Zacta

TEST REPORT

Report number : Z101C-15069
Issue date : August 21, 2015

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

FCC Part 27 Subpart C
IC RSS-130

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

Applicant	:	KYOCERA Corporation
Equipment under test (EUT)	:	Module
Model number	:	KA36
FCC ID	:	JOYKA36
IC Certification Number	:	574B-KA36

Date of test : June 15-17, 20, 25, 2015

Test place : TÜV SÜD Zacta Ltd. Yonezawa Testing Center
4149-7 Hachimanpara 5-chome
Yonezawa-shi Yamagata 992-1128 Japan
Phone: +81-238-28-2880 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, or any agency of the federal government.

Tested by : Taiki Watanabe

Tested by : Hikaru Shibata

Authorized by : Hiroaki Suzuki
Manager of EMC Technical Department

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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, IC RSS-130.

1.2 Standards

CFR47 FCC Part 27 Subpart C
IC RSS-130

1.2.1 Test Methods

KDB 971168 D01 Power Meas License Digital Systems v02r02
ANSI/TIA/EIA-603-D-2010

1.2.2 Deviation from standards

None

1.3 List of applied test to the EUT

FCC Section	IC Section	Test items	Condition	Result
2.1046	N/A	Conducted Output Power	Conducted	PASS
27.50(c)(10)	RSS-130 4.4	Effective Radiated Power	Radiated	PASS
27.50(d)(5)	N/A	Peak to Average Ratio	Conducted	PASS
2.1049	RSS-130 4.3	Occupied Bandwidth	Conducted	PASS
27.53(g) 2.1051	RSS-130 4.6	Band Edge Spurious and Harmonic at Antenna Terminal	Conducted	PASS
27.53(g) 2.1053	RSS-130 4.6	Radiated emissions and Harmonic Emissions	Radiated	PASS
27.54 2.1055	RSS-130 4.3	Frequency Stability	Conducted	PASS

1.3.1 Test set up

Table-Top

1.4 Modification to the EUT by laboratory

None

2. Equipment Under Test

2.1 General Description of equipment

EUT is the Module.

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	:	Module
Trade name	:	Kyocera
Model number	:	KA36
Serial number	:	N/A
EUT condition	:	Pre-Production
Power ratings	:	DC 3.9V
Size	:	(W) 40.0 × (D) 40.0 × (H) 4.3 mm
Environment	:	Indoor and Outdoor use
Terminal limitation	:	-20˚C to 60˚C
RF Specification		
Frequency of Operation	:	Up Link LTE Band X II: 699-716MHz Down Link LTE Band X II: 729-746MHz
Modulation type	:	QPSK, 16QAM
Emission designator	:	BW 1.4M QPSK: 1M10G7W, 16QAM: 1M11D7W BW 3M QPSK: 2M72 G7W, 16QAM: 2M72 D7W BW 5M QPSK: 4M52 G7W, 16QAM: 4M53 D7W BW 10M QPSK: 9M01 G7W, 16QAM: 9M01 D7W
Conducted Output power	:	QPSK: 0.190W (22.78dBm) 16QAM: 0.152W (21.83dBm)
Antenna type	:	External antenna
Antenna gain	:	2.41dBi

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	Channel	Frequency [MHz]
LTE Band X II	QPSK	1.4MHz	23017	699.7
			23095	707.5
			23173	715.3
		3MHz	23025	700.5
			23095	707.5
			23165	714.5
		5MHz	23035	701.5
			23095	707.5
			23155	713.5
		10MHz	23060	704.0
			23095	707.5
			23130	711.0
	16QAM	1.4MHz	23017	699.7
			23095	707.5
			23173	715.3
		3MHz	23025	700.5
			23095	707.5
			23165	714.5
		5MHz	23035	701.5
			23095	707.5
			23155	713.5
		10MHz	23060	704.0
			23095	707.5
			23130	711.0

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 Y axis and the worst case recorded.

3. Configuration of equipment

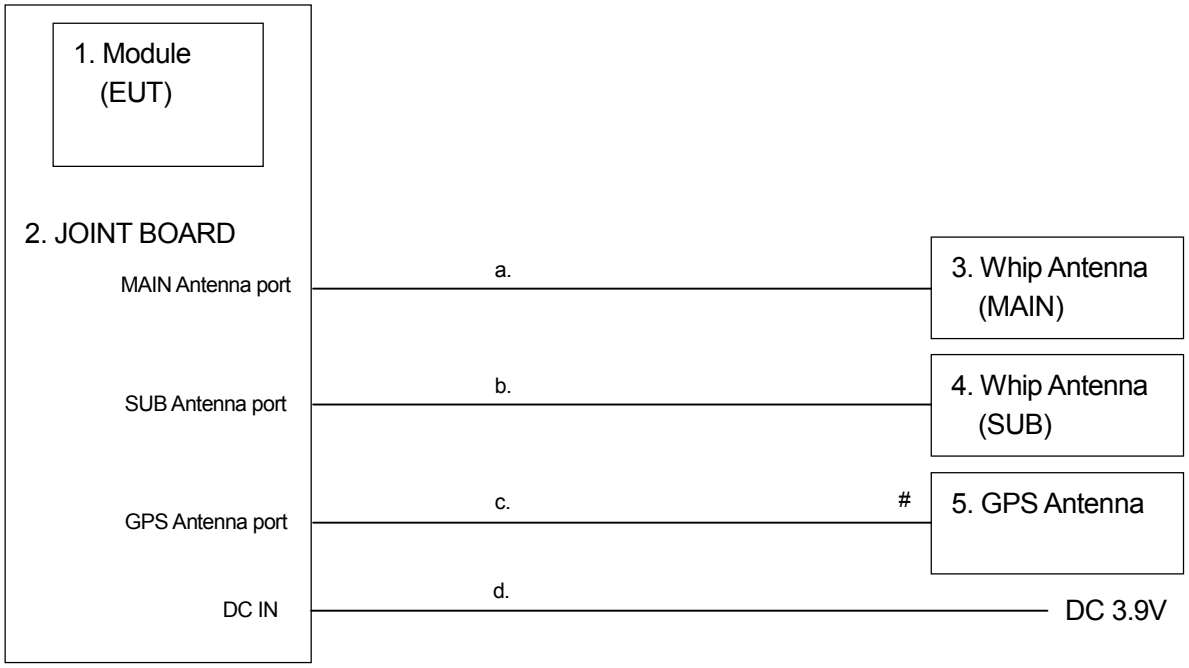
3.1 Equipment(s) used

No.	Equipment	Company	Model No.	Serial No.	FCC ID / DoC	Comment
1	Module	KYOCERA	KA36	N/A	JOYKA36	EUT
2	JOINT BOARD	KYOCERA	N/A	N/A	N/A	-
3	Whip Antenna	STAF	N/A	N/A	N/A	-
4	Whip Antenna	EAD	PTR7210	N/A	N/A	-
5	GPS Antenna	PASTERNACK	PE51066	N/A	N/A	-

3.2 Cable(s) used

No.	Cable	Length[m]	Shield	Connector	Comment
a	RF cable (MAIN)	0.3	YES	Metal	-
b	RF cable (SUB)	0.3	YES	Metal	-
c	GPS Antenna cable	5.0	YES	Metal	-
d	DC cable	1.3	NO	Plastic	-

3.3 System configuration



: Un-detachable cable

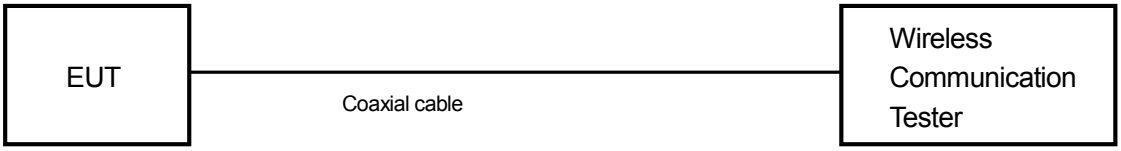
Note1: Numbers assigned to equipment or cables on this diagram correspond to the list in “3.1 Equipment(s) used” and “3.2 Cable(s) used”.

4. Conducted Output Power

4.1 Measurement procedure [FCC 2.1046]

The conducted output power was measured with a wireless communication tester connected to the antenna terminal. The wireless communication tester parameters were set to produce the maximum power from the EUT.

- Test configuration



4.2 Measurement result

Date : June 15, 2015
Temperature : 24.3 [˚C]
Humidity : 45.4 [%]
Test place : Shielded room No.4

Test engineer : Hikaru Shibata

Band	BW [MHz]	Mode	RB Allocation	RB offset	Target MPR	Avg Power[dBm]		
						23017	23095	23173
						699.7 MHz	707.5 MHz	715.3 MHz
LTE Band 12	1.4	QPSK	1	0	0	22.30	22.71	22.82
			1	3	0	22.44	22.67	22.75
			1	5	0	22.48	22.70	22.72
			3	0	0	22.32	22.61	22.69
			3	1	0	22.40	22.58	22.70
			3	3	0	22.43	22.62	22.80
			6	0	1	21.59	21.75	21.85
		16QAM	1	0	1	21.37	21.50	21.70
			1	3	1	21.44	21.74	21.57
			1	5	1	21.54	21.68	21.54
			3	0	1	21.51	21.82	21.69
			3	1	1	21.42	21.56	21.69
			3	3	1	21.48	21.63	21.81
			6	0	2	20.50	20.61	20.81

Band	BW [MHz]	Mode	RB Allocation	RB offset	Target MPR	Avg Power[dBm]		
						23025	23095	23165
						700.5 MHz	707.5 MHz	714.5 MHz
LTE Band 12	3	QPSK	1	0	0	22.37	22.78	22.69
			1	8	0	22.39	22.68	22.68
			1	14	0	22.58	22.75	22.86
			8	0	1	21.58	21.80	21.70
			8	4	1	21.51	21.67	21.55
			8	7	1	21.63	21.81	21.79
			15	0	1	21.55	21.75	21.74
		16QAM	1	0	1	21.34	21.45	21.65
			1	8	1	21.33	21.72	21.45
			1	14	1	21.57	21.65	21.52
			8	0	2	20.45	20.65	20.67
			8	4	2	20.47	20.69	20.74
			8	7	2	20.44	20.83	20.67
			15	0	2	20.54	20.70	20.79

Band	BW [MHz]	Mode	RB Allocation	RB offset	Target MPR	Avg Power[dBm]		
						23035	23095	23155
						701.5 MHz	707.5 MHz	713.5 MHz
LTE Band 12	5	QPSK	1	0	0	22.46	22.74	22.48
			1	12	0	22.57	22.62	22.77
			1	24	0	22.62	22.66	22.88
			12	0	1	21.49	21.74	21.73
			12	7	1	21.60	21.73	21.70
			12	13	1	21.68	21.73	21.62
			25	0	1	21.68	21.72	21.62
		16QAM	1	0	1	21.34	21.68	21.24
			1	12	1	21.49	21.44	21.73
			1	24	1	21.40	21.62	21.83
			12	0	2	20.52	20.75	20.69
			12	7	2	20.62	20.71	20.70
			12	13	2	20.62	20.71	20.66
			25	0	2	20.52	20.71	20.70

Band	BW [MHz]	Mode	RB Allocation	RB offset	Target MPR	Avg Power[dBm]		
						23060	23095	23130
						704.0 MHz	707.5 MHz	711.0 MHz
LTE Band 12	10	QPSK	1	0	0	22.39	22.71	22.77
			1	25	0	22.76	22.58	22.75
			1	49	0	22.64	22.60	22.75
			25	0	1	21.52	21.69	21.68
			25	12	1	21.67	21.68	21.69
			25	25	1	21.76	21.71	21.61
			50	0	1	21.54	21.65	21.66
		16QAM	1	0	1	21.24	21.52	21.75
			1	25	1	21.65	21.45	21.63
			1	49	1	21.57	21.65	21.55
			25	0	2	20.58	20.79	20.77
			25	12	2	20.71	20.72	20.67
			25	25	2	20.73	20.71	20.73
			50	0	2	20.66	20.58	20.61

5. Effective Radiated Power

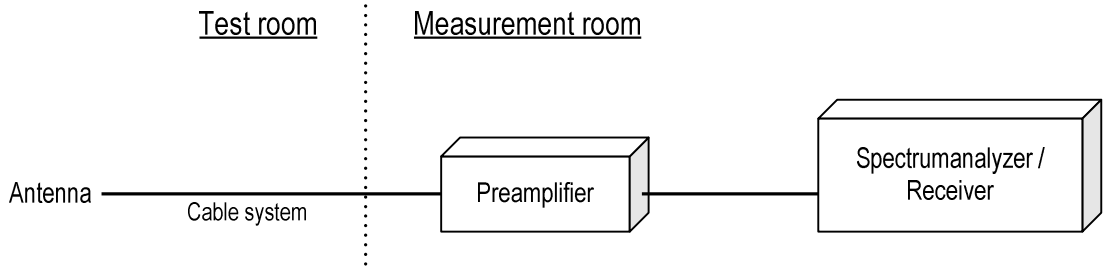
5.1 Measurement procedure
[FCC 27.50(c)(10), IC RSS-130 4.4]

<Step 1>
The EUT and support equipment are placed on a 1 meter x 1.5 meter surface, 0.8 meter height FRP 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.

Spectrum analyzer setting
- Detector: RMS Average (RBW: 430kHz, VBW: 1.5MHz)

- Test configuration



5.2 Calculation method

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

Example:
Limit @ 707.5MHz : 34.7dBm
S.G Reading = 30.3dBm Cable loss = 0.7dB Ant. Gain = -10.0dBd
Result = 30.3 - 0.7 + (-10.0) = 19.6dBm
Margin = 34.7- 19.6 = 15.1dB

5.3 Limit

3 W (34.7dBm)

5.4 Test data

Date : June 16, 2015
Temperature : 23.4 [˚C]
Humidity : 56.2 [%] Test engineer : Taiki Watanabe
Test place : 3m Semi-anechoic chamber

Date : June 17, 2015
Temperature : 23.9 [˚C]
Humidity : 57.7 [%] Test engineer : Hikaru Shibata
Test place : 3m Semi-anechoic chamber

[LTE Band X II]
QPSK, BW 1.4MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	699.7	-11.1	30.5	0.7	-10.0	19.8	34.7	14.9
H	707.5	-10.9	30.3	0.7	-10.0	19.6	34.7	15.1
H	715.3	-9.9	31.6	0.7	-10.1	20.8	34.7	13.9

16QAM, BW 1.4MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	699.7	-12.8	28.8	0.7	-10.0	18.1	34.7	16.6
H	707.5	-13.1	28.1	0.7	-10.0	17.4	34.7	17.3
H	715.3	-13.0	28.4	0.7	-10.1	17.6	34.7	17.1

QPSK, BW 3MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	700.5	-10.8	30.5	0.7	-10.0	19.8	34.7	14.9
H	707.5	-11.3	29.6	0.7	-10.0	18.9	34.7	15.8
H	714.5	-11.1	30.0	0.7	-10.1	19.2	34.7	15.5

16QAM, BW 3MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	700.5	-11.6	29.7	0.7	-10.0	19.0	34.7	15.7
H	707.5	-11.7	29.2	0.7	-10.0	18.5	34.7	16.2
H	714.5	-11.1	30.0	0.7	-10.1	19.2	34.7	15.5

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QPSK, BW 5MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	701.5	-11.6	29.5	0.7	-10.0	18.8	34.7	15.9
H	707.5	-11.5	29.3	0.7	-10.0	18.6	34.7	16.1
H	713.5	-11.2	29.5	0.7	-10.1	18.7	34.7	16.0

16QAM, BW 5MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	701.5	-11.8	29.3	0.7	-10.0	18.6	34.7	16.1
H	707.5	-11.8	29.0	0.7	-10.0	18.3	34.7	16.4
H	713.5	-11.2	29.5	0.7	-10.1	18.7	34.7	16.0

QPSK, BW 10MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	704.0	-12.4	28.4	0.7	-10.0	17.7	34.7	17.0
H	707.5	-12.2	28.6	0.7	-10.0	17.9	34.7	16.8
H	711.0	-12.8	28.0	0.7	-10.1	17.3	34.7	17.4

16QAM, BW 10MHz

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	704.0	-12.2	28.6	0.7	-10.0	17.9	34.7	16.8
H	707.5	-12.7	28.1	0.7	-10.0	17.4	34.7	17.3
H	711.0	-13.1	27.7	0.7	-10.1	17.0	34.7	17.7

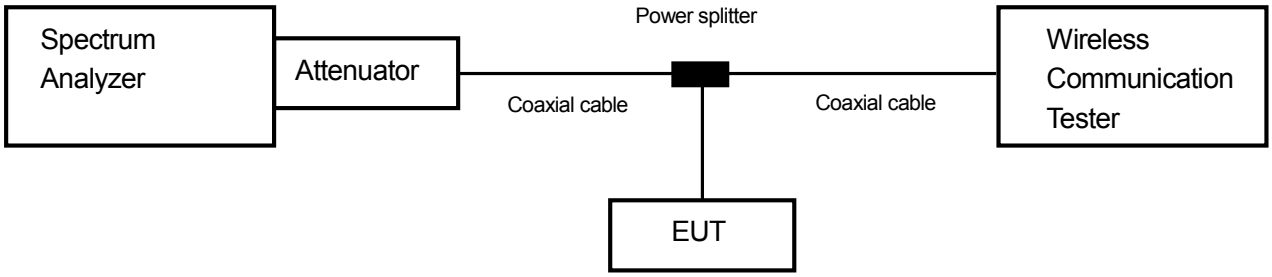
6. Peak to Average Ratio

6.1 Measurement procedure [FCC 27.50(d)(5)]

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

The spectrum analyzer is set to;
- Power Stat CCDF mode

- Test configuration



6.2 Limit

13.0dB or less

6.3 Measurement result

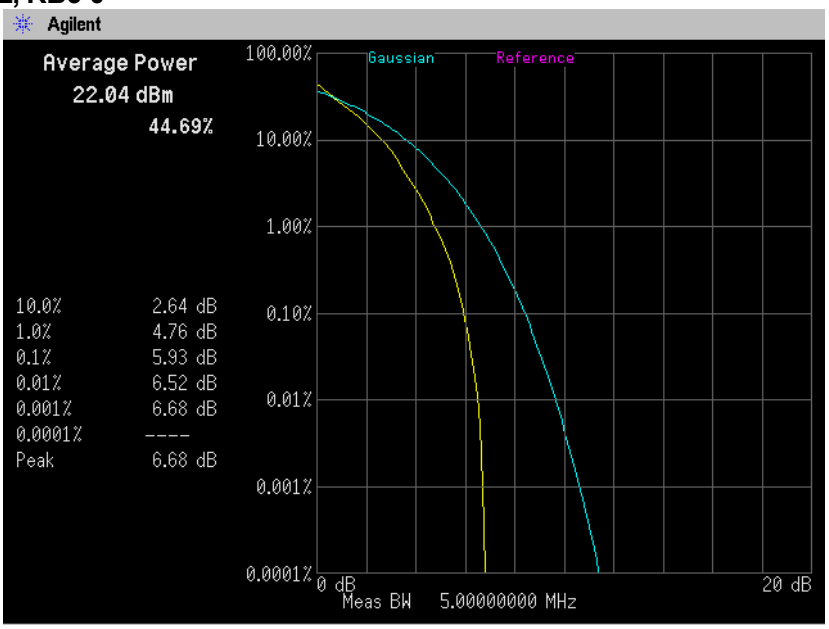
Date : June 20, 2015
Temperature : 24.2 [˚C]
Humidity : 53.7 [%]
Test place : Shielded room No.4

Test engineer : Hikaru Shibata

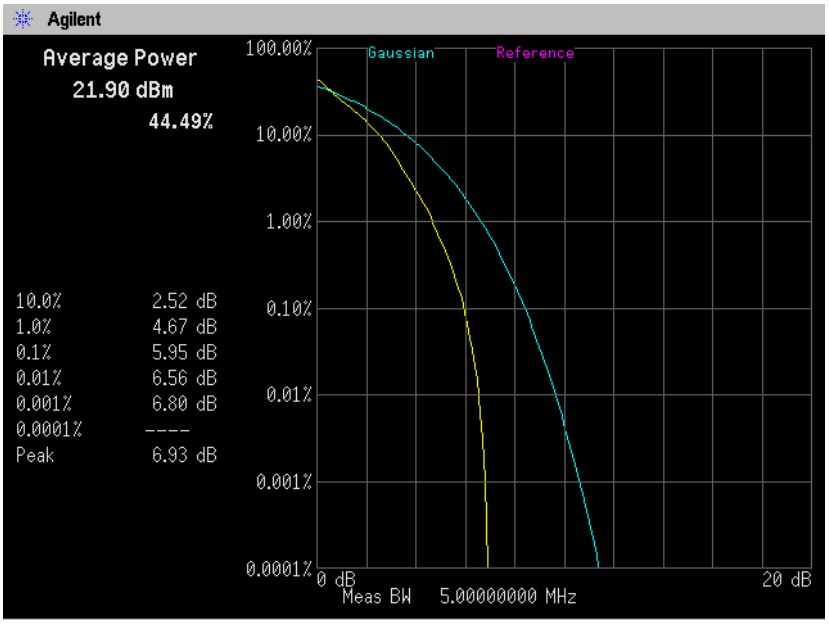
Band	Channel	Frequency [MHz]	Modulation	BW [MHz]	RB	Peak to Average Power Ratio [dB]	Limit [dB]
LTE Band X II	23095	707.5.0	QPSK	1.4	6-0	5.93	13.0
				3	15-0	5.95	13.0
				5	25-0	5.72	13.0
				10	50-0	4.52	13.0
			16QAM	1.4	3-0	6.98	13.0
				3	15-0	6.84	13.0
				5	25-0	6.71	13.0
				10	50-0	6.32	13.0

6.4 Trace data

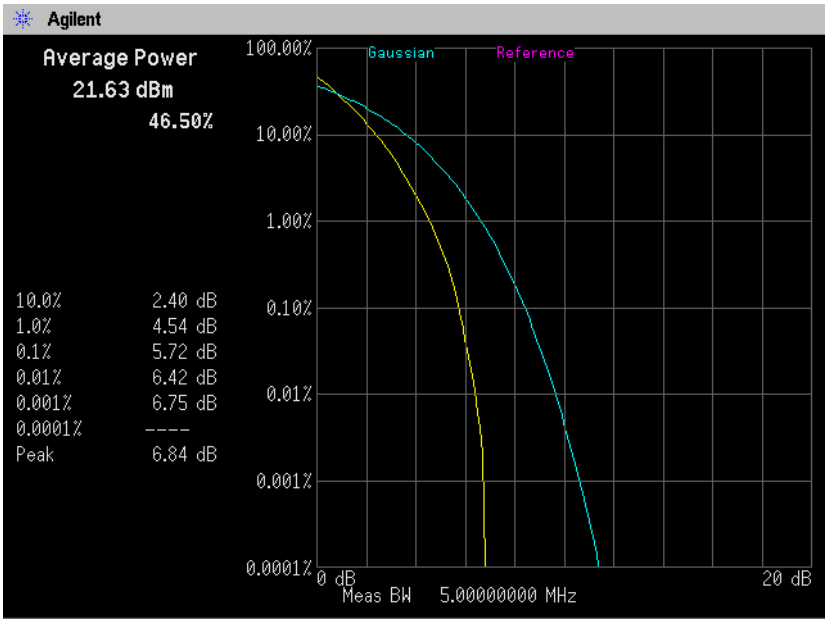
[LTE Band X II]
Channel: 23095
QPSK, BW 1.4MHz, RB6-0



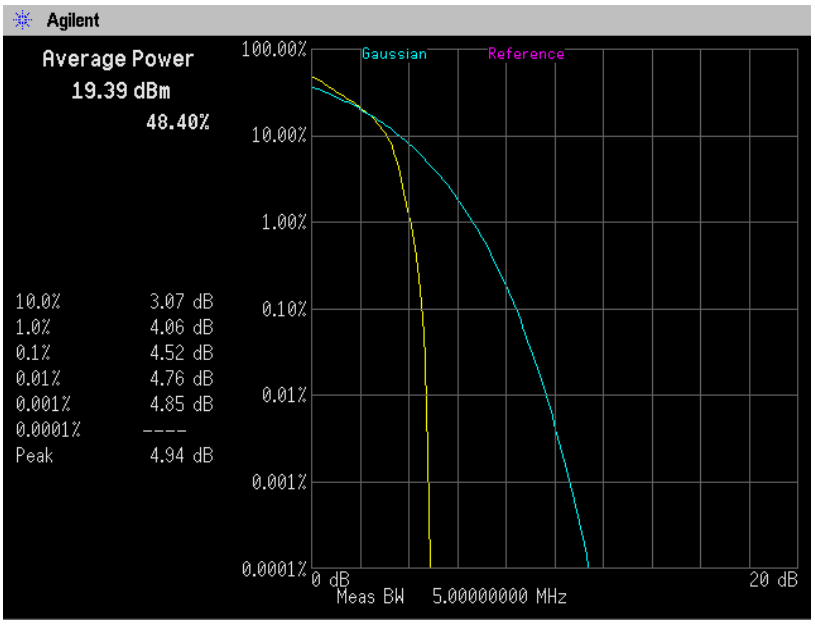
QPSK, BW 3MHz, RB15-0



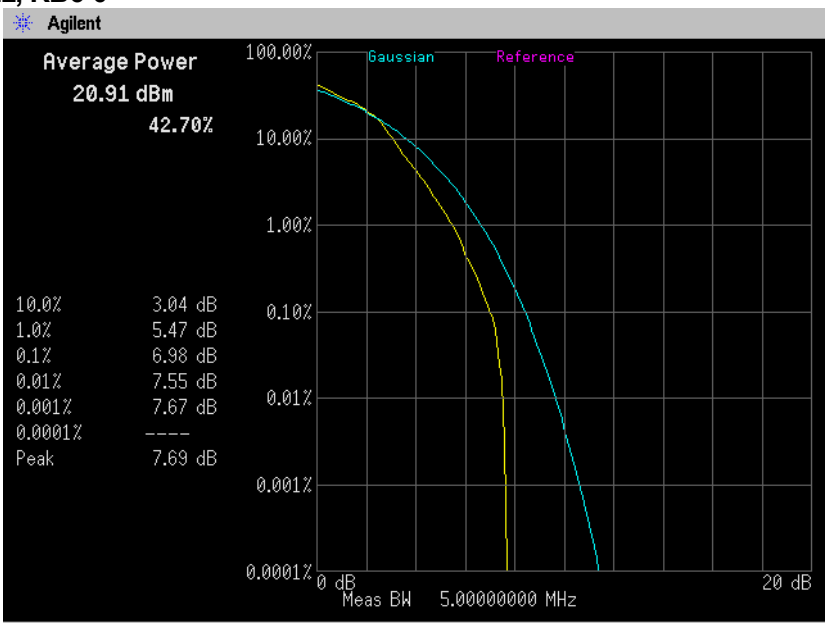
QPSK, BW 5MHz, RB25-0



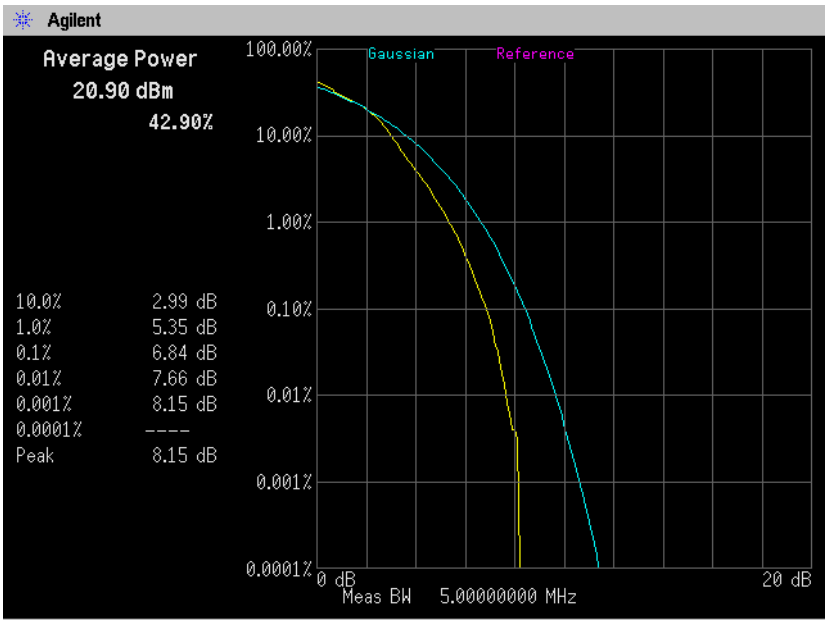
QPSK, BW 10MHz, RB50-0



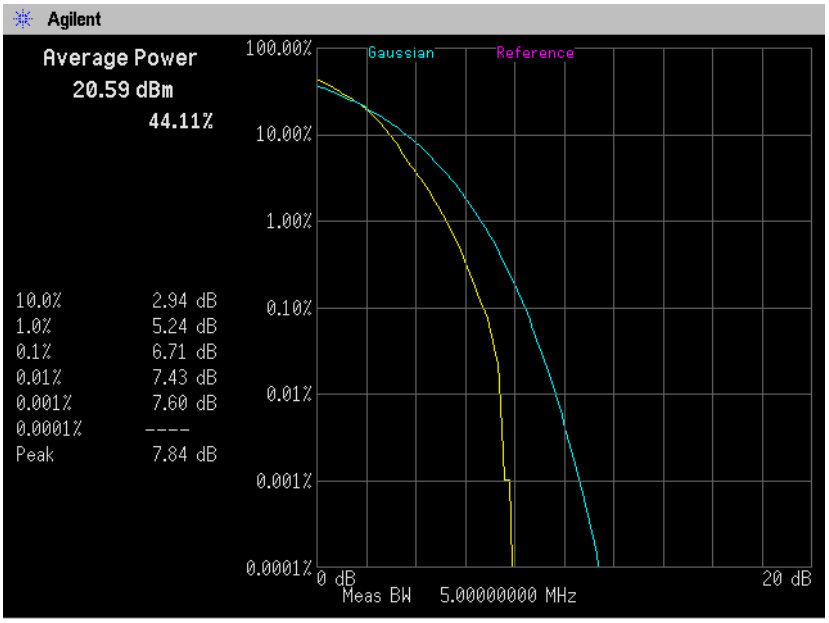
16QAM, BW 1.4MHz, RB6-0



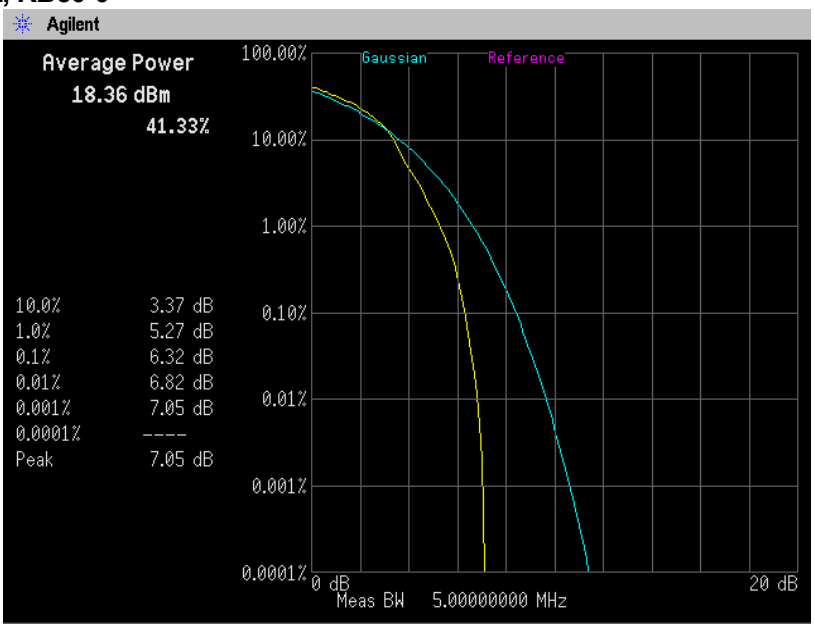
16QAM, BW 3MHz, RB15-0



16QAM, BW 5MHz, RB25-0



16QAM, BW 10MHz, RB50-0



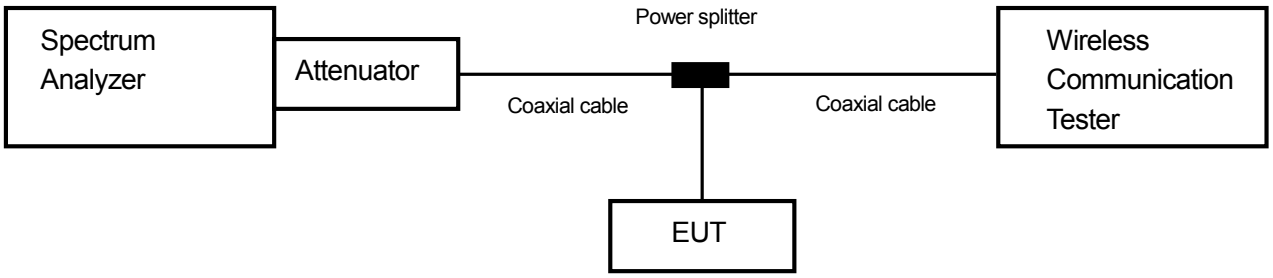
7. Occupied Bandwidth

7.1 Measurement procedure [FCC 2.1049, IC RSS-130 4.3]

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

The spectrum analyzer is set to;
- RBW=30kHz, VBW=91kHz, Span=3MHz, Sweep=auto, Detector=Peak, Trace mode=Max hold
- RBW=62kHz, VBW=100kHz, Span=6MHz, Sweep=auto, Detector=Peak, Trace mode=Max hold
- RBW=100kHz, VBW=300kHz, Span=10MHz, Sweep=auto, Detector=Peak, Trace mode=Max hold
- RBW=200kHz, VBW=620kHz, Span=20MHz, Sweep=auto, Detector=Peak, Trace mode=Max hold

- Test configuration



7.2 Limit

None

7.3 Measurement result

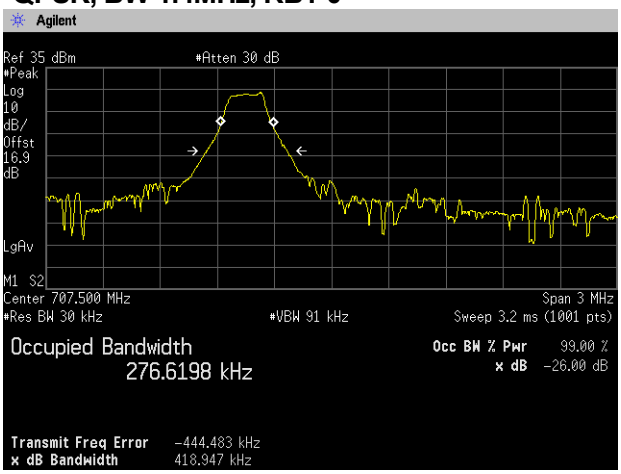
Date : June 20, 2015
Temperature : 24.2 [˚C]
Humidity : 53.7 [%]
Test place : Shielded room No.4

Test engineer : Hikaru Shibata

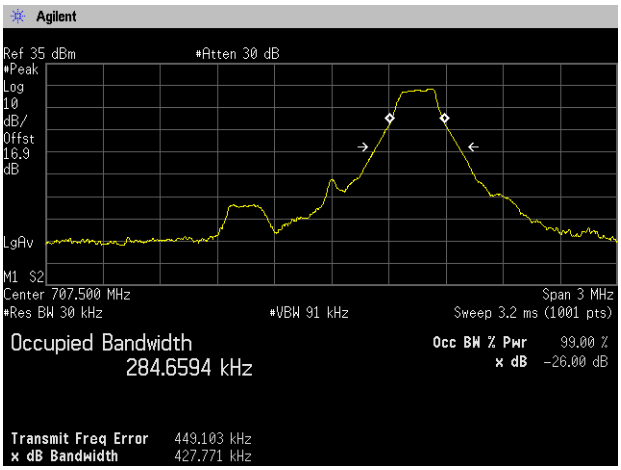
BW	Mode	UL RB Allocation	UL RB Start	Frequency [MHz]	26dB Bandwidth [MHz]	99% OBW [MHz]
1.4MHz	QPSK	1	0	707.5	0.419	0.2766
		1	5		0.428	0.2847
		3	1		0.908	0.6114
		6	0		1.337	1.1022
1.4MHz	16QAM	1	0	707.5	0.412	0.2766
		1	5		0.422	0.2781
		3	1		0.932	0.6222
		6	0		1.322	1.1098
3MHz	QPSK	1	0	707.5	0.514	0.3604
		1	14		0.498	0.3475
		8	4		2.188	1.5540
		15	0		3.099	2.7186
3MHz	16QAM	1	0	707.5	0.503	0.3634
		1	14		0.512	0.3594
		8	4		2.169	1.5640
		15	0		3.086	2.7220
5MHz	QPSK	1	0	707.5	0.733	0.5072
		1	24		0.730	0.5011
		12	7		3.312	2.3088
		25	0		5.078	4.5190
5MHz	16QAM	1	0	707.5	0.685	0.4761
		1	24		0.704	0.4897
		12	7		3.369	2.3458
		25	0		5.170	4.5321
10MHz	QPSK	1	0	707.5	1.032	0.7489
		1	49		1.010	0.7240
		25	12		6.657	4.7476
		50	0		10.101	9.0113
10MHz	16QAM	1	0	707.5	1.027	0.7407
		1	49		1.035	0.7240
		25	12		6.723	4.7960
		50	0		9.998	9.0069

7.4 Trace data

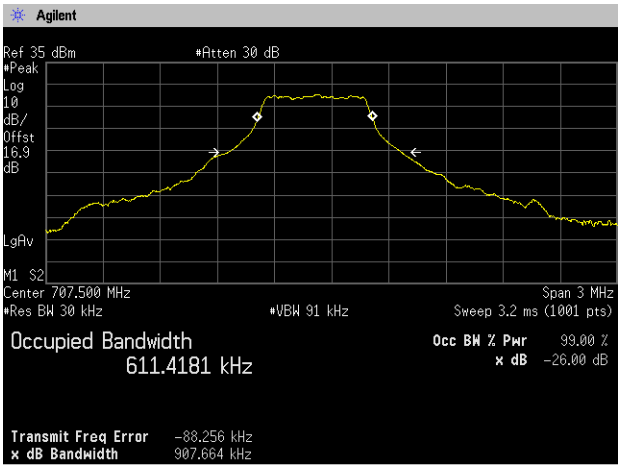
[LTE Band X II]
Channel: 23095
QPSK, BW 1.4MHz, RB1-0



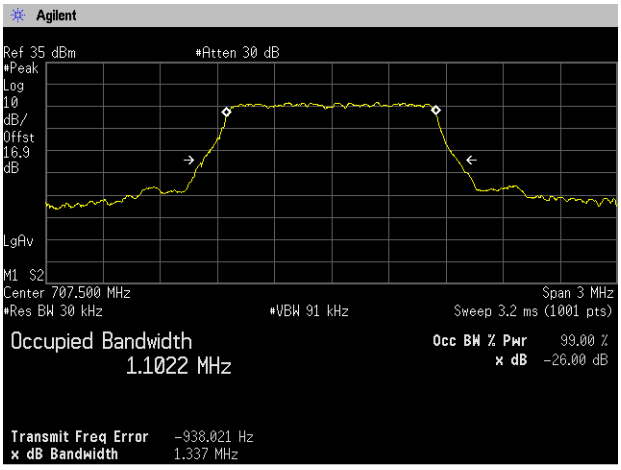
RB1-5



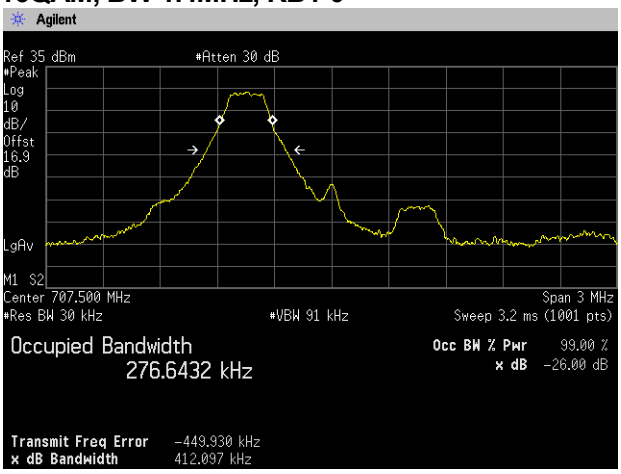
RB3-1



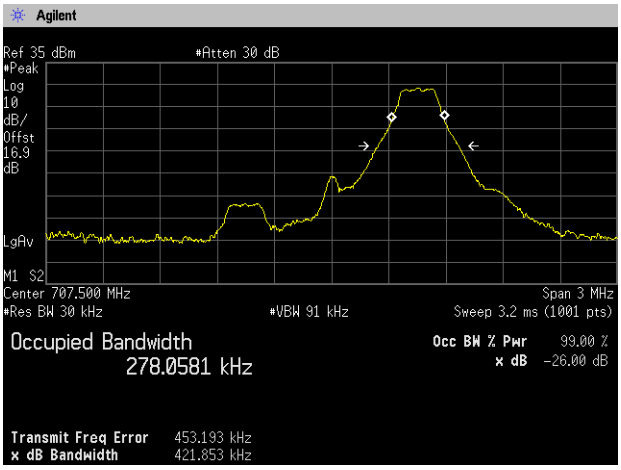
RB6-0



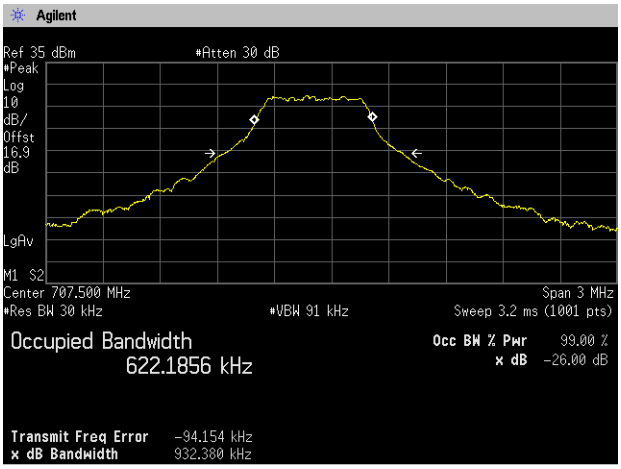
16QAM, BW 1.4MHz, RB1-0



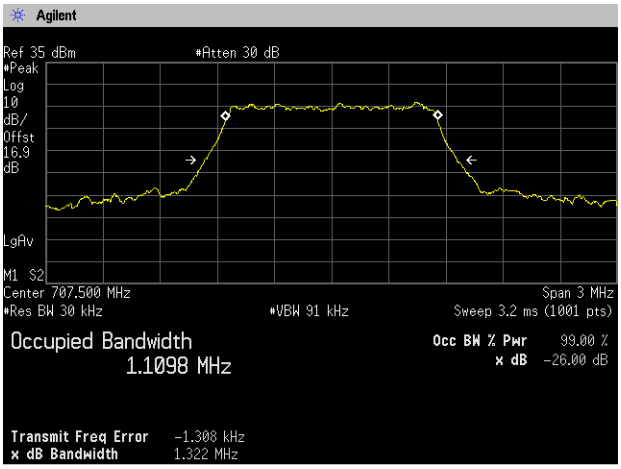
RB1-5



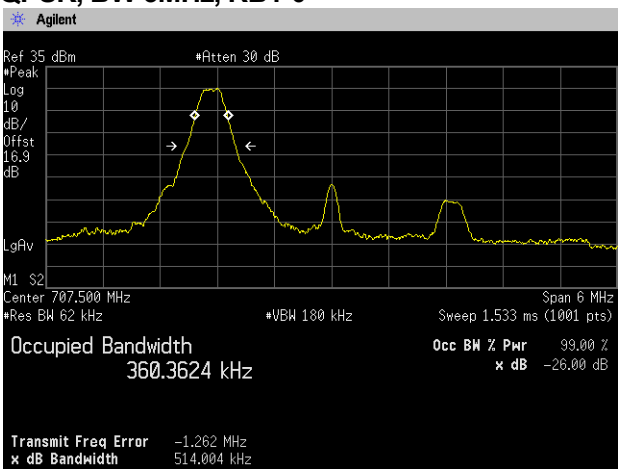
RB3-1



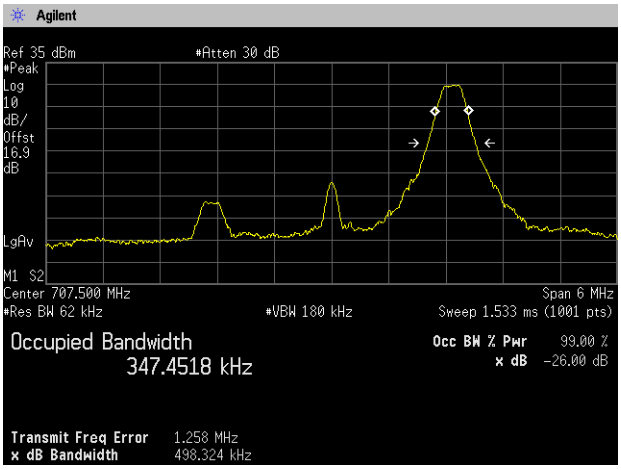
RB6-0



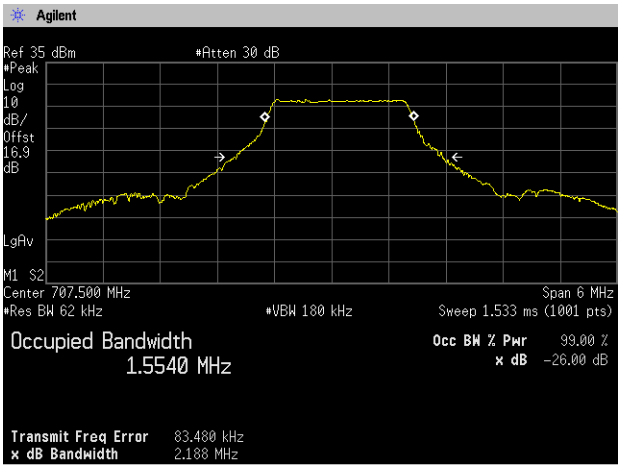
QPSK, BW 3MHz, RB1-0



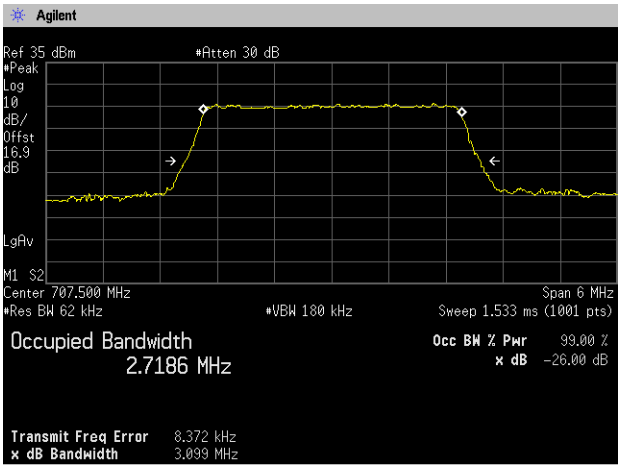
RB5-14



RB8-4

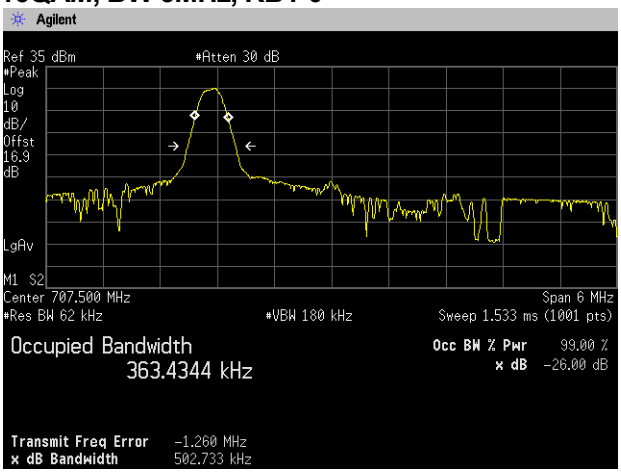


RB15-0

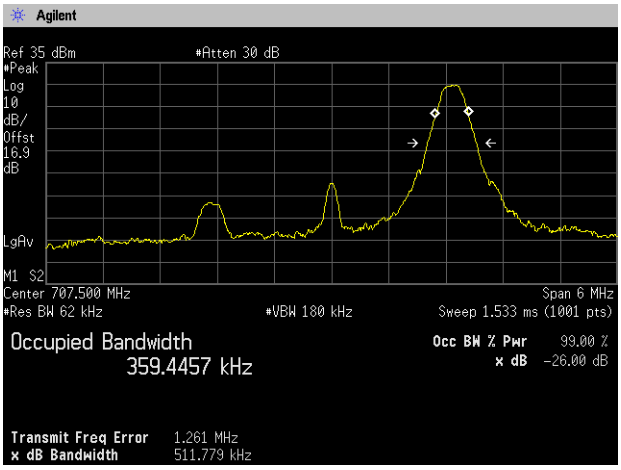


Zacta

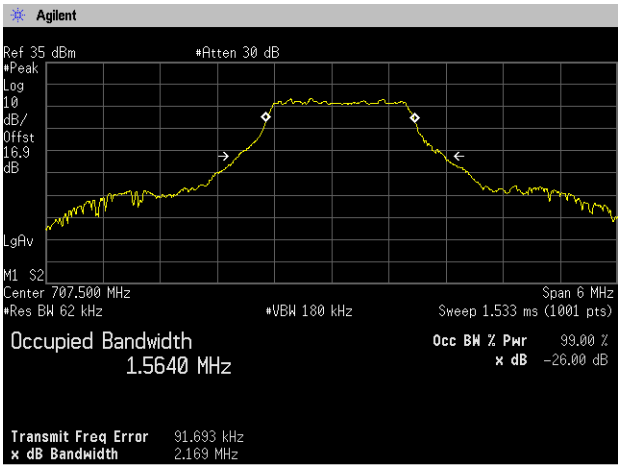
16QAM, BW 3MHz, RB1-0



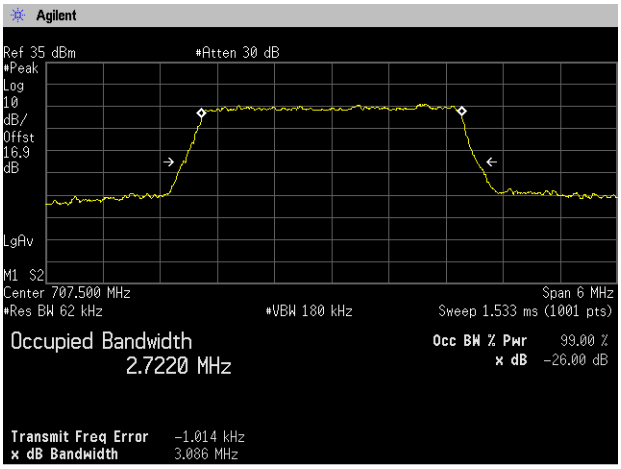
RB1-14



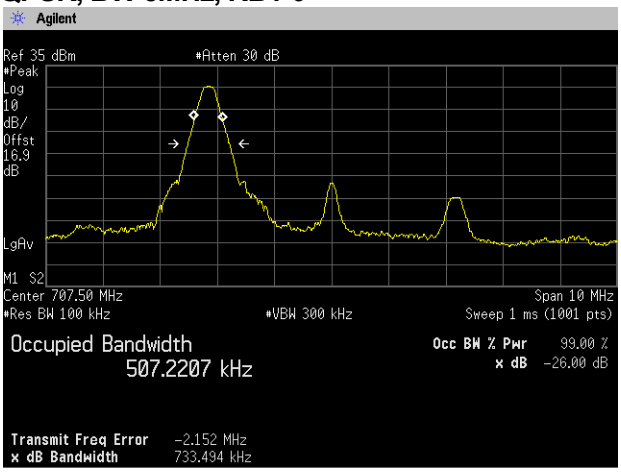
RB8-4



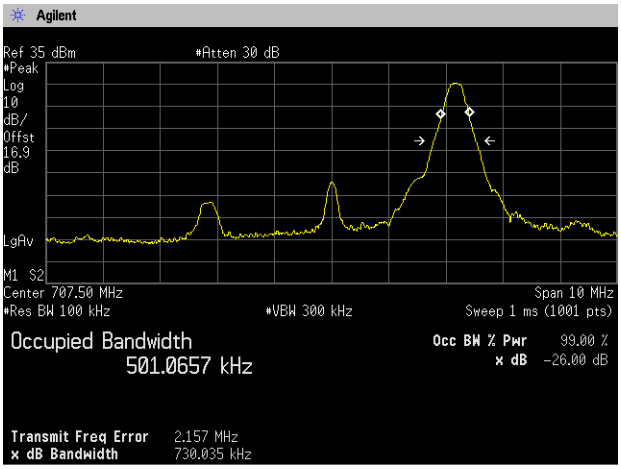
RB15-0



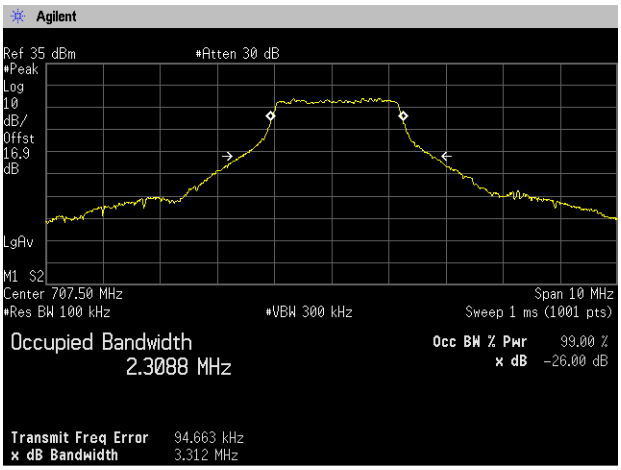
QPSK, BW 5MHz, RB1-0



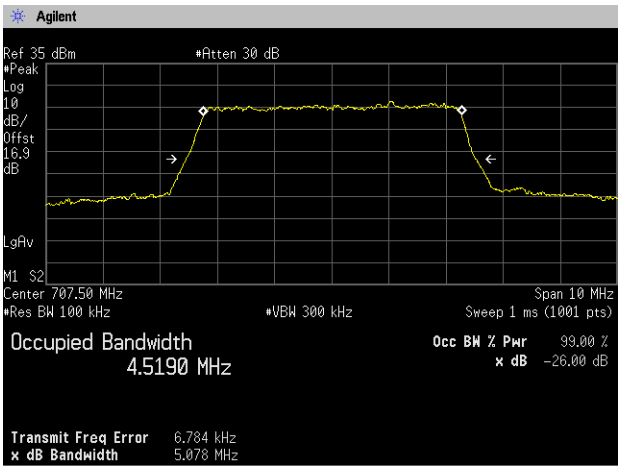
RB1-24



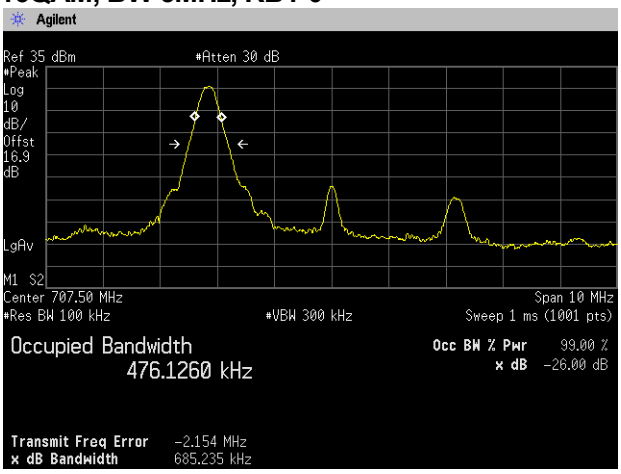
RB12-7



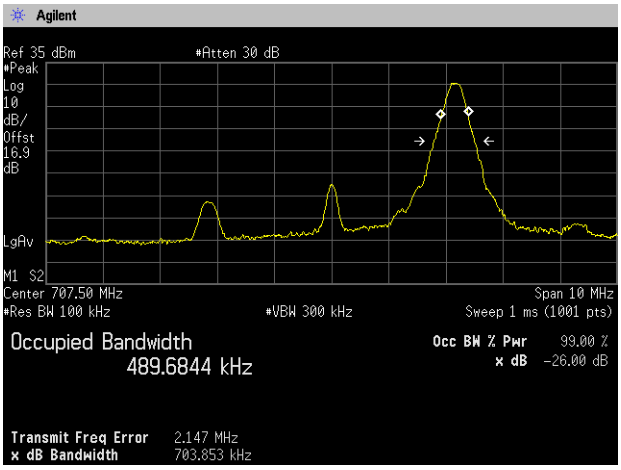
RB25-0



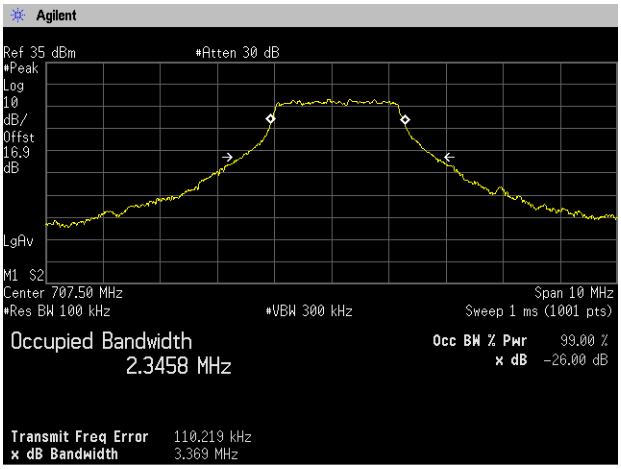
16QAM, BW 5MHz, RB1-0



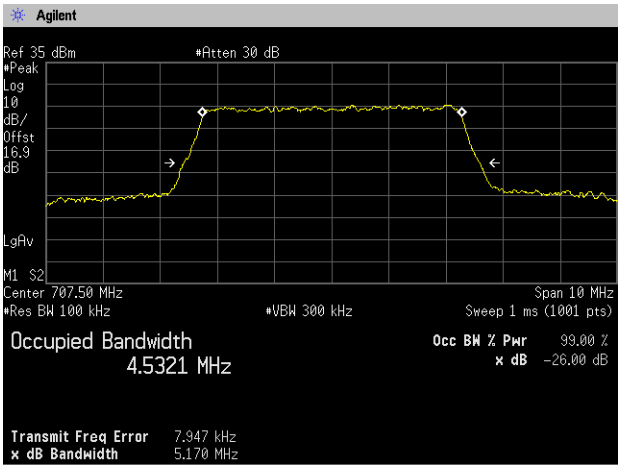
RB1-24



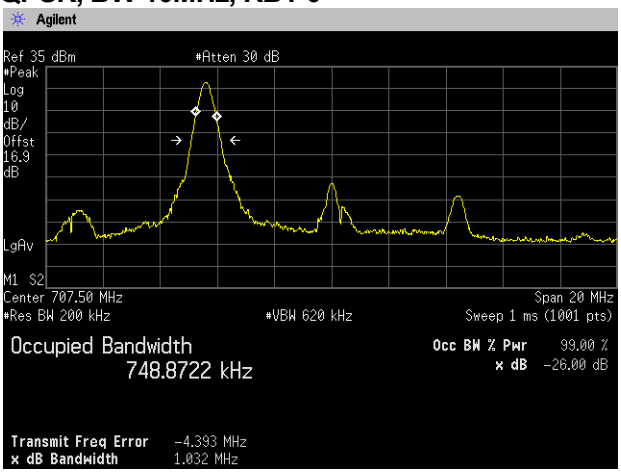
RB12-7



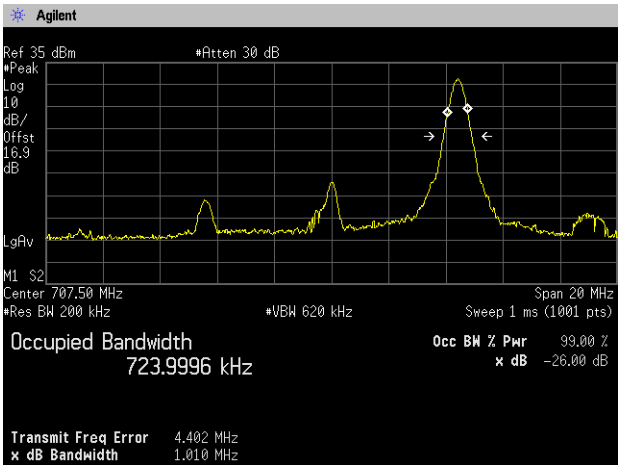
RB25-0



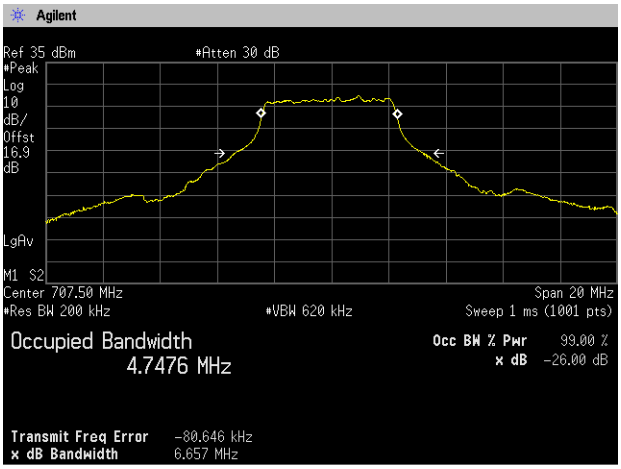
QPSK, BW 10MHz, RB1-0



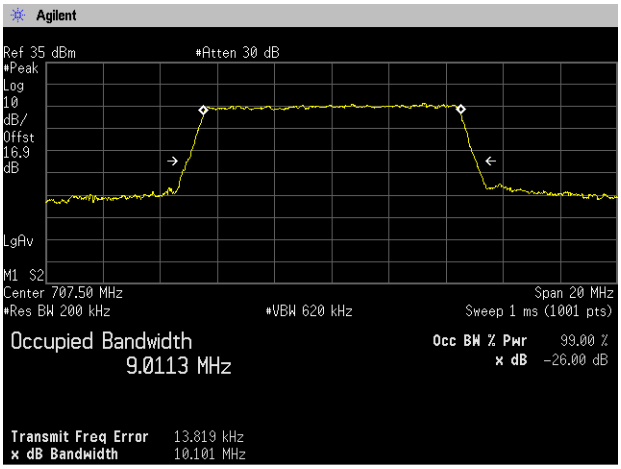
RB1-49



RB25-12

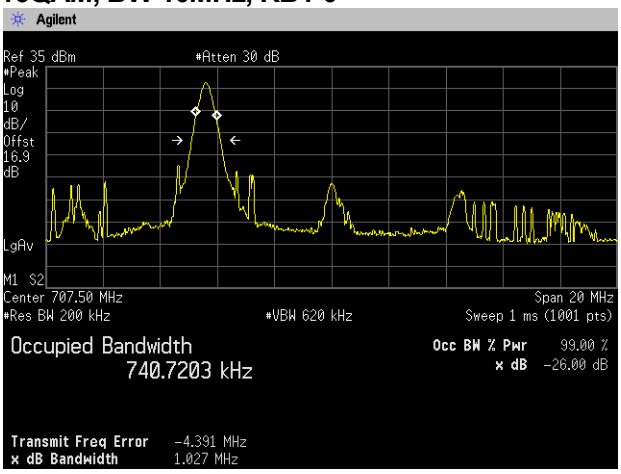


RB50-0

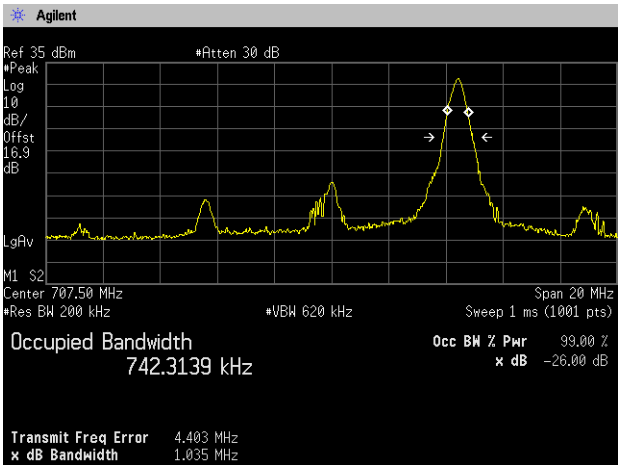


Zacta

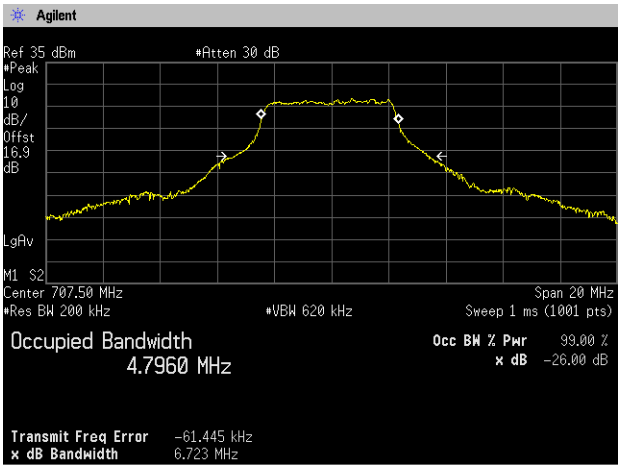
16QAM, BW 10MHz, RB1-0



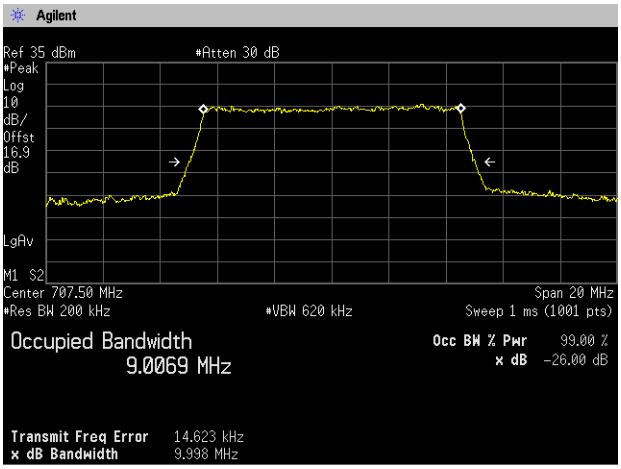
RB1-49



RB25-12



RB50-0



8. Band Edge Spurious and Harmonic at Antenna Terminals

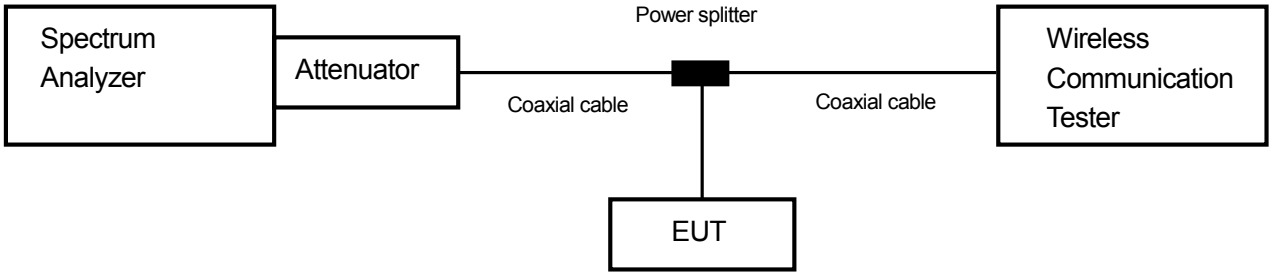
8.1 Measurement procedure
[FCC 27.53(g), 2.1051, IC RSS-130 4.6]

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>
- RBW=20kHz, VBW=62kHz, Span=2.8MHz, Sweep=auto, Detector=RMS, Trace mode=Max hold
- RBW=43kHz, VBW=130kHz, Span=6MHz, Sweep=auto, Detector=RMS, Trace mode=Max hold
- RBW=75kHz, VBW=220kHz, Span=10MHz, Sweep=auto, Detector=RMS, Trace mode=Max hold
- RBW=150kHz, VBW=430kHz, Span=20MHz, Sweep=auto, Detector=RMS, Trace mode=Max hold

<Spurious Emissions>
- RBW=1MHz, VBW=3MHz, Span=Arbitrary setting, Sweep=auto, Detector=Peak, Trace mode=Max hold

- Test configuration



8.2 Limit

-13dBm or less

8.3 Measurement result

Date : June 20, 2015
Temperature : 24.2 [˚C]
Humidity : 53.7 [%]
Test place : Shielded room No.4

Test engineer : Hikaru Shibata

Band	Modulation	Bandwidth	Results	
LTE Band X II	QPSK	1.4MHz	See the trace data	PASS
		3MHz	See the trace data	PASS
		5MHz	See the trace data	PASS
		10MHz	See the trace data	PASS
	16QAM	1.4MHz	See the trace data	PASS
		3MHz	See the trace data	PASS
		5MHz	See the trace data	PASS
		10MHz	See the trace data	PASS

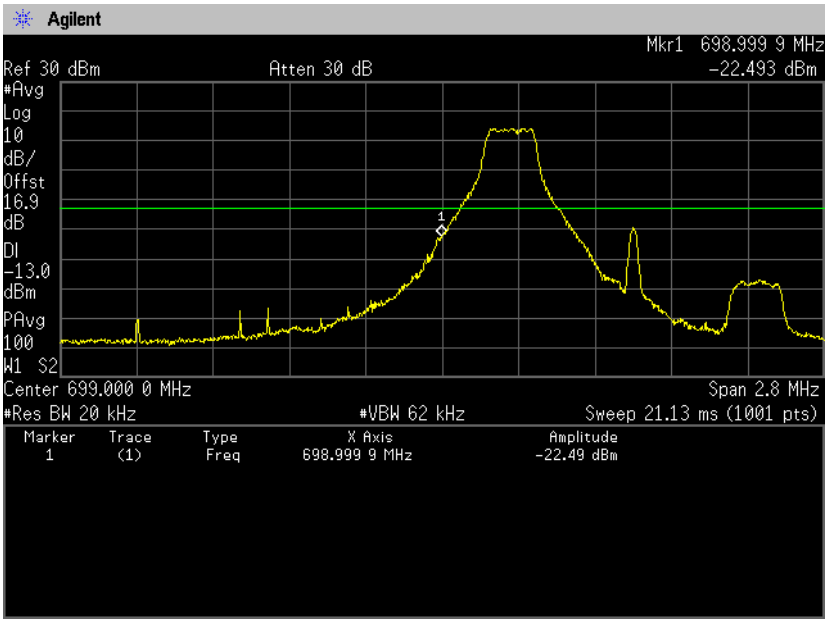
8.4 Trace data

[LTE Band X II]

(Band Edge)

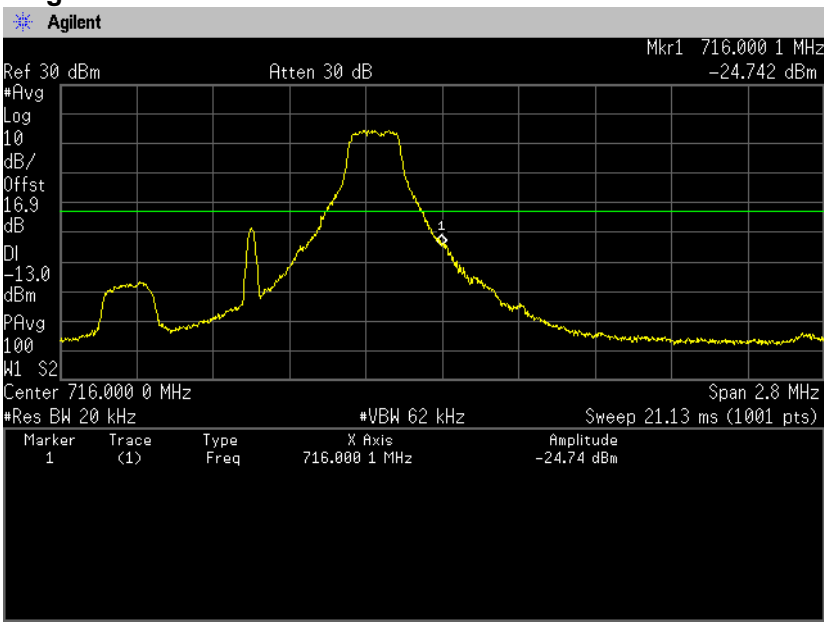
QPSK, BW 1.4MHz, RB1-0

Channel: Low

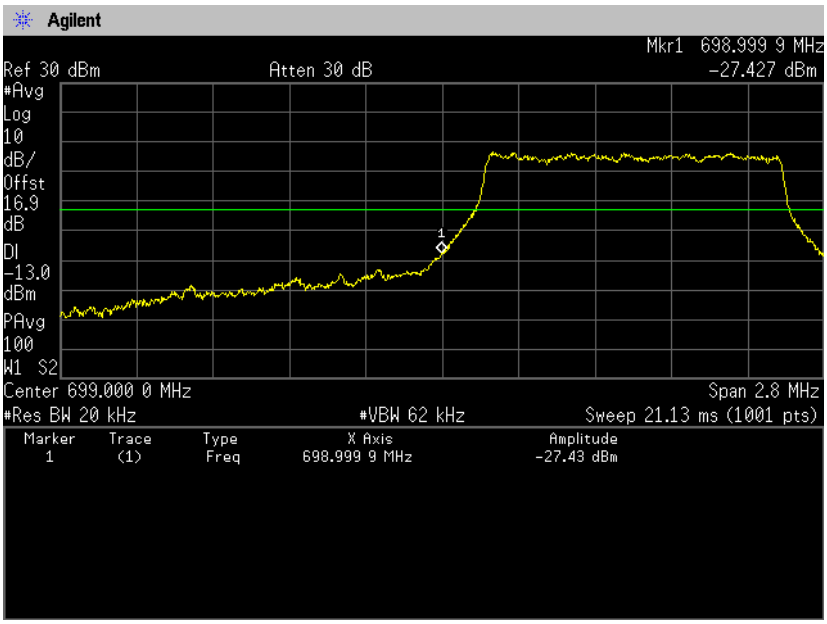


QPSK, BW 1.4MHz, RB1-5

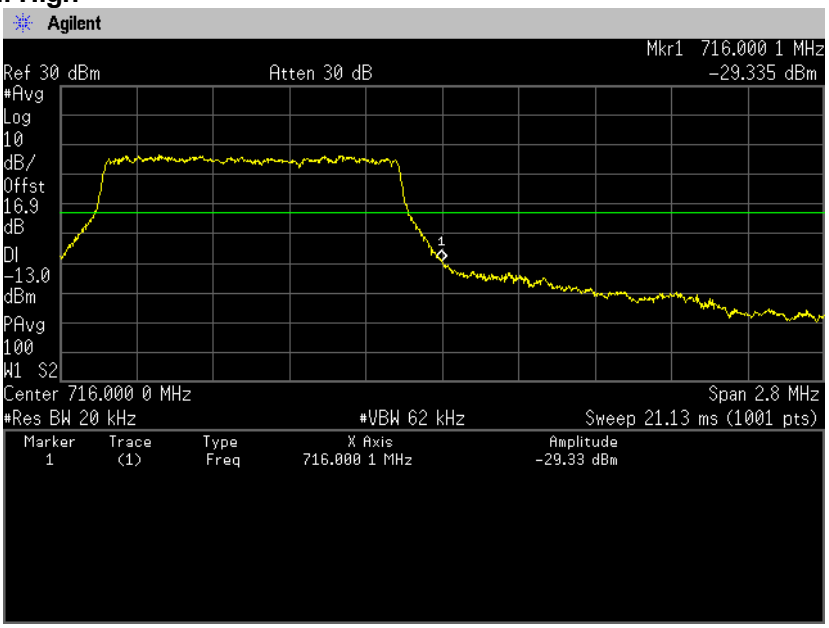
Channel: High



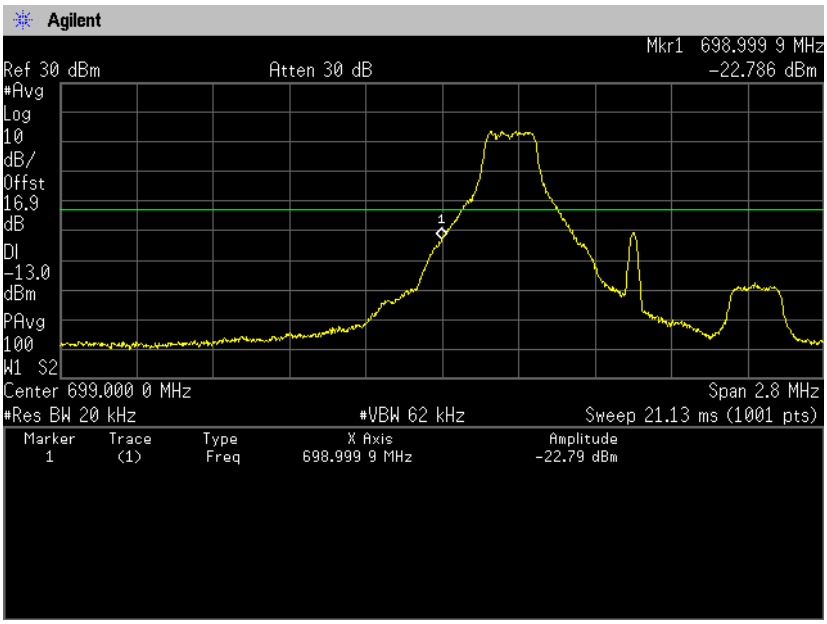
QPSK, BW 1.4MHz, RB6-0
Channel: Low



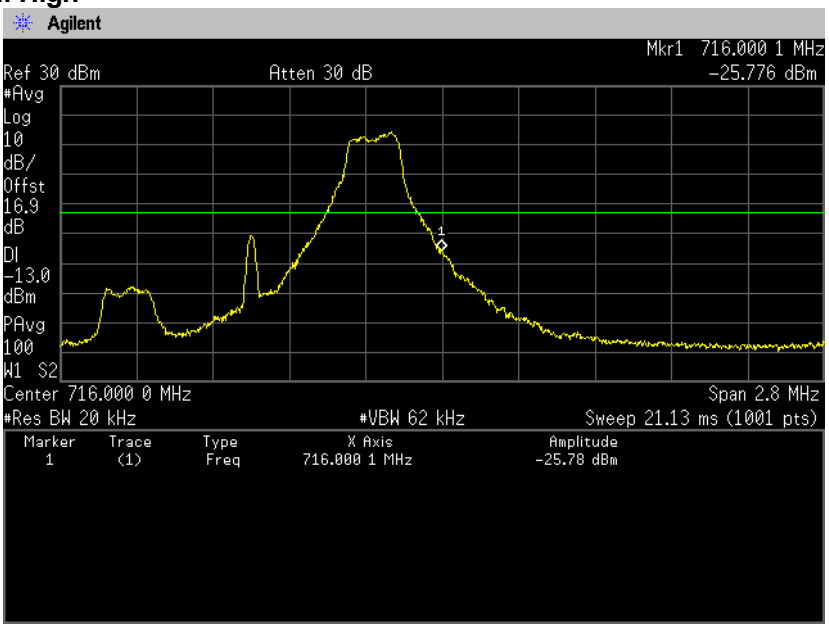
QPSK, BW 1.4MHz, RB6-0
Channel: High



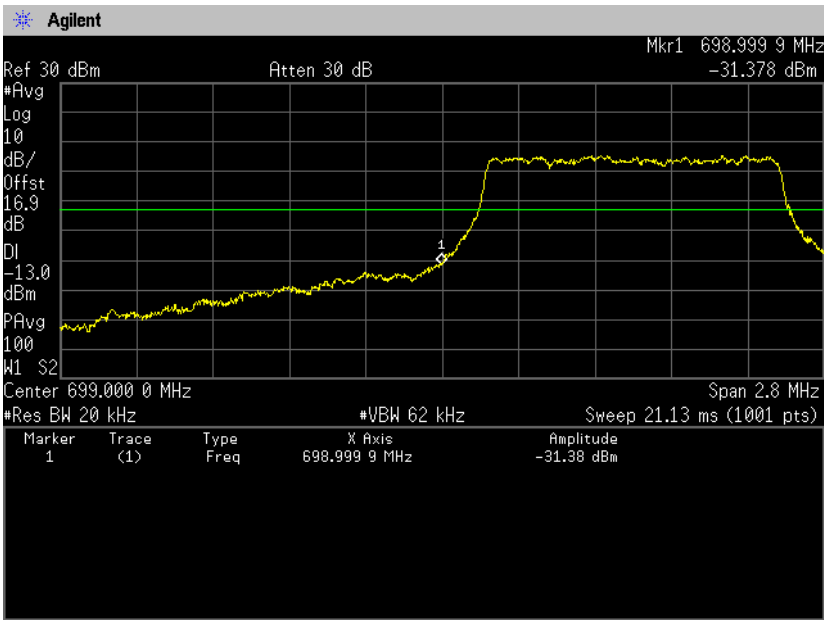
16QAM, BW 1.4MHz, RB1-0
Channel: Low



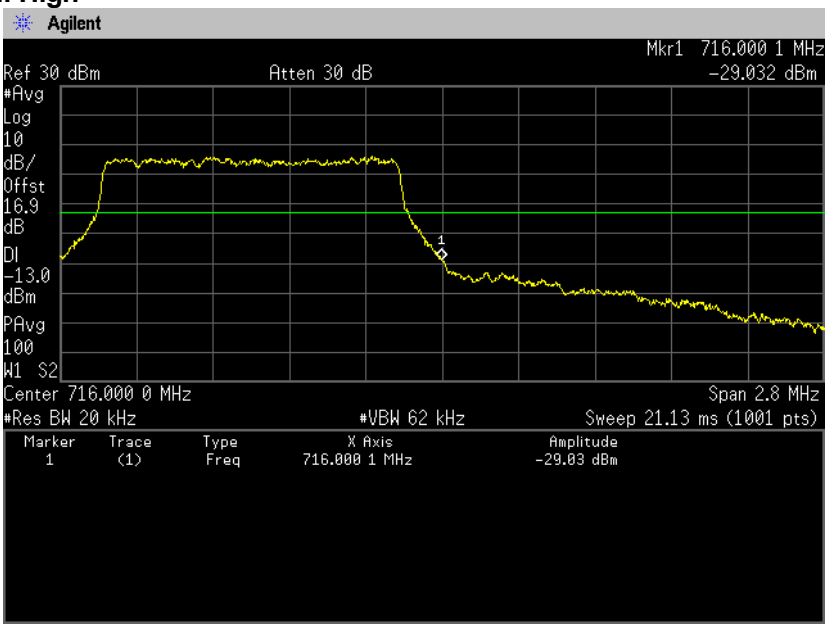
16QAM, BW 1.4MHz, RB1-5
Channel: High



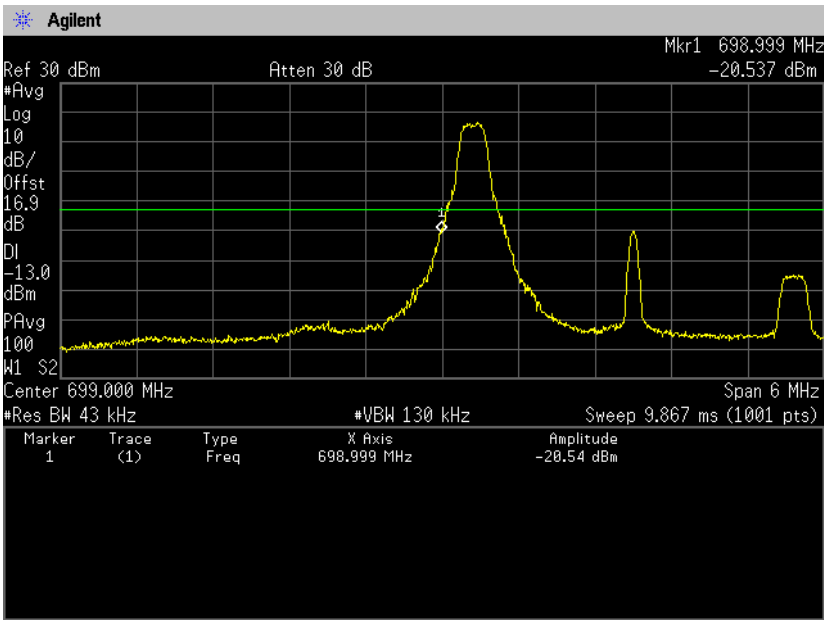
16QAM, BW 1.4MHz, RB6-0
Channel: Low



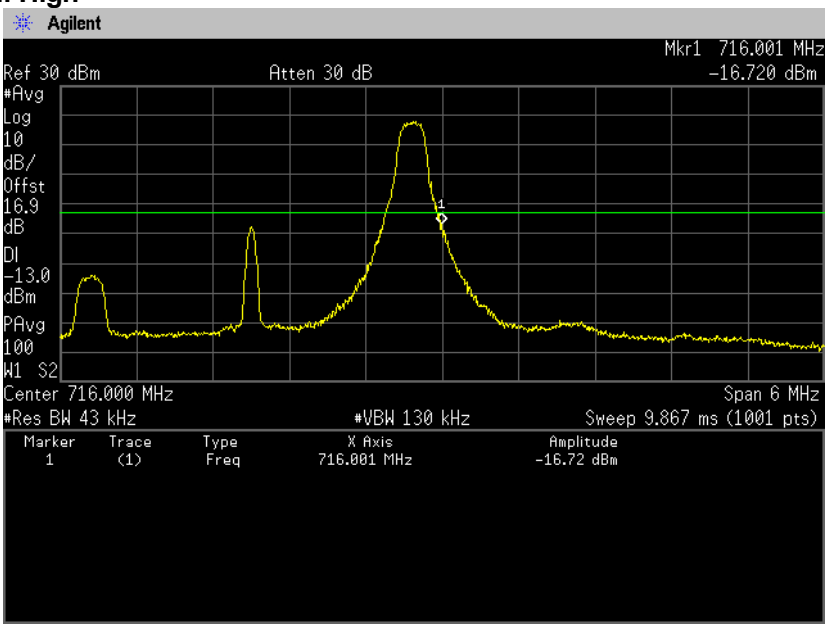
16QAM, BW 1.4MHz, RB6-0
Channel: High



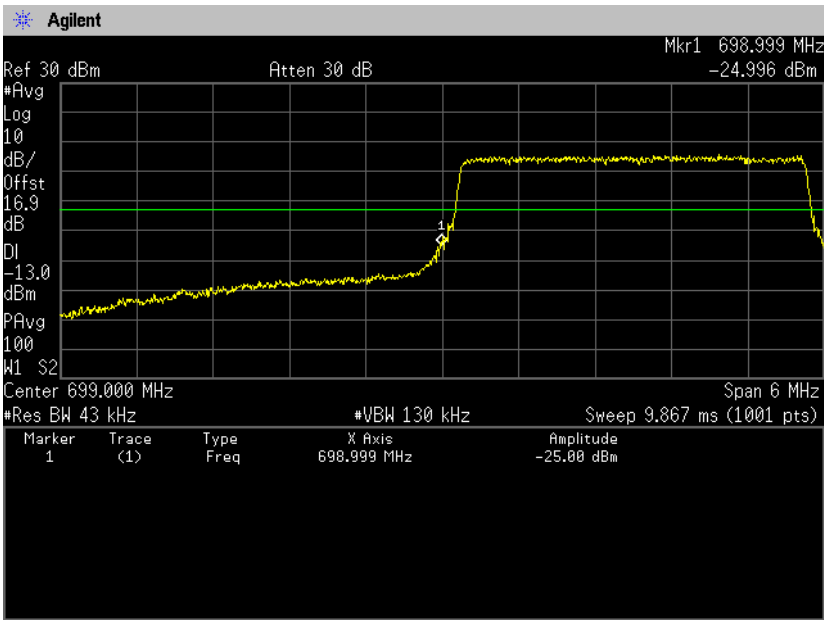
QPSK, BW 3MHz, RB1-0
Channel: Low



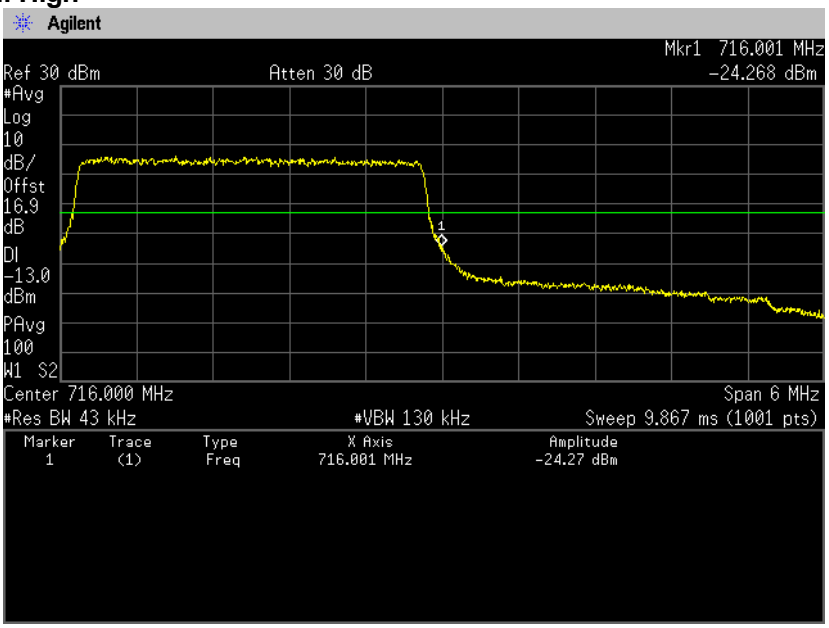
QPSK, BW 3MHz, RB1-14
Channel: High



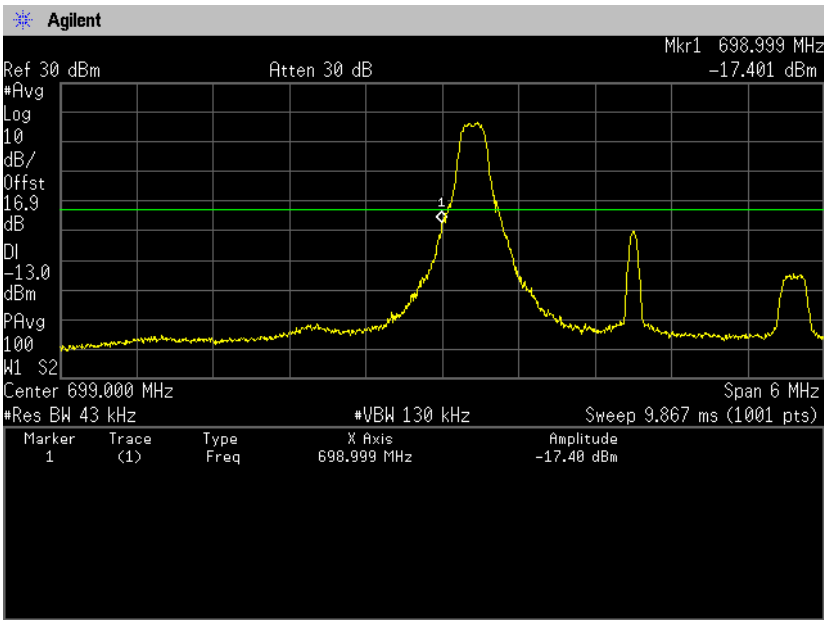
QPSK, BW 3MHz, RB15-0
Channel: Low



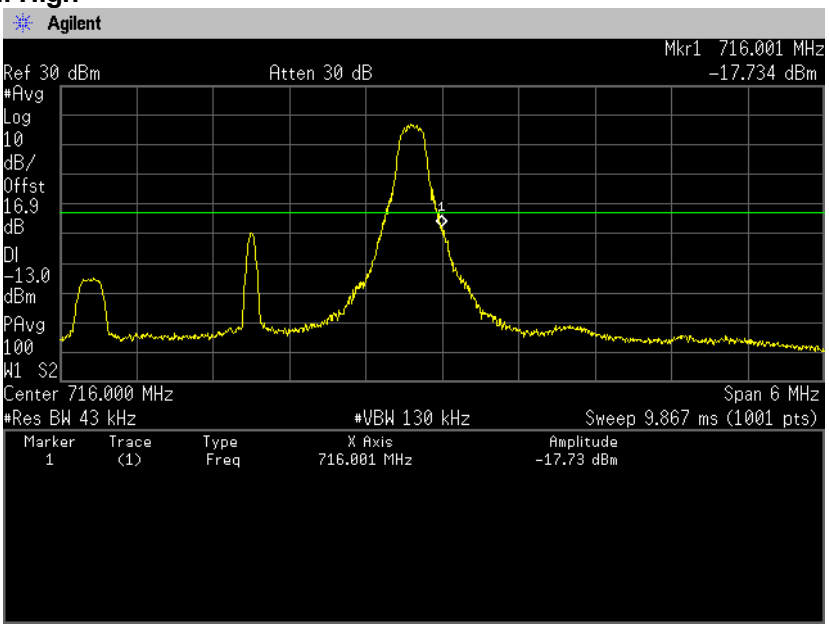
QPSK, BW 3MHz, RB15-0
Channel: High



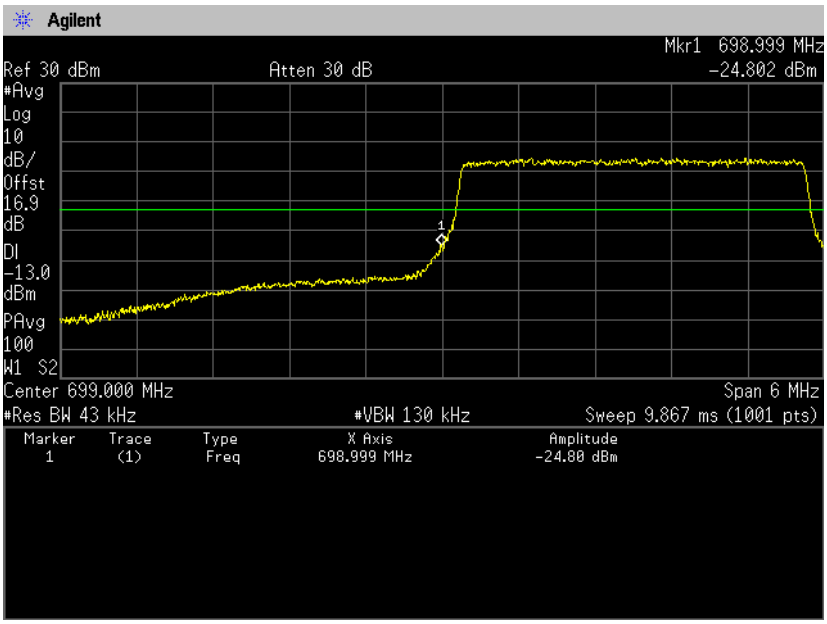
16QAM, BW 3MHz, RB1-0
Channel: Low



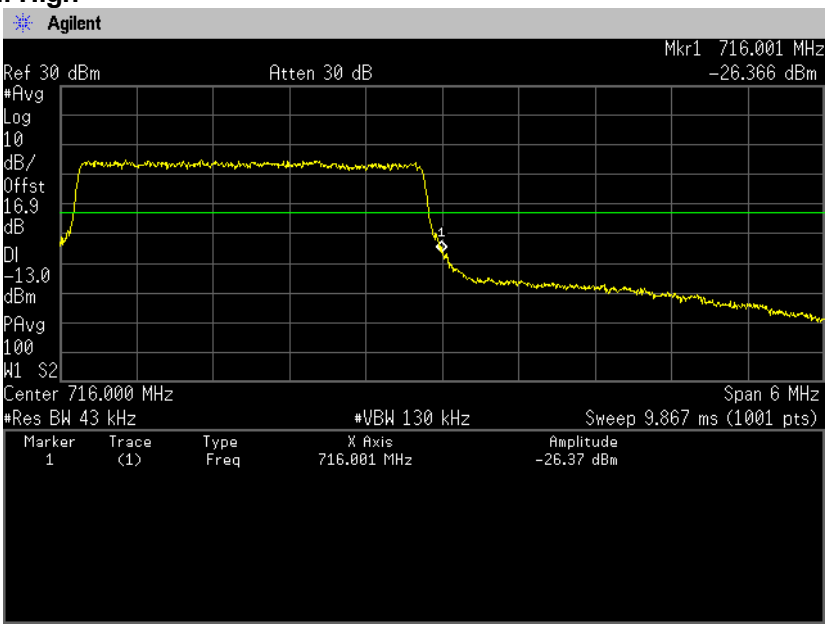
16QAM, BW 3MHz, RB1-14
Channel: High



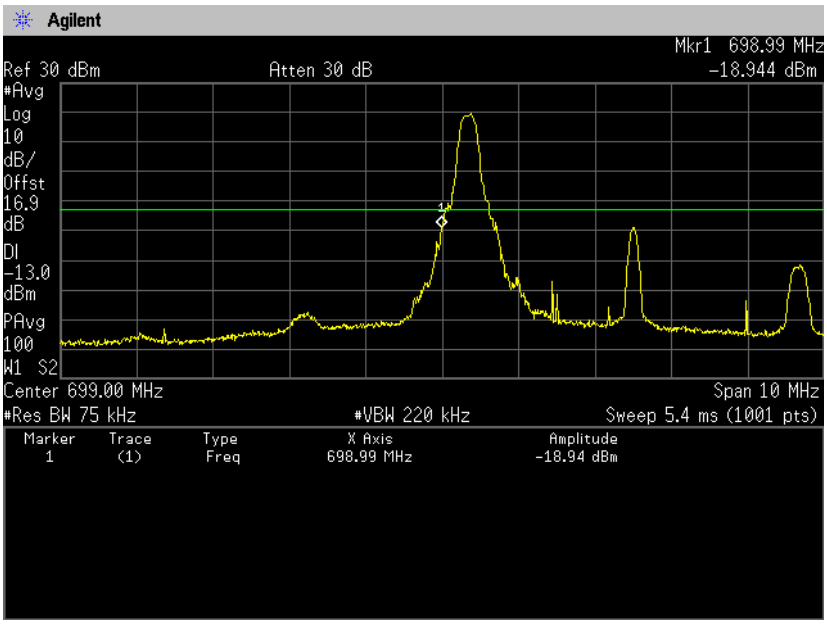
16QAM, BW 3MHz, RB15-0
Channel: Low



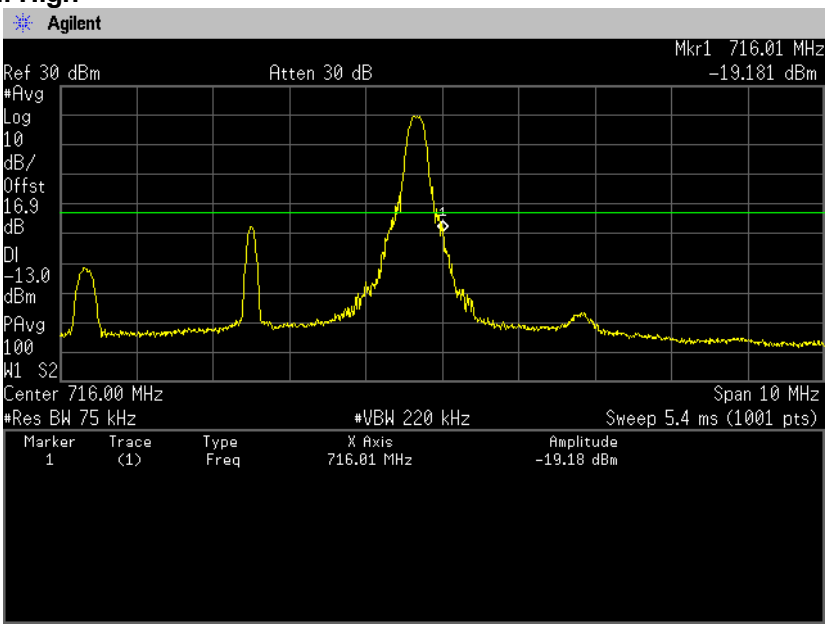
16QAM, BW 3MHz, RB15-0
Channel: High



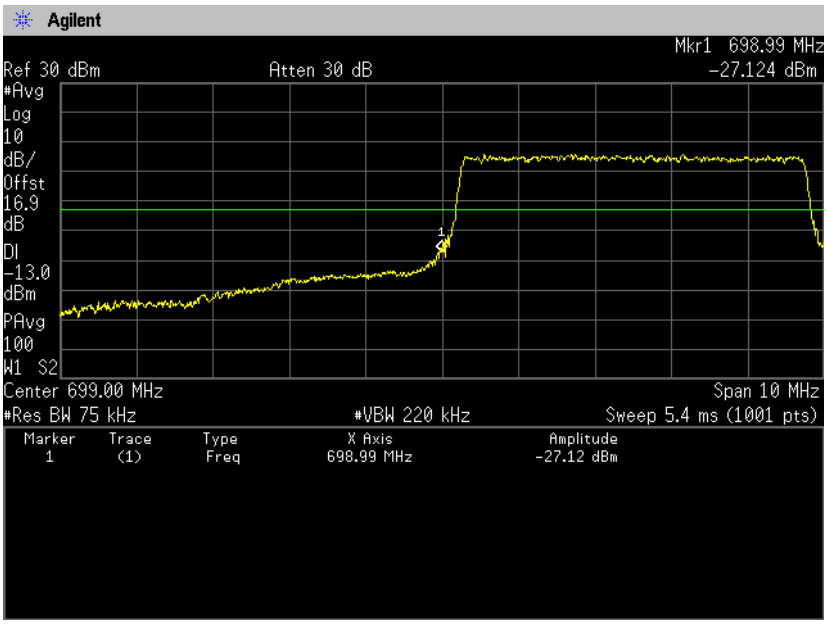
QPSK, BW 5MHz, RB1-0
Channel: Low



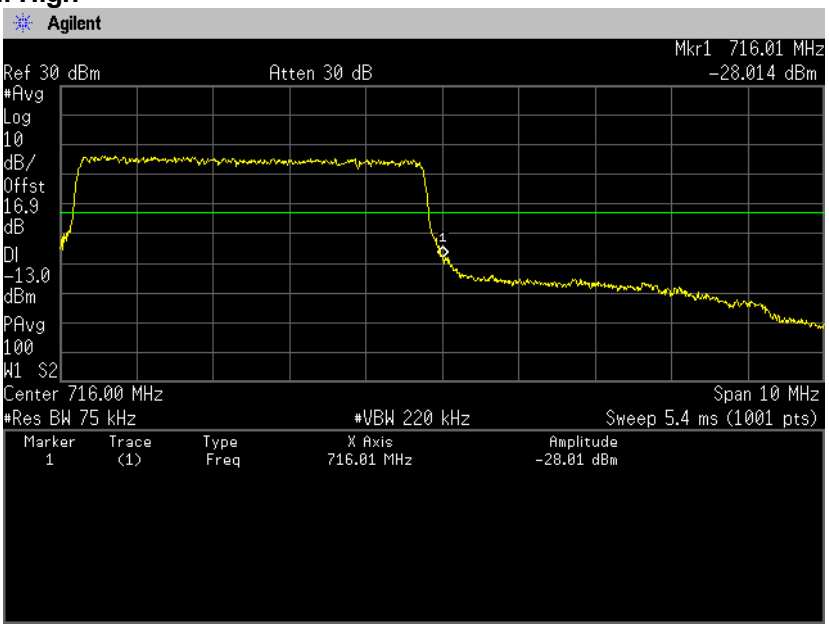
QPSK, BW 5MHz, RB1-24
Channel: High



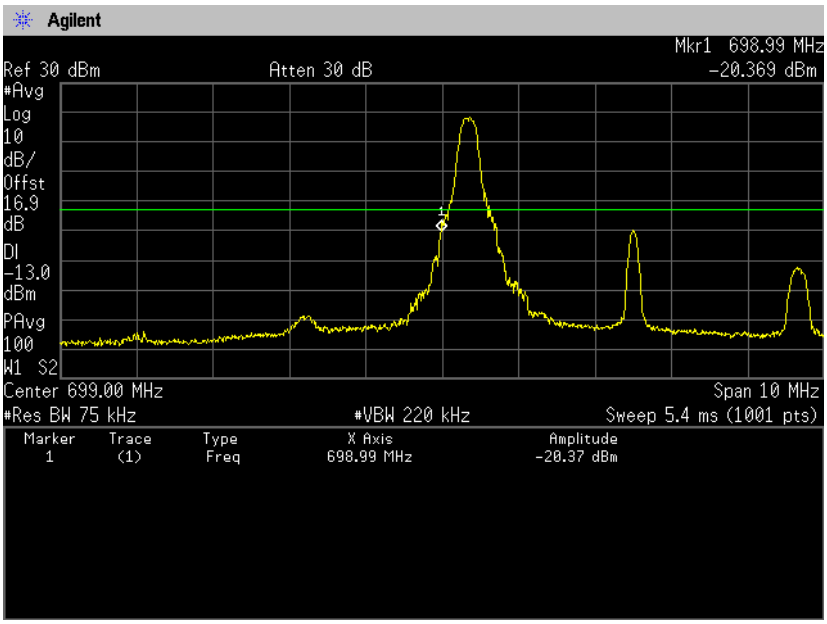
QPSK, BW 5MHz, RB25-0
Channel: Low



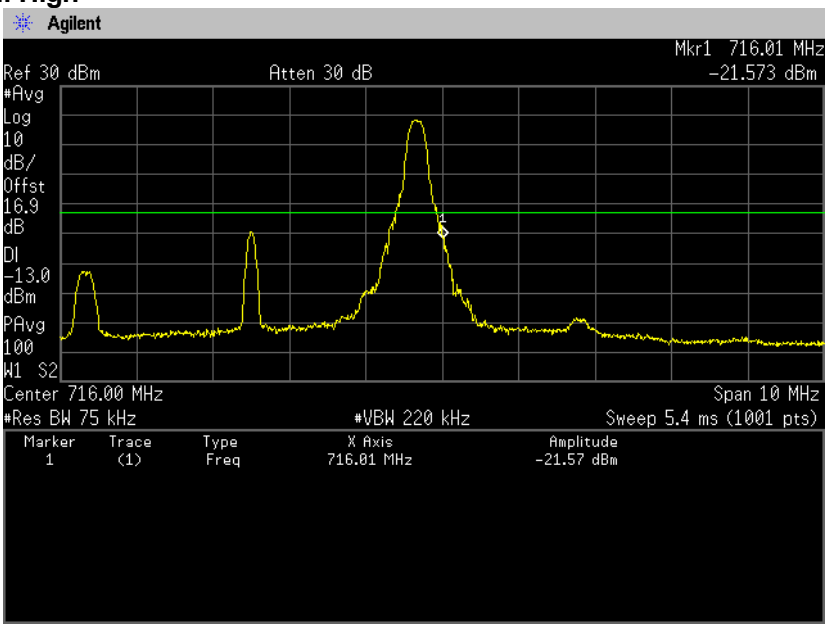
QPSK, BW 5MHz, RB25-0
Channel: High



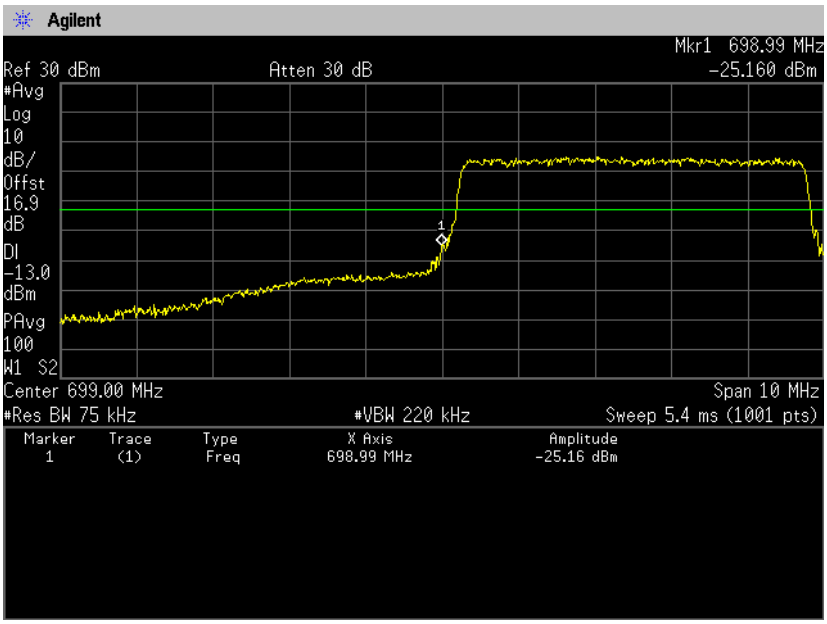
16QAM, BW 5MHz, RB1-0
Channel: Low



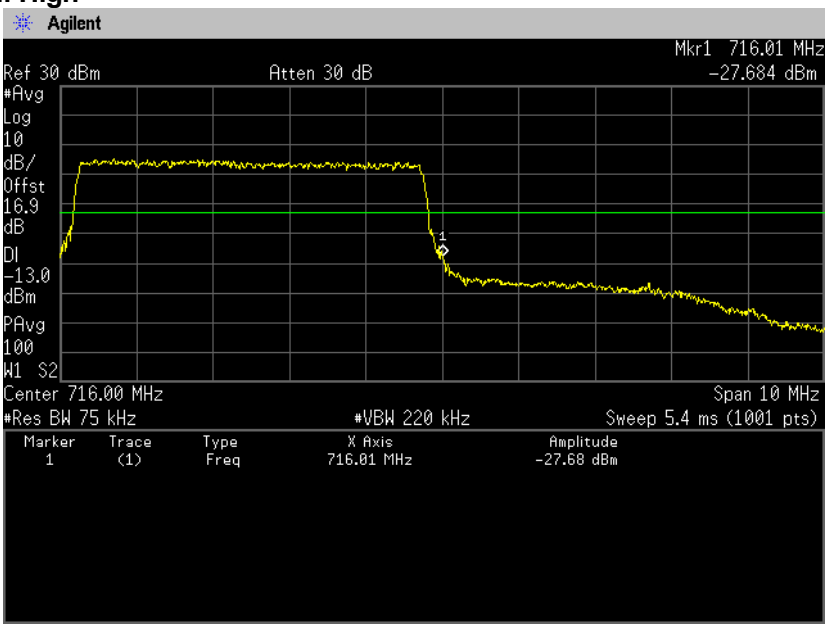
16QAM, BW 5MHz, RB1-24
Channel: High



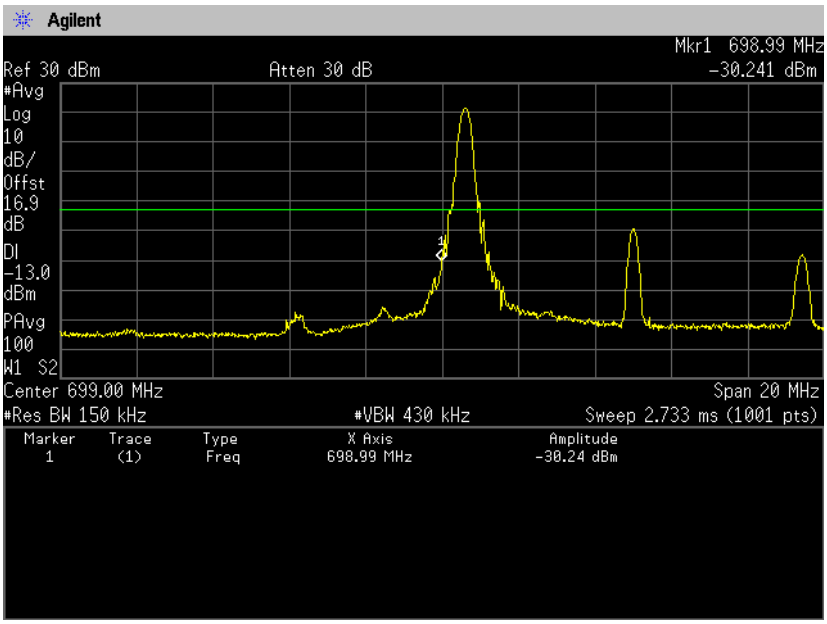
16QAM, BW 5MHz, RB25-0
Channel: Low



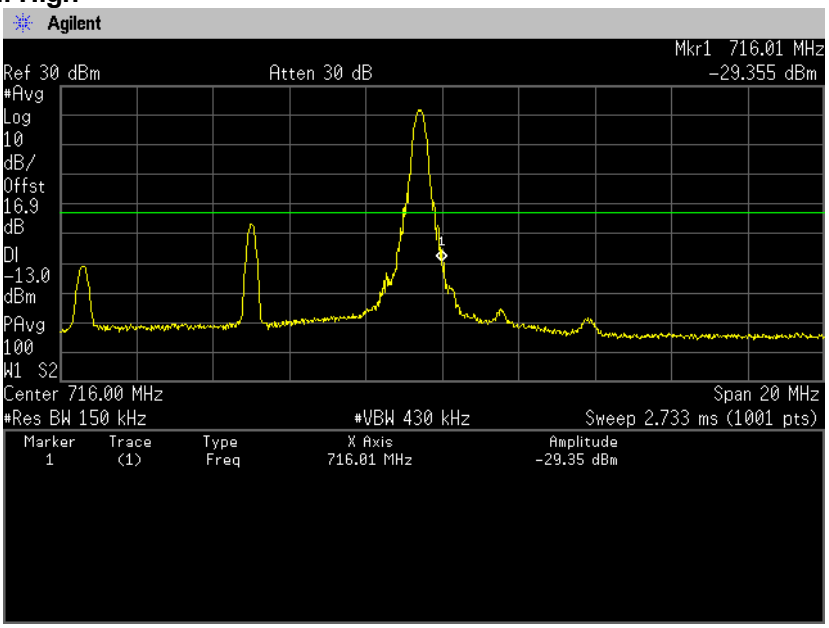
16QAM, BW 5MHz, RB25-0
Channel: High



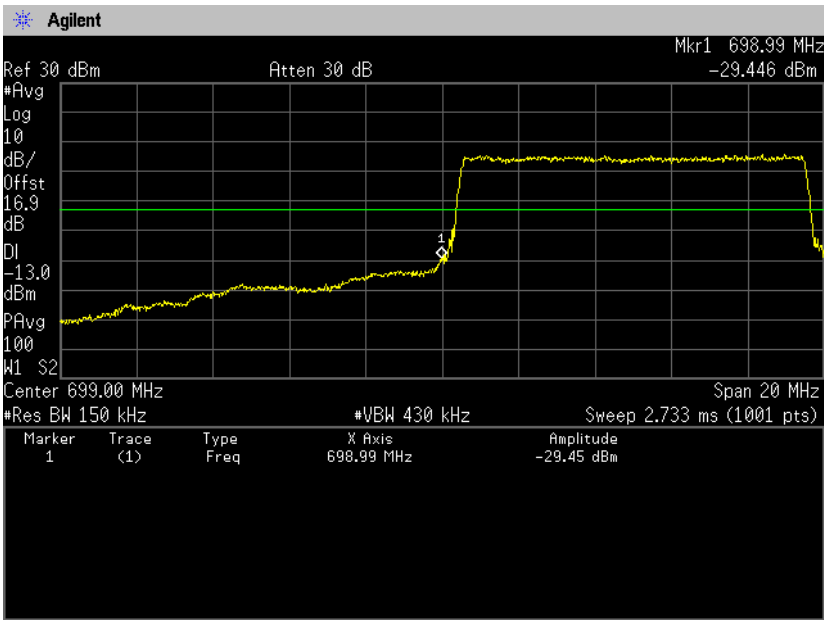
QPSK, BW 10MHz, RB1-0
Channel: Low



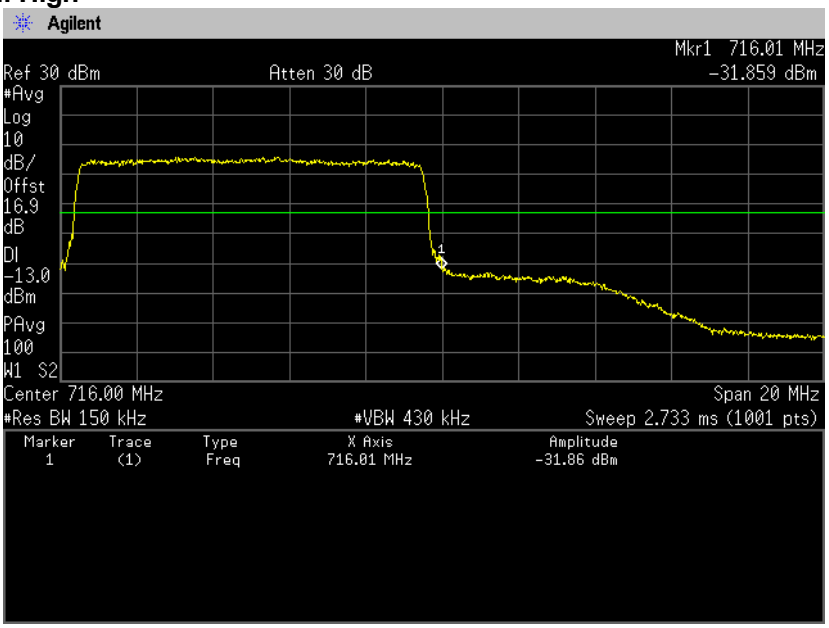
QPSK, BW 10MHz, RB1-49
Channel: High



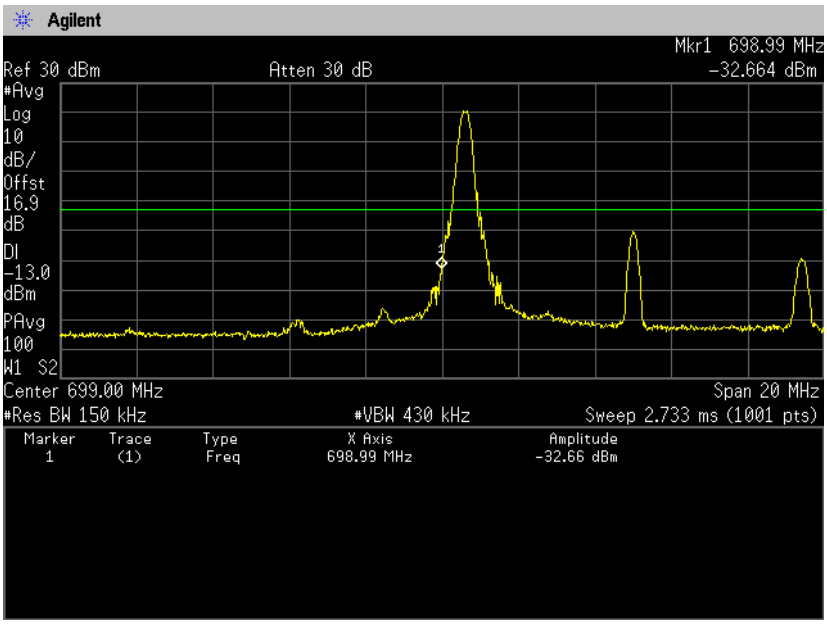
QPSK, BW 10MHz, RB50-0
Channel: Low



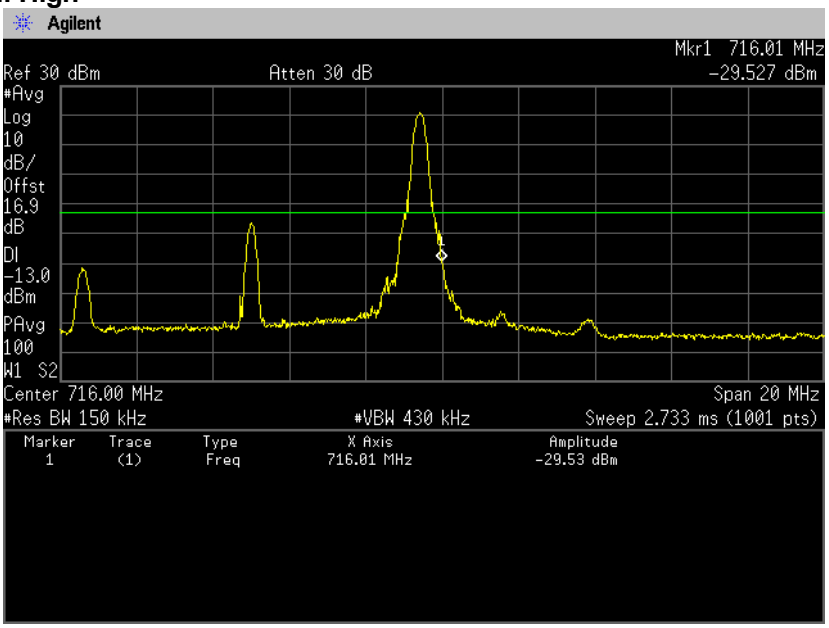
QPSK, BW 10MHz, RB50-0
Channel: High



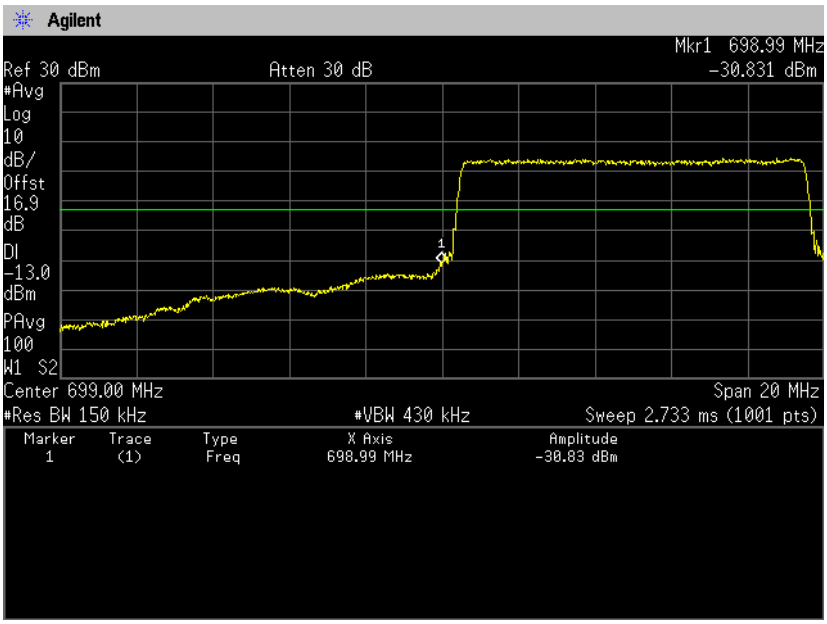
16QAM, BW 10MHz, RB1-0
Channel: Low



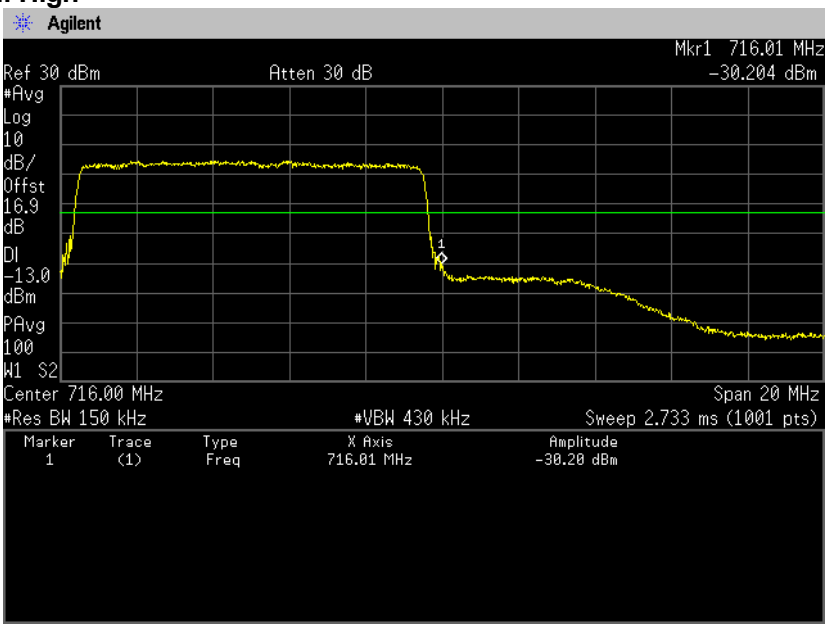
16QAM, BW 10MHz, RB1-49
Channel: High



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

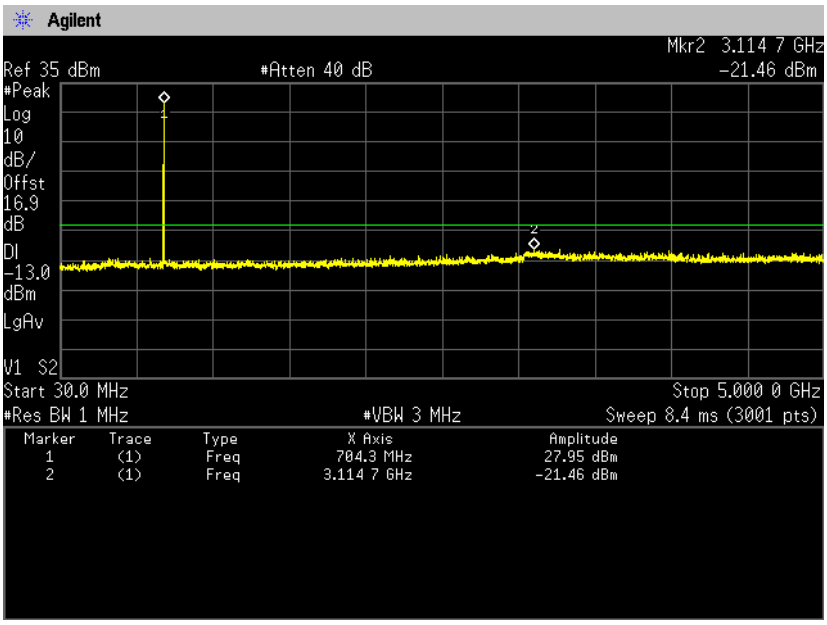


16QAM, BW 10MHz, RB50-0
Channel: High

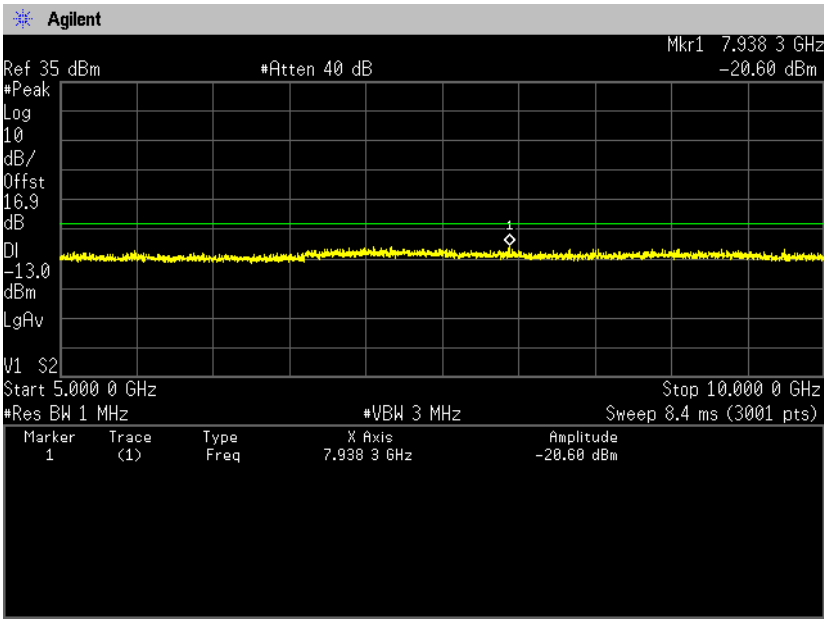


(Spurious Emissions)
Note: Conducted spurious test was measured in the worst case of conducted output power.

QPSK, BW 10MHz, RB1-24
Channel: 23060
30MHz-5GHz

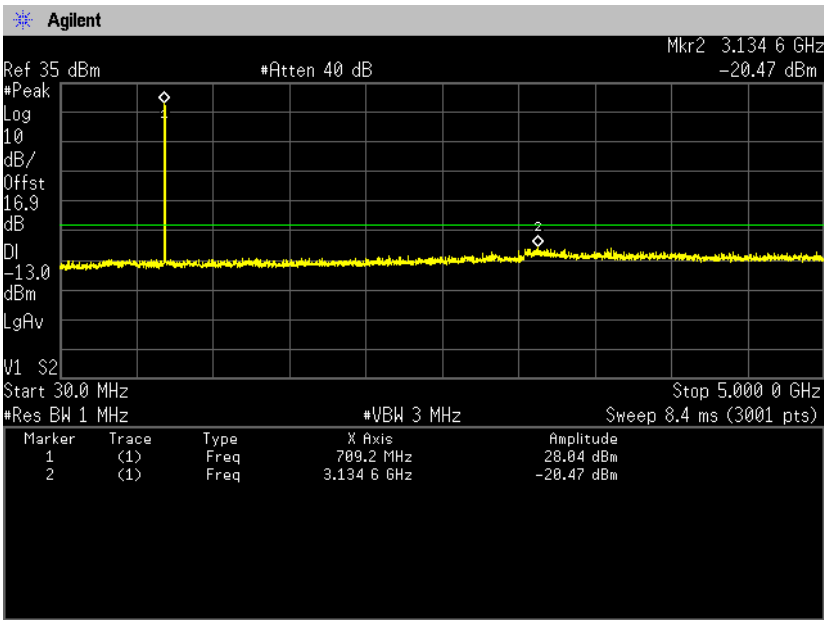


5GHz-10GHz

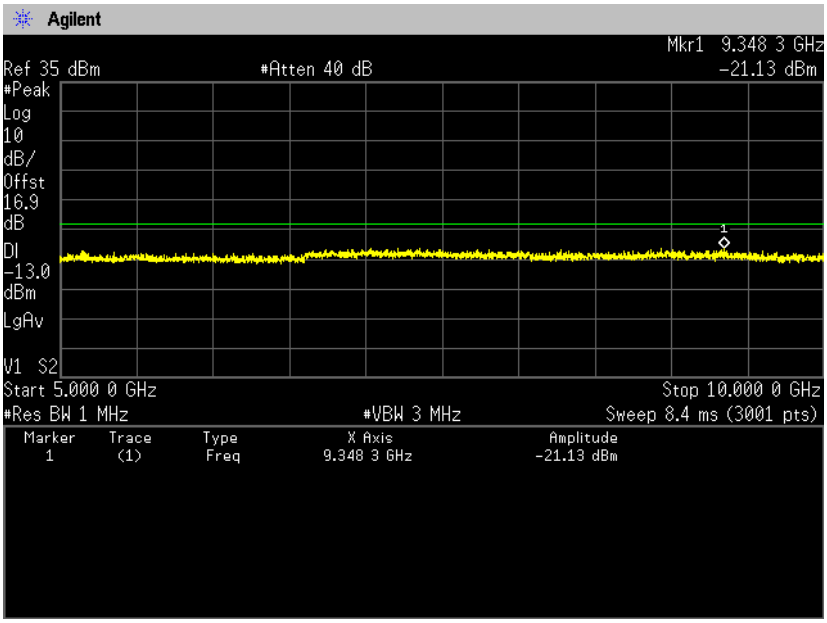


Zacta

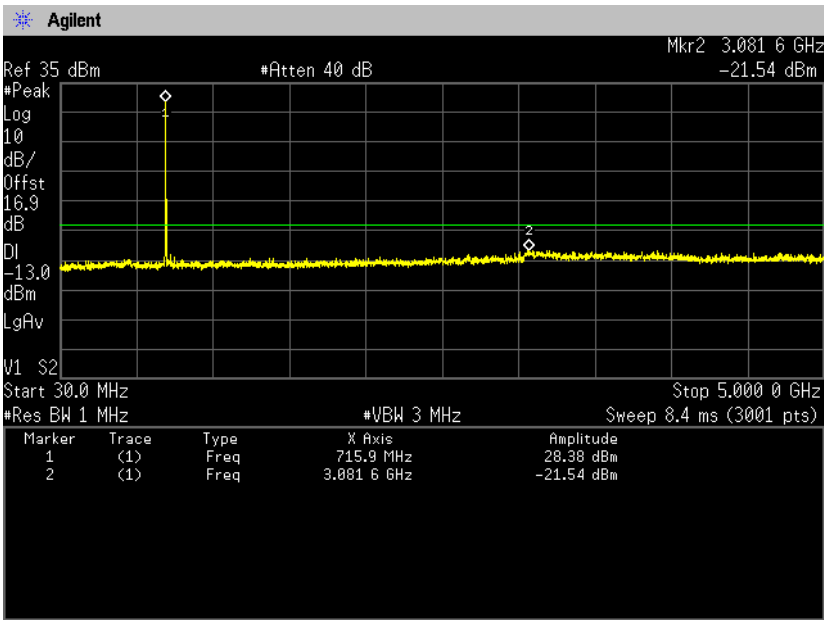
Channel: 23095
30MHz-5GHz



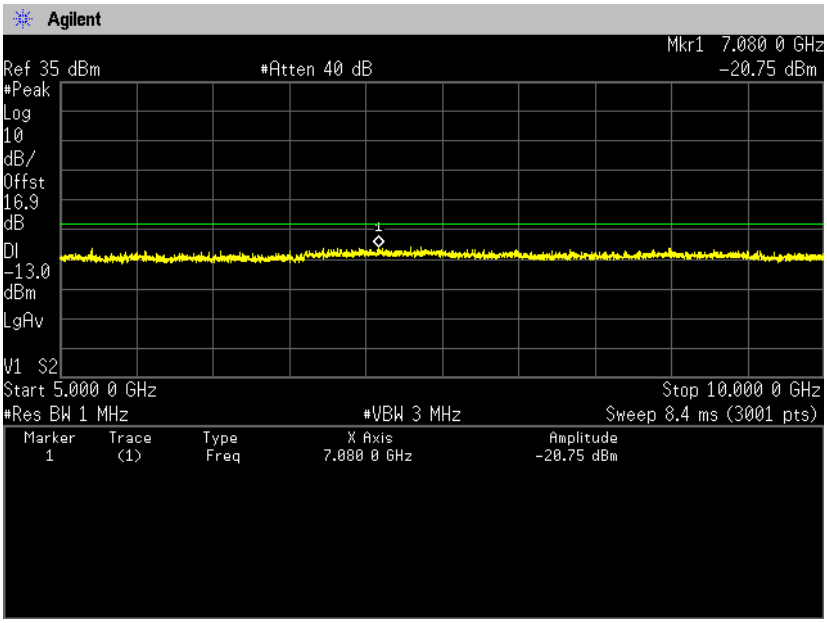
5GHz-10GHz



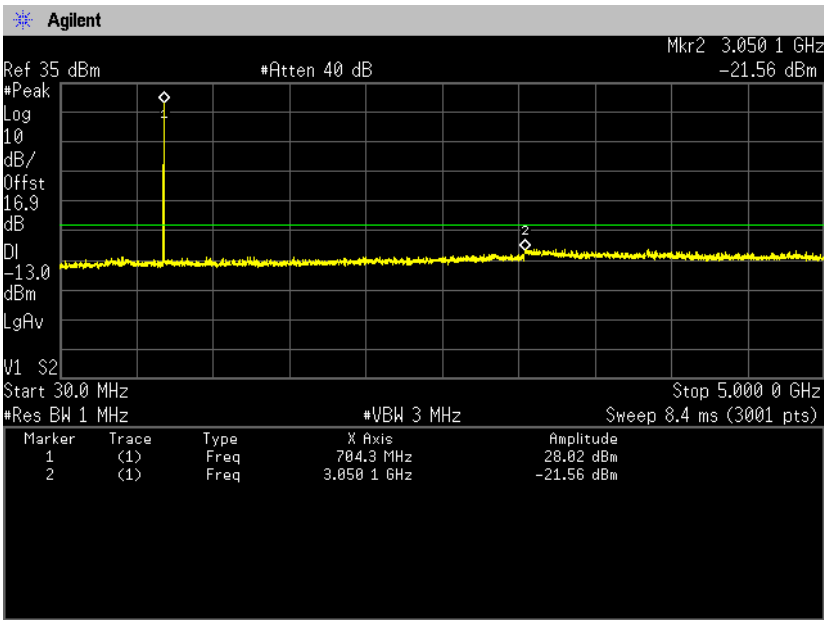
Channel: 23130
30MHz-5GHz



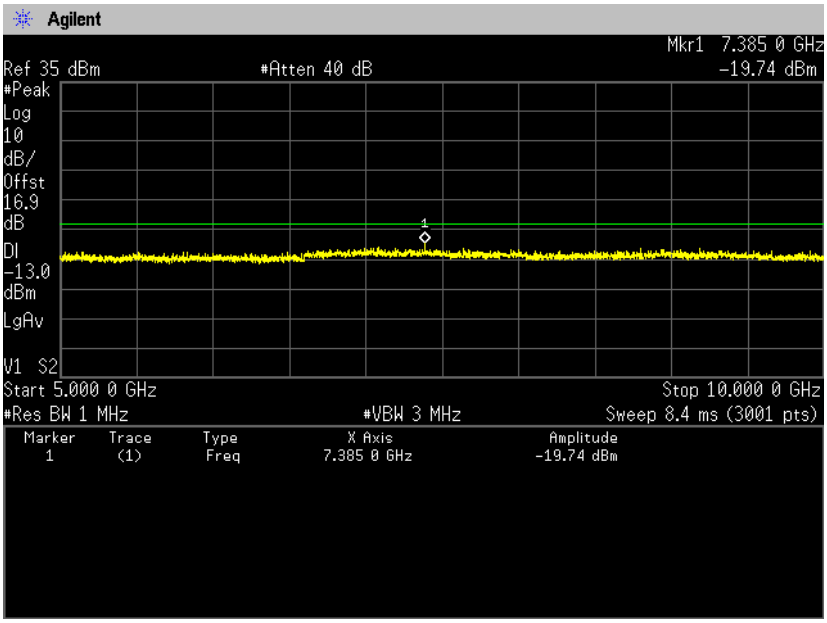
5GHz-10GHz



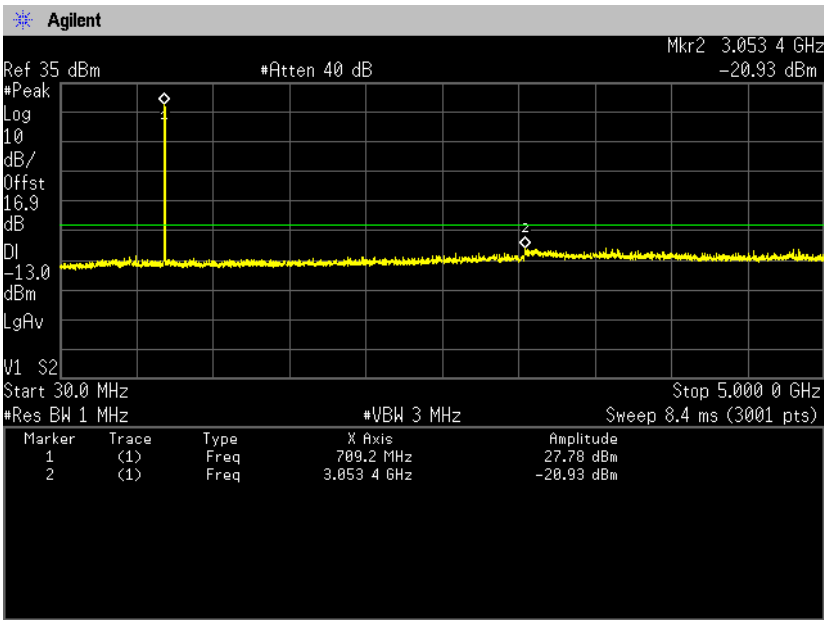
16QAM, BW 10MHz, RB1-24
Channel: 23060
30MHz-5GHz



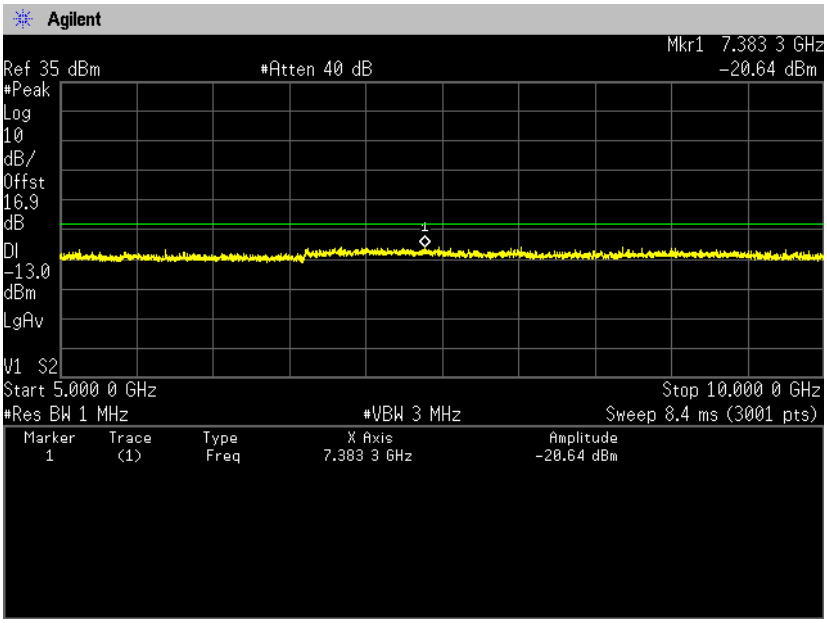
5GHz-10GHz



Channel: 23095
30MHz-5GHz

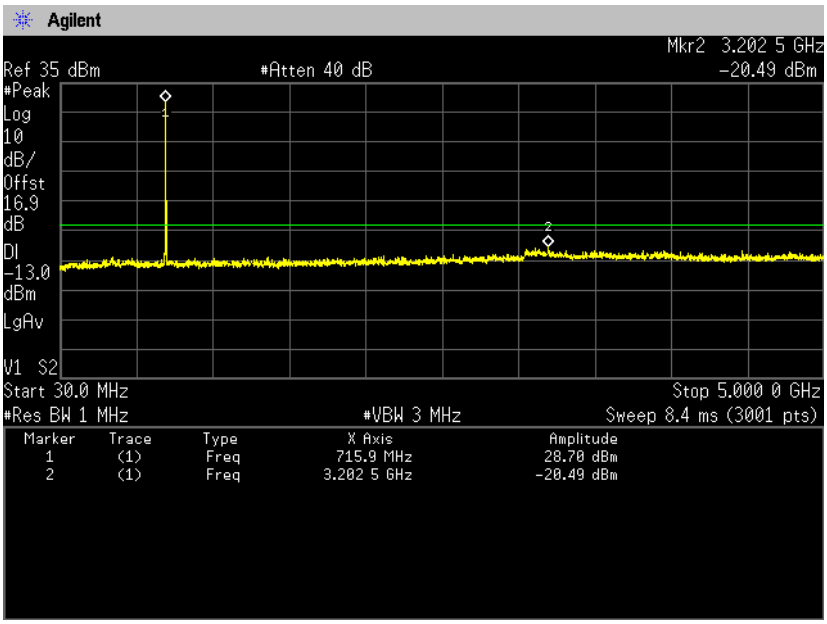


5GHz-10GHz

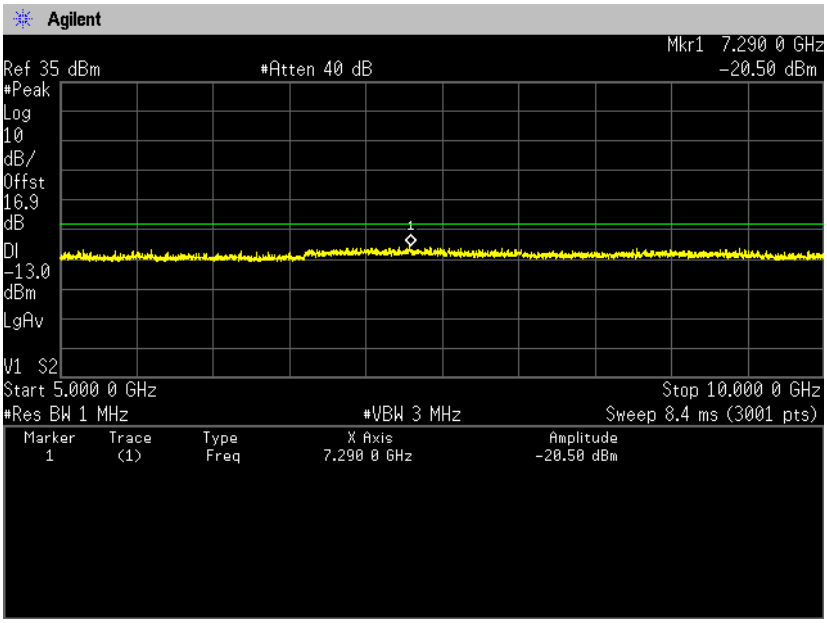


Zacta

Channel: 23130
30MHz-5GHz



5GHz-10GHz



9. Radiated Emissions and Harmonic Emissions

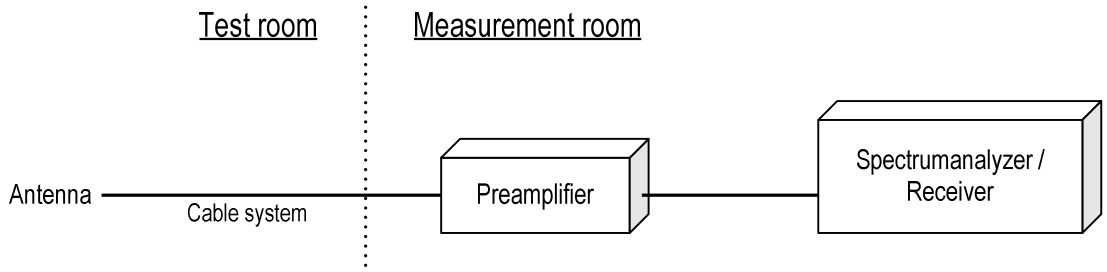
9.1 Measurement procedure
[FCC 27.53(g), 2.1053, IC RSS-130 4.6]

<Step 1>
The EUT and support equipment are placed on a 1 meter x 1.5 meter surface, 0.8 meter height FRP 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.

Spectrum analyzer setting
- Detector: Peak (RBW: 1MHz, VBW: 3MHz)

- Test configuration



9.2 Calculation method

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

Example:
Limit @ 1398.3MHz : -13.0dBm
S.G Reading = -58.9dBm Cable loss = 1.0dB Ant. Gain = 5.8dBd
Result = -58.9 – 1.0 + 5.8 = -54.1dBm
Margin = -13.0-(-54.1) = 41.1dB

9.3 Limit

-13dBm or less

9.4 Test data

Date : June 16, 2015
Temperature : 23.4 [˚C]
Humidity : 56.2 [%] Test engineer : Taiki Watanabe
Test place : 3m Semi-anechoic chamber

Date : June 17, 2015
Temperature : 23.6 [˚C]
Humidity : 60.2 [%] Test engineer : Taiki Watanabe
Test place : 3m Semi-anechoic chamber

Date : June 17, 2015
Temperature : 23.9 [˚C]
Humidity : 57.7 [%] Test engineer : Hikaru Shibata
Test place : 3m Semi-anechoic chamber

[LTE Band X II]
QPSK, BW 1.4MHz
Channel: 23017

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1398.3	-54.1	-58.9	1.0	5.8	-54.1	-13.0	41.1
V	1398.5	-53.8	-58.2	1.0	5.8	-53.3	-13.0	40.3
H	2796.6	-62.6	-65.4	1.4	8.0	-58.8	-13.0	45.8
V	2796.6	-62.9	-65.9	1.4	8.0	-59.3	-13.0	46.3
H	3496.3	-59.5	-59.8	1.5	7.5	-53.8	-13.0	40.8
V	3496.2	-56.5	-56.1	1.5	7.5	-50.1	-13.0	37.1

Channel: 23095

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1414.1	-52.3	-56.9	1.0	5.9	-51.9	-13.0	38.9
V	1414.1	-51.7	-55.9	1.0	5.9	-50.9	-13.0	37.9
H	2828.3	-64.0	-66.3	1.4	8.0	-59.7	-13.0	46.7
V	2828.3	-64.3	-67.1	1.4	8.0	-60.5	-13.0	47.5
H	3535.3	-62.7	-65.2	1.6	7.7	-59.1	-13.0	46.1
V	3535.3	-59.6	-60.8	1.6	7.7	-54.7	-13.0	41.7

Channel: 23173

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1429.7	-56.6	-60.9	1.0	6.1	-55.8	-13.0	42.8
V	1429.7	-52.8	-57.0	1.0	6.1	-51.9	-13.0	38.9
H	2859.2	-59.2	-61.6	1.4	8.0	-55.0	-13.0	42.0
V	2859.4	-61.1	-63.5	1.4	8.0	-56.9	-13.0	43.9
H	3574.2	-60.4	-61.3	1.6	7.6	-55.3	-13.0	42.3
V	3574.2	-56.2	-58.9	1.6	7.6	-52.9	-13.0	39.9

Zacta

16QAM, BW 1.4MHz
Channel: 23017

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1398.8	-54.2	-59.0	1.0	5.8	-54.1	-13.0	41.1
V	1398.8	-53.2	-57.6	1.0	5.8	-52.7	-13.0	39.7
H	2797.6	-62.2	-65.0	1.4	8.0	-58.4	-13.0	45.4
V	2797.8	-62.7	-65.7	1.4	8.0	-59.1	-13.0	46.1
H	3497.1	-59.7	-60.0	1.5	7.5	-54.0	-13.0	41.0
V	3497.0	-57.3	-56.9	1.5	7.5	-50.9	-13.0	37.9

Channel: 23095

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1414.2	-52.1	-56.7	1.0	5.9	-51.7	-13.0	38.7
V	1414.5	-52.4	-56.6	1.0	5.9	-51.6	-13.0	38.6
H	2829.0	-61.2	-63.5	1.4	8.0	-56.9	-13.0	43.9
V	2829.0	-61.8	-64.6	1.4	8.0	-58.0	-13.0	45.0
H	3536.5	-62.7	-65.2	1.6	7.7	-59.1	-13.0	46.1
V	3536.2	-58.7	-59.9	1.6	7.7	-53.8	-13.0	40.8

Channel: 23173

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1430.0	-51.9	-56.2	1.0	6.1	-51.1	-13.0	38.1
V	1430.0	-52.9	-57.1	1.0	6.1	-52.0	-13.0	39.0
H	2860.4	-58.6	-61.0	1.4	8.0	-54.4	-13.0	41.4
V	2860.4	-60.7	-63.1	1.4	8.0	-56.5	-13.0	43.5
H	3574.8	-60.8	-61.7	1.6	7.6	-55.7	-13.0	42.7
V	3575.2	-55.9	-58.6	1.6	7.6	-52.6	-13.0	39.6

QPSK, BW 3MHz
Channel: 23025

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1403.4	-51.0	-55.7	1.0	5.9	-50.8	-13.0	37.8
V	1403.6	-50.1	-54.5	1.0	5.9	-49.6	-13.0	36.6
H	2105.3	-55.8	-61.1	1.2	6.8	-55.5	-13.0	42.5
V	2105.3	-57.3	-62.2	1.2	6.8	-56.6	-13.0	43.6
H	2807.2	-55.2	-58.0	1.4	8.0	-51.4	-13.0	38.4
H	3508.9	-56.6	-56.9	1.5	7.5	-50.9	-13.0	37.9
V	3508.9	-54.3	-53.9	1.5	7.5	-47.9	-13.0	34.9

Channel: 23095

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1417.5	-51.8	-56.4	1.0	6.0	-51.4	-13.0	38.4
V	1417.5	-51.4	-55.6	1.0	6.0	-50.6	-13.0	37.6
H	2126.3	-57.5	-63.2	1.2	6.8	-57.6	-13.0	44.6
H	2835.1	-56.7	-59.0	1.4	8.0	-52.4	-13.0	39.4
V	2835.2	-57.8	-60.6	1.4	8.0	-54.0	-13.0	41.0
H	3543.8	-57.5	-60.0	1.6	7.7	-53.8	-13.0	40.8
V	3543.7	-54.2	-55.4	1.6	7.7	-49.2	-13.0	36.2

Channel: 23165

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1431.5	-52.8	-57.9	1.0	6.1	-52.8	-13.0	39.8
V	1431.6	-50.1	-54.3	1.0	6.1	-49.2	-13.0	36.2
H	2147.2	-56.9	-60.2	1.2	6.9	-54.5	-13.0	41.5
H	2862.9	-54.9	-57.3	1.4	8.0	-50.7	-13.0	37.7
V	2863.1	-56.8	-59.2	1.4	8.0	-52.6	-13.0	39.6
H	3578.7	-55.3	-56.2	1.6	7.6	-50.2	-13.0	37.2
V	3578.9	-53.4	-56.1	1.6	7.6	-50.1	-13.0	37.1

Zacta

16QAM, BW 3MHz
Channel: 23025

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1398.5	-52.6	-57.3	1.0	5.8	-52.4	-13.0	39.4
V	1398.5	-51.8	-56.2	1.0	5.8	-51.3	-13.0	38.3
H	2097.7	-60.5	-65.8	1.2	6.8	-60.2	-13.0	47.2
H	2797.0	-60.3	-63.1	1.4	8.0	-56.5	-13.0	43.5
V	2797.0	-60.4	-63.4	1.4	8.0	-56.8	-13.0	43.8
H	3496.1	-57.0	-57.3	1.5	7.5	-51.3	-13.0	38.3
V	3496.2	-53.5	-53.1	1.5	7.5	-47.1	-13.0	34.1

Channel: 23095

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1412.6	-53.2	-57.8	1.0	5.9	-52.8	-13.0	39.8
V	1412.5	-50.8	-55.0	1.0	5.9	-50.0	-13.0	37.0
H	2118.7	-62.4	-68.1	1.2	6.8	-62.4	-13.0	49.4
H	2824.7	-59.9	-62.2	1.4	8.0	-55.6	-13.0	42.6
V	2825.0	-59.1	-61.9	1.4	8.0	-55.3	-13.0	42.3
H	3531.4	-59.5	-62.0	1.6	7.7	-55.9	-13.0	42.9
V	3531.3	-57.4	-58.6	1.6	7.7	-52.5	-13.0	39.5

Channel: 23165

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1426.4	-51.1	-56.2	1.0	6.0	-51.1	-13.0	38.1
V	1426.4	-50.2	-54.4	1.0	6.0	-49.3	-13.0	36.3
H	2853.1	-59.3	-61.7	1.4	8.0	-55.1	-13.0	42.1
V	2853.0	-60.4	-62.8	1.4	8.0	-56.2	-13.0	43.2
H	3566.1	-60.2	-61.1	1.6	7.7	-55.0	-13.0	42.0
V	3566.1	-55.6	-58.3	1.6	7.7	-52.2	-13.0	39.2

QPSK, BW 5MHz
Channel: 23035

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1407.4	-53.9	-60.9	1.0	5.9	-56.0	-13.0	43.0
V	1407.4	-50.8	-55.0	1.0	5.9	-50.1	-13.0	37.1
H	2111.0	-60.0	-64.9	1.2	6.8	-59.3	-13.0	46.3
V	2111.0	-60.3	-60.5	1.2	6.8	-54.9	-13.0	41.9
H	2814.6	-62.5	-65.4	1.4	8.0	-58.8	-13.0	45.8
V	2814.6	-58.7	-59.6	1.4	8.0	-53.0	-13.0	40.0
H	3518.4	-59.3	-61.5	1.5	7.6	-55.5	-13.0	42.5
V	3518.4	-55.8	-56.1	1.5	7.6	-50.1	-13.0	37.1

Channel: 23095

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1419.4	-55.2	-62.3	1.0	6.0	-57.3	-13.0	44.3
V	1419.4	-53.3	-59.1	1.0	6.0	-54.1	-13.0	41.1
H	2129.0	-63.6	-69.8	1.2	6.8	-64.2	-13.0	51.2
V	2129.0	-62.8	-65.5	1.2	6.8	-59.9	-13.0	46.9
H	2838.6	-60.7	-66.9	1.4	8.0	-60.3	-13.0	47.3
V	2838.6	-61.4	-62.5	1.4	8.0	-55.9	-13.0	42.9
H	3548.3	-56.9	-59.3	1.6	7.7	-53.1	-13.0	40.1
V	3548.3	-54.5	-53.3	1.6	7.7	-47.1	-13.0	34.1

Channel: 23155

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1431.3	-54.2	-60.7	1.0	6.1	-55.6	-13.0	42.6
V	1431.3	-53.9	-59.7	1.0	6.1	-54.6	-13.0	41.6
H	2147.0	-60.4	-64.7	1.2	6.9	-59.0	-13.0	46.0
V	2147.0	-60.7	-65.2	1.2	6.9	-59.5	-13.0	46.5
H	2862.7	-60.7	-64.5	1.4	8.0	-57.9	-13.0	44.9
V	2862.7	-61.6	-65.5	1.4	8.0	-58.9	-13.0	45.9
H	3578.3	-57.5	-58.2	1.6	7.6	-52.2	-13.0	39.2
V	3578.3	-54.7	-53.3	1.6	7.6	-47.3	-13.0	34.3

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16QAM, BW 5MHz
Channel: 23035

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1407.4	-54.8	-61.8	1.0	5.9	-56.8	-13.0	43.8
V	1407.4	-51.1	-55.3	1.0	5.9	-50.4	-13.0	37.4
H	2111.0	-61.0	-65.9	1.2	6.8	-60.2	-13.0	47.2
V	2111.0	-61.8	-62.0	1.2	6.8	-56.4	-13.0	43.4
H	2814.6	-56.8	-59.7	1.4	8.0	-53.0	-13.0	40.0
V	2814.6	-59.2	-60.1	1.4	8.0	-53.4	-13.0	40.4
H	3518.4	-59.8	-62.0	1.5	7.6	-56.0	-13.0	43.0
V	3518.4	-58.3	-58.6	1.5	7.6	-52.6	-13.0	39.6

Channel: 23095

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1419.4	-54.4	-61.5	1.0	6.0	-56.5	-13.0	43.5
V	1419.4	-53.9	-59.7	1.0	6.0	-54.7	-13.0	41.7
H	2129.0	-60.6	-66.8	1.2	6.8	-61.2	-13.0	48.2
V	2129.0	-60.7	-63.4	1.2	6.8	-57.8	-13.0	44.8
H	2838.6	-62.1	-68.3	1.4	8.0	-61.6	-13.0	48.6
V	2838.6	-62.5	-63.6	1.4	8.0	-57.0	-13.0	44.0
H	3548.3	-58.4	-60.8	1.6	7.7	-54.6	-13.0	41.6
V	3548.3	-54.8	-53.6	1.6	7.7	-47.4	-13.0	34.4

Channel: 23155

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1431.3	-53.9	-60.4	1.0	6.1	-55.3	-13.0	42.3
V	1431.3	-52.8	-58.6	1.0	6.1	-53.5	-13.0	40.5
H	2147.0	-59.6	-63.9	1.2	6.9	-58.2	-13.0	45.2
V	2147.0	-59.5	-64.0	1.2	6.9	-58.3	-13.0	45.3
H	2862.7	-59.2	-63.0	1.4	8.0	-56.4	-13.0	43.4
V	2862.7	-61.3	-65.2	1.4	8.0	-58.7	-13.0	45.7
H	3578.3	-57.5	-58.2	1.6	7.6	-52.2	-13.0	39.2
V	3578.3	-55.8	-54.4	1.6	7.6	-48.4	-13.0	35.4

QPSK, BW 10MHz
Channel: 23060

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1408.2	-55.1	-62.1	1.0	5.9	-57.2	-13.0	44.2
V	1408.2	-51.2	-55.4	1.0	5.9	-50.5	-13.0	37.5
H	2112.3	-57.7	-62.6	1.2	6.8	-57.0	-13.0	44.0
V	2112.3	-61.0	-61.2	1.2	6.8	-55.6	-13.0	42.6
H	2816.5	-58.7	-61.6	1.4	8.0	-55.0	-13.0	42.0
V	2816.5	-59.2	-60.1	1.4	8.0	-53.5	-13.0	40.5
H	3520.5	-61.9	-64.1	1.5	7.6	-58.0	-13.0	45.0
V	3520.5	-58.4	-58.7	1.5	7.6	-52.6	-13.0	39.6

Channel: 23095

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1415.3	-55.8	-62.9	1.0	6.0	-57.9	-13.0	44.9
V	1415.3	-53.3	-59.1	1.0	6.0	-54.1	-13.0	41.1
H	2122.6	-59.8	-66.0	1.2	6.8	-60.4	-13.0	47.4
V	2122.6	-62.4	-65.1	1.2	6.8	-59.5	-13.0	46.5
H	2830.4	-61.3	-67.5	1.4	8.0	-60.9	-13.0	47.9
V	2830.4	-62.5	-63.6	1.4	8.0	-57.0	-13.0	44.0
H	3537.7	-61.6	-64.0	1.6	7.7	-57.9	-13.0	44.9
V	3537.7	-57.5	-56.3	1.6	7.7	-50.2	-13.0	37.2

Channel: 23130

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1422.1	-53.4	-59.9	1.0	6.0	-54.9	-13.0	41.9
V	1422.1	-51.4	-57.2	1.0	6.0	-52.2	-13.0	39.2
H	2133.5	-61.0	-65.3	1.2	6.8	-59.7	-13.0	46.7
V	2133.5	-62.1	-66.6	1.2	6.8	-61.0	-13.0	48.0
H	2844.5	-62.0	-65.8	1.4	8.0	-59.2	-13.0	46.2
V	2844.5	-62.6	-66.5	1.4	8.0	-59.9	-13.0	46.9
H	3555.0	-57.8	-58.5	1.6	7.7	-52.3	-13.0	39.3
V	3555.0	-54.2	-52.8	1.6	7.7	-46.6	-13.0	33.6

Zacta

16QAM, BW 10MHz
Channel: 23060

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1399.2	-56.3	-62.8	1.0	5.8	-58.0	-13.0	45.0
V	1399.2	-53.5	-58.0	1.0	5.8	-53.1	-13.0	40.1
H	2099.0	-61.8	-67.4	1.2	6.8	-61.8	-13.0	48.8
H	2798.4	-57.9	-60.4	1.4	8.0	-53.8	-13.0	40.8
V	2798.4	-60.4	-59.3	1.4	8.0	-52.7	-13.0	39.7
H	3408.0	-59.2	-61.0	1.5	7.6	-55.0	-13.0	42.0
V	3408.0	-55.7	-54.4	1.5	7.6	-48.4	-13.0	35.4

Channel: 23095

H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1406.3	-54.8	-61.0	1.0	5.9	-56.1	-13.0	43.1
V	1406.3	-50.5	-54.4	1.0	5.9	-49.5	-13.0	36.5
H	2109.3	-59.2	-63.5	1.2	6.8	-57.9	-13.0	44.9
V	2109.3	-60.9	-59.1	1.2	6.8	-53.5	-13.0	40.5
H	2812.4	-60.0	-65.6	1.4	8.0	-59.0	-13.0	46.0
V	2812.4	-58.5	-61.2	1.4	8.0	-54.6	-13.0	41.6
H	3515.5	-57.4	-59.0	1.5	7.6	-53.0	-13.0	40.0
V	3515.5	-55.8	-54.6	1.5	7.6	-48.6	-13.0	35.6

Channel: 23130

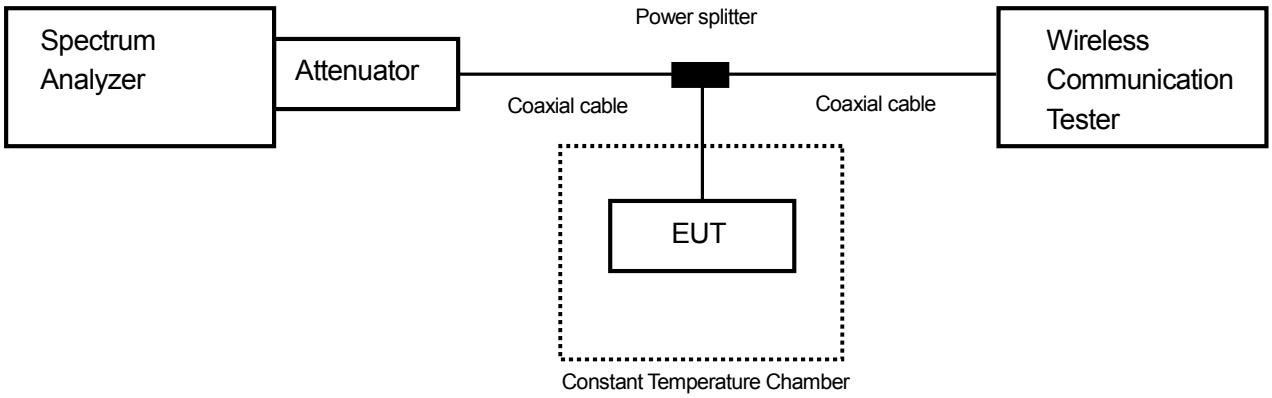
H/V	Frequency [MHz]	S.A Reading [dBm]	S.G Reading [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	1413.2	-54.9	-60.5	1.0	5.9	-55.5	-13.0	42.5
V	1413.2	-52.8	-56.3	1.0	5.9	-51.3	-13.0	38.3
H	2119.7	-59.3	-64.0	1.2	6.8	-58.3	-13.0	45.3
V	2119.7	-63.0	-69.2	1.2	6.8	-63.6	-13.0	50.6
H	2826.4	-61.7	-66.8	1.4	8.0	-60.2	-13.0	47.2
V	2826.4	-61.6	-68.9	1.4	8.0	-62.2	-13.0	49.2
H	3533.0	-61.5	-67.4	1.6	7.7	-61.3	-13.0	48.3
V	3533.0	-59.6	-63.2	1.6	7.7	-57.1	-13.0	44.1

10. Frequency Stability

10.1 Measurement procedure [FCC 27.54, 2.1055, IC RSS-130 4.3]

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



10.2 Limit

±2.5ppm

10.3 Measurement result

Date : June 25, 2015
Temperature : 27.7 [˚C]
Humidity : 45.3 [%] Test engineer : Hikaru Shibata
Test place : Shielded room No.4

[LTE Band X II]
(Channel: 23095)

Limit: ±0.00025% = ±2.5ppm					
Power Supply [V]	**Temperature [ºC]**	**Measurements Frequency [Hz]**	**Frequency Tolerance [ppm]**	**Limit [ppm]**	**Result**
3.90	25(Ref.)	707,504,746	0.00000	±2.5	Pass
	50	707,503,671	-1.51942	±2.5	Pass
	40	707,504,753	0.00989	±2.5	Pass
	30	707,504,297	-0.63462	±2.5	Pass
	20	707,504,099	-0.91448	±2.5	Pass
	10	707,505,367	0.87773	±2.5	Pass
	0	707,504,716	-0.04240	±2.5	Pass
	-10	707,504,892	0.20636	±2.5	Pass
	-20	707,504,172	-0.81130	±2.5	Pass
	-30	707,504,596	-0.21201	±2.5	Pass
3.315	25	707,504,795	0.06926	±2.5	Pass
4.485	25	707,504,673	-0.10318	±2.5	Pass

Calculation;

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

11. 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 at mains port	±3.0dB
Radiated emission (9kHz – 30MHz)	±4.4dB
Radiated emission (30MHz – 1000MHz)	±4.5dB
Radiated emission (1000MHz – 26GHz)	±3.9dB

12. Laboratory description

1. Location:

TÜV SÜD Zacta Ltd. Yonezawa Testing Center
4149-7 Hachimanpara 5-chome Yonezawa-shi Yamagata 992-1128 Japan
Phone: +81-238-28-2880 Fax: +81-238-28-2888

2. Facility filing information:

1) NVLAP accreditation: NVLAP Lab. code: 200306-0

2) VLAC accreditation: Lab. code: VLAC-013

Site name	Radiated emission	Conducted emission for mains port	Conducted emission for telecom port	Radiated emission (CMAD)	Expiry Date
3m Semi-anechoic chamber	VLAC-013			-	Jul. 3, 2017
10m Semi-anechoic chamber No.1				VLAC-013	
10m Semi-anechoic chamber No.2					
Shielded room No.1	-	VLAC-013		-	

3) FCC filing:

Site name	Registration Number	Expiry Date
Site 3	91065	Oct. 1, 2017
3m Semi-anechoic chamber	540072	Feb. 20, 2017
10m Semi-anechoic chamber No.1		
10m Semi-anechoic chamber No.2		
Shielded room No.1		

4) Industry Canada Oats site filing:

Site name	Sites on file: Oats 3m/10m	Expiry Date
Site 3	4224A-3	Dec. 3, 2017
3m Semi-anechoic chamber	4224A-4	
10m Semi-anechoic chamber No.1	4224A-5	
10m Semi-anechoic chamber No.2	4224A-6	Jan. 15, 2017

5) VCCI site filing:

Site name	Radiated emission	Conducted emission for mains port	Conducted emission for telecom port	Expiry Date
Site 3	R-138	C-134	T-1222	Nov. 16, 2017
3m Semi-anechoic chamber	A-0166			Jul. 3, 2017
10m Semi-anechoic chamber No.1				
10m Semi-anechoic chamber No.2				
Shielded room No.1	-	A-0166		

6) TÜV SÜD PS authorization:
Authorized as an EMC test laboratory

7) TÜV Rheinland authorization:
Authorized as an EMC test laboratory

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, 2016	Jun. 11, 2015
Microwave cable	RS	YH20_S1	N/A (S389)	Aug. 31, 2015	Aug. 30, 2014
Attenuator	Weinschel	56-10	J4180	Nov. 30, 2015	Nov. 12, 2014
Microwave cable	SUHNER	SUCOFLEX104/1.5m	199121/4	Oct. 31, 2015	Oct. 7, 2014
Microwave cable	SUHNER	SUCOFLEX104/1.5m	322086/4	Jul. 31, 2015	Jul. 30, 2014
Power splitter	ANRITSU	K240B	020205	Jul. 31, 2015	Jul. 12, 2014
Wideband radio frequency tester	ROHDE&SCHWARZ	CMW500	116338	Apr. 30, 2016	Apr. 2, 2015
Operation type temperature controlled bath	Espec	PL1KP	14007261	Jan. 31, 2016	Jan. 9, 2015

Radiated emission

Equipment	Company	Model No.	Serial No.	Cal. Due	Cal. Date
EMI Receiver	ROHDE&SCHWARZ	ESCI	100451	Dec. 31, 2015	Dec. 25, 2014
Preamplifier	ANRITSU	MH648A	M96057	Jun. 30, 2016	Jun. 12, 2015
Biconical antenna	Schwarzbeck	VHA9103/BBA9106	2125	Jun. 30, 2016	Jun. 4, 2015
Log periodic antenna	Schwarzbeck	UHALP9108A	0560	Jun. 30, 2016	Jun. 4, 2015
Attenuator	TME	CFA-01NPJ-6	N/A (S275)	Jun. 30, 2016	Jun. 23, 2015
Attenuator	TME	CFA-01NPJ-3	N/A (S272)	Jun. 30, 2016	Jun. 23, 2015
Spectrum analyzer	Agilent Technologies	E4440A	US44302655	Jun. 30, 2016	Jun. 11, 2015
Preamplifier	TSJ	MLA-100M18-B02-40	1929118	May 31, 2016	May 1, 2015
Attenuator	AEROFLEX	26A-10	081217-08	Mar. 31, 2016	Mar. 12, 2015
Dipole antenna	Schwarzbeck	VHAP	1020	Sep. 30, 2015	Sep. 5, 2014
Dipole antenna	Schwarzbeck	UHAP	994	Sep. 30, 2015	Sep. 5, 2014
Double ridged guide antenna	EMCO	3115	5205	Feb. 29, 2016	Feb. 16, 2015
Attenuator	Agilent Technologies	8491B	MY39268633	Feb. 29, 2016	Feb. 1, 2015
Double ridged guide antenna	EMCO	3115	000058532	Oct. 31, 2015	Oct. 14, 2014
Signal generator	ROHDE&SCHWARZ	SMB100A	177525	Jun. 30, 2016	Jun. 19, 2015
Power amplifier	R&K	CGA020M602-2633R	B40240	Mar.31, 2016	Mar. 23, 2015
Microwave cable	SUHNER	SUCOFELX102/2m	31648/2	Mar. 28, 2016	Mar. 10, 2015
High pass filter	Micro-Tronics	HPM50115	004	Jul. 31, 2015	Jul. 12, 2014
High pass filter	Wainwright	WHKX2.8/18G-6SS	1	Jul. 31, 2015	Jul. 17, 2014
Wideband radio frequency tester	ROHDE&SCHWARZ	CMW500	126079	Aug. 31, 2015	Aug. 28, 2014
Microwave cable	SUHNER	SUCOFLEX104/9m	346316/4	Oct. 31, 2015	Oct. 31, 2014
		SUCOFLEX104/1m	322084/4	Oct. 31, 2015	Oct. 31, 2014
		SUCOFLEX104/1.5m	317226/4	Oct. 31, 2015	Oct. 31, 2014
		SUCOFLEX104/7m	41625/6	Oct. 31, 2015	Oct. 31, 2014
PC	DELL	DIMENSION E521	75465BX	N/A	N/A
Software	TOYO Corporation	EP5/RE-AJ	0611193/V5.3.61	N/A	N/A
3m Semi-anechoic chamber	TOKIN	N/A	N/A (9002-NSA)	Apr. 30, 2016	Apr. 27, 2015
3m Semi-anechoic chamber	TOKIN	N/A	N/A (9002-SVSWR)	Apr. 30, 2016	Apr. 27, 2015

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