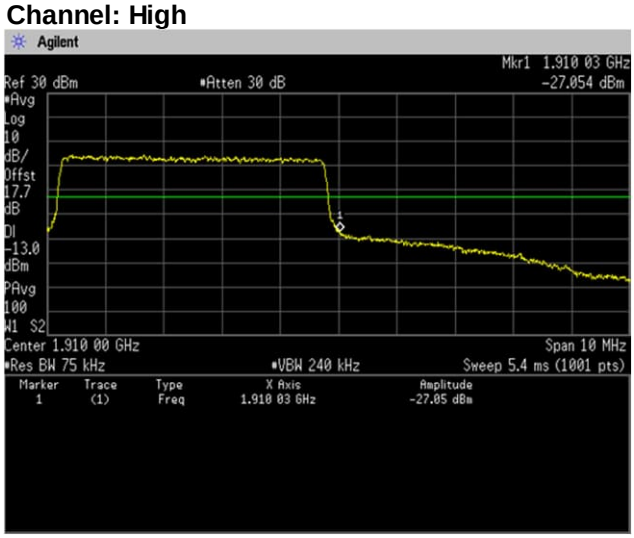
RB1-24
Channel: High



64QAM, BW 5MHz, RB25-0
Channel: Low

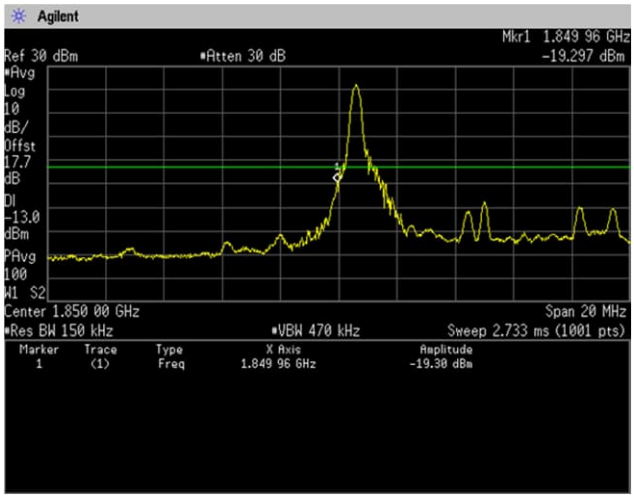


Channel: High

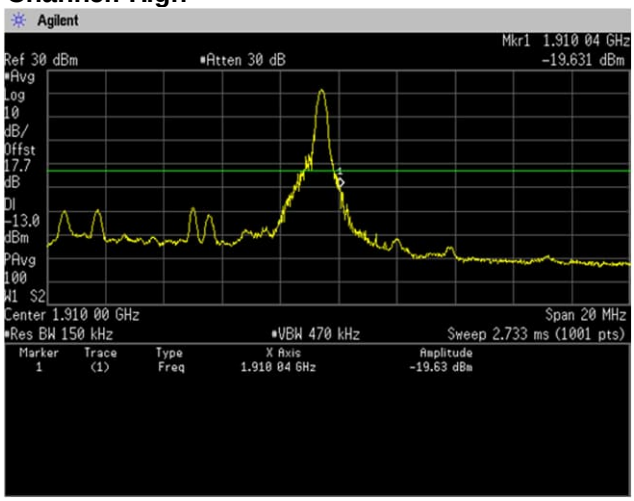


[LTE Band II]
(Band Edge)

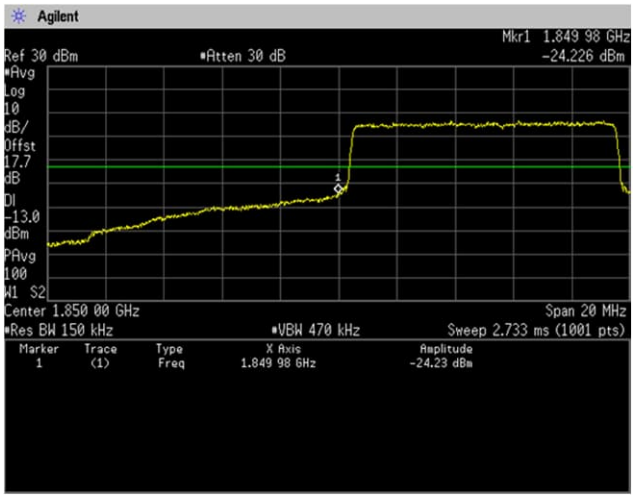
QPSK, BW 10MHz, RB1-0
Channel: Low



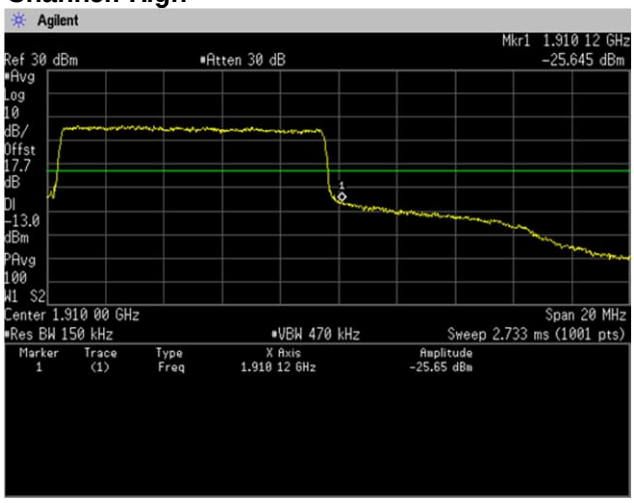
RB1-49
Channel: High



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

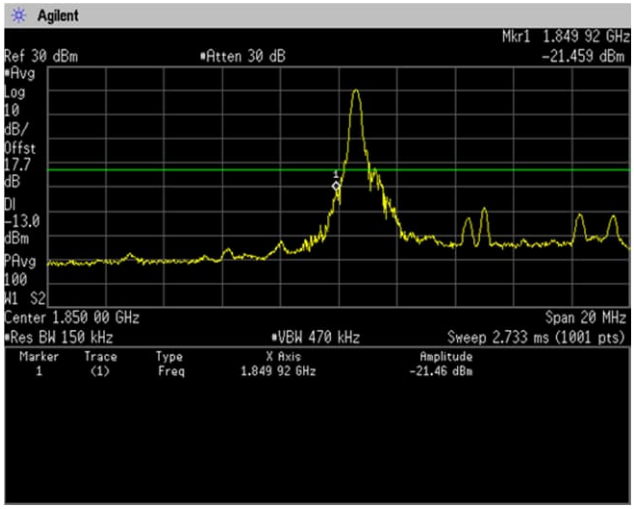


Channel: High

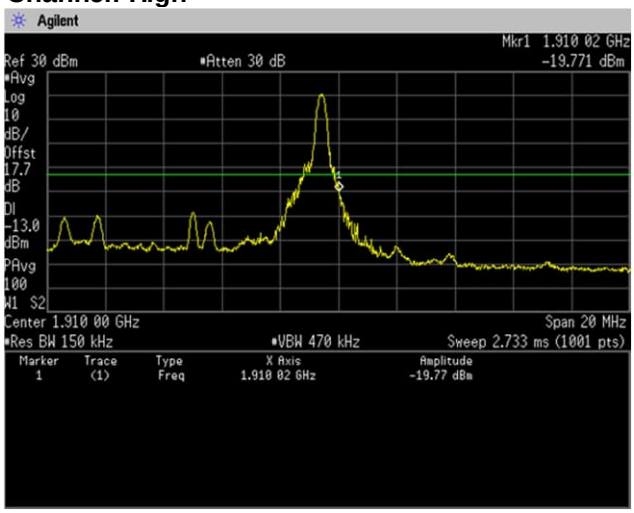


[LTE Band II]
(Band Edge)

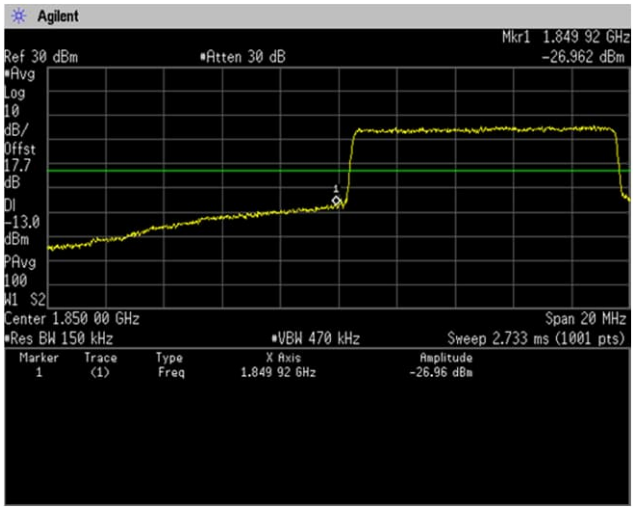
16QAM, BW 10MHz, RB1-0
Channel: Low



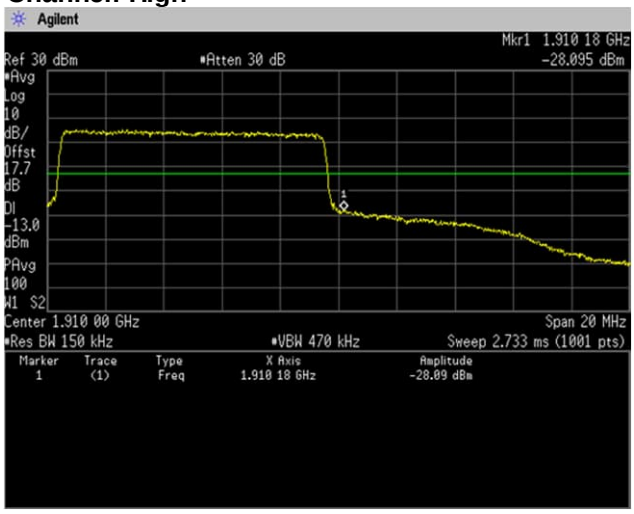
RB1-49
Channel: High



16QAM, BW 10MHz, RB50-0
Channel: Low

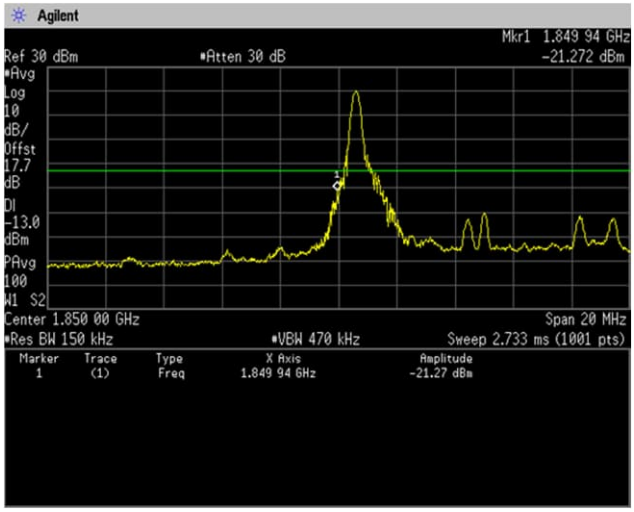


Channel: High

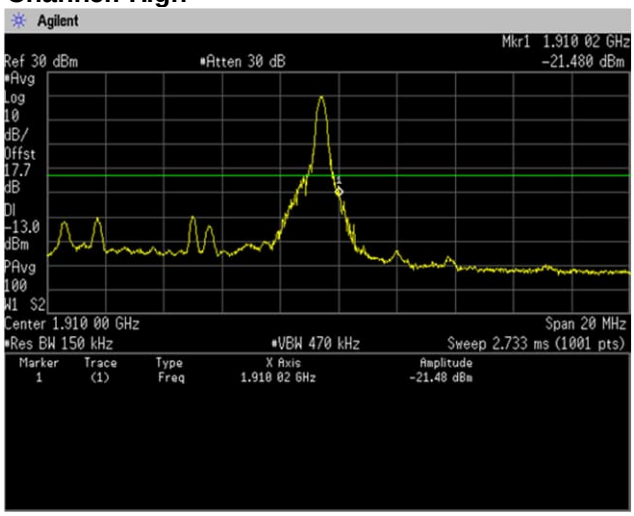


[LTE Band II]
(Band Edge)

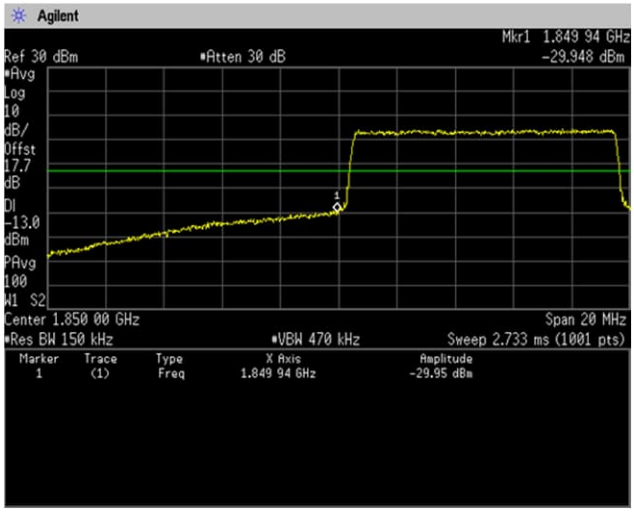
64QAM, BW 10MHz, RB1-0
Channel: Low



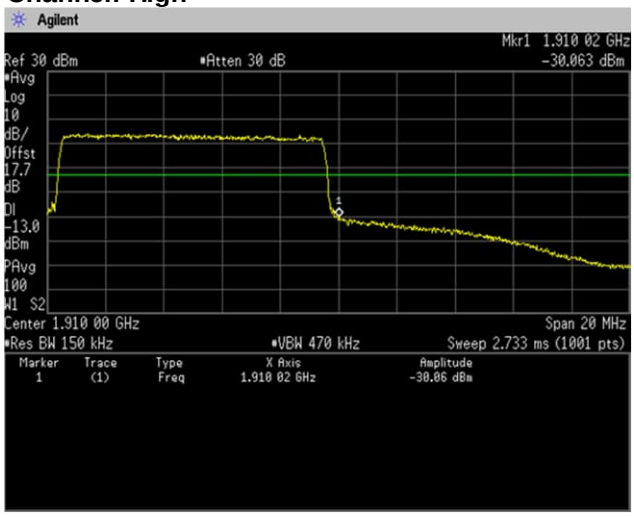
RB1-49
Channel: High



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

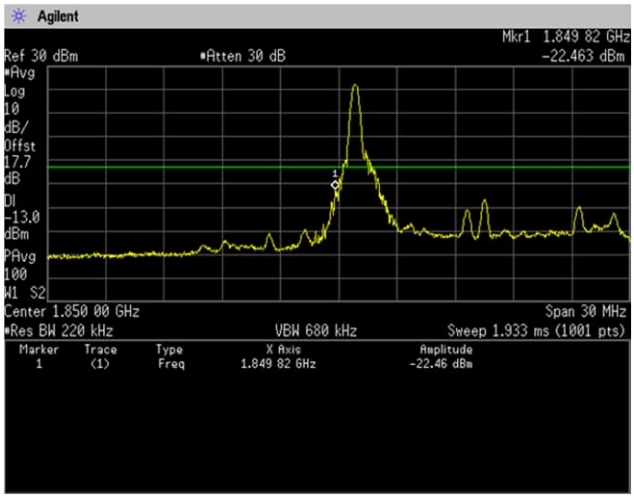


Channel: High

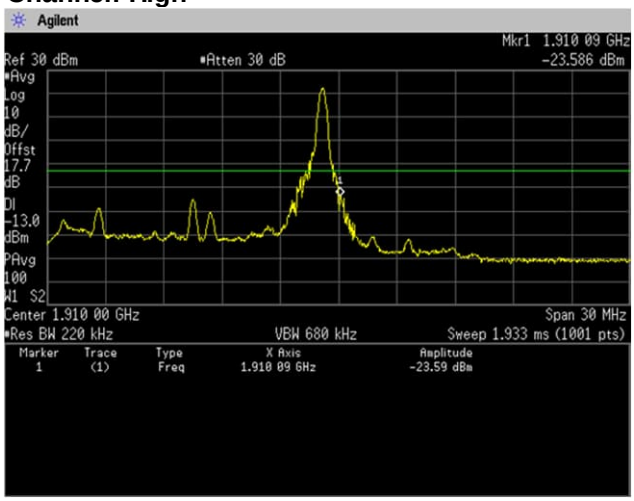


[LTE Band II]
(Band Edge)

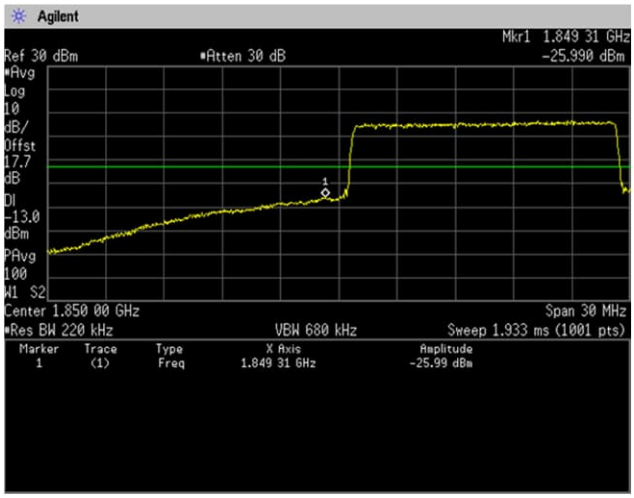
QPSK, BW 15MHz, RB1-0
Channel: Low



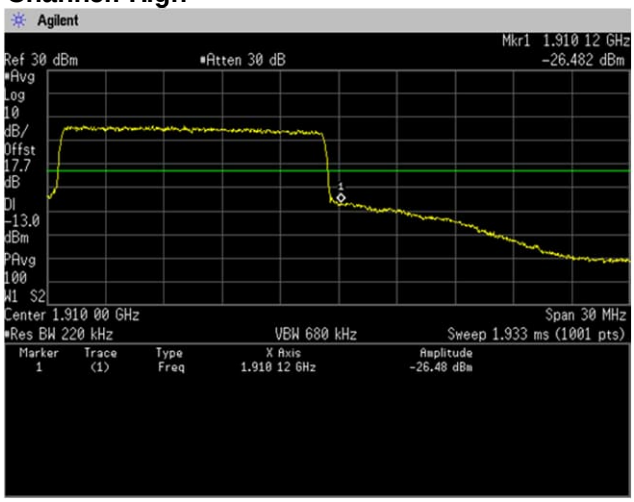
RB1-74
Channel: High



QPSK, BW 15MHz, RB75-0
Channel: Low

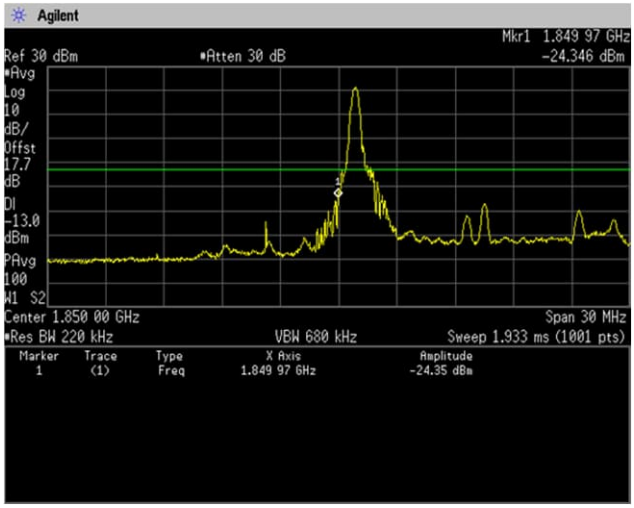


Channel: High

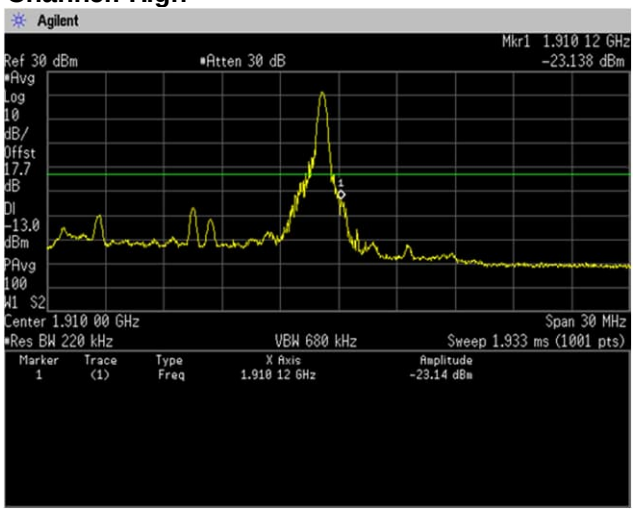


[LTE Band II]
(Band Edge)

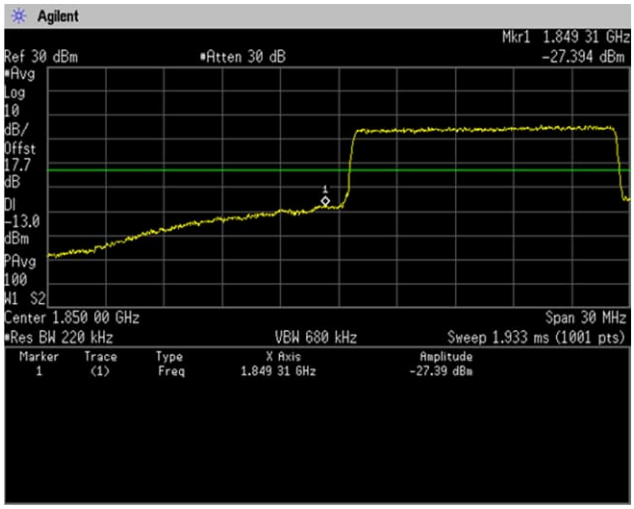
16QAM, BW 15MHz, RB1-0
Channel: Low



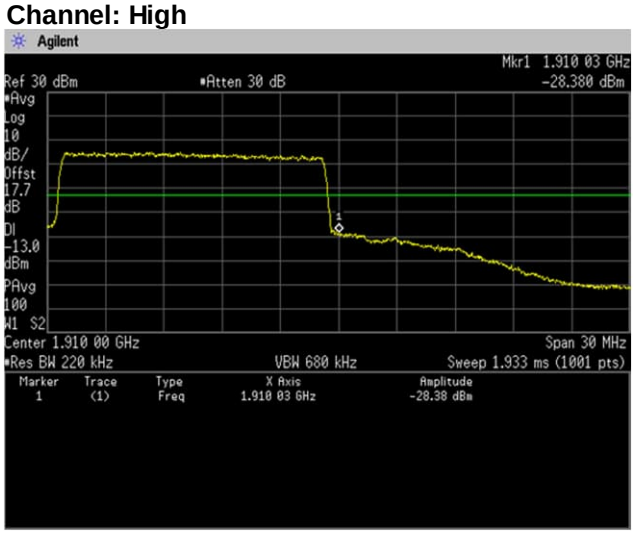
RB1-74
Channel: High



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

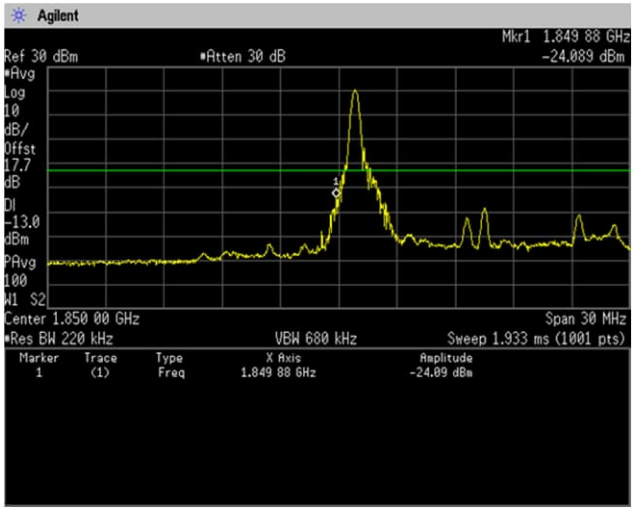


Channel: High

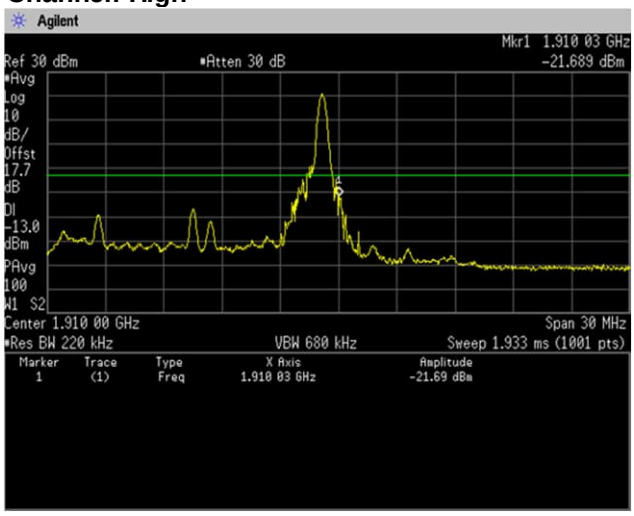


[LTE Band II]
(Band Edge)

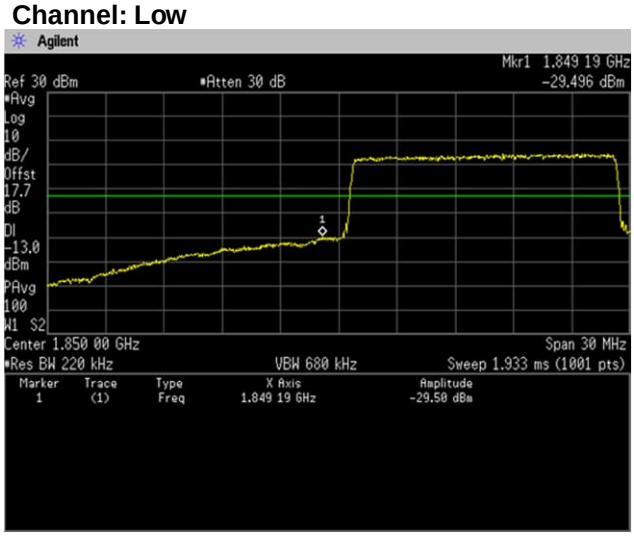
64QAM, BW 15MHz, RB1-0
Channel: Low



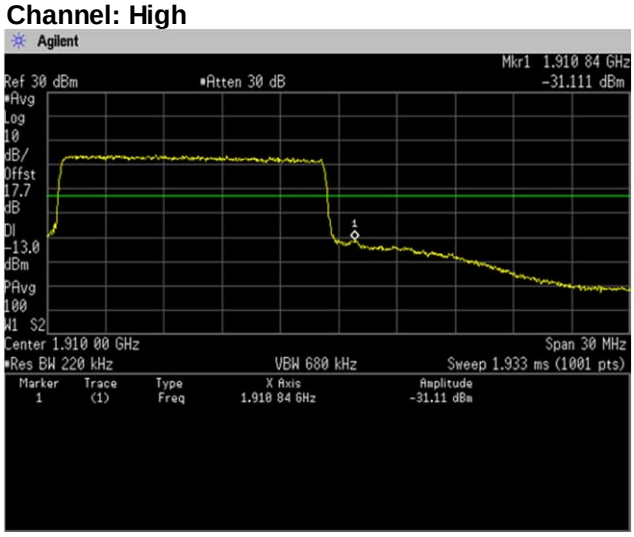
RB1-74
Channel: High



64QAM, BW 15MHz, RB75-0
Channel: Low

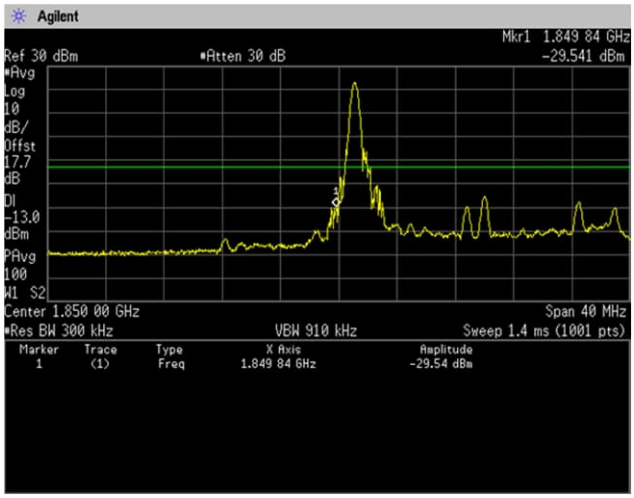


Channel: High

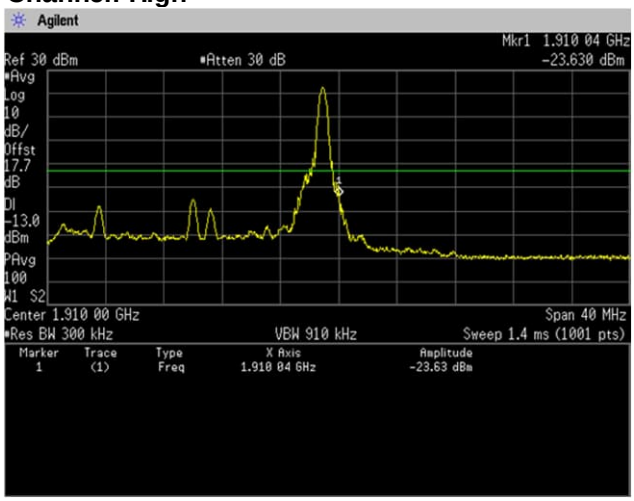


[LTE Band II]
(Band Edge)

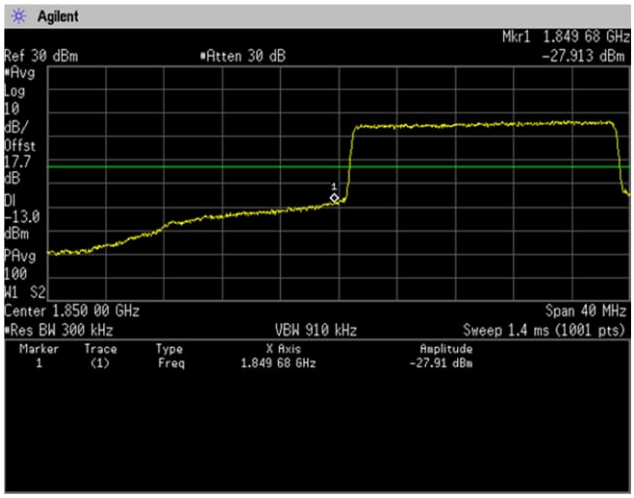
QPSK, BW 20MHz, RB1-0
Channel: Low



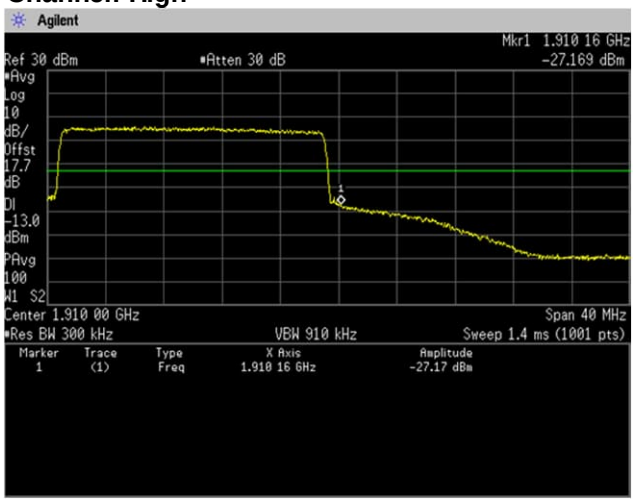
RB1-99
Channel: High



QPSK, BW 20MHz, RB100-0
Channel: Low

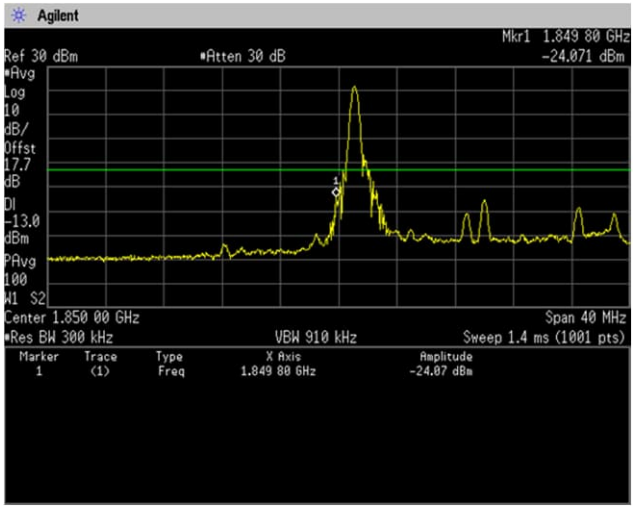


Channel: High

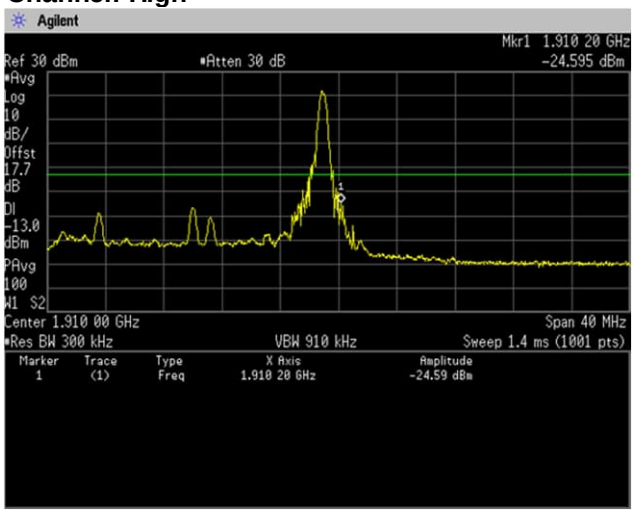


[LTE Band II]
(Band Edge)

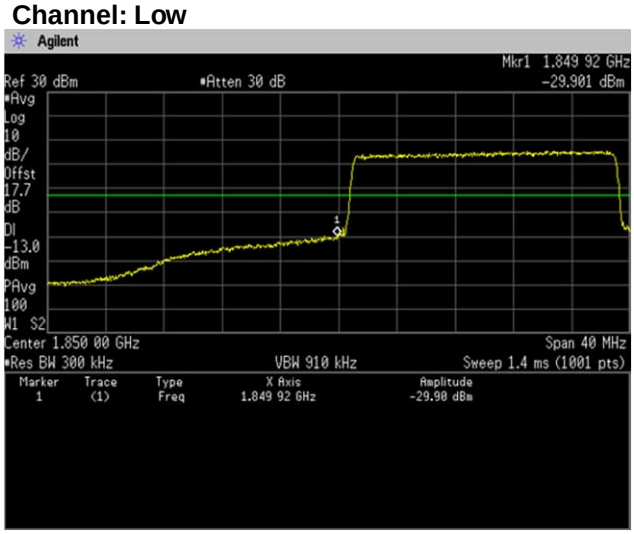
16QAM, BW 20MHz, RB1-0
Channel: Low



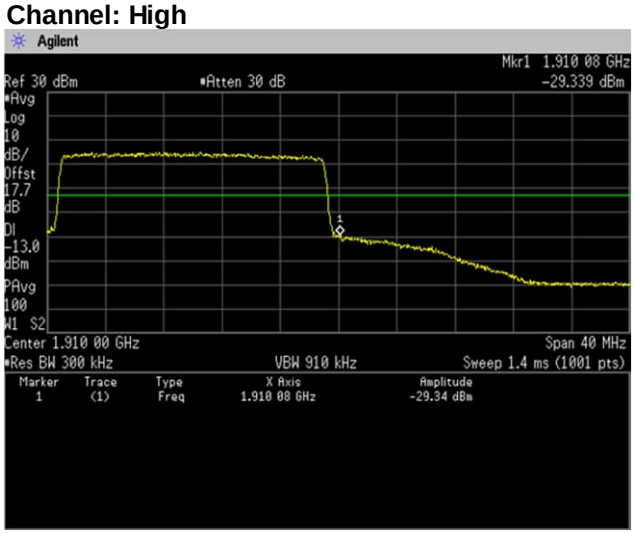
RB1-99
Channel: High



16QAM, BW 20MHz, RB100-0
Channel: Low

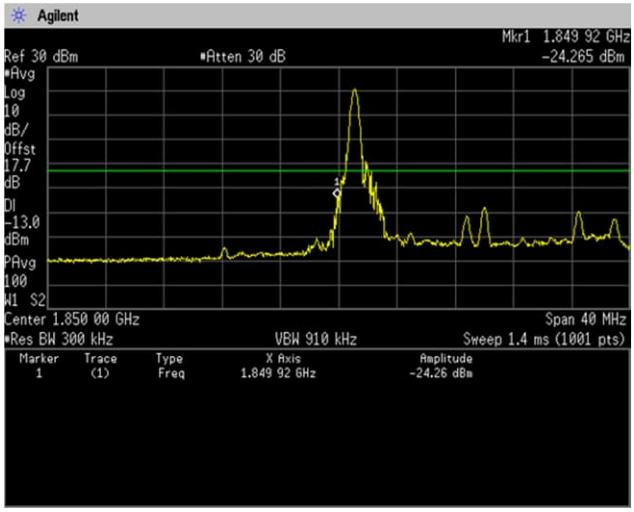


Channel: High

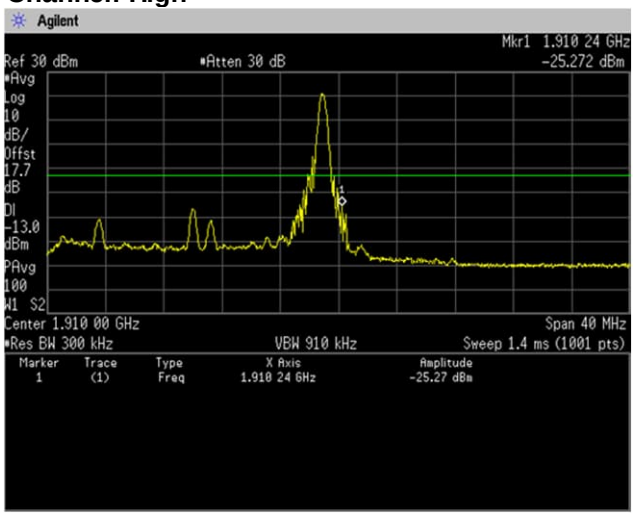


[LTE Band II]
(Band Edge)

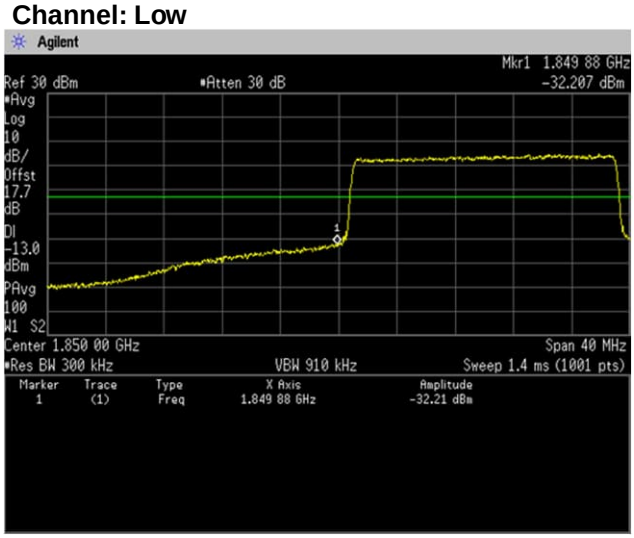
64QAM, BW 20MHz, RB1-0
Channel: Low



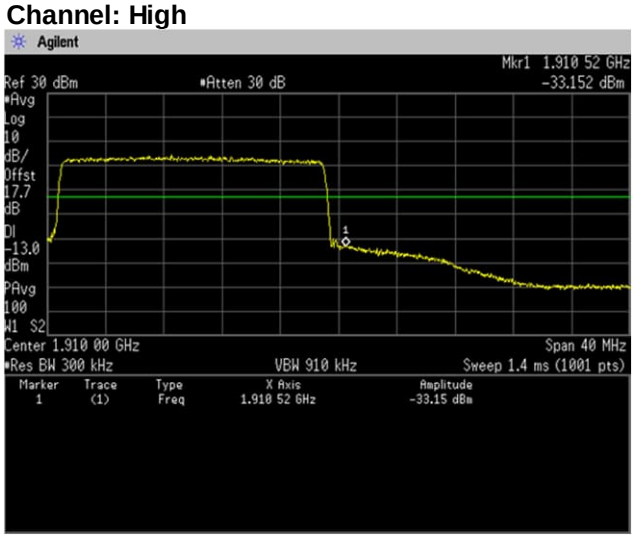
RB1-99
Channel: High



64QAM, BW 20MHz, RB100-0
Channel: Low



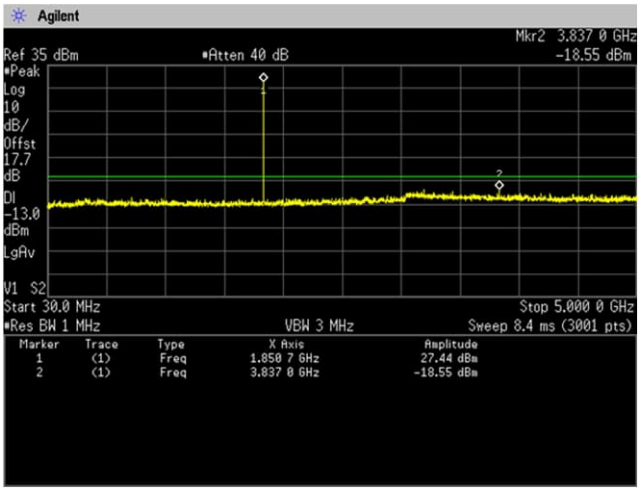
Channel: High



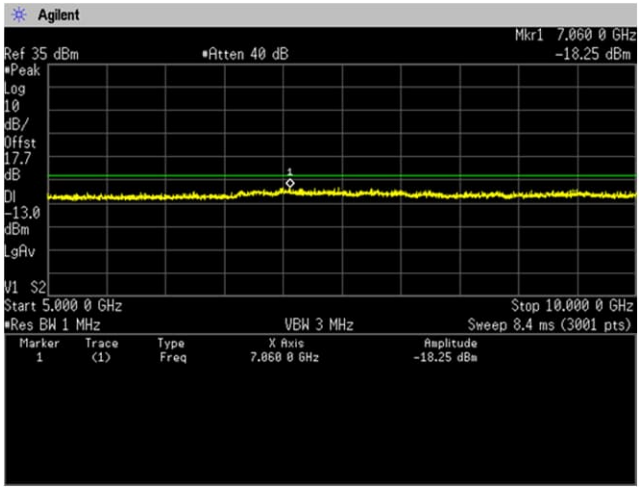
[LTE Band II]
(Spurious Emissions)
Note: Conducted spurious test was measured in the worst case of Equivalent Isotropic Radiated Power.

QPSK, BW 1.4MHz, RB 1-3
Channel: Low

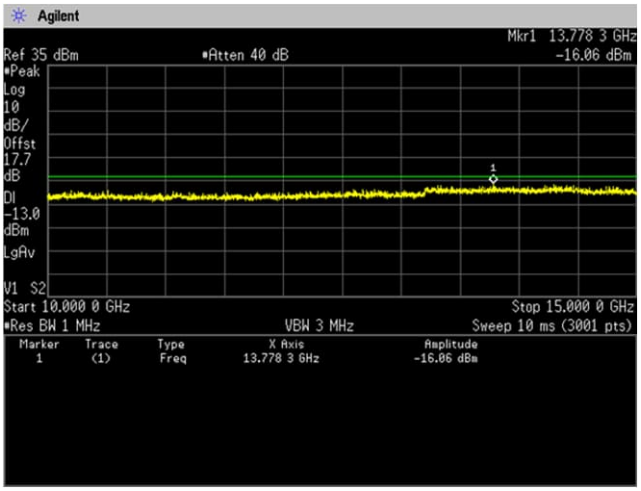
30MHz-5GHz



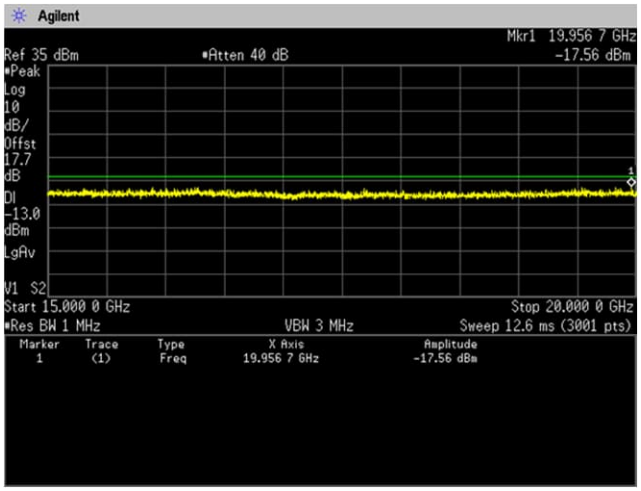
5GHz-10GHz



10GHz-15GHz



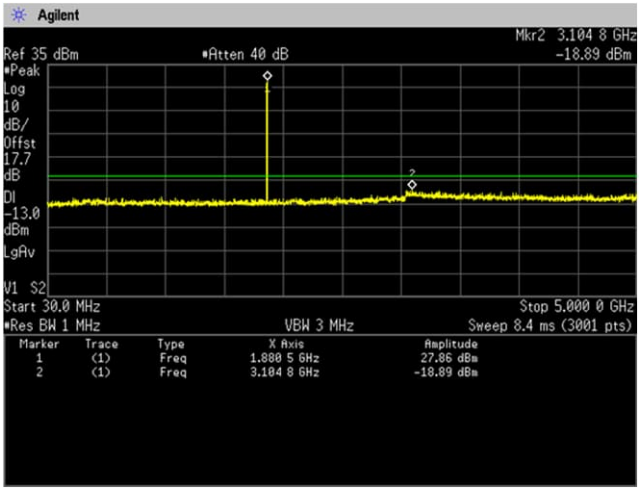
15GHz-20GHz



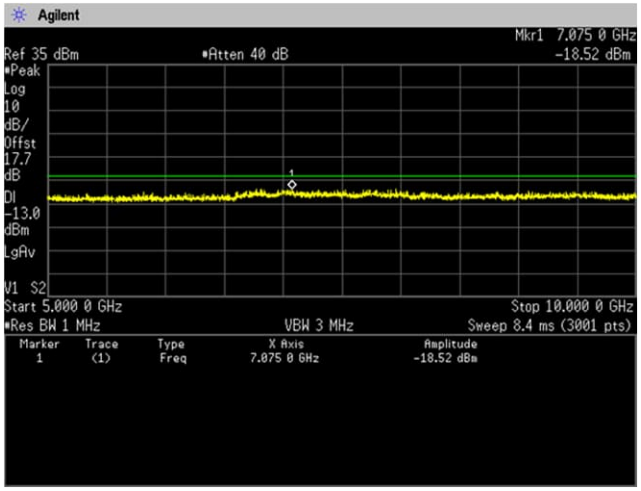
[LTE Band II]
(Spurious Emissions)

Channel: Middle

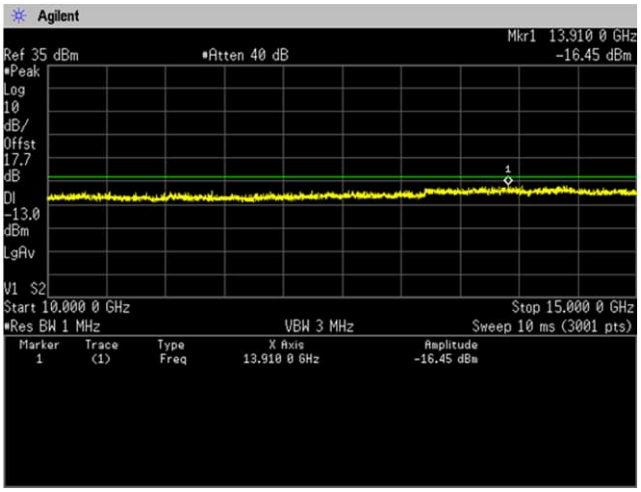
30MHz-5GHz



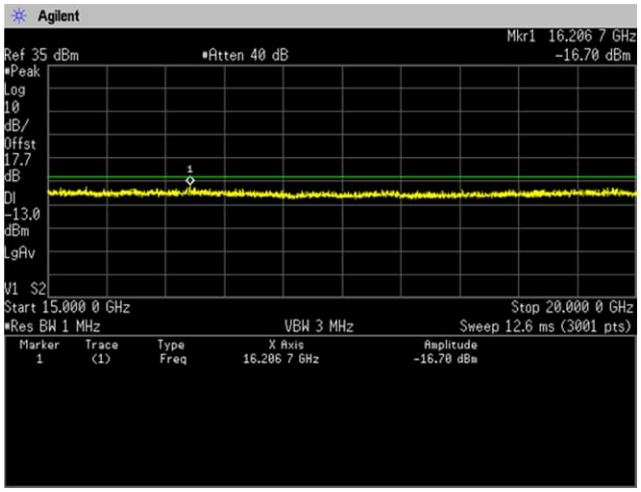
5GHz-10GHz



10GHz-15GHz



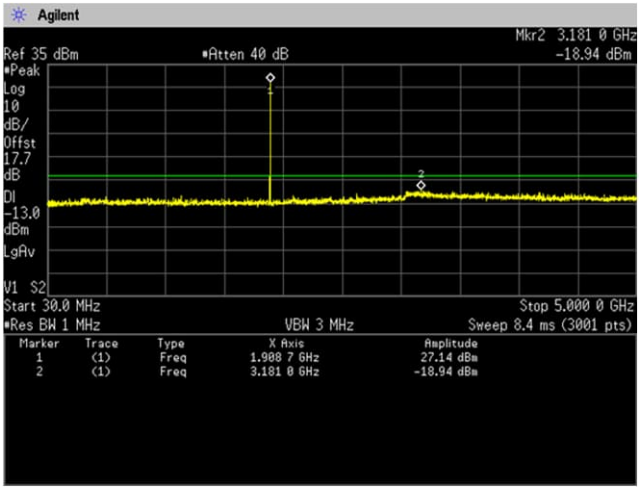
15GHz-20GHz



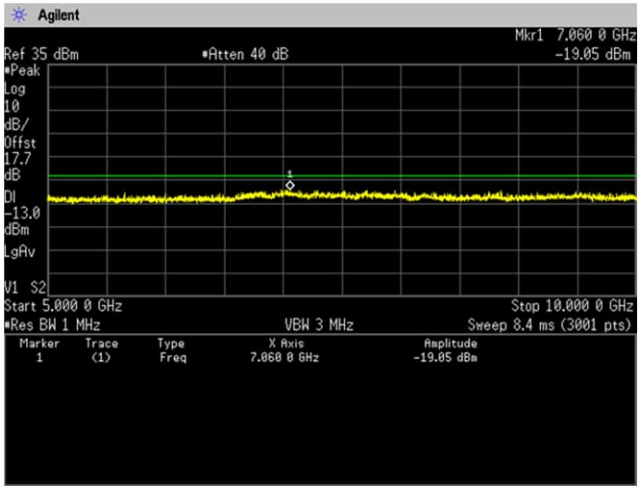
[LTE Band II]
(Spurious Emissions)

Channel: High

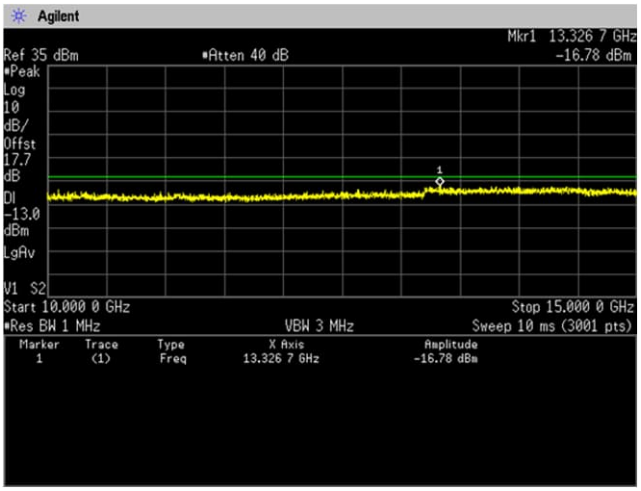
30MHz-5GHz



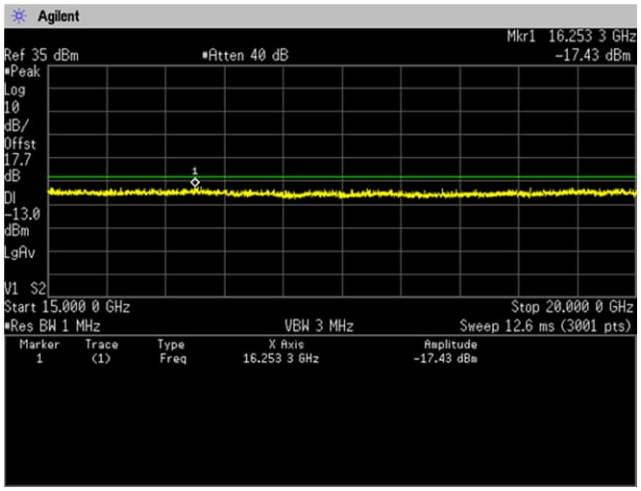
5GHz-10GHz



10GHz-15GHz



15GHz-20GHz



4.5 Radiated Emissions and Harmonic Emissions

4.5.1 Measurement procedure

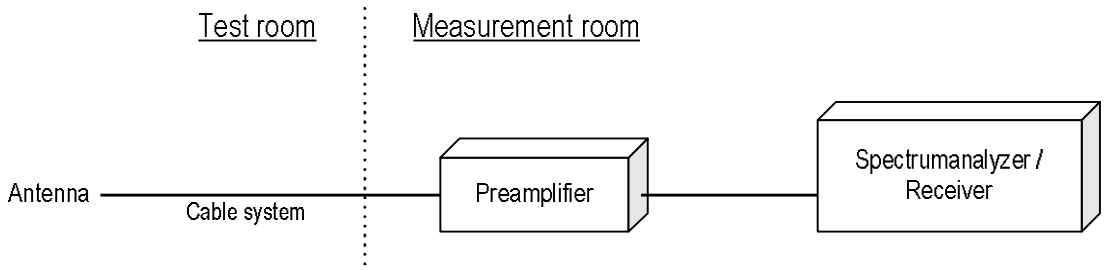
[FCC 24.238(a), 2.1053]

<Step 1>
The EUT and support equipment are placed on 1.0 meter x 1.0 meter surface, 0.8 meter height (Below or equal 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 (Biconical antenna, Log periodic antenna and double ridged guide 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. The frequency is investigated up to 20 GHz.

<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;
a) RBW = 100 kHz for below 1 GHz and 1 MHz for above 1 GHz / VBW ≥ 3 x RBW
b) Detector = Peak
c) Trace mode = Max hold
d) Sweep time = auto-couple

- Test configuration



4.5.2 Calculation method

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

Example:
Limit @ 3760.0 MHz : -13.0 dBm
Ant. Input = -55.6 dBm Cable loss = 1.6 dB Ant. Gain = 9.2 dBi
Result = -55.6 - 1.6 + 9.2 = -48.0 dBm
Margin = -13.0 - (-48.0) = 35.0 dB

4.5.3 Limit

-13 dBm or less

4.5.4 Test data

Date	:	26-April-2024			
Temperature	:	21.8 [˚C]			
Humidity	:	38.8 [%]	Test engineer	:	
Test place	:	3m Semi-anechoic chamber			Tadahiro Seino

Date	:	26~27-April-2024			
Temperature	:	22.7 [˚C]			
Humidity	:	38.0 [%]	Test engineer	:	
Test place	:	3m Semi-anechoic chamber			Chiaki Kanno

[GSM1900]
Channel: 512

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3700.4	-59.4	-52.3	1.6	8.5	-45.4	-13.0	32.4

Channel: 661

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3760.0	-59.6	-52.5	1.7	8.3	-45.9	-13.0	32.9

Channel: 810

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3819.6	-59.7	-52.6	1.7	8.4	-45.9	-13.0	32.9

[WCDMA Band II - X-axis, Open, Without camera]
Channel: 9262

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3700.4	-59.2	-52.1	1.6	8.5	-45.2	-13.0	32.2

Channel: 9400

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3760.0	-59.2	-52.1	1.7	8.3	-45.5	-13.0	32.5

Channel: 9538

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3815.2	-59.8	-52.7	1.7	8.4	-46.0	-13.0	33.0

[LTE Band II]
QPSK, BW 1.4MHz
Channel: 18607

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3701.4	-59.5	-52.4	1.6	8.5	-45.5	-13.0	32.5

Channel: 18900

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3760.0	-59.8	-52.7	1.7	8.3	-46.1	-13.0	33.1

Channel: 19193

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3818.6	-59.9	-52.8	1.7	8.4	-46.1	-13.0	33.1

16QAM, BW 1.4MHz
Channel: 18607

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3701.4	-60.1	-53.0	1.6	8.5	-46.1	-13.0	33.1

Channel: 18900

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3760.0	-60.0	-52.9	1.7	8.3	-46.3	-13.0	33.3

Channel: 19193

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3818.6	-60.1	-53.0	1.7	8.4	-46.3	-13.0	33.3

64QAM, BW 1.4MHz
Channel: 18607

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3701.4	-60.2	-53.1	1.6	8.5	-46.2	-13.0	33.2

Channel: 18900

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3760.0	-60.2	-53.1	1.7	8.3	-46.5	-13.0	33.5

Channel: 19193

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3818.6	-60.3	-53.2	1.7	8.4	-46.5	-13.0	33.5

[LTE Band II]
QPSK, BW 3MHz
Channel: 18615

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3703.0	-59.6	-52.5	1.6	8.5	-45.6	-13.0	32.6

Channel: 18900

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3760.0	-59.7	-52.6	1.7	8.3	-46.0	-13.0	33.0

Channel: 19185

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3817.0	-59.7	-52.6	1.7	8.4	-45.9	-13.0	32.9

16QAM, BW 3MHz
Channel: 18615

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3703.0	-59.9	-52.8	1.6	8.5	-45.9	-13.0	32.9

Channel: 18900

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3760.0	-59.8	-52.7	1.7	8.3	-46.1	-13.0	33.1

Channel: 19185

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3817.0	-59.9	-52.8	1.7	8.4	-46.1	-13.0	33.1

64QAM, BW 3MHz
Channel: 18615

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3703.0	-60.2	-53.1	1.6	8.5	-46.2	-13.0	33.2

Channel: 18900

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3760.0	-60.0	-52.9	1.7	8.3	-46.3	-13.0	33.3

Channel: 19185

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3817.0	-60.1	-53.0	1.7	8.4	-46.3	-13.0	33.3

[LTE Band II]
QPSK, BW 5MHz
Channel: 18625

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3705.0	-59.7	-52.6	1.6	8.5	-45.8	-13.0	32.8

Channel: 18900

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3760.0	-60.0	-52.9	1.7	8.3	-46.3	-13.0	33.3

Channel: 19175

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3815.0	-60.1	-53.0	1.7	8.4	-46.3	-13.0	33.3

16QAM, BW 5MHz
Channel: 18625

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3705.0	-60.0	-52.9	1.6	8.5	-46.1	-13.0	33.1

Channel: 18900

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3760.0	-60.2	-53.1	1.7	8.3	-46.5	-13.0	33.5

Channel: 19175

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3815.0	-60.2	-53.1	1.7	8.4	-46.4	-13.0	33.4

64QAM, BW 5MHz
Channel: 18625

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3705.0	-60.1	-53.0	1.6	8.5	-46.2	-13.0	33.2

Channel: 18900

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3760.0	-60.3	-53.2	1.7	8.3	-46.6	-13.0	33.6

Channel: 19175

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3815.0	-60.3	-53.2	1.7	8.4	-46.5	-13.0	33.5

[LTE Band II]
QPSK, BW 10MHz
Channel: 18650

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3710.0	-59.7	-52.6	1.6	8.5	-45.8	-13.0	32.8

Channel: 18900

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3760.0	-59.8	-52.7	1.7	8.3	-46.1	-13.0	33.1

Channel: 19150

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3810.0	-59.7	-52.6	1.7	8.4	-45.9	-13.0	32.9

16QAM, BW 10MHz
Channel: 18650

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3710.0	-60.0	-52.9	1.6	8.5	-46.1	-13.0	33.1

Channel: 18900

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3760.0	-59.9	-52.8	1.7	8.3	-46.2	-13.0	33.2

Channel: 19150

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3810.0	-59.8	-52.7	1.7	8.4	-46.0	-13.0	33.0

64QAM, BW 10MHz
Channel: 18650

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3710.0	-60.2	-53.1	1.6	8.5	-46.3	-13.0	33.3

Channel: 18900

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3760.0	-60.0	-52.9	1.7	8.3	-46.3	-13.0	33.3

Channel: 19150

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3810.0	-60.0	-52.9	1.7	8.4	-46.2	-13.0	33.2

[LTE Band II]
QPSK, BW 15MHz
Channel: 18675

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3715.0	-59.6	-52.5	1.6	8.4	-45.7	-13.0	32.7

Channel: 18900

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3760.0	-59.5	-52.4	1.7	8.3	-45.8	-13.0	32.8

Channel: 19125

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3805.0	-59.7	-52.2	1.7	8.4	-45.5	-13.0	32.5

16QAM, BW 15MHz
Channel: 18675

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3715.0	-59.8	-52.7	1.6	8.4	-45.9	-13.0	32.9

Channel: 18900

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3760.0	-59.8	-52.7	1.7	8.3	-46.1	-13.0	33.1

Channel: 19125

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3805.0	-59.9	-52.8	1.7	8.4	-46.1	-13.0	33.1

64QAM, BW 15MHz
Channel: 18675

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3715.0	-60.1	-53.0	1.6	8.4	-46.2	-13.0	33.2

Channel: 18900

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3760.0	-60.0	-52.9	1.7	8.3	-46.3	-13.0	33.3

Channel: 19125

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3805.0	-60.1	-53.0	1.7	8.4	-46.3	-13.0	33.3

[LTE Band II - X-axis, Open, Without camera]
QPSK, BW 20MHz
Channel: 18700

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3720.0	-59.8	-52.7	1.6	8.4	-45.9	-13.0	32.9

Channel: 18900

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3760.0	-59.9	-52.8	1.7	8.3	-46.2	-13.0	33.2

Channel: 19100

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3800.0	-59.7	-52.6	1.7	8.4	-45.9	-13.0	32.9

16QAM, BW 20MHz
Channel: 18700

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3720.0	-59.9	-52.8	1.6	8.4	-46.0	-13.0	33.0

Channel: 18900

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3760.0	-60.0	-52.9	1.7	8.3	-46.3	-13.0	33.3

Channel: 19100

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3800.0	-59.9	-52.8	1.7	8.4	-46.1	-13.0	33.1

64QAM, BW 20MHz
Channel: 18700

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3720.0	-60.0	-52.9	1.6	8.4	-46.1	-13.0	33.1

Channel: 18900

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3760.0	-60.2	-53.1	1.7	8.3	-46.5	-13.0	33.5

Channel: 19100

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3800.0	-60.1	-53.0	1.7	8.4	-46.3	-13.0	33.3

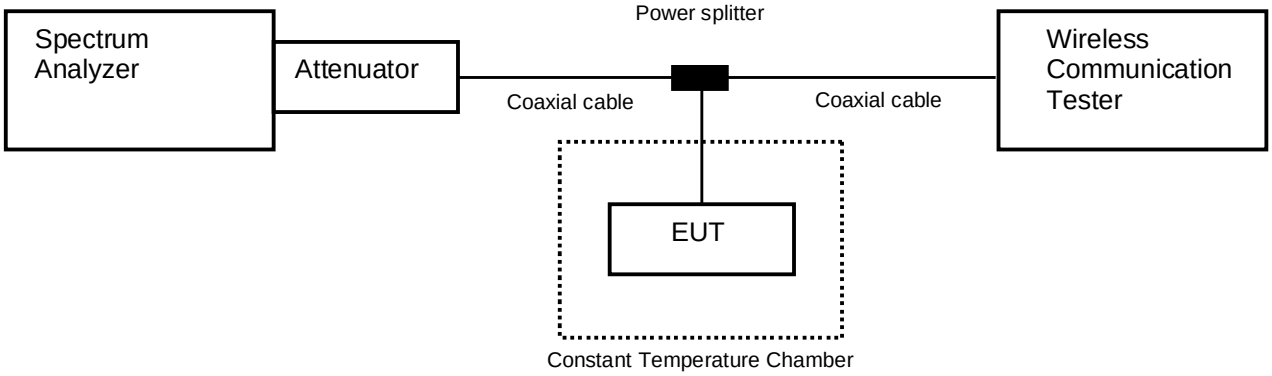
4.6 Frequency Stability

4.6.1 Measurement procedure

[FCC 24.235, 2.1055]

The EUT was placed of an inside of an constant temperature chamber as the temperature in the chamber was varied between -30˚C and +50˚C. The temperature was incremented by 10˚C intervals and the unit was allowed to stabilize at each measurement. The frequency drift was measured with the normal Temperature and voltage tolerance and it is presented as the ppm unit.

- Test configuration



4.6.2 Limit

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

4.6.3 Measurement result

Date : 25-April-2024
Temperature : 20.7 [˚C]
Humidity : 48.3 [%] Test engineer :
Test place : Shielded room No.4 Kazunori Saito

Date : 26-April-2024
Temperature : 18.6 [˚C]
Humidity : 45.4 [%] Test engineer :
Test place : Shielded room No.4 Kazunori Saito

[GSM1900]
Channel: 661

Power Supply [V]	Temperature [ºC]	Measurements Frequency [Hz]	Frequency Tolerance [ppm]	Result
3.87	25(Ref.)	1,879,999,976	0.00000	Pass
	50	1,879,999,980	0.00203	Pass
	40	1,879,999,976	-0.00048	Pass
	30	1,879,999,986	0.00526	Pass
	20	1,879,999,978	0.00091	Pass
	10	1,879,999,982	0.00297	Pass
	0	1,879,999,979	0.00126	Pass
	-10	1,879,999,985	0.00455	Pass
	-20	1,879,999,986	0.00486	Pass
	-30	1,879,999,977	0.00052	Pass
3.48	25	1,879,999,983	0.00327	Pass
4.26	25	1,879,999,978	0.00084	Pass

Calculation;
Frequency Tolerance (ppm) = Measurements Frequency (Hz) – Reference Frequency (Hz) / Reference Frequency (Hz) x 1000000

[WCDMA Band II]
Channel: 9400

Power Supply [V]	Temperature [ºC]	Measurements Frequency [Hz]	Frequency Tolerance [ppm]	Result
3.87	25(Ref.)	1,879,999,994	0.00000	Pass
	50	1,880,000,007	0.00657	Pass
	40	1,879,999,991	-0.00186	Pass
	30	1,880,000,005	0.00596	Pass
	20	1,880,000,006	0.00625	Pass
	10	1,880,000,007	0.00695	Pass
	0	1,880,000,006	0.00613	Pass
	-10	1,880,000,009	0.00788	Pass
	-20	1,880,000,008	0.00713	Pass
	-30	1,880,000,010	0.00848	Pass
3.48	25	1,879,999,994	-0.00036	Pass
4.26	25	1,879,999,990	-0.00245	Pass

Calculation;
Frequency Tolerance (ppm) = Measurements Frequency (Hz) – Reference Frequency (Hz) / Reference Frequency (Hz) x 1000000

[LTE Band II]
QPSK, BW 10MHz, RB 50-0
Channel: 18900

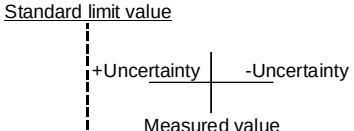
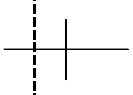
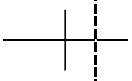
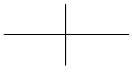
Power Supply [V]	Temperature [ºC]	Measurements Frequency [Hz]	Frequency Tolerance [ppm]	Result
3.87	25(Ref.)	1,879,999,986	0.00000	Pass
	50	1,879,999,986	-0.00030	Pass
	40	1,879,999,986	0.00009	Pass
	30	1,879,999,992	0.00332	Pass
	20	1,879,999,986	-0.00018	Pass
	10	1,880,000,020	0.01803	Pass
	0	1,880,000,022	0.01887	Pass
	-10	1,879,999,967	-0.00994	Pass
	-20	1,880,000,025	0.02061	Pass
	-30	1,879,999,979	-0.00400	Pass
3.48	25	1,879,999,987	0.00060	Pass
4.26	25	1,879,999,989	0.00128	Pass

Calculation;
Frequency Tolerance (ppm) = Measurements Frequency (Hz) – Reference Frequency (Hz) / Reference Frequency (Hz) x 1000000

5 Measurement Uncertainty

Expanded uncertainties stated are calculated with a coverage Factor k=2.
Please note that these results are not taken into account when measurement uncertainty considerations contained in ETSI TR 100 028 Parts 1 and 2 determining compliance or non-compliance with test result.

Test item	Measurement uncertainty
Conducted emission, AMN (9 kHz – 150 kHz)	±3.7 dB
Conducted emission, AMN (150 kHz – 30 MHz)	±3.3 dB
Radiated emission (9kHz – 30 MHz)	±3.8 dB
Radiated emission (30 MHz – 1000 MHz)	±5.4 dB
Radiated emission (1 GHz – 6 GHz)	±4.6 dB
Radiated emission (6 GHz – 18 GHz)	±4.7 dB
Radiated emission (18 GHz – 40 GHz)	±6.3 dB
Radio Frequency	$\pm 1.3 * 10^{-8}$
RF power, conducted	±0.7 dB
Adjacent channel power	±1.5 dB
Temperature	±0.6 °C
Humidity	±1.2 %
Voltage (DC)	±0.4 %
Voltage (AC, <10kHz)	±0.2 %

Judge	Measured value and standard limit value
PASS	**Case1**  Even if it takes uncertainty into consideration, a standard limit value is fulfilled.
	Case2  Although measured value is in a standard limit value, a limit value won't be fulfilled if uncertainty is taken into consideration.
FAIL	**Case3**  Although measured value exceeds a standard limit value, a limit value will be fulfilled if uncertainty is taken into consideration.
	Case4  Even if it takes uncertainty into consideration, a standard limit value isn't fulfilled.

6 Laboratory Information

Testing was performed and the report was issued at:

TÜV SÜD Japan Ltd. Yonezawa Testing Center

Address: 5-4149-7 Hachimanpara, Yonezawa-shi, Yamagata, 992-1128 Japan
Phone: +81-238-28-2881

Accreditation and Registration
A2LA
Certificate #3686.03

VLAC
Accreditation No.: VLAC-013

BSMI
Laboratory Code: SL2-IN-E-6018, SL2-A1-E-6018

Innovation, Science and Economic Development Canada
ISED#: 4224A

VCCI Council
Registration number: A-0166

Appendix A. Test Equipment

Antenna port conducted test

Equipment	Company	Model No.	Serial No.	Cal. Due	Cal. Date
Spectrum analyzer	Agilent Technologies	E4440A	US44302655	31-Oct-2024	06-Oct-2023
Spectrum analyzer	ROHDE&SCHWARZ	FSV40	101732	31-May-2025	17-May-2024
Attenuator	Weinschel	56-10	J4993	31-Dec-2024	19-Dec-2023
Microwave cable	Junkosha Inc.	MWX221/1m	N/A(S400)	31-Mar-2025	7-Mar-2024
Power divider	Keysight	11636B	MY51359874	30-Sep-2024	20-Sep-2023
Wideband Radio Frequency Tester	ROHDE&SCHWARZ	CMW500	126079	31-Aug-2024	31-Aug-2023
Wideband Radio Frequency Tester	ROHDE&SCHWARZ	CMW500	116338	30-Sep-2024	21-Sep-2024
Temperature and humidity chamber	ESPEC	PL1KP	14007261	30-Jun-2024	30-Jun-2023

Radiated emission

Equipment	Company	Model No.	Serial No.	Cal. Due	Cal. Date
EMI Receiver	ROHDE&SCHWARZ	ESW44	103171	31-Oct-2024	19-Oct-2023
Preamplifier	SONOMA	310	372170	30-Sep-2024	21-Sep-2023
Biconical antenna	Schwarzbeck	VHBB9124/BBA9106	1344	30-Jun-2024	19-Jun-2023
Log periodic antenna	Schwarzbeck	VUSLP9111B	346	31-Dec-2024	22-Dec-2023
Attenuator	TOYO Connector	NA-PJ-6/6dB	N/A(S541)	30-Sep-2024	21-Sep-2023
Attenuator	TAMAGAWA.ELEC	CFA-10/3dB	N/A(S503)	31-Jul-2024	20-Jul-2023
Preamplifier	TSJ	MLA-100M18-B02-40	1929118	31-Dec-2024	19-Dec-2023
Attenuator	AEROFLEX	26A-10	081217-08	31-Dec-2024	19-Dec-2023
Double ridged guide antenna	ETS LINDGREN	3117	00052315	30-Jun-2024	22-Jun-2023
Attenuator	HUBER+SUHNER	6803.17.B	N/A(2340)	31-Dec-2024	20-Dec-2023
Double ridged guide antenna	A.H.Systems Inc.	SAS-574	469	31-Aug-2024	8-Aug-2023
Preamplifier	TSJ	MLA-1840-B03-35	1240332	31-Aug-2024	8-Aug-2023
Band rejection filter	Micro-Tronics	BRC50720	014	31-Dec-2024	18-Dec-2023
Signal generator	ROHDE&SCHWARZ	SMB100A	177525	31-Dec-2024	20-Dec-2023
RF power amplifier	R&K	CGA020M602-2633R	B40240	30-Jun-2024	21-Jun-2023
Attenuator	Qualwave Inc.	QFA2620-26.5-20-S	22295089	30-Sep-2024	20-Sep-2023
Microwave cable	HUBER+SUHNER	SUCOFELX102/2m	31648	31-Mar-2025	7-Mar-2024
Dipole antenna	Schwarzbeck	VHAP	1021	31-Jul-2024	06-Jul-2023
Dipole antenna	Schwarzbeck	UHAP	993	31-Jul-2024	06-Jul-2023
Double ridged guide antenna	ETS LINDGREN	3117	00218815	31-Dec-2024	7-Dec-2023
Wideband Radio Frequency Tester	ROHDE&SCHWARZ	CMW500	126079	31-Aug-2024	31-Aug-2023
Wideband Radio Frequency Tester	ROHDE&SCHWARZ	CMW500	116338	30-Sep-2024	21-Sep-2024
Microwave cable	HUBER+SUHNER	SUCOFLEX104/9m	800690/4	31-Oct-2024	20-Oct-2023
		SUCOFLEX104/1m	my24610/4	31-Dec-2024	20-Dec-2023
		SUCOFLEX104/9m	2001099/4	31-Dec-2024	20-Dec-2023
		SUCOFLEX104/1m	MY32976/4	31-Dec-2024	20-Dec-2023
		SUCOFLEX104/2m	SN MY28404/4	31-Dec-2024	20-Dec-2023
		SUCOFLEX104/7m	41625/6	31-Dec-2024	21-Dec-2023
Software	TOYO Technica	ES10/RE-AJ	Ver.2023.01.001	N/A	N/A
Absorber	RIKEN	PFP30	N/A	N/A	N/A
3m Semi an-echoic Chamber	TOKIN	N/A	N/A(9002-NSA)	31-May-2024	28-May-2023
3m Semi an-echoic Chamber	TOKIN	N/A	N/A(9002-SVSWR)	31-May-2024	29-May-2023

*: The calibrations of the above equipment are traceable to NIST or equivalent standards of the reference organizations.