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TEST REPORT

Report number : JPD-TR-18037-0
Issue date : June 1, 2018

The device, as described herewith, was tested pursuant to applicable test procedure and complies with the requirements of;

FCC Part 27 Subpart C
FCC Part 27 Subpart L

The test results are traceable to the international or national standards.

Applicant	:	KYOCERA Corporation
Equipment under test (EUT)	:	Mobile Phone
Model number	:	YKHA81
FCC ID	:	JOYYKHA81

Date of test : March 22, 23, 27, 2018
April 2, 3, 5, 6, 9, 2018
May 11, 14, 22, 25, 2018

Test place : TÜV SÜD Zacta Ltd. Yonezawa Testing Center
5-4149-7, Hachimanpara, Yonezawa-shi,
Yamagata, 992-1128 Japan
Phone: +81-238-28-2881 Fax: +81-238-28-2888

Test results : Complied

The results in this report are applicable only to the equipment tested.
This report shall not be re-produced except in full without the written approval of TÜV SÜD Zacta Ltd.
This test report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, ILAC-MRA, or any agency of the federal government.

Tested by : Tadahiro Seino Taiki Watanabe
Tadahiro Seino Taiki Watanabe

Approved by : Hiroaki Suzuki
Hiroaki Suzuki
Lab Manager of RF Lab

NVLAP TESTING
NVLAP LAB CODE 200306-0

ilac-MRA

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1. Summary of Test

1.1 Purpose of test

It is the original test in order to verify conformance to FCC Part 27 Subpart C and Subpart L.

1.2 Standards

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

1.2.1 Test Methods

KDB 971168 D01 Power Meas License Digital Systems v03r01
ANSI/TIA/EIA-603-D-2010

1.2.2 Deviation from standards

None

1.3 List of applied test to the EUT

Test items Section	Test items	Condition	Result
2.1046	Conducted Output Power	Conducted	PASS Note 1
27.50	Effective Radiated Power	Radiated	PASS
27.50	Peak to Average Ratio	Conducted	PASS
2.1049	Occupied Bandwidth	Conducted	PASS
27.53 2.1051	Band Edge Spurious and Harmonic at Antenna Terminal	Conducted	PASS
27.53 2.1053	Radiated emissions and Harmonic Emissions	Radiated	PASS
27.54 2.1055	Frequency Stability	Conducted	PASS

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

1.3.1 Test set up

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1.4 Modification to the EUT by laboratory

None

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2. Equipment Under Test

2.1 General Description of equipment

EUT is the Mobile Phone.

2.2 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	:	Mobile Phone
Trade name	:	Kyocera
Model number	:	YKHA81
Serial number	:	N/A
EUT condition	:	Pre-Production
Power ratings	:	Battery: DC 3.8V
Size	:	(W) 71.0mm × (D) 9.7mm × (H) 147.3mm
Environment	:	Indoor and Outdoor use
Operating environment	:	Temperature: 5˚C to 40˚C Humidity: 35% to 90%
RF Specification		
Frequency of Operation	:	Up Link WCDMA Band IV: 1712.4-1752.6MHz LTE Band IV: 1710.0-1755.0MHz Down Link WCDMA Band IV: 2112.4-2152.6MHz LTE Band IV: 2110.0-2155.0MHz
Modulation type	:	WCDMA Band IV: QPSK, 16QAM LTE Band IV: QPSK, 16QAM
Emission designator	:	WCDMA Band IV: 4M12F9W LTE Band IV: BW 1.4M QPSK: 1M10G7D, 16QAM: 1M10W7D BW 3M QPSK: 2M71G7D, 16QAM: 2M72W7D BW 5M QPSK: 4M53G7D, 16QAM: 4M51W7D BW 10M QPSK: 8M97G7D, 16QAM: 8M98W7D BW 15M QPSK: 13M4G7D, 16QAM: 13M5W7D BW 20M QPSK: 17M9G7D, 16QAM: 17M9W7D
Effective Radiated Power (E.R.P.)	:	WCDMA Band IV: 0.302W (24.8dBm) LTE Band IV: 0.302W (24.8dBm)
Antenna type	:	Internal antenna
Antenna gain	:	WCDMA Band IV: -1.1dBi LTE Band IV: -1.1dBi

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2.3 Variation of the family model(s)

Not applicable

2.4 Description of Test mode

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

Band	Modulation	Bandwidth [MHz]	Channel	Frequency [MHz]
WCDMA Band IV	QPSK	-	1312, 1413, 1513	1712.4, 1732.6, 1752.6
	16QAM	-	1312, 1413, 1513	1712.4, 1732.6, 1752.6
LTE Band IV	QPSK	1.4	19957, 20175, 20393	1710.7, 1732.5, 1754.3
		3	19965, 20175, 20385	1711.5, 1732.5, 1753.5
		5	19975, 20175, 20375	1712.5, 1732.5, 1752.5
		10	20000, 20175, 20350	1715.0, 1732.5, 1750.0
		15	20025, 20175, 20325	1717.5, 1732.5, 1747.5
		20	20050, 20175, 20300	1720.0, 1732.5, 1745.0
	16QAM	1.4	19957, 20175, 20393	1710.7, 1732.5, 1754.3
		3	19965, 20175, 20385	1711.5, 1732.5, 1753.5
		5	19975, 20175, 20375	1712.5, 1732.5, 1752.5
		10	20000, 20175, 20350	1715.0, 1732.5, 1750.0
		15	20025, 20175, 20325	1717.5, 1732.5, 1747.5
		20	20050, 20175, 20300	1720.0, 1732.5, 1745.0

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 (All Bands) and the worst case recorded.

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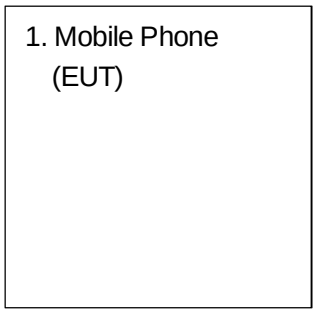
3. Configuration of equipment

3.1 Equipment(s) used

No.	Equipment	Company	Model No.	Serial No.	FCC ID / DoC	Comment
1	Mobile Phone	KYOCERA	YKHA81	N/A	JOYYKHA81	EUT

3.2 System configuration



Note1: Numbers assigned to equipment or cables on this diagram correspond to the list in “3.1 Equipment(s) used”.

4. Effective Isotropic Radiated Power

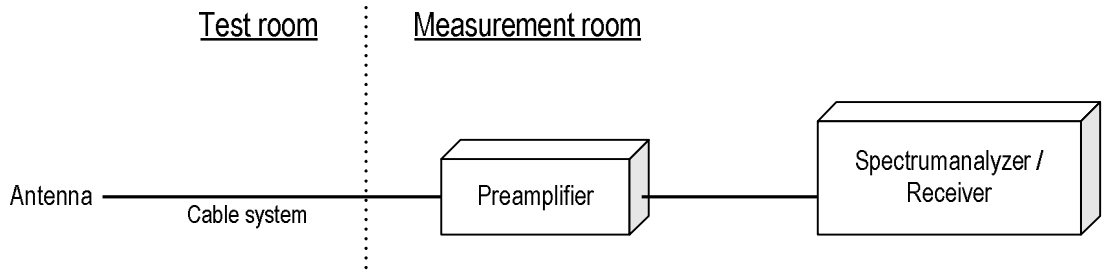
4.1 Measurement procedure [FCC 27.50]

<Step 1>
The EUT and support equipment are placed on a 1 meter x 1 meter surface, 0.8 meter height 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 1MHz. 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 1MHz
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



4.2 Calculation method

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

Example:
Limit @ 1732.5MHz : 30.0dBm
Ant. Input = 15.0dBm Cable loss = 1.1dB Ant. Gain = 8.0dBi
Result = 15.0 - 1.1 + 8.0 = 21.9dBm
Margin = 30.0 – 21.9 = 8.1dB

4.3 Limit

1 W (30.0dBm)

4.4 Test data

Date	:	March 22, 2018			
Temperature	:	21.6 [˚C]			
Humidity	:	25.3 [%]	Test engineer	:	
Test place	:	3m Semi-anechoic chamber			Taiki Watanabe

Date	:	March 23, 2018			
Temperature	:	23.7 [˚C]			
Humidity	:	22.4 [%]	Test engineer	:	
Test place	:	3m Semi-anechoic chamber			Tadahiro Seino

Date	:	April 9, 2018			
Temperature	:	20.4 [˚C]			
Humidity	:	23.6 [%]	Test engineer	:	
Test place	:	3m Semi-anechoic chamber			Tadahiro Seino

[WCDMA Band IV]

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1712.4	-26.5	17.3	1.1	8.5	24.8	30.0	5.2
H	1732.6	-26.4	15.6	1.1	8.3	22.8	30.0	7.2
H	1752.6	-26.6	16.2	1.1	8.2	23.3	30.0	6.7

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[LTE Band IV]

QPSK, BW 1.4MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1710.7	-26.0	16.2	1.1	8.5	23.7	30.0	6.3
H	1732.5	-26.5	16.1	1.1	8.3	23.3	30.0	6.7
H	1754.3	-26.6	16.3	1.1	8.2	23.4	30.0	6.6

16QAM, BW 1.4MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1710.7	-26.3	16.0	1.1	8.5	23.5	30.0	6.5
H	1732.5	-26.7	15.4	1.1	8.3	22.6	30.0	7.4
H	1754.3	-27.2	15.6	1.1	8.2	22.7	30.0	7.3

QPSK, BW 3MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1711.5	-26.3	16.1	1.1	8.5	23.6	30.0	6.4
H	1732.5	-26.2	15.9	1.1	8.3	23.1	30.0	6.9
H	1753.5	-26.9	15.9	1.1	8.2	23.0	30.0	7.0

16QAM, BW 3MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1711.5	-27.5	14.9	1.1	8.5	22.4	30.0	7.6
H	1732.5	-26.6	15.5	1.1	8.3	22.7	30.0	7.3
H	1753.5	-27.8	15.0	1.1	8.2	22.1	30.0	7.9

QPSK, BW 5MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1712.5	-26.0	16.5	1.1	8.5	24.0	30.0	6.0
H	1732.5	-25.9	16.2	1.1	8.3	23.4	30.0	6.6
H	1752.5	-26.4	16.3	1.1	8.2	23.4	30.0	6.6

16QAM, BW 5MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1712.5	-26.8	15.7	1.1	8.5	23.2	30.0	6.8
H	1732.5	-26.9	15.2	1.1	8.3	22.4	30.0	7.6
H	1752.5	-27.7	14.9	1.1	8.2	22.0	30.0	8.0

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QPSK, BW 10MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1715.0	-26.0	16.8	1.1	8.5	24.2	30.0	5.8
H	1732.5	-26.1	16.0	1.1	8.3	23.2	30.0	6.8
H	1750.0	-26.2	16.3	1.1	8.2	23.4	30.0	6.6

16QAM, BW 10MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1715.0	-27.0	15.9	1.1	8.5	23.3	30.0	6.7
H	1732.5	-26.9	15.2	1.1	8.3	22.4	30.0	7.6
H	1750.0	-27.4	15.0	1.1	8.2	22.1	30.0	7.9

QPSK, BW 15MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1717.5	-25.6	17.4	1.1	8.5	24.8	30.0	5.2
H	1732.5	-26.1	16.0	1.1	8.3	23.2	30.0	6.8
H	1747.5	-26.6	15.7	1.1	8.2	22.8	30.0	7.2

16QAM, BW 15MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1717.5	-26.8	16.3	1.1	8.5	23.7	30.0	6.3
H	1732.5	-27.3	14.8	1.1	8.3	22.0	30.0	8.0
H	1747.5	-27.0	15.2	1.1	8.2	22.3	30.0	7.7

QPSK, BW 20MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1720.0	-26.2	17.0	1.1	8.4	24.4	30.0	5.6
H	1732.5	-26.5	15.6	1.1	8.3	22.8	30.0	7.2
H	1745.0	-27.2	14.8	1.1	8.2	21.9	30.0	8.1

16QAM, BW 20MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1720.0	-27.2	16.1	1.1	8.4	23.5	30.0	6.5
H	1732.5	-26.6	15.5	1.1	8.3	22.7	30.0	7.3
H	1745.0	-27.8	14.1	1.1	8.2	21.2	30.0	8.8

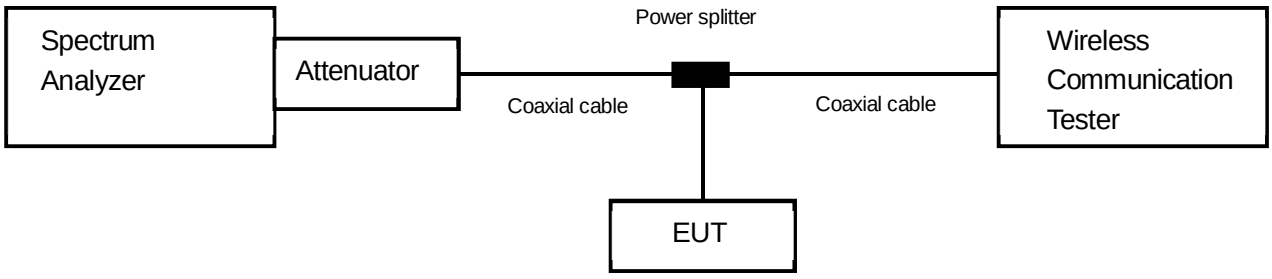
5. Peak to Average Ratio

5.1 Measurement procedure [FCC 27.50]

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

The spectrum analyzer is set to;
a) Power Stat CCDF mode
b) Set resolution / measurement bandwidth ≥ 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



5.2 Limit

13dB or less

5.3 Measurement result

Date : May 11, 2018
Temperature : 24.1 [˚C]
Humidity : 27.8 [%] Test engineer :
Test place : Shielded room No.4 Tadahiro Seino

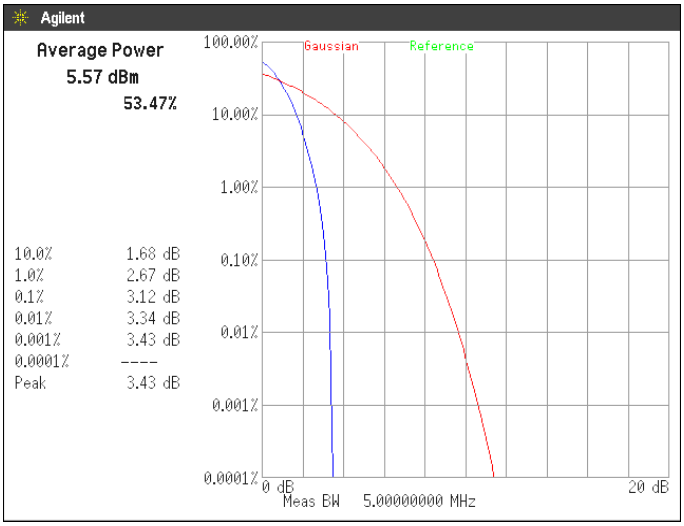
Band	Channel	Frequency [MHz]	Peak to Average Power Ratio [dB]	Limit [dB]
WCDMA Band IV	1312	1712.4	3.12	13.0
	1413	1732.6	3.16	
	1513	1752.6	3.19	

Band	Channel	Frequency [MHz]	Modulation	Bandwidth [MHz]	RB	Peak to Average Power Ratio [dB]	Limit [dB]
LTE Band IV	20175	1732.5	QPSK	1.4	6-0	5.02	13.0
				3	15-0	5.09	
				5	25-0	5.09	
				10	50-0	4.59	
				15	75-0	5.82	
				20	100-0	6.58	
			16QAM	1.4	6-0	5.78	
				3	15-0	5.94	
				5	25-0	5.88	
				10	50-0	6.19	
				15	75-0	6.93	
				20	100-0	7.30	

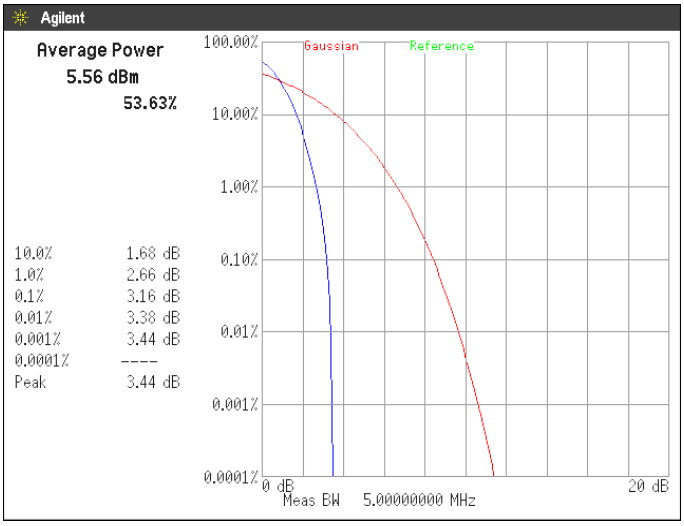
5.4 Trace data

[WCDMA Band IV]

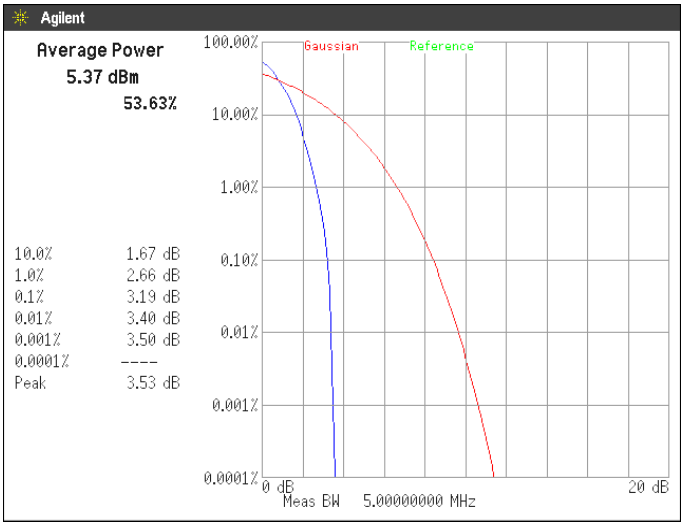
Channel: 1312



Channel: 1413



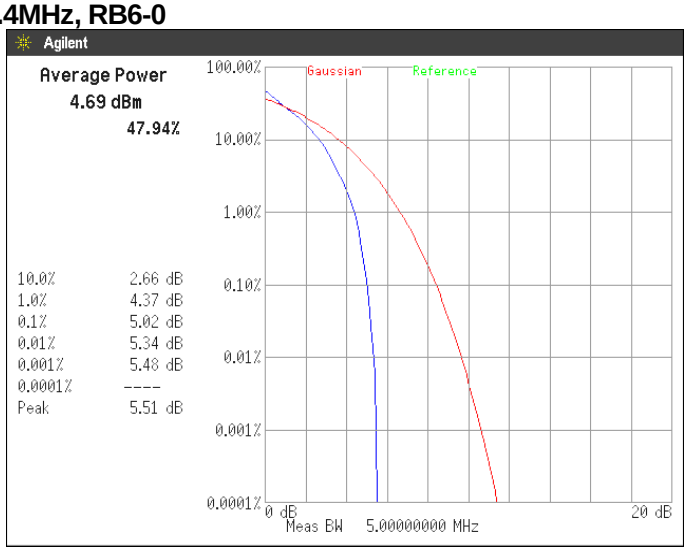
Channel: 1513



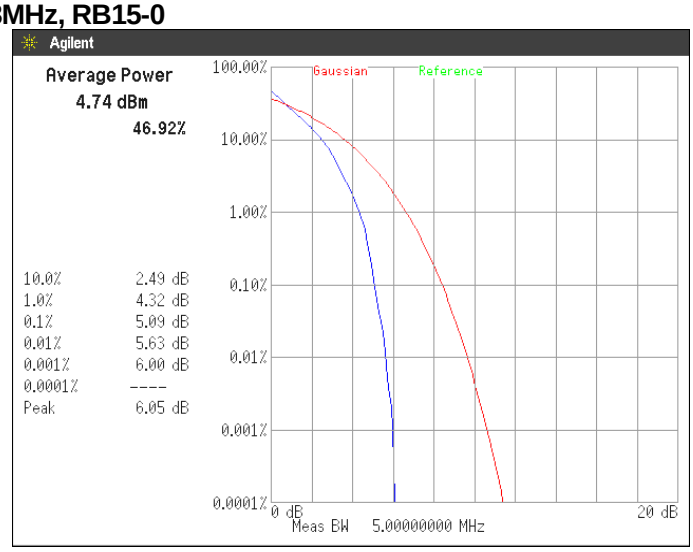
[LTE Band IV]

Channel: 20175

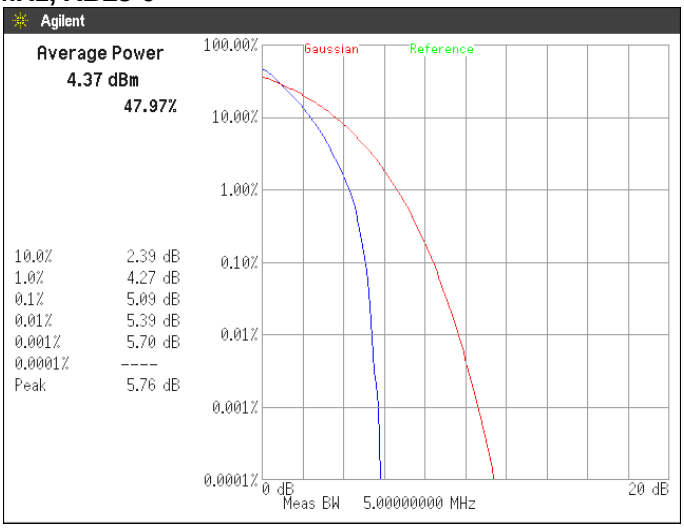
QPSK, BW 1.4MHz, RB6-0



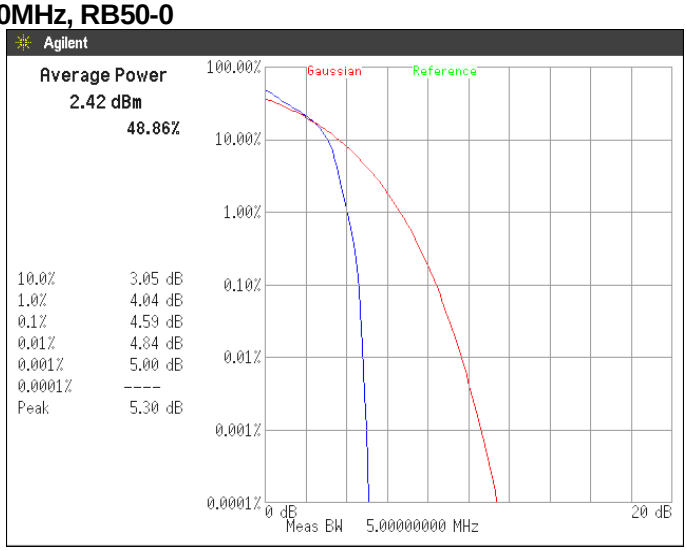
QPSK, BW 3MHz, RB15-0



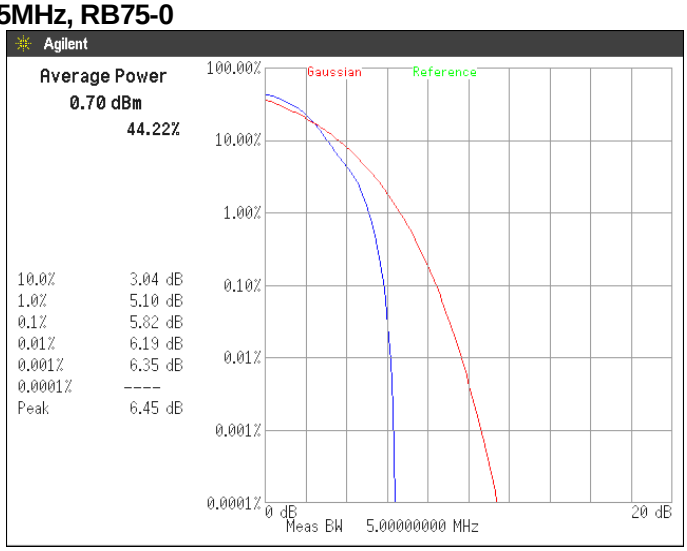
QPSK, BW 5MHz, RB25-0



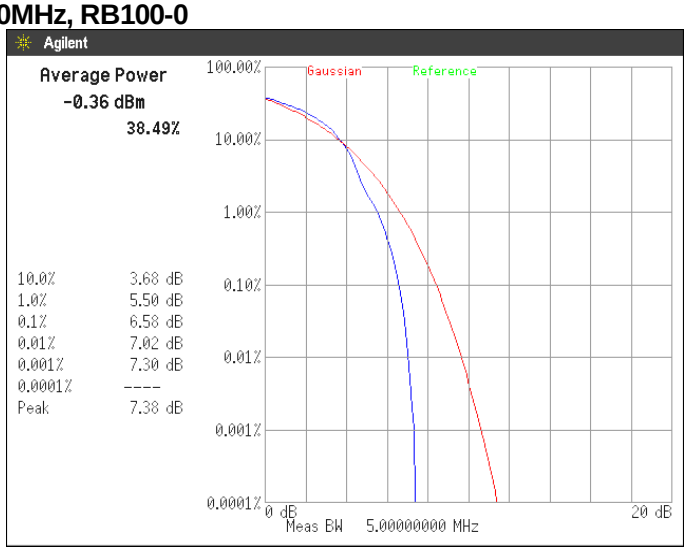
Channel: 20175
QPSK, BW 10MHz, RB50-0



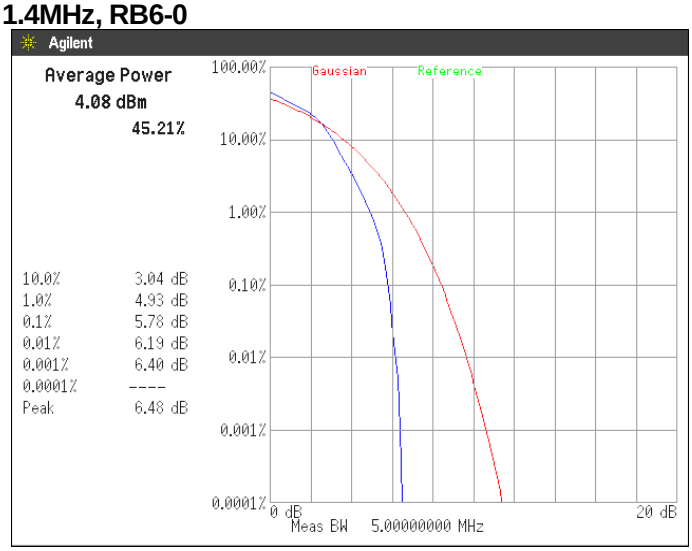
QPSK, BW 15MHz, RB75-0



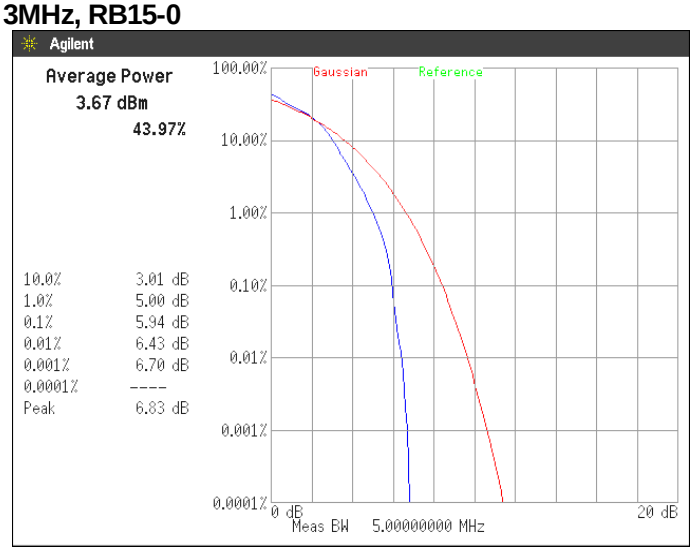
QPSK, BW 20MHz, RB100-0



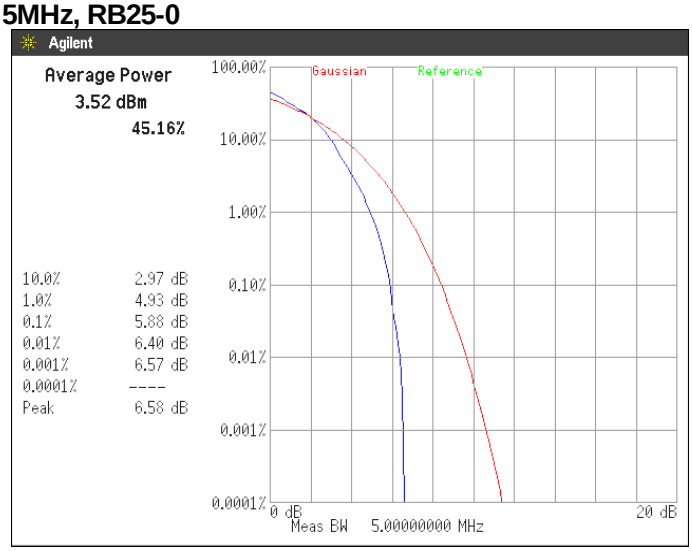
Channel: 20175
16QAM, BW 1.4MHz, RB6-0



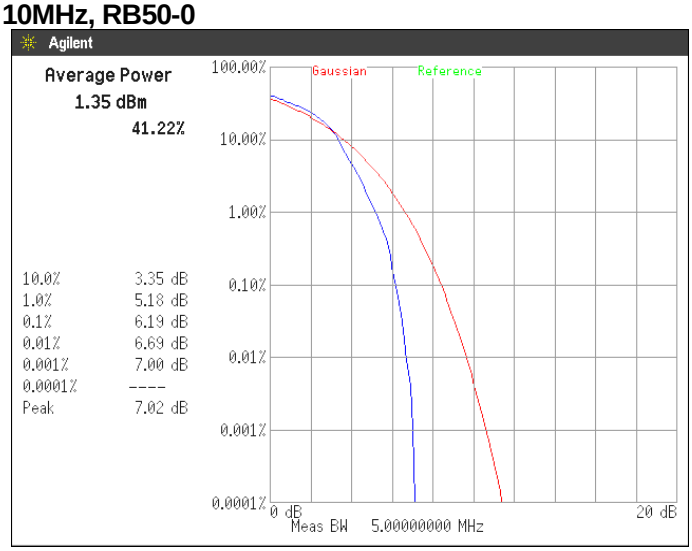
16QAM, BW 3MHz, RB15-0



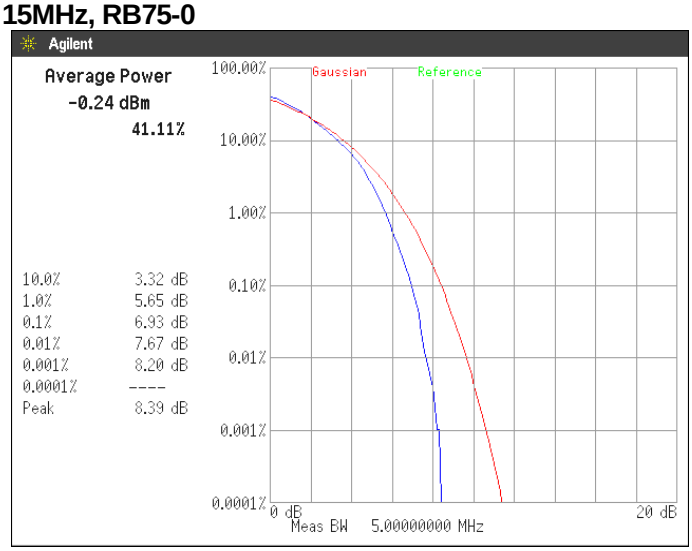
16QAM, BW 5MHz, RB25-0



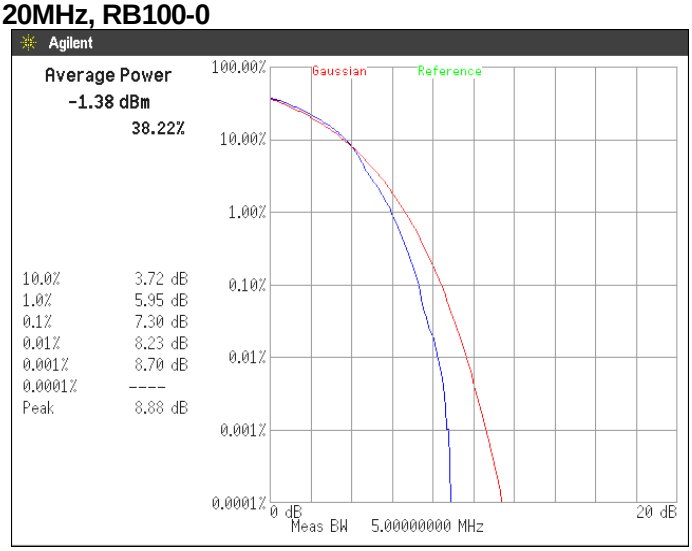
Channel: 20175
16QAM, BW 10MHz, RB50-0



16QAM, BW 15MHz, RB75-0



16QAM, BW 20MHz, RB100-0



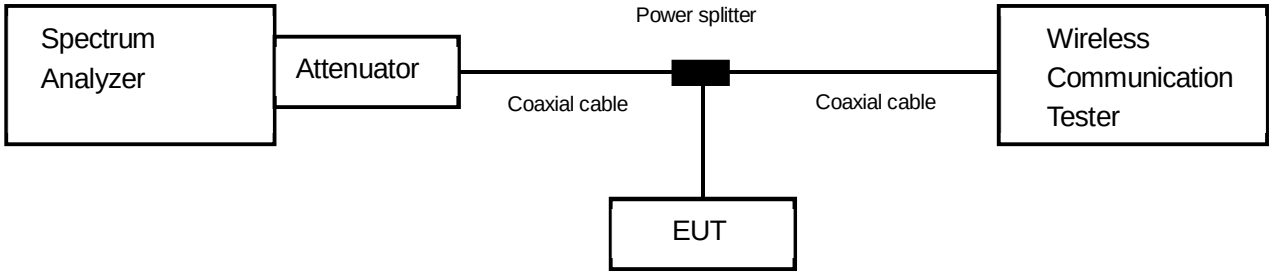
6. Occupied Bandwidth

6.1 Measurement procedure [FCC 2.1049]

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

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

- Test configuration



6.2 Limit

None

6.3 Measurement result

Date : May 11, 2018
Temperature : 24.1 [˚C]
Humidity : 27.8 [%] Test engineer :
Test place : Shielded room No.4 Tadahiro Seino

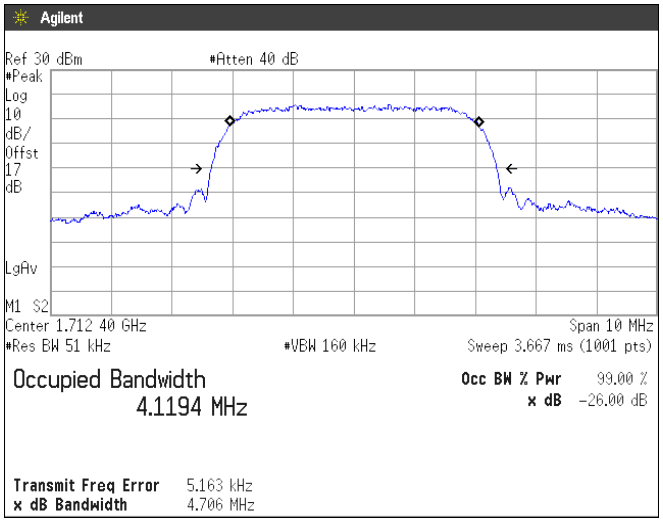
Band	Channel	Frequency [MHz]	Test Result [MHz]
WCDMA Band IV	1312	1712.4	4.1194
	1413	1732.6	4.1199
	1513	1752.6	4.1202

Band	Channel	Frequency [MHz]	Bandwidth [MHz]	Modulation	RB	Test Result [MHz]
LTE Band IV	20175	1732.5	1.4	QPSK	3-1	0.6175
					6-0	1.0974
				16QAM	3-1	0.6284
					6-0	1.1031
			3	QPSK	8-4	1.5412
					15-0	2.7141
				16QAM	8-4	1.5656
					15-0	2.7249
			5	QPSK	12-7	2.3736
					25-0	4.5310
				16QAM	12-7	2.3374
					25-0	4.5111
			10	QPSK	25-12	4.6479
					50-0	8.9734
				16QAM	25-12	4.6798
					50-0	8.9752
			15	QPSK	36-20	6.7513
					75-0	13.4315
				16QAM	36-20	6.7582
					75-0	13.4617
			20	QPSK	50-24	9.2669
					100-0	17.9044
				16QAM	50-24	9.2913
					100-0	17.9202

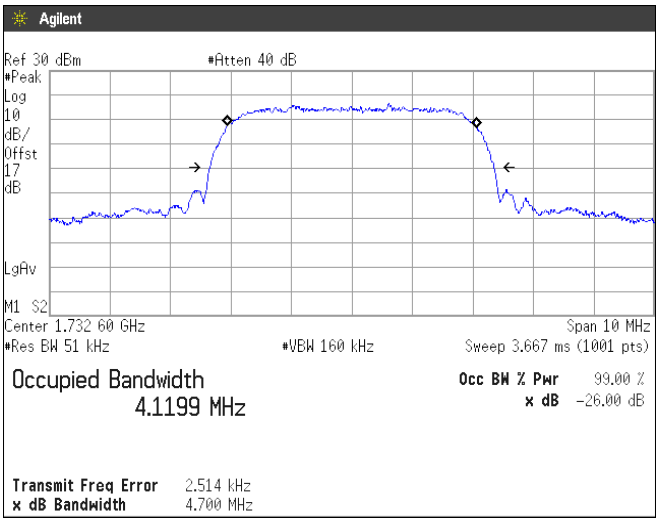
6.4 Trace data

[WCDMA Band IV]

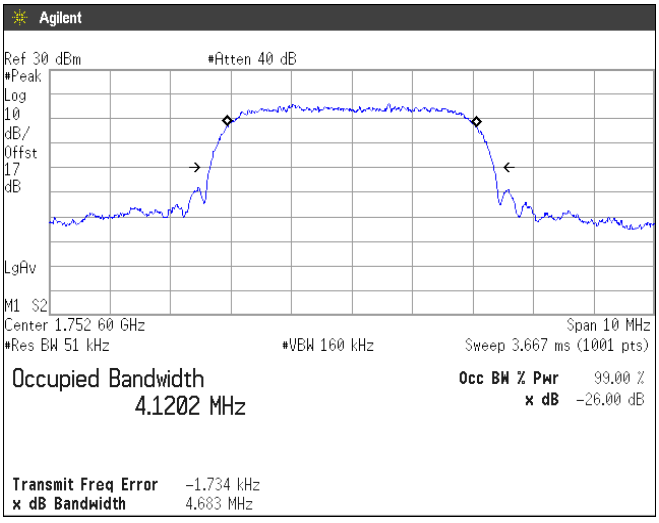
Channel: 1312



Channel: 1413



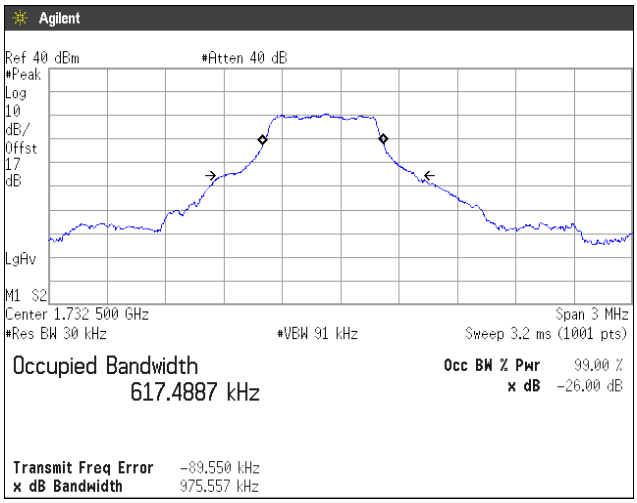
Channel: 1513



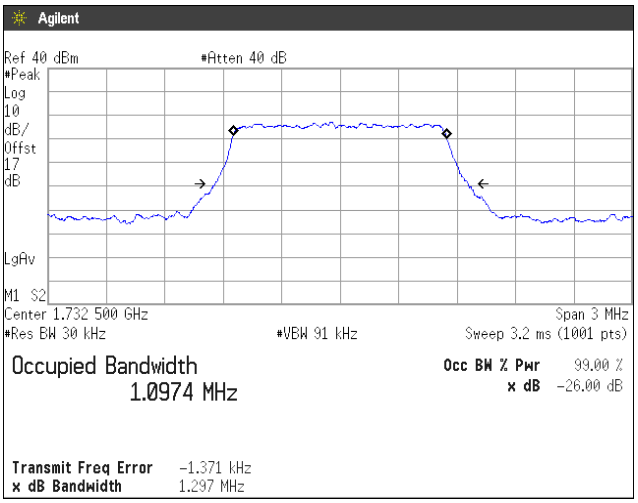
[LTE Band IV]
Channel: 20175

QPSK, BW 1.4MHz

RB3-1

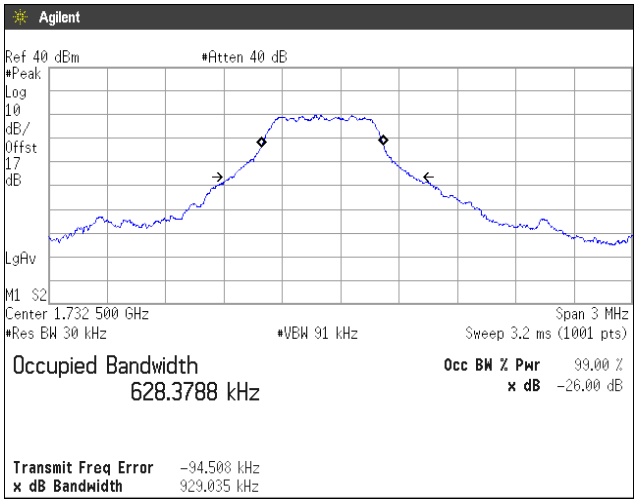


RB6-0

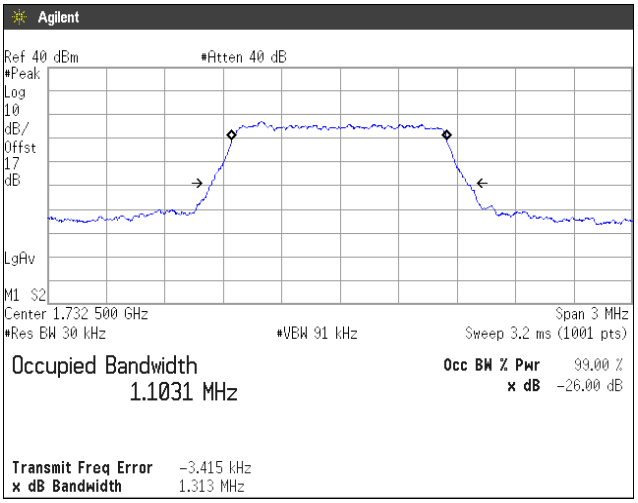


16QAM, BW 1.4MHz

RB3-1

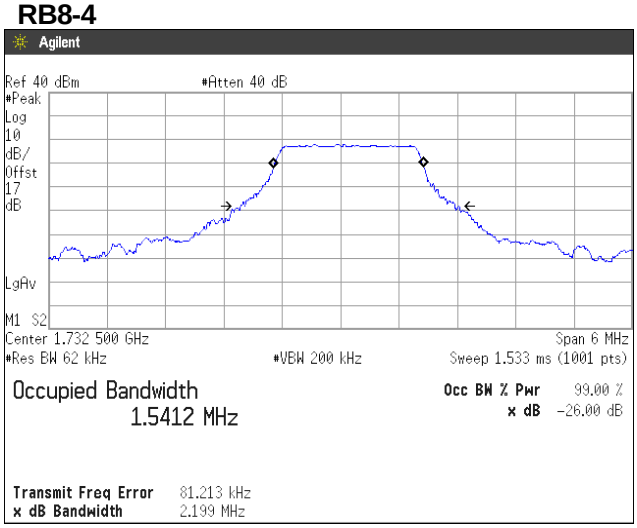


RB6-0

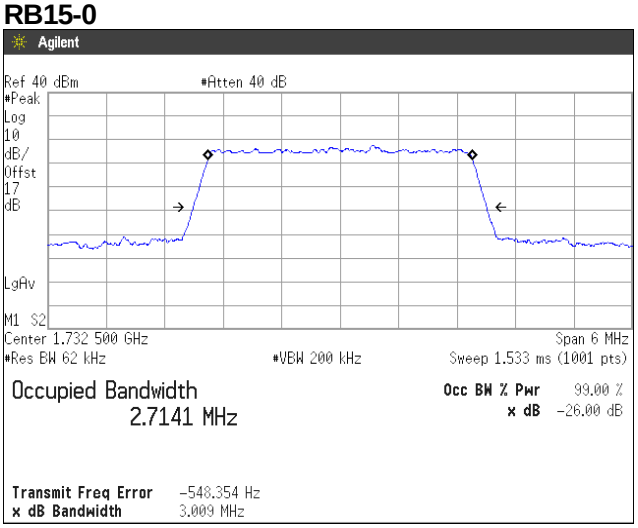


QPSK, BW 3MHz

RB8-4

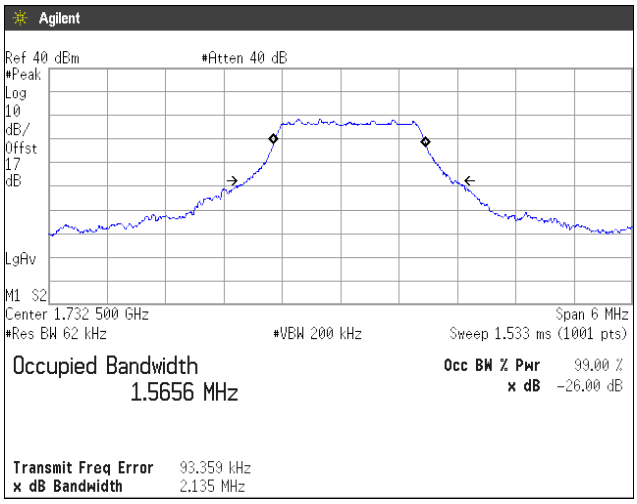


RB15-0

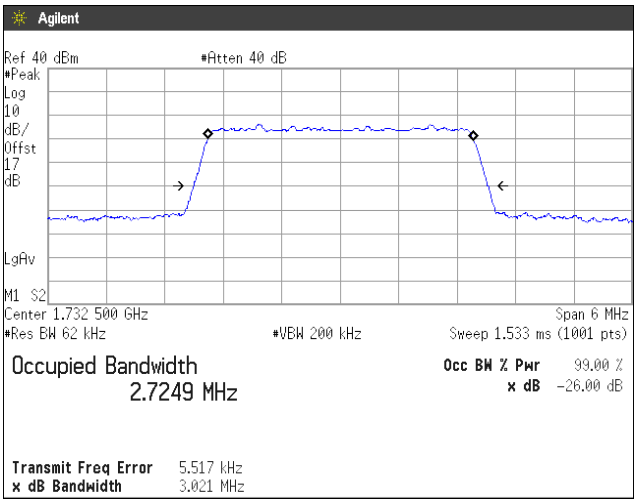


16QAM, BW 3MHz

RB8-4

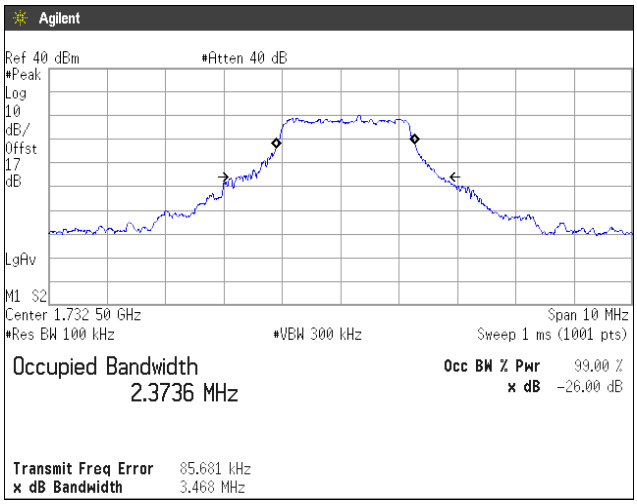


RB15-0

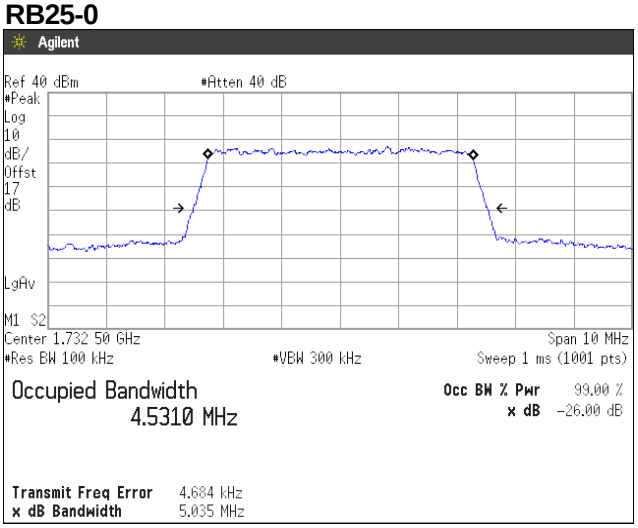


QPSK, BW 5MHz

RB12-7

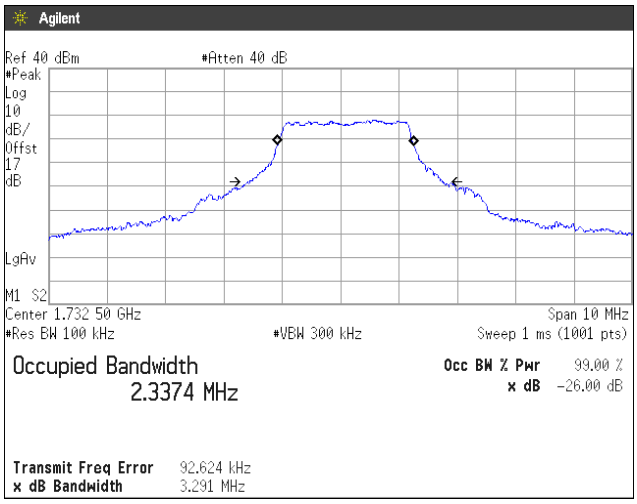


RB25-0

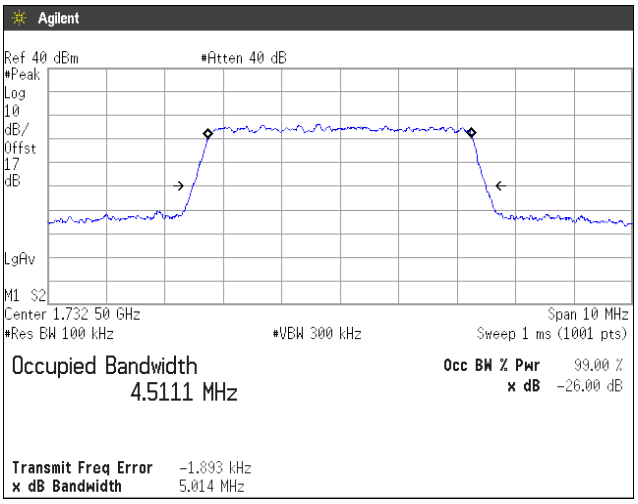


16QAM, BW 5MHz

RB12-7

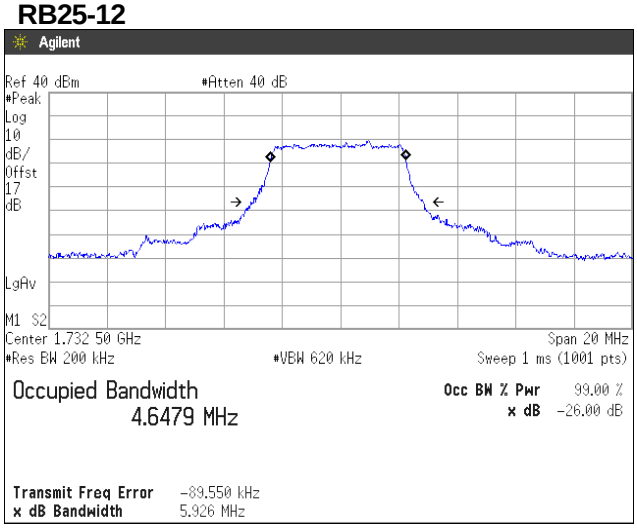


RB25-0

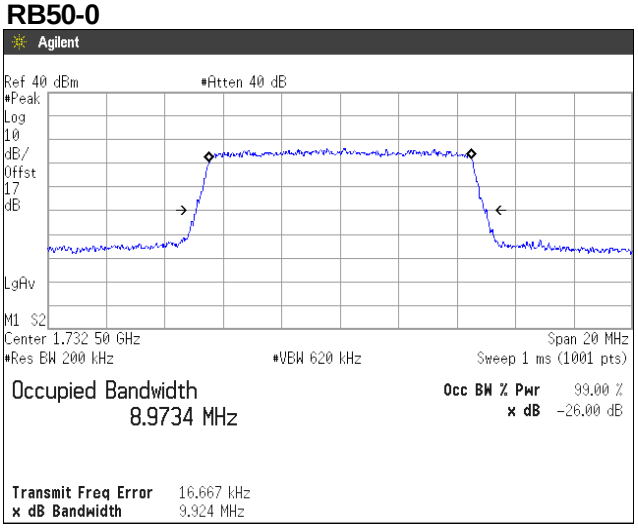


QPSK, BW 10MHz

RB25-12

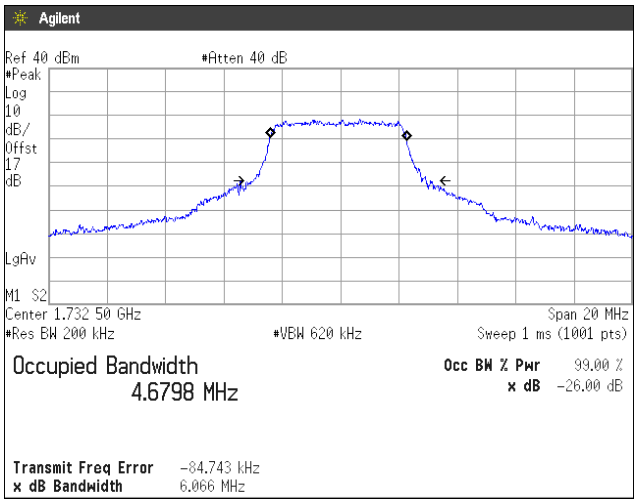


RB50-0

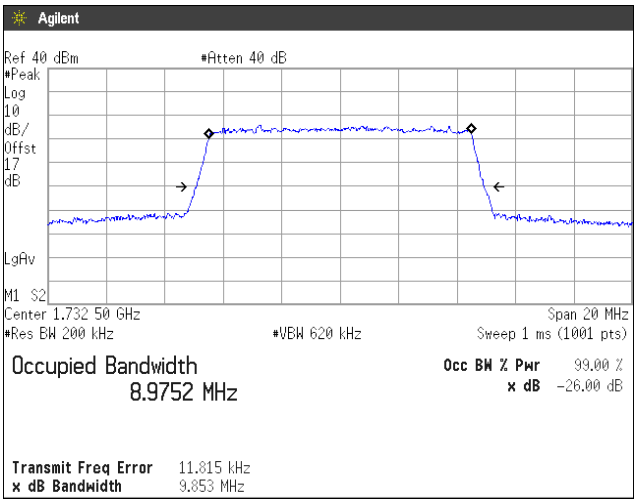


16QAM, BW 10MHz

RB25-12

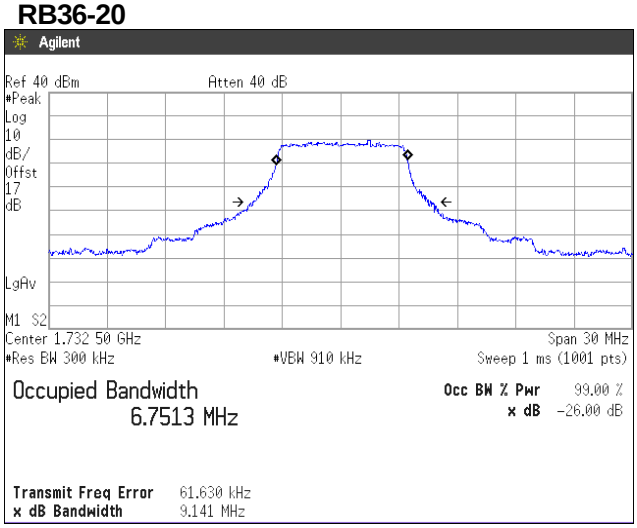


RB50-0

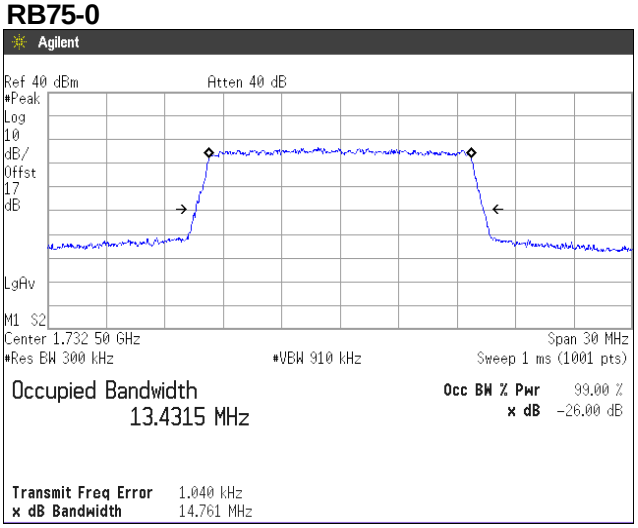


QPSK, BW 15MHz

RB36-20

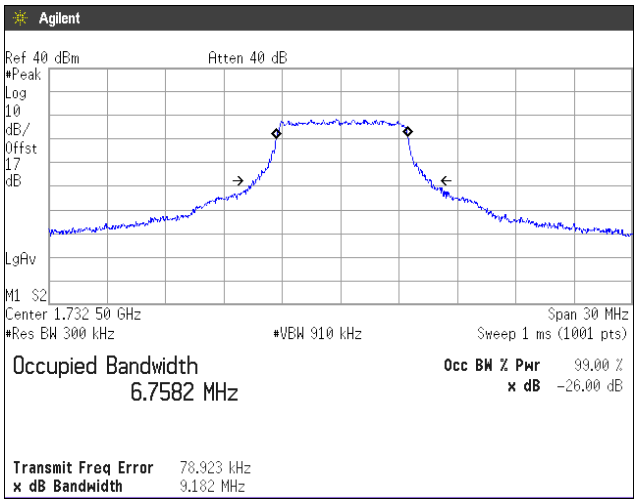


RB75-0

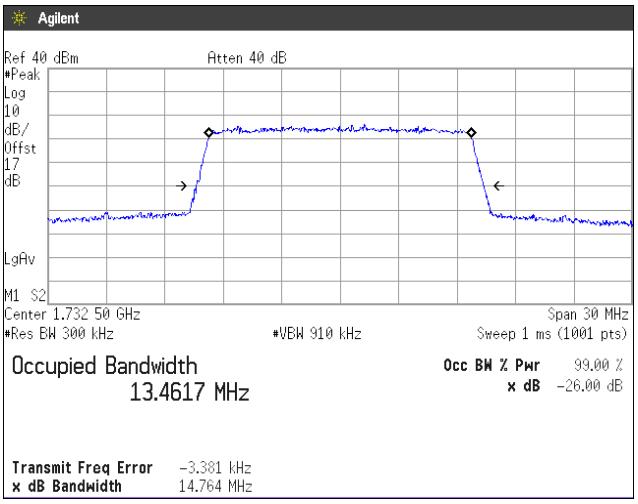


16QAM, BW 15MHz

RB36-20

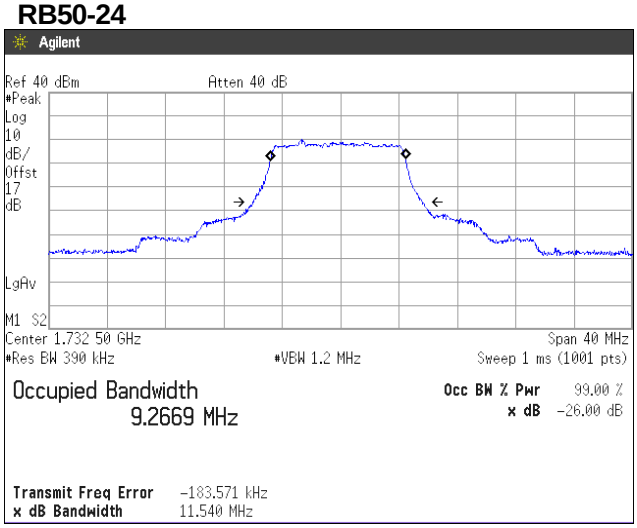


RB75-0

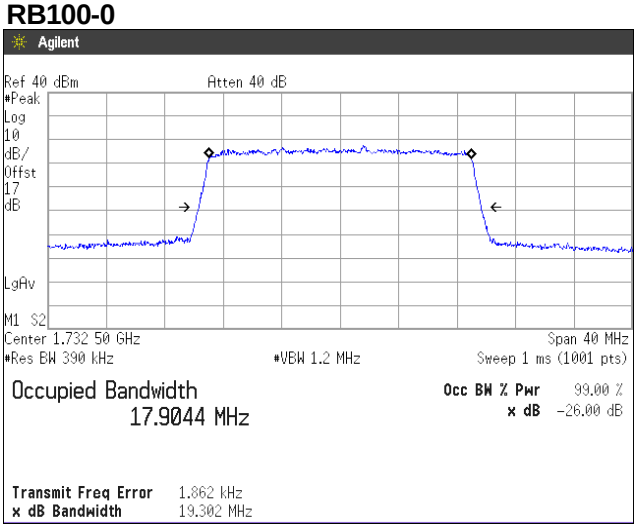


QPSK, BW 20MHz

RB50-24

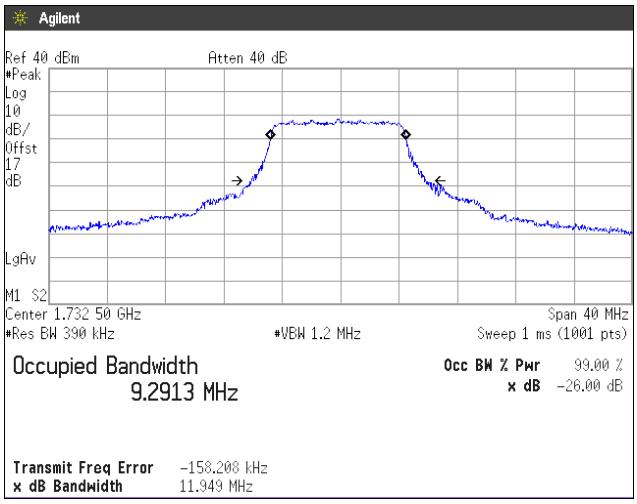


RB100-0

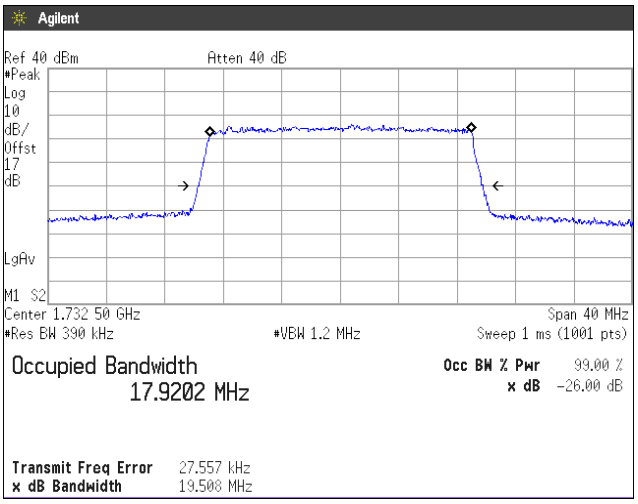


16QAM, BW 20MHz

RB50-24



RB100-0



2

7. Band Edge Spurious and Harmonic at Antenna Terminals

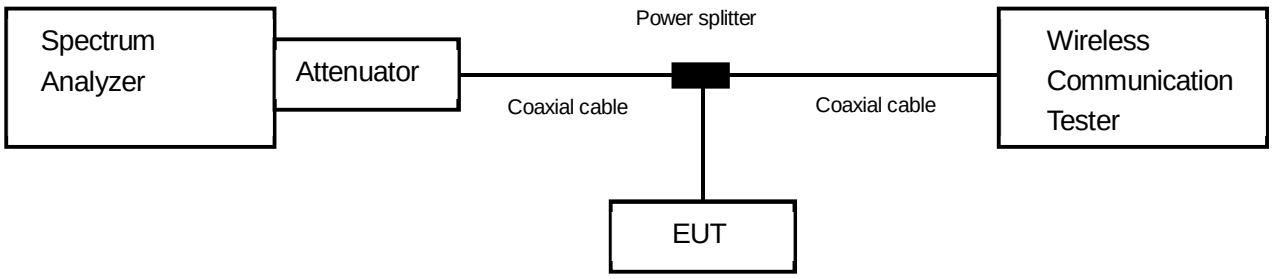
7.1 Measurement procedure [FCC 27.53, 2.1051]

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

The spectrum analyzer is set to;
<Band Edge>
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



7.2 Limit

-13dB or less

7.3 Measurement result

Date : May 14, 2018
Temperature : 20.1 [˚C]
Humidity : 56.2 [%] Test engineer :
Test place : Shielded room No.4 Tadahiro Seino

Band	Channel	Frequency [MHz]	Limit [dB]	Results	
WCDMA Band IV	1312	1712.4	-13.0	See the trace data	PASS
	1513	1752.6	-13.0	See the trace data	PASS

Band	Modulation	Bandwidth [MHz]	Limit [dB]	Results	
LTE Band IV	QPSK	1.4	-13.0	See the trace data	PASS
		3	-13.0	See the trace data	PASS
		5	-13.0	See the trace data	PASS
		10	-13.0	See the trace data	PASS
		15	-13.0	See the trace data	PASS
		20	-13.0	See the trace data	PASS
	16QAM	1.4	-13.0	See the trace data	PASS
		3	-13.0	See the trace data	PASS
		5	-13.0	See the trace data	PASS
		10	-13.0	See the trace data	PASS
		15	-13.0	See the trace data	PASS
		20	-13.0	See the trace data	PASS

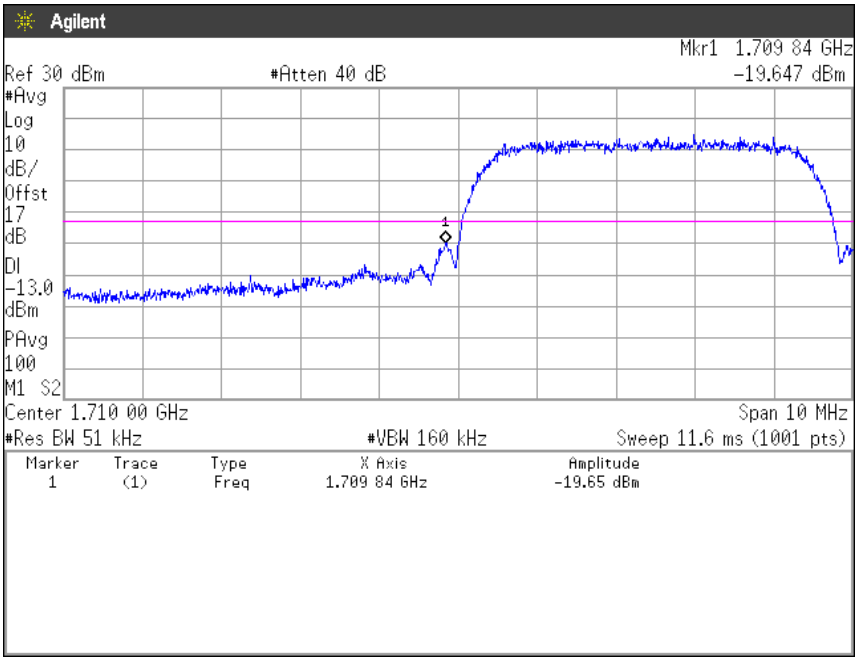
Zacta

7.4 Trace data

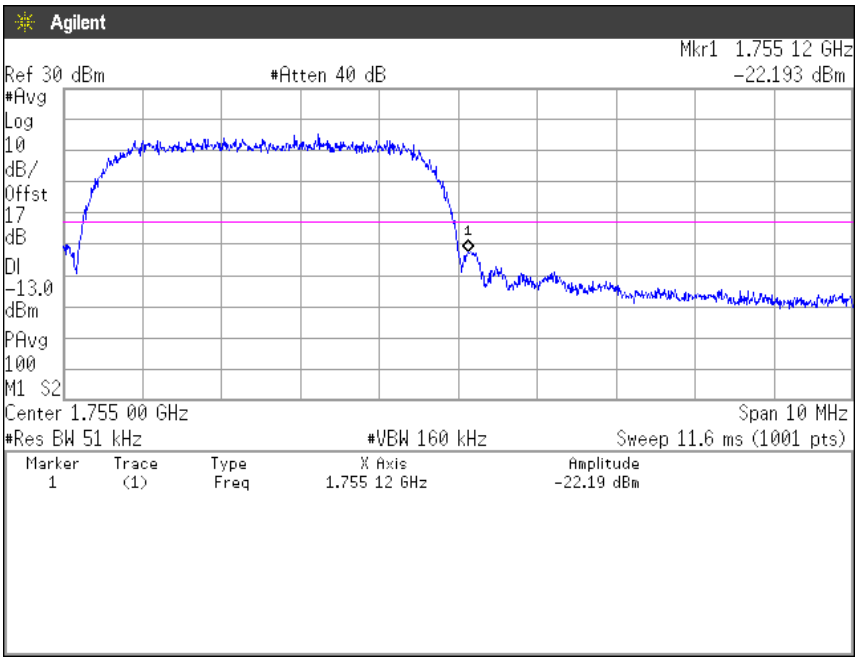
[WCDMA Band IV]

(Band Edge)

Channel: 1312



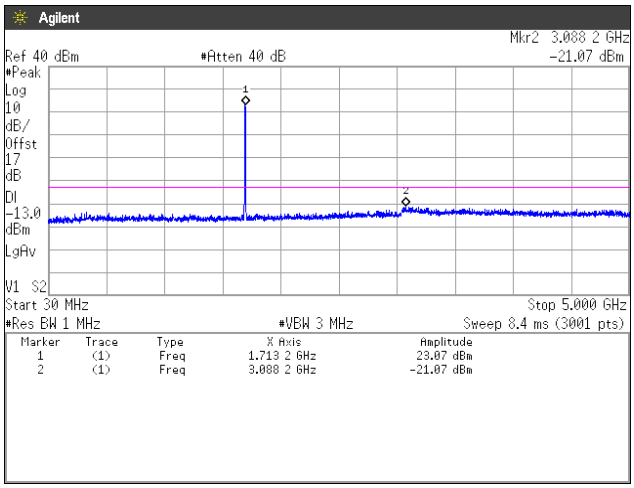
Channel: 1513



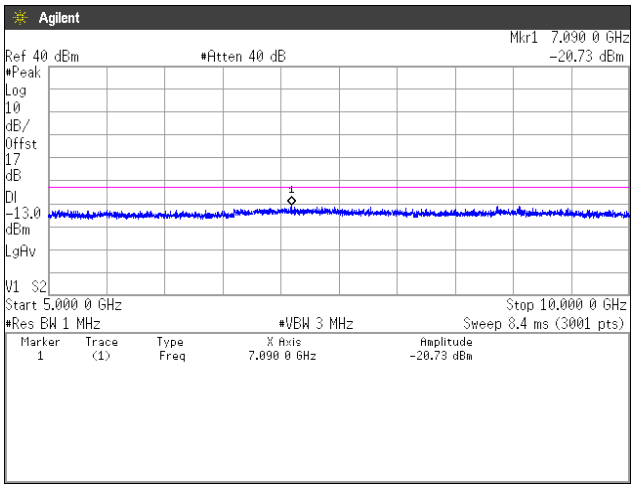
(Spurious Emissions)
Note: Conducted spurious test was measured in the worst case of conducted output power.

Channel: 1312

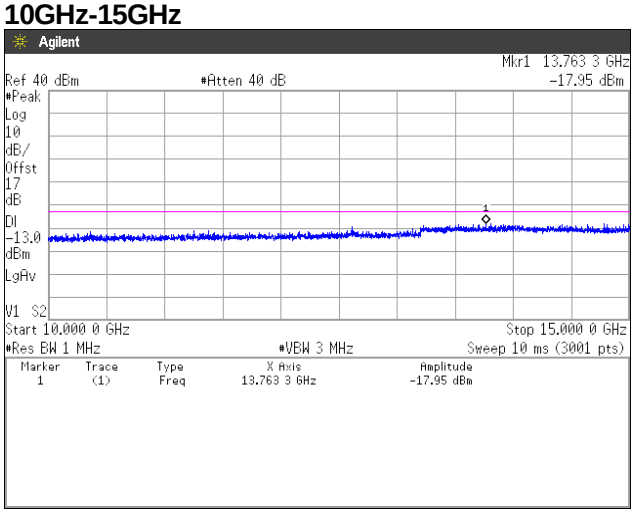
30MHz-5GHz



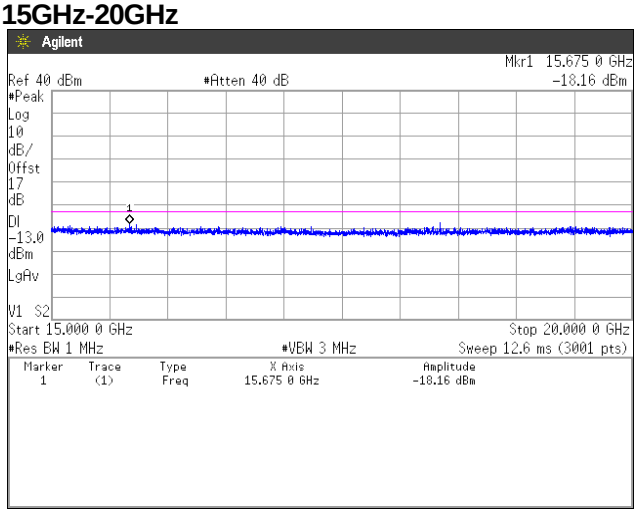
5GHz-10GHz



10GHz-15GHz

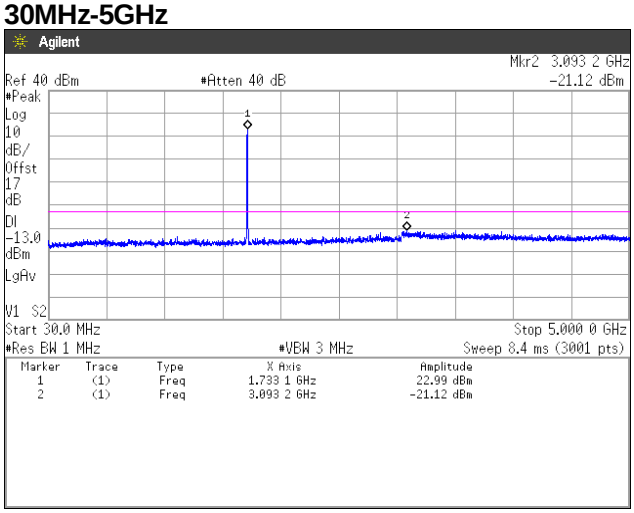


15GHz-20GHz

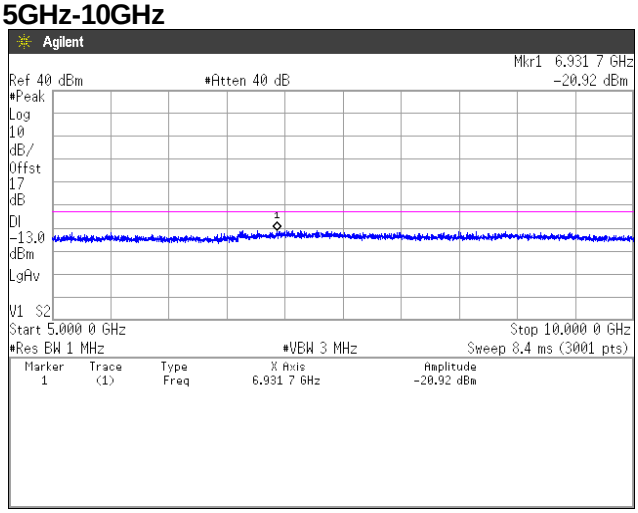


Channel: 1413

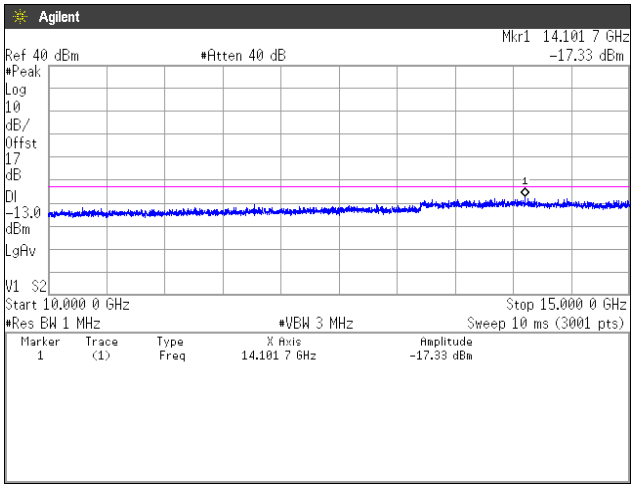
30MHz-5GHz



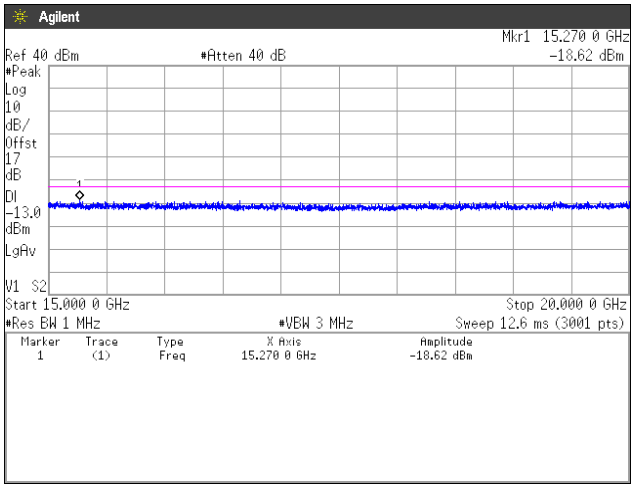
5GHz-10GHz



10GHz-15GHz

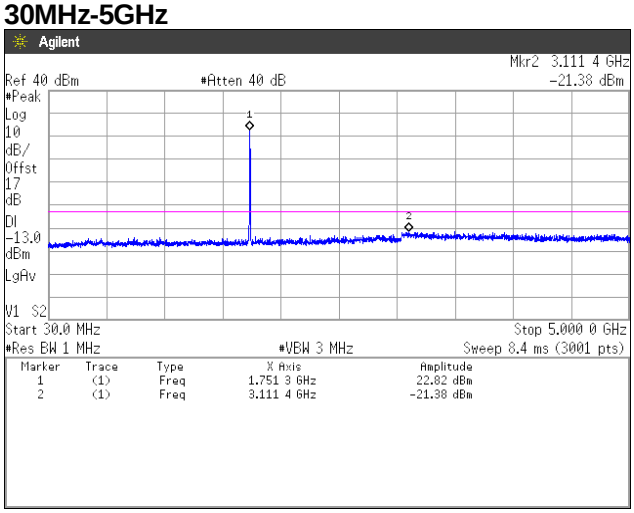


15GHz-20GHz

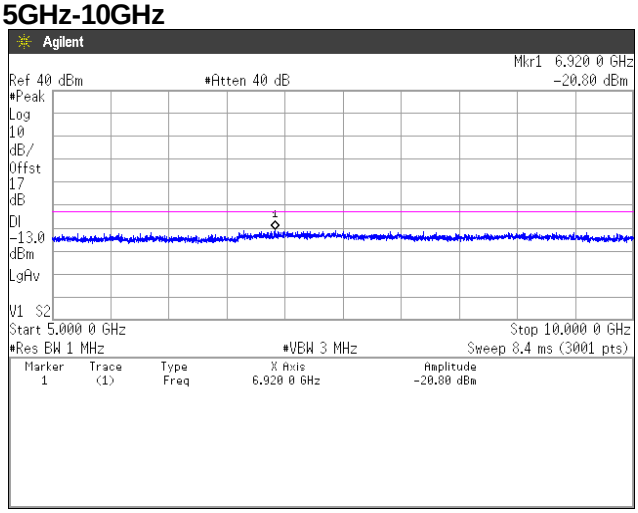


Channel: 1513

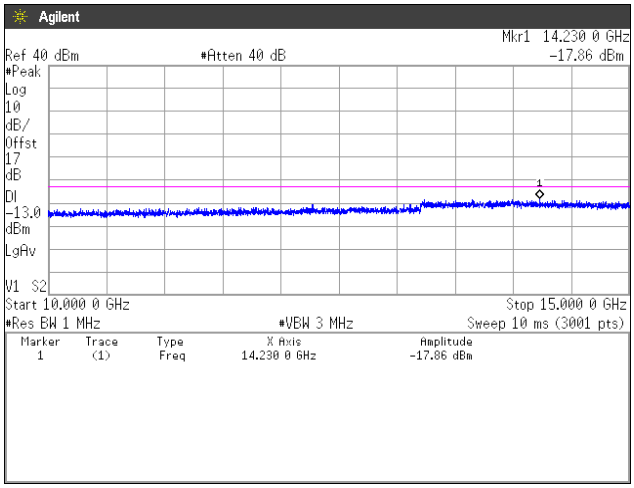
30MHz-5GHz



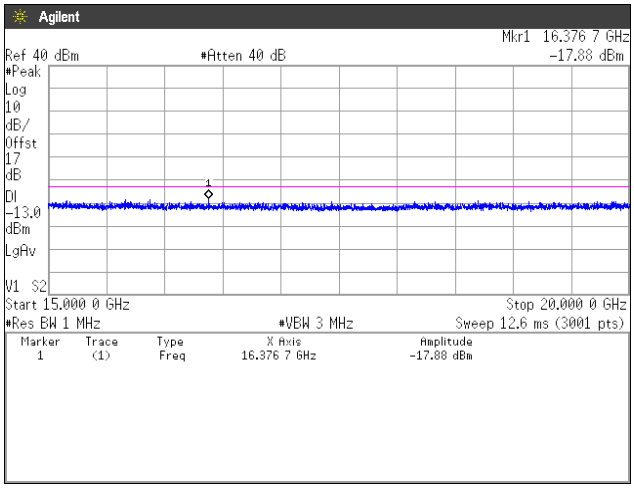
5GHz-10GHz



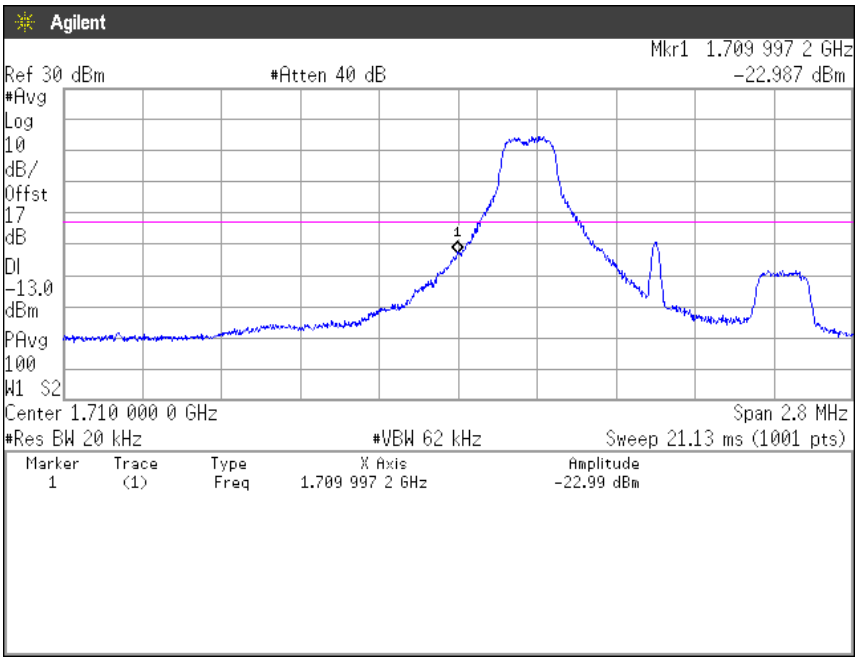
10GHz-15GHz



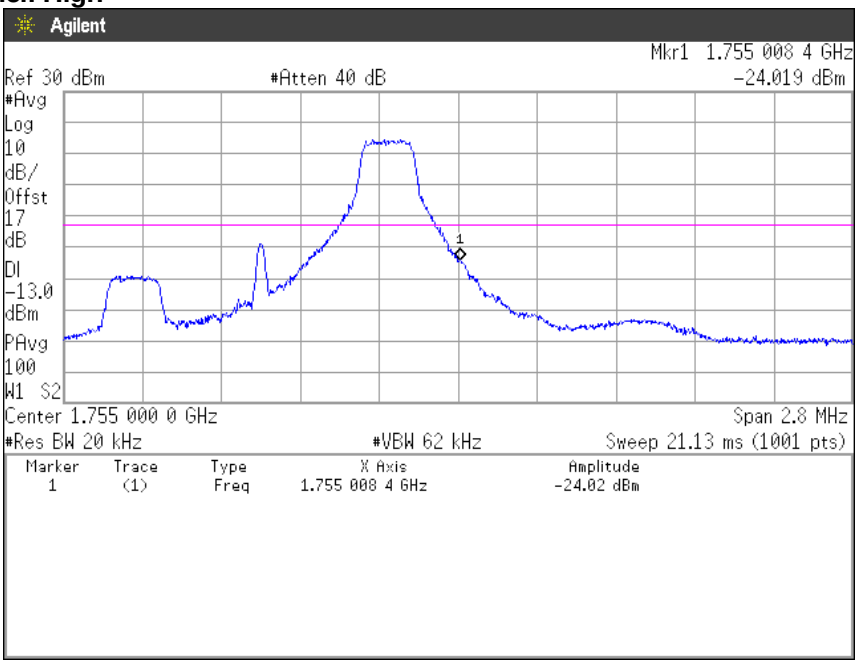
15GHz-20GHz



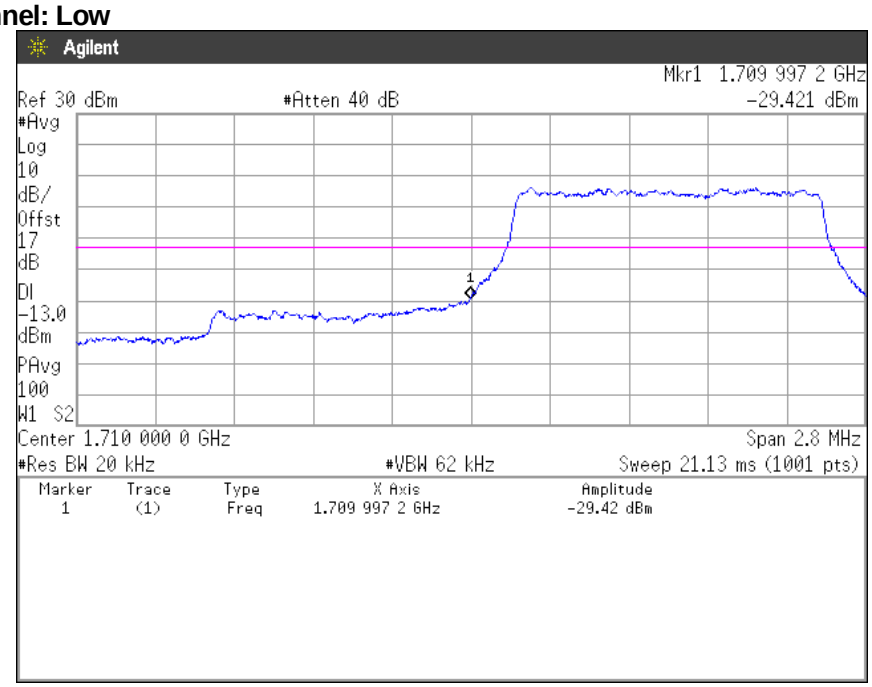
[LTE Band IV]
(Band Edge)
QPSK, BW 1.4MHz, RB1-0
Channel: Low



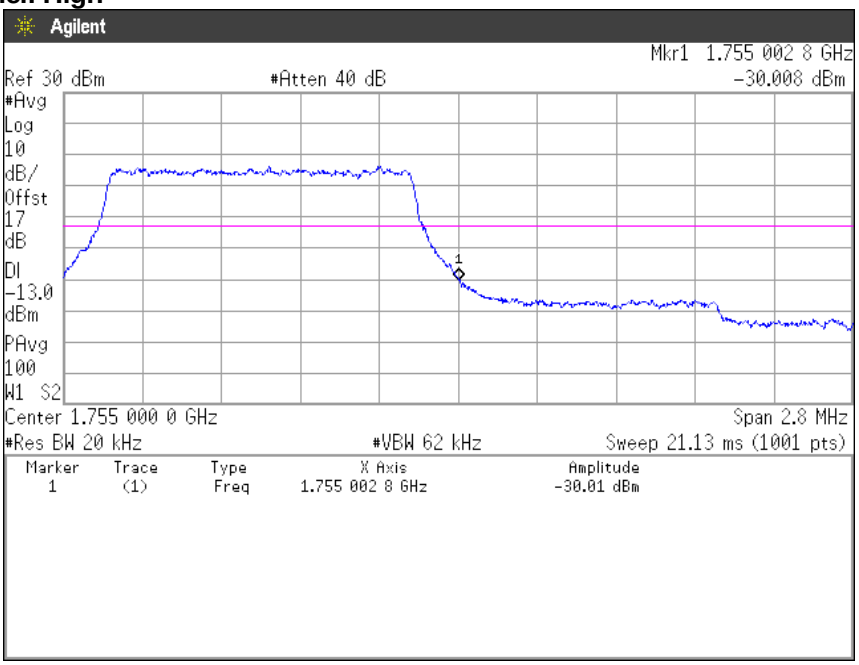
QPSK, BW 1.4MHz, RB1-5
Channel: High



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

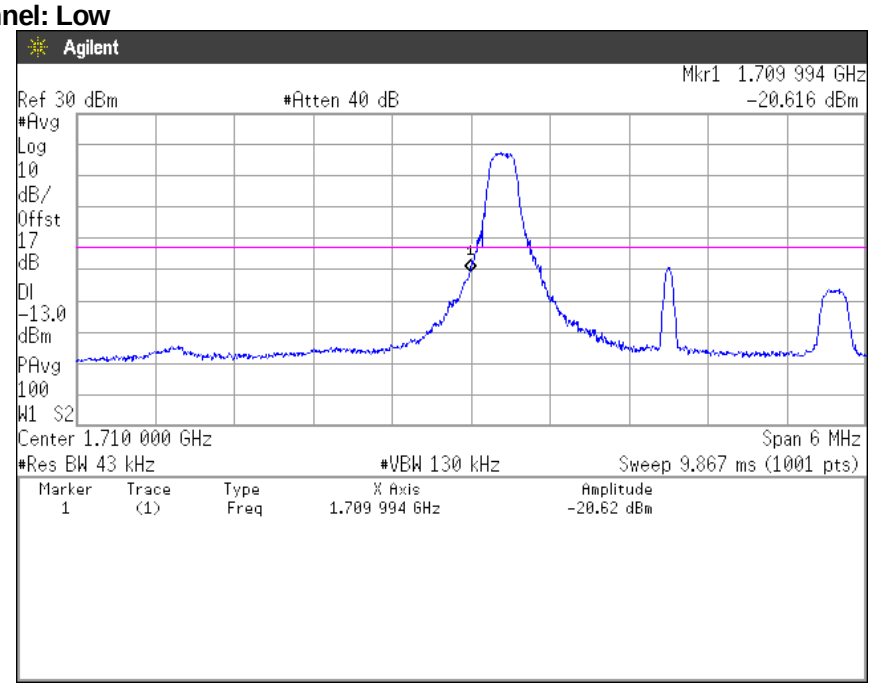


QPSK, BW 1.4MHz, RB6-0
Channel: High



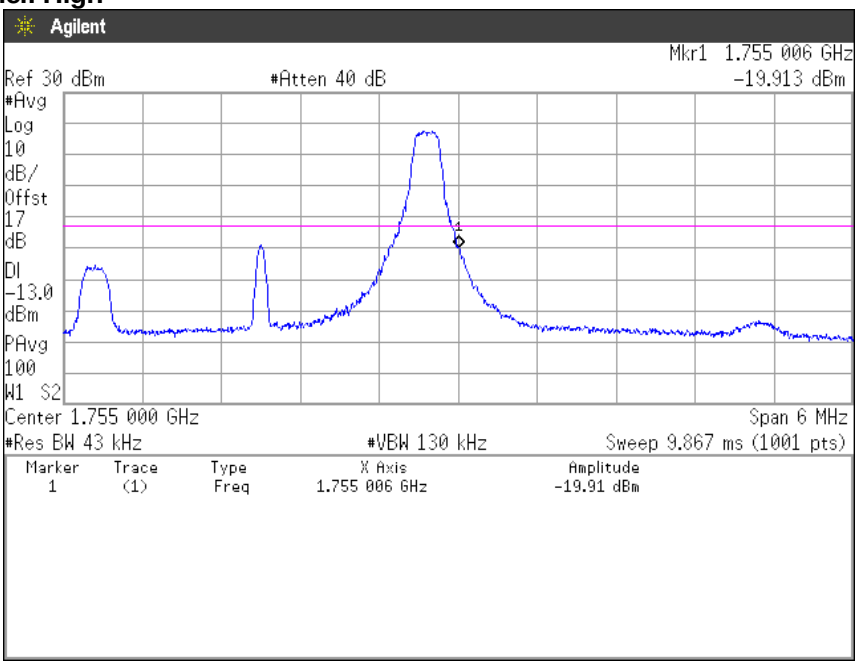
QPSK, BW 3MHz, RB1-0

Channel: Low

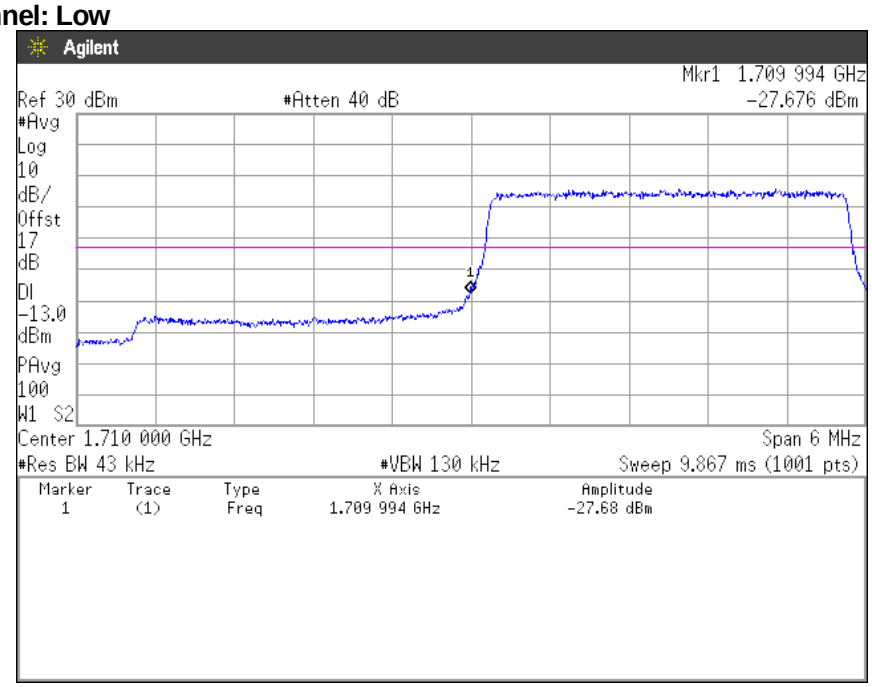


QPSK, BW 3MHz, RB1-14

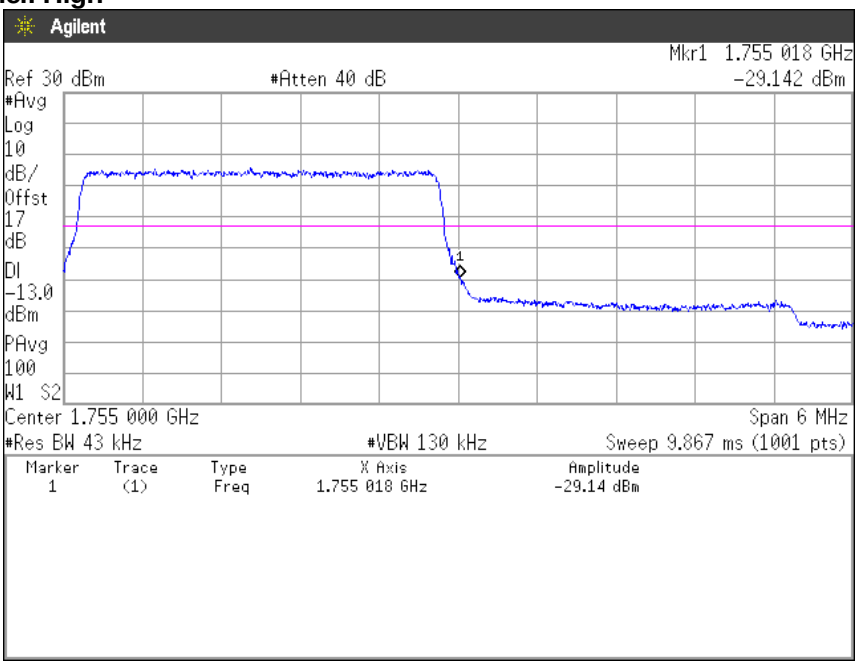
Channel: High



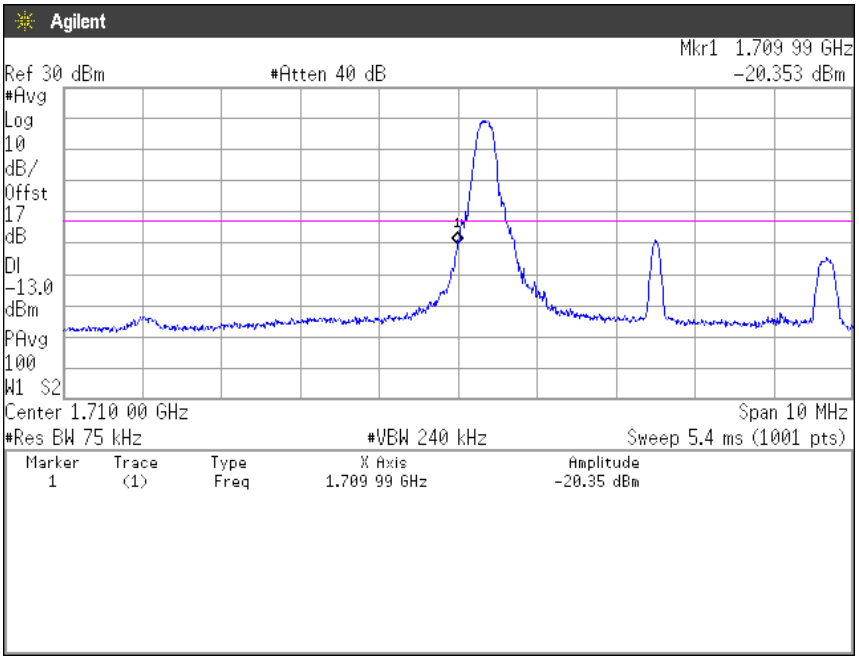
QPSK, BW 3MHz, RB15-0
Channel: Low



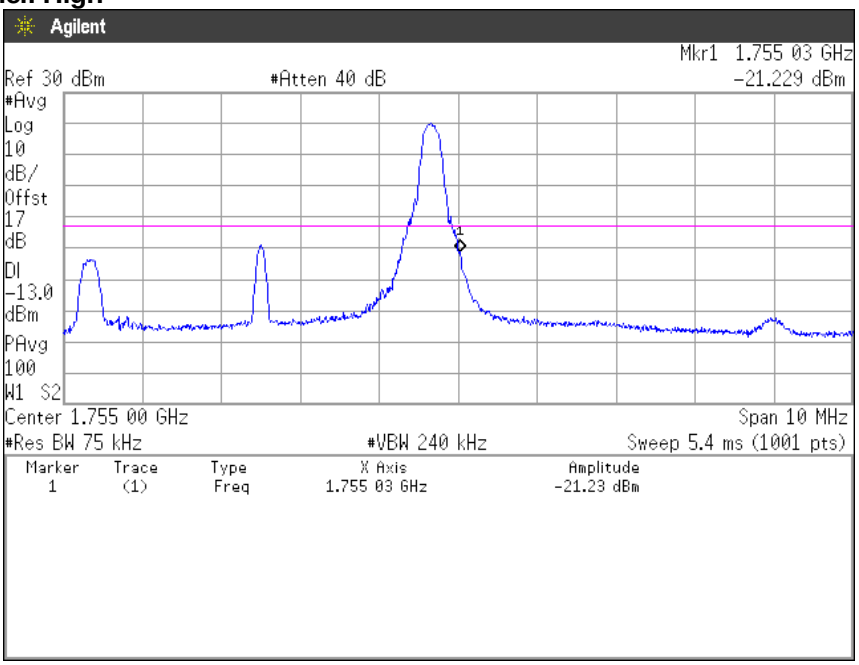
QPSK, BW 3MHz, RB15-0
Channel: High



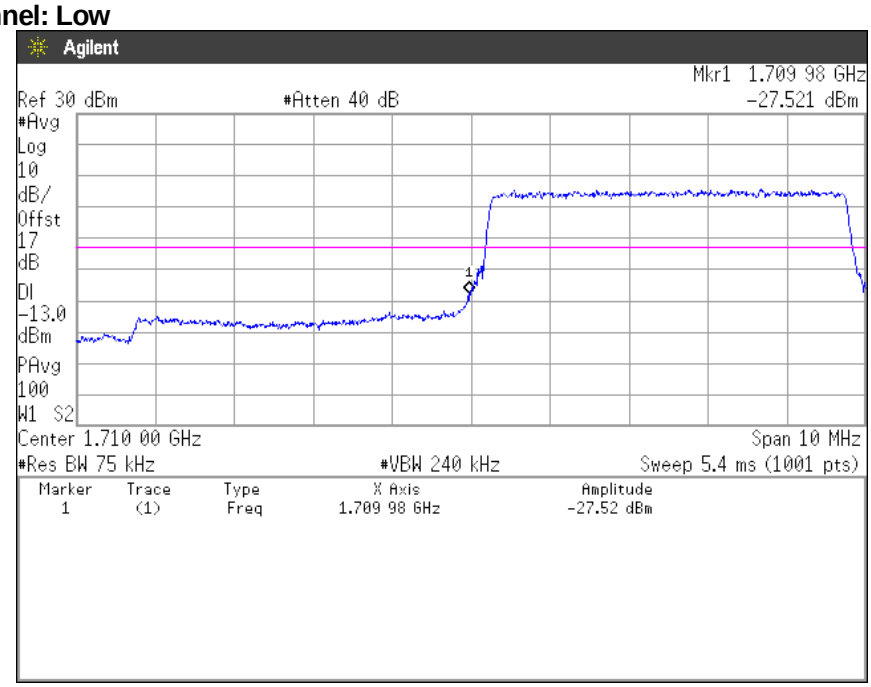
QPSK, BW 5MHz, RB1-0
Channel: Low



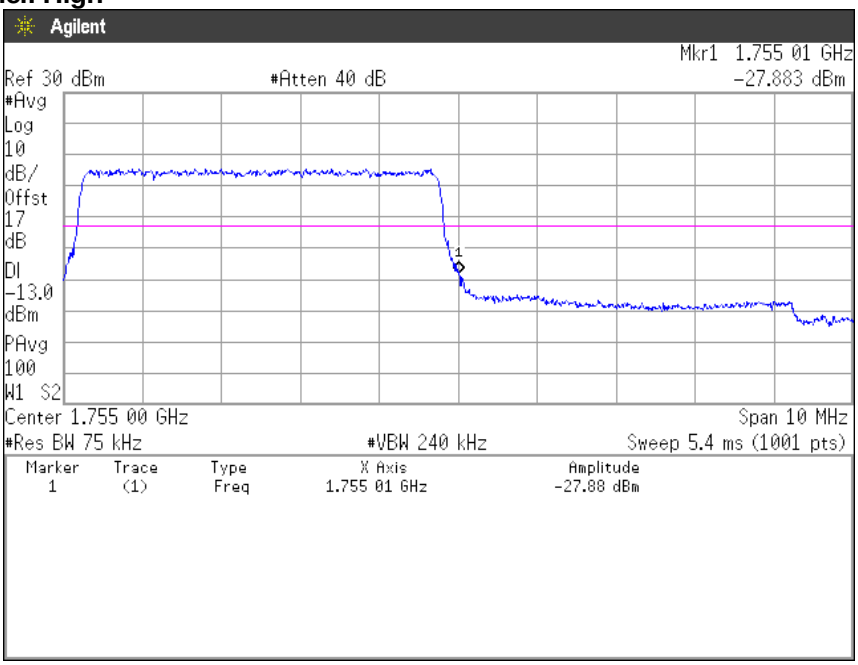
QPSK, BW 5MHz, RB1-24
Channel: High



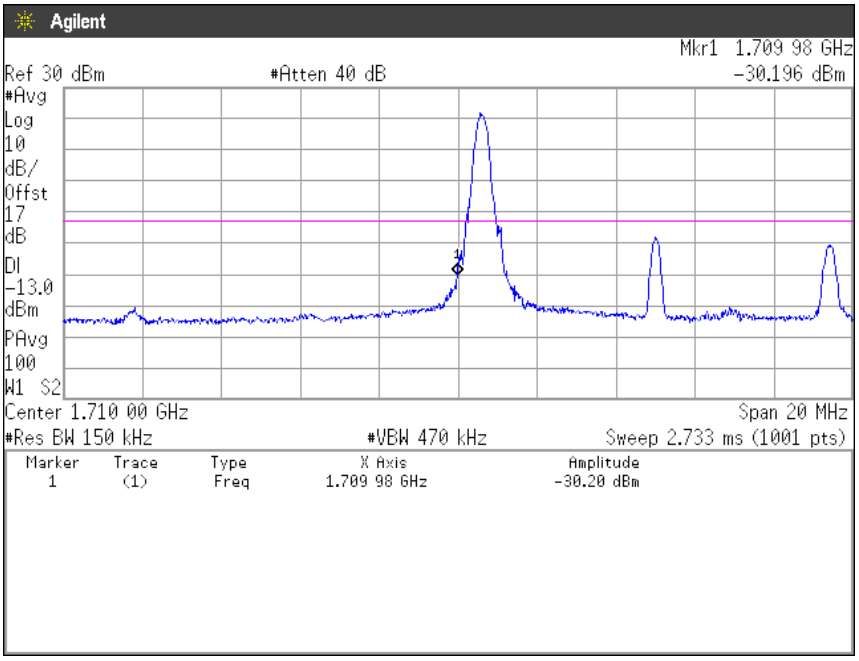
QPSK, BW 5MHz, RB25-0
Channel: Low



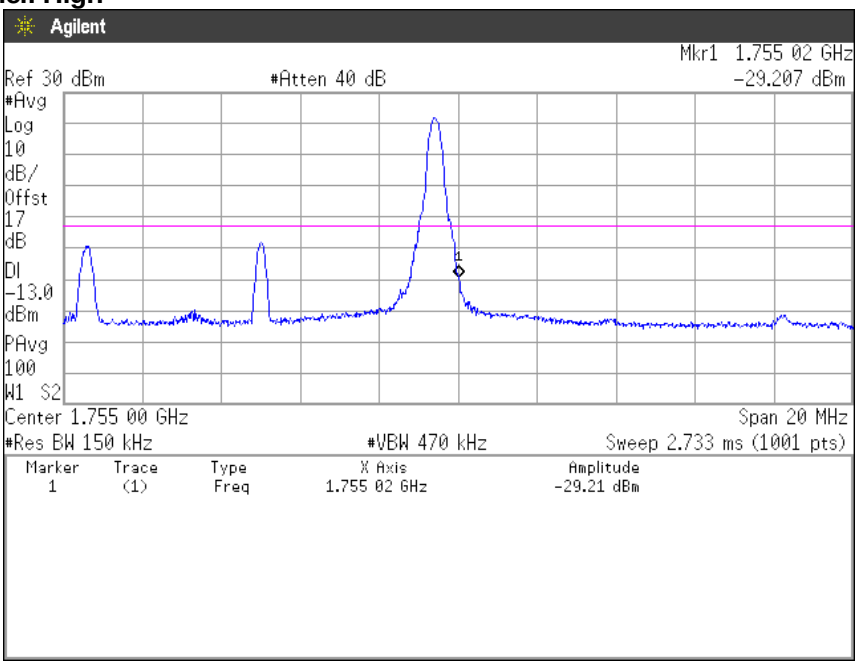
QPSK, BW 5MHz, RB25-0
Channel: High



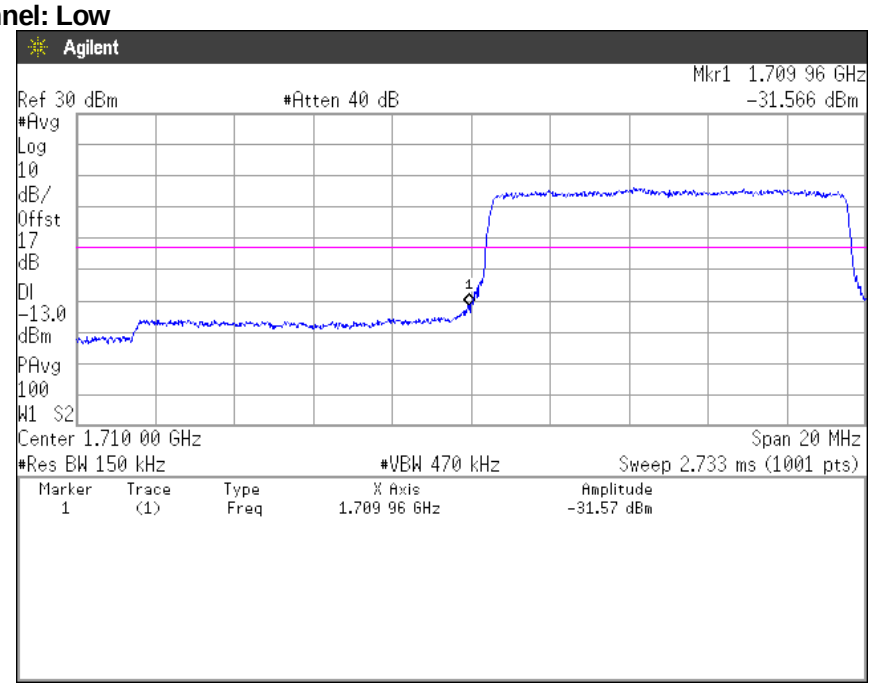
QPSK, BW 10MHz, RB1-0
Channel: Low



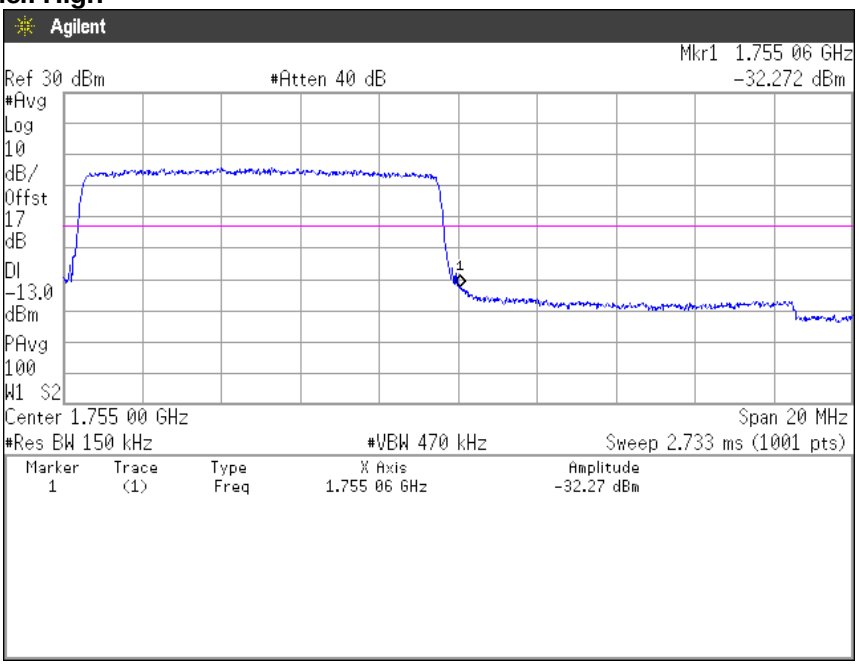
QPSK, BW 10MHz, RB1-49
Channel: High



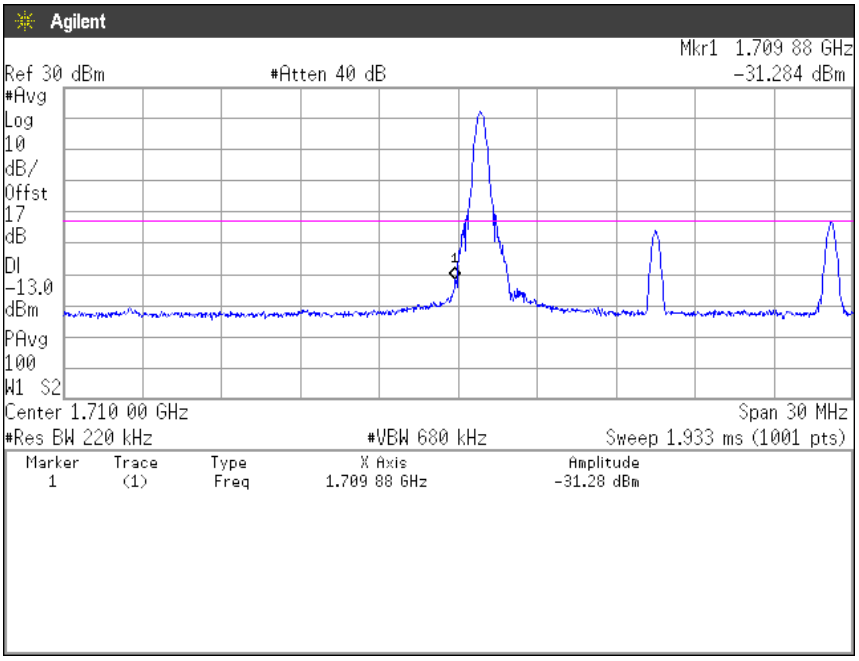
QPSK, BW 10MHz, RB50-0
Channel: Low



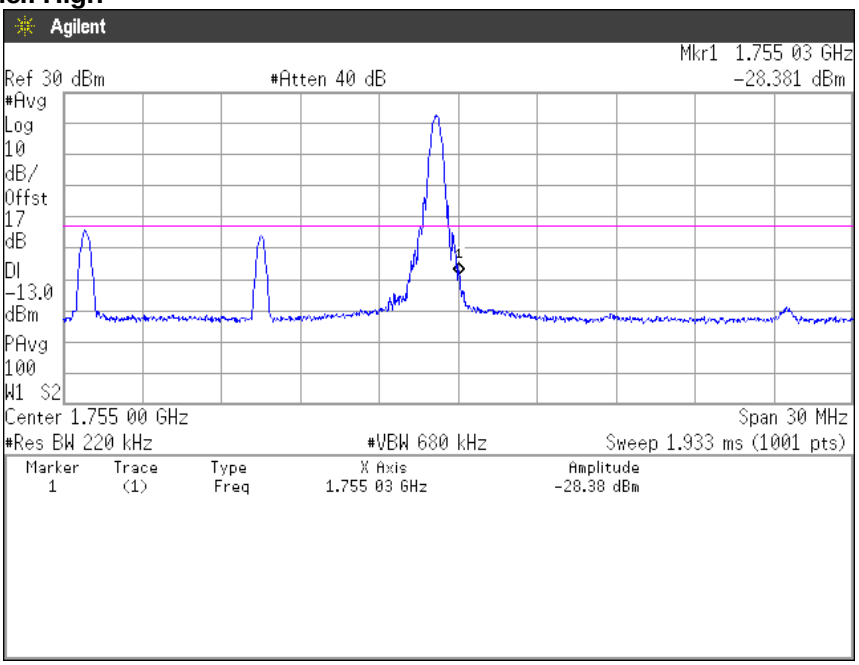
QPSK, BW 10MHz, RB50-0
Channel: High



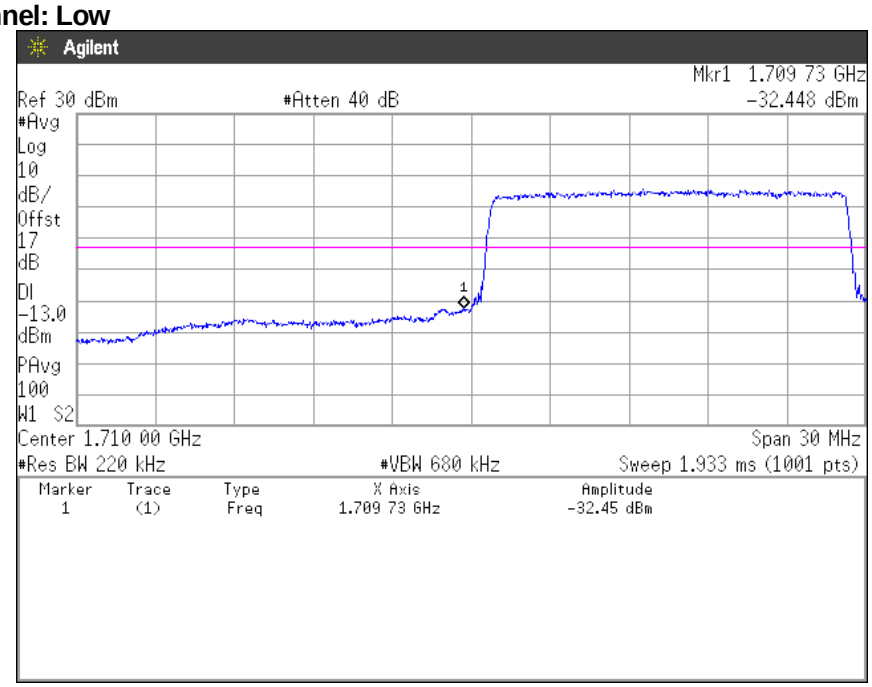
QPSK, BW 15MHz, RB1-0
Channel: Low



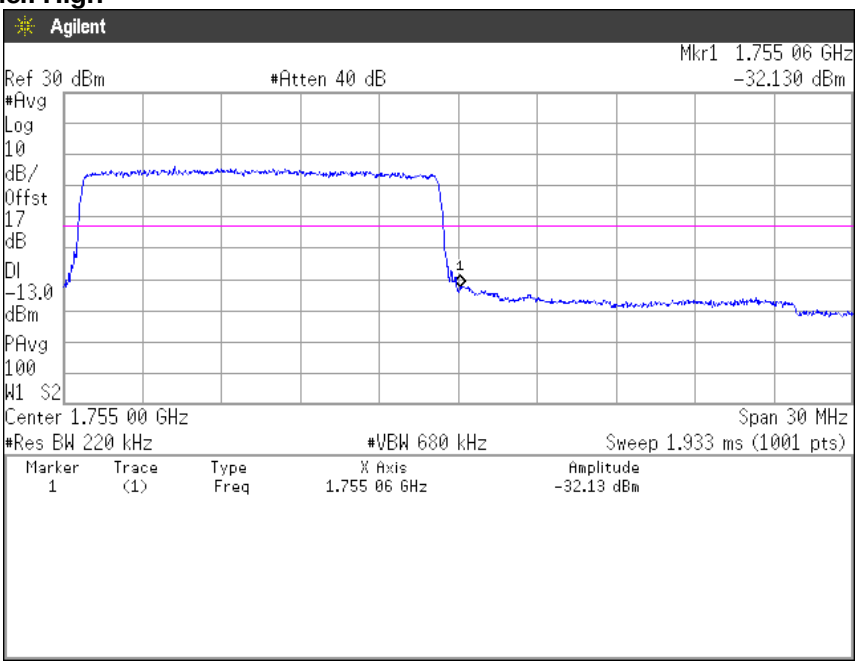
QPSK, BW 15MHz, RB1-74
Channel: High



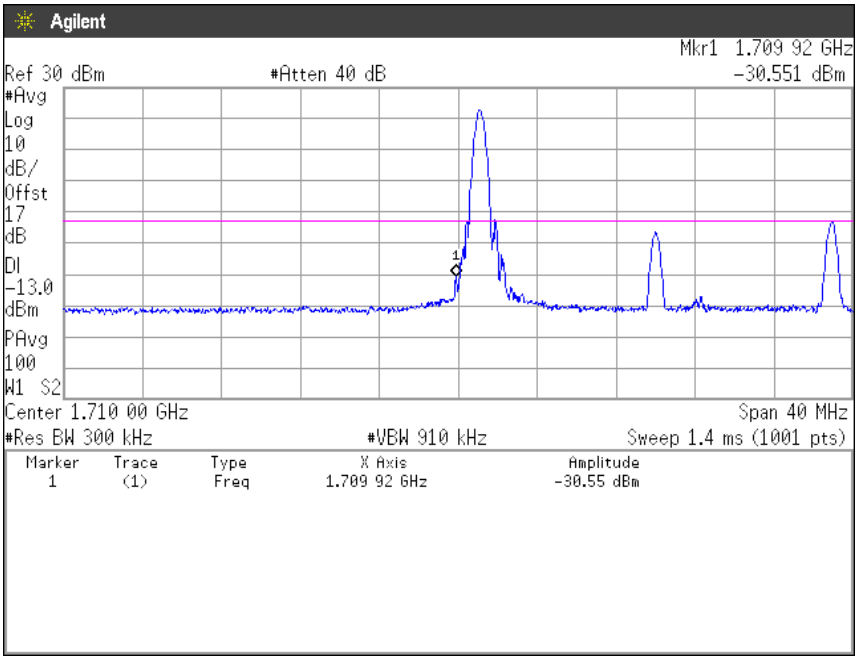
QPSK, BW 15MHz, RB75-0
Channel: Low



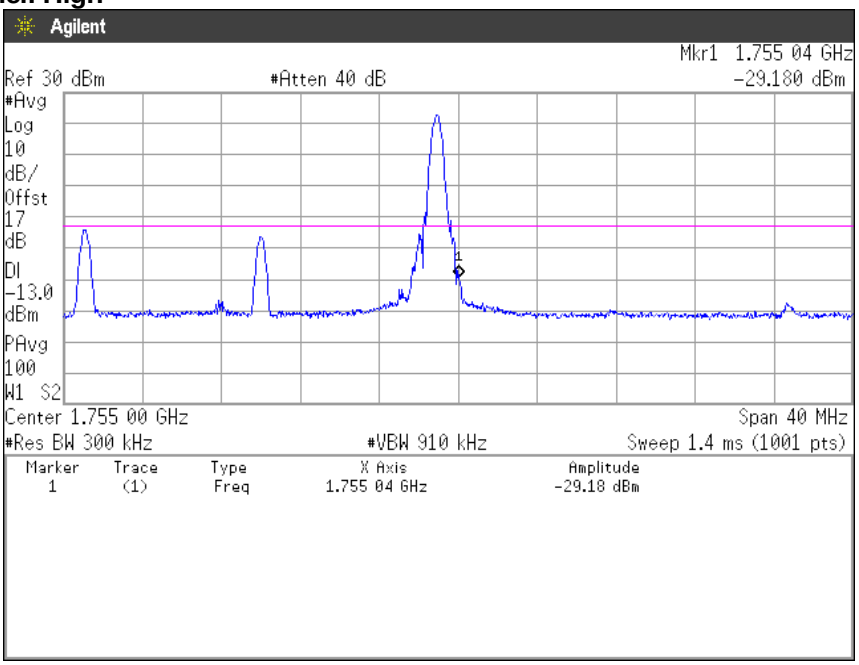
QPSK, BW 15MHz, RB75-0
Channel: High



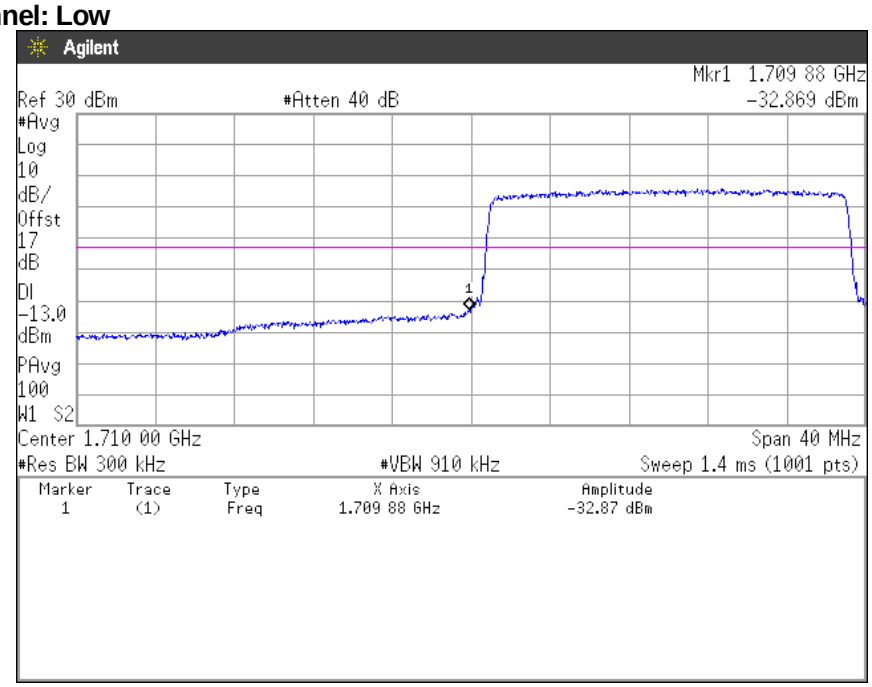
QPSK, BW 20MHz, RB1-0
Channel: Low



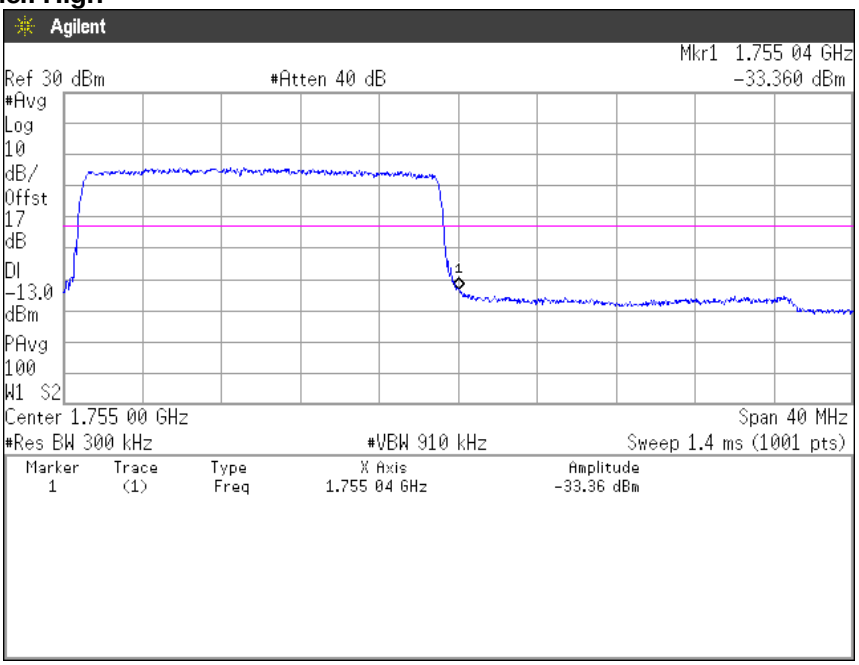
QPSK, BW 20MHz, RB1-99
Channel: High



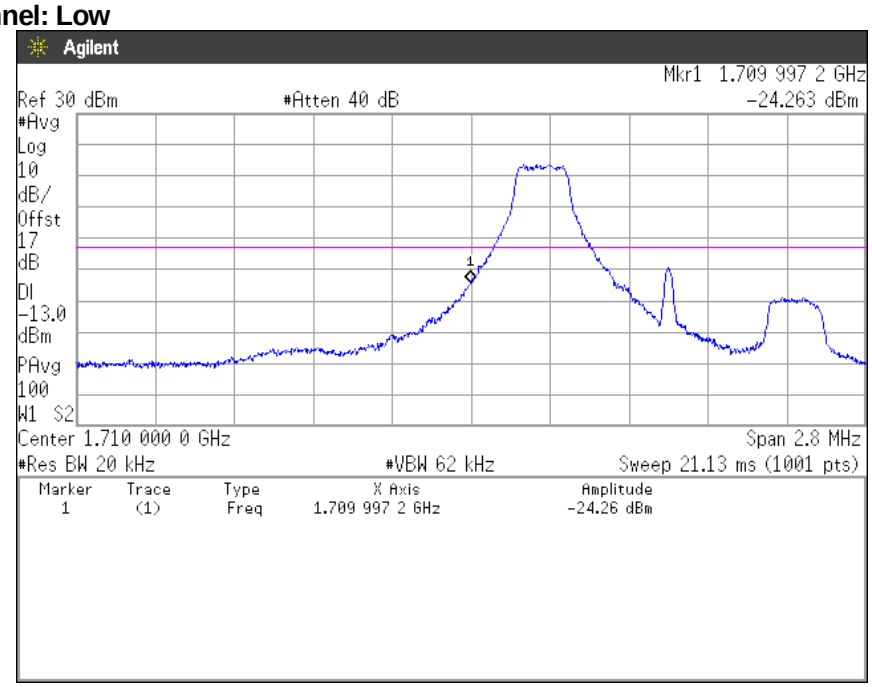
QPSK, BW 20MHz, RB100-0
Channel: Low



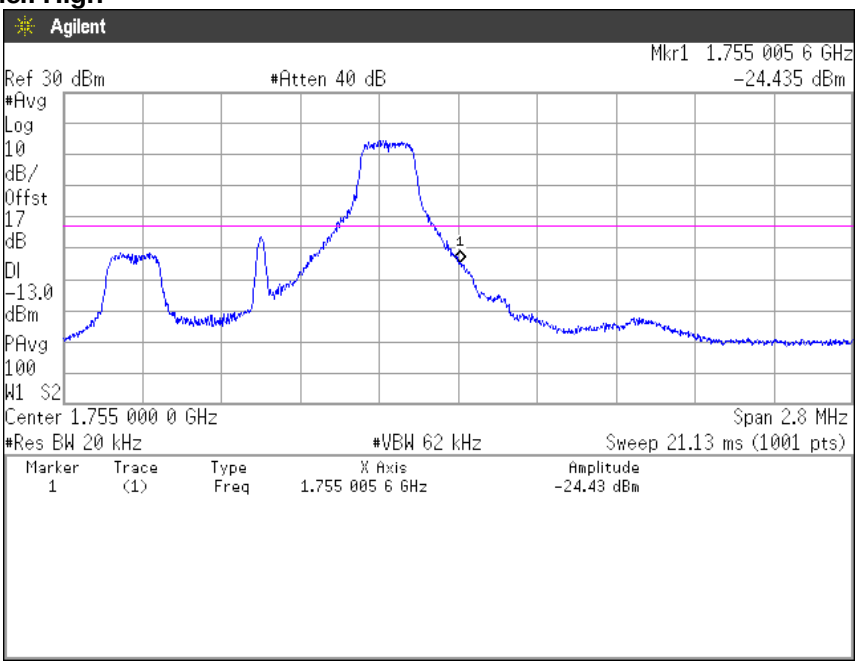
QPSK, BW 20MHz, RB100-0
Channel: High



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



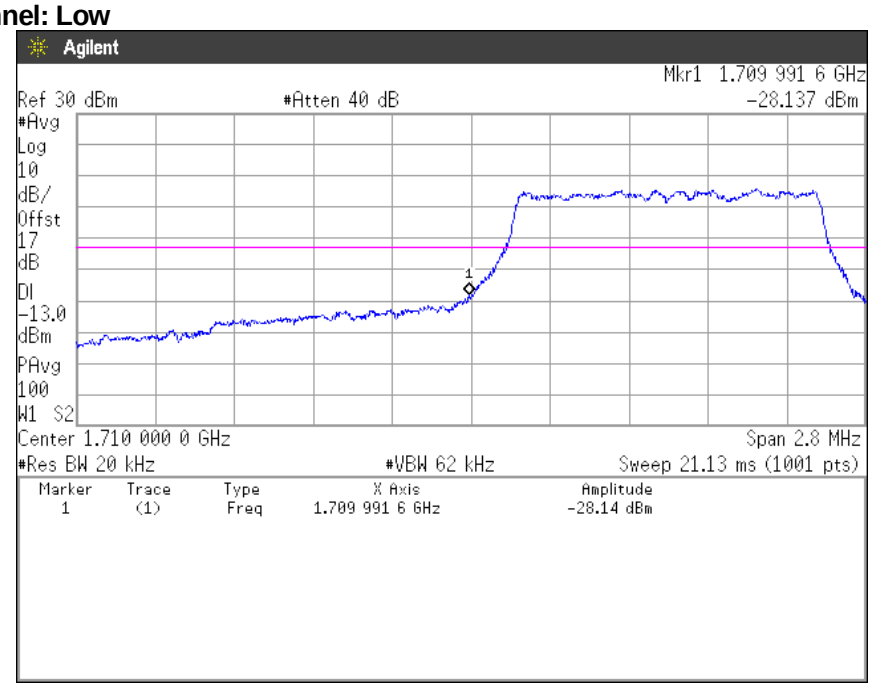
16QAM, BW 1.4MHz, RB1-5
Channel: High



Zacta

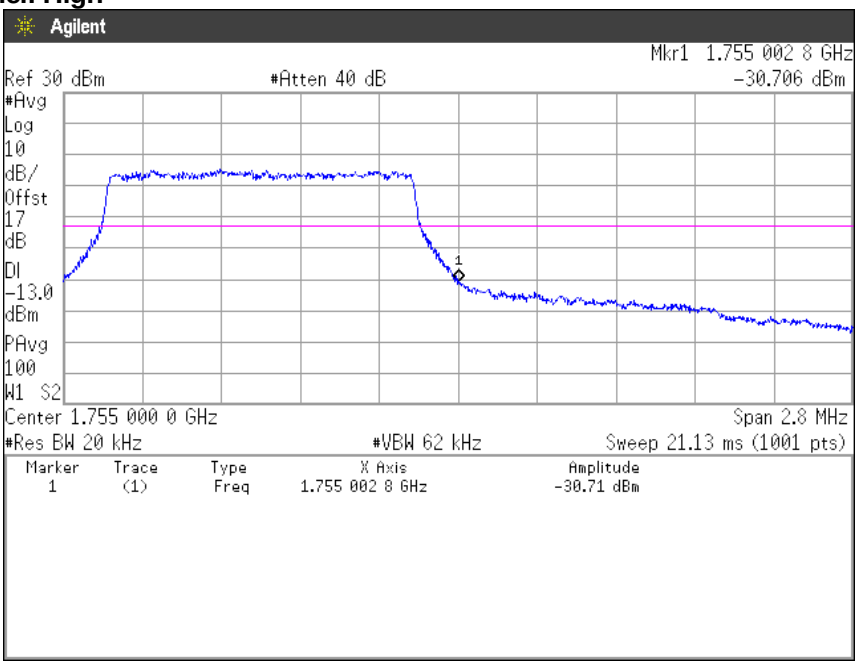
16QAM, BW 1.4MHz, RB6-0

Channel: Low



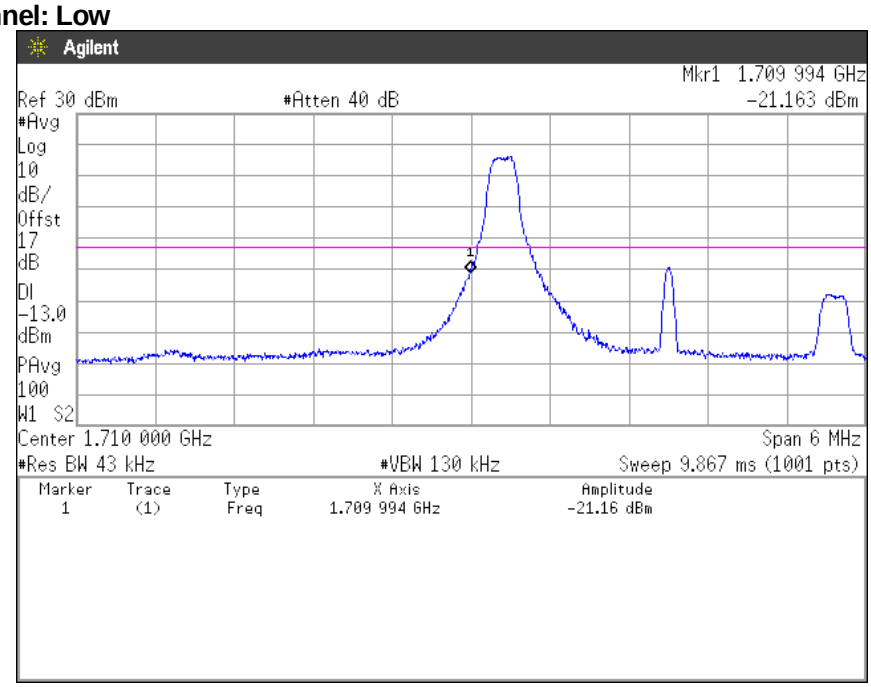
16QAM, BW 1.4MHz, RB6-0

Channel: High



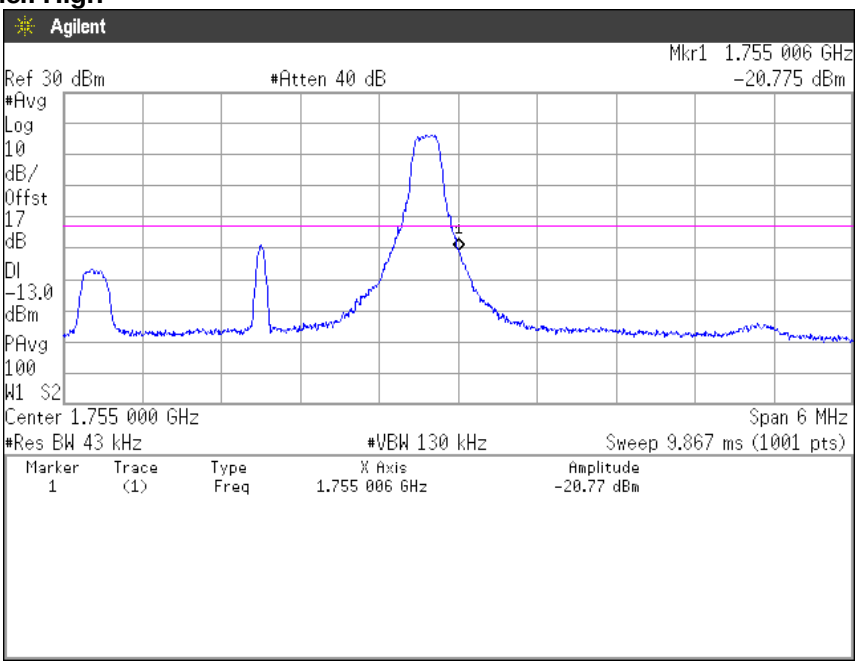
16QAM, BW 3MHz, RB1-0

Channel: Low

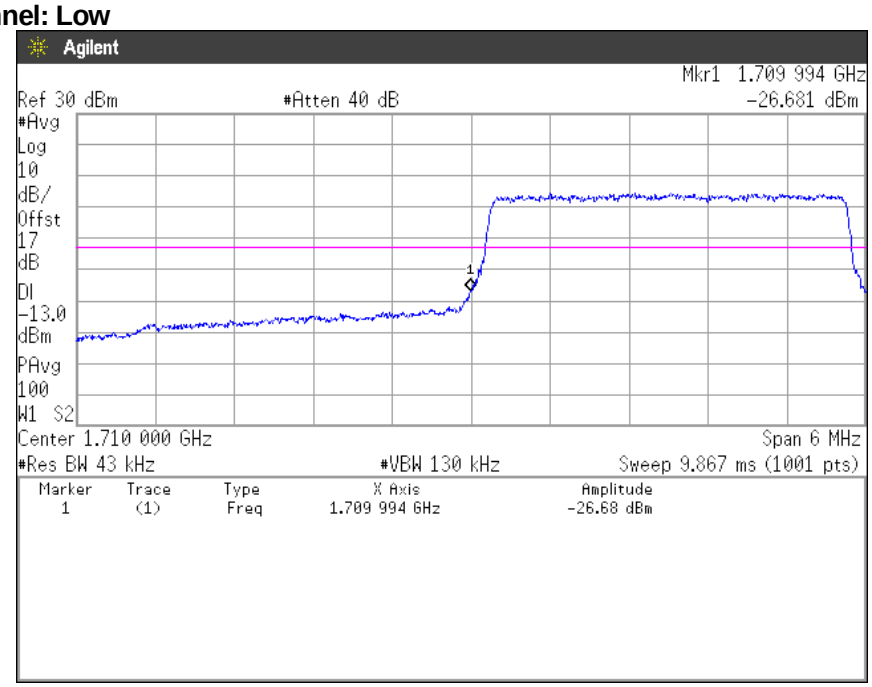


16QAM, BW 3MHz, RB1-14

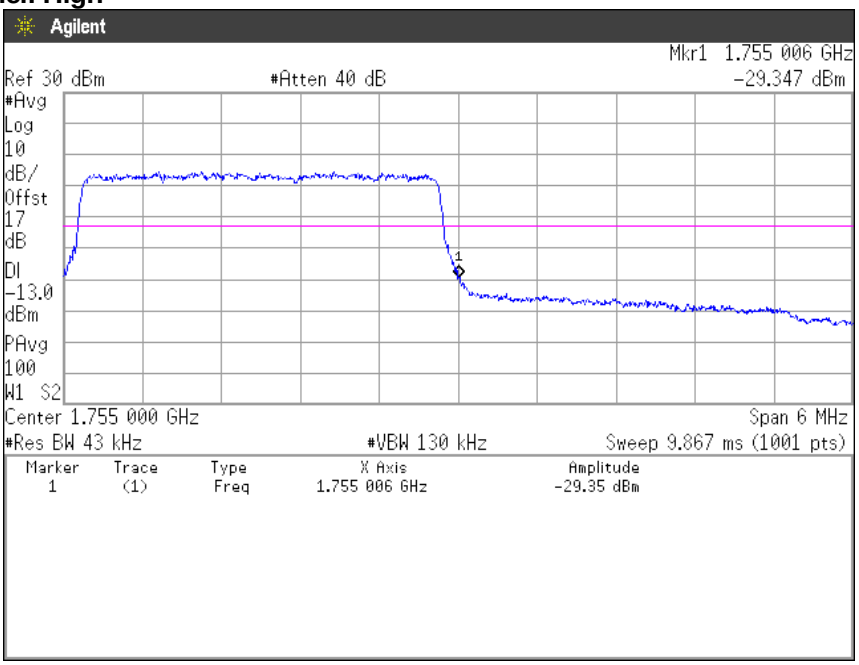
Channel: High



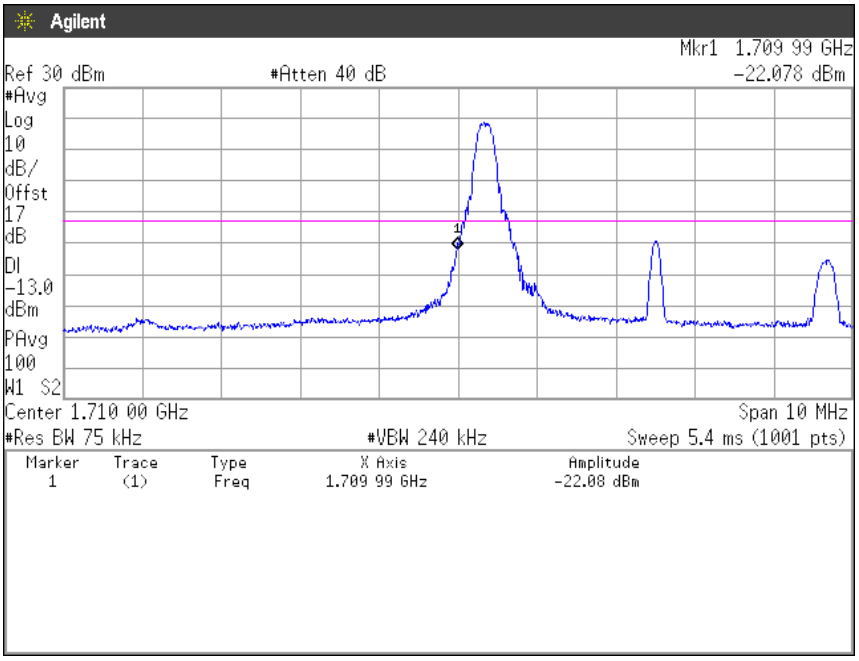
16QAM, BW 3MHz, RB15-0
Channel: Low



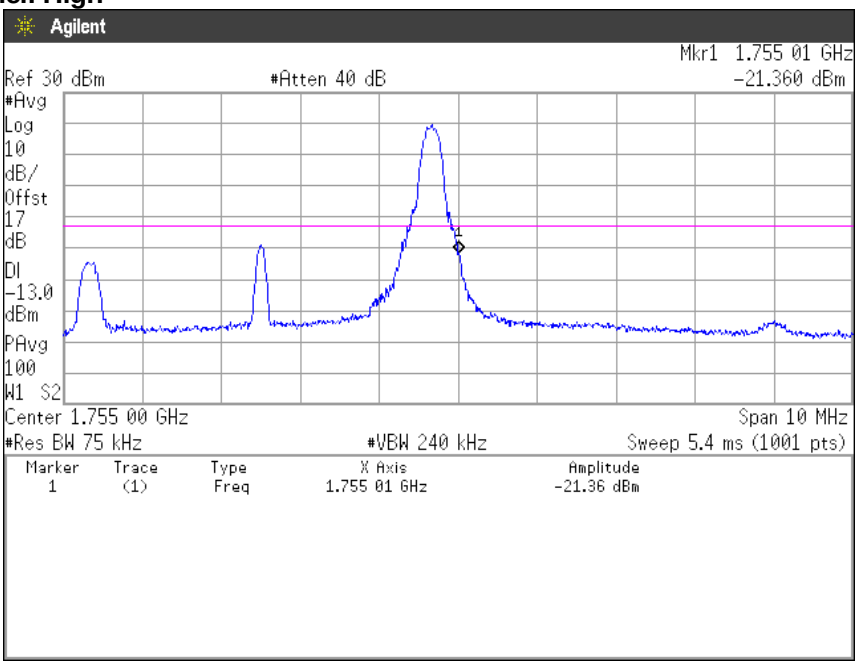
16QAM, BW 3MHz, RB15-0
Channel: High



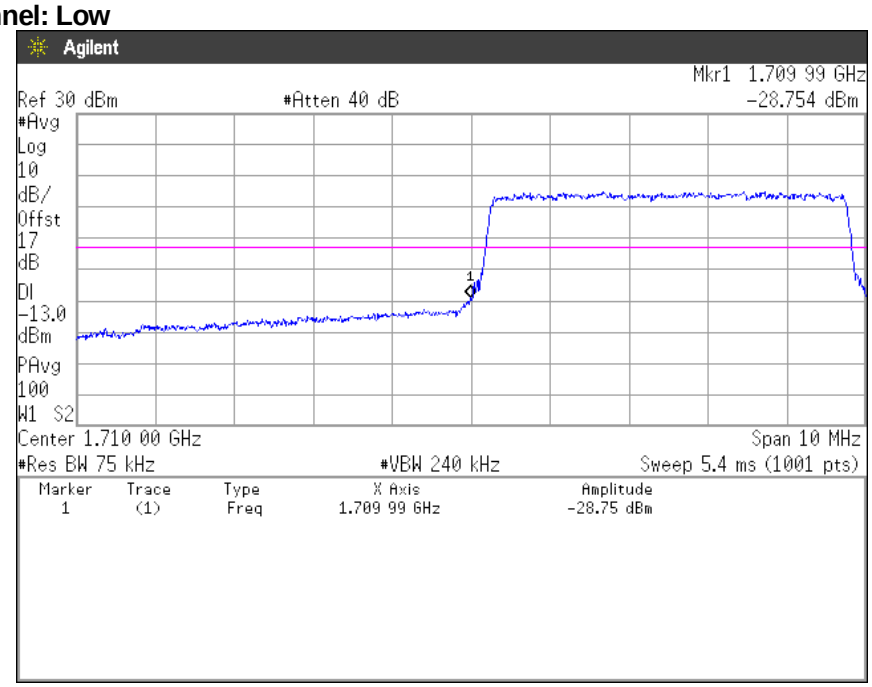
16QAM, BW 5MHz, RB1-0
Channel: Low



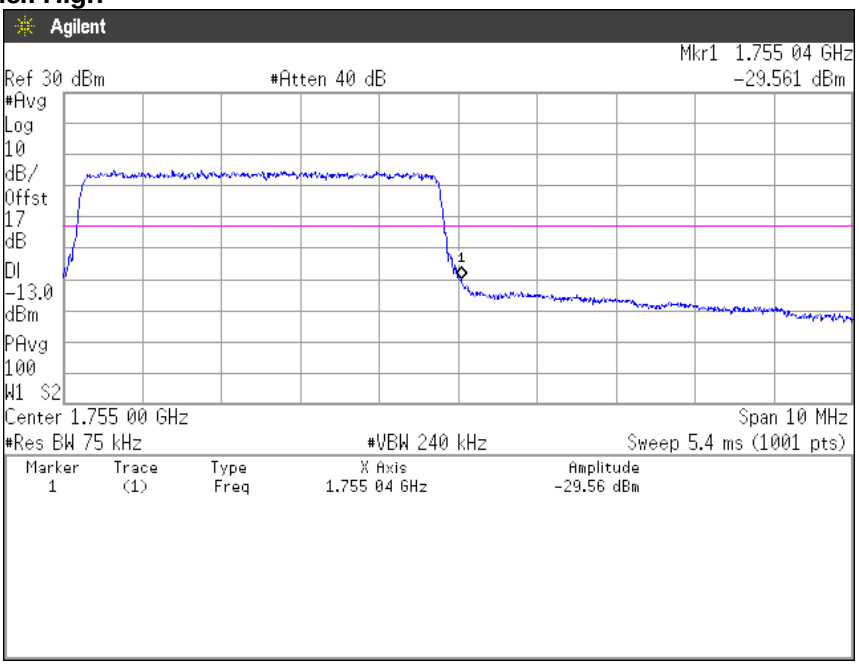
16QAM, BW 5MHz, RB1-24
Channel: High



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



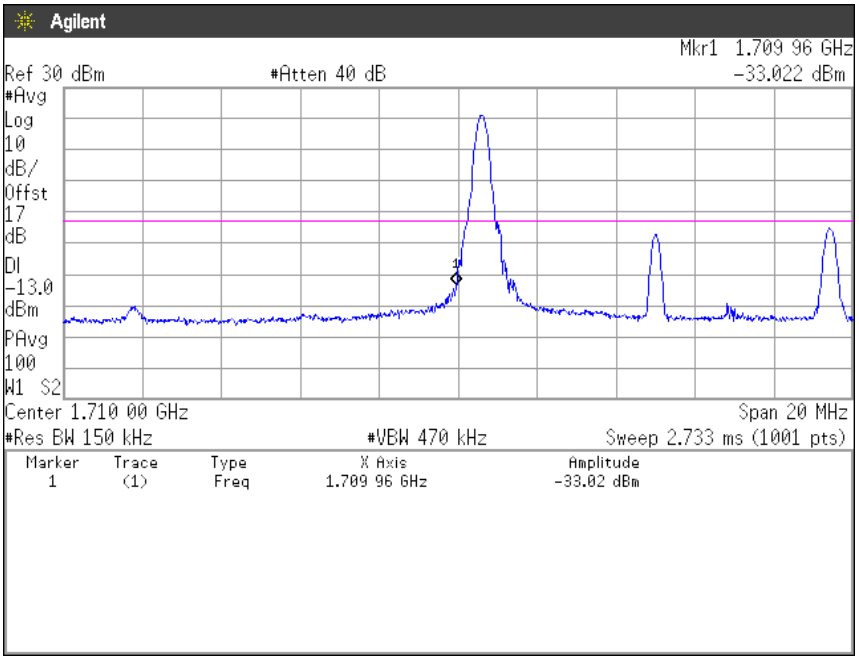
16QAM, BW 5MHz, RB25-0
Channel: High



Zacta

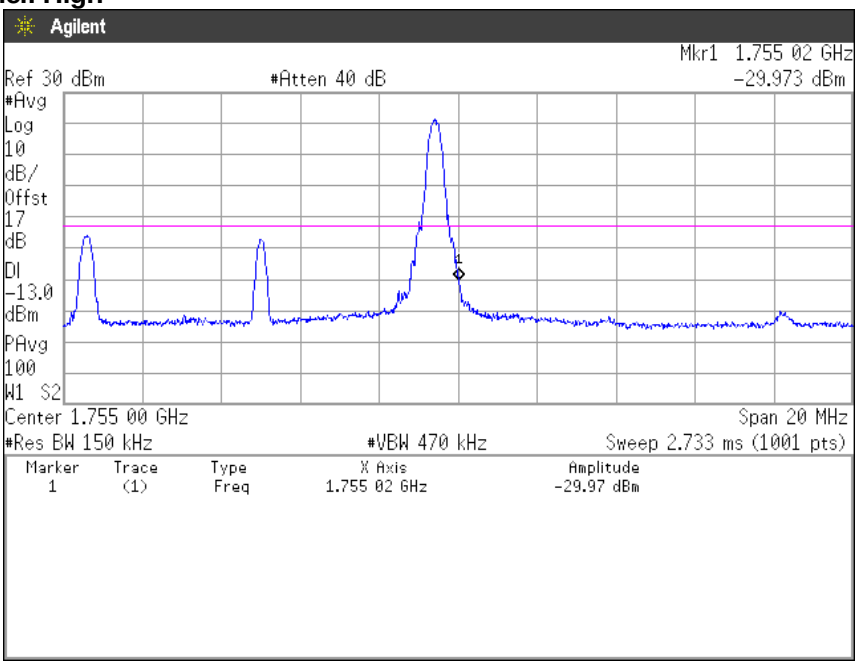
16QAM, BW 10MHz, RB1-0

Channel: Low

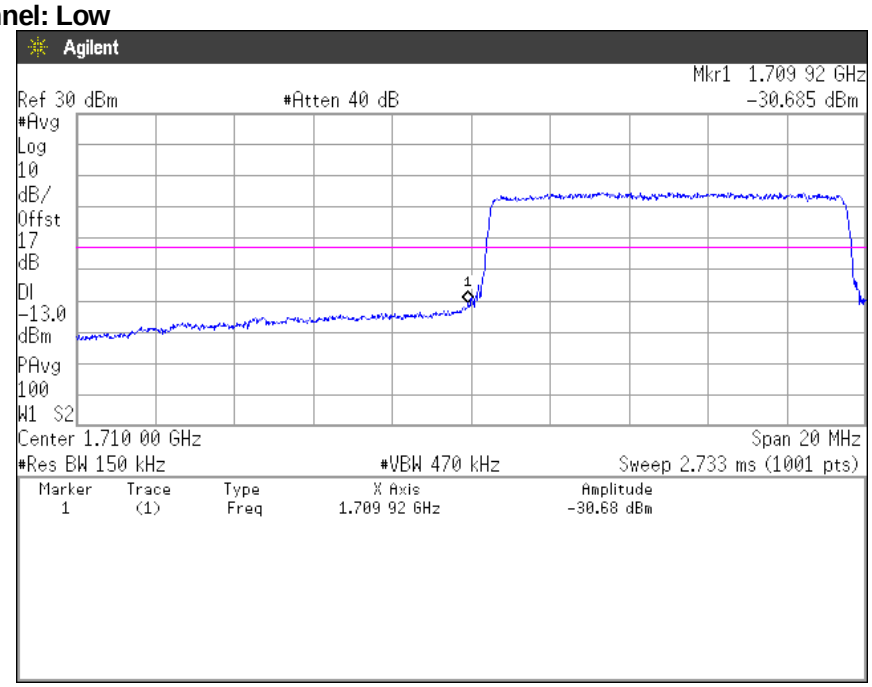


16QAM, BW 10MHz, RB1-49

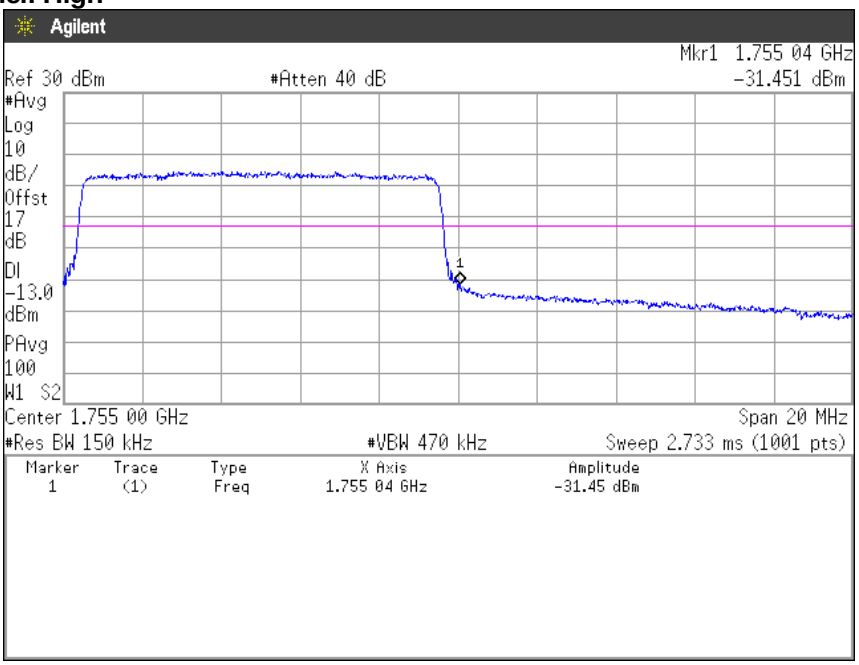
Channel: High



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



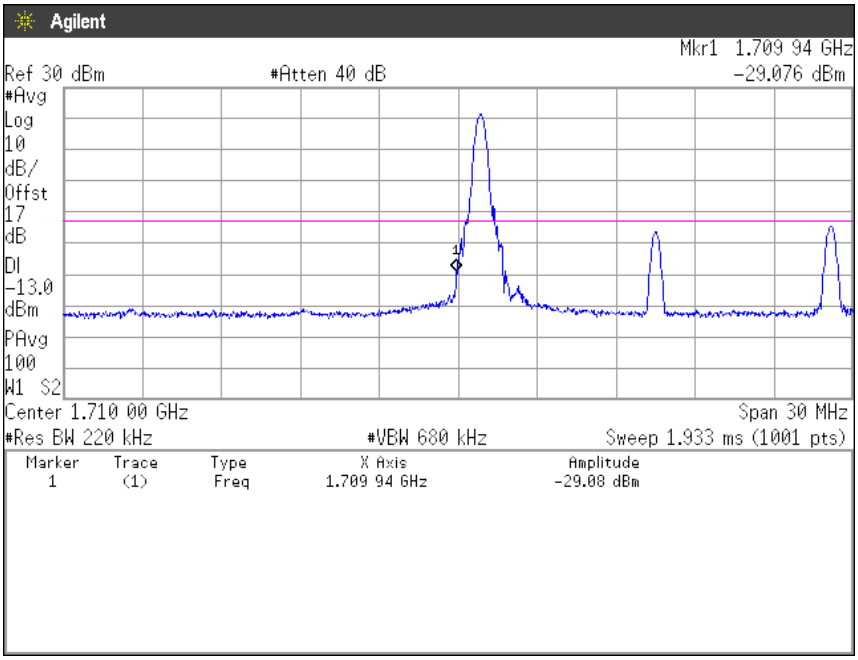
16QAM, BW 10MHz, RB50-0
Channel: High



Zacta

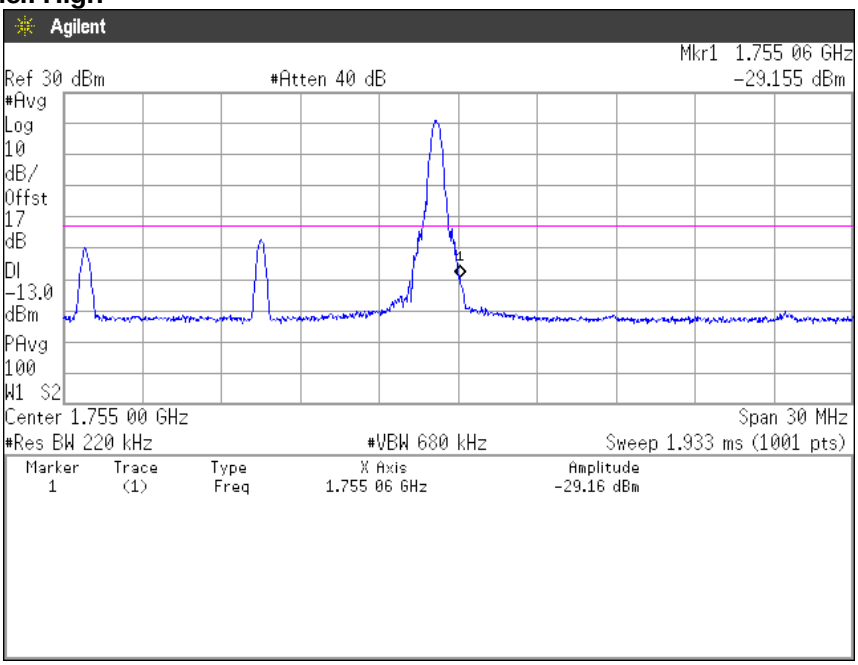
16QAM, BW 15MHz, RB1-0

Channel: Low



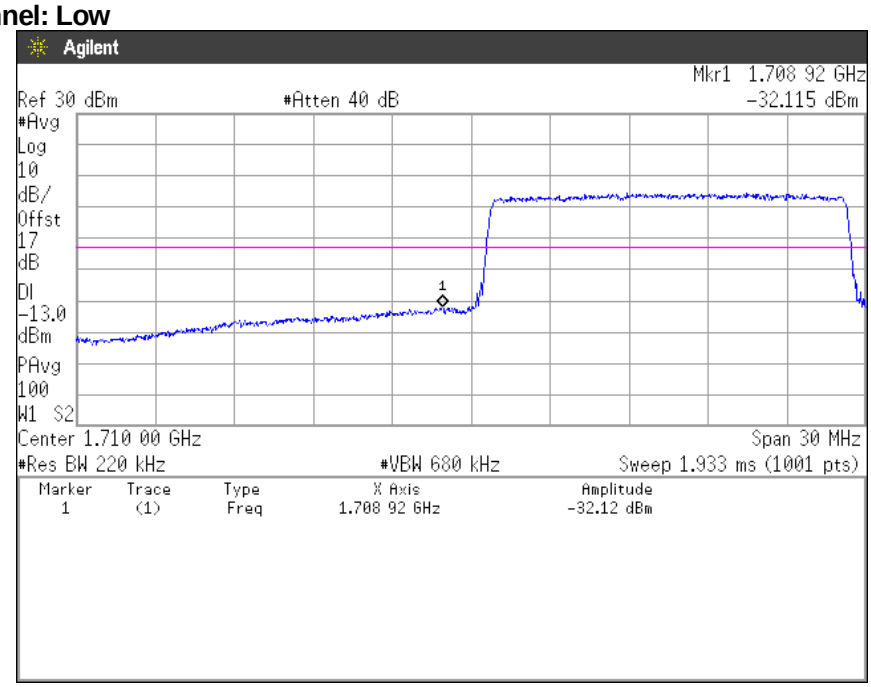
16QAM, BW 15MHz, RB1-74

Channel: High

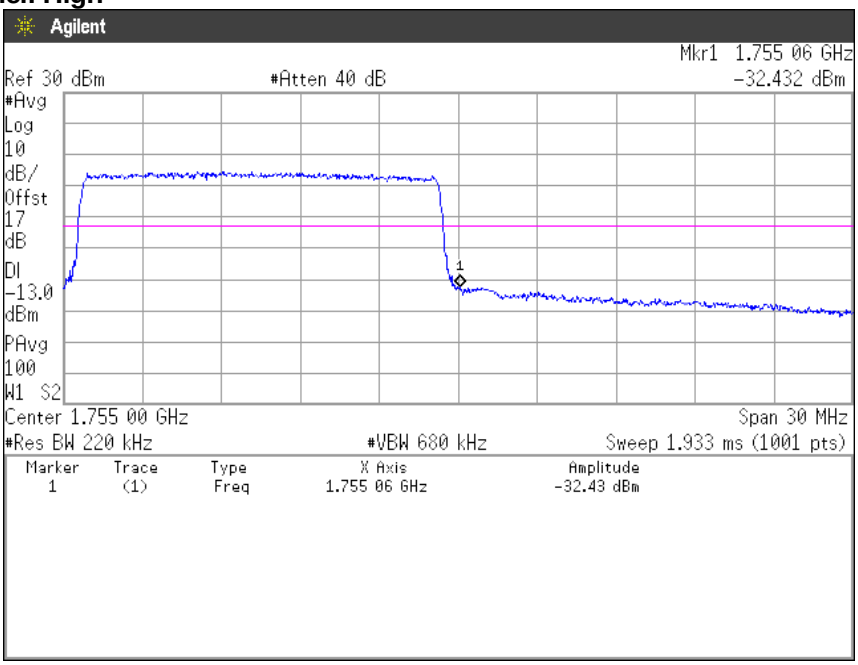


Zacta

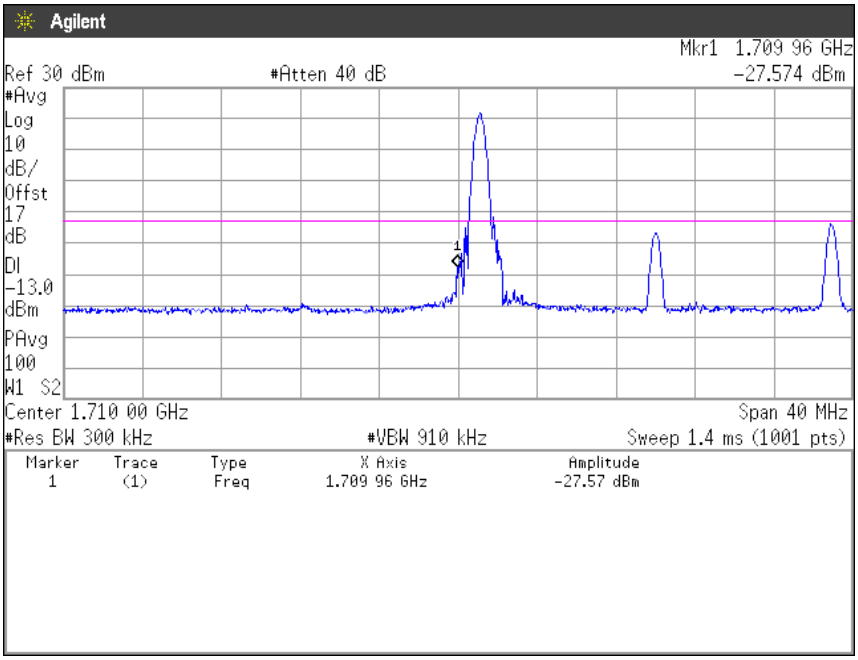
16QAM, BW 15MHz, RB75-0
Channel: Low



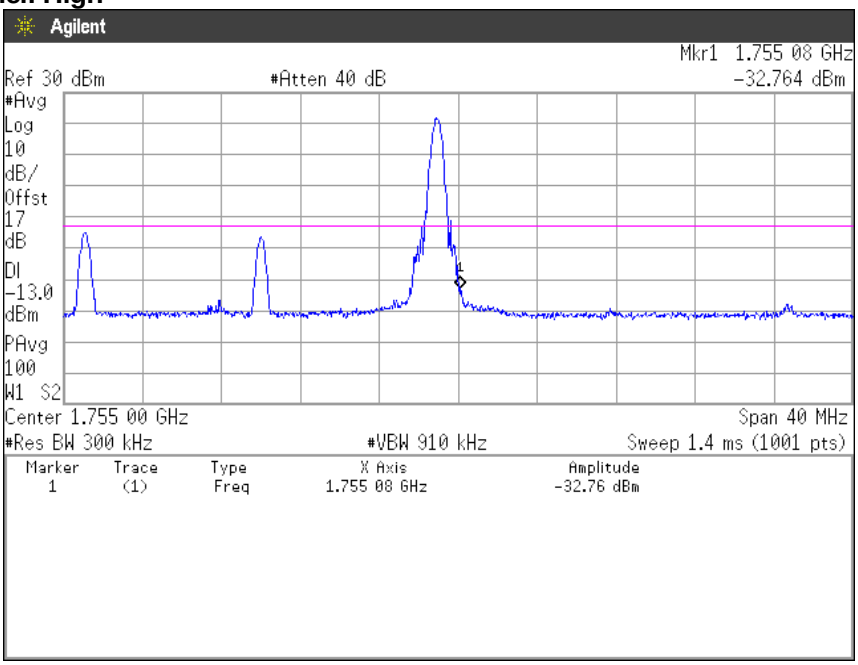
16QAM, BW 15MHz, RB75-0
Channel: High



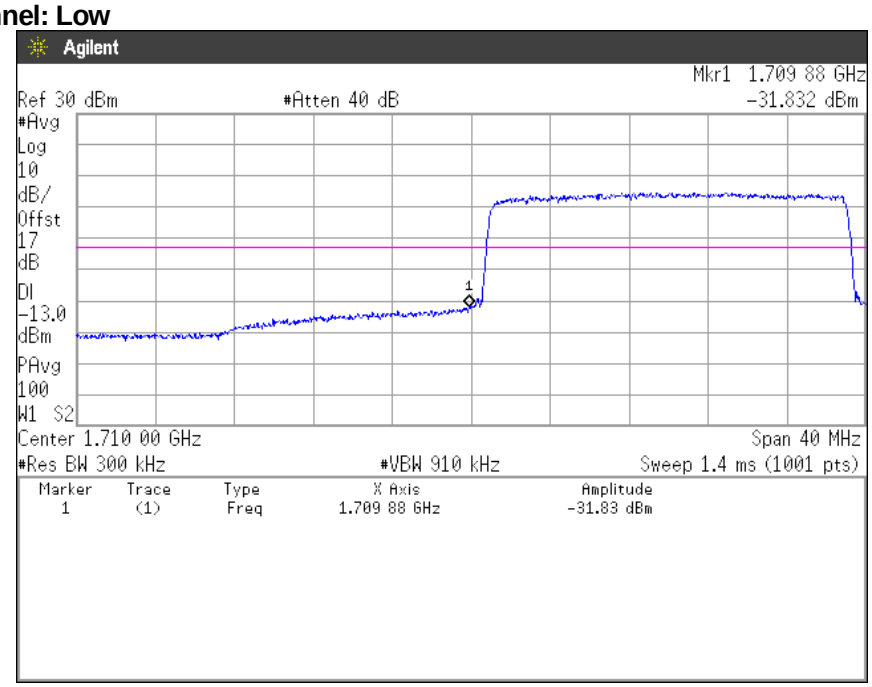
16QAM, BW 20MHz, RB1-0
Channel: Low



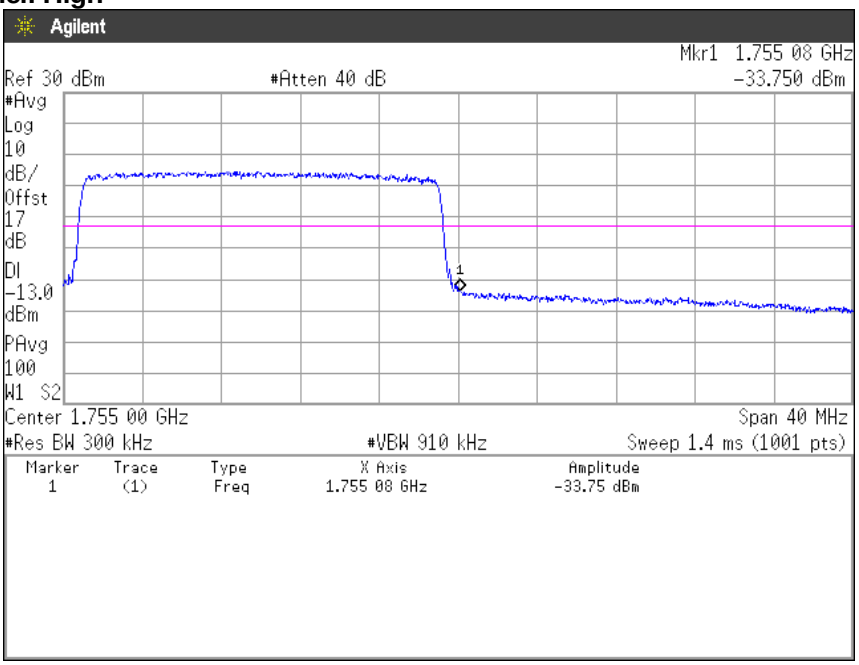
16QAM, BW 20MHz, RB1-99
Channel: High



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



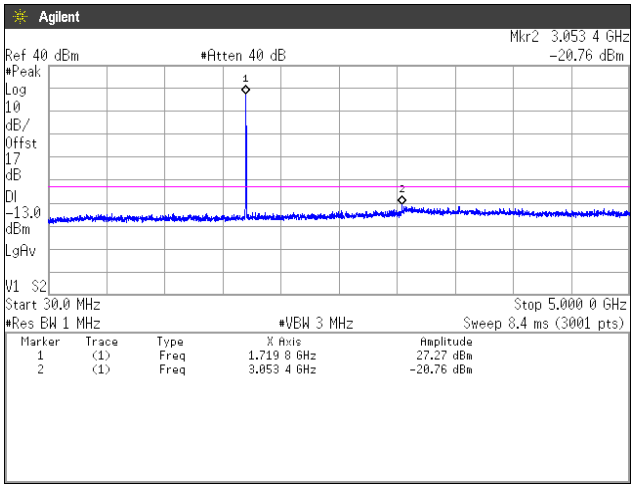
16QAM, BW 20MHz, RB100-0
Channel: High



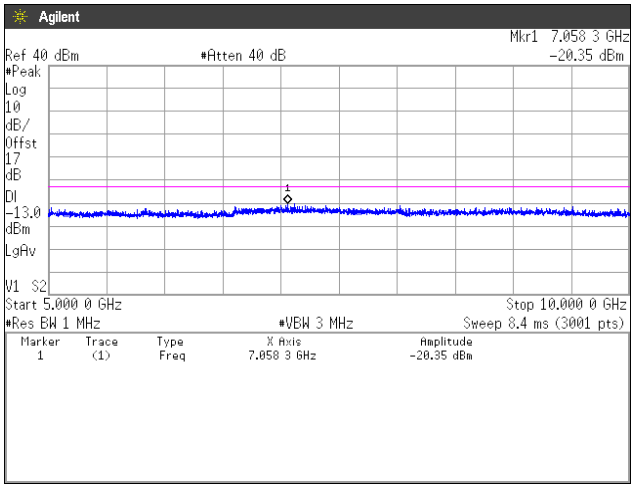
(Spurious Emissions)
Note: Conducted spurious test was measured in the worst case of conducted output power.

QPSK, BW 20MHz
Channel: 20050

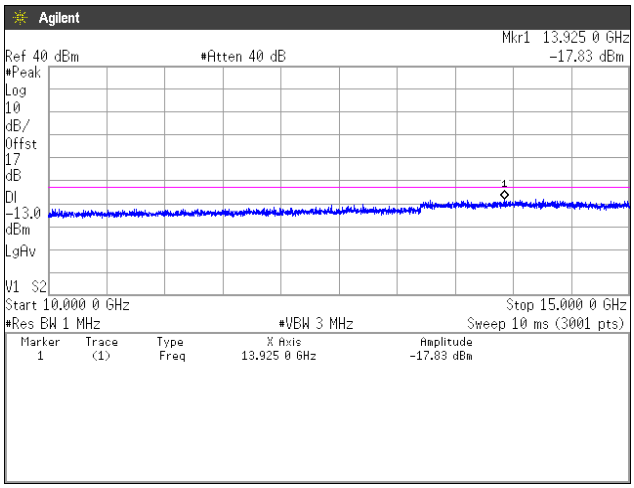
30MHz-5GHz



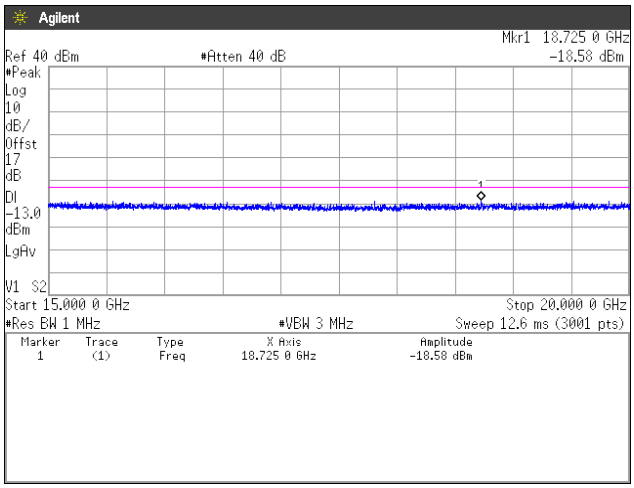
5GHz-10GHz



10GHz-15GHz

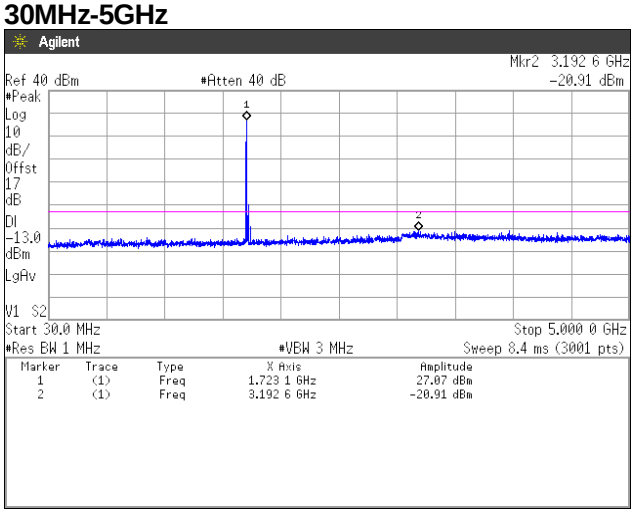


15GHz-20GHz

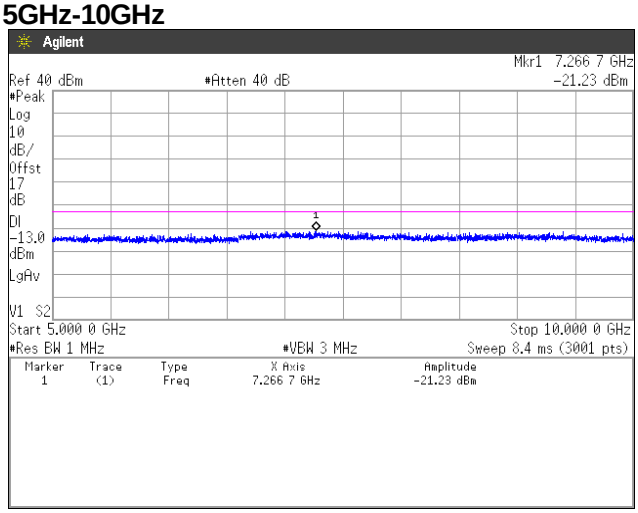


Channel: 20175

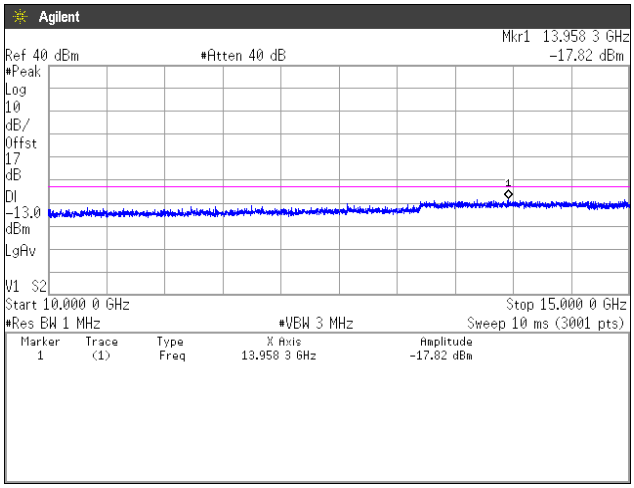
30MHz-5GHz



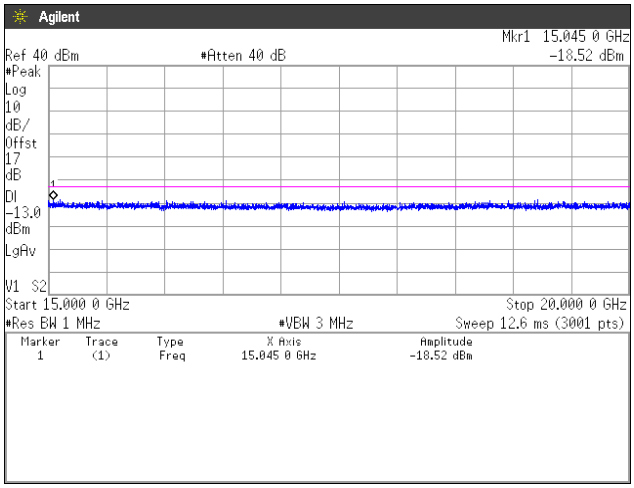
5GHz-10GHz



10GHz-15GHz

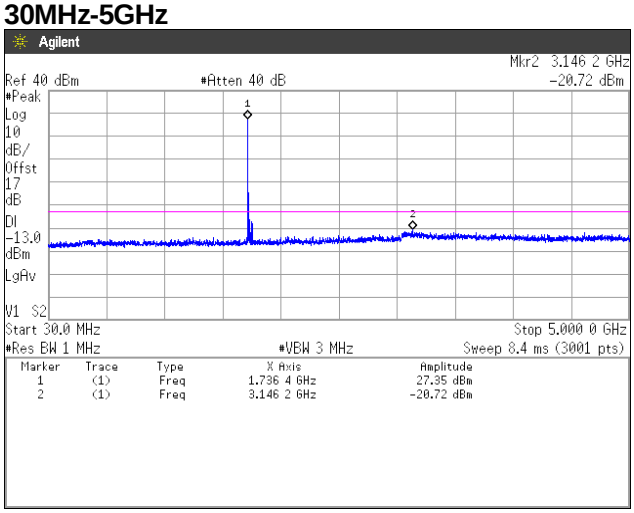


15GHz-20GHz

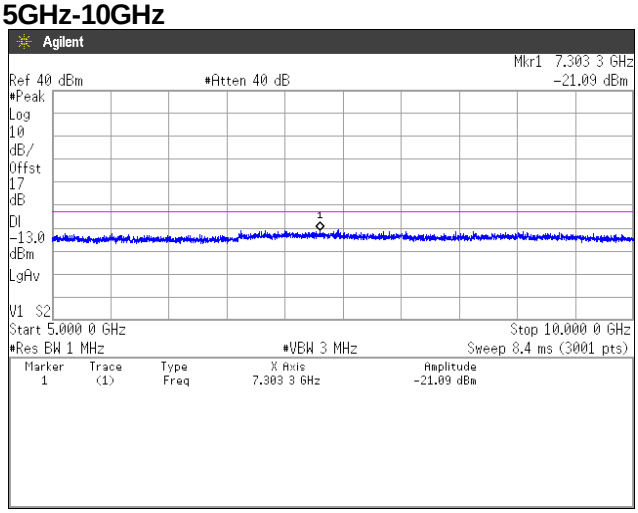


Channel: 20300

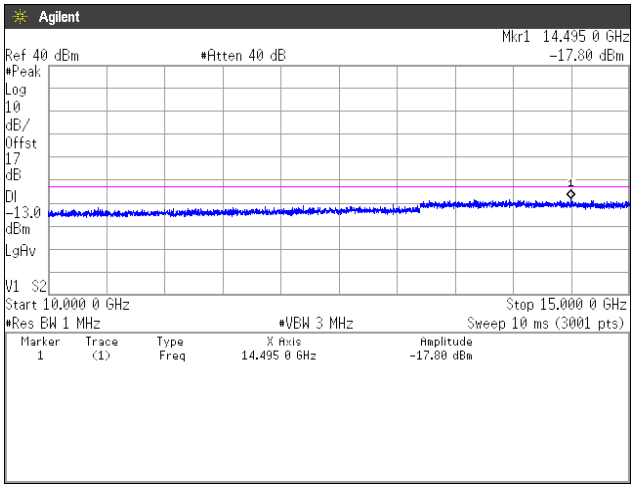
30MHz-5GHz



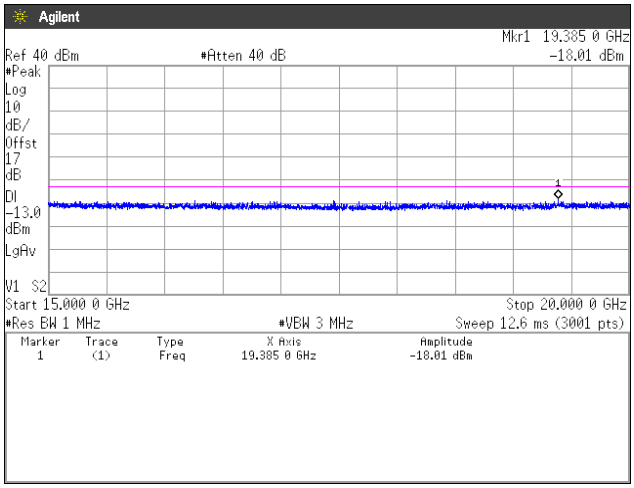
5GHz-10GHz



10GHz-15GHz



15GHz-20GHz



8. Radiated Emissions and Harmonic Emissions

8.1 Measurement procedure [FCC 27.53, 2.1053]

<Step 1>

The EUT and support equipment are placed on a 1 meter x 1 meter surface, 0.8 meter height 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 1MHz. The turntable is rotated by 360 degrees and stopped at azimuth of producing the maximum emission. The frequency is investigated up to 20GHz.

<Step 2>

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

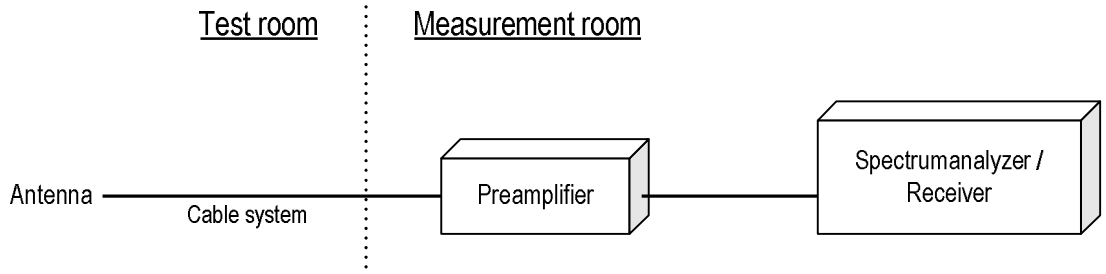
The frequency of the signal generator is adjusted to the measurement frequency.

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

- Test configuration



8.2 Calculation method

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

Example:
Limit @ 3465.0MHz : -13.0dBm
Ant. Input = -50.7dBm Cable loss = 1.6dB Ant. Gain = 9.1dBi
Result = -50.7 - 1.6 + 9.1 = -43.2dBm
Margin = -13.0 - (-43.2) = 30.2dB

8.3 Limit

-13dBm or less

8.4 Test data

Date	:	March 27, 2018			
Temperature	:	20.0 [˚C]			
Humidity	:	22.8 [%]	Test engineer	:	
Test place	:	3m Semi-anechoic chamber			Tadahiro Seino

Date	:	April 2~3, 2018			
Temperature	:	21.4 [˚C]			
Humidity	:	27.3 [%]	Test engineer	:	
Test place	:	3m Semi-anechoic chamber			Tadahiro Seino

Date	:	April 5, 2018			
Temperature	:	20.7 [˚C]			
Humidity	:	31.9 [%]	Test engineer	:	
Test place	:	3m Semi-anechoic chamber			Tadahiro Seino

Date	:	April 5~6, 2018			
Temperature	:	24.0 [˚C]			
Humidity	:	20.3 [%]	Test engineer	:	
Test place	:	3m Semi-anechoic chamber			Tadahiro Seino

Date	:	April 9, 2018			
Temperature	:	20.4 [˚C]			
Humidity	:	23.6 [%]	Test engineer	:	
Test place	:	3m Semi-anechoic chamber			Tadahiro Seino

[WCDMA Band IV]

Channel: 1312

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3424.8	-53.8	-54.4	1.6	9.7	-46.2	-13.0	33.2

Channel: 1413

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3465.2	-53.6	-53.5	1.6	9.8	-45.3	-13.0	32.3

Channel: 1513

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3505.2	-53.2	-53.1	1.6	9.9	-44.8	-13.0	31.8

Zacta

[LTE Band IV]
QPSK, BW 1.4MHz
Channel: 19957

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3421.4	-53.6	-53.6	1.6	9.7	-45.4	-13.0	32.4

Channel: 20175

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3465.0	-53.7	-54.1	1.6	9.8	-45.9	-13.0	32.9

Channel: 20393

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3508.6	-53.9	-56.8	1.6	9.9	-48.5	-13.0	35.5

16QAM, BW 1.4MHz
Channel: 19957

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3421.4	-54.2	-55.7	1.6	9.7	-47.5	-13.0	34.5

Channel: 20175

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3465.0	-54.0	-54.6	1.6	9.8	-46.4	-13.0	33.4

Channel: 20393

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3508.6	-54.7	-58.0	1.6	9.9	-49.7	-13.0	36.7

Zacta

QPSK, BW 3MHz
Channel: 19965

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3423.0	-54.2	-56.7	1.6	9.7	-48.5	-13.0	35.5

Channel: 20175

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3465.0	-52.8	-50.9	1.6	9.8	-42.7	-13.0	29.7

Channel: 20385

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3507.0	-52.6	-51.1	1.6	9.9	-42.8	-13.0	29.8

16QAM, BW 3MHz
Channel: 19965

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3423.0	-53.1	-53.7	1.6	9.7	-45.5	-13.0	32.5

Channel: 20175

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3465.0	-52.7	-50.8	1.6	9.8	-42.6	-13.0	29.6

Channel: 20385

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3507.0	-51.7	-48.9	1.6	9.9	-40.6	-13.0	27.6

QPSK, BW 5MHz
Channel: 19975

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3425.0	-53.0	-53.1	1.6	9.7	-44.9	-13.0	31.9

Channel: 20175

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3465.0	-52.1	-49.7	1.6	9.8	-41.5	-13.0	28.5

Channel: 20375

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3505.0	-51.5	-48.0	1.6	9.9	-39.7	-13.0	26.7

16QAM, BW 5MHz
Channel: 19975

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3425.0	-53.2	-53.6	1.6	9.7	-45.4	-13.0	32.4

Channel: 20175

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3465.0	-52.6	-50.6	1.6	9.8	-42.4	-13.0	29.4

Channel: 20375

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3505.0	-52.9	-51.7	1.6	9.9	-43.4	-13.0	30.4

QPSK, BW 10MHz
Channel: 20000

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3430.0	-53.4	-54.0	1.6	9.7	-45.8	-13.0	32.8

Channel: 20175

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3465.0	-53.2	-51.8	1.6	9.8	-43.6	-13.0	30.6

Channel: 20350

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3500.0	-51.9	-49.2	1.6	9.9	-40.9	-13.0	27.9

16QAM, BW 10MHz
Channel: 20000

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3430.0	-53.4	-54.0	1.6	9.7	-45.8	-13.0	32.8

Channel: 20175

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3465.0	-52.4	-50.0	1.6	9.8	-41.8	-13.0	28.8

Channel: 20350

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3500.0	-51.6	-48.4	1.6	9.9	-40.1	-13.0	27.1

Zacta

QPSK, BW 15MHz
Channel: 20025

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3435.0	-53.2	-53.8	1.6	9.7	-45.6	-13.0	32.6

Channel: 20175

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3465.0	-52.4	-50.0	1.6	9.8	-41.8	-13.0	28.8

Channel: 20325

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3495.0	-51.6	-48.7	1.6	9.9	-40.4	-13.0	27.4

16QAM, BW 15MHz
Channel: 20025

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3435.0	-53.7	-54.8	1.6	9.7	-46.6	-13.0	33.6

Channel: 20175

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3465.0	-52.7	-50.6	1.6	9.8	-42.4	-13.0	29.4

Channel: 20325

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3495.0	-51.3	-48.0	1.6	9.9	-39.7	-13.0	26.7

Zacta

QPSK, BW 20MHz
Channel: 20050

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3440.0	-52.2	-50.3	1.6	9.7	-42.1	-13.0	29.1

Channel: 20175

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3465.0	-52.3	-49.9	1.6	9.8	-41.7	-13.0	28.7

Channel: 20300

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3490.0	-51.9	-48.8	1.6	9.8	-40.5	-13.0	27.5

16QAM, BW 20MHz
Channel: 20050

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3440.0	-52.9	-51.3	1.6	11.9	-40.9	-13.0	27.9

Channel: 20175

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3465.0	-51.8	-48.7	1.6	12.0	-38.3	-13.0	25.3

Channel: 20300

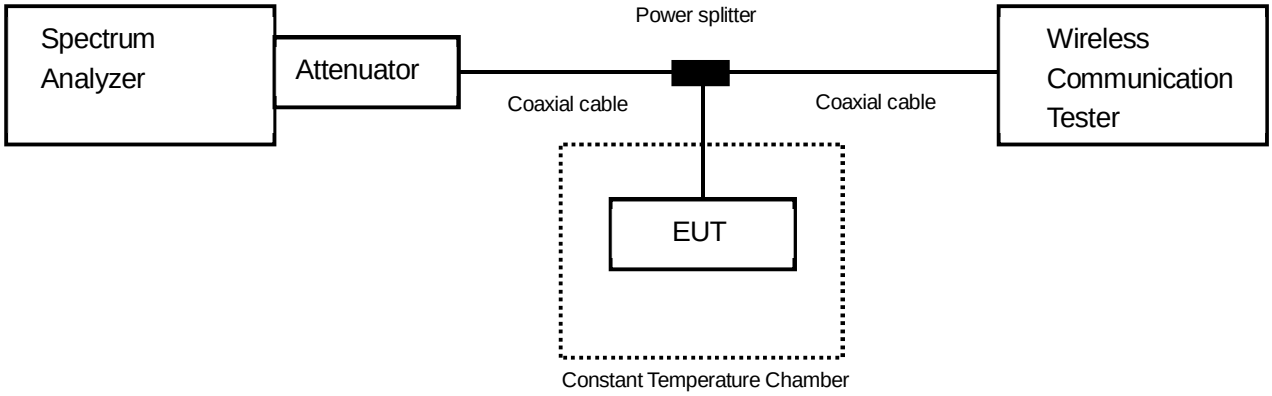
H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	3490.0	-52.1	-49.6	1.6	12.0	-39.1	-13.0	26.1

9. Frequency Stability

9.1 Measurement procedure [FCC 27.54, 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



9.2 Limit

±2.5ppm

9.3 Measurement result

Date	:	May 22, 2018			
Temperature	:	23.3 [˚C]			
Humidity	:	36.7 [%]	Test engineer	:	
Test place	:	Shielded room No.4			Tadahiro Seino

Date	:	May 25, 2018			
Temperature	:	22.7 [˚C]			
Humidity	:	45.6 [%]	Test engineer	:	
Test place	:	Shielded room No.4			Tadahiro Seino

[WCDMA Band IV]
Channel: 1413

Limit: ±0.00025% = ±2.5ppm					
Power Supply [V]	Temperature [ºC]	Measurements Frequency [Hz]	Frequency Tolerance [ppm]	Limit [ppm]	Result
3.80	25(Ref.)	1,732,599,995	0.00000	±2.5	Pass
	50	1,732,600,003	0.00432	±2.5	Pass
	40	1,732,600,004	0.00502	±2.5	Pass
	30	1,732,599,995	-0.00024	±2.5	Pass
	20	1,732,600,002	0.00387	±2.5	Pass
	10	1,732,600,003	0.00461	±2.5	Pass
	0	1,732,599,997	0.00102	±2.5	Pass
	-10	1,732,600,002	0.00393	±2.5	Pass
	-20	1,732,600,004	0.00515	±2.5	Pass
	-30	1,732,600,005	0.00591	±2.5	Pass
3.42	25	1,732,599,997	0.00102	±2.5	Pass
4.18	25	1,732,600,004	0.00499	±2.5	Pass

[LTE Band IV]
QPSK, BW 20MHz
Channel: 20175

Limit: ±0.00025% = ±2.5ppm					
Power Supply [V]	Temperature [ºC]	Measurements Frequency [Hz]	Frequency Tolerance [ppm]	Limit [ppm]	Result
3.80	25(Ref.)	1,732,500,007	0.00000	±2.5	Pass
	50	1,732,500,006	-0.00100	±2.5	Pass
	40	1,732,500,005	-0.00169	±2.5	Pass
	30	1,732,499,993	-0.00858	±2.5	Pass
	20	1,732,500,005	-0.00137	±2.5	Pass
	10	1,732,500,008	0.00017	±2.5	Pass
	0	1,732,500,004	-0.00173	±2.5	Pass
	-10	1,732,499,995	-0.00735	±2.5	Pass
	-20	1,732,500,028	0.01165	±2.5	Pass
	-30	1,732,500,011	0.00222	±2.5	Pass
3.42	25	1,732,499,995	-0.00716	±2.5	Pass
4.18	25	1,732,500,004	-0.00197	±2.5	Pass

Calculation;

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

10. Uncertainty of measurement

Expanded uncertainties stated are calculated with a coverage Factor k=2.
Please note that these results are not taken into account when determining compliance or non-compliance with test result.

Test item	Measurement uncertainty
Conducted emission, AMN (9kHz – 150kHz)	±3.8dB
Conducted emission, AMN (150kHz – 30MHz)	±3.3dB
Radiated emission (9kHz – 30MHz)	±3.0dB
Radiated emission (30MHz – 1000MHz)	±4.7dB
Radiated emission (1GHz – 6GHz)	±4.9dB
Radiated emission (6GHz – 18GHz)	±5.2dB
Radiated emission (18GHz – 40GHz)	±5.8dB

11. Laboratory Information

1. Location

Name: Yonezawa Testing Center
Address: 5-4149-7, Hachimanpara, Yonezawa-shi, Yamagata, 992-1128 Japan
Phone: +81-238-28-2881
Fax: +81-238-28-2888

2. Accreditation and Registration

1) VLAC
Accreditation No.: VLAC-013

2) NVLAP
LAB CODE: 200306-0

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

4) Industry Canada

Site number	Facility	Expiration date
4224A-4	3m Semi-anechoic chamber	2020-11-27
4224A-5	10m Semi-anechoic chamber No.1	2020-11-27
4224A-6	10m Semi-anechoic chamber No.2	2019-12-14

5) VCCI Council

Registration number	Expiration date
A-0166	2019-07-03

Appendix A. Test equipment

Antenna port conducted test

Equipment	Company	Model No.	Serial No.	Cal. Due	Cal. Date
Spectrum analyzer	Agilent Technologies	E4440A	US44302655	Jun. 30, 2018	Jun. 28, 2017
Attenuator	Weinschel	56-10	J4993	Dec. 31, 2018	Dec. 4, 2017
Microwave cable	HUBER+SUHNER	SUCOFLEX 104	199119/4	Mar. 31, 2019	Mar. 1, 2018
Power divider	ANRITSU	K240B	020205	Jul. 31, 2018	Jul. 21, 2017
Wideband Radio Frequency Tester	ROHDE&SCHWARZ	CMW500	126079	Oct. 31, 2018	Oct. 13, 2017
Temperature and humidity chamber	ESPEC	PL1KP	14007261	Dec. 31, 2018	Dec. 20, 2017

Radiated emission

Equipment	Company	Model No.	Serial No.	Cal. Due	Cal. Date
EMI Receiver	ROHDE&SCHWARZ	ESCI	100765	Sep. 30, 2018	Sep. 13, 2017
Spectrum analyzer	Agilent Technologies	E4440A	US40420937	Oct. 31, 2018	Oct. 19, 2017
Preamplifier	SONOMA	310	372170	Sep. 30, 2018	Sep. 12, 2017
Biconical antenna	Schwarzbeck	VHA9103/BBA9106	2155	Jul. 31, 2018	Jul. 18, 2017
Log periodic antenna	Schwarzbeck	UHALP9108A	0560	Jul. 31, 2018	Jul. 18, 2017
Attenuator	TME	CFA-01NPJ-6	N/A(S275)	Jan. 31, 2019	Jan. 18, 2018
Attenuator	TME	CFA-01NPJ-3	N/A(S272)	Jan. 31, 2019	Jan. 18, 2018
Preamplifier	TSJ	MLA-100M18-B02-40	1929118	Jan. 31, 2019	Jan. 18, 2018
Attenuator	AEROFLEX	26A-10	081217-08	Jan. 31, 2019	Jan. 18, 2018
Double ridged guide antenna	ETS LINDGREN	3117	00052315	Mar. 31, 2019	Mar. 14, 2018
Attenuator	Agilent Technologies	8491B	MY39268633	Mar. 31, 2019	Mar. 14, 2018
Double ridged guide antenna	A.H.Systems Inc.	SAS-574	469	Aug. 31, 2018	Aug. 8, 2017
Preamplifier	TSJ	MLA-1840-B03-35	1240332	Aug. 31, 2018	Aug. 8, 2017
Band rejection filter	Micro-Tronics	BRC50719	014	Dec. 31, 2018	Dec. 5, 2017
High Pass Filter	Wainwright	WHKX2.8/18G-6SS	1	Jul. 31, 2018	Jul. 20, 2017
Signal generator	ROHDE&SCHWARZ	SMB100A	177525	Jun. 30, 2018	Jun. 12, 2017
RF power amplifier	R&K	CGA020M602-2633R	B40240	May 31, 2018	May 26, 2017
Microwave cable	HUBER+SUHNER	SUCOFELX102/2m	31648	Mar. 31, 2019	Mar. 1, 2018
Dipole antenna	Schwarzbeck	VHAP	1021	Aug. 31, 2018	Aug. 2, 2017
Dipole antenna	Schwarzbeck	UHAP	993	Aug. 31, 2018	Aug. 2, 2017
Double ridged guide antenna	EMCO	3115	00058532	Jan. 31, 2019	Jan. 18, 2018
Wideband Radio Frequency Tester	ROHDE&SCHWARZ	CMW500	126079	Oct. 31, 2018	Oct. 13, 2017
Microwave cable	HUBER+SUHNER	SUCOFLEX104/9m	MY30037/4	Jan. 31, 2019	Jan. 18, 2018
		SUCOFLEX104/1m	my24610/4	Jan. 31, 2019	Jan. 18, 2018
		SUCOFLEX104/8m	SN MY30031/4	Jan. 31, 2019	Jan. 18, 2018
		SUCOFLEX104	MY32976/4	Jan. 31, 2019	Jan. 18, 2018
		SUCOFLEX104/1.5m	MY19309/4	Jan. 31, 2019	Jan. 19, 2018
		SUCOFLEX104/7m	41625/6	Jan. 31, 2019	Jan. 19, 2018
PC	DELL	DIMENSION E521	75465BX	N/A	N/A
Software	TOYO Corporation	EP5/RE-AJ	0611193/V5.6.0	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)	May 31, 2018	May 30, 2017
3m Semi an-echoic Chamber	TOKIN	N/A	N/A(9002-SVSWR)	May 31, 2018	May 31, 2017

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