JQA File No. : KL80150382
Issue Date : September 28, 2015

TEST REPORT

Applicant	:	Sharp Corporation, Communication Systems Division
Address	:	2-13-1, Iida Hachihonmatsu, Higashi-Hiroshima City, Hiroshima, 739-0192, Japan
Products	:	Smart Phone
Model No.	:	502SH
Serial No.	:	004401/11/553733/0 004401/11/553701/7
FCC ID	:	APYHRO00226
Test Standard	:	CFR 47 FCC Rules and Regulations Part 27
Test Results	:	**Passed**
Date of Test	:	September 16 ~ 19, 2015

ilac-MRA VLAC Lab Accreditation VLAC-001-2

Kousei Shibata
Manager
Japan Quality Assurance Organization
KITA-KANSAI Testing Center
SAITO EMC Branch
7-3-10, Saito-asagi, Ibaraki-shi, Osaka 567-0085, Japan

- The measurement values stated in Test Report was made with traceable to National Institute of Advanced Industrial Science and Technology (AIST) of Japan and National Institute of Information and Communications Technology (NICT) of Japan.
- The applicable standard, testing condition and testing method which were used for the tests are based on the request of the applicant.
- The test results presented in this report relate only to the offered test sample.
- The contents of this test report cannot be used for the purposes, such as advertisement for consumers.
- This test report shall not be reproduced except in full without the written approval of JQA.
- VLAC does not approve, certify or warrant the product by this test report.

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DEFINITIONS FOR ABBREVIATION AND SYMBOLS USED IN THIS TEST REPORT

EUT : Equipment Under Test
AE : Associated Equipment
N/A : Not Applicable
N/T : Not Tested
EMC : Electromagnetic Compatibility
EMI : Electromagnetic Interference
EMS : Electromagnetic Susceptibility

☑ - indicates that the listed condition, standard or equipment is applicable for this report.
☐ - indicates that the listed condition, standard or equipment is not applicable for this report.

1 Description of the Equipment Under Test

1. Manufacturer : Sharp Corporation, Communication Systems Division
   2-13-1, Iida Hachihonmatsu, Higashi-Hiroshima City, Hiroshima, 739-0192, Japan
2. Products : Smart Phone
3. Model No. : 502SH
4. Serial No. : 004401/11/553733/0
   004401/11/553701/7
5. Product Type : Pre-production
6. Date of Manufacture : July, 2015
7. Power Rating : 4.0VDC (Lithium-ion Battery LIS1613SPPC(SY6) 3100mAh)
8. Grounding : None
9. Transmitting Frequency : 1710.7 MHz(19957CH) – 1754.3MHz(20393CH) (BW: 1.4MHz)
   1711.5 MHz(19965CH) – 1753.5MHz(20385CH) (BW: 3MHz)
   1712.5 MHz(19975CH) – 1752.5MHz(20375CH) (BW: 5MHz)
   1715.0 MHz(20000CH) – 1750.0MHz(20350CH) (BW: 10MHz)
   1717.5 MHz(20025CH) – 1747.5MHz(20325CH) (BW: 15MHz)
   1720.0 MHz(20050CH) – 1745.0MHz(20300CH) (BW: 20MHz)
10. Receiving Frequency : 2110.7 MHz(1957CH) – 2154.3MHz(2393CH) (BW: 1.4MHz)
    2111.5 MHz(1965CH) – 2153.5MHz(2385CH) (BW: 3MHz)
    2112.5 MHz(1975CH) – 2152.5MHz(2375CH) (BW: 5MHz)
    2115.0 MHz(2000CH) – 2150.0MHz(2350CH) (BW: 10MHz)
    2117.5 MHz(2025CH) – 2147.5MHz(2325CH) (BW: 15MHz)
    2120.0 MHz(2050CH) – 2145.0MHz(2300CH) (BW: 20MHz)
11. Emission Designations :

BW (MHz)	QPSK	16QAM
1.4	1M08G7D	1M09D7W
3	2M69G7D	2M68D7W
5	4M47G7D	4M47D7W
10	8M94G7D	8M95D7W
15	13M4G7D	13M4D7W
20	17M9G7D	17M9D7W

12. Max. RF Output Power :

BW (MHz)	QPSK (W EIRP)	16QAM (W EIRP)
1.4	0.151	0.129
3	0.148	0.129
5	0.145	0.123
10	0.148	0.132
15	0.148	0.126
20	0.148	0.126

13. Category : LTE FDD (Band 4)
14. EUT Authorization : Certification
15. Received Date of EUT : September 3, 2015

16. Channel Plan

The carrier spacing is 100 kHz.
The carrier frequency is designated by the absolute frequency channel number (ARFCN).
The carrier frequency is expressed in the equation shown as follows:

Transmitting Frequency (in MHz) = $1710.7 + 0.1 \times (n - 19957)$
where, n : channel number ($19957 \leq n \leq 20393$)

Receiving Frequency (in MHz) = $2110.7 + 0.1 \times (n - 1957)$
where, n : channel number ($1957 \leq n \leq 2393$)

2 Summary of Test Results

Applied Standard : CFR 47 FCC Rules and Regulations Part 27
Subpart L — 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 2110-2155 MHz, 2155-2180 MHz, 2180-2200 MHz Bands

The EUT described in clause 1 was tested according to the applied standard shown above.
Details of the test configuration is shown in clause 6.
The conclusion for the test items of which are required by the applied standard is indicated under the test result.

☑ - The test result was **passed** for the test requirements of the applied standard.

☐ - The test result was **failed** for the test requirements of the applied standard.

☐ - The test result was **not judged** the test requirements of the applied standard.

In the approval of test results,
- Determining compliance with the limits in this report was based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
- No deviations were employed from the applied standard.
- No modifications were conducted by JQA to achieve compliance to the limitations.

Reviewed by:

Shigeru Kinoshita
Assistant Manager
JQA KITA-KANSAI Testing Center
SAITO EMC Branch

Tested by:

Shigeru Osawa
Deputy Manager
JQA KITA-KANSAI Testing Center
SAITO EMC Branch

3 Test Procedure

Test Requirements : CFR 47 FCC Rules and Regulations Part 2
§2.1046, §2.1047, §2.1049, §2.1051, §2.1053, §2.1055 and §2.1057

Test Procedure : ANSI C63.4–2003, TIA/EIA–603-C-2004
FCC KDB 971168 D01 Power Meas License Digital Systems v02r02,
released October 17, 2014

4 Test Location

Japan Quality Assurance Organization (JQA)
KITA-KANSAI Testing Center
7-7, Ishimaru, 1-chome, Minoh-shi, Osaka, 562-0027, Japan
SAITO EMC Branch
7-3-10, Saito-asagi, Ibaraki-shi, Osaka 567-0085, Japan

5 Recognition of Test Laboratory

JQA KITA-KANSAI Testing Center SAITO EMC Branch is accredited under ISO/IEC 17025 by following accreditation bodies and the test facility is registered by the following bodies.

VLAC Accreditation No.	:	VLAC-001-2 (Expiry date : March 30, 2016)
VCCI Registration No.	:	A-0002 (Expiry date : March 30, 2016)
BSMI Registration No.	:	SL2-IS-E-6006, SL2-IN-E-6006, SL2-R1/R2-E-6006, SL2-A1-E-6006 (Expiry date : September 14, 2016)
IC Registration No.	:	2079E-3, 2079E-4 (Expiry date : July 16, 2017)

Accredited as conformity assessment body for Japan electrical appliances and material law by METI. (Expiry date : February 22, 2016)

6 Description of Test Setup

6.1 Test Configuration

The equipment under test (EUT) consists of :

	Item	Manufacturer	Model No.	Serial No.	FCC ID
A	Smart Phone	Sharp	502SH	004401/11/553733/0 *1) 004401/11/553701/7 *2)	APYHRO00226
B	AC Adapter	Hosiden	ZTDAC1	D7A	N/A
C	Earphone	Softbank Mobile	ZTCAA1	--	N/A
D	DTV Antenna	Sharp	--	--	N/A

*1) Used for Field Strength of Spurious Emission
*2) Used for Antenna Conducted Emission and Frequency Stability

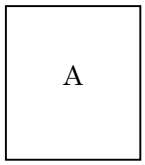
The auxiliary equipment used for testing :
None

Type of Cable:

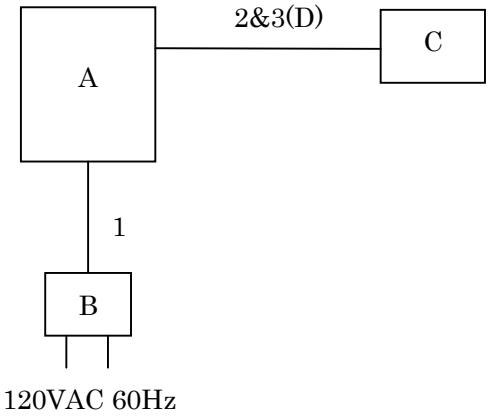
No.	Description	Identification (Manu. etc.)	Connector Shielded	Cable Shielded	Ferrite Core	Length (m)
1	USB conversion cable	--	--	NO	NO	1.5
2	Earphone Cable	--	--	NO	NO	0.5
3	DTV Antenna Cable	--	--	NO	NO	0.1

6.2 Test Arrangement (Drawings)

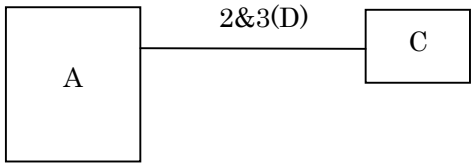
a) Single Unit



b) AC Adapter used



c) Earphone used



6.3 Operating Condition

Power Supply Voltage : 4.0 VDC (for Battery)
120 VAC, 60 Hz (For AC Adapter)

1. Bandwidth: 1.4 MHz/3 MHz/5 MHz/10 MHz/15 MHz/20 MHz
2. Modulation Type: QPSK/16QAM

The tests were carried under worst condition shown as follows:

Test Item	Bandwidth (MHz)	Modulation	RB Size
RF Power Output	1.4/3/5/10/15/20	QPSK/16QAM	1
ERP / EIRP RF Power Output	1.4/3/5/10/15/20	QPSK/16QAM	1
Occupied Bandwidth	1.4/3/5/10/15/20	QPSK/16QAM	Full
Spurious Emissions at Antenna Terminals	1.4/3/5/10/15/20	QPSK	1
Band-Edge Emission	1.4/3/5/10/15/20	QPSK/16QAM	1/Full
Field Strength of Spurious Radiation	1.4/3/5/10/15/20	QPSK	1

The Radiated Emission test were carried under 3 test configurations shown in clause 6.2.
In all tests, the fully charged battery is used for the EUT.

Other Clock Frequency
19.2MHz, 48MHz, 12MHz, 27.12MHz

The EUT was rotated through three orthogonal axis (X, Y and Z axis) in radiated measurement.
The EUT with temporary antenna port was used in conducted measurement.

RF Output Verification

The tests were conducted at the middle channel.

CH	Frequency (MHz)	BW (MHz)	Mode	RB Allocation	RB Offset	Target MPR	Conducted Avrage Power (dBm)
20175	1732.5	1.4	QPSK	1	0	0	22.90
				1	3	0	**22.93**
				1	5	0	22.86
				3	0	0	22.73
				3	2	0	22.85
				3	3	0	22.79
				6	0	1	21.70
			16QAM	1	0	1	21.83
				1	3	1	22.11
				1	5	1	22.01
				3	0	1	21.75
				3	2	1	21.82
				3	3	1	21.81
				6	0	2	20.68

CH	Frequency (MHz)	BW (MHz)	Mode	RB Allocation	RB Offset	Target MPR	Conducted Avrage Power (dBm)
20175	1732.5	3	QPSK	1	0	0	22.89
				1	8	0	**23.03**
				1	14	0	22.90
				8	0	1	21.75
				8	4	1	21.84
				8	7	1	21.84
				15	0	1	21.76
			16QAM	1	0	1	22.10
				1	8	1	22.38
				1	14	1	22.11
				8	0	2	20.75
				8	4	2	20.85
				8	7	2	20.82
				15	0	2	20.69

CH	Frequency (MHz)	BW (MHz)	Mode	RB Allocation	RB Offset	Target MPR	Conducted Avrage Power (dBm)
20175	1732.5	5	QPSK	1	0	0	22.94
				1	13	0	**23.04**
				1	24	0	22.92
				12	0	1	21.82
				12	7	1	21.86
				12	13	1	21.74
				25	0	1	21.77
			16QAM	1	0	1	22.37
				1	13	1	22.34
				1	24	1	22.31
				12	0	2	20.83
				12	7	2	20.85
				12	13	2	20.76
				25	0	2	20.75

CH	Frequency (MHz)	BW (MHz)	Mode	RB Allocation	RB Offset	Target MPR	Conducted Avrage Power (dBm)
20175	1732.5	10	QPSK	1	0	0	22.95
				1	25	0	**23.04**
				1	49	0	22.82
				25	0	1	21.79
				25	13	1	21.85
				25	25	1	21.80
				50	0	1	21.79
			16QAM	1	0	1	22.17
				1	25	1	22.24
				1	49	1	22.23
				25	0	2	20.75
				25	13	2	20.82
				25	25	2	20.78
				50	0	2	20.74

CH	Frequency (MHz)	BW (MHz)	Mode	RB Allocation	RB Offset	Target MPR	Conducted Avrage Power (dBm)
20175	1732.5	15	QPSK	1	0	0	**23.10**
				1	38	0	22.91
				1	74	0	23.01
				36	0	1	21.98
				36	20	1	21.91
				36	39	1	21.97
				75	0	1	21.95
			16QAM	1	0	1	22.34
				1	38	1	22.16
				1	74	1	22.12
				36	0	2	20.92
				36	20	2	20.85
				36	39	2	20.93
				75	0	2	20.88

CH	Frequency (MHz)	BW (MHz)	Mode	RB Allocation	RB Offset	Target MPR	Conducted Avrage Power (dBm)
20175	1732.5	20	QPSK	1	0	0	**23.15**
				1	50	0	22.89
				1	99	0	22.93
				50	0	1	22.01
				50	25	1	22.00
				50	50	1	22.02
				100	0	1	21.98
			16QAM	1	0	1	22.40
				1	50	1	22.15
				1	99	1	22.07
				50	0	2	20.96
				50	25	2	20.97
				50	50	2	20.99
				100	0	2	20.96

7 Test Requirements

7.0 Summary of the Test Results

Test Item	FCC Specification	Reference of the Test Report	Results	Remarks
RF Power Output	Section 27.50(d)	Section 7.1	Passed	-
ERP / EIRP RF Power Output	Section 27.50(d)	Section 7.2	Passed	-
Modulation Characteristics	-	-	-	-
Occupied Bandwidth	Section 27.53(h)	Section 7.4	Passed	-
Spurious Emissions at Antenna Terminals	Section 27.53(h)	Section 7.5	Passed	-
Band-Edge Emission	Section 27.53(h)	Section 7.6	Passed	-
Field Strength of Spurious Radiation	Section 27.53(h)	Section 7.7	Passed	-
Frequency Stability	Section 27.54	Section 7.8	Passed	-

7.1 RF Power Output (§2.1046)

For the requirements, ☑ - Applicable [☑ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

7.1.1 Test Results

For the standard, ☑ - **Passed** ☐ - **Failed** ☐ - **Not judged**

Transmitter Power of BW: 1.4 MHz(QPSK) is	209.4	mW	at 1710.700	MHz
Transmitter Power of BW: 1.4 MHz(16QAM) is	171.8	mW	at 1710.700	MHz
Transmitter Power of BW: 3 MHz(QPSK) is	203.2	mW	at 1711.500	MHz
Transmitter Power of BW: 3 MHz(16QAM) is	174.2	mW	at 1753.500	MHz
Transmitter Power of BW: 5 MHz(QPSK) is	208.0	mW	at 1712.500	MHz
Transmitter Power of BW: 5 MHz(16QAM) is	172.6	mW	at 1732.500	MHz
Transmitter Power of BW: 10 MHz(QPSK) is	201.4	mW	at 1732.500	MHz
Transmitter Power of BW: 10 MHz(16QAM) is	167.5	mW	at 1732.500	MHz
Transmitter Power of BW: 15 MHz(QPSK) is	204.2	mW	at 1732.500	MHz
Transmitter Power of BW: 15 MHz(16QAM) is	171.4	mW	at 1732.500	MHz
Transmitter Power of BW: 20 MHz(QPSK) is	206.5	mW	at 1732.500	MHz
Transmitter Power of BW: 20 MHz(16QAM) is	173.8	mW	at 1732.500	MHz

Uncertainty of Measurement Results ± 0.9 dB(2σ)

Remarks : _____

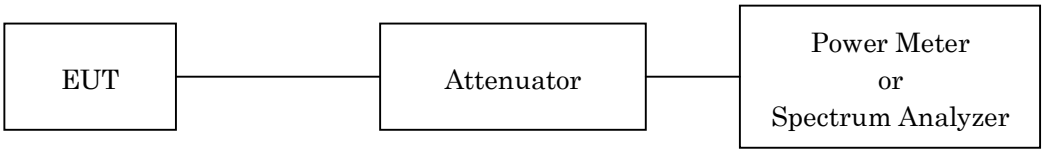
7.1.2 Test Instruments

Shielded Room S4				
Type	**Model**	**Serial No. (ID)**	**Manufacturer**	**Cal. Due**
Power Meter	ML2495A	1423001 (B-16)	Anritsu	2016/07/16
Power Sensor	MA2411B	1339136 (B-18)	Anritsu	2016/07/16
Spectrum Analyzer	E4446A	US44300388 (A-39)	Agilent	2016/08/11
Attenuator	43KC-20	1418003 (D-41)	Anritsu	2016/07/05
RF Cable	SUCOFLEX102	14253/2 (C-52)	HUBER+SUHNER	2016/08/16

NOTE : The calibration interval of the above test instruments is 12 months.

7.1.3 Test Method and Test Setup (Diagrammatic illustration)

The Conducted RF Power Output and CCDF were measured with a power meter ,a spectrum analyzer, one attenuator and a short, low loss cable.



7.1.4 Test Data

1-1) BW 1.4MHz(1RB)
Mode: QPSK

(LTE 1.4MHz)QPSK

Test Date: September 16, 2015
Temp.: 26 °C, Humi: 62 %

Transmitting Frequency CH	[MHz]	Correction Factor [dB]	Meter Reading (Average) [dBm]	Results (Average) [dBm]	[mW]
19957	1710.700	20.31	2.90	23.21	209.4
20175	1732.500	20.31	2.62	22.93	196.3
20393	1754.300	20.31	2.75	23.06	202.3

Calculated result at 1710.700 MHz, as the maximum level point shown on underline:

	Correction Factor	=	20.31	dB
+)	Meter Reading	=	2.90	dBm
	Result	=	23.21	dBm = 209.4 mW

NOTE : The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.

Mode: 16QAM

(LTE 1.4MHz)16QAM

Test Date: September 16, 2015
Temp.: 26 °C, Humi: 62 %

Transmitting Frequency CH	[MHz]	Correction Factor [dB]	Meter Reading (Average) [dBm]	Results (Average) [dBm]	[mW]
19957	1710.700	20.31	2.04	22.35	171.8
20175	1732.500	20.31	1.80	22.11	162.6
20393	1754.300	20.31	1.92	22.23	167.1

Calculated result at 1710.700 MHz, as the maximum level point shown on underline:

	Correction Factor	=	20.31	dB
+)	Meter Reading	=	2.04	dBm
	Result	=	22.35	dBm = 171.8 mW

NOTE : The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.

1-2) BW 3MHz(1RB)
Mode: QPSK

(LTE 3MHz)QPSK

Test Date: September 16, 2015
Temp.: 26 °C, Humi: 62 %

Transmitting Frequency CH	[MHz]	Correction Factor [dB]	Meter Reading (Average) [dBm]	Results (Average) [dBm]	[mW]
19965	1711.500	20.31	2.77	23.08	203.2
20175	1732.500	20.31	2.72	23.03	200.9
20385	1753.500	20.31	2.62	22.93	196.3

Calculated result at 1711.500 MHz, as the maximum level point shown on underline:

	Correction Factor	=	20.31	dB
+)	Meter Reading	=	2.77	dBm
	Result	=	23.08	dBm = 203.2 mW

NOTE : The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.

Mode: 16QAM

(LTE 3MHz)16QAM

Test Date: September 16, 2015
Temp.: 26 °C, Humi: 62 %

Transmitting Frequency CH	[MHz]	Correction Factor [dB]	Meter Reading (Average) [dBm]	Results (Average) [dBm]	[mW]
19965	1711.500	20.31	2.09	22.40	173.8
20175	1732.500	20.31	2.07	22.38	173.0
20385	1753.500	20.31	2.10	22.41	174.2

Calculated result at 1753.500 MHz, as the maximum level point shown on underline:

	Correction Factor	=	20.31	dB
+)	Meter Reading	=	2.10	dBm
	Result	=	22.41	dBm = 174.2 mW

NOTE : The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.

1-3) BW 5MHz(1RB)
Mode: QPSK

(LTE 5MHz)QPSK

Test Date: September 16, 2015
Temp.: 26 °C, Humi: 62 %

Transmitting Frequency CH	[MHz]	Correction Factor [dB]	Meter Reading (Average) [dBm]	Results (Average) [dBm]	[mW]
19975	1712.500	20.31	2.87	23.18	208.0
20175	1732.500	20.31	2.73	23.04	201.4
20375	1752.500	20.31	2.64	22.95	197.2

Calculated result at 1712.500 MHz, as the maximum level point shown on underline:

	Correction Factor	=	20.31	dB
+)	Meter Reading	=	2.87	dBm
	Result	=	23.18	dBm = 208.0 mW

NOTE : The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.

Mode: 16QAM

(LTE 5MHz)16QAM

Test Date: September 16, 2015
Temp.: 26 °C, Humi: 62 %

Transmitting Frequency CH	[MHz]	Correction Factor [dB]	Meter Reading (Average) [dBm]	Results (Average) [dBm]	[mW]
19975	1712.500	20.31	2.02	22.33	171.0
20175	1732.500	20.31	2.06	22.37	172.6
20375	1752.500	20.31	1.98	22.29	169.4

Calculated result at 1732.500 MHz, as the maximum level point shown on underline:

	Correction Factor	=	20.31	dB
+)	Meter Reading	=	2.06	dBm
	Result	=	22.37	dBm = 172.6 mW

NOTE : The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.

1-4) BW 10MHz(1RB)
Mode: QPSK

(LTE 10MHz)QPSK

Test Date: September 16, 2015
Temp.: 26 °C, Humi: 62 %

Transmitting Frequency CH	[MHz]	Correction Factor [dB]	Meter Reading (Average) [dBm]	Results (Average) [dBm]	[mW]
20000	1715.000	20.31	2.64	22.95	197.2
20175	1732.500	20.31	2.73	23.04	201.4
20350	1750.000	20.31	2.70	23.01	200.0

Calculated result at 1732.500 MHz, as the maximum level point shown on underline:

	Correction Factor	=	20.31	dB
+)	Meter Reading	=	2.73	dBm
	Result	=	23.04	dBm = 201.4 mW

NOTE : The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.

Mode: 16QAM

(LTE 10MHz)16QAM

Test Date: September 16, 2015
Temp.: 26 °C, Humi: 62 %

Transmitting Frequency CH	[MHz]	Correction Factor [dB]	Meter Reading (Average) [dBm]	Results (Average) [dBm]	[mW]
20000	1715.000	20.31	1.80	22.11	162.6
20175	1732.500	20.31	1.93	22.24	167.5
20350	1750.000	20.31	1.74	22.05	160.3

Calculated result at 1732.500 MHz, as the maximum level point shown on underline:

	Correction Factor	=	20.31	dB
+)	Meter Reading	=	1.93	dBm
	Result	=	22.24	dBm = 167.5 mW

NOTE : The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.

1-5) BW 15MHz(1RB)
Mode: QPSK

(LTE 15MHz)QPSK

Test Date: September 16, 2015
Temp.: 26 °C, Humi: 62 %

CH	Transmitting Frequency [MHz]	Correction Factor [dB]	Meter Reading (Average) [dBm]	Results (Average) [dBm]	Results (Average) [mW]
20025	1717.500	20.31	2.75	23.06	202.3
20175	1732.500	20.31	2.79	23.10	204.2
20325	1747.500	20.31	2.64	22.95	197.2

Calculated result at 1732.500 MHz, as the maximum level point shown on underline:

Correction Factor	=	20.31	dB
+) Meter Reading	=	2.79	dBm
Result	=	23.10	dBm = 204.2 mW

NOTE : The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.

Mode: 16QAM

(LTE 15MHz)16QAM

Test Date: September 16, 2015
Temp.: 26 °C, Humi: 62 %

CH	Transmitting Frequency [MHz]	Correction Factor [dB]	Meter Reading (Average) [dBm]	Results (Average) [dBm]	Results (Average) [mW]
20025	1717.500	20.31	1.97	22.28	169.0
20175	1732.500	20.31	2.03	22.34	171.4
20325	1747.500	20.31	1.85	22.16	164.4

Calculated result at 1732.500 MHz, as the maximum level point shown on underline:

Correction Factor	=	20.31	dB
+) Meter Reading	=	2.03	dBm
Result	=	22.34	dBm = 171.4 mW

NOTE : The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.

1-6) BW 20MHz(1RB)
Mode: QPSK

(LTE 20MHz)QPSK

Test Date: September 16, 2015
Temp.: 26 °C, Humi: 62 %

CH	Transmitting Frequency [MHz]	Correction Factor [dB]	Meter Reading (Average) [dBm]	Results (Average) [dBm]	Results (Average) [mW]
20050	1720.000	20.31	2.83	23.14	206.1
20175	1732.500	20.31	2.84	23.15	206.5
20300	1745.000	20.31	2.74	23.05	201.8

Calculated result at 1732.500 MHz, as the maximum level point shown on underline:

Correction Factor	=	20.31	dB
+) Meter Reading	=	2.84	dBm
Result	=	23.15	dBm = 206.5 mW

NOTE : The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.

Mode: 16QAM

(LTE 20MHz)16QAM

Test Date: September 16, 2015
Temp.: 26 °C, Humi: 62 %

CH	Transmitting Frequency [MHz]	Correction Factor [dB]	Meter Reading (Average) [dBm]	Results (Average) [dBm]	Results (Average) [mW]
20050	1720.000	20.31	2.06	22.37	172.6
20175	1732.500	20.31	2.09	22.40	173.8
20300	1745.000	20.31	1.95	22.26	168.3

Calculated result at 1732.500 MHz, as the maximum level point shown on underline:

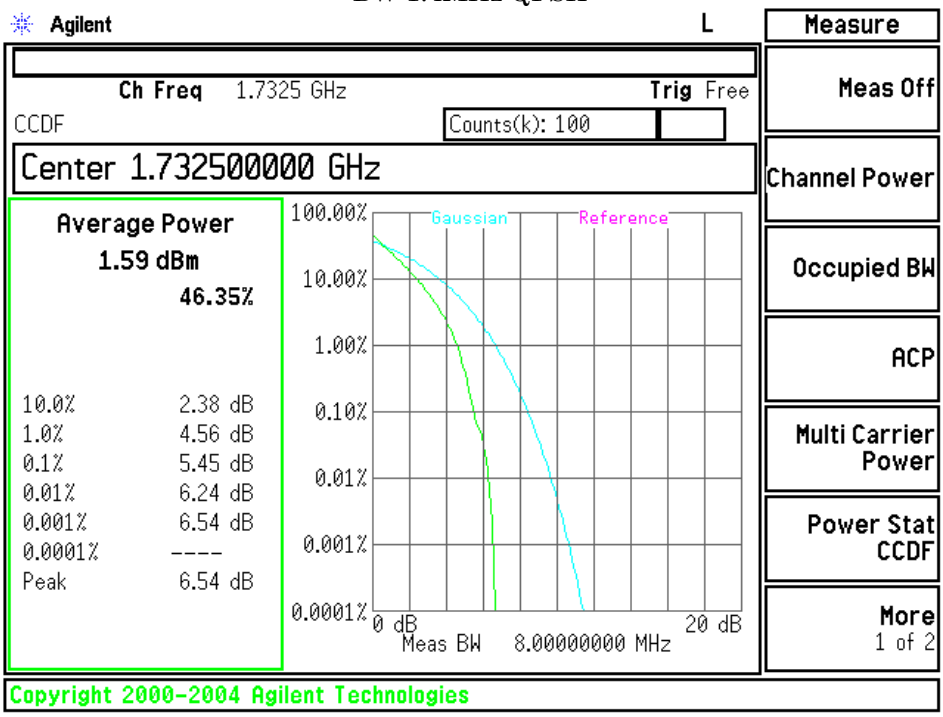
Correction Factor	=	20.31	dB
+) Meter Reading	=	2.09	dBm
Result	=	22.40	dBm = 173.8 mW

NOTE : The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.

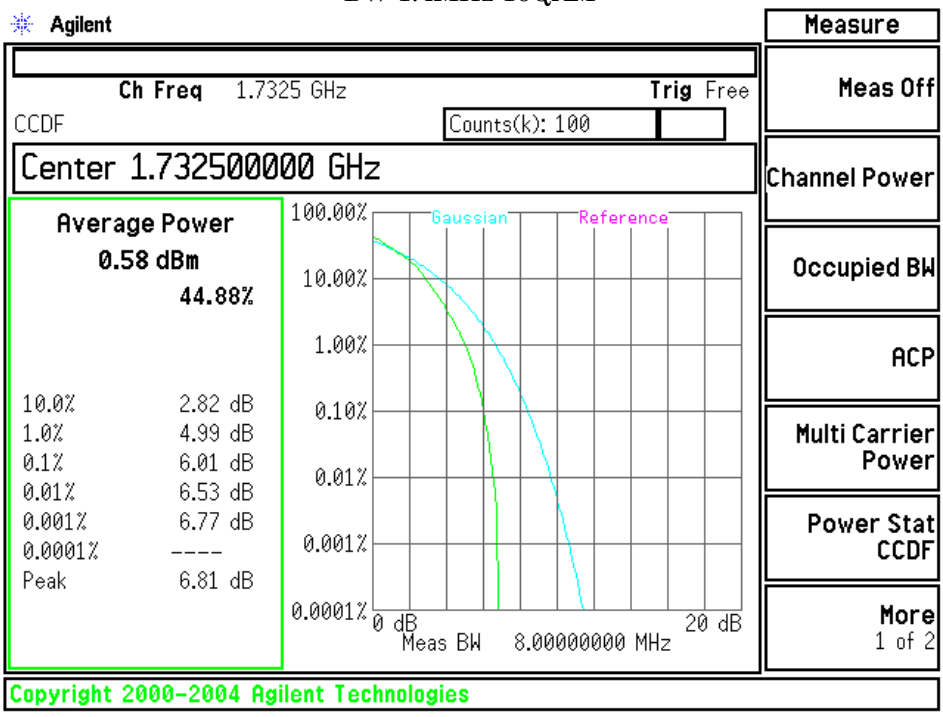
2) CCDF

Channel	Frequency (MHz)	BW (MHz)	Peak to Average Factor(CCDF 0.1%) [dB]		
			QPSK	16QAM	Limit
20175	1732.50	1.4	5.45	6.01	13
20175	1732.50	3	5.43	6.06	13
20175	1732.50	5	5.45	6.08	13
20175	1732.50	10	5.23	6.12	13
20175	1732.50	15	5.53	6.58	13
20175	1732.50	20	6.17	7.01	13

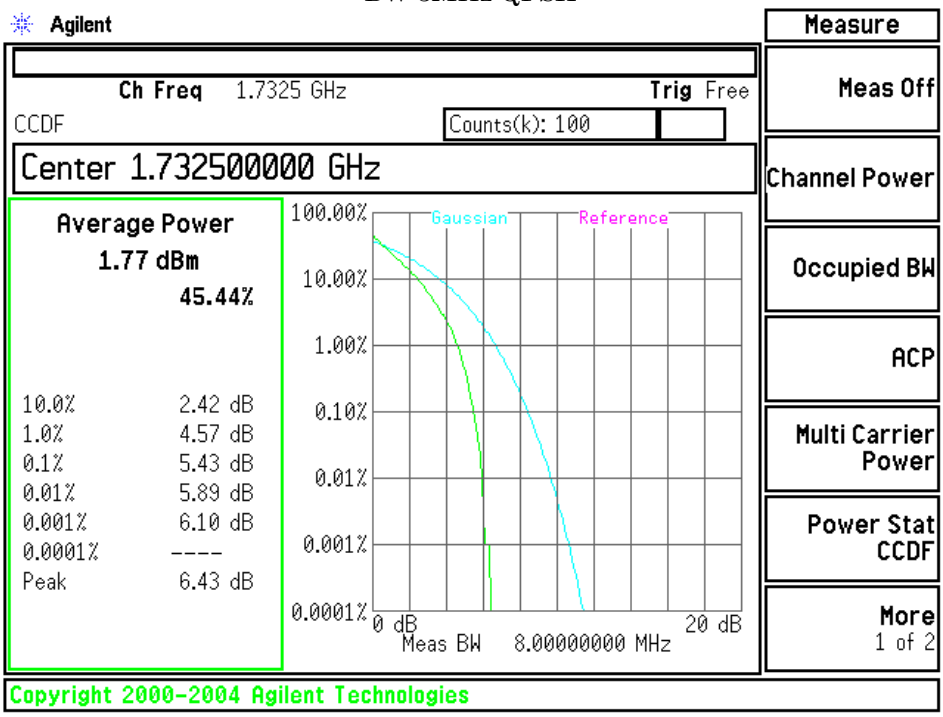
BW 1.4MHz QPSK



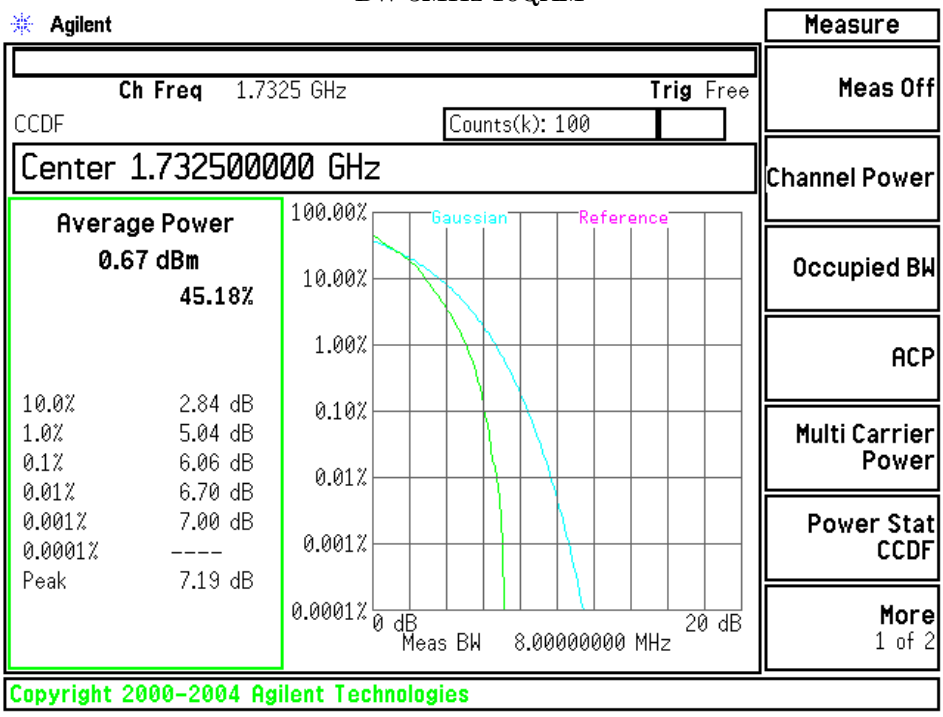
BW 1.4MHz 16QAM



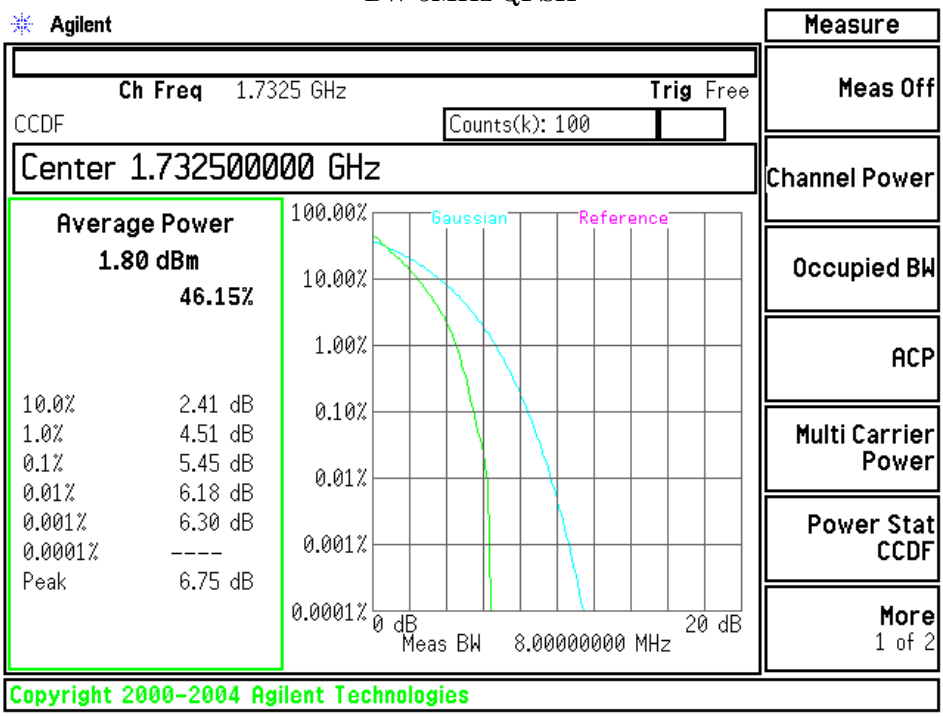
BW 3MHz QPSK



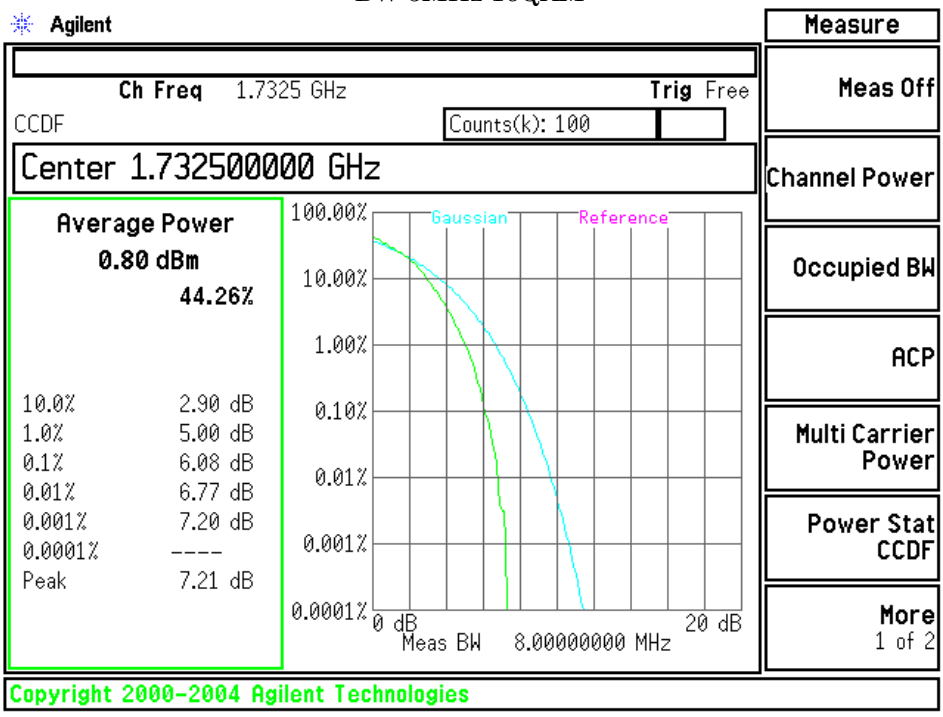
BW 3MHz 16QAM



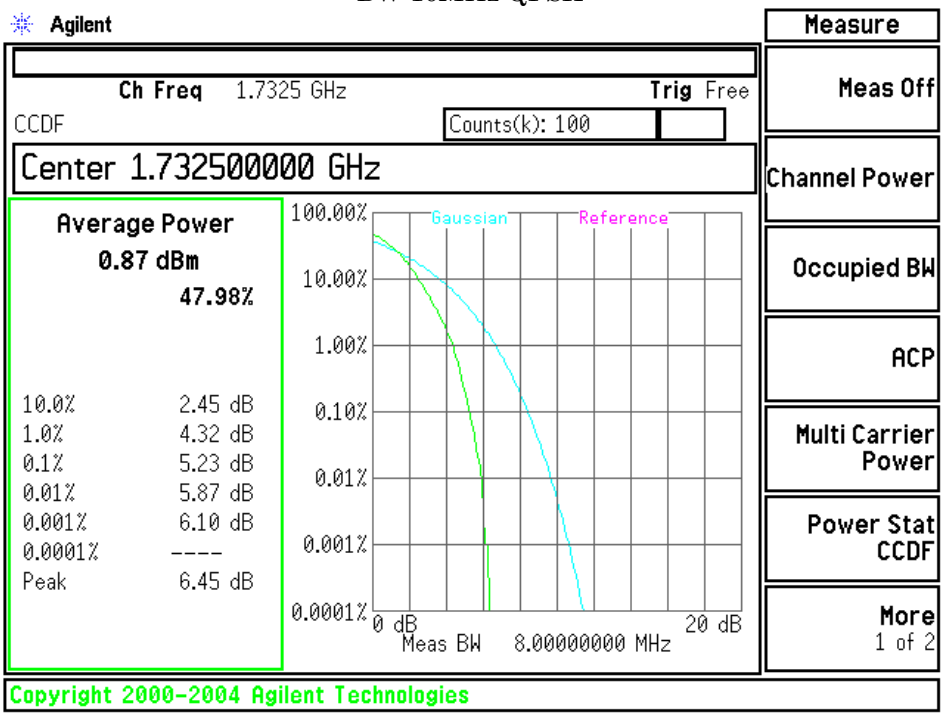
BW 5MHz QPSK



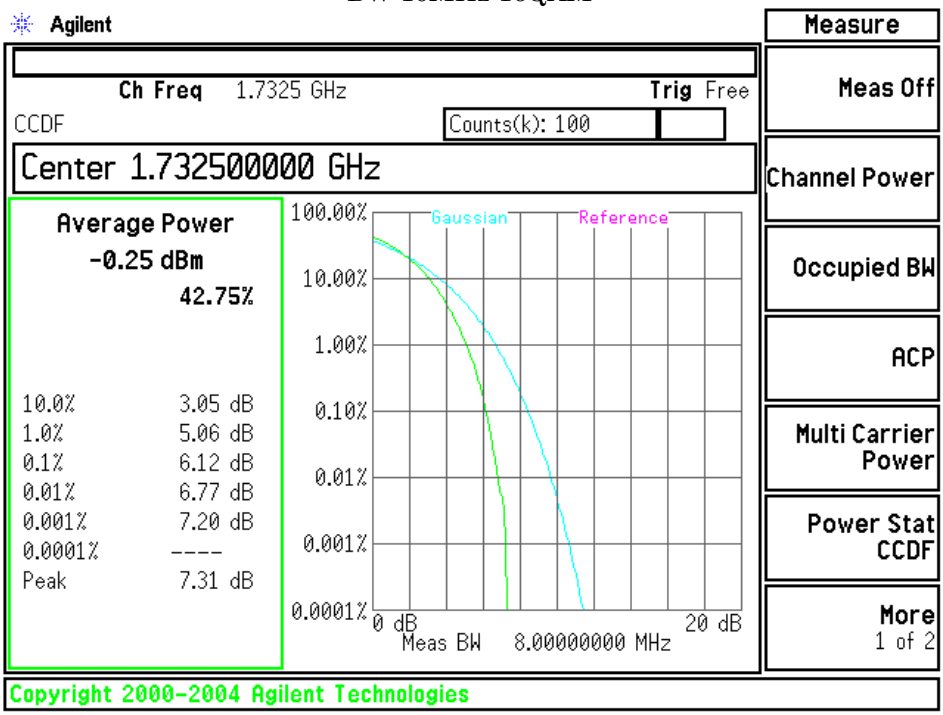
BW 5MHz 16QAM



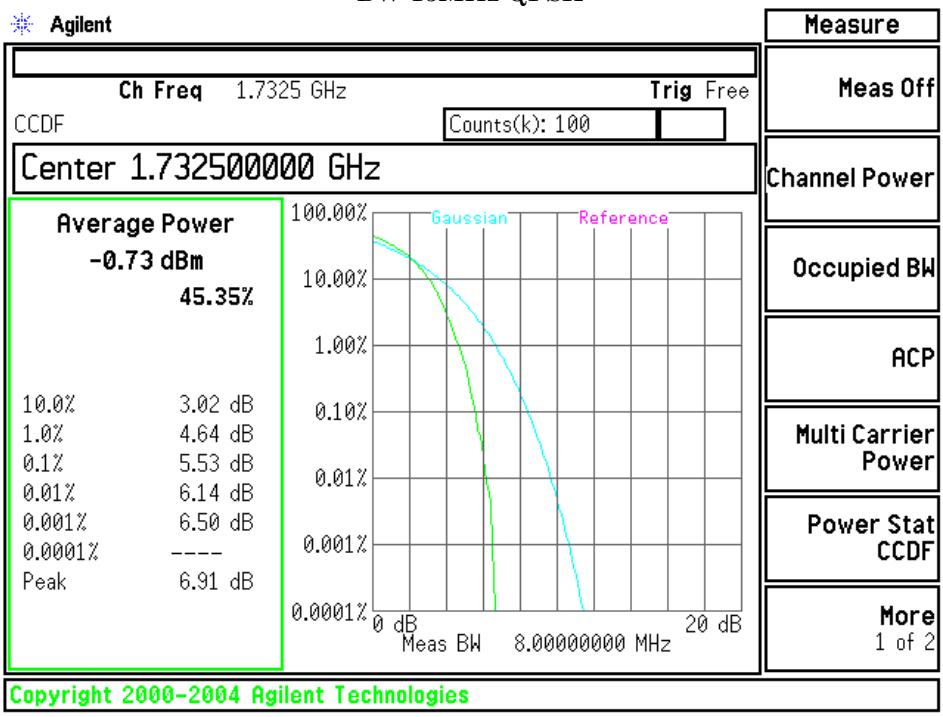
BW 10MHz QPSK



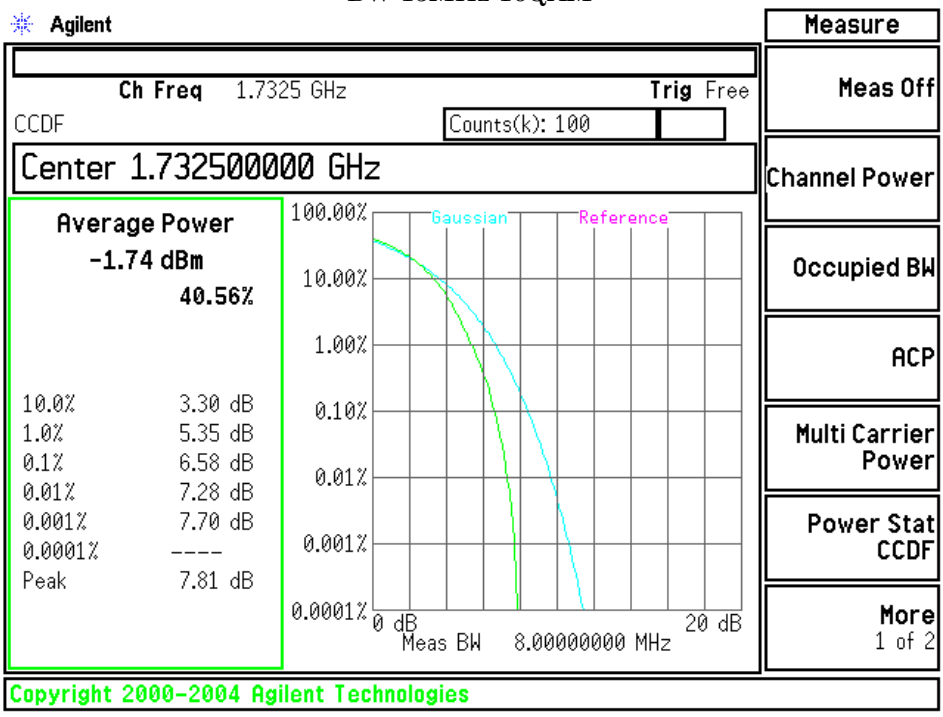
BW 10MHz 16QAM



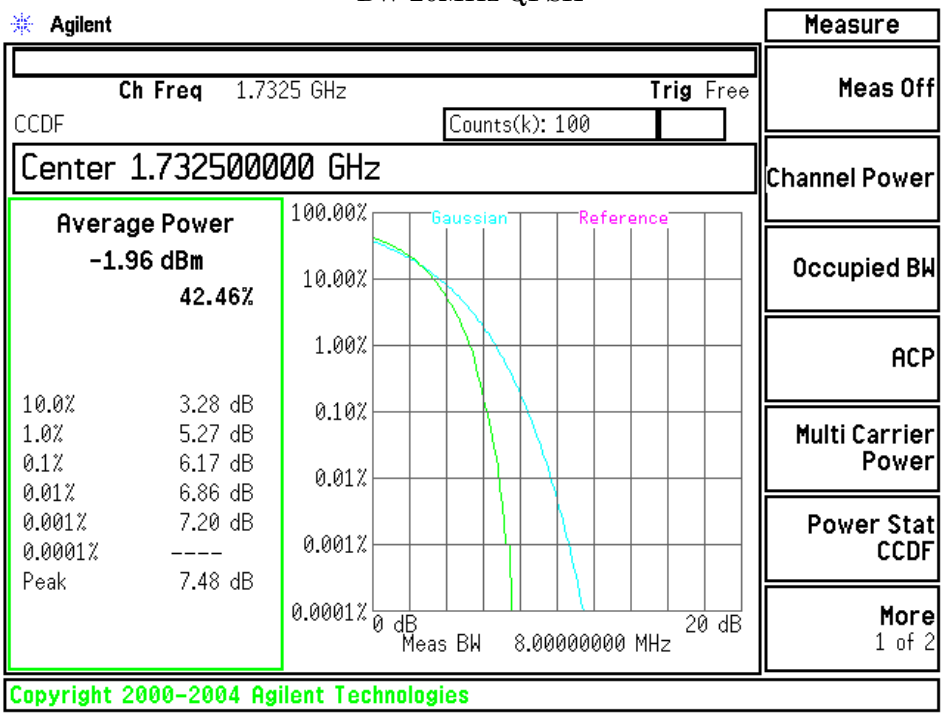
BW 15MHz QPSK



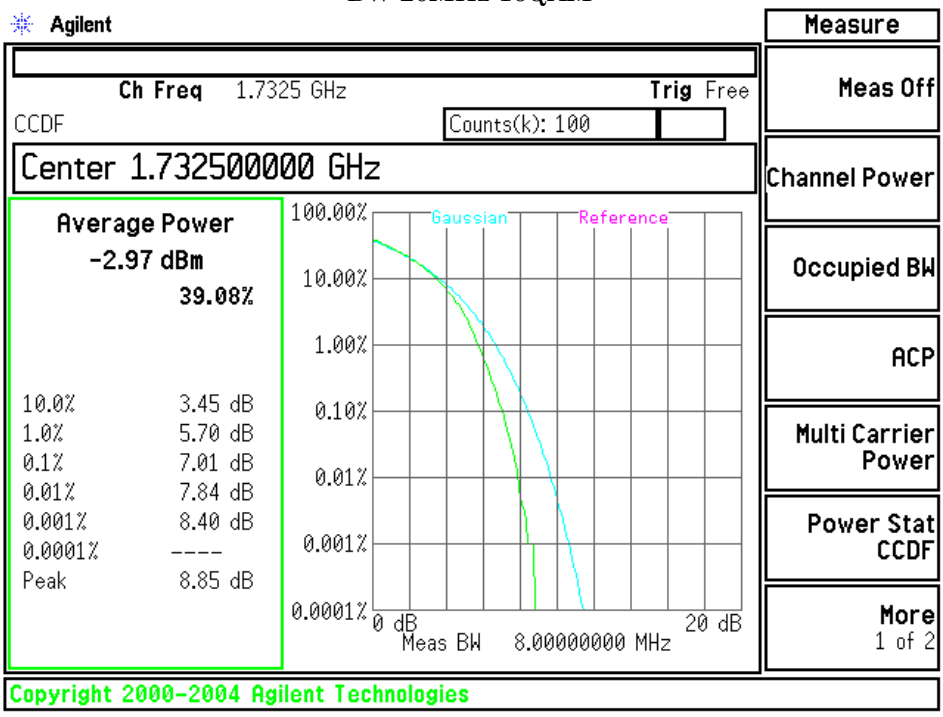
BW 15MHz 16QAM



BW 20MHz QPSK



BW 20MHz 16QAM



7.2 ERP / EIRP RF Power Output

For the requirements, ☑ - Applicable [☑ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

7.2.1 Test Results

For the standard, ☑ - **Passed** ☐ - **Failed** ☐ - **Not judged**

Min. Limit Margin 8.2 dB at 1754.300 MHz

Uncertainty of Measurement Results ± 1.8 dB(2σ)

Remarks : The maximum EIRP is 0.151 W at 1754.300 MHz (BW 1.4MHz, QPSK).

7.2.2 Test Instruments

Anechoic Chamber A2				
Type	**Model**	**Serial No. (ID)**	**Manufacturer**	**Cal. Due**
Test Receiver	ESU 26	100170 (A-6)	Rohde & Schwarz	2016/04/25
Signal Generator	E8257D	MY45140309 (B-39)	Agilent	2016/08/10
Power Meter	N1911A	GB45100291 (B-63)	Agilent	2016/07/16
Power Sensor	N1921A	US44510470 (B-64)	Agilent	2016/07/16
Horn Antenna (TX)	91888-2	560 (C-40-1)	EATON	2016/06/25
Horn Antenna (RX)	91888-2	562 (C-41-1)	EATON	2016/06/16
Attenuator (TX)	2-10	BA6214 (D-79)	Weinschel	2015/11/18
Attenuator (RX)	2-10	BF7557 (D-80)	Weinschel	2015/11/18
RF Cable (RX)	SUCOFLEX104	267479/4 (C-66)	HUBER+SUHNER	2016/01/19
RF Cable (TX)	SUCOFLEX102E	6683/2E (C-70)	HUBER+SUHNER	2015/11/18

NOTE : The calibration interval of the above test instruments is 12 months.

7.2.3 Test Method and Test Setup (Diagrammatic illustration)

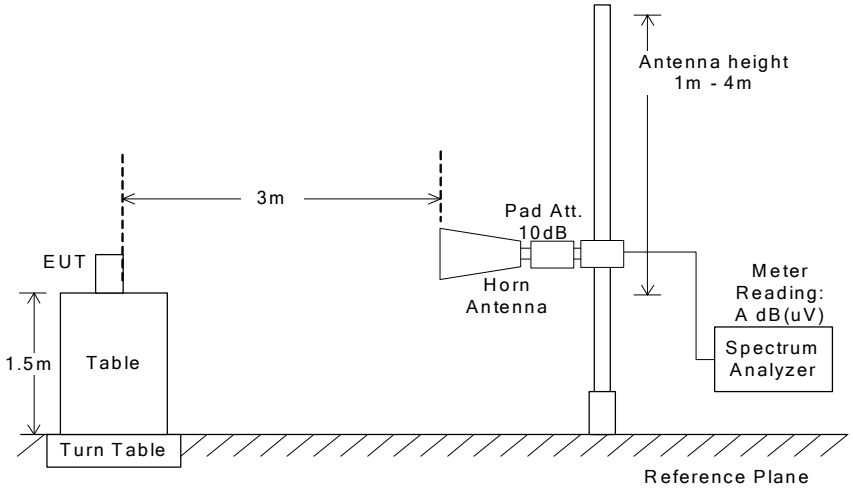
Step 1:
In order to obtain the maximum emission, the EUT was placed at the height 1.5 m on the non-conducted support and was varying at three orthogonal axes, at the distance 3 m from the receiving antenna and rotated around 360 degrees.
The receiving antenna height was varied from 1 m to 4 m.
The EUT on the table was placed to be maximum emission against at the receiving antenna polarized (vertical and horizontal).
Then the meter reading of the spectrum analyzer at the maximum emission was A dB(μV).

Step 2:
The EUT was replaced to substitution antenna at the same polarized under the same condition as step 1.
The RF power was fed to the transmitting antenna through the RF amplifier from the signal generator.
In order to obtain the maximum emission level, the height of the receiving antenna was varied from 1 m to 4 m.
The level of maximum emission was A dB(μV), same as the recorded level in the step 1.
Then the RF power into the substitution horn antenna was P (dBm).

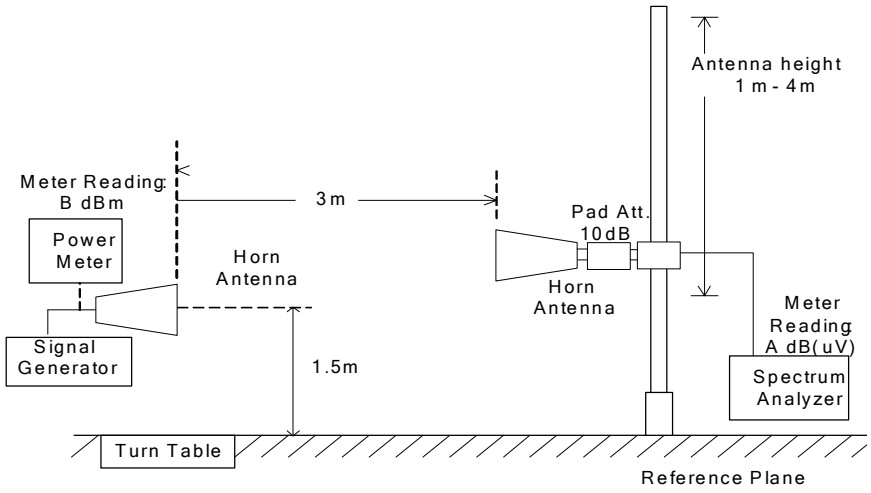
The ERP/EIRP output power was calculated in the following equation.

ERP (dBm) = P (dBm) – Balun loss of the tuned dipole antenna (dB) + Cable loss (dB)
EIRP (dBm) = P (dBm) + Gh (dBi)
where, Gh (dBi) : Gain of the substitution horn antenna.

– Side View –



(a)EUT



(b) Substitution Horn Antenna

7.2.4 Test Data

1-1) BW 1.4MHz(1RB)
Mode: QPSK

(LTE 1.4MHz)QPSK

Test Date: September 17, 2015
Temp.: 22 °C, Humi: 73 %

1. Measurement Results

Transmitting Frequency		Emission Measurement [dB(uV)]		Substitution Measurement [dB(uV)]		Supplied Power to Substitution Antenna	Gain of Substitution Antenna
CH	[MHz]	Hori. (Mh)	Vert. (Mv)	Hori. (Msh)	Vert. (Msv)	[dBm]	[dBi]
19957	1710.700	84.2	84.4	72.8	72.7	- 5.0	13.9
20175	1732.500	85.1	85.4	72.6	72.5	- 5.0	13.8
20393	1754.300	85.4	85.5	72.3	72.5	- 5.0	13.7

2. Calculation Results

Transmitting Frequency		Average EIRP [dBm]		Maximum Average EIRP	Limits	Margin
CH	[MHz]	Hori. (EIRPh)	Vert. (EIRPv)	[W]	[dBm]	[dB]
19957	1710.700	20.3	20.6	0.115	30.0	+ 9.4
20175	1732.500	21.3	21.7	0.148	30.0	+ 8.3
20393	1754.300	21.8	21.7	0.151	30.0	+ 8.2

Calculated result at 1754.300 MHz, as the worst point shown on underline:

	Emission Measurment (Mh)	=	85.4 dB(uV)
	Substitution Measurement (Msh)	=	-72.3 dB(uV)
	Supplied Power to Substitution Antenna	=	-5.0 dBm
+)	Gain of Substitution Antenna	=	13.7 dB
	Result (EIRPh)	=	21.8 dBm = 0.151 W

Minimum Margin: 30.0 - 21.8 = 8.2 (dB)

NOTE : Setting of measuring instrument(s) :

Detector Function
RMS

1-2) BW 1.4MHz(1RB)
Mode: 16QAM

(LTE 1.4MHz)16QAM

Test Date: September 17, 2015
Temp.: 22 °C, Humi: 73 %

1. Measurement Results

CH	Transmitting Frequency [MHz]	Emission Measurement [dB(uV)] Hori. (Mh)	Emission Measurement [dB(uV)] Vert. (Mv)	Substitution Measurement [dB(uV)] Hori. (Msh)	Substitution Measurement [dB(uV)] Vert. (Msv)	Supplied Power to Substitution Antenna [dBm]	Gain of Substitution Antenna [dBi]
19957	1710.700	83.6	83.8	72.8	72.7	- 5.0	13.9
20175	1732.500	84.3	84.6	72.6	72.5	- 5.0	13.8
20393	1754.300	84.7	84.7	72.3	72.5	- 5.0	13.7

2. Calculation Results

CH	Transmitting Frequency [MHz]	Average EIRP [dBm] Hori. (EIRPh)	Average EIRP [dBm] Vert. (EIRPv)	Maximum Average EIRP [W]	Limits [dBm]	Margin [dB]
19957	1710.700	19.7	20.0	0.100	30.0	+10.0
20175	1732.500	20.5	20.9	0.123	30.0	+ 9.1
20393	1754.300	21.1	20.9	0.129	30.0	+ 8.9

Calculated result at 1754.300 MHz, as the worst point shown on underline:

	Emission Measurment (Mh)	=	84.7 dB(uV)
	Substitution Measurement (Msh)	=	-72.3 dB(uV)
	Supplied Power to Substitution Antenna	=	-5.0 dBm
+)	Gain of Substitution Antenna	=	13.7 dB
	Result (EIRPh)	=	21.1 dBm = 0.129 W

Minimum Margin: 30.0 - 21.1 = 8.9 (dB)

NOTE : Setting of measuring instrument(s) :

Detector Function
RMS

2-1) BW 3MHz(1RB)
Mode: QPSK

(LTE 3MHz)QPSK

Test Date: September 17, 2015
Temp.: 22 °C, Humi: 73 %

1. Measurement Results

CH	Transmitting Frequency [MHz]	Emission Measurement [dB(uV)] Hori. (Mh)	Emission Measurement [dB(uV)] Vert. (Mv)	Substitution Measurement [dB(uV)] Hori. (Msh)	Substitution Measurement [dB(uV)] Vert. (Msv)	Supplied Power to Substitution Antenna [dBm]	Gain of Substitution Antenna [dBi]
19965	1711.500	84.1	84.8	72.7	72.7	- 5.0	13.9
20175	1732.500	84.9	85.3	72.6	72.5	- 5.0	13.8
20385	1753.500	85.2	85.5	72.3	72.5	- 5.0	13.7

2. Calculation Results

CH	Transmitting Frequency [MHz]	Average EIRP [dBm] Hori. (EIRPh)	Average EIRP [dBm] Vert. (EIRPv)	Maximum Average EIRP [W]	Limits [dBm]	Margin [dB]
19965	1711.500	20.3	21.0	0.126	30.0	+ 9.0
20175	1732.500	21.1	21.6	0.145	30.0	+ 8.4
20385	1753.500	21.6	21.7	0.148	30.0	+ 8.3

Calculated result at 1753.500 MHz, as the worst point shown on underline:

	Emission Measurment (Mv)	=	85.5 dB(uV)
	Substitution Measurement (Msv)	=	-72.5 dB(uV)
	Supplied Power to Substitution Antenna	=	-5.0 dBm
+)	Gain of Substitution Antenna	=	13.7 dB
	Result (EIRPv)	=	21.7 dBm = 0.148 W

Minimum Margin: 30.0 - 21.7 = 8.3 (dB)

NOTE : Setting of measuring instrument(s) :

Detector Function
RMS

2-2) BW 3MHz(1RB)
Mode: 16QAM

(LTE 3MHz)16QAM

Test Date: September 17, 2015
Temp.: 22 °C, Humi: 73 %

1. Measurement Results

Transmitting Frequency		Emission Measurement [dB(uV)]		Substitution Measurement [dB(uV)]		Supplied Power to Substitution Antenna	Gain of Substitution Antenna
CH	[MHz]	Hori. (Mh)	Vert. (Mv)	Hori. (Msh)	Vert. (Msv)	[dBm]	[dBi]
19965	1711.500	83.5	84.2	72.7	72.7	- 5.0	13.9
20175	1732.500	84.2	84.5	72.6	72.5	- 5.0	13.8
20385	1753.500	84.7	84.9	72.3	72.5	- 5.0	13.7

2. Calculation Results

Transmitting Frequency		Average EIRP [dBm]		Maximum Average EIRP	Limits	Margin
CH	[MHz]	Hori. (EIRPh)	Vert. (EIRPv)	[W]	[dBm]	[dB]
19965	1711.500	19.7	20.4	0.110	30.0	+ 9.6
20175	1732.500	20.4	20.8	0.120	30.0	+ 9.2
20385	1753.500	21.1	21.1	0.129	30.0	+ 8.9

Calculated result at 1753.500 MHz, as the worst point shown on underline:

	Emission Measurment (Mh)	=	84.7 dB(uV)
	Substitution Measurement (Msh)	=	-72.3 dB(uV)
	Supplied Power to Substitution Antenna	=	-5.0 dBm
+)	Gain of Substitution Antenna	=	13.7 dB
	Result (EIRPh)	=	21.1 dBm = 0.129 W

Minimum Margin: 30.0 - 21.1 = 8.9 (dB)

NOTE : Setting of measuring instrument(s) :

Detector Function
RMS

3-1) BW 5MHz(1RB)
Mode: QPSK

(LTE 5MHz)QPSK

Test Date: September 17, 2015
Temp.: 22 °C, Humi: 73 %

1. Measurement Results

CH	Transmitting Frequency [MHz]	Emission Measurement [dB(uV)] Hori. (Mh)	Emission Measurement [dB(uV)] Vert. (Mv)	Substitution Measurement [dB(uV)] Hori. (Msh)	Substitution Measurement [dB(uV)] Vert. (Msv)	Supplied Power to Substitution Antenna [dBm]	Gain of Substitution Antenna [dBi]
19975	1712.500	84.3	84.6	72.8	72.7	- 5.0	13.9
20175	1732.500	85.0	85.3	72.6	72.5	- 5.0	13.8
20375	1752.500	85.1	85.3	72.3	72.5	- 5.0	13.7

2. Calculation Results

CH	Transmitting Frequency [MHz]	Average EIRP [dBm] Hori. (EIRPh)	Average EIRP [dBm] Vert. (EIRPv)	Maximum Average EIRP [W]	Limits [dBm]	Margin [dB]
19975	1712.500	20.4	20.8	0.120	30.0	+ 9.2
20175	1732.500	21.2	21.6	0.145	30.0	+ 8.4
20375	1752.500	21.5	21.5	0.141	30.0	+ 8.5

Calculated result at 1732.500 MHz, as the worst point shown on underline:

	Emission Measurment (Mv)	=	85.3 dB(uV)
	Substitution Measurement (Msv)	=	-72.5 dB(uV)
	Supplied Power to Substitution Antenna	=	-5.0 dBm
+)	Gain of Substitution Antenna	=	13.8 dB
	Result (EIRPv)	=	21.6 dBm = 0.145 W

Minimum Margin: 30.0 - 21.6 = 8.4 (dB)

NOTE : Setting of measuring instrument(s) :

Detector Function
RMS

3-2) BW 5MHz(1RB)
Mode: 16QAM

(LTE 5MHz)16QAM

Test Date: September 17, 2015
Temp.: 22 °C, Humi: 73 %

1. Measurement Results

CH	Transmitting Frequency [MHz]	Emission Measurement [dB(uV)] Hori. (Mh)	Emission Measurement [dB(uV)] Vert. (Mv)	Substitution Measurement [dB(uV)] Hori. (Msh)	Substitution Measurement [dB(uV)] Vert. (Msv)	Supplied Power to Substitution Antenna [dBm]	Gain of Substitution Antenna [dBi]
19975	1712.500	83.7	84.1	72.8	72.7	- 5.0	13.9
20175	1732.500	84.2	84.6	72.6	72.5	- 5.0	13.8
20375	1752.500	84.4	84.5	72.3	72.5	- 5.0	13.7

2. Calculation Results

CH	Transmitting Frequency [MHz]	Average EIRP [dBm] Hori. (EIRPh)	Average EIRP [dBm] Vert. (EIRPv)	Maximum Average EIRP [W]	Limits [dBm]	Margin [dB]
19975	1712.500	19.8	20.3	0.107	30.0	+ 9.7
20175	1732.500	20.4	20.9	0.123	30.0	+ 9.1
20375	1752.500	20.8	20.7	0.120	30.0	+ 9.2

Calculated result at 1732.500 MHz, as the worst point shown on underline:

	Emission Measurment (Mv)	=	84.6 dB(uV)
	Substitution Measurement (Msv)	=	-72.5 dB(uV)
	Supplied Power to Substitution Antenna	=	-5.0 dBm
+)	Gain of Substitution Antenna	=	13.8 dB
	Result (EIRPv)	=	20.9 dBm = 0.123 W

Minimum Margin: 30.0 - 20.9 = 9.1 (dB)

NOTE : Setting of measuring instrument(s) :

Detector Function
RMS

4-1) BW 10MHz(1RB)
Mode: QPSK

(LTE 10MHz)QPSK

Test Date: September 17, 2015
Temp.: 22 °C, Humi: 73 %

1. Measurement Results

CH	Transmitting Frequency [MHz]	Emission Measurement [dB(uV)] Hori. (Mh)	Emission Measurement [dB(uV)] Vert. (Mv)	Substitution Measurement [dB(uV)] Hori. (Msh)	Substitution Measurement [dB(uV)] Vert. (Msv)	Supplied Power to Substitution Antenna [dBm]	Gain of Substitution Antenna [dBi]
20000	1715.000	84.2	84.6	72.8	72.7	- 5.0	13.8
20175	1732.500	85.1	85.3	72.6	72.5	- 5.0	13.8
20350	1750.000	85.3	85.5	72.3	72.5	- 5.0	13.7

2. Calculation Results

CH	Transmitting Frequency [MHz]	Average EIRP [dBm] Hori. (EIRPh)	Average EIRP [dBm] Vert. (EIRPv)	Maximum Average EIRP [W]	Limits [dBm]	Margin [dB]
20000	1715.000	20.2	20.7	0.117	30.0	+ 9.3
20175	1732.500	21.3	21.6	0.145	30.0	+ 8.4
20350	1750.000	21.7	21.7	0.148	30.0	+ 8.3

Calculated result at 1750.000 MHz, as the worst point shown on underline:

	Emission Measurment (Mh)	=	85.3 dB(uV)
	Substitution Measurement (Msh)	=	-72.3 dB(uV)
	Supplied Power to Substitution Antenna	=	-5.0 dBm
+)	Gain of Substitution Antenna	=	13.7 dB
	Result (EIRPh)	=	21.7 dBm = 0.148 W

Minimum Margin: 30.0 - 21.7 = 8.3 (dB)

NOTE : Setting of measuring instrument(s) :

Detector Function
RMS

4-2) BW 10MHz(1RB)
Mode: 16QAM

(LTE 10MHz)16QAM

Test Date: September 17, 2015
Temp.: 22 °C, Humi: 73 %

1. Measurement Results

CH	Transmitting Frequency [MHz]	Emission Measurement [dB(uV)] Hori. (Mh)	Emission Measurement [dB(uV)] Vert. (Mv)	Substitution Measurement [dB(uV)] Hori. (Msh)	Substitution Measurement [dB(uV)] Vert. (Msv)	Supplied Power to Substitution Antenna [dBm]	Gain of Substitution Antenna [dBi]
20000	1715.000	83.6	84.0	72.8	72.7	- 5.0	13.8
20175	1732.500	84.3	84.5	72.6	72.5	- 5.0	13.8
20350	1750.000	84.8	84.9	72.3	72.5	- 5.0	13.7

2. Calculation Results

CH	Transmitting Frequency [MHz]	Average EIRP [dBm] Hori. (EIRPh)	Average EIRP [dBm] Vert. (EIRPv)	Maximum Average EIRP [W]	Limits [dBm]	Margin [dB]
20000	1715.000	19.6	20.1	0.102	30.0	+ 9.9
20175	1732.500	20.5	20.8	0.120	30.0	+ 9.2
20350	1750.000	21.2	21.1	0.132	30.0	+ 8.8

Calculated result at 1750.000 MHz, as the worst point shown on underline:

	Emission Measurment (Mh)	=	84.8 dB(uV)
	Substitution Measurement (Msh)	=	-72.3 dB(uV)
	Supplied Power to Substitution Antenna	=	-5.0 dBm
+)	Gain of Substitution Antenna	=	13.7 dB
	Result (EIRPh)	=	21.2 dBm = 0.132 W

Minimum Margin: 30.0 - 21.2 = 8.8 (dB)

NOTE : Setting of measuring instrument(s) :

Detector Function
RMS

5-1) BW 15MHz(1RB)
Mode: QPSK

(LTE 15MHz)QPSK

Test Date: September 17, 2015
Temp.: 22 °C, Humi: 73 %

1. Measurement Results

CH	Transmitting Frequency [MHz]	Emission Measurement [dB(uV)] Hori. (Mh)	Emission Measurement [dB(uV)] Vert. (Mv)	Substitution Measurement [dB(uV)] Hori. (Msh)	Substitution Measurement [dB(uV)] Vert. (Msv)	Supplied Power to Substitution Antenna [dBm]	Gain of Substitution Antenna [dBi]
20025	1717.500	84.4	84.9	72.7	72.6	- 5.0	13.8
20175	1732.500	84.9	85.2	72.6	72.5	- 5.0	13.8
20325	1747.500	85.1	85.4	72.4	72.4	- 5.0	13.7

2. Calculation Results

CH	Transmitting Frequency [MHz]	Average EIRP [dBm] Hori. (EIRPh)	Average EIRP [dBm] Vert. (EIRPv)	Maximum Average EIRP [W]	Limits [dBm]	Margin [dB]
20025	1717.500	20.5	21.1	0.129	30.0	+ 8.9
20175	1732.500	21.1	21.5	0.141	30.0	+ 8.5
20325	1747.500	21.4	21.7	0.148	30.0	+ 8.3

Calculated result at 1747.500 MHz, as the worst point shown on underline:

	Emission Measurment (Mv)	=	85.4 dB(uV)
	Substitution Measurement (Msv)	=	-72.4 dB(uV)
	Supplied Power to Substitution Antenna	=	-5.0 dBm
+)	Gain of Substitution Antenna	=	13.7 dB
	Result (EIRPv)	=	21.7 dBm = 0.148 W

Minimum Margin: 30.0 - 21.7 = 8.3 (dB)

NOTE : Setting of measuring instrument(s) :

Detector Function
RMS

5-2) BW 15MHz(1RB)
Mode: 16QAM

(LTE 15MHz)16QAM

Test Date: September 17, 2015
Temp.: 22 °C, Humi: 73 %

1. Measurement Results

CH	Transmitting Frequency [MHz]	Emission Measurement [dB(uV)] Hori. (Mh)	Emission Measurement [dB(uV)] Vert. (Mv)	Substitution Measurement [dB(uV)] Hori. (Msh)	Substitution Measurement [dB(uV)] Vert. (Msv)	Supplied Power to Substitution Antenna [dBm]	Gain of Substitution Antenna [dBi]
20025	1717.500	83.7	84.3	72.7	72.6	- 5.0	13.8
20175	1732.500	84.1	84.4	72.6	72.5	- 5.0	13.8
20325	1747.500	84.3	84.7	72.4	72.4	- 5.0	13.7

2. Calculation Results

CH	Transmitting Frequency [MHz]	Average EIRP [dBm] Hori. (EIRPh)	Average EIRP [dBm] Vert. (EIRPv)	Maximum Average EIRP [W]	Limits [dBm]	Margin [dB]
20025	1717.500	19.8	20.5	0.112	30.0	+ 9.5
20175	1732.500	20.3	20.7	0.117	30.0	+ 9.3
20325	1747.500	20.6	21.0	0.126	30.0	+ 9.0

Calculated result at 1747.500 MHz, as the worst point shown on underline:

	Emission Measurment (Mv)	=	84.7 dB(uV)
	Substitution Measurement (Msv)	=	-72.4 dB(uV)
	Supplied Power to Substitution Antenna	=	-5.0 dBm
+)	Gain of Substitution Antenna	=	13.7 dB
	Result (EIRPv)	=	21.0 dBm = 0.126 W

Minimum Margin: 30.0 - 21.0 = 9.0 (dB)

NOTE : Setting of measuring instrument(s) :

Detector Function
RMS

6-1) BW 20MHz(1RB)
Mode: QPSK

(LTE 20MHz)QPSK

Test Date: September 17, 2015
Temp.: 22 °C, Humi: 73 %

1. Measurement Results

CH	Transmitting Frequency [MHz]	Emission Measurement [dB(uV)] Hori. (Mh)	Emission Measurement [dB(uV)] Vert. (Mv)	Substitution Measurement [dB(uV)] Hori. (Msh)	Substitution Measurement [dB(uV)] Vert. (Msv)	Supplied Power to Substitution Antenna [dBm]	Gain of Substitution Antenna [dBi]
20050	1720.000	84.5	85.0	72.6	72.6	- 5.0	13.8
20175	1732.500	84.9	85.2	72.6	72.5	- 5.0	13.8
20300	1745.000	85.1	85.4	72.5	72.4	- 5.0	13.7

2. Calculation Results

CH	Transmitting Frequency [MHz]	Average EIRP [dBm] Hori. (EIRPh)	Average EIRP [dBm] Vert. (EIRPv)	Maximum Average EIRP [W]	Limits [dBm]	Margin [dB]
20050	1720.000	20.7	21.2	0.132	30.0	+ 8.8
20175	1732.500	21.1	21.5	0.141	30.0	+ 8.5
20300	1745.000	21.3	21.7	0.148	30.0	+ 8.3

Calculated result at 1745.000 MHz, as the worst point shown on underline:

	Emission Measurment (Mv)	=	85.4 dB(uV)
	Substitution Measurement (Msv)	=	-72.4 dB(uV)
	Supplied Power to Substitution Antenna	=	-5.0 dBm
+)	Gain of Substitution Antenna	=	13.7 dB
	Result (EIRPv)	=	21.7 dBm = 0.148 W

Minimum Margin: 30.0 - 21.7 = 8.3 (dB)

NOTE : Setting of measuring instrument(s) :

Detector Function
RMS

6-2) BW 20MHz(1RB)
Mode: 16QAM

(LTE 20MHz)16QAM

Test Date: September 17, 2015
Temp.: 22 °C, Humi: 73 %

1. Measurement Results

CH	Transmitting Frequency [MHz]	Emission Measurement [dB(uV)] Hori. (Mh)	Emission Measurement [dB(uV)] Vert. (Mv)	Substitution Measurement [dB(uV)] Hori. (Msh)	Substitution Measurement [dB(uV)] Vert. (Msv)	Supplied Power to Substitution Antenna [dBm]	Gain of Substitution Antenna [dBi]
20050	1720.000	83.9	84.3	72.6	72.6	- 5.0	13.8
20175	1732.500	83.9	84.4	72.6	72.5	- 5.0	13.8
20300	1745.000	84.4	84.7	72.5	72.4	- 5.0	13.7

2. Calculation Results

CH	Transmitting Frequency [MHz]	Average EIRP [dBm] Hori. (EIRPh)	Average EIRP [dBm] Vert. (EIRPv)	Maximum Average EIRP [W]	Limits [dBm]	Margin [dB]
20050	1720.000	20.1	20.5	0.112	30.0	+ 9.5
20175	1732.500	20.1	20.7	0.117	30.0	+ 9.3
20300	1745.000	20.6	21.0	0.126	30.0	+ 9.0

Calculated result at 1745.000 MHz, as the worst point shown on underline:

	Emission Measurment (Mv)	=	84.7 dB(uV)
	Substitution Measurement (Msv)	=	-72.4 dB(uV)
	Supplied Power to Substitution Antenna	=	-5.0 dBm
+)	Gain of Substitution Antenna	=	13.7 dB
	Result (EIRPv)	=	21.0 dBm = 0.126 W

Minimum Margin: 30.0 - 21.0 = 9.0 (dB)

NOTE : Setting of measuring instrument(s) :

Detector Function
RMS

7.3 Modulation Characteristics (§2.1047)

For the requirements, ☐ - Applicable [☐ - Tested. ☐ - Not tested by applicant request.]
☑ - Not Applicable

7.4 Occupied Bandwidth (§2.1049)

For the requirements, ☑ - Applicable [☑ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

7.4.1 Test Results

For the standard, ☑ - **Passed** ☐ - **Failed** ☐ - **Not judged**

The 99% Bandwidth of BW: 1.4 MHz(QPSK) is	1.08	MHz	at	1710.7/1732.5/1754.3	MHz
The 99% Bandwidth of BW: 1.4 MHz(16QAM) is	1.09	MHz	at	1732.5/1754.3	MHz
The 99% Bandwidth of BW: 3 MHz(QPSK) is	2.69	MHz	at	1711.5/1732.5	MHz
The 99% Bandwidth of BW: 3 MHz(16QAM) is	2.68	MHz	at	1711.5/1732.5/1753.5	MHz
The 99% Bandwidth of BW: 5 MHz(QPSK) is	4.47	MHz	at	1712.5/1732.5/1752.5	MHz
The 99% Bandwidth of BW: 5 MHz(16QAM) is	4.47	MHz	at	1712.5/1732.5/1752.5	MHz
The 99% Bandwidth of BW: 10 MHz(QPSK) is	8.94	MHz	at	1732.5/1750	MHz
The 99% Bandwidth of BW: 10 MHz(16QAM) is	8.95	MHz	at	1715/1732.5	MHz
The 99% Bandwidth of BW: 15 MHz(QPSK) is	13.4	MHz	at	1717.5/1732.5/1747.5	MHz
The 99% Bandwidth of BW: 15 MHz(16QAM) is	13.4	MHz	at	1717.5/1732.5/1747.5	MHz
The 99% Bandwidth of BW: 20 MHz(QPSK) is	17.9	MHz	at	1745	MHz
The 99% Bandwidth of BW: 20 MHz(16QAM) is	17.9	MHz	at	1745	MHz
The 26dB Bandwidth of BW: 1.4 MHz(QPSK) is	1.22	MHz	at	1732.5/1754.3	MHz
The 26dB Bandwidth of BW: 1.4 MHz(16QAM) is	1.23	MHz	at	1710.7/1732.5	MHz
The 26dB Bandwidth of BW: 3 MHz(QPSK) is	2.96	MHz	at	1732.5/1753.5	MHz
The 26dB Bandwidth of BW: 3 MHz(16QAM) is	2.95	MHz	at	1753.5	MHz
The 26dB Bandwidth of BW: 5 MHz(QPSK) is	4.89	MHz	at	1712.5	MHz
The 26dB Bandwidth of BW: 5 MHz(16QAM) is	4.86	MHz	at	1712.5	MHz
The 26dB Bandwidth of BW: 10 MHz(QPSK) is	9.70	MHz	at	1750	MHz
The 26dB Bandwidth of BW: 10 MHz(16QAM) is	9.73	MHz	at	1732.5	MHz
The 26dB Bandwidth of BW: 15 MHz(QPSK) is	14.4	MHz	at	1717.5/1732.5/1747.5	MHz
The 26dB Bandwidth of BW: 15 MHz(16QAM) is	14.4	MHz	at	1717.5/1732.5/1747.5	MHz
The 26dB Bandwidth of BW: 20 MHz(QPSK) is	19.2	MHz	at	1732.5	MHz
The 26dB Bandwidth of BW: 20 MHz(16QAM) is	19.1	MHz	at	1720	MHz

Uncertainty of Measurement Results ± 0.9 %(2σ)

Remarks : _____

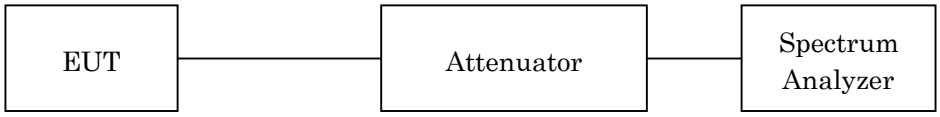
7.4.2 Test Instruments

Shielded Room S4				
Type	**Model**	**Serial No. (ID)**	**Manufacturer**	**Cal. Due**
Spectrum Analyzer	E4446A	US44300388 (A-39)	Agilent	2016/08/11
Attenuator	43KC-20	1418003 (D-41)	Anritsu	2016/07/05
RF Cable	SUCOFLEX102	14253/2 (C-52)	HUBER+SUHNER	2016/08/16

NOTE : The calibration interval of the above test instruments is 12 months.

7.4.3 Test Method and Test Setup (Diagrammatic illustration)

The test system is shown as follows:



The setting of the spectrum analyzer are shown as follows:

LTE Bandwidth	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Res. Bandwidth	20 kHz	30 kHz	51 kHz	100 kHz	150 kHz	200 kHz
Video Bandwidth	62 kHz	100 kHz	160 kHz	300 kHz	470 kHz	620 kHz
Span	3 MHz	6 MHz	10 MHz	20 MHz	30 MHz	40 MHz
Sweep Time	AUTO	AUTO	AUTO	AUTO	AUTO	AUTO
Trace	Maxhold	Maxhold	Maxhold	Maxhold	Maxhold	Maxhold

7.4.4 Test Data

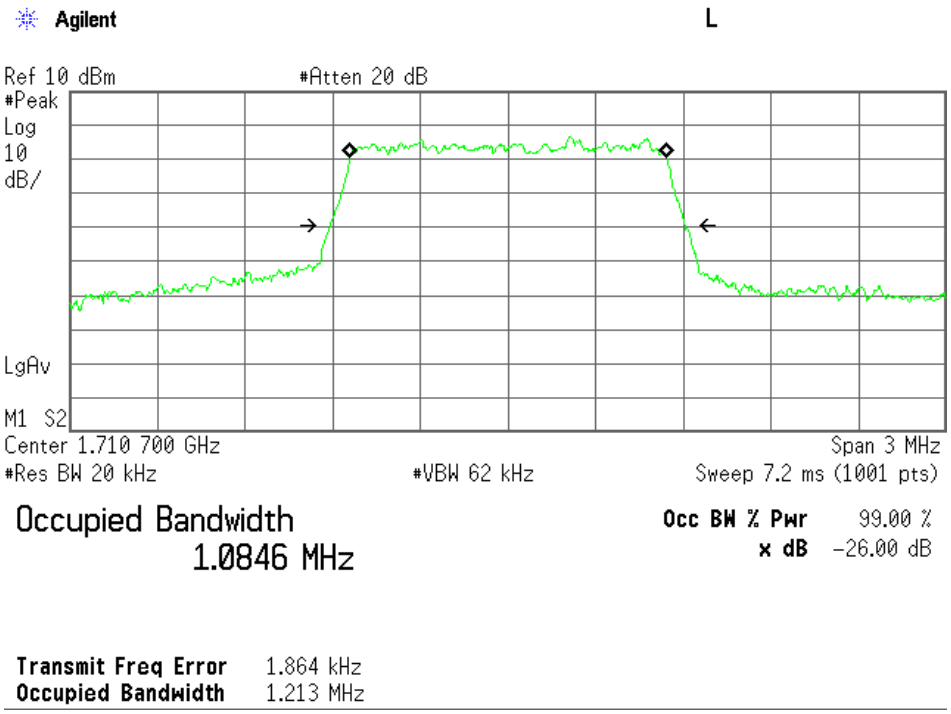
The resolution bandwidth was set to about 1 – 5 % of emission bandwidth, -26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.

Test Date :September 16 2015
Temp.:26°C, Humi:62%

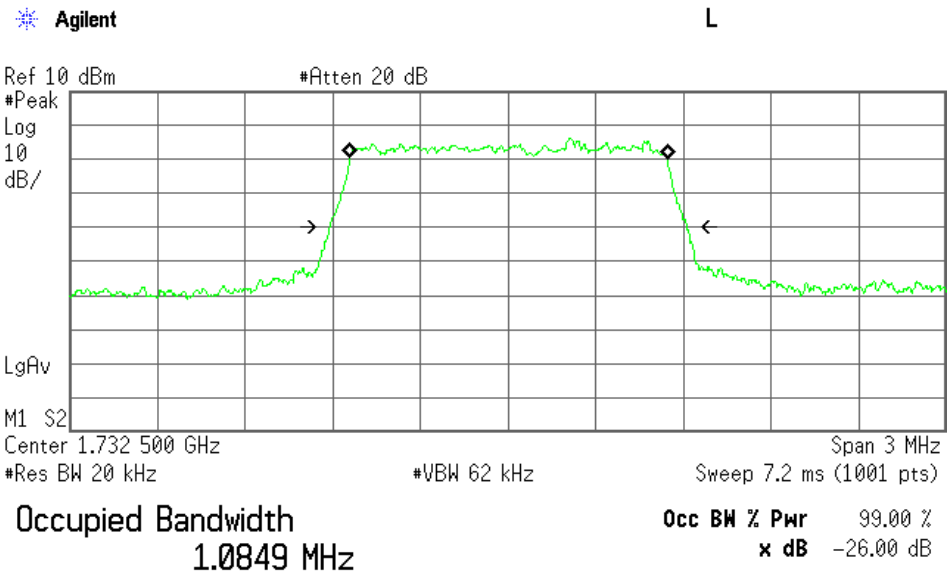
1-1) BW 1.4MHz(Full RB)
Mode: QPSK

Channel	Frequency (MHz)	99% Bandwidth (MHz)	-26dBc Bandwidth (MHz)
19957	1710.70	1.08	1.21
20175	1732.50	1.08	1.22
20393	1754.30	1.08	1.22

Low Channel

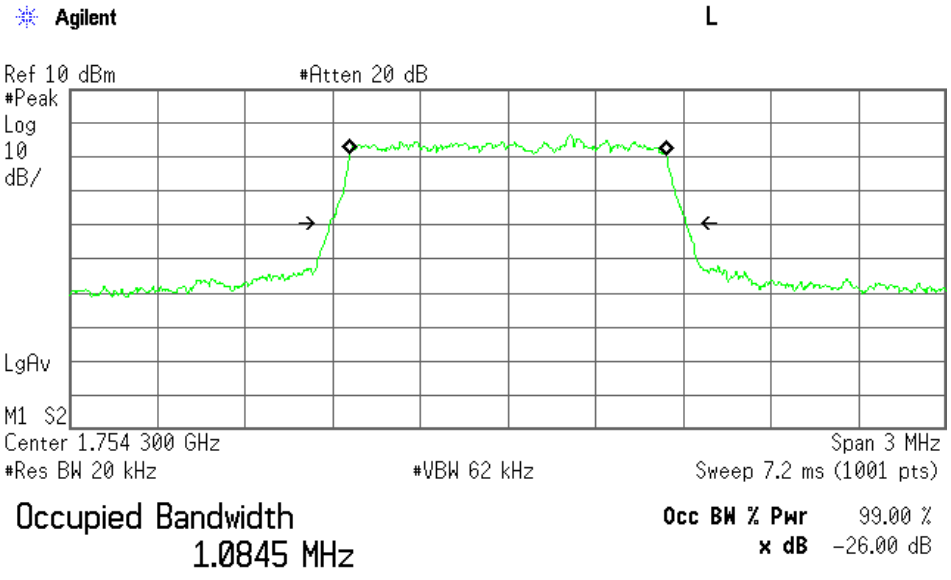


Middle Channel



Transmit Freq Error	2.106 kHz
Occupied Bandwidth	1.221 MHz

High Channel

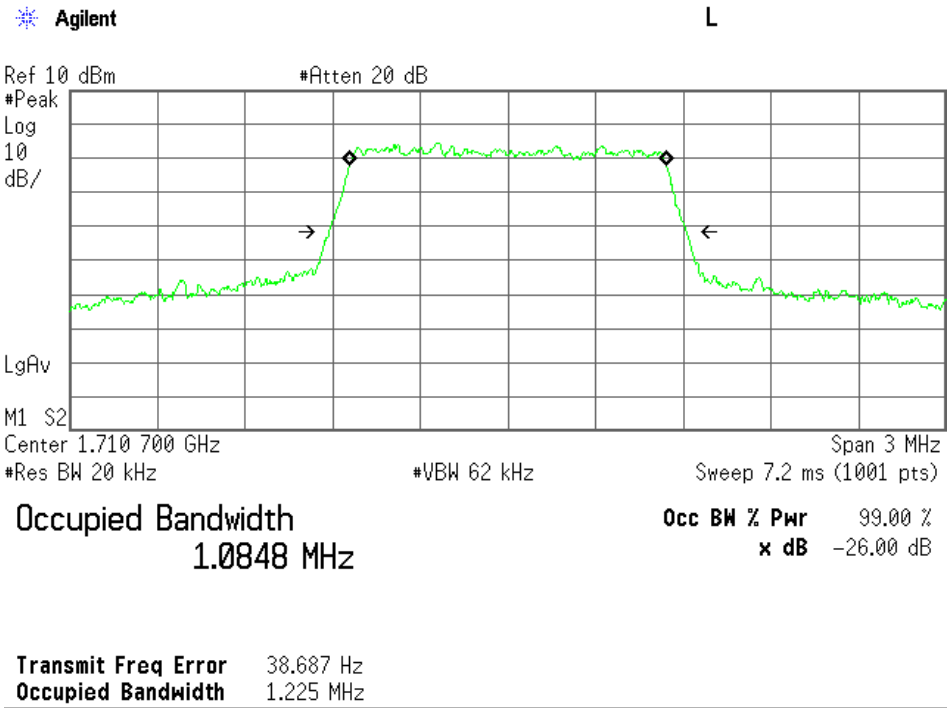


Transmit Freq Error	1.601 kHz
Occupied Bandwidth	1.222 MHz

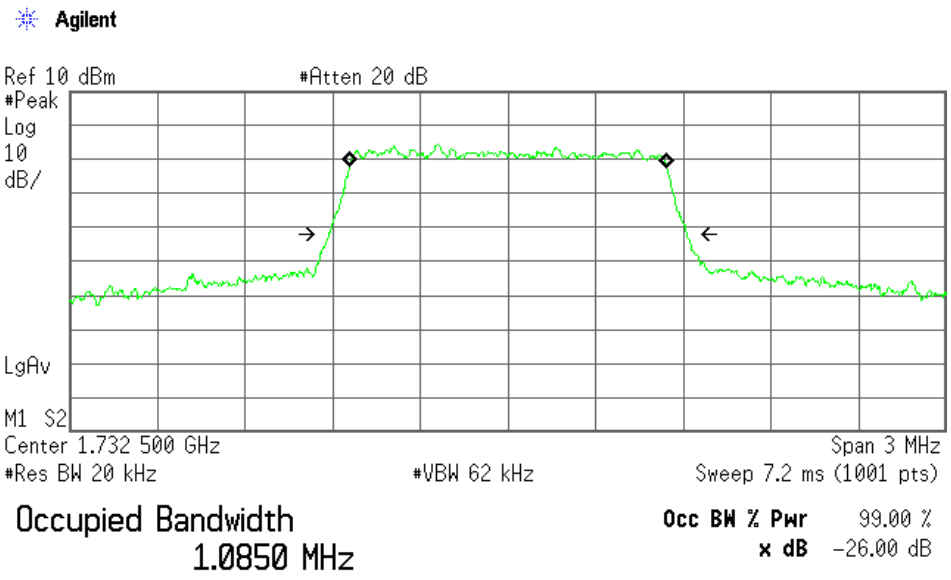
1-2) BW 1.4MHz(Full RB)
Mode: 16QAM

Channel	Frequency (MHz)	99% Bandwidth (MHz)	-26dBc Bandwidth (MHz)
19957	1710.70	1.08	1.23
20175	1732.50	1.09	1.23
20393	1754.30	1.09	1.22

Low Channel

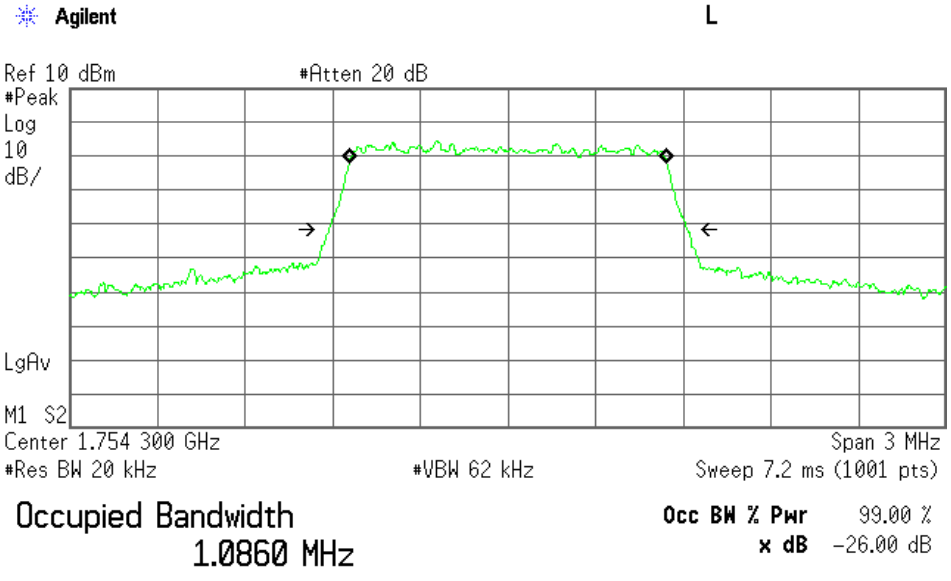


Middle Channel



Transmit Freq Error	529.887 Hz
Occupied Bandwidth	1.225 MHz

High Channel

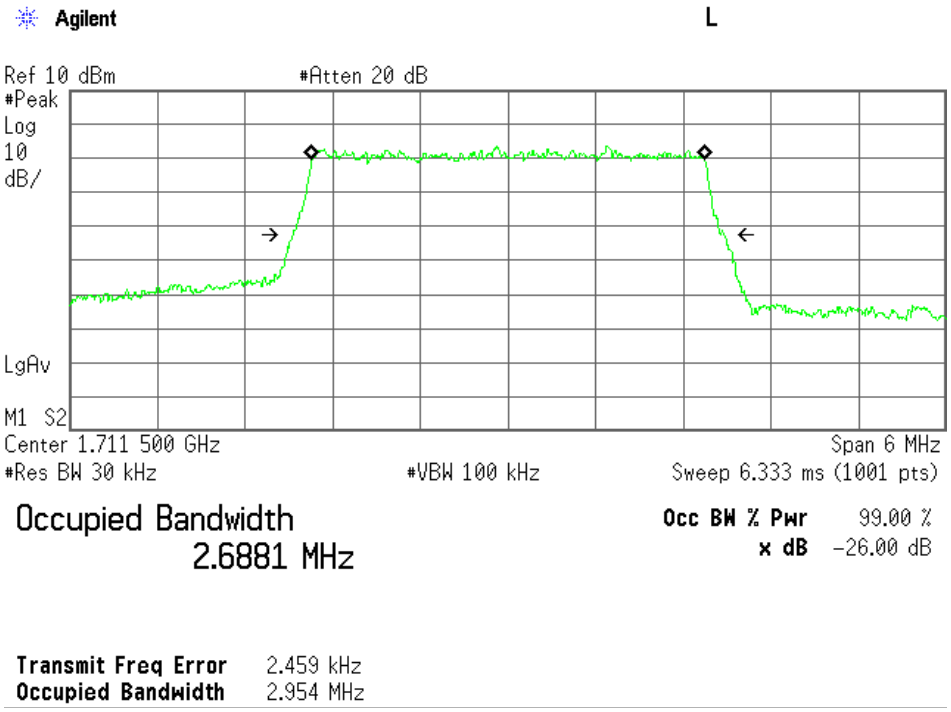


Transmit Freq Error	160.636 Hz
Occupied Bandwidth	1.224 MHz

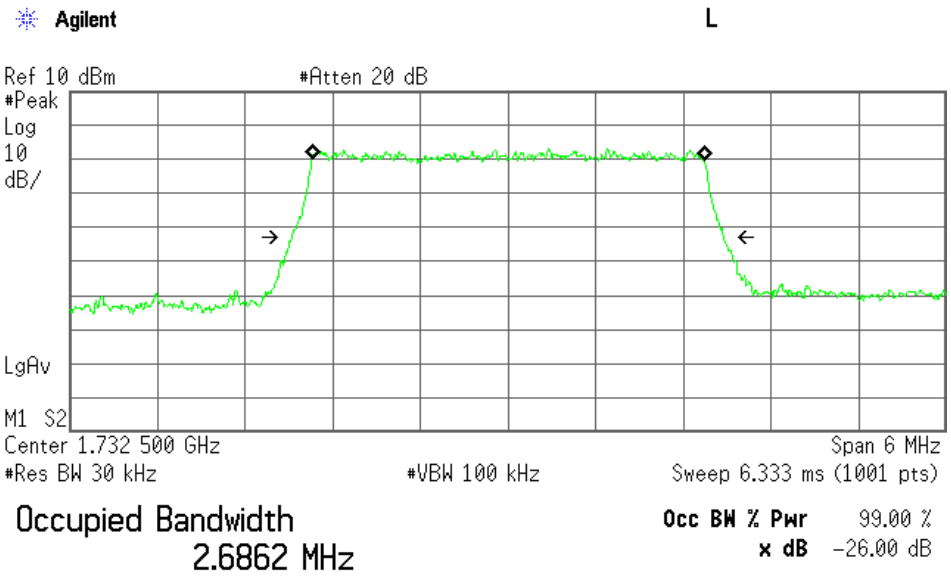
2-1) BW 3MHz(Full RB)
Mode: QPSK

Channel	Frequency (MHz)	99% Bandwidth (MHz)	-26dBc Bandwidth (MHz)
19965	1711.50	2.69	2.95
20175	1732.50	2.69	2.96
20385	1753.50	2.68	2.96

Low Channel

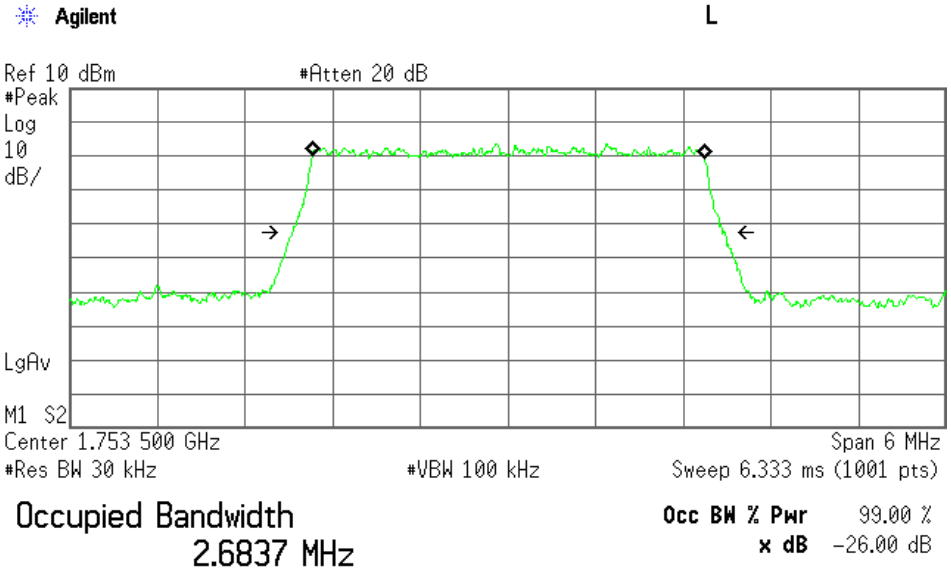


Middle Channel



Transmit Freq Error	3.057 kHz
Occupied Bandwidth	2.955 MHz

High Channel

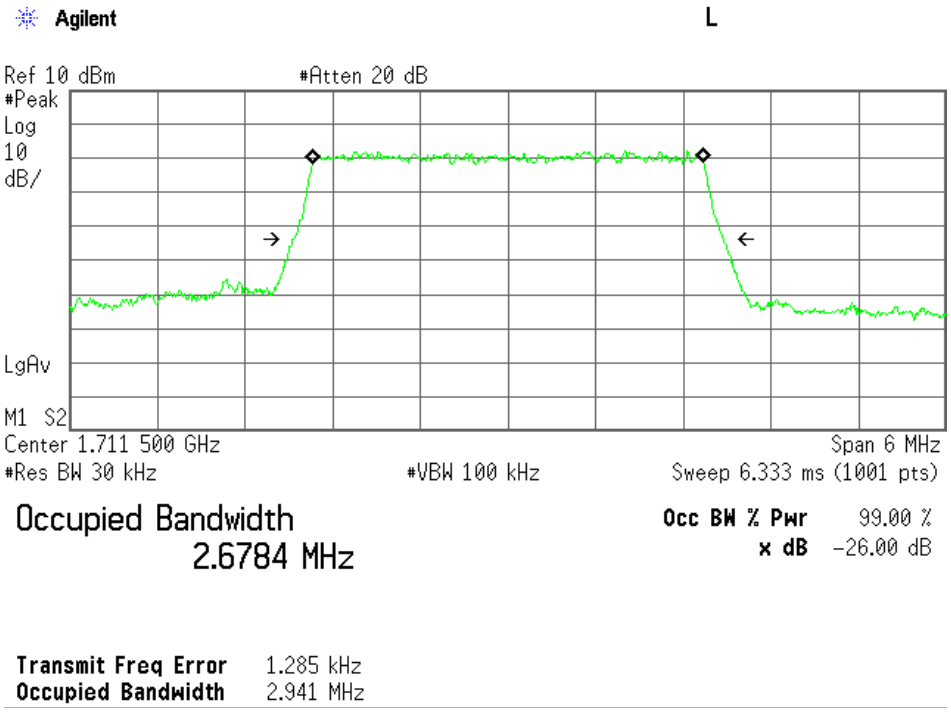


Transmit Freq Error	2.716 kHz
Occupied Bandwidth	2.962 MHz

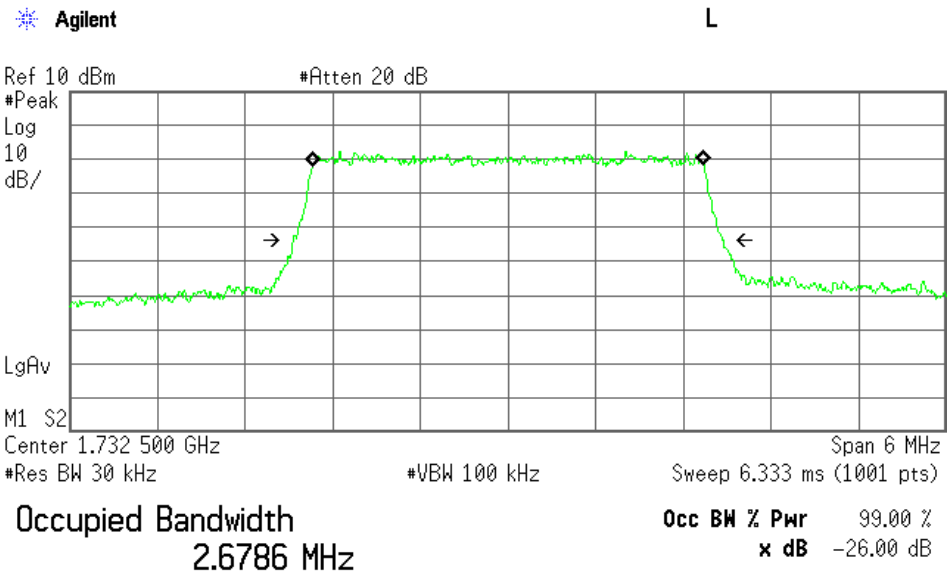
2-2) BW 3MHz(Full RB)
Mode: 16QAM

Channel	Frequency (MHz)	99% Bandwidth (MHz)	-26dBc Bandwidth (MHz)
19965	1711.50	2.68	2.94
20175	1732.50	2.68	2.93
20385	1753.50	2.68	2.95

Low Channel

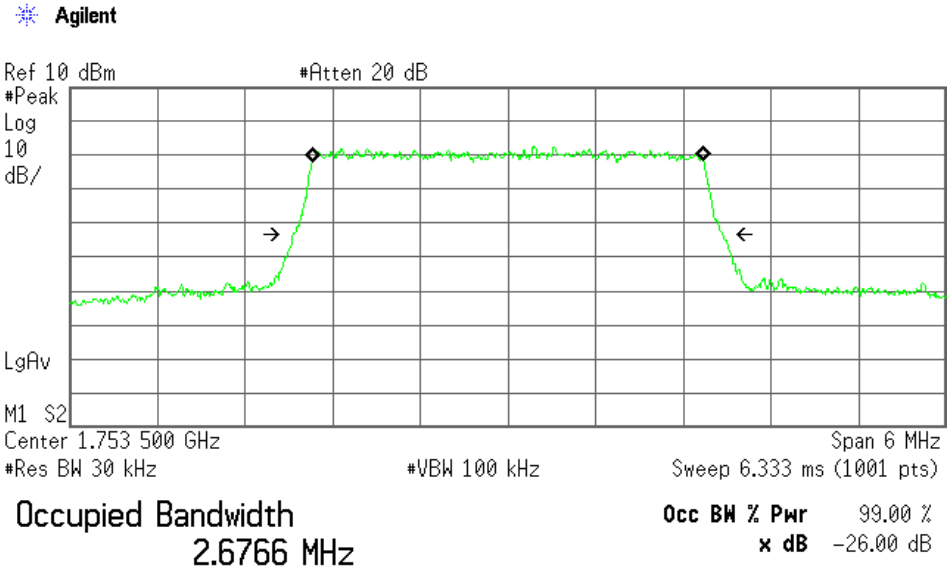


Middle Channel



Transmit Freq Error	1.332 kHz
Occupied Bandwidth	2.933 MHz

High Channel

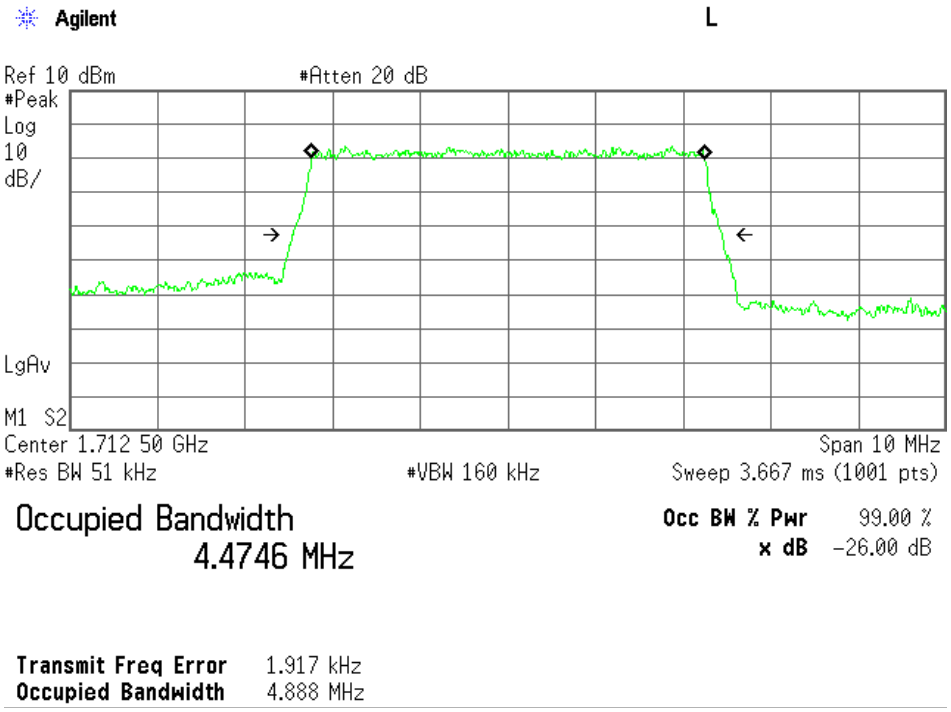


Transmit Freq Error	-14.491 Hz
Occupied Bandwidth	2.945 MHz

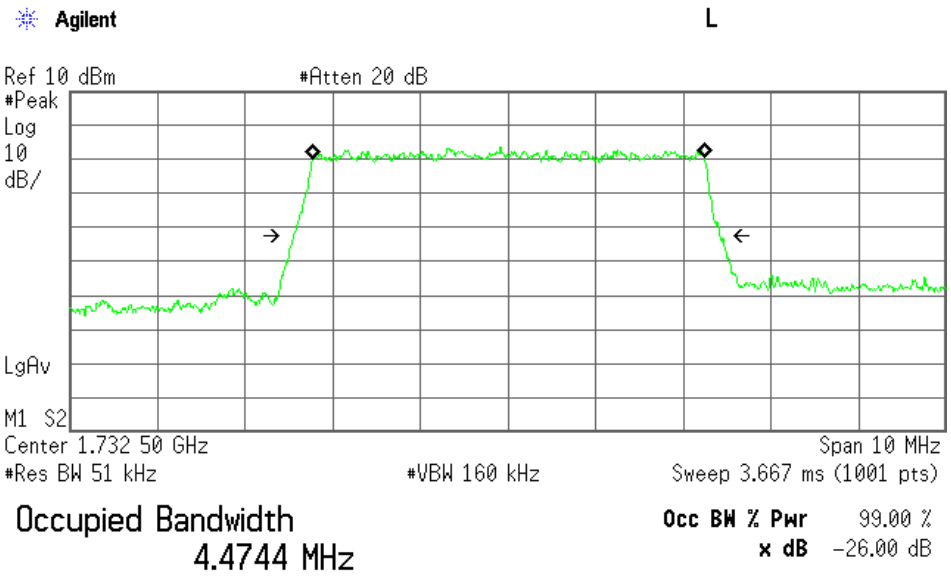
3-1) BW 5MHz(Full RB)
Mode: QPSK

Channel	Frequency (MHz)	99% Bandwidth (MHz)	-26dBc Bandwidth (MHz)
19975	1712.50	4.47	4.89
20175	1732.50	4.47	4.87
20375	1752.50	4.47	4.85

Low Channel

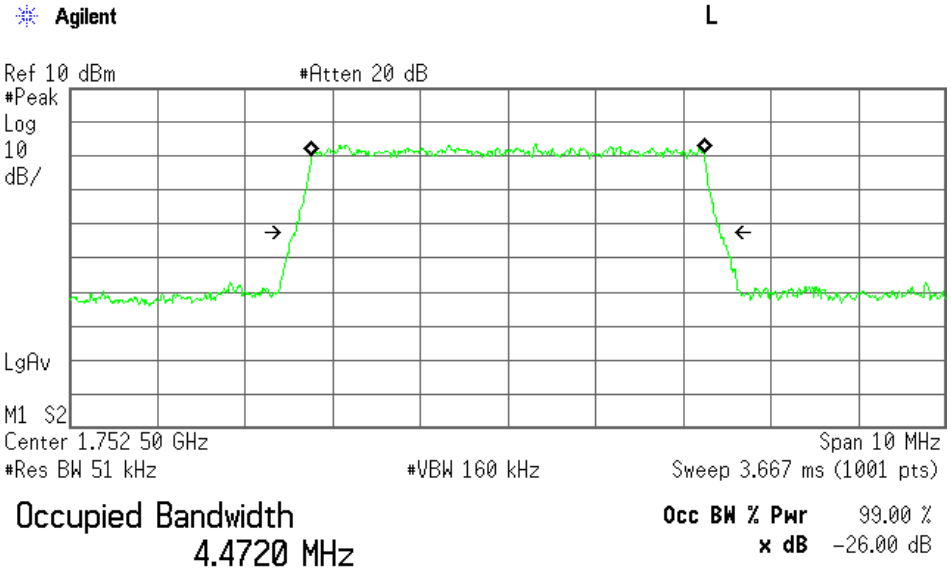


Middle Channel



Transmit Freq Error	5.453 kHz
Occupied Bandwidth	4.868 MHz

High Channel

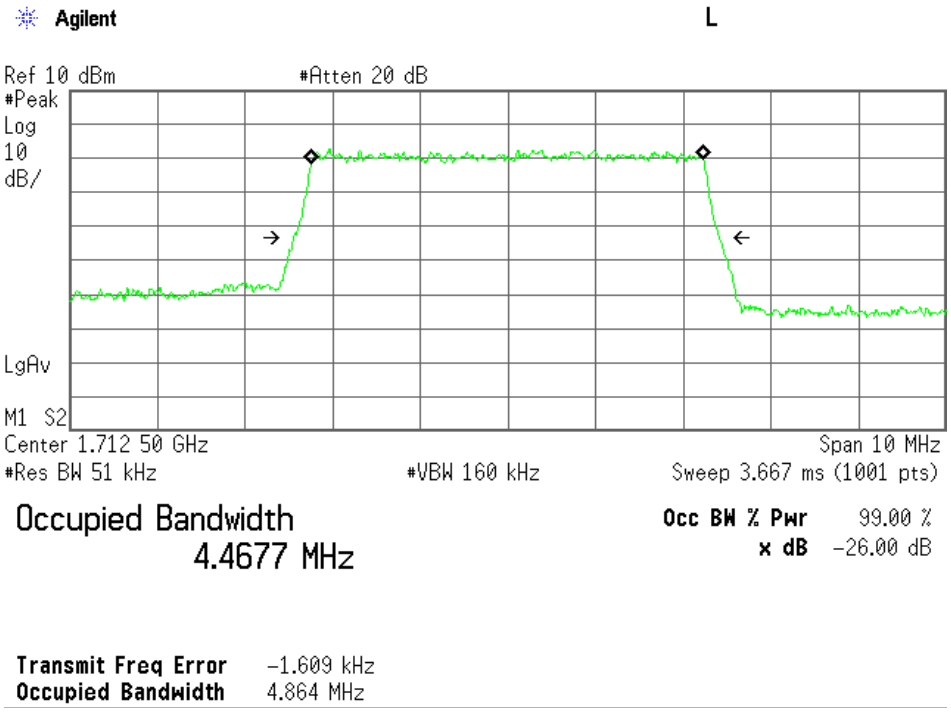


Transmit Freq Error	737.683 Hz
Occupied Bandwidth	4.854 MHz

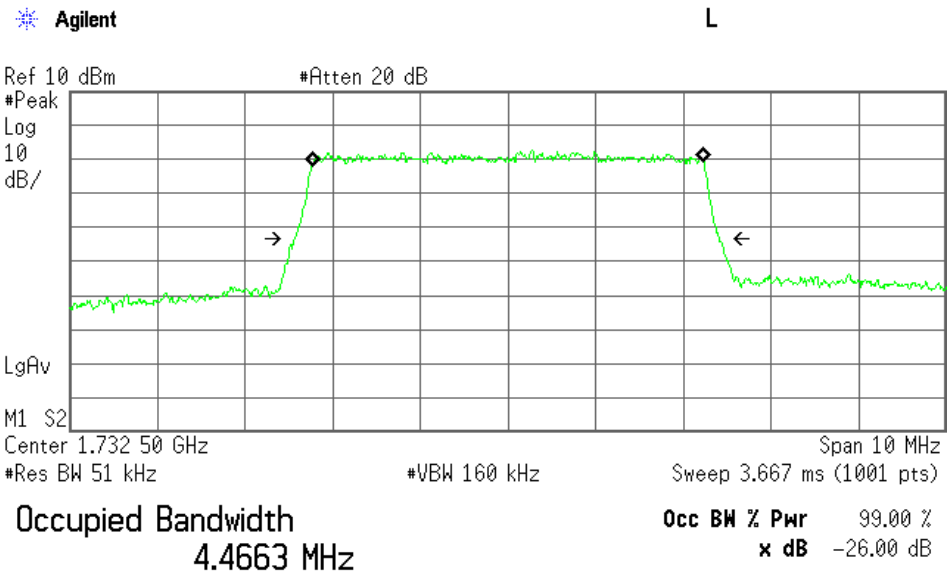
3-2) BW 5MHz(Full RB)
Mode: 16QAM

Channel	Frequency (MHz)	99% Bandwidth (MHz)	-26dBc Bandwidth (MHz)
19975	1712.50	4.47	4.86
20175	1732.50	4.47	4.84
20375	1752.50	4.47	4.85

Low Channel

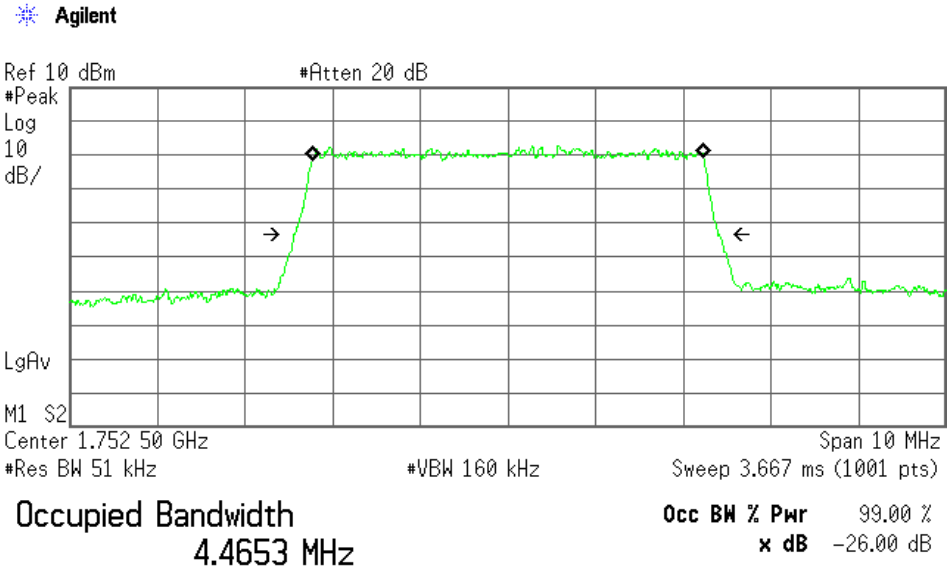


Middle Channel



Transmit Freq Error	-286.820 Hz
Occupied Bandwidth	4.843 MHz

High Channel

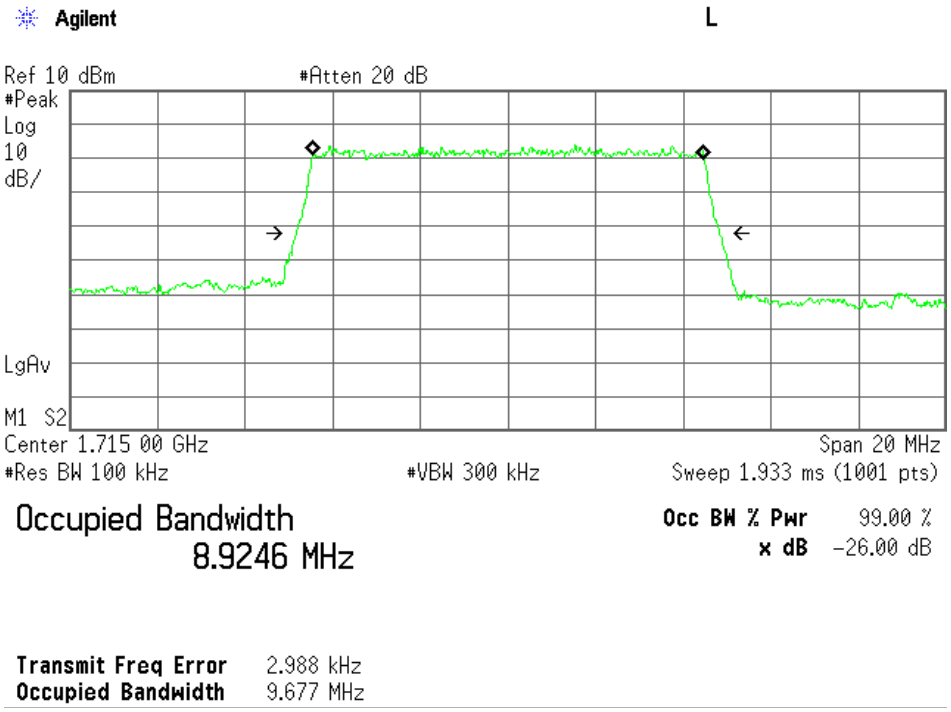


Transmit Freq Error	-938.437 Hz
Occupied Bandwidth	4.854 MHz

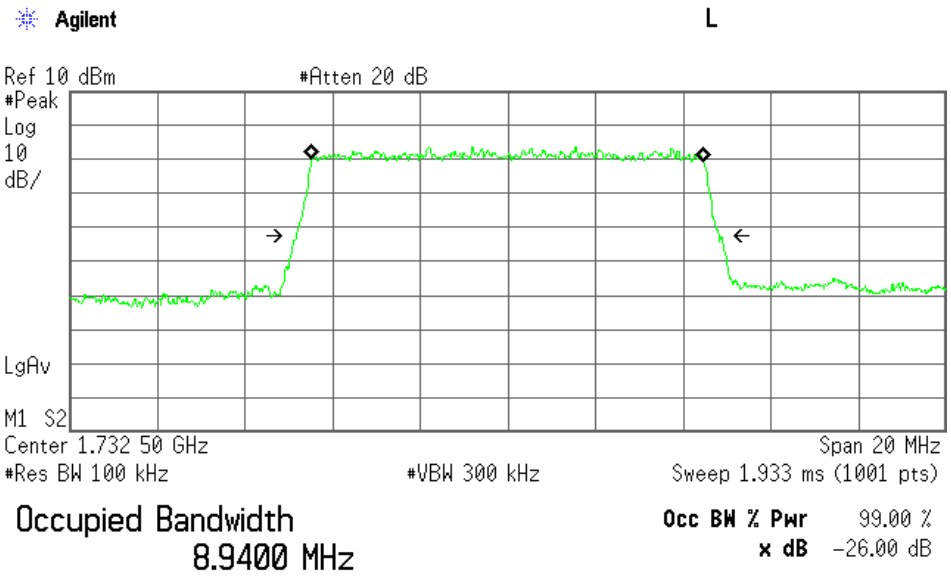
4-1) BW 10MHz(Full RB)
Mode: QPSK

Channel	Frequency (MHz)	99% Bandwidth (MHz)	-26dBc Bandwidth (MHz)
20000	1715.00	8.92	9.68
20175	1732.50	8.94	9.65
20350	1750.00	8.94	9.70

Low Channel

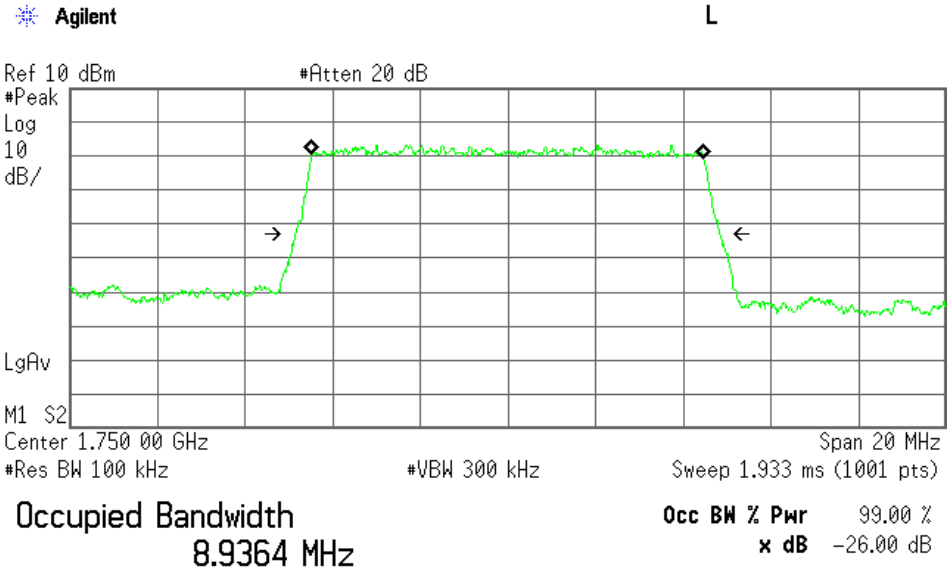


Middle Channel



Transmit Freq Error	-2.385 kHz
Occupied Bandwidth	9.647 MHz

High Channel

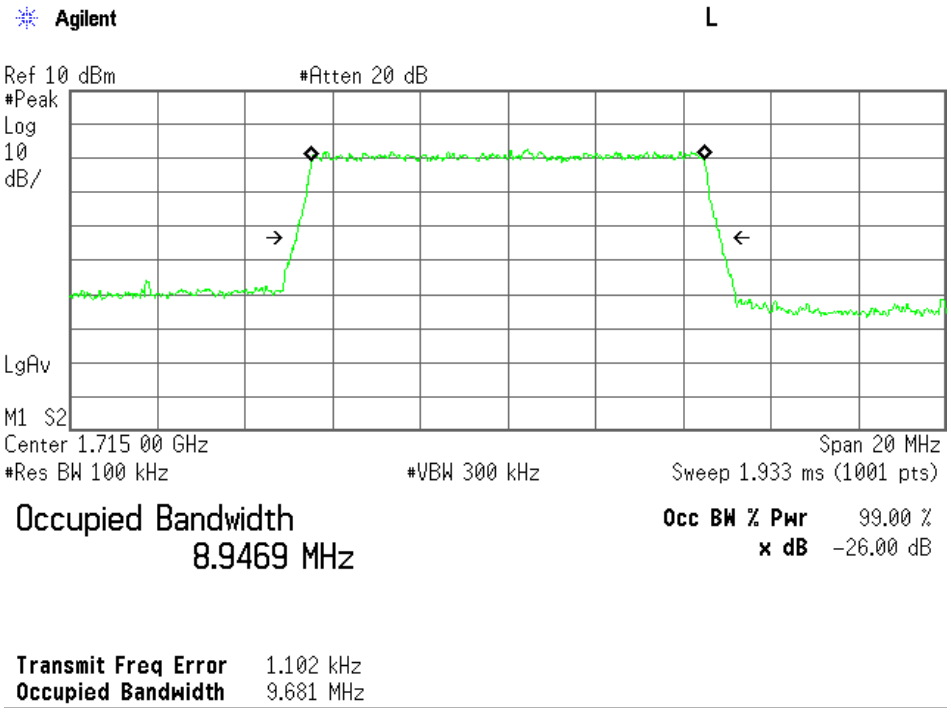


Transmit Freq Error	-5.841 kHz
Occupied Bandwidth	9.695 MHz

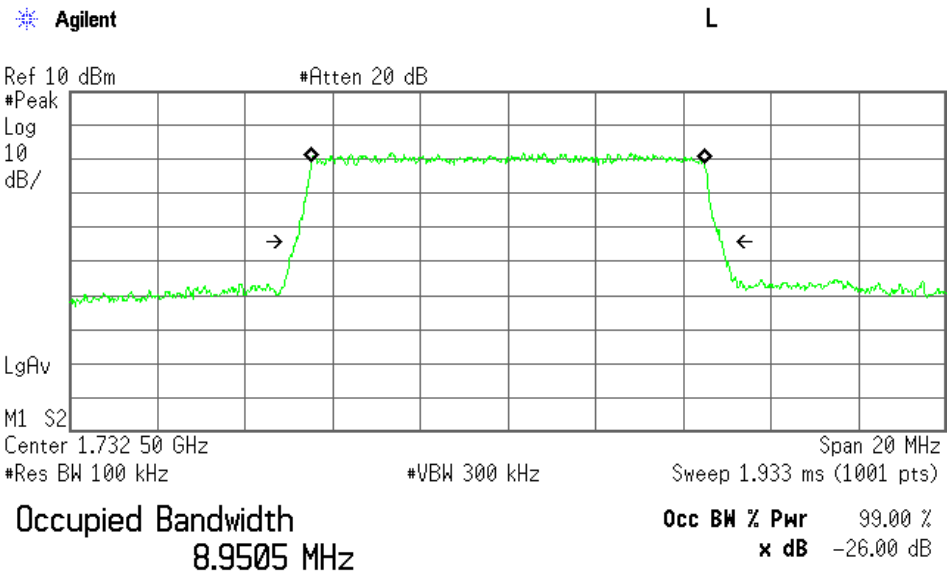
4-2) BW 10MHz(Full RB)
Mode: 16QAM

Channel	Frequency (MHz)	99% Bandwidth (MHz)	-26dBc Bandwidth (MHz)
20000	1715.00	8.95	9.68
20175	1732.50	8.95	9.73
20350	1750.00	8.93	9.60

Low Channel

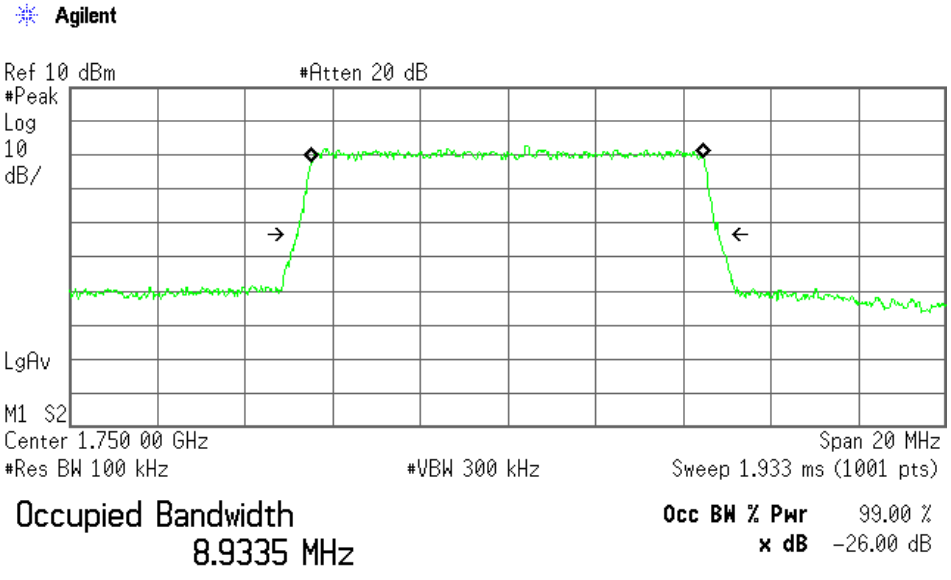


Middle Channel



Transmit Freq Error	-1.318 kHz
Occupied Bandwidth	9.733 MHz

High Channel

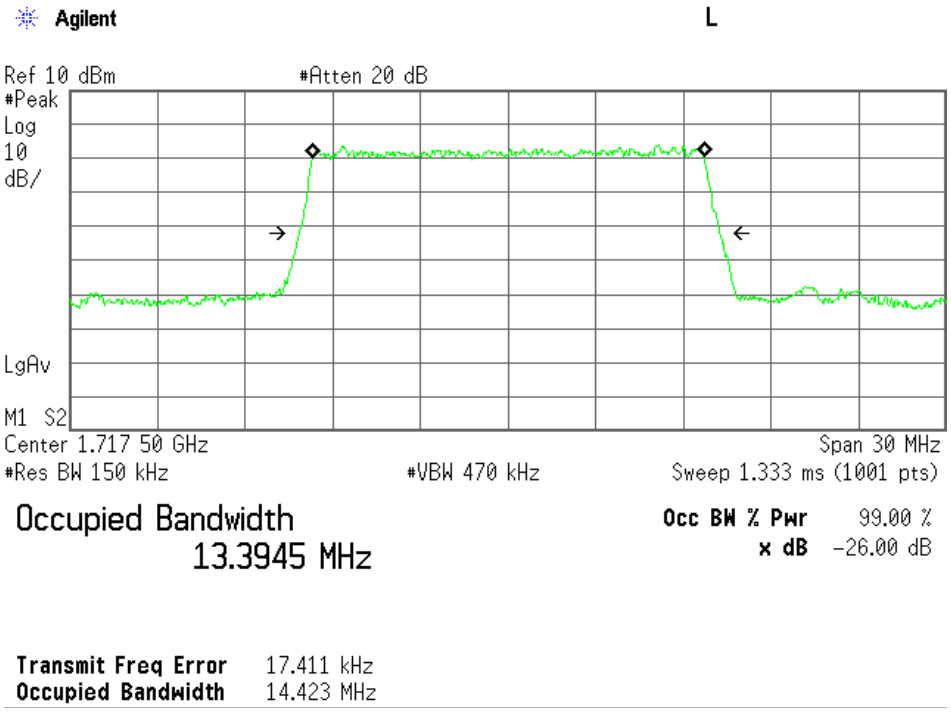


Transmit Freq Error	-4.632 kHz
Occupied Bandwidth	9.599 MHz

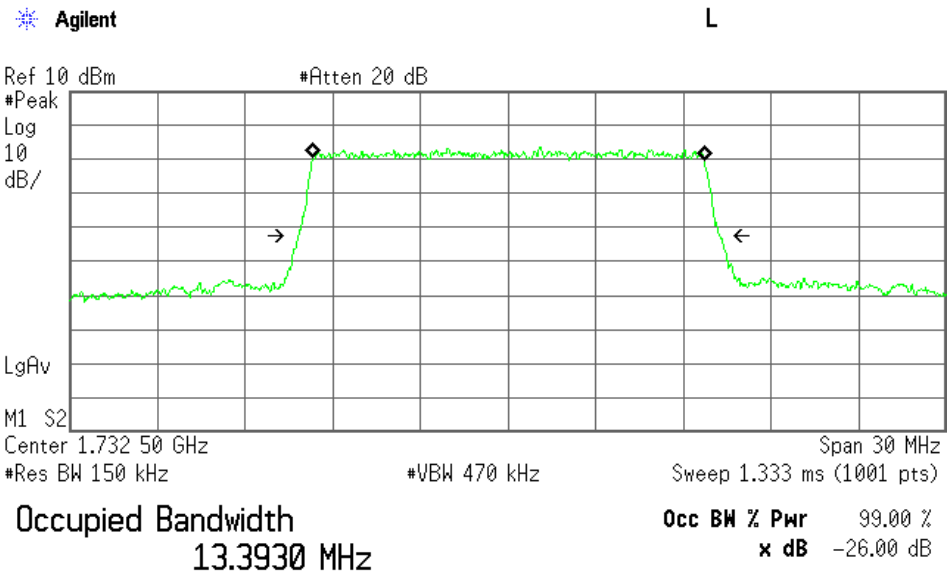
5-1) BW 15MHz(Full RB)
Mode: QPSK

Channel	Frequency (MHz)	99% Bandwidth (MHz)	-26dBc Bandwidth (MHz)
20025	1717.50	13.4	14.4
20175	1732.50	13.4	14.4
20325	1747.50	13.4	14.4

Low Channel

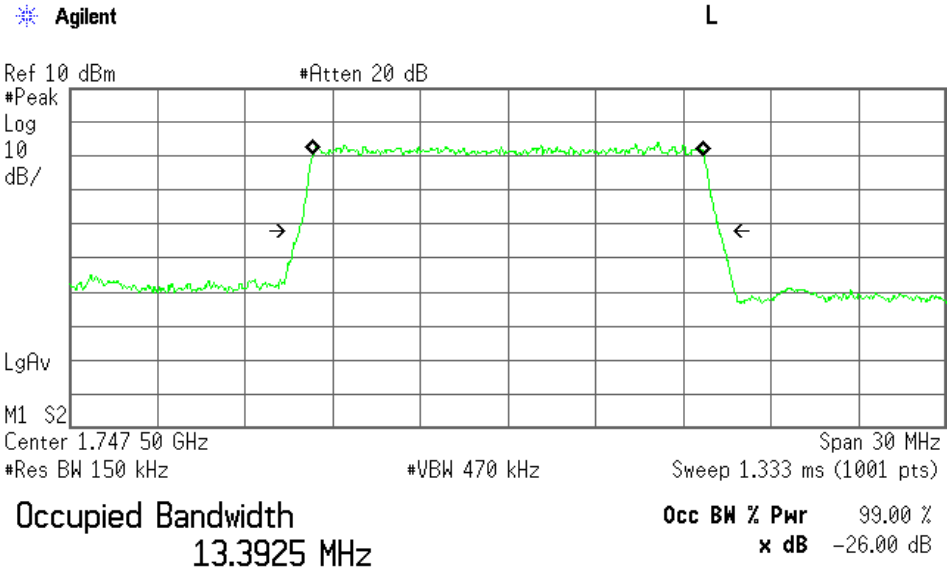


Middle Channel



Transmit Freq Error	18.255 kHz
Occupied Bandwidth	14.428 MHz

High Channel

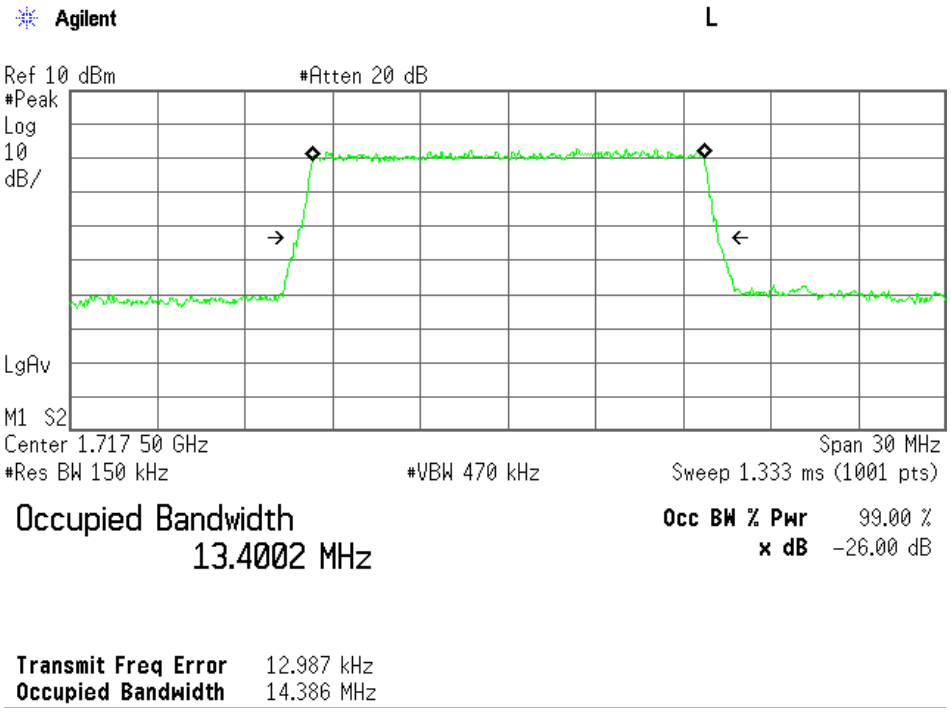


Transmit Freq Error	7.126 kHz
Occupied Bandwidth	14.365 MHz

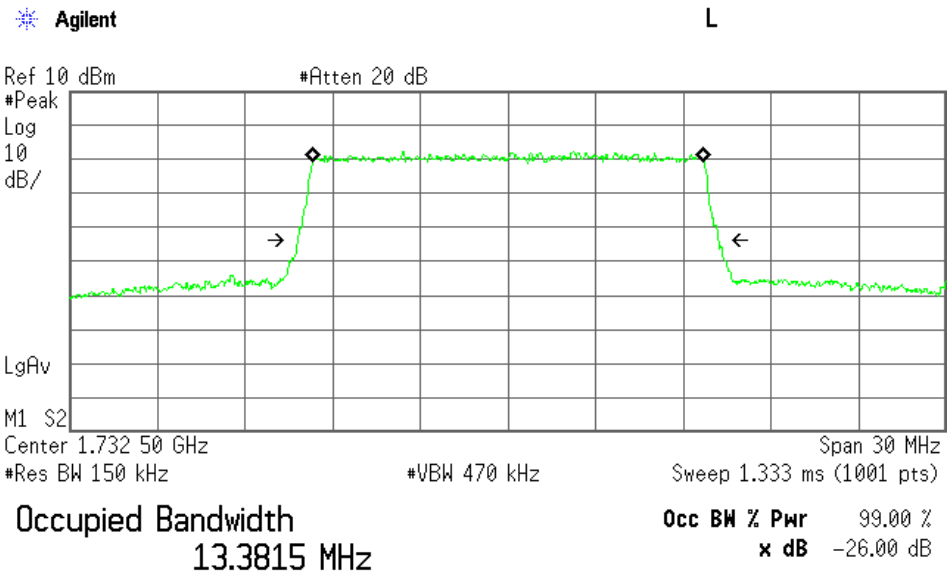
5-2) BW 15MHz(Full RB)
Mode: 16QAM

Channel	Frequency (MHz)	99% Bandwidth (MHz)	-26dBc Bandwidth (MHz)
20025	1717.50	13.4	14.4
20175	1732.50	13.4	14.4
20325	1747.50	13.4	14.4

Low Channel

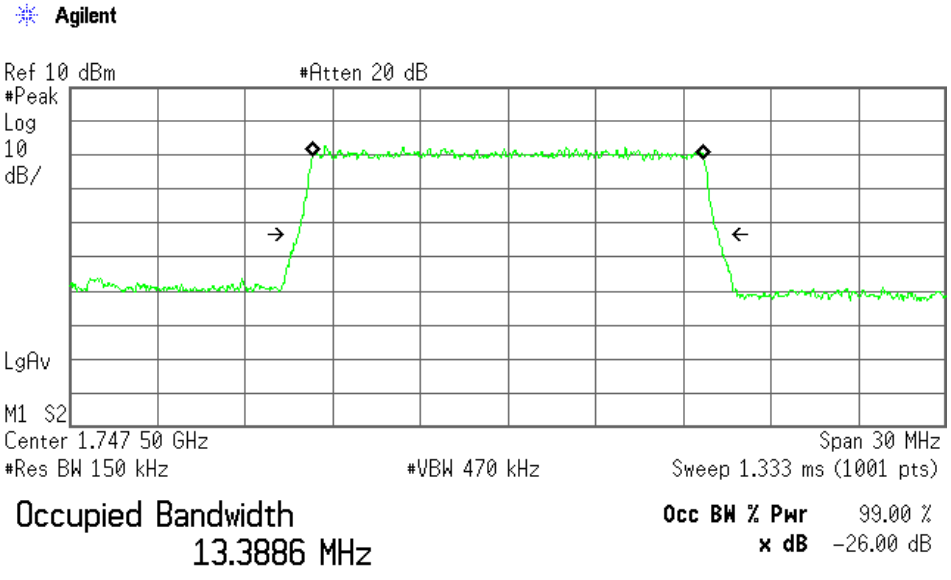


Middle Channel



Transmit Freq Error	9.801 kHz
Occupied Bandwidth	14.378 MHz

High Channel



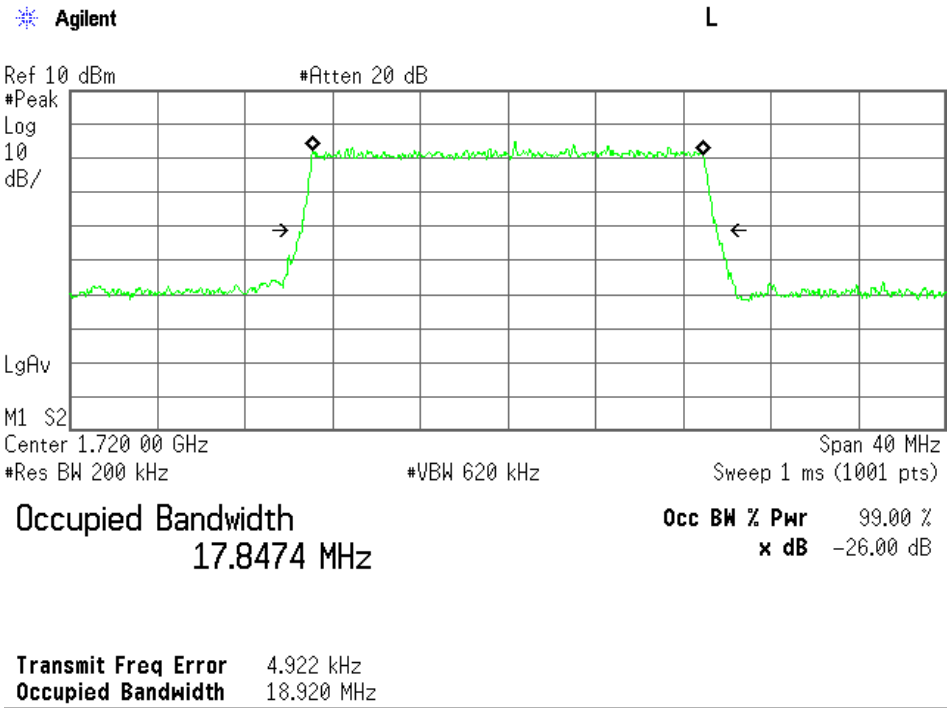
Transmit Freq Error	240.907 Hz
Occupied Bandwidth	14.359 MHz

6-1) BW 20MHz(Full RB)

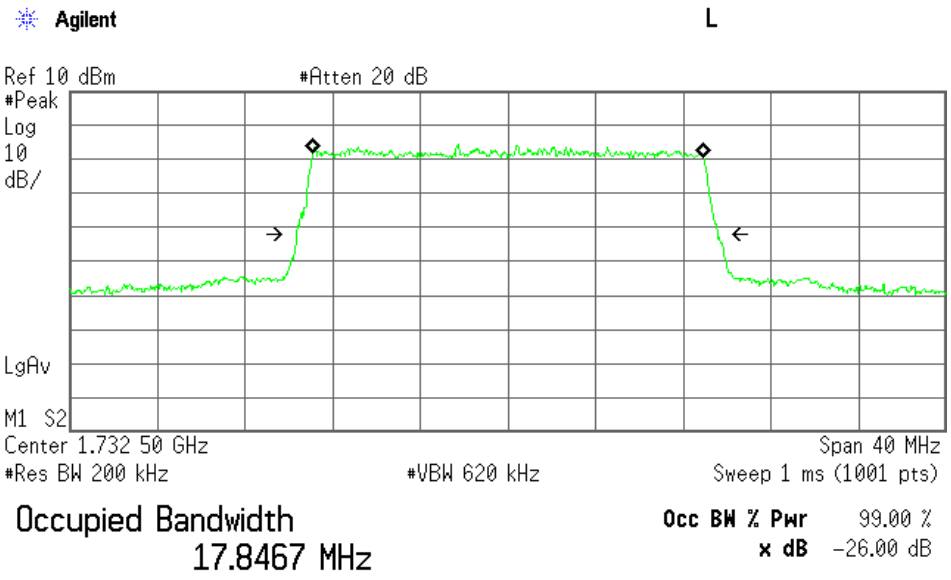
Mode: QPSK

Channel	Frequency (MHz)	99% Bandwidth (MHz)	-26dBc Bandwidth (MHz)
20050	1720.00	17.8	18.9
20175	1732.50	17.8	19.2
20300	1745.00	17.9	19.0

Low Channel

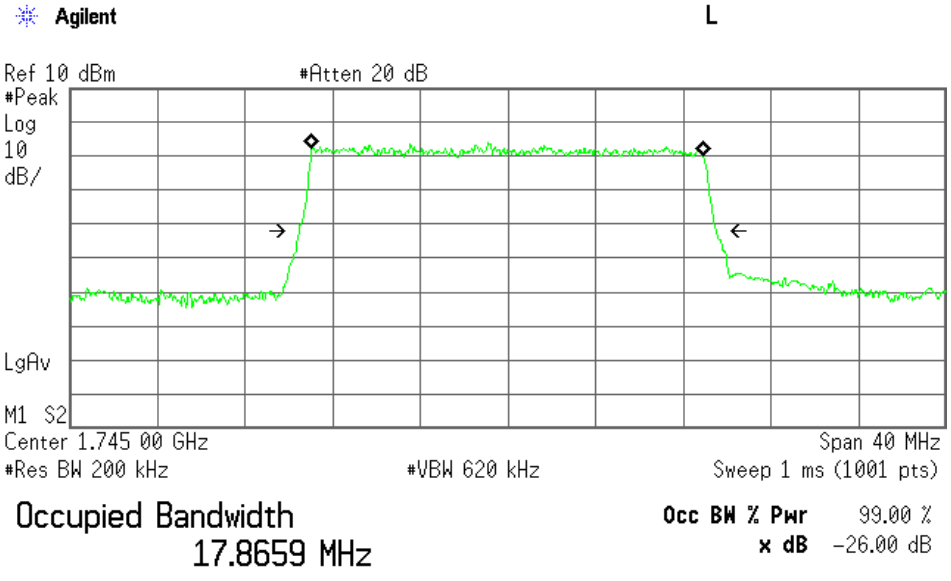


Middle Channel



Transmit Freq Error	7.790 kHz
Occupied Bandwidth	19.244 MHz

High Channel

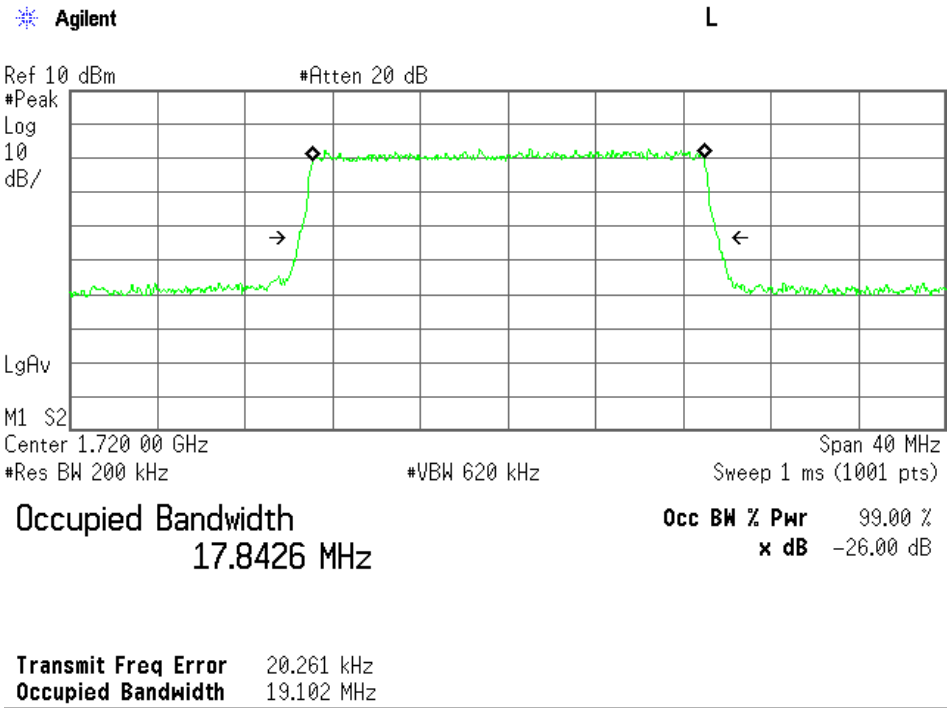


Transmit Freq Error	-13.074 kHz
Occupied Bandwidth	18.998 MHz

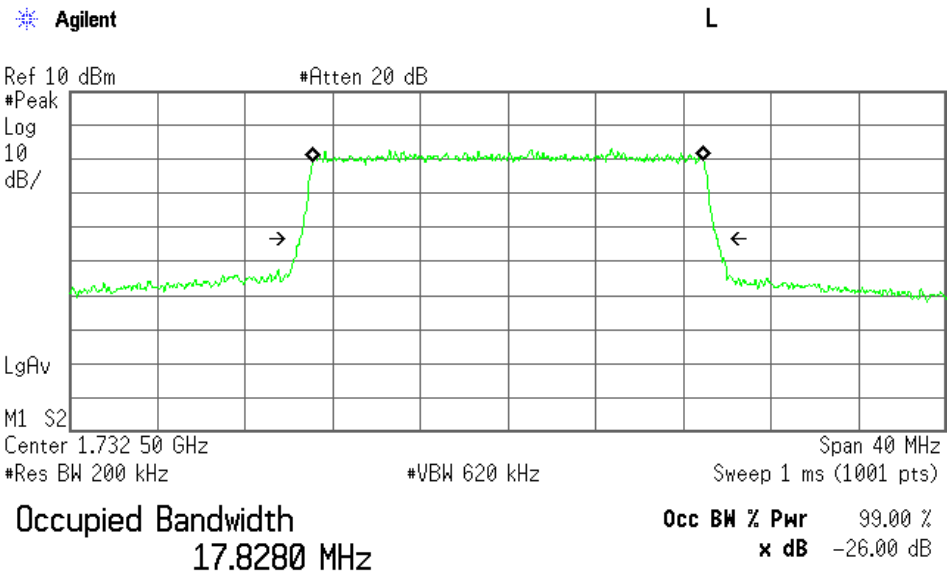
6-2) BW 20MHz(Full RB)
Mode: 16QAM

Channel	Frequency (MHz)	99% Bandwidth (MHz)	-26dBc Bandwidth (MHz)
20050	1720.00	17.8	19.1
20175	1732.50	17.8	18.9
20300	1745.00	17.9	19.0

Low Channel

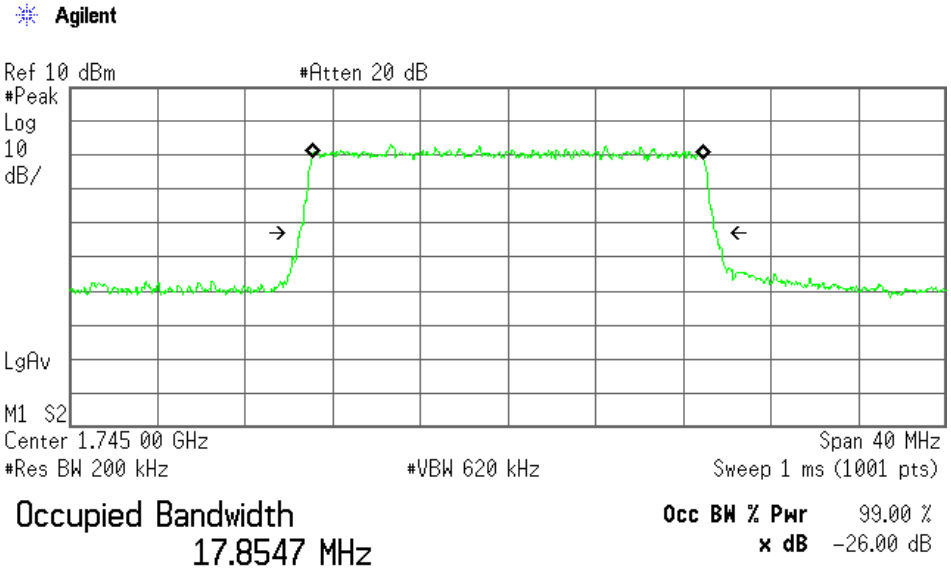


Middle Channel



Transmit Freq Error	16.487 kHz
Occupied Bandwidth	18.939 MHz

High Channel



Transmit Freq Error	-557.723 Hz
Occupied Bandwidth	18.969 MHz

7.5 Spurious Emissions at Antenna Terminals (§2.1051)

For the requirements, ☑ - Applicable [☑ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

7.5.1 Test Results

For the standard, ☑ - **Passed** ☐ - **Failed** ☐ - **Not judged**

Min. Limit Margin 29.5 dB at 5262.900 MHz

Uncertainty of Measurement Results

9 kHz – 1 GHz	± 1.4	dB(2σ)
1 GHz – 18 GHz	± 1.7	dB(2σ)
18 GHz – 40 GHz	± 2.3	dB(2σ)

Remarks : BW 1.4 MHz

7.5.2 Test Instruments

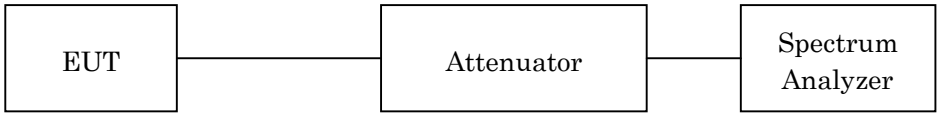
Shielded Room S4				
Type	**Model**	**Serial No. (ID)**	**Manufacturer**	**Cal. Due**
Spectrum Analyzer	E4446A	US44300388 (A-39)	Agilent	2016/08/11
Attenuator	43KC-20	1418003 (D-41)	Anritsu	2016/07/05
RF Cable	SUCOFLEX102	14253/2 (C-52)	HUBER+SUHNER	2016/08/16
High Pass Filter	HPM13899	001 (D-96)	MICRO-TRONICS	2016/02/08

NOTE : The calibration interval of the above test instruments is 12 months.

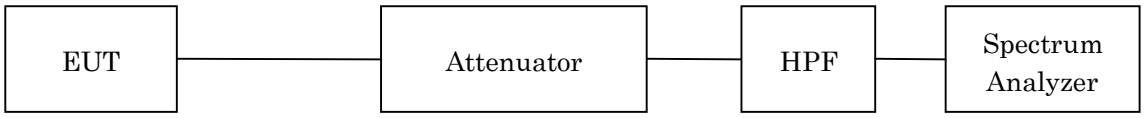
7.5.3 Test Method and Test Setup (Diagrammatic illustration)

The Antenna Conducted Emission was measured with a spectrum analyzer. The test system is shown as follows:

a) Frequency Range: 9 kHz – 2 GHz



b) Frequency Range: 2 GHz – 20 GHz



The setting of the spectrum analyzer are shown as follows:

Frequency Range	9 kHz - 150 kHz	150 kHz - 30 MHz	30 MHz - 20 GHz
Res. Bandwidth	200 Hz	10 kHz	1 MHz
Video Bandwidth	1 kHz	30 kHz	3 MHz
Sweep Time	AUTO	AUTO	AUTO
Trace	Maxhold	Maxhold	Maxhold

7.5.4 Test Data

1) BW 1.4MHz(1RB)

(LTE 1.4MHz)

Test Date: September 16, 2015
Temp.: 26 °C, Humi: 62 %

CH	Transmitting Frequency [MHz]	Measured Frequency [MHz]	Corr. Factor [dB]	Meter Readings [dBm]	Limits [dBm]	Results [dBm]	Margin [dB]	Remarks
19957	1710.700	3421.400	21.0	-69.3	-13.0	-48.3	+35.3	C
		5132.100	21.1	< -70.0	-13.0	< -48.9	> +35.9	C
		6842.800	21.3	< -70.0	-13.0	< -48.7	> +35.7	C
		8553.500	21.6	< -70.0	-13.0	< -48.4	> +35.4	C
		10264.200	21.8	< -70.0	-13.0	< -48.2	> +35.2	C
		11974.900	22.1	< -70.0	-13.0	< -47.9	> +34.9	C
		13685.600	22.3	< -70.0	-13.0	< -47.7	> +34.7	C
		15396.300	22.6	< -70.0	-13.0	< -47.4	> +34.4	C
		17107.000	22.9	< -70.0	-13.0	< -47.1	> +34.1	C
20175	1732.500	3465.000	21.0	-68.4	-13.0	-47.4	+34.4	C
		5197.500	21.1	< -70.0	-13.0	< -48.9	> +35.9	C
		6930.000	21.3	< -70.0	-13.0	< -48.7	> +35.7	C
		8662.500	21.6	< -70.0	-13.0	< -48.4	> +35.4	C
		10395.000	21.8	< -70.0	-13.0	< -48.2	> +35.2	C
		12127.500	22.1	< -70.0	-13.0	< -47.9	> +34.9	C
		13860.000	22.3	< -70.0	-13.0	< -47.7	> +34.7	C
		15592.500	22.6	< -70.0	-13.0	< -47.4	> +34.4	C
		17325.000	22.9	< -70.0	-13.0	< -47.1	> +34.1	C
20393	1754.300	3508.600	21.0	-68.1	-13.0	-47.1	+34.1	C
		5262.900	21.1	-63.6	-13.0	-42.5	+29.5	C
		7017.200	21.3	< -70.0	-13.0	< -48.7	> +35.7	C
		8771.500	21.6	< -70.0	-13.0	< -48.4	> +35.4	C
		10525.800	21.8	< -70.0	-13.0	< -48.2	> +35.2	C
		12280.100	22.1	< -70.0	-13.0	< -47.9	> +34.9	C
		14034.400	22.3	< -70.0	-13.0	< -47.7	> +34.7	C
		15788.700	22.7	< -70.0	-13.0	< -47.3	> +34.3	C
		17543.000	22.9	< -70.0	-13.0	< -47.1	> +34.1	C

Calculated result at 5262.9 MHz, as the worst point shown on underline:

	Corr. Factor	=	21.1 dB
+)	Meter Reading	=	-63.6 dBm
	Result	=	-42.5 dBm

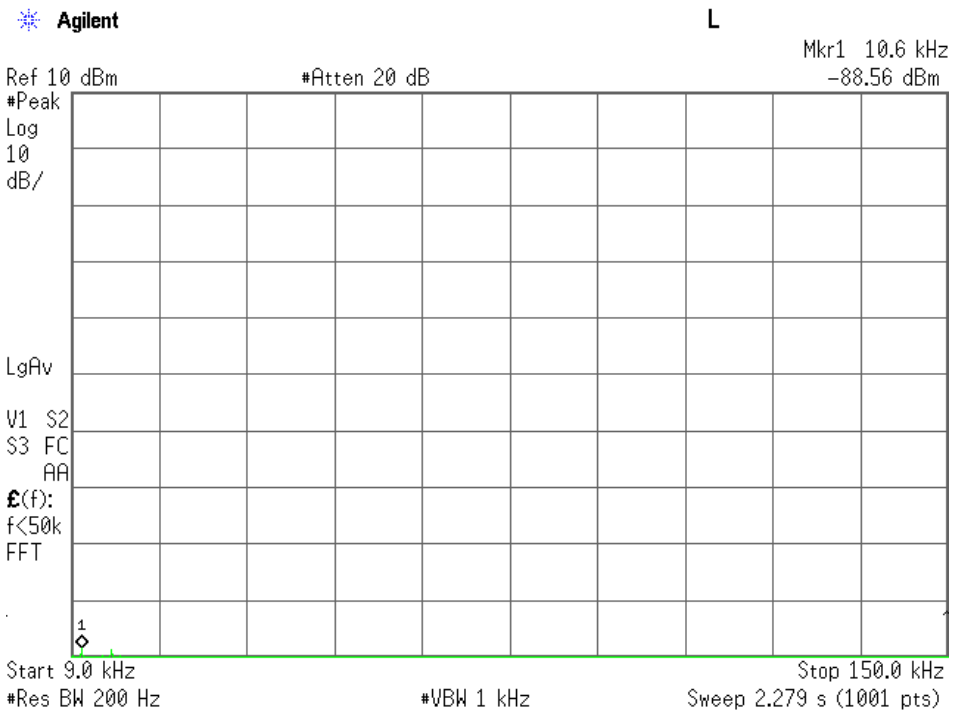
Minimum Margin: -13.0 - (-42.5) = 29.5 (dB)

NOTES

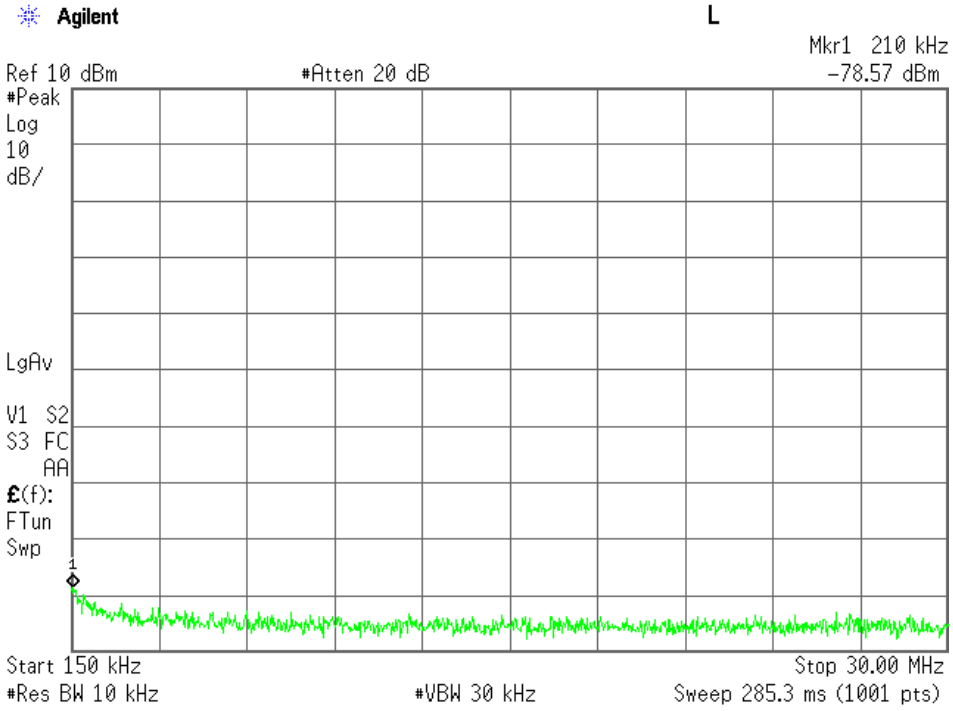
1. The spectrum was checked from 9 kHz to 20 GHz.
2. Applied limits : -13.0 [dBm] = 10log(TP[mW]) - (43 + 10log(tp[W])) = 10log(TP[mW]) - (43 + (10 log(TP[mW]) - 30))
   where, tp[W] = TP[mW] / 1000 : Transmitter power at anttena terminal
3. The correction factor is shown as follows:
   Corr. Factor [dB] = Cable Loss + Pad Att. [dB] (9 kHz - 2 GHz)
   Corr. Factor [dB] = Cable Loss + Pad Att. + High Pass Filter Loss [dB] (over 2 GHz)
4. The symbol of "<" means "or less".
5. The symbol of ">" means "more than".
6. Setting of measuring instrument(s) :

	Detector Function	RES B.W.	V.B.W.	Sweep Time
A	Peak	200 Hz	1 kHz	AUTO
B	Peak	10 kHz	30 kHz	AUTO
C	Peak	1 MHz	3 MHz	AUTO

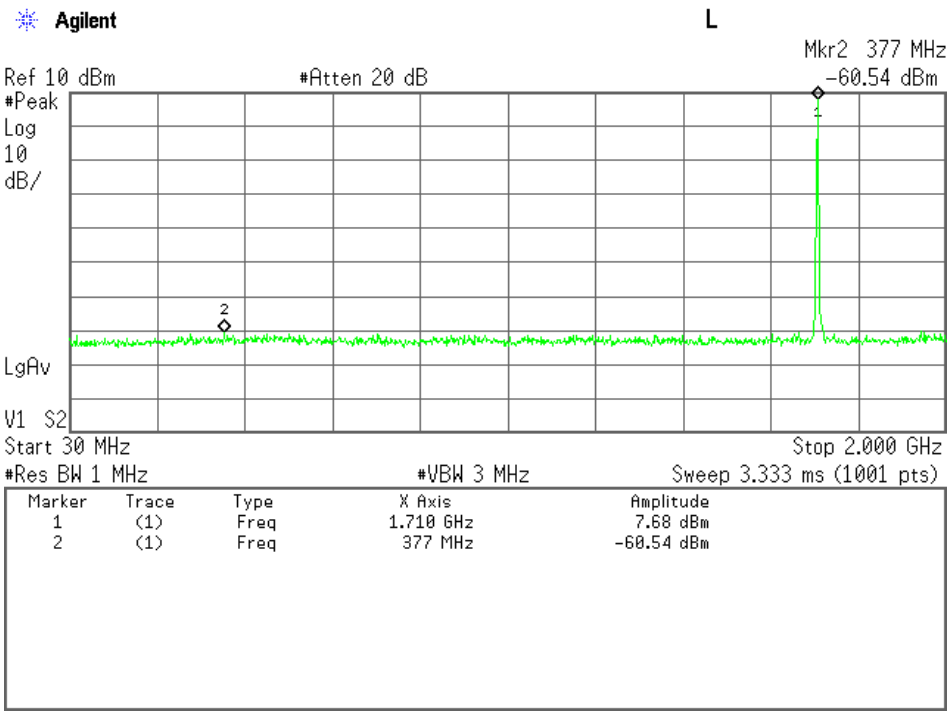
Low Channel, Out-Of-Band Emissions (9 kHz – 150 kHz)



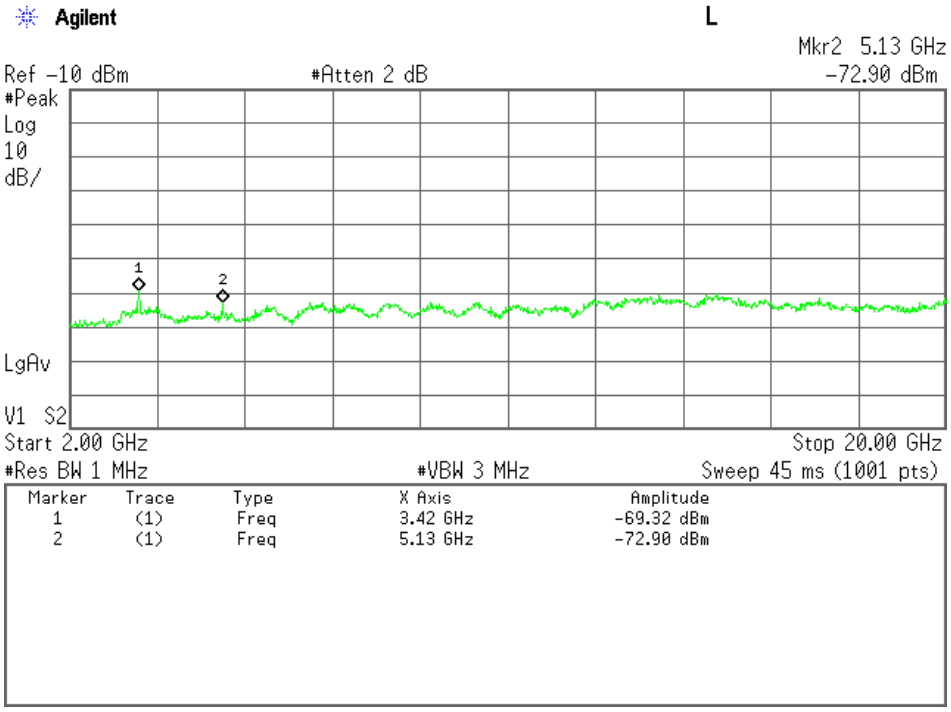
Low Channel, Out-Of-Band Emissions (150 kHz – 30 MHz)



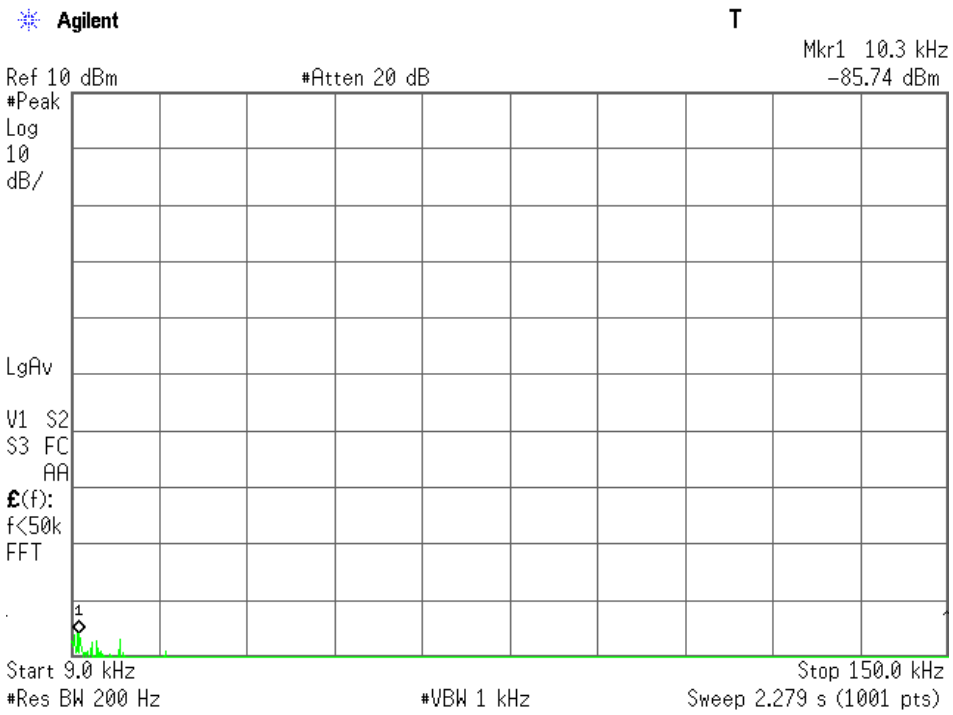
Low Channel, Out-Of-Band Emissions (30 MHz – 2 GHz)



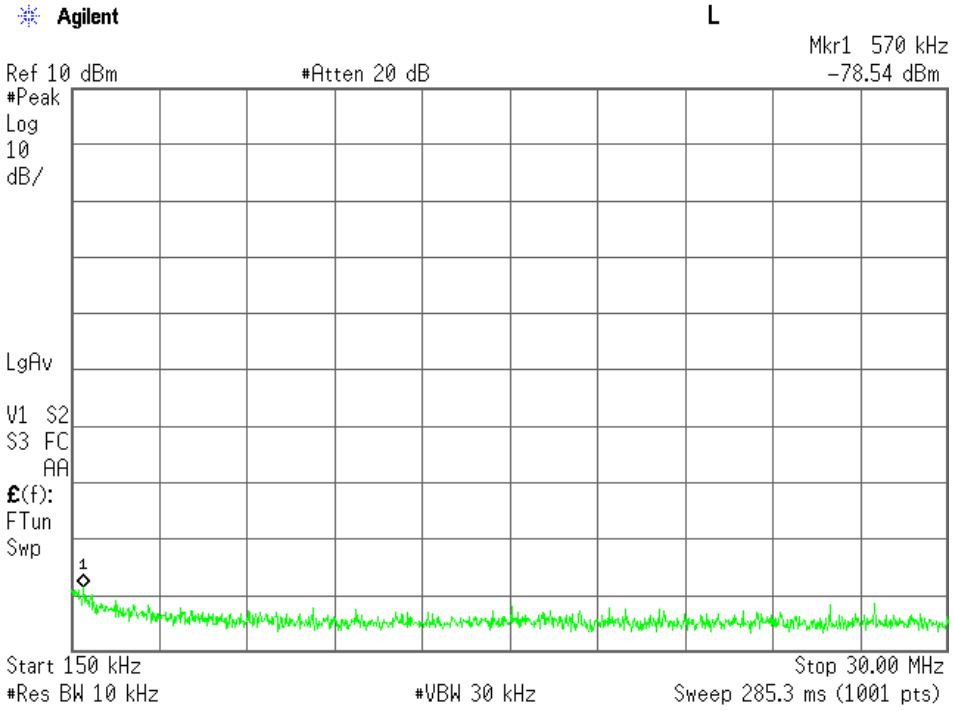
Low Channel, Out-Of-Band Emissions (2 GHz – 20 GHz)



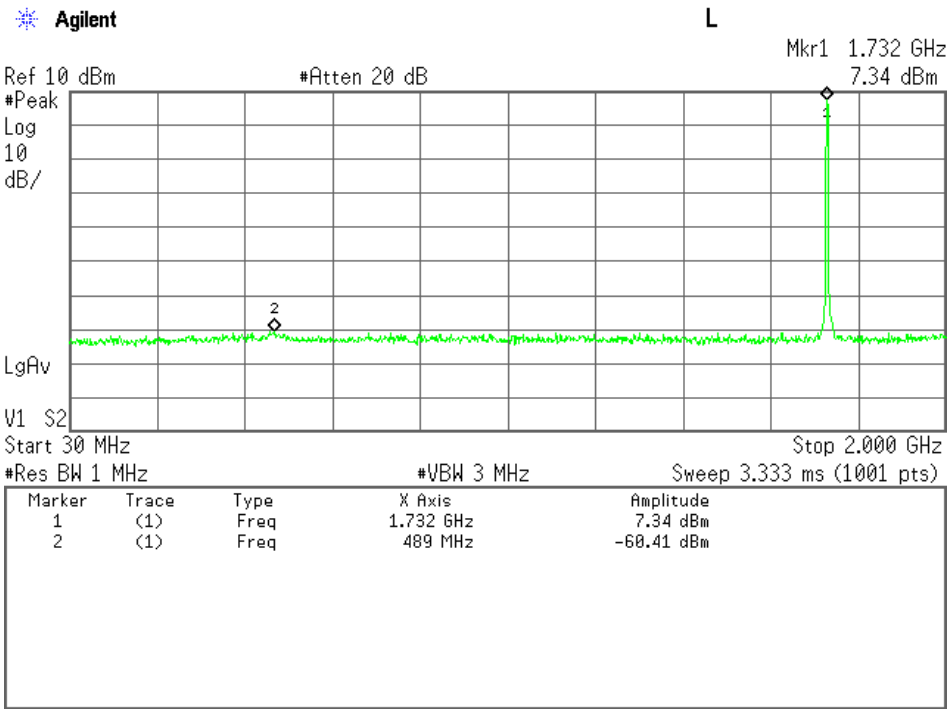
Middle Channel, Out-Of-Band Emissions (9 kHz – 150 kHz)



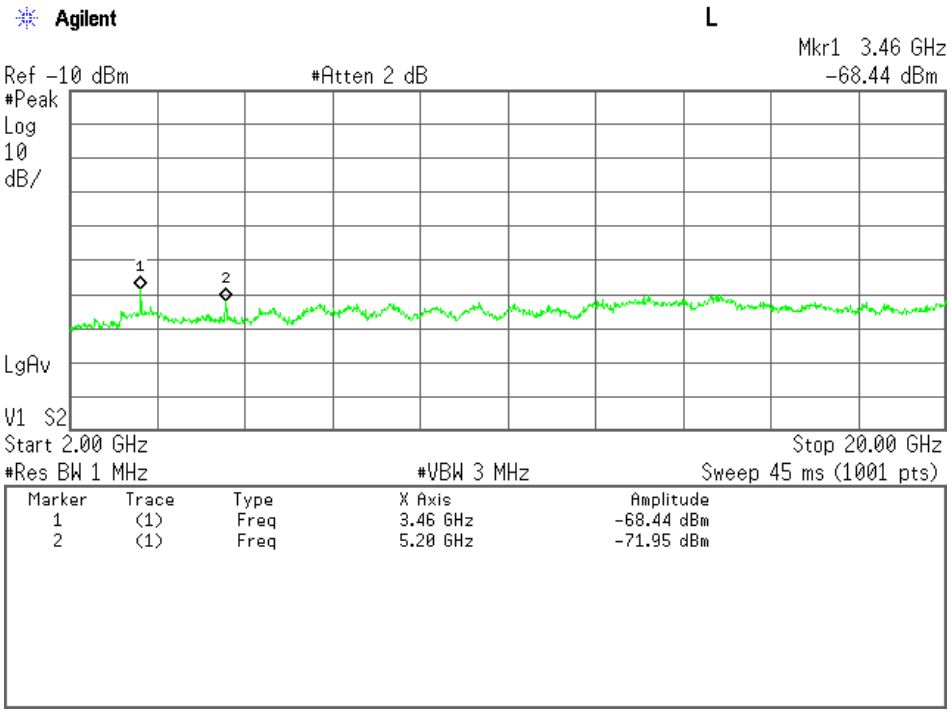
Middle Channel, Out-Of-Band Emissions (150 kHz – 30 MHz)



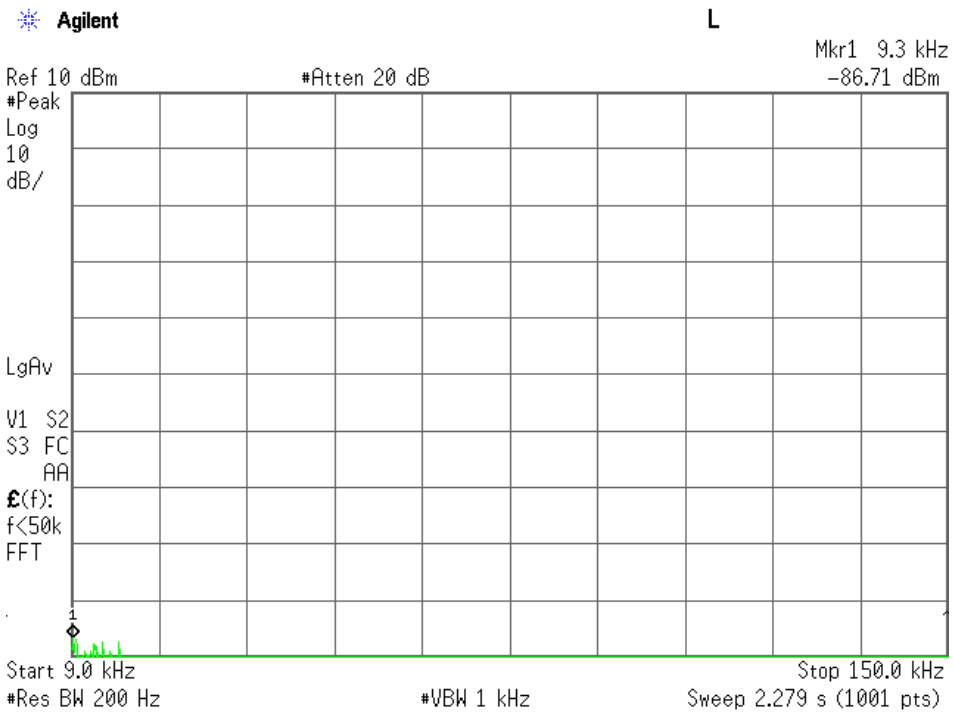
Middle Channel, Out-Of-Band Emissions (30 MHz – 2 GHz)



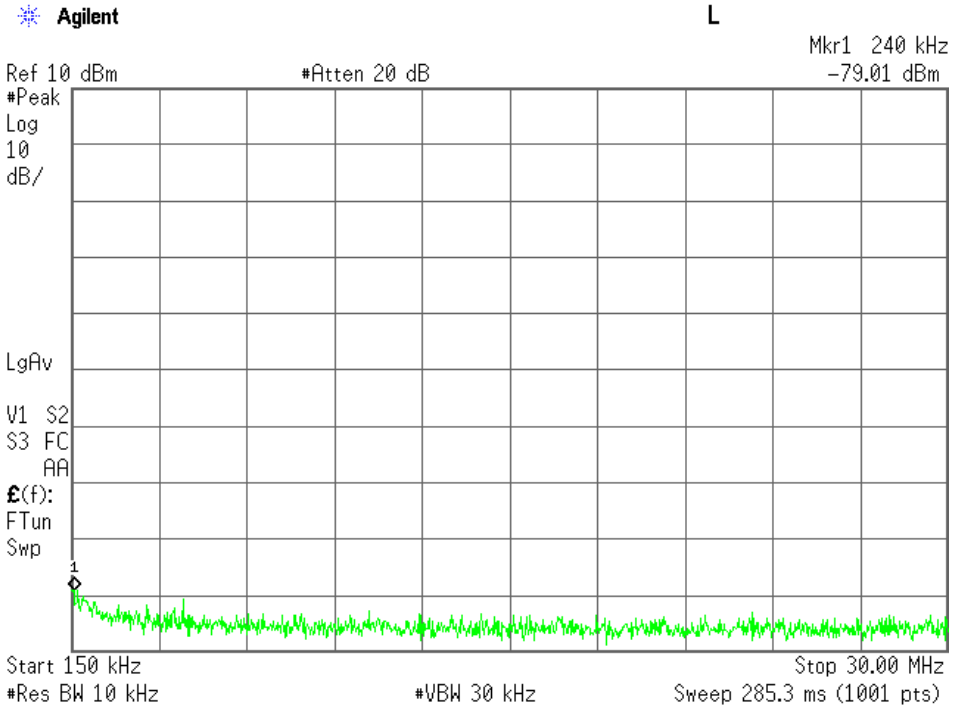
Middle Channel, Out-Of-Band Emissions (2 GHz – 20 GHz)



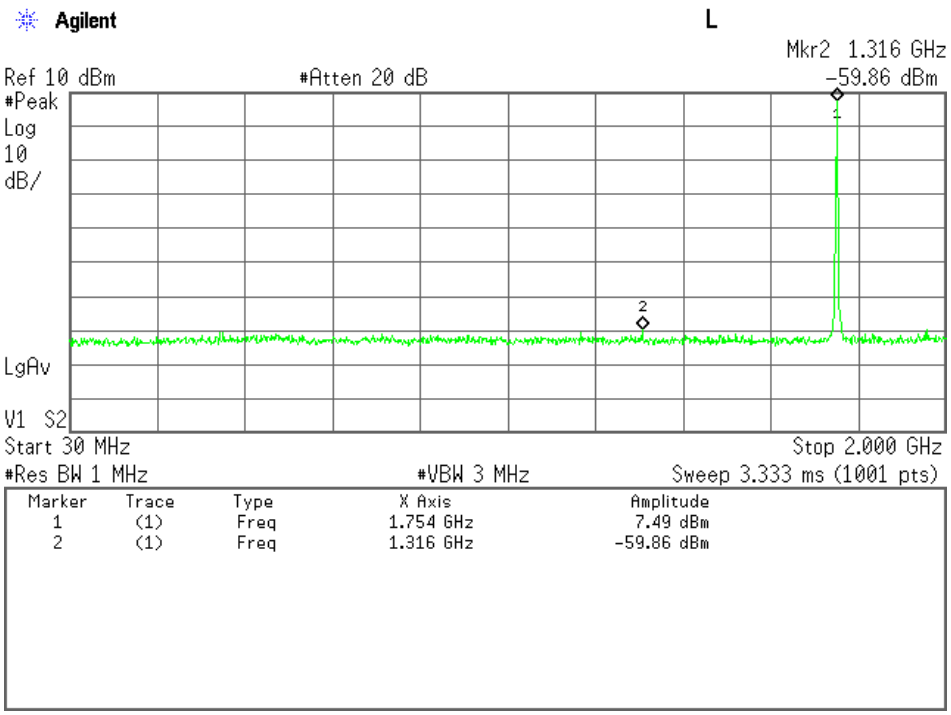
High Channel, Out-Of-Band Emissions (9 kHz – 150 kHz)



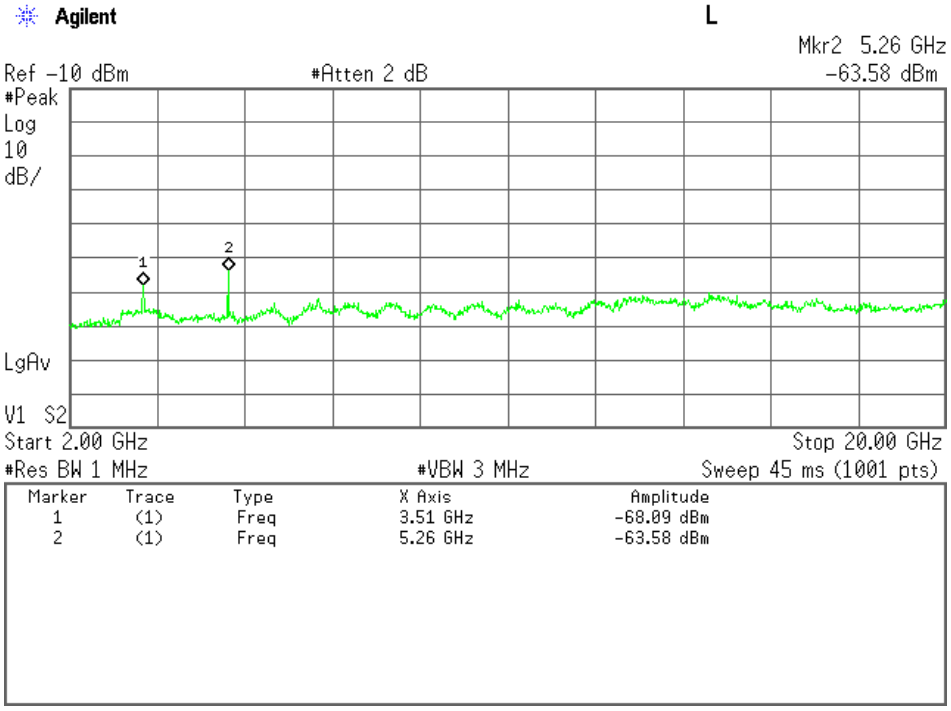
High Channel, Out-Of-Band Emissions (150 kHz – 30 MHz)



High Channel, Out-Of-Band Emissions (30 MHz – 2 GHz)



High Channel, Out-Of-Band Emissions (2 GHz – 20 GHz)



2) BW 3MHz(1RB)

(LTE 3MHz)

Test Date: September 16, 2015
Temp.: 26 °C, Humi: 62 %

CH	Transmitting Frequency [MHz]	Measured Frequency [MHz]	Corr. Factor [dB]	Meter Readings [dBm]	Limits [dBm]	Results [dBm]	Margin [dB]	Remarks
19965	1711.500	3423.000	21.0	-68.1	-13.0	-47.1	+34.1	C
		5134.500	21.1	< -70.0	-13.0	< -48.9	> +35.9	C
		6846.000	21.3	< -70.0	-13.0	< -48.7	> +35.7	C
		8557.500	21.6	< -70.0	-13.0	< -48.4	> +35.4	C
		10269.000	21.8	< -70.0	-13.0	< -48.2	> +35.2	C
		11980.500	22.1	< -70.0	-13.0	< -47.9	> +34.9	C
		13692.000	22.3	< -70.0	-13.0	< -47.7	> +34.7	C
		15403.500	22.6	< -70.0	-13.0	< -47.4	> +34.4	C
		17115.000	22.9	< -70.0	-13.0	< -47.1	> +34.1	C
20175	1732.500	3465.000	21.0	-67.8	-13.0	-46.8	+33.8	C
		5197.500	21.1	-69.7	-13.0	-48.6	+35.6	C
		6930.000	21.3	< -70.0	-13.0	< -48.7	> +35.7	C
		8662.500	21.6	< -70.0	-13.0	< -48.4	> +35.4	C
		10395.000	21.8	< -70.0	-13.0	< -48.2	> +35.2	C
		12127.500	22.1	< -70.0	-13.0	< -47.9	> +34.9	C
		13860.000	22.3	< -70.0	-13.0	< -47.7	> +34.7	C
		15592.500	22.6	< -70.0	-13.0	< -47.4	> +34.4	C
		17325.000	22.9	< -70.0	-13.0	< -47.1	> +34.1	C
20385	1753.500	3507.000	21.0	-67.6	-13.0	-46.6	+33.6	C
		5260.500	21.1	-63.7	-13.0	-42.6	+29.6	C
		7014.000	21.3	< -70.0	-13.0	< -48.7	> +35.7	C
		8767.500	21.6	< -70.0	-13.0	< -48.4	> +35.4	C
		10521.000	21.8	< -70.0	-13.0	< -48.2	> +35.2	C
		12274.500	22.1	< -70.0	-13.0	< -47.9	> +34.9	C
		14028.000	22.3	< -70.0	-13.0	< -47.7	> +34.7	C
		15781.500	22.7	< -70.0	-13.0	< -47.3	> +34.3	C
		17535.000	22.9	< -70.0	-13.0	< -47.1	> +34.1	C

Calculated result at 5260.5 MHz, as the worst point shown on underline:

	Corr. Factor	=	21.1 dB
+)	Meter Reading	=	-63.7 dBm
	Result	=	-42.6 dBm

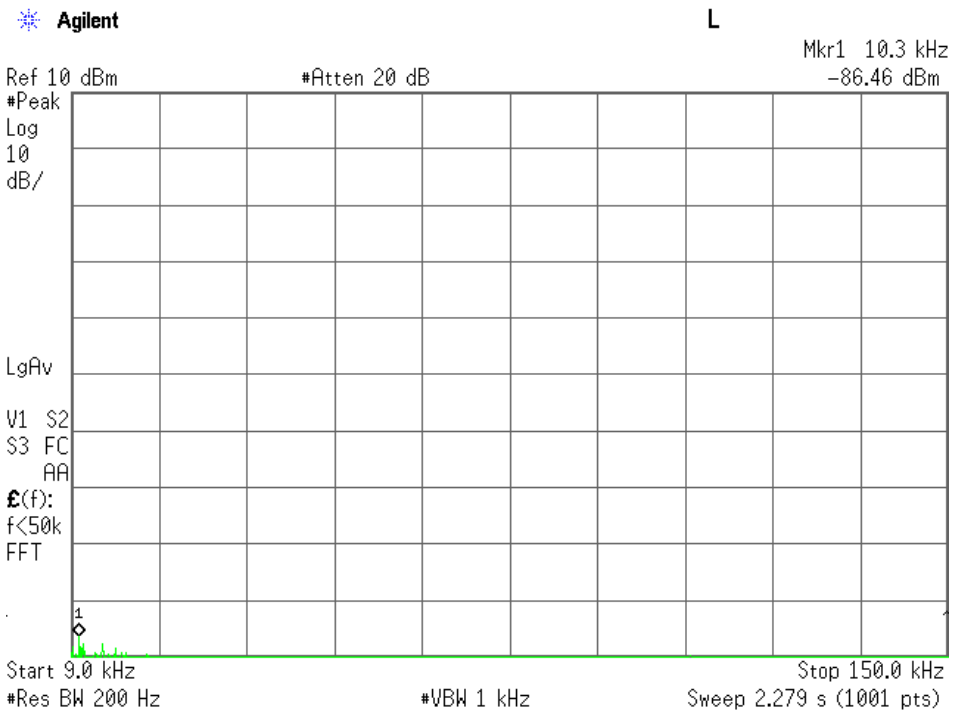
Minimum Margin: -13.0 - (-42.6) = 29.6 (dB)

NOTES

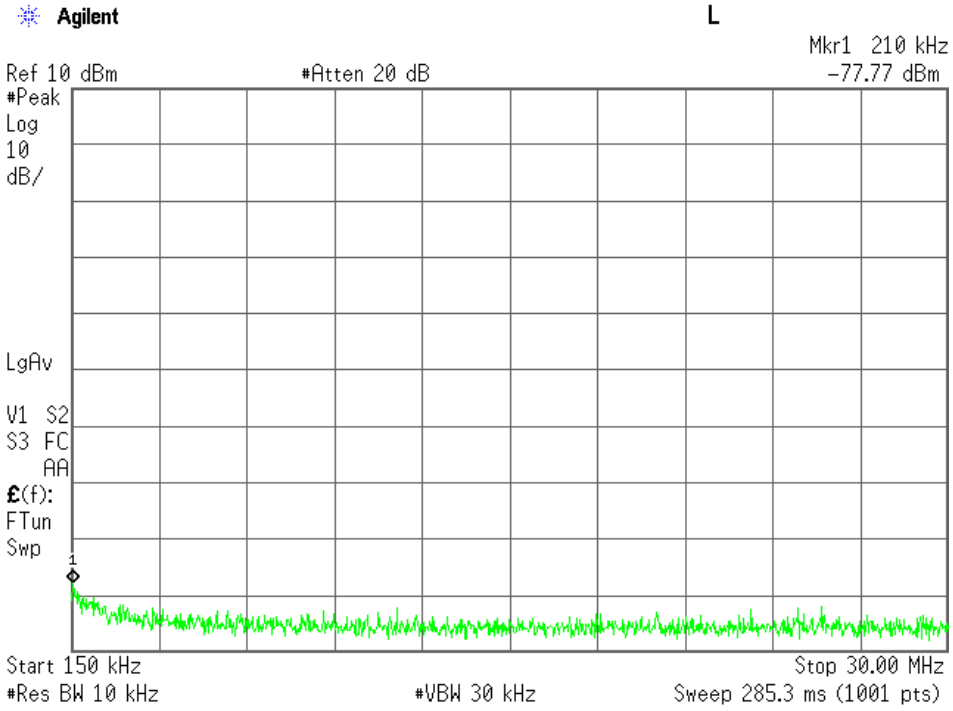
1. The spectrum was checked from 9 kHz to 20 GHz.
2. Applied limits : -13.0 [dBm] = 10log(TP[mW]) - (43 + 10log(tp[W])) = 10log(TP[mW]) - (43 + (10 log(TP[mW]) - 30))
   where, tp[W] = TP[mW] / 1000 : Transmitter power at anttena terminal
3. The correction factor is shown as follows:
   Corr. Factor [dB] = Cable Loss + Pad Att. [dB] (9 kHz - 2 GHz)
   Corr. Factor [dB] = Cable Loss + Pad Att. + High Pass Filter Loss [dB] (over 2 GHz)
4. The symbol of "<" means "or less".
5. The symbol of ">" means "more than".
6. Setting of measuring instrument(s) :

	Detector Function	RES B.W.	V.B.W.	Sweep Time
A	Peak	200 Hz	1 kHz	AUTO
B	Peak	10 kHz	30 kHz	AUTO
C	Peak	1 MHz	3 MHz	AUTO

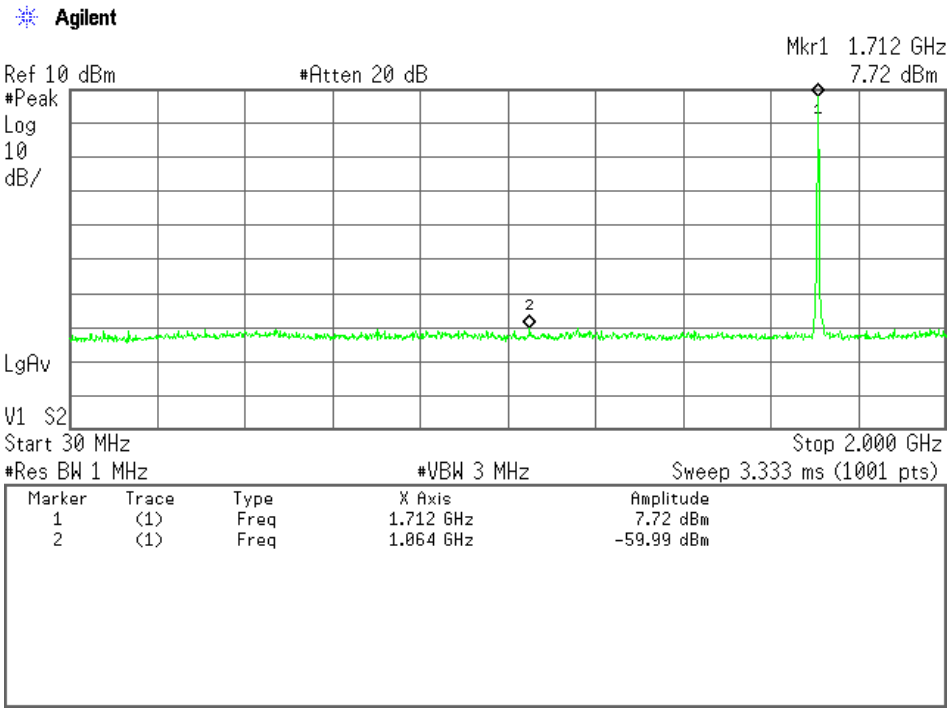
Low Channel, Out-Of-Band Emissions (9 kHz – 150 kHz)



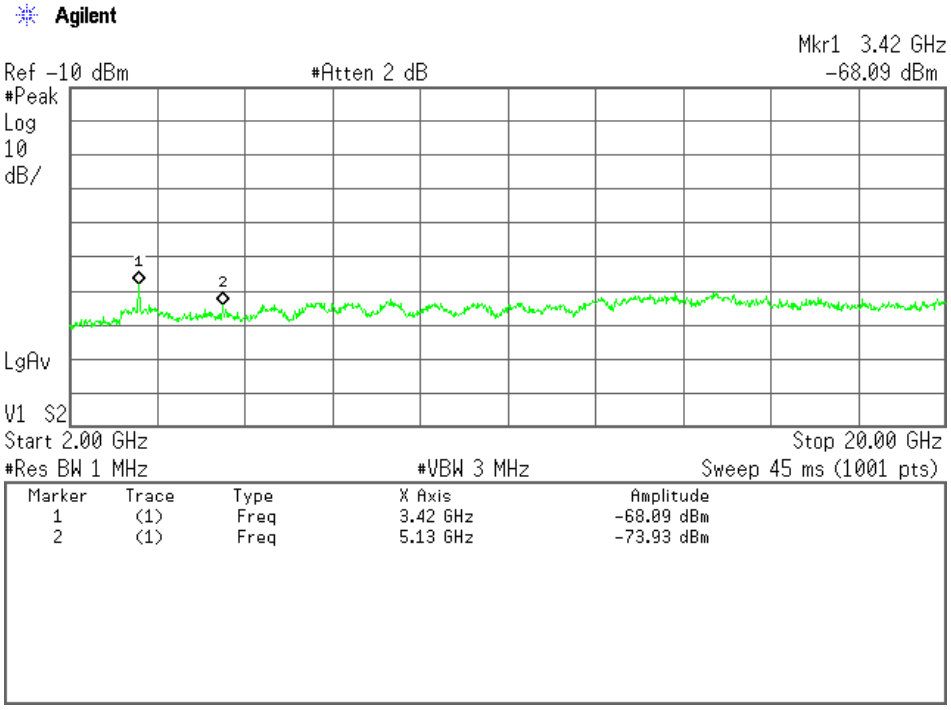
Low Channel, Out-Of-Band Emissions (150 kHz – 30 MHz)



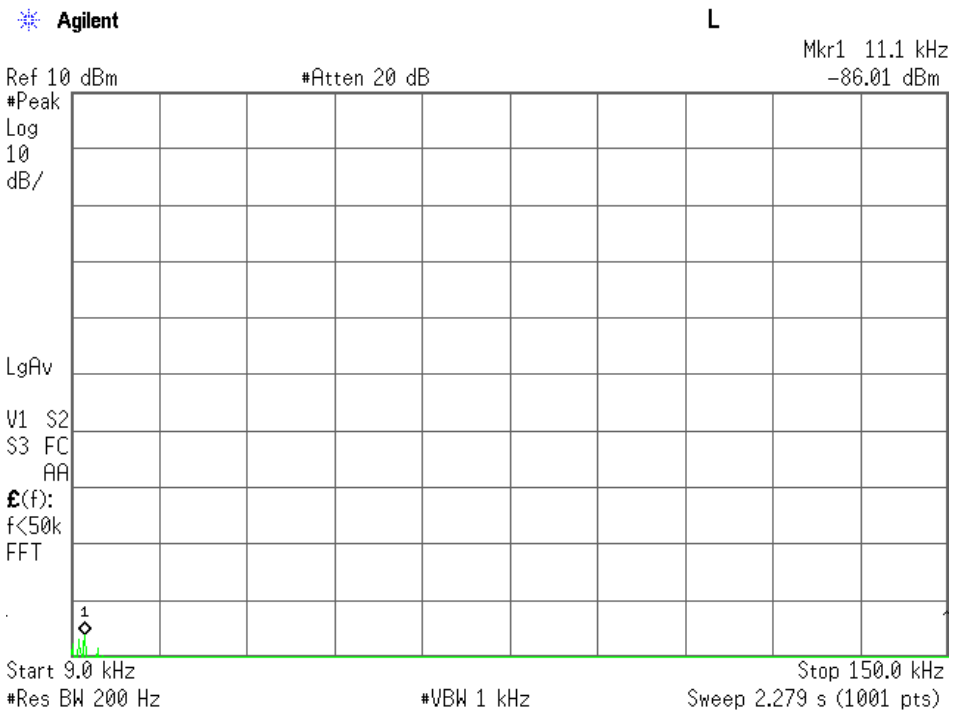
Low Channel, Out-Of-Band Emissions (30 MHz – 2 GHz)



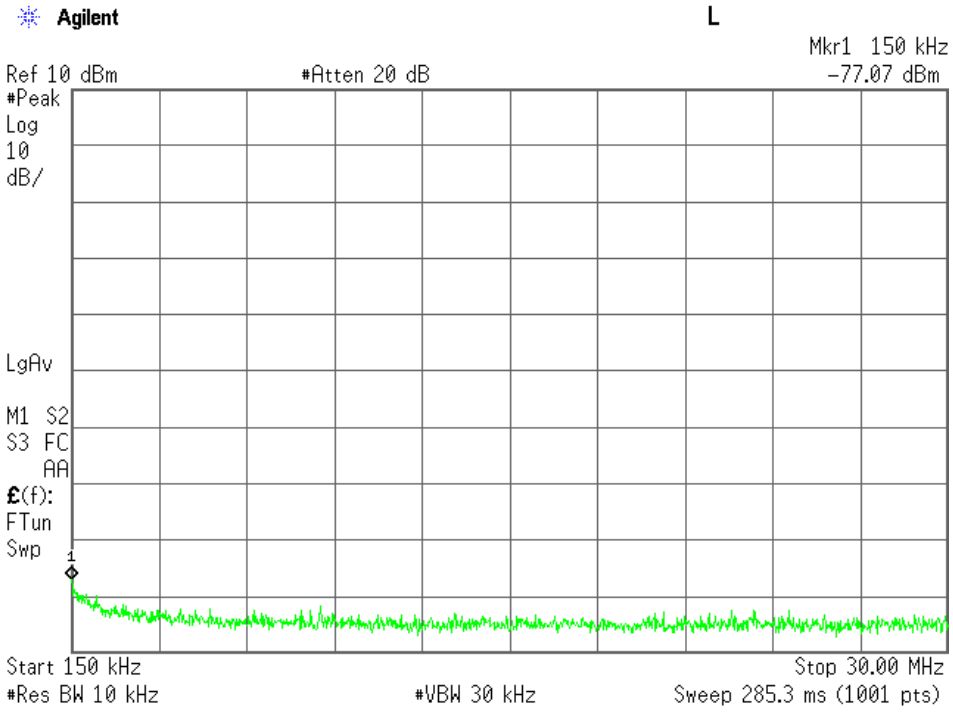
Low Channel, Out-Of-Band Emissions (2 GHz – 20 GHz)



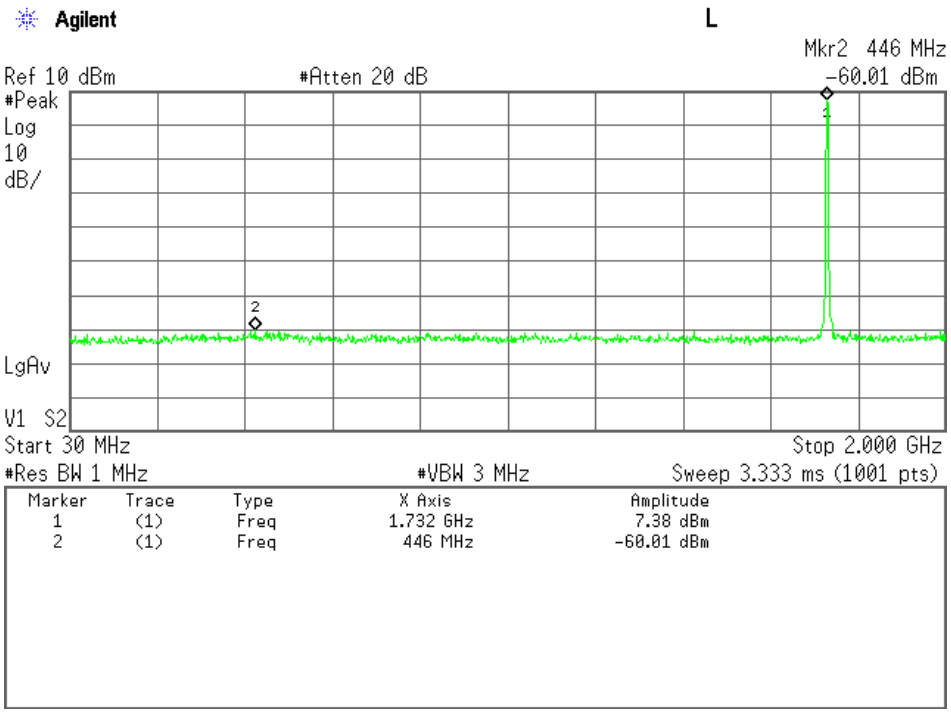
Middle Channel, Out-Of-Band Emissions (9 kHz – 150 kHz)



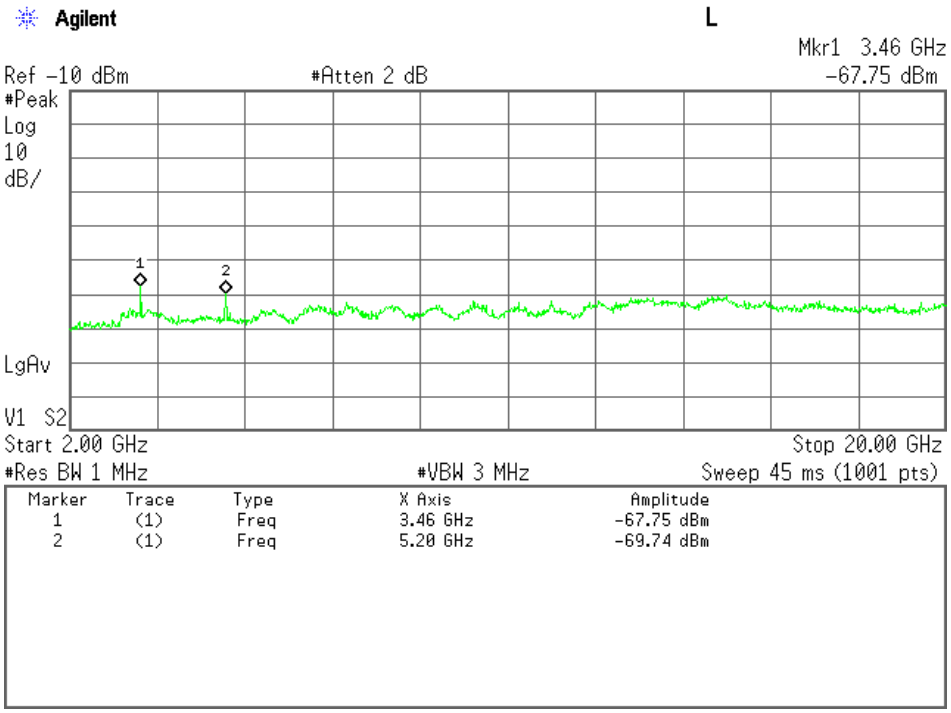
Middle Channel, Out-Of-Band Emissions (150 kHz – 30 MHz)



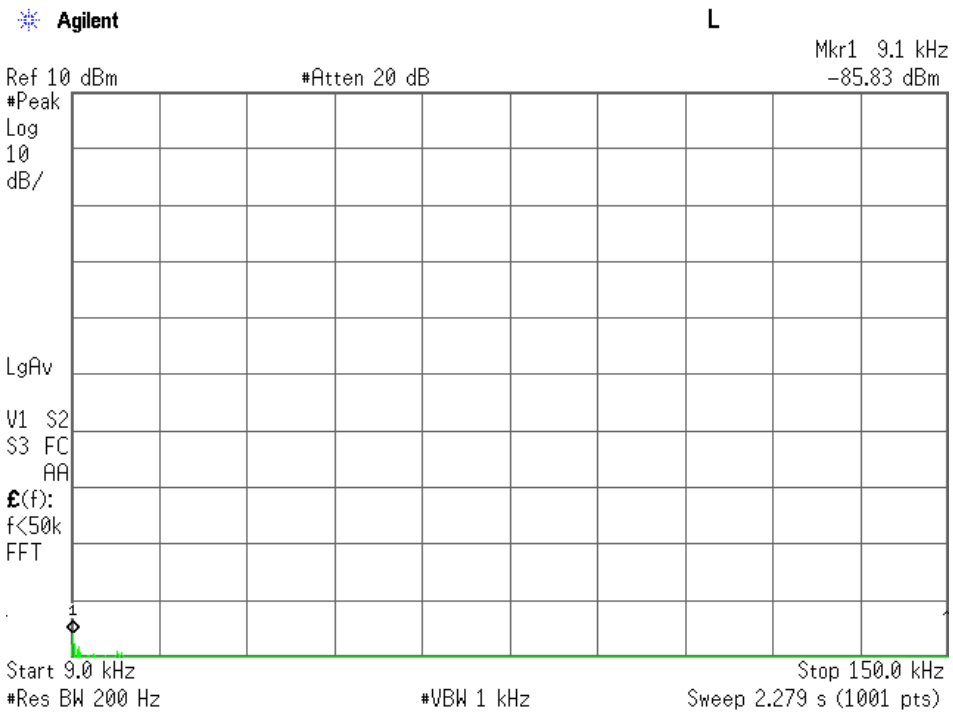
Middle Channel, Out-Of-Band Emissions (30 MHz – 2 GHz)



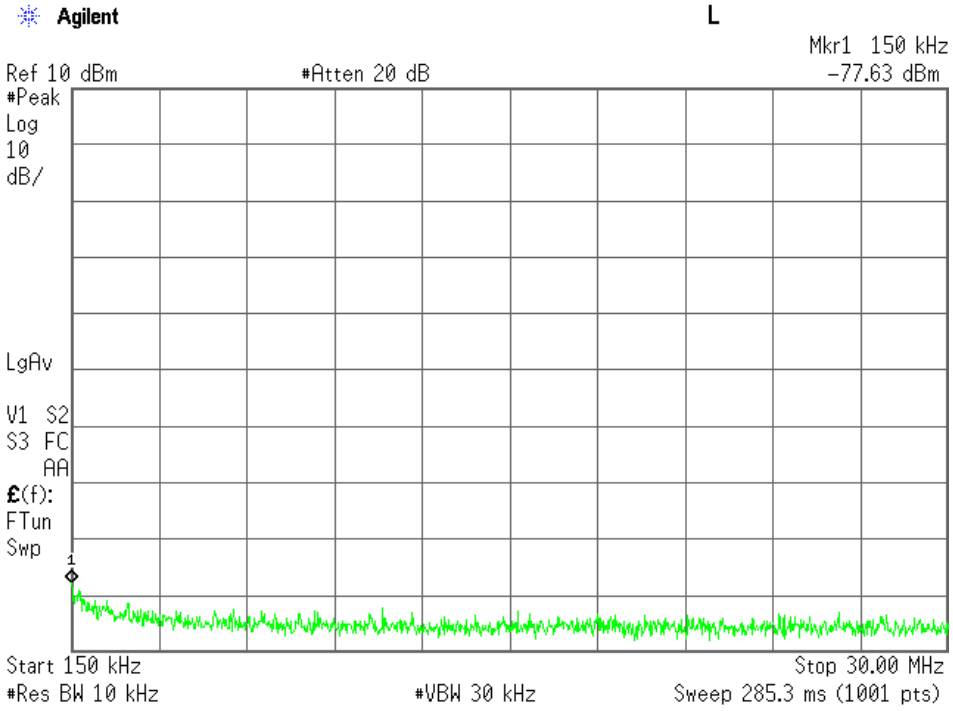
Middle Channel, Out-Of-Band Emissions (2 GHz – 20 GHz)



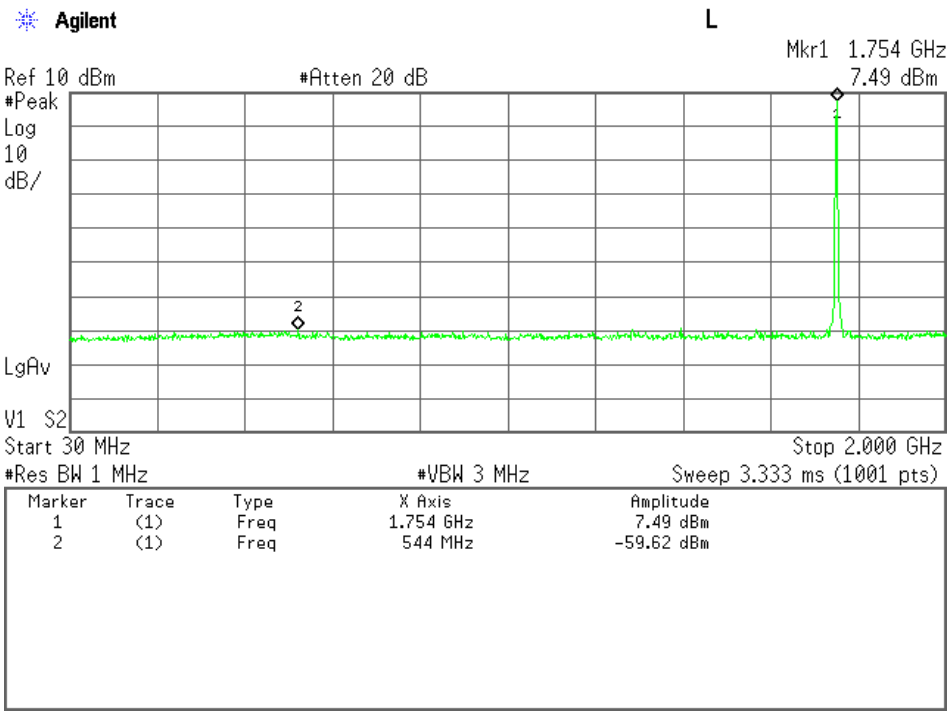
High Channel, Out-Of-Band Emissions (9 kHz – 150 kHz)



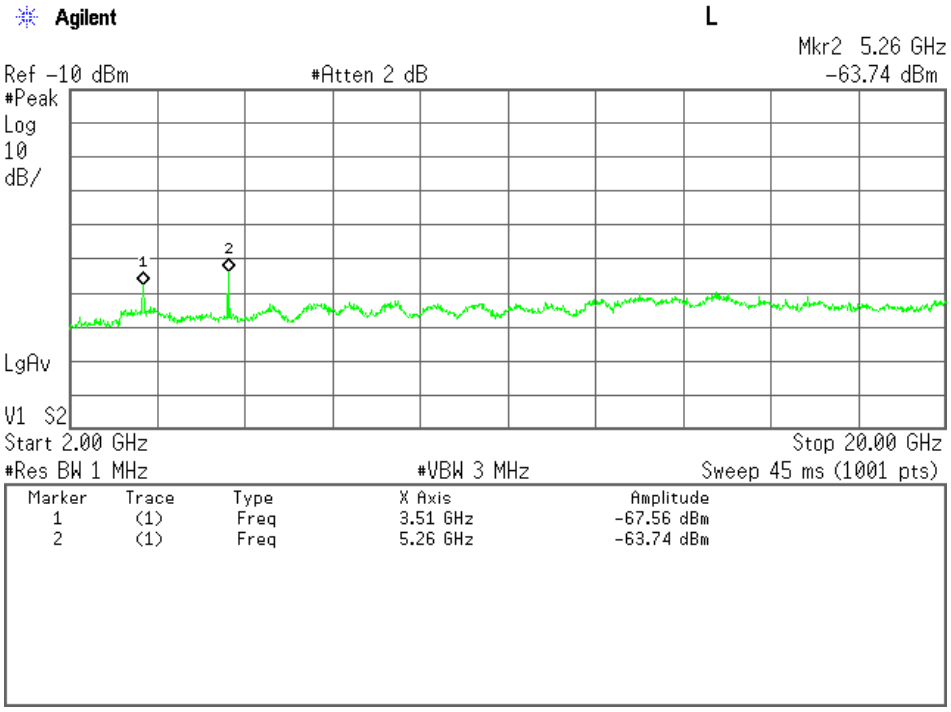
High Channel, Out-Of-Band Emissions (150 kHz – 30 MHz)



High Channel, Out-Of-Band Emissions (30 MHz – 2 GHz)



High Channel, Out-Of-Band Emissions (2 GHz – 20 GHz)



3) BW 5MHz(1RB)

(LTE 5MHz)

Test Date: September 16, 2015
Temp.: 26 °C, Humi: 62 %

Transmitting Frequency CH	[MHz]	Measured Frequency [MHz]	Corr. Factor [dB]	Meter Readings [dBm]	Limits [dBm]	Results [dBm]	Margin [dB]	Remarks
19975	1712.500	3425.000	21.0	-68.7	-13.0	-47.7	+34.7	C
		5137.500	21.1	< -70.0	-13.0	< -48.9	> +35.9	C
		6850.000	21.3	< -70.0	-13.0	< -48.7	> +35.7	C
		8562.500	21.6	< -70.0	-13.0	< -48.4	> +35.4	C
		10275.000	21.8	< -70.0	-13.0	< -48.2	> +35.2	C
		11987.500	22.1	< -70.0	-13.0	< -47.9	> +34.9	C
		13700.000	22.3	< -70.0	-13.0	< -47.7	> +34.7	C
		15412.500	22.6	< -70.0	-13.0	< -47.4	> +34.4	C
		17125.000	22.9	< -70.0	-13.0	< -47.1	> +34.1	C
20175	1732.500	3465.000	21.0	-68.3	-13.0	-47.3	+34.3	C
		5197.500	21.1	< -70.0	-13.0	< -48.9	> +35.9	C
		6930.000	21.3	< -70.0	-13.0	< -48.7	> +35.7	C
		8662.500	21.6	< -70.0	-13.0	< -48.4	> +35.4	C
		10395.000	21.8	< -70.0	-13.0	< -48.2	> +35.2	C
		12127.500	22.1	< -70.0	-13.0	< -47.9	> +34.9	C
		13860.000	22.3	< -70.0	-13.0	< -47.7	> +34.7	C
		15592.500	22.6	< -70.0	-13.0	< -47.4	> +34.4	C
		17325.000	22.9	< -70.0	-13.0	< -47.1	> +34.1	C
20375	1752.500	3505.000	21.0	-68.2	-13.0	-47.2	+34.2	C
		5257.500	21.1	-64.0	-13.0	-42.9	+29.9	C
		7010.000	21.3	< -70.0	-13.0	< -48.7	> +35.7	C
		8762.500	21.6	< -70.0	-13.0	< -48.4	> +35.4	C
		10515.000	21.8	< -70.0	-13.0	< -48.2	> +35.2	C
		12267.500	22.1	< -70.0	-13.0	< -47.9	> +34.9	C
		14020.000	22.3	< -70.0	-13.0	< -47.7	> +34.7	C
		15772.500	22.7	< -70.0	-13.0	< -47.3	> +34.3	C
		17525.000	22.9	< -70.0	-13.0	< -47.1	> +34.1	C

Calculated result at 5257.5 MHz, as the worst point shown on underline:

	Corr. Factor	=	21.1 dB
+)	Meter Reading	=	-64.0 dBm
	Result	=	-42.9 dBm

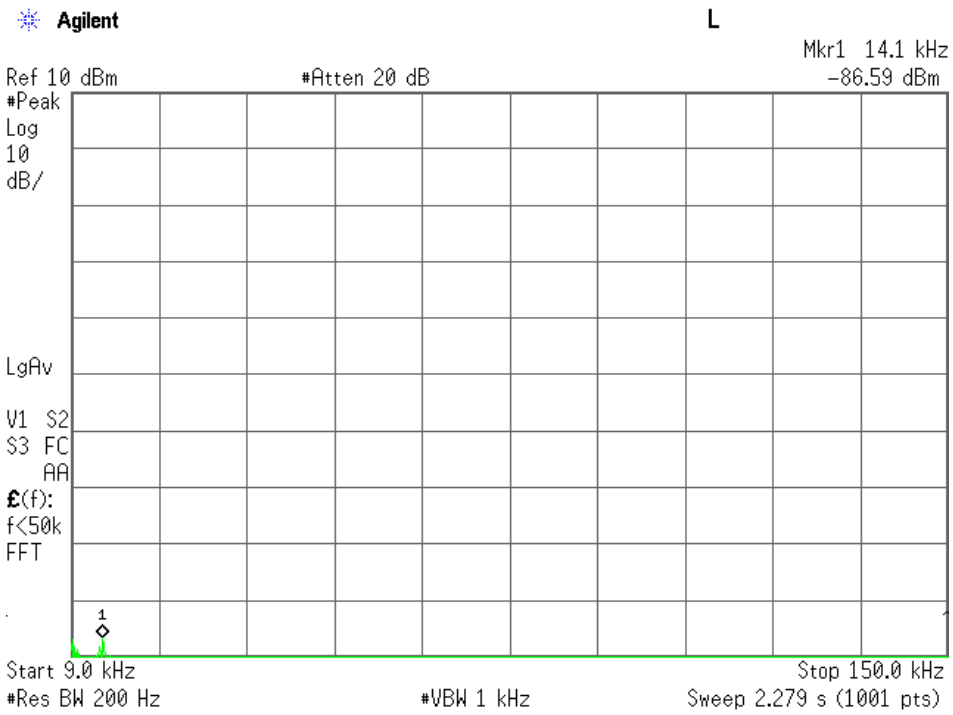
Minimum Margin: -13.0 - (-42.9) = 29.9 (dB)

NOTES

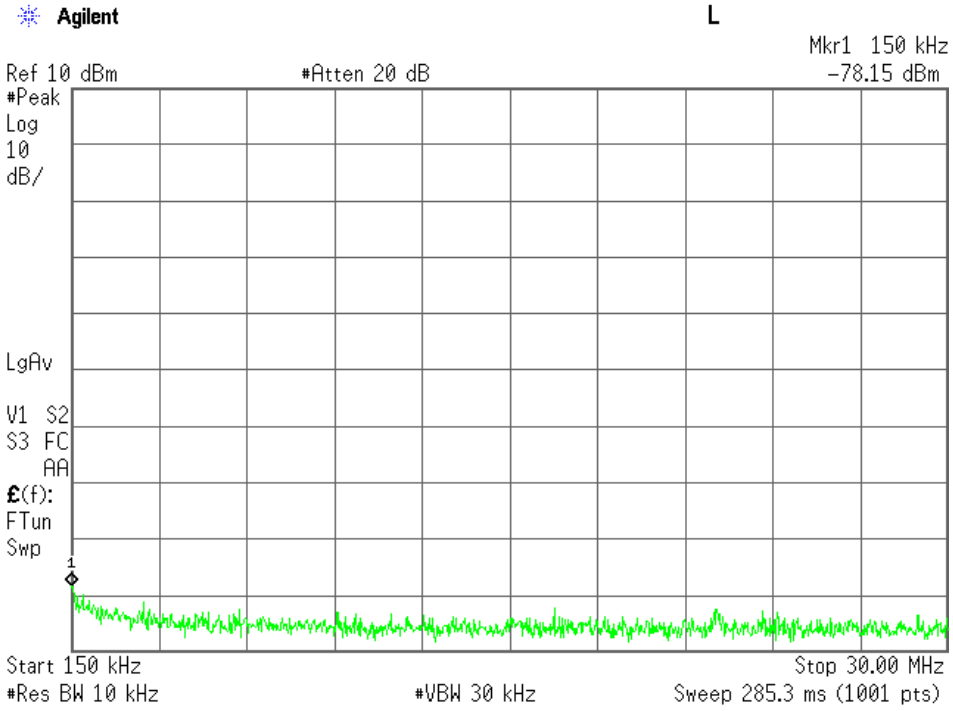
1. The spectrum was checked from 9 kHz to 20 GHz.
2. Applied limits : -13.0 [dBm] = 10log(TP[mW]) - (43 + 10log(tp[W])) = 10log(TP[mW]) - (43 + (10 log(TP[mW]) - 30))
   where, tp[W] = TP[mW] / 1000 : Transmitter power at anttena terminal
3. The correction factor is shown as follows:
   Corr. Factor [dB] = Cable Loss + Pad Att. [dB] (9 kHz - 2 GHz)
   Corr. Factor [dB] = Cable Loss + Pad Att. + High Pass Filter Loss [dB] (over 2 GHz)
4. The symbol of "<" means "or less".
5. The symbol of ">" means "more than".
6. Setting of measuring instrument(s) :

	Detector Function	RES B.W.	V.B.W.	Sweep Time
A	Peak	200 Hz	1 kHz	AUTO
B	Peak	10 kHz	30 kHz	AUTO
C	Peak	1 MHz	3 MHz	AUTO

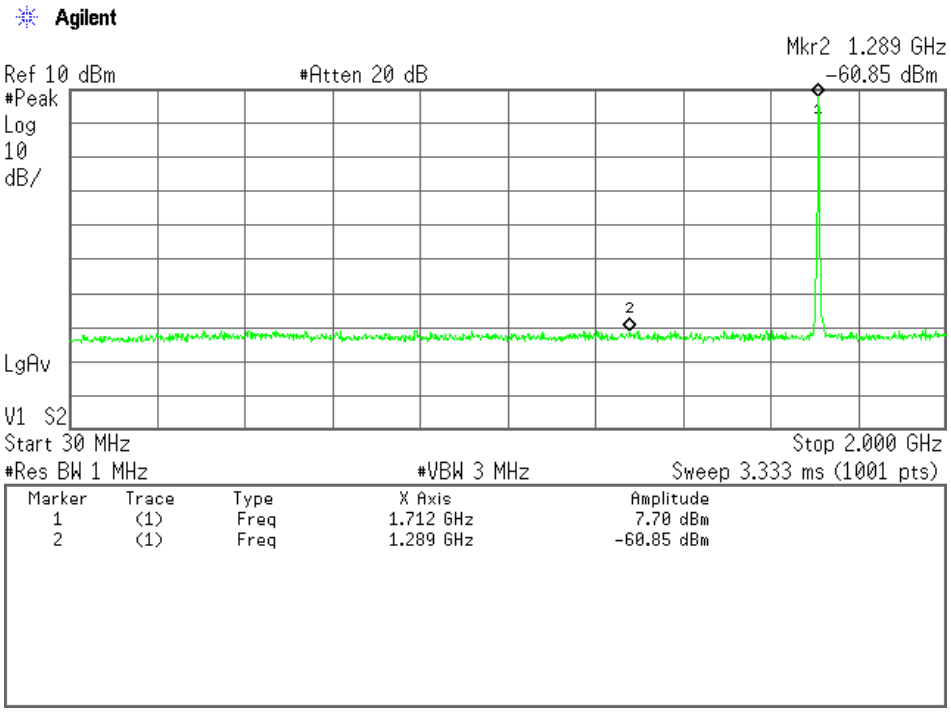
Low Channel, Out-Of-Band Emissions (9 kHz – 150 kHz)



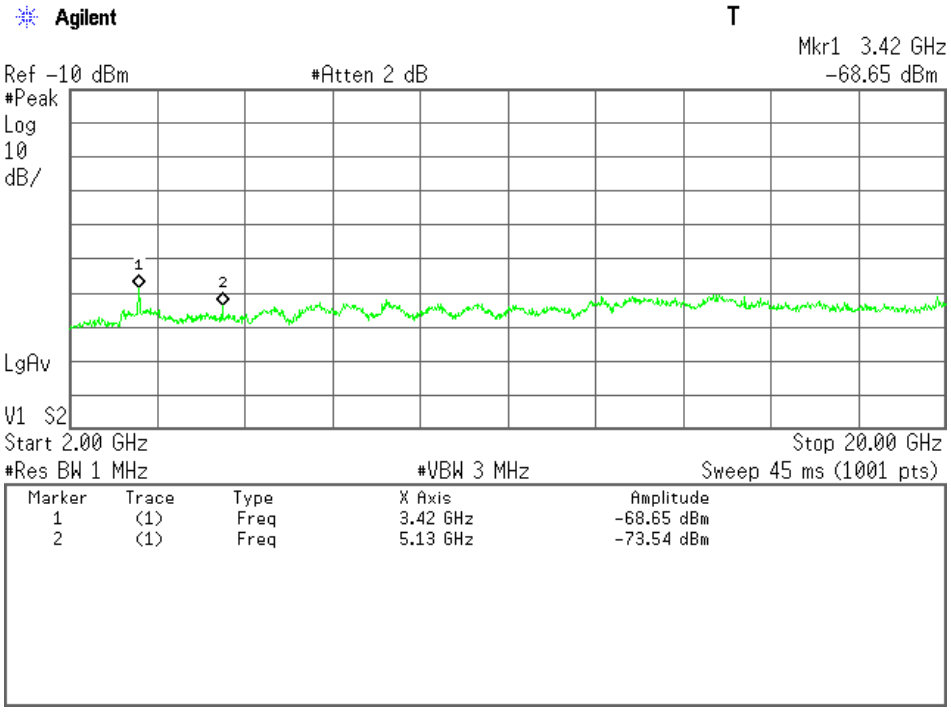
Low Channel, Out-Of-Band Emissions (150 kHz – 30 MHz)



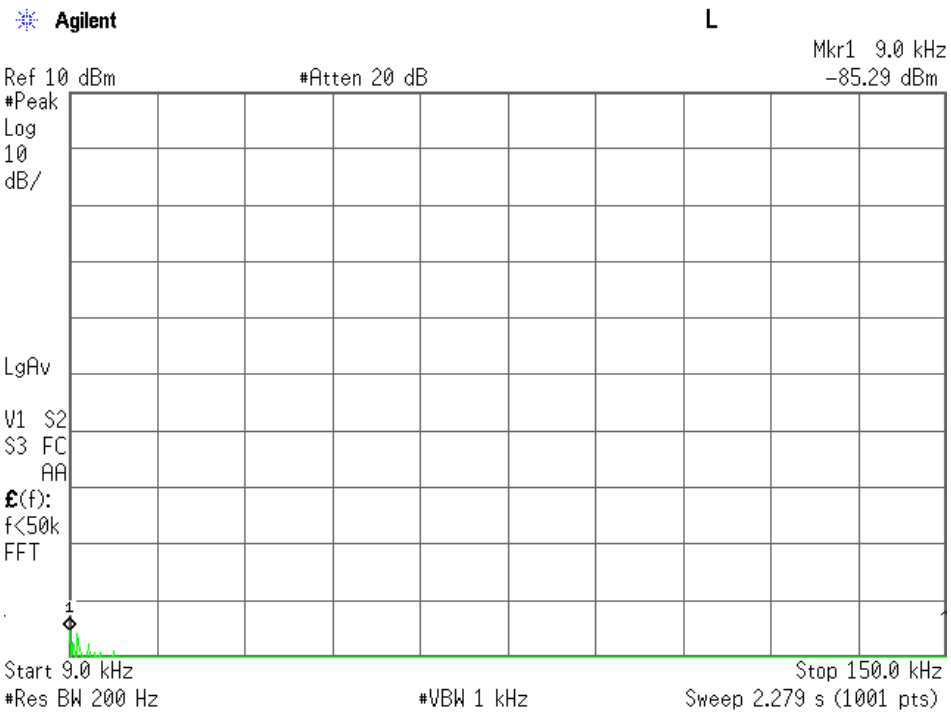
Low Channel, Out-Of-Band Emissions (30 MHz – 2 GHz)



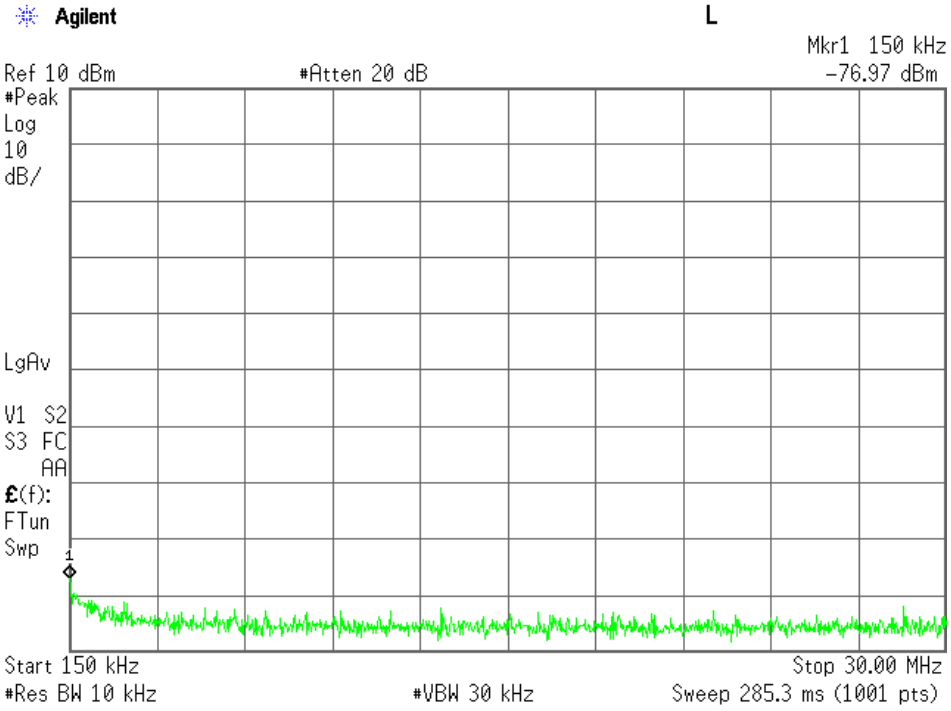
Low Channel, Out-Of-Band Emissions (2 GHz – 20 GHz)



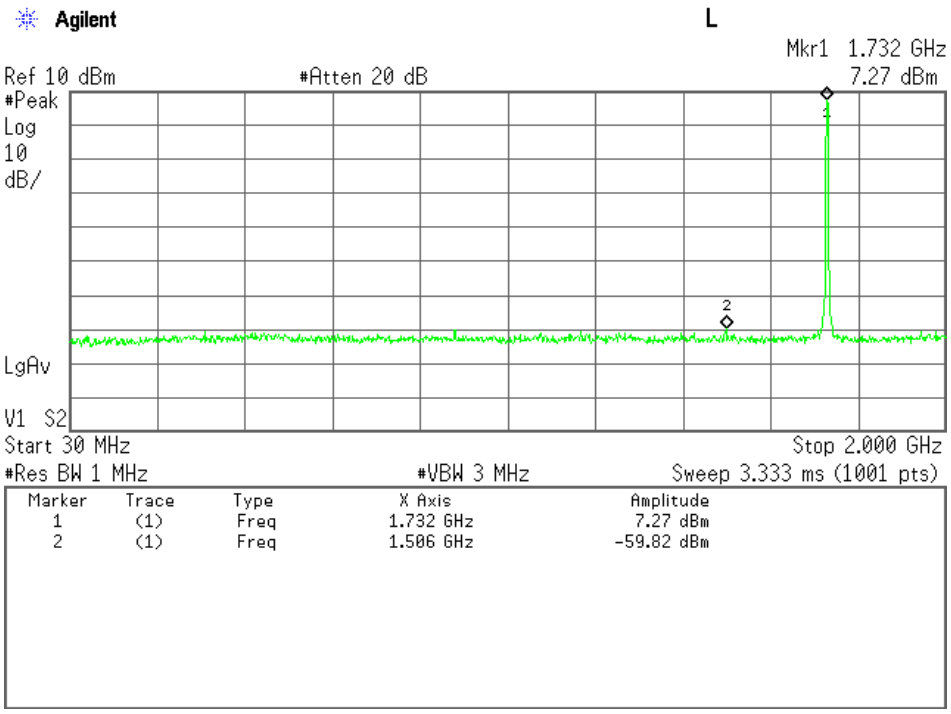
Middle Channel, Out-Of-Band Emissions (9 kHz – 150 kHz)



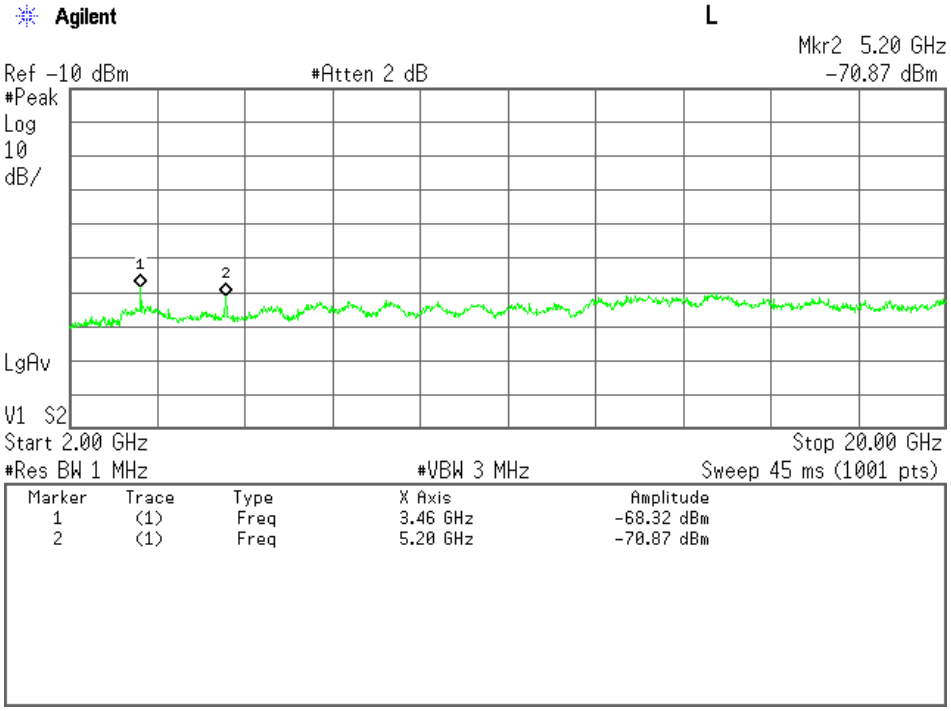
Middle Channel, Out-Of-Band Emissions (150 kHz – 30 MHz)



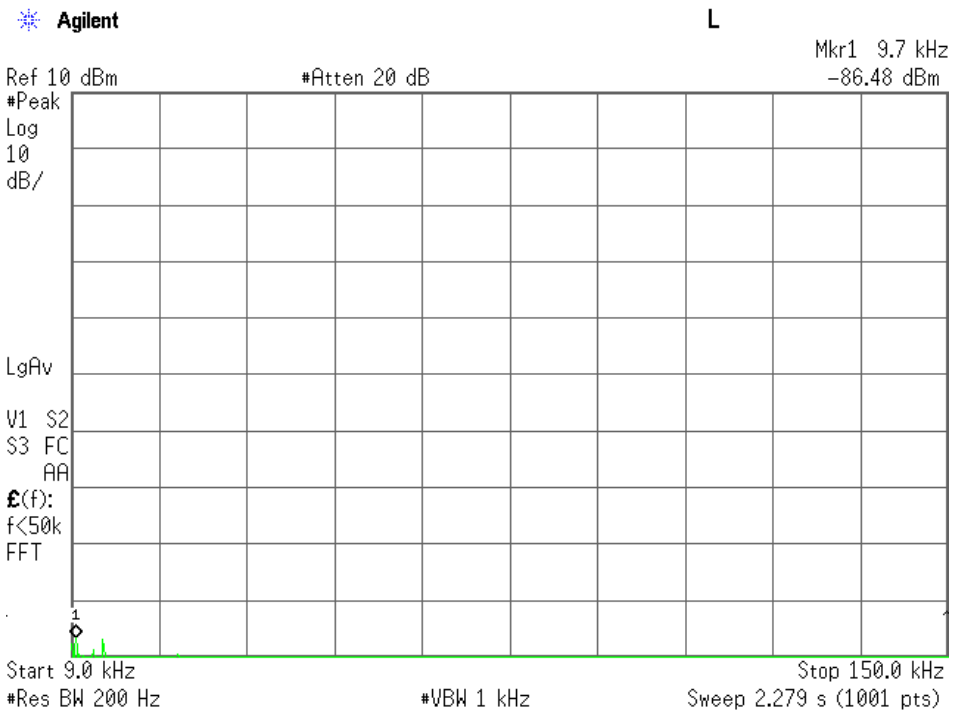
Middle Channel, Out-Of-Band Emissions (30 MHz – 2 GHz)



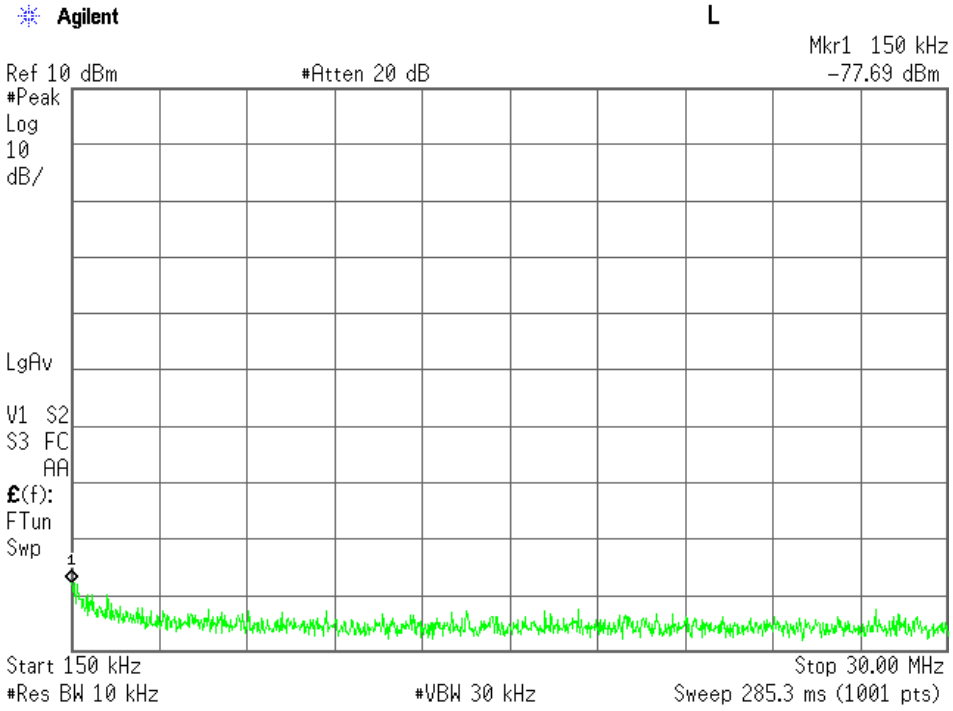
Middle Channel, Out-Of-Band Emissions (2 GHz – 20 GHz)



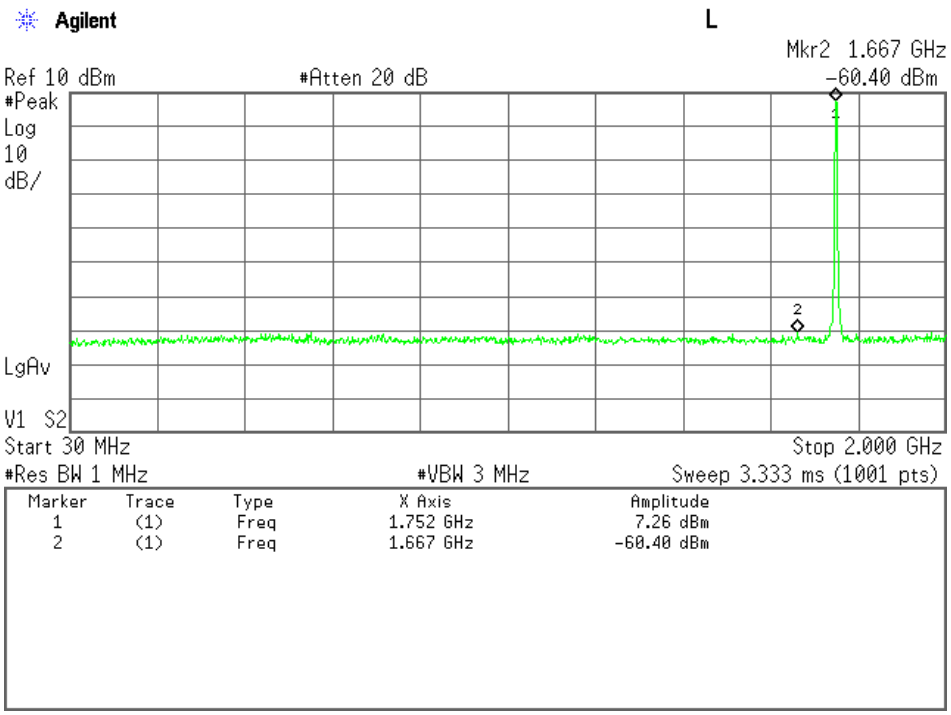
High Channel, Out-Of-Band Emissions (9 kHz – 150 kHz)



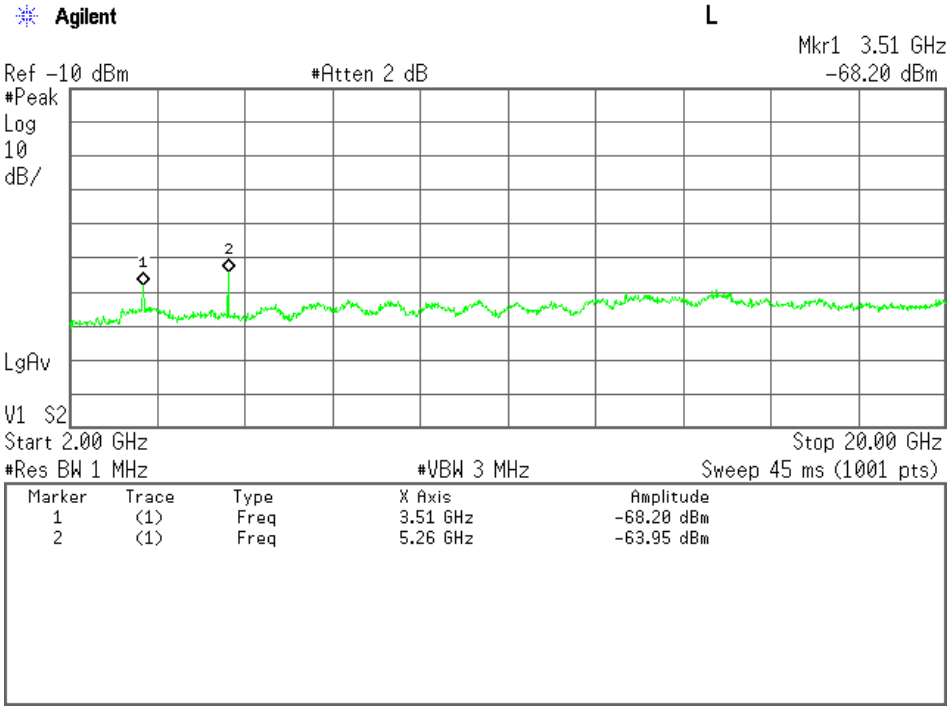
High Channel, Out-Of-Band Emissions (150 kHz – 30 MHz)



High Channel, Out-Of-Band Emissions (30 MHz – 2 GHz)



High Channel, Out-Of-Band Emissions (2 GHz – 20 GHz)



4) BW 10MHz(1RB)

(LTE 10MHz)

Test Date: September 16, 2015
Temp.: 26 °C, Humi: 62 %

CH	Transmitting Frequency [MHz]	Measured Frequency [MHz]	Corr. Factor [dB]	Meter Readings [dBm]	Limits [dBm]	Results [dBm]	Margin [dB]	Remarks
20000	1715.000	3430.000	21.0	-66.9	-13.0	-45.9	+32.9	C
		5145.000	21.1	< -70.0	-13.0	< -48.9	> +35.9	C
		6860.000	21.3	< -70.0	-13.0	< -48.7	> +35.7	C
		8575.000	21.6	< -70.0	-13.0	< -48.4	> +35.4	C
		10290.000	21.8	< -70.0	-13.0	< -48.2	> +35.2	C
		12005.000	22.1	< -70.0	-13.0	< -47.9	> +34.9	C
		13720.000	22.3	< -70.0	-13.0	< -47.7	> +34.7	C
		15435.000	22.6	< -70.0	-13.0	< -47.4	> +34.4	C
		17150.000	22.9	< -70.0	-13.0	< -47.1	> +34.1	C
20175	1732.500	3465.000	21.0	-66.8	-13.0	-45.8	+32.8	C
		5197.500	21.1	< -70.0	-13.0	< -48.9	> +35.9	C
		6930.000	21.3	< -70.0	-13.0	< -48.7	> +35.7	C
		8662.500	21.6	< -70.0	-13.0	< -48.4	> +35.4	C
		10395.000	21.8	< -70.0	-13.0	< -48.2	> +35.2	C
		12127.500	22.1	< -70.0	-13.0	< -47.9	> +34.9	C
		13860.000	22.3	< -70.0	-13.0	< -47.7	> +34.7	C
		15592.500	22.6	< -70.0	-13.0	< -47.4	> +34.4	C
		17325.000	22.9	< -70.0	-13.0	< -47.1	> +34.1	C
20350	1750.000	3500.000	21.0	-67.8	-13.0	-46.8	+33.8	C
		5250.000	21.1	-63.7	-13.0	-42.6	+29.6	C
		7000.000	21.3	< -70.0	-13.0	< -48.7	> +35.7	C
		8750.000	21.6	< -70.0	-13.0	< -48.4	> +35.4	C
		10500.000	21.8	< -70.0	-13.0	< -48.2	> +35.2	C
		12250.000	22.1	< -70.0	-13.0	< -47.9	> +34.9	C
		14000.000	22.3	< -70.0	-13.0	< -47.7	> +34.7	C
		15750.000	22.7	< -70.0	-13.0	< -47.3	> +34.3	C
		17500.000	22.9	< -70.0	-13.0	< -47.1	> +34.1	C

Calculated result at 5250.0 MHz, as the worst point shown on underline:

	Corr. Factor	=	21.1 dB
+)	Meter Reading	=	-63.7 dBm
	Result	=	-42.6 dBm

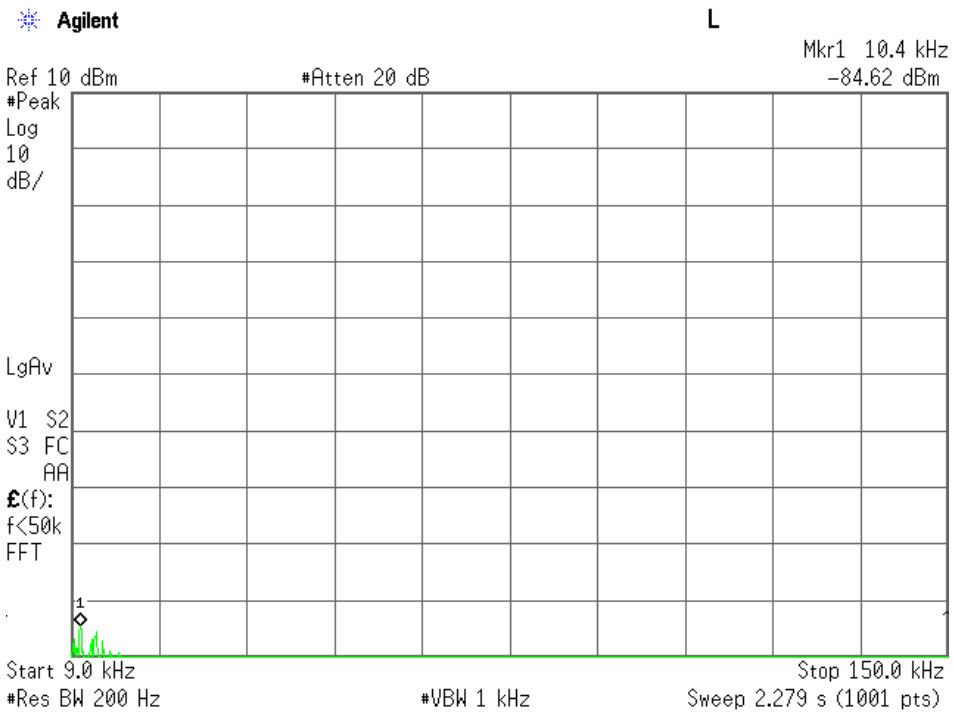
Minimum Margin: -13.0 - (-42.6) = 29.6 (dB)

NOTES

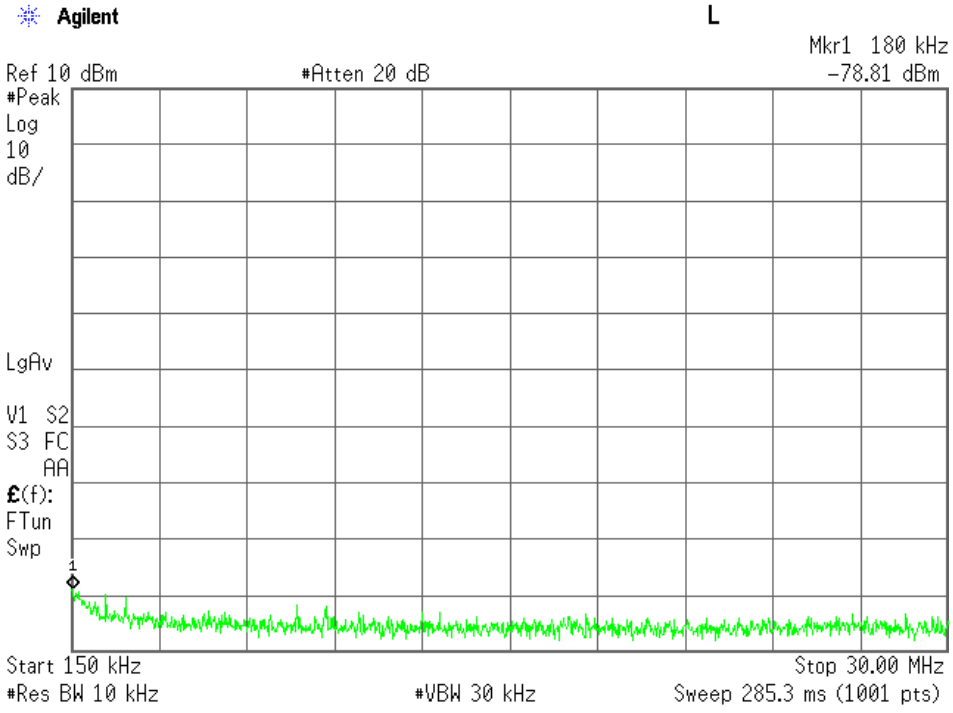
1. The spectrum was checked from 9 kHz to 20 GHz.
2. Applied limits : -13.0 [dBm] = 10log(TP[mW]) - (43 + 10log(tp[W])) = 10log(TP[mW]) - (43 + (10 log(TP[mW]) - 30))
   where, tp[W] = TP[mW] / 1000 : Transmitter power at anttena terminal
3. The correction factor is shown as follows:
   Corr. Factor [dB] = Cable Loss + Pad Att. [dB] (9 kHz - 2 GHz)
   Corr. Factor [dB] = Cable Loss + Pad Att. + High Pass Filter Loss [dB] (over 2 GHz)
4. The symbol of "<" means "or less".
5. The symbol of ">" means "more than".
6. Setting of measuring instrument(s) :

	Detector Function	RES B.W.	V.B.W.	Sweep Time
A	Peak	200 Hz	1 kHz	AUTO
B	Peak	10 kHz	30 kHz	AUTO
C	Peak	1 MHz	3 MHz	AUTO

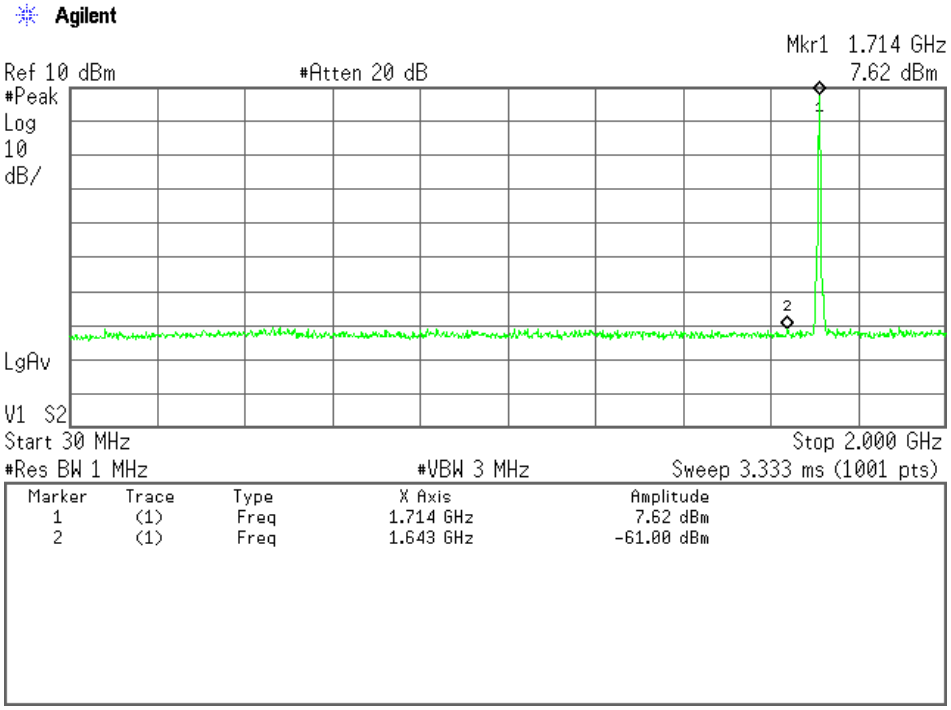
Low Channel, Out-Of-Band Emissions (9 kHz – 150 kHz)



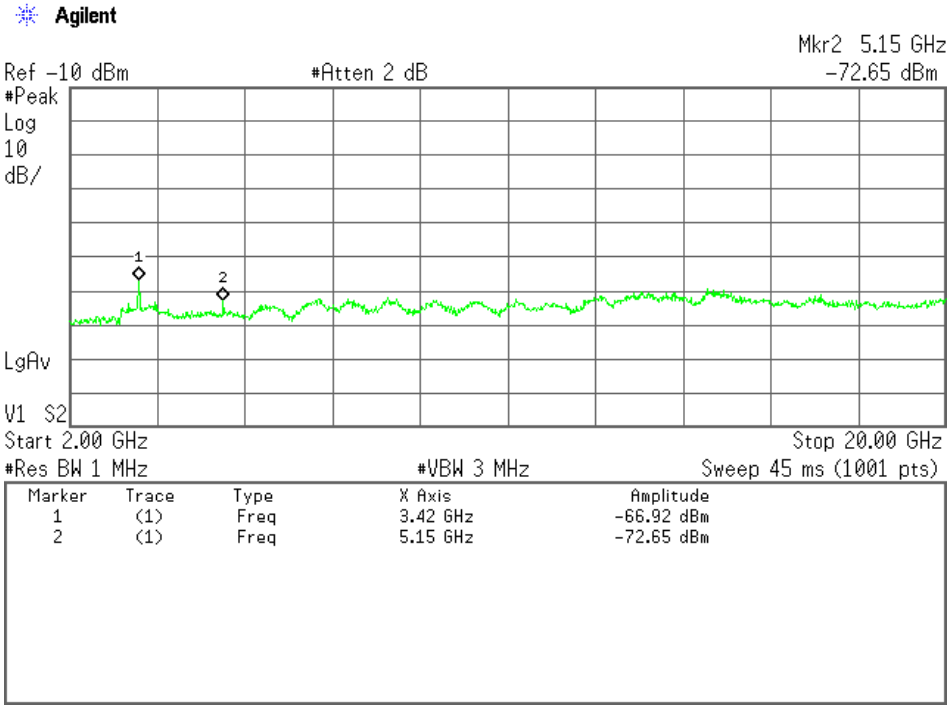
Low Channel, Out-Of-Band Emissions (150 kHz – 30 MHz)



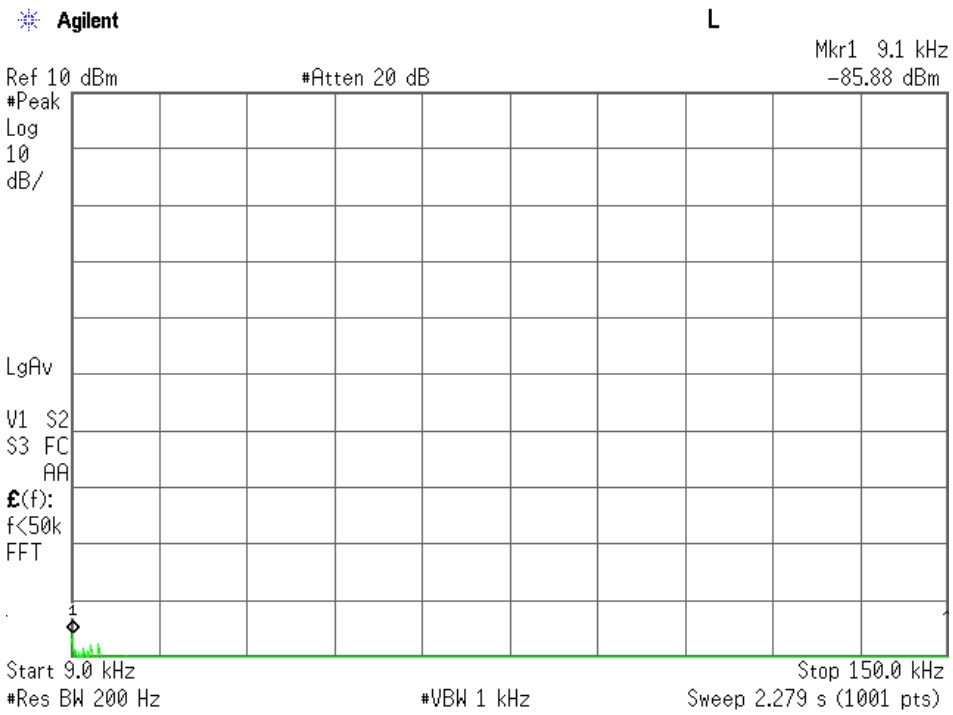
Low Channel, Out-Of-Band Emissions (30 MHz – 2 GHz)



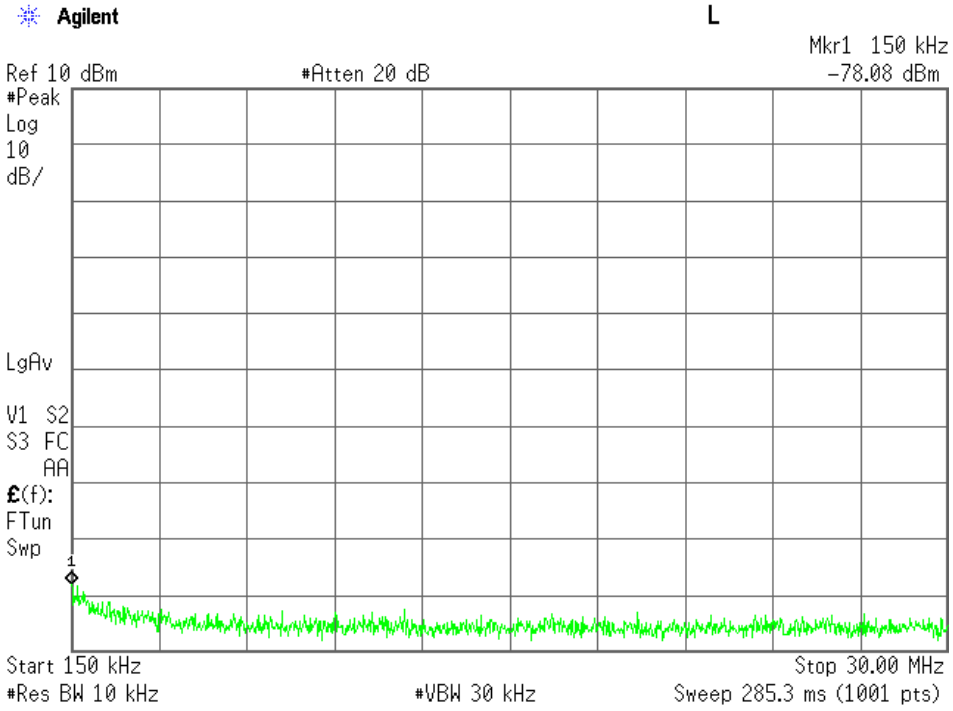
Low Channel, Out-Of-Band Emissions (2 GHz – 20 GHz)



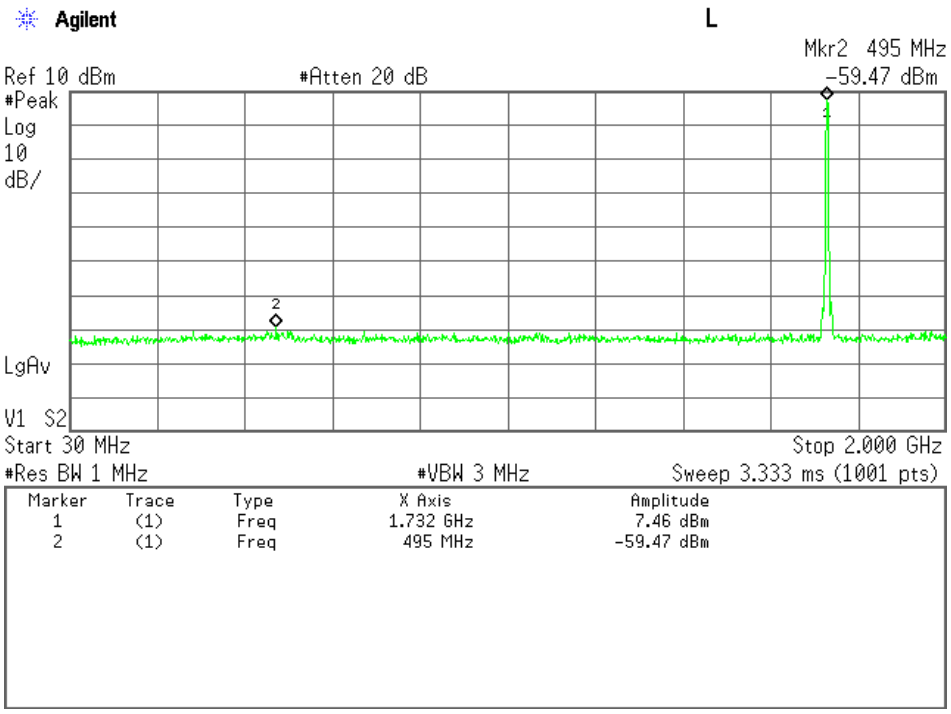
Middle Channel, Out-Of-Band Emissions (9 kHz – 150 kHz)



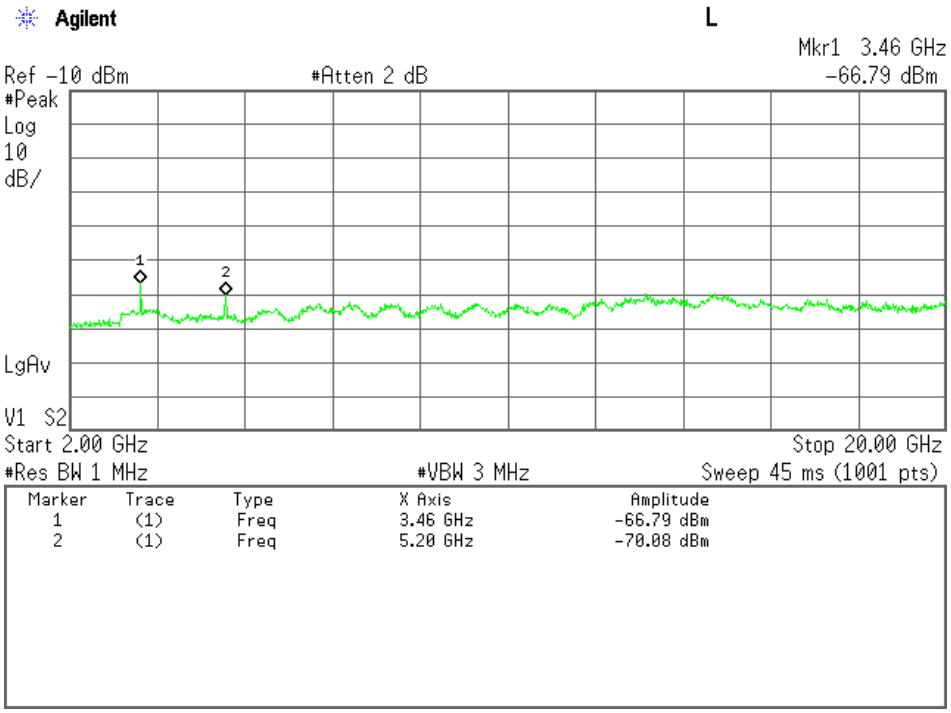
Middle Channel, Out-Of-Band Emissions (150 kHz – 30 MHz)



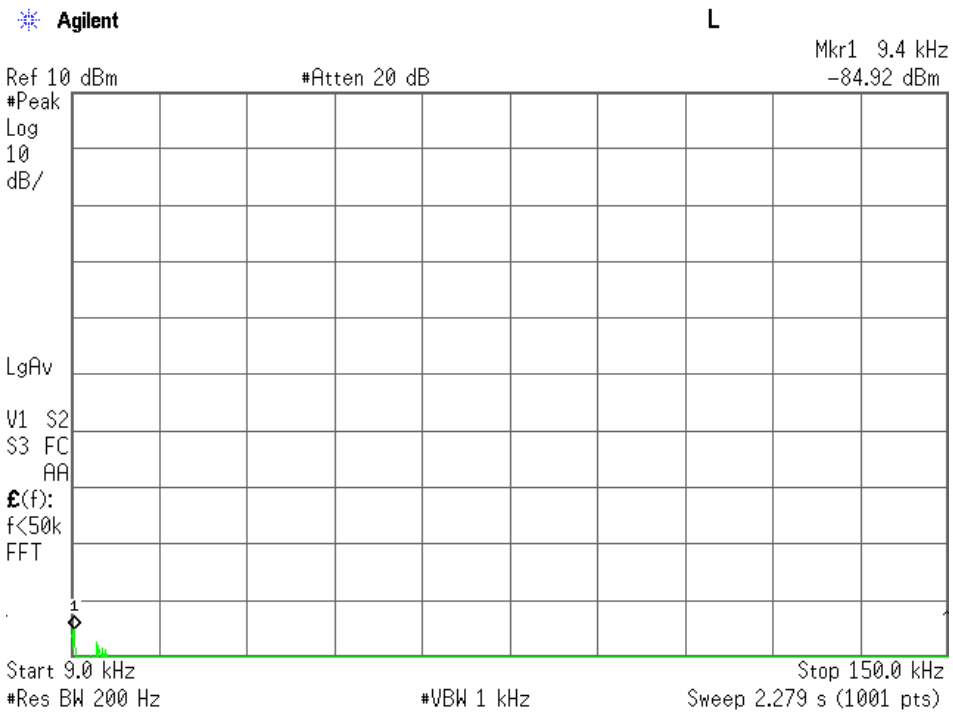
Middle Channel, Out-Of-Band Emissions (30 MHz – 2 GHz)



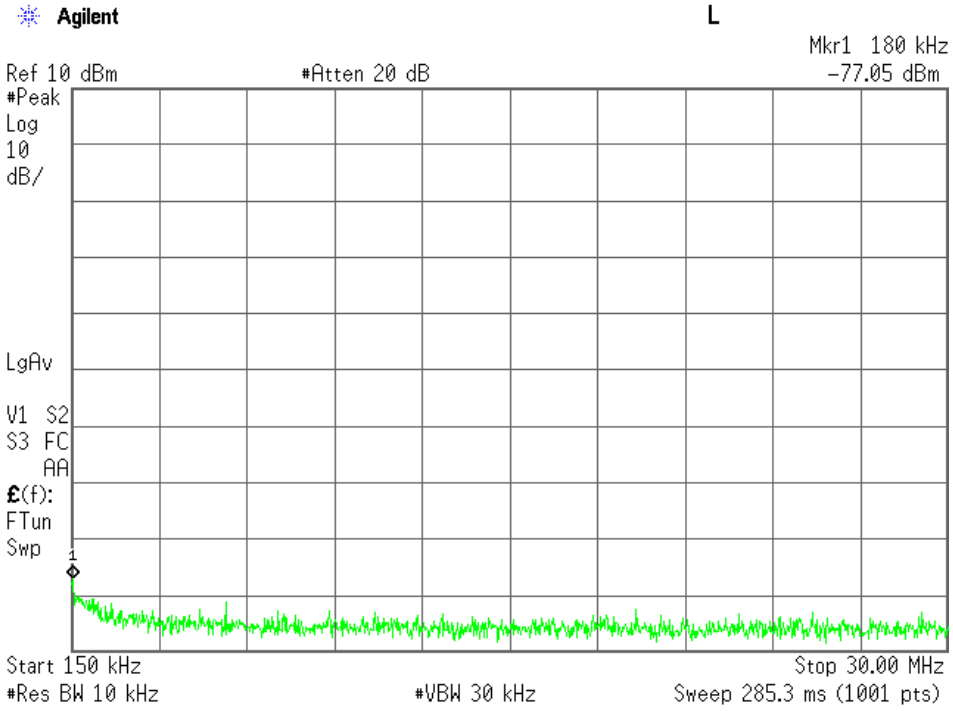
Middle Channel, Out-Of-Band Emissions (2 GHz – 20 GHz)



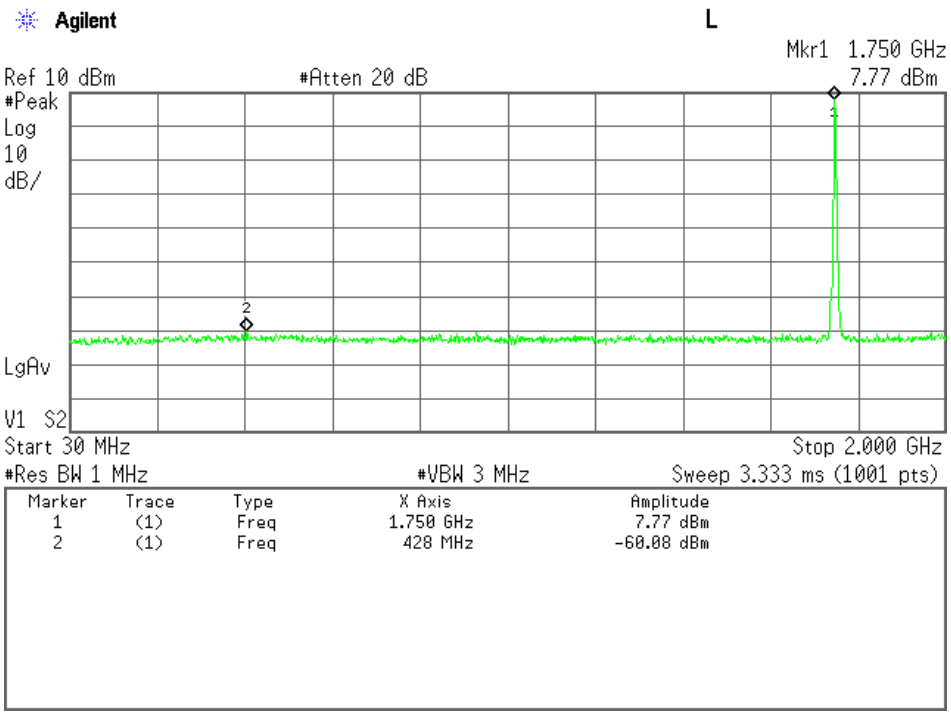
High Channel, Out-Of-Band Emissions (9 kHz – 150 kHz)



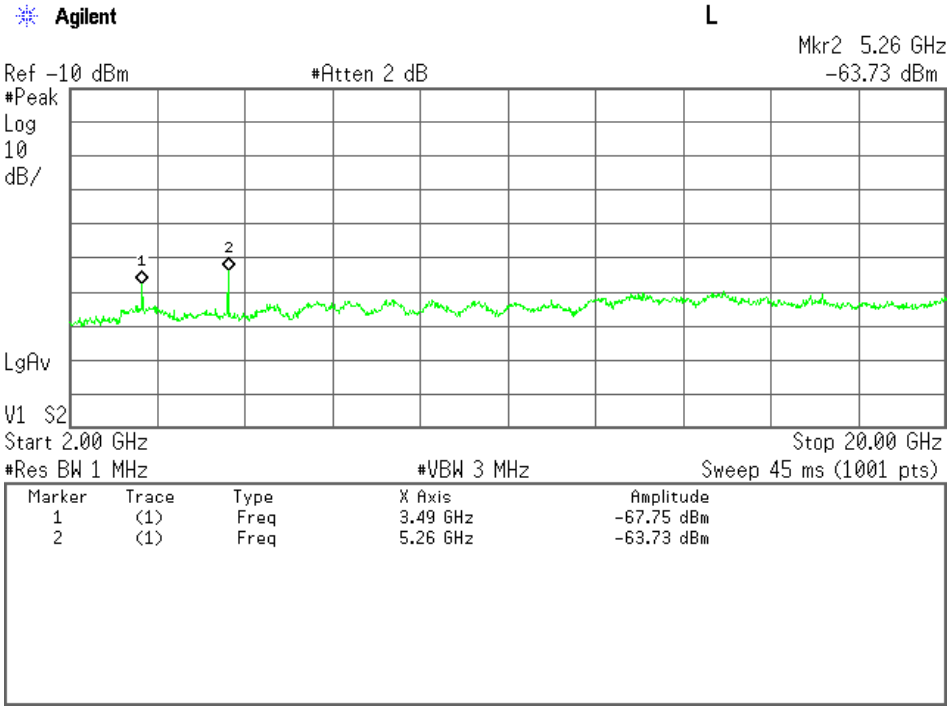
High Channel, Out-Of-Band Emissions (150 kHz – 30 MHz)



High Channel, Out-Of-Band Emissions (30 MHz – 2 GHz)



High Channel, Out-Of-Band Emissions (2 GHz – 20 GHz)



5) BW 15MHz(1RB)

(LTE 15MHz)

Test Date: September 16, 2015
Temp.: 26 °C, Humi: 62 %

CH	Transmitting Frequency [MHz]	Measured Frequency [MHz]	Corr. Factor [dB]	Meter Readings [dBm]	Limits [dBm]	Results [dBm]	Margin [dB]	Remarks
20025	1717.500	3435.000	21.0	-67.0	-13.0	-46.0	+33.0	C
		5152.500	21.1	< -70.0	-13.0	< -48.9	> +35.9	C
		6870.000	21.3	< -70.0	-13.0	< -48.7	> +35.7	C
		8587.500	21.6	< -70.0	-13.0	< -48.4	> +35.4	C
		10305.000	21.8	< -70.0	-13.0	< -48.2	> +35.2	C
		12022.500	22.1	< -70.0	-13.0	< -47.9	> +34.9	C
		13740.000	22.3	< -70.0	-13.0	< -47.7	> +34.7	C
		15457.500	22.6	< -70.0	-13.0	< -47.4	> +34.4	C
		17175.000	22.9	< -70.0	-13.0	< -47.1	> +34.1	C
20175	1732.500	3465.000	21.0	-67.0	-13.0	-46.0	+33.0	C
		5197.500	21.1	-69.4	-13.0	-48.3	+35.3	C
		6930.000	21.3	< -70.0	-13.0	< -48.7	> +35.7	C
		8662.500	21.6	< -70.0	-13.0	< -48.4	> +35.4	C
		10395.000	21.8	< -70.0	-13.0	< -48.2	> +35.2	C
		12127.500	22.1	< -70.0	-13.0	< -47.9	> +34.9	C
		13860.000	22.3	< -70.0	-13.0	< -47.7	> +34.7	C
		15592.500	22.6	< -70.0	-13.0	< -47.4	> +34.4	C
		17325.000	22.9	< -70.0	-13.0	< -47.1	> +34.1	C
20325	1747.500	3495.000	21.0	-67.8	-13.0	-46.8	+33.8	C
		5242.500	21.1	-65.2	-13.0	-44.1	+31.1	C
		6990.000	21.3	< -70.0	-13.0	< -48.7	> +35.7	C
		8737.500	21.6	< -70.0	-13.0	< -48.4	> +35.4	C
		10485.000	21.8	< -70.0	-13.0	< -48.2	> +35.2	C
		12232.500	22.1	< -70.0	-13.0	< -47.9	> +34.9	C
		13980.000	22.3	< -70.0	-13.0	< -47.7	> +34.7	C
		15727.500	22.6	< -70.0	-13.0	< -47.4	> +34.4	C
		17475.000	22.9	< -70.0	-13.0	< -47.1	> +34.1	C

Calculated result at 5242.5 MHz, as the worst point shown on underline:

	Corr. Factor	=	21.1 dB
+)	Meter Reading	=	-65.2 dBm
	Result	=	-44.1 dBm

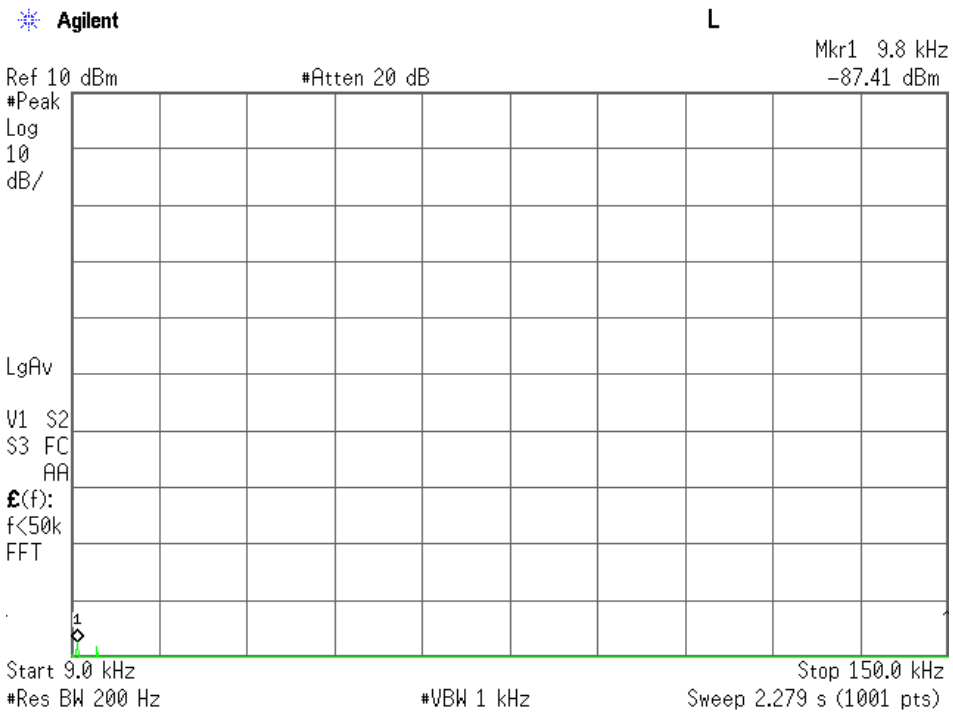
Minimum Margin: -13.0 - (-44.1) = 31.1 (dB)

NOTES

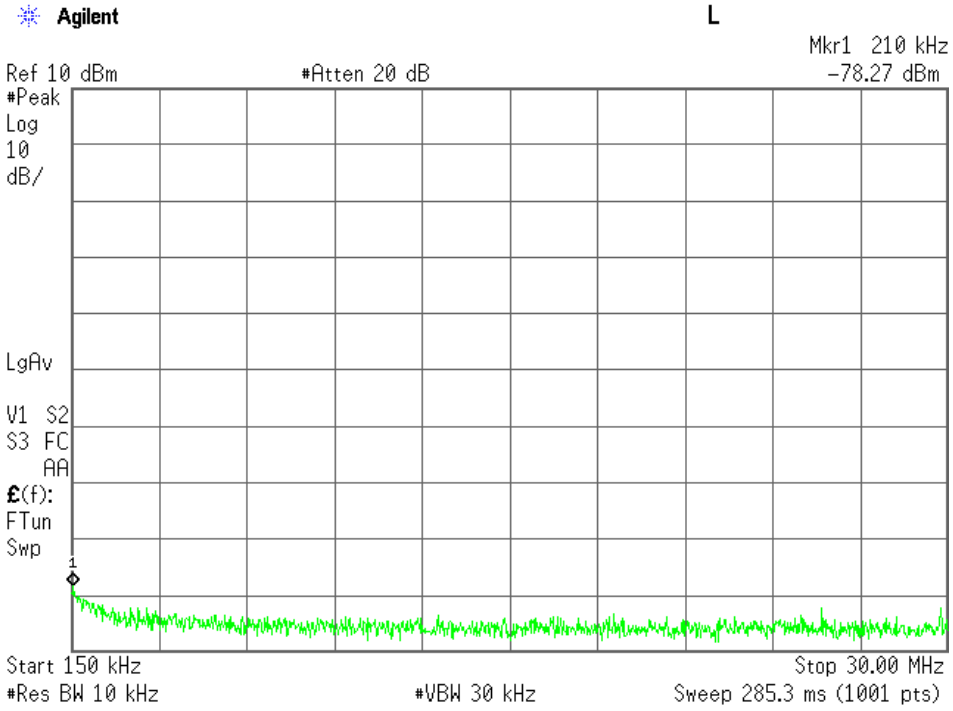
1. The spectrum was checked from 9 kHz to 20 GHz.
2. Applied limits : -13.0 [dBm] = 10log(TP[mW]) - (43 + 10log(tp[W])) = 10log(TP[mW]) - (43 + (10 log(TP[mW]) - 30))
   where, tp[W] = TP[mW] / 1000 : Transmitter power at anttena terminal
3. The correction factor is shown as follows:
   Corr. Factor [dB] = Cable Loss + Pad Att. [dB] (9 kHz - 2 GHz)
   Corr. Factor [dB] = Cable Loss + Pad Att. + High Pass Filter Loss [dB] (over 2 GHz)
4. The symbol of "<" means "or less".
5. The symbol of ">" means "more than".
6. Setting of measuring instrument(s) :

	Detector Function	RES B.W.	V.B.W.	Sweep Time
A	Peak	200 Hz	1 kHz	AUTO
B	Peak	10 kHz	30 kHz	AUTO
C	Peak	1 MHz	3 MHz	AUTO

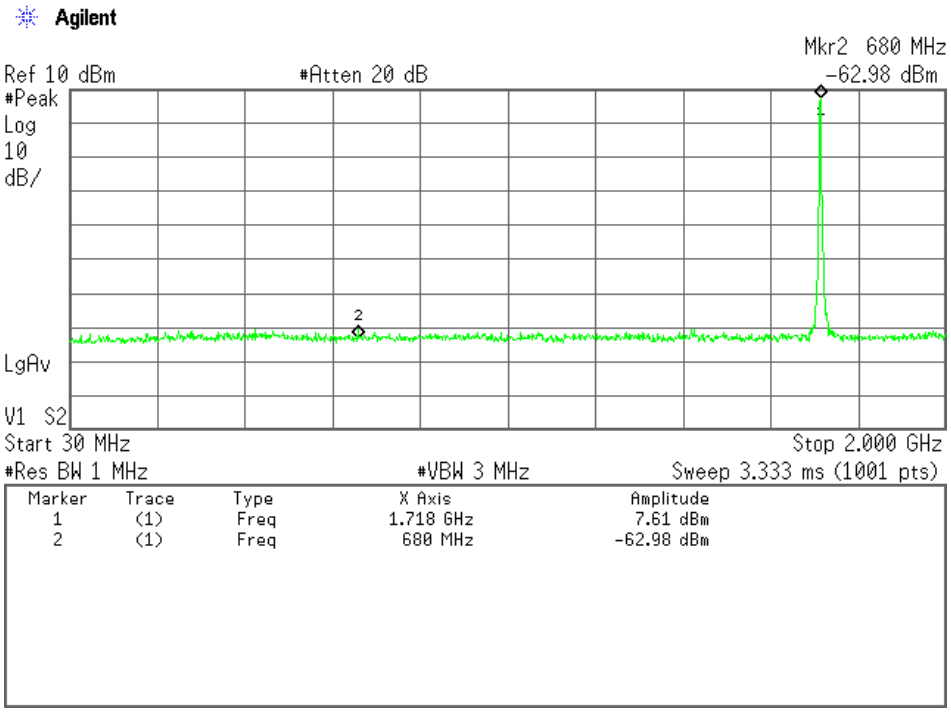
Low Channel, Out-Of-Band Emissions (9 kHz – 150 kHz)



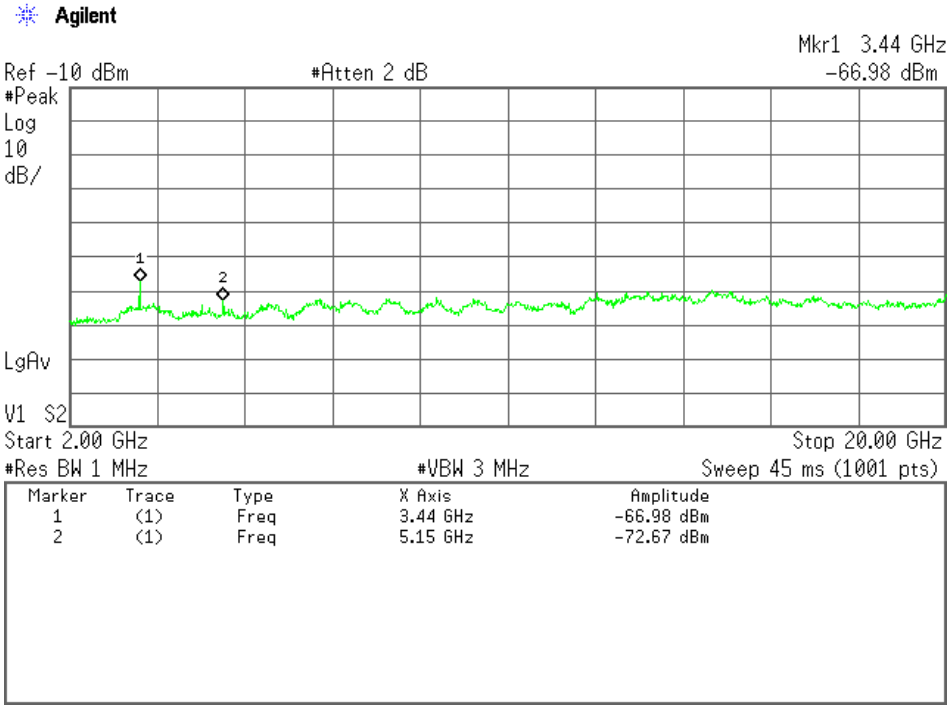
Low Channel, Out-Of-Band Emissions (150 kHz – 30 MHz)



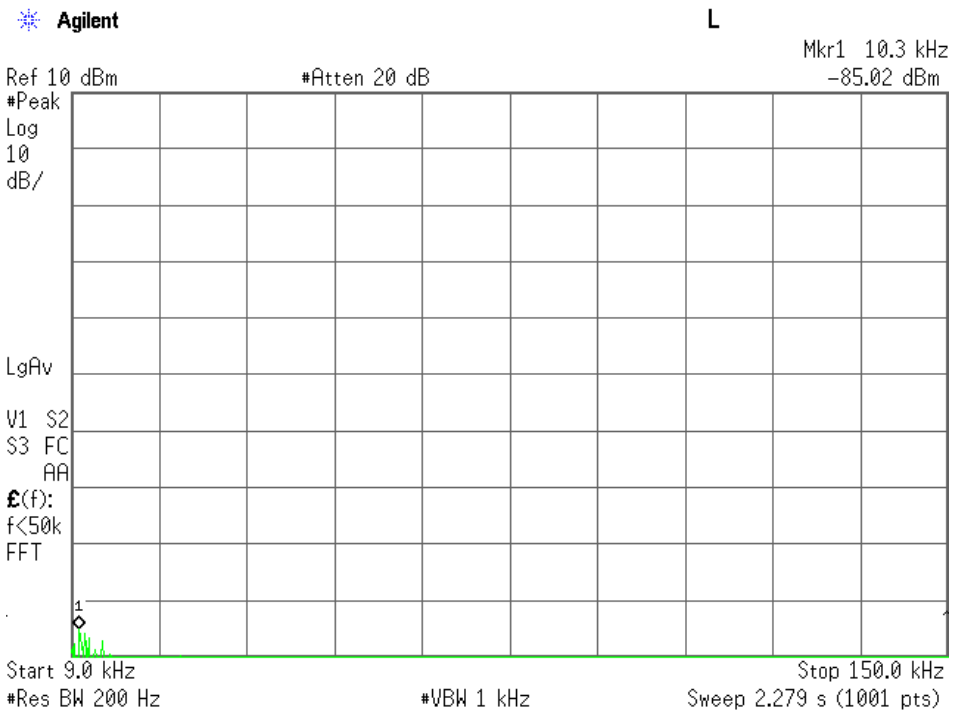
Low Channel, Out-Of-Band Emissions (30 MHz – 2 GHz)



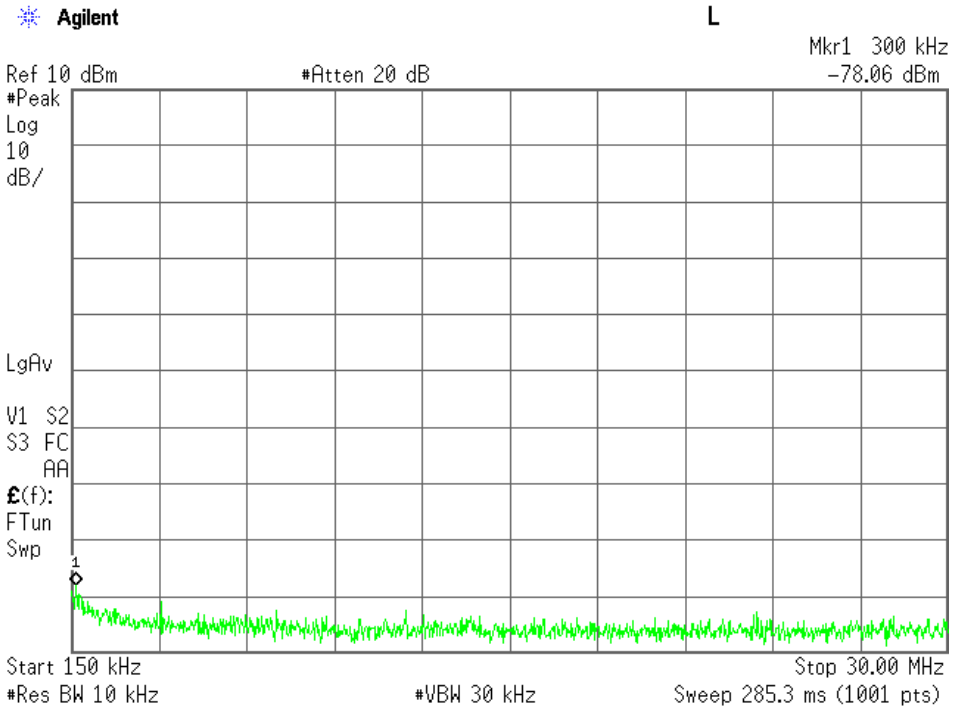
Low Channel, Out-Of-Band Emissions (2 GHz – 20 GHz)



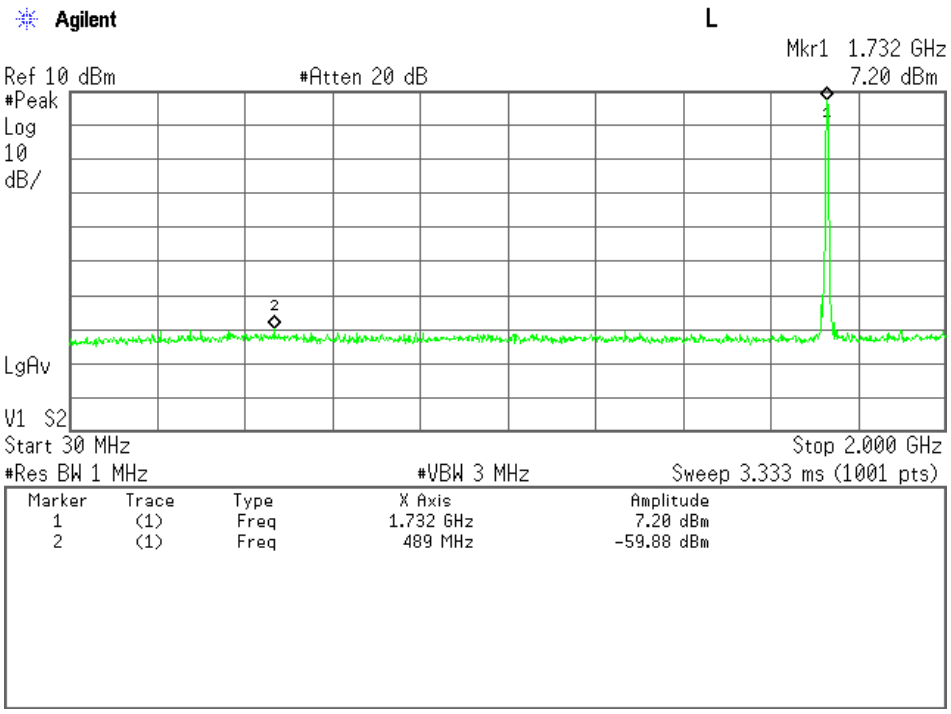
Middle Channel, Out-Of-Band Emissions (9 kHz – 150 kHz)



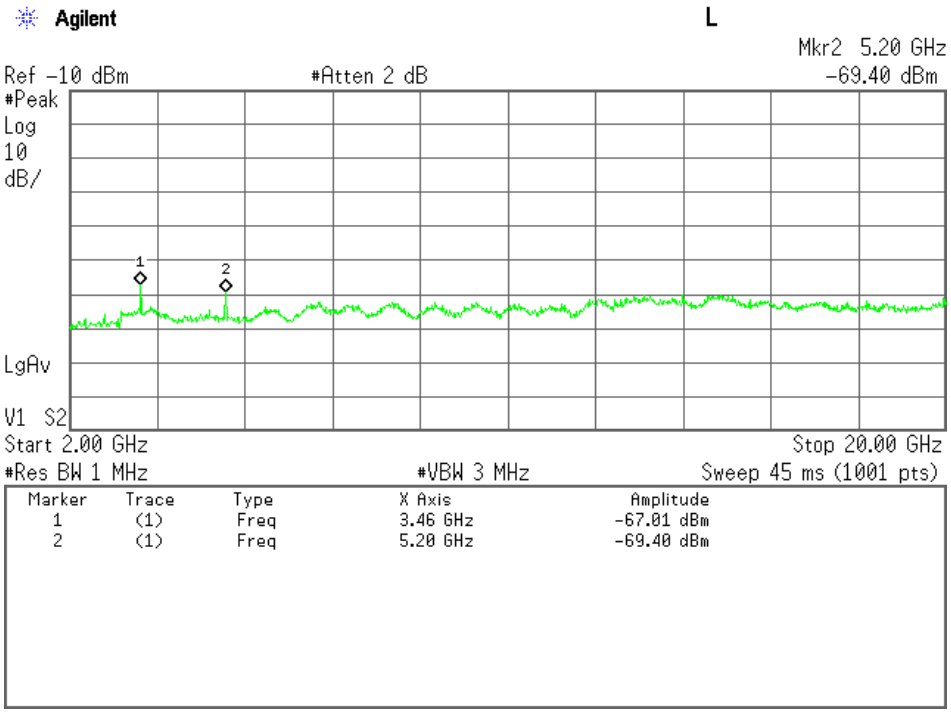
Middle Channel, Out-Of-Band Emissions (150 kHz – 30 MHz)



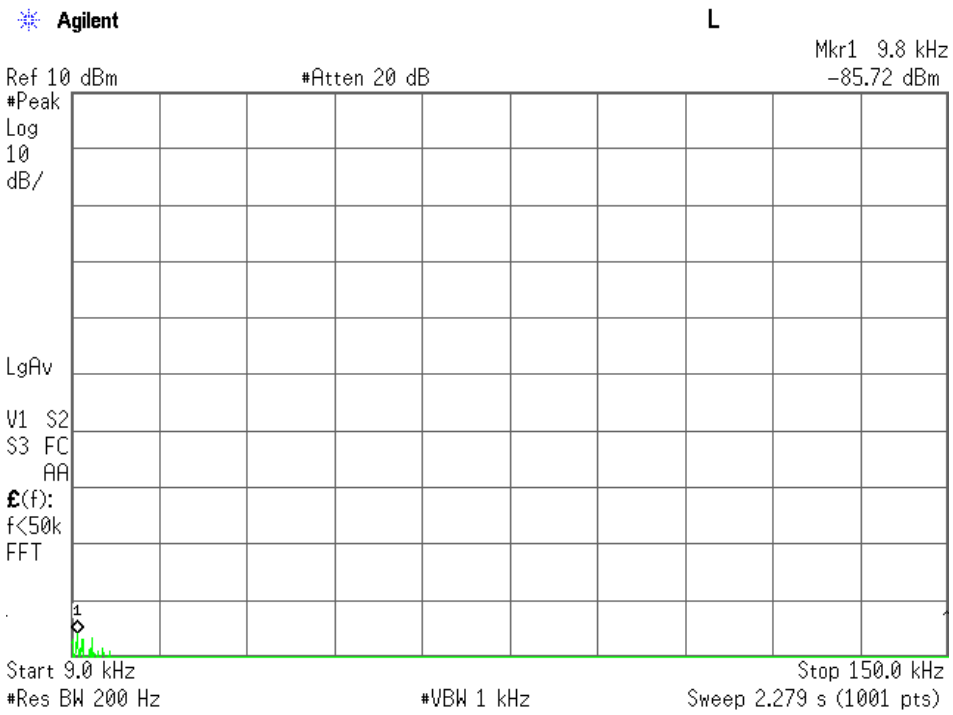
Middle Channel, Out-Of-Band Emissions (30 MHz – 2 GHz)



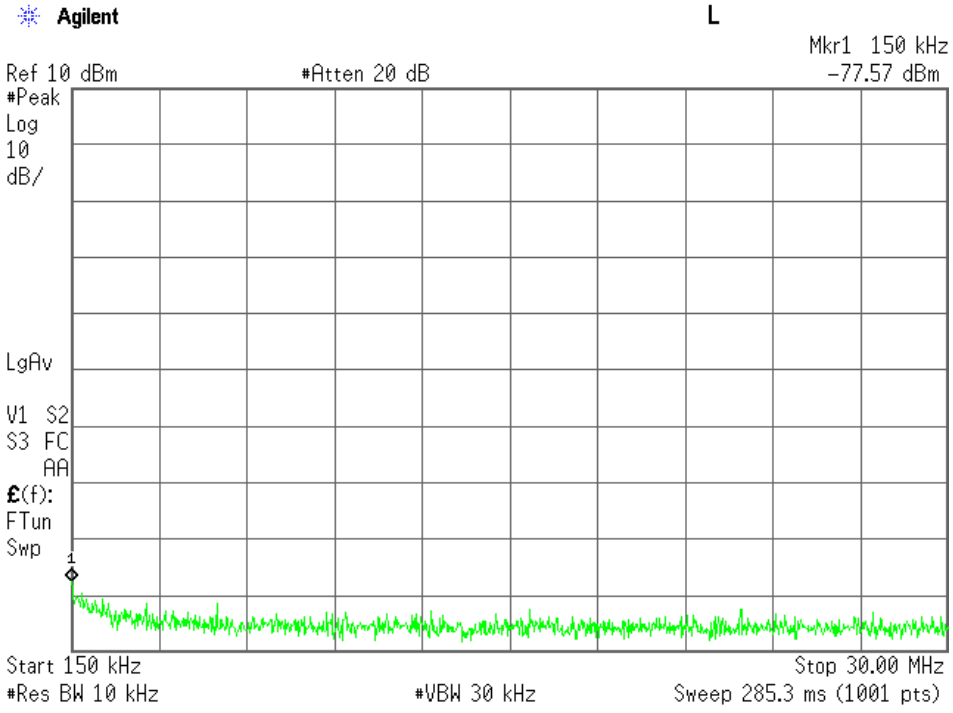
Middle Channel, Out-Of-Band Emissions (2 GHz – 20 GHz)



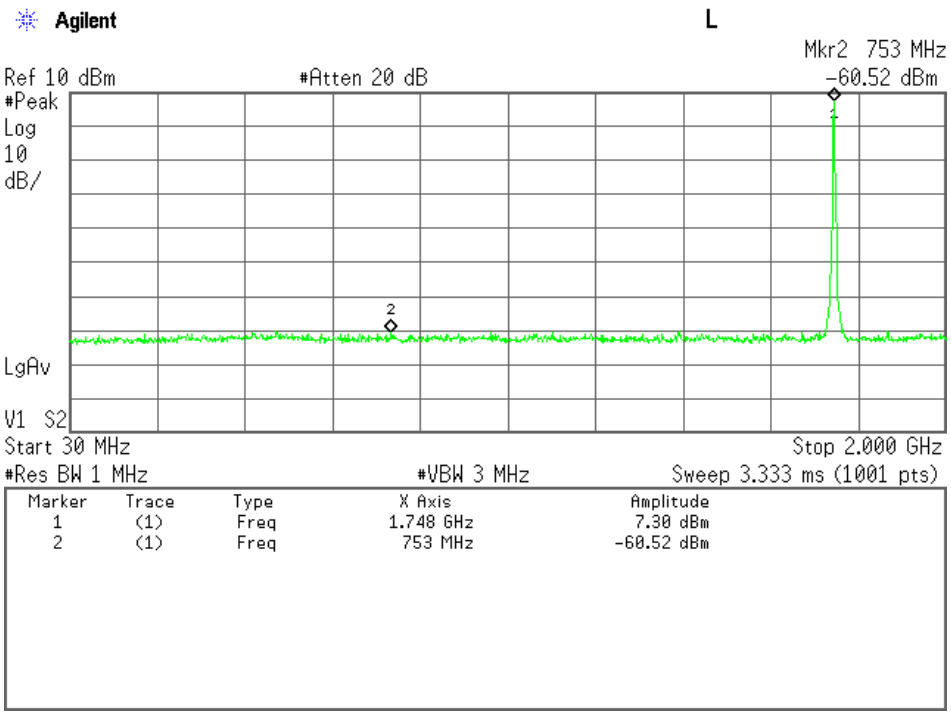
High Channel, Out-Of-Band Emissions (9 kHz – 150 kHz)



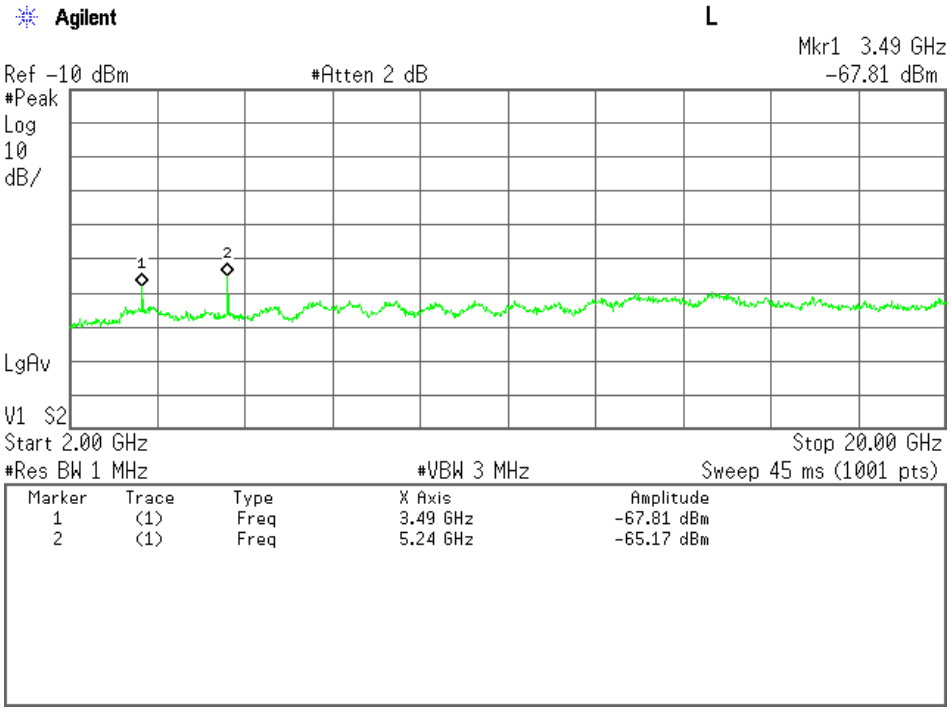
High Channel, Out-Of-Band Emissions (150 kHz – 30 MHz)



High Channel, Out-Of-Band Emissions (30 MHz – 2 GHz)



High Channel, Out-Of-Band Emissions (2 GHz – 20 GHz)



6) BW 20MHz(1RB)

(LTE 20MHz)

Test Date: September 16, 2015
Temp.: 26 °C, Humi: 62 %

CH	Transmitting Frequency [MHz]	Measured Frequency [MHz]	Corr. Factor [dB]	Meter Readings [dBm]	Limits [dBm]	Results [dBm]	Margin [dB]	Remarks
20050	1720.000	3440.000	21.0	-66.8	-13.0	-45.8	+32.8	C
		5160.000	21.1	< -70.0	-13.0	< -48.9	> +35.9	C
		6880.000	21.3	< -70.0	-13.0	< -48.7	> +35.7	C
		8600.000	21.6	< -70.0	-13.0	< -48.4	> +35.4	C
		10320.000	21.8	< -70.0	-13.0	< -48.2	> +35.2	C
		12040.000	22.1	< -70.0	-13.0	< -47.9	> +34.9	C
		13760.000	22.3	< -70.0	-13.0	< -47.7	> +34.7	C
		15480.000	22.6	< -70.0	-13.0	< -47.4	> +34.4	C
		17200.000	22.9	< -70.0	-13.0	< -47.1	> +34.1	C
20175	1732.500	3465.000	21.0	-67.5	-13.0	-46.5	+33.5	C
		5197.500	21.1	< -70.0	-13.0	< -48.9	> +35.9	C
		6930.000	21.3	< -70.0	-13.0	< -48.7	> +35.7	C
		8662.500	21.6	< -70.0	-13.0	< -48.4	> +35.4	C
		10395.000	21.8	< -70.0	-13.0	< -48.2	> +35.2	C
		12127.500	22.1	< -70.0	-13.0	< -47.9	> +34.9	C
		13860.000	22.3	< -70.0	-13.0	< -47.7	> +34.7	C
		15592.500	22.6	< -70.0	-13.0	< -47.4	> +34.4	C
		17325.000	22.9	< -70.0	-13.0	< -47.1	> +34.1	C
20300	1745.000	3490.000	21.0	-67.5	-13.0	-46.5	+33.5	C
		5235.000	21.1	-66.8	-13.0	-45.7	+32.7	C
		6980.000	21.3	< -70.0	-13.0	< -48.7	> +35.7	C
		8725.000	21.6	< -70.0	-13.0	< -48.4	> +35.4	C
		10470.000	21.8	< -70.0	-13.0	< -48.2	> +35.2	C
		12215.000	22.1	< -70.0	-13.0	< -47.9	> +34.9	C
		13960.000	22.3	< -70.0	-13.0	< -47.7	> +34.7	C
		15705.000	22.6	< -70.0	-13.0	< -47.4	> +34.4	C
		17450.000	22.9	< -70.0	-13.0	< -47.1	> +34.1	C

Calculated result at 5235.0 MHz, as the worst point shown on underline:

	Corr. Factor	=	21.1 dB
+)	Meter Reading	=	-66.8 dBm
	Result	=	-45.7 dBm

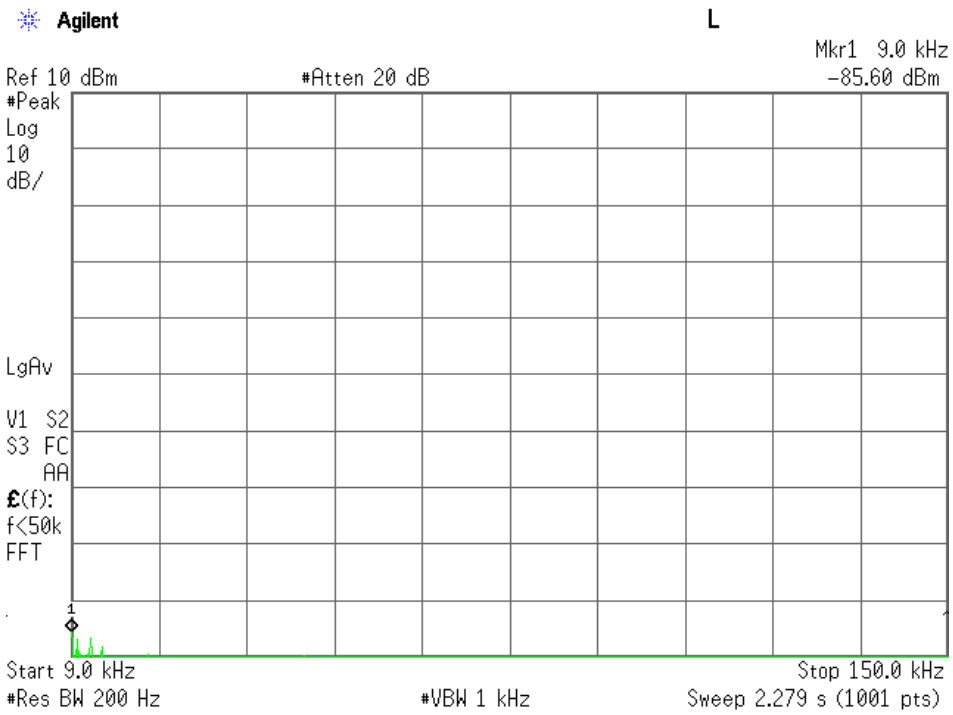
Minimum Margin: -13.0 - (-45.7) = 32.7 (dB)

NOTES

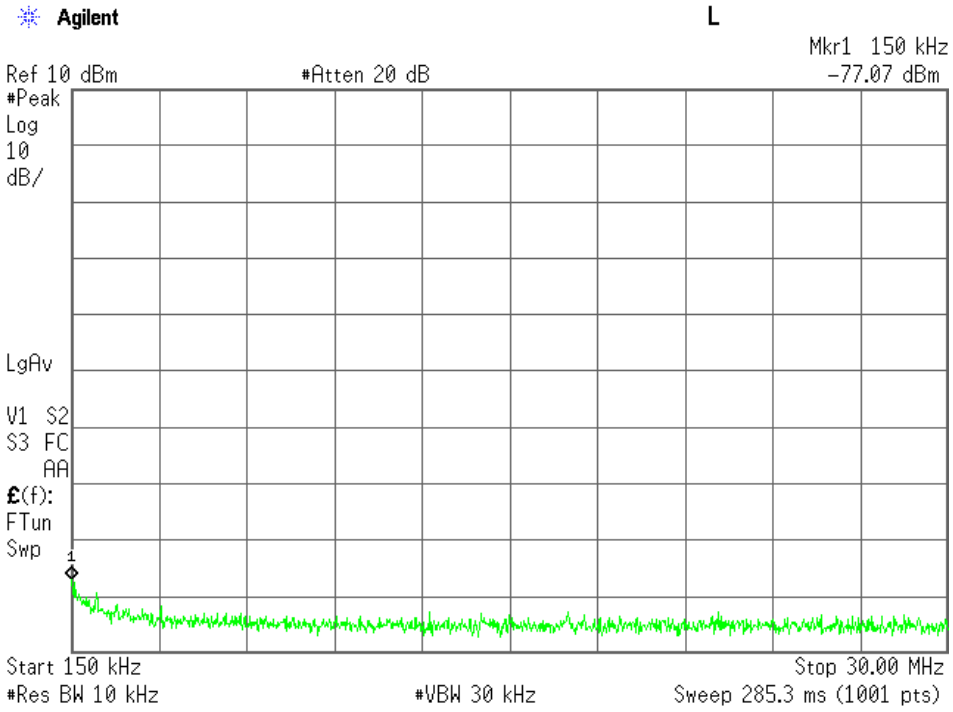
1. The spectrum was checked from 9 kHz to 20 GHz.
2. Applied limits : -13.0 [dBm] = 10log(TP[mW]) - (43 + 10log(tp[W])) = 10log(TP[mW]) - (43 + (10 log(TP[mW]) - 30))
   where, tp[W] = TP[mW] / 1000 : Transmitter power at anttena terminal
3. The correction factor is shown as follows:
   Corr. Factor [dB] = Cable Loss + Pad Att. [dB] (9 kHz - 2 GHz)
   Corr. Factor [dB] = Cable Loss + Pad Att. + High Pass Filter Loss [dB] (over 2 GHz)
4. The symbol of "<" means "or less".
5. The symbol of ">" means "more than".
6. Setting of measuring instrument(s) :

	Detector Function	RES B.W.	V.B.W.	Sweep Time
A	Peak	200 Hz	1 kHz	AUTO
B	Peak	10 kHz	30 kHz	AUTO
C	Peak	1 MHz	3 MHz	AUTO

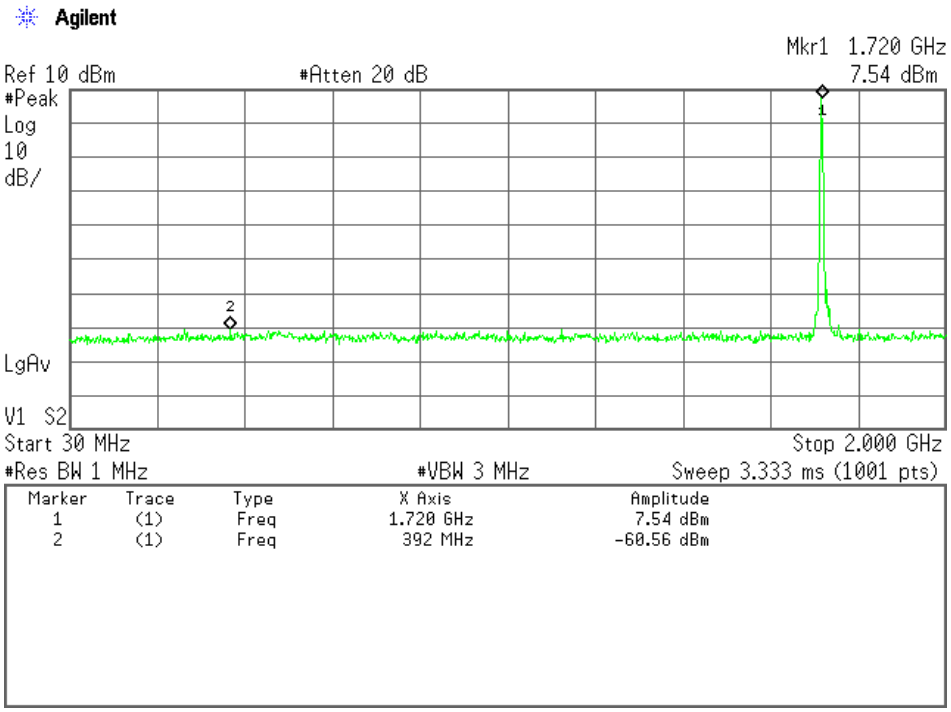
Low Channel, Out-Of-Band Emissions (9 kHz – 150 kHz)



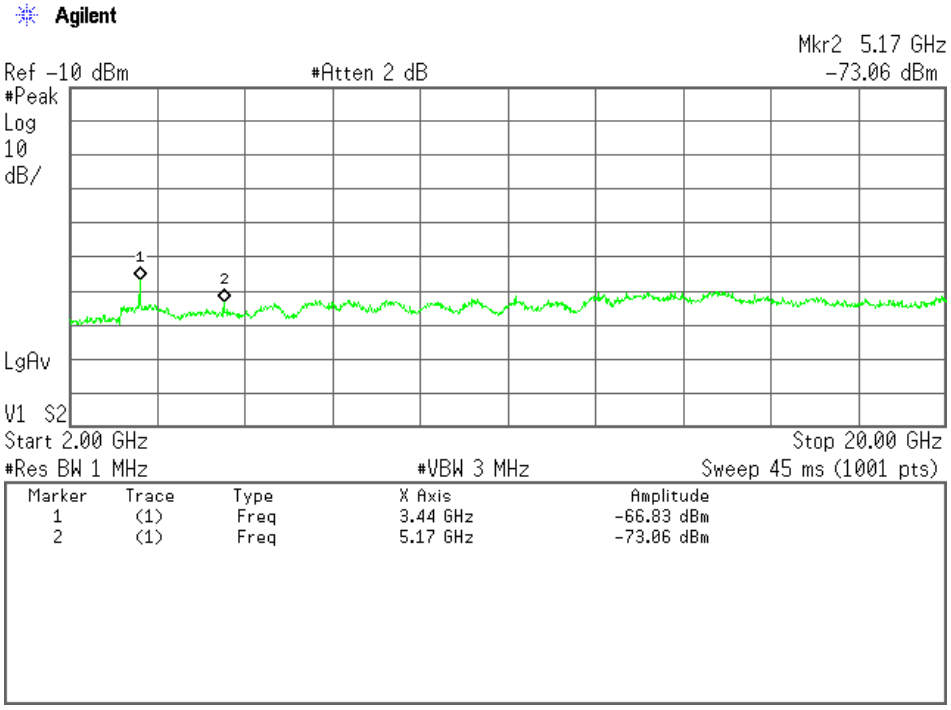
Low Channel, Out-Of-Band Emissions (150 kHz – 30 MHz)



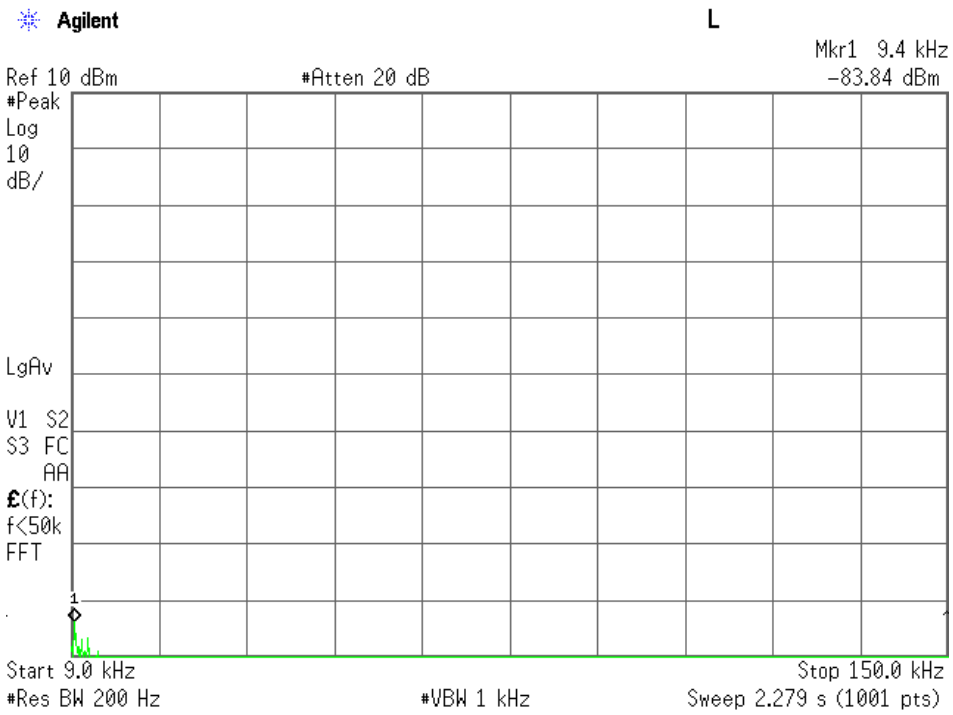
Low Channel, Out-Of-Band Emissions (30 MHz – 2 GHz)



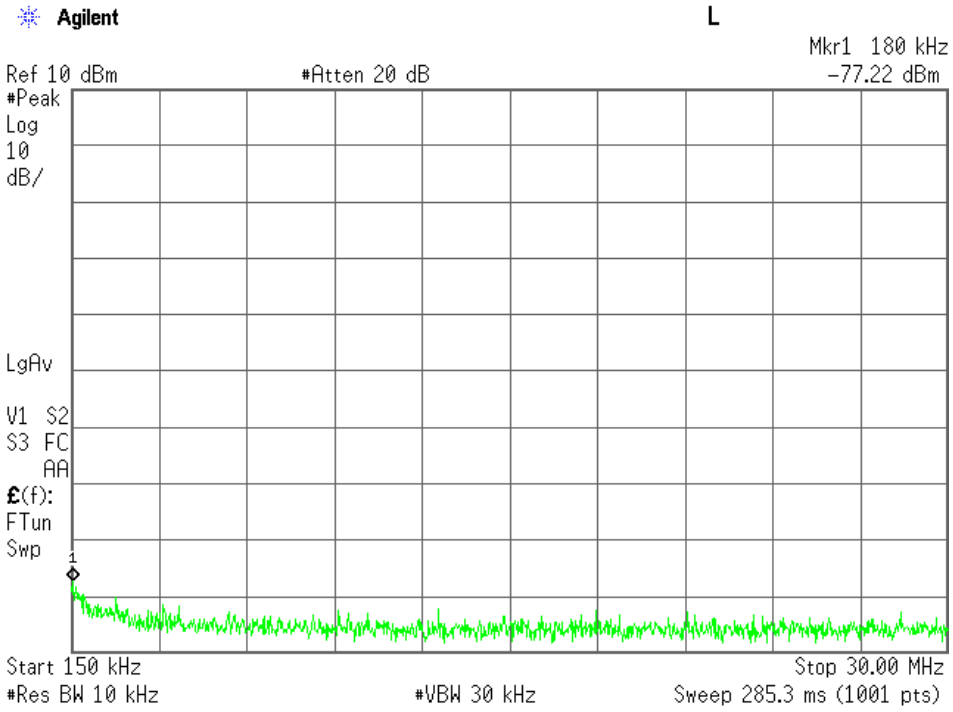
Low Channel, Out-Of-Band Emissions (2 GHz – 20 GHz)



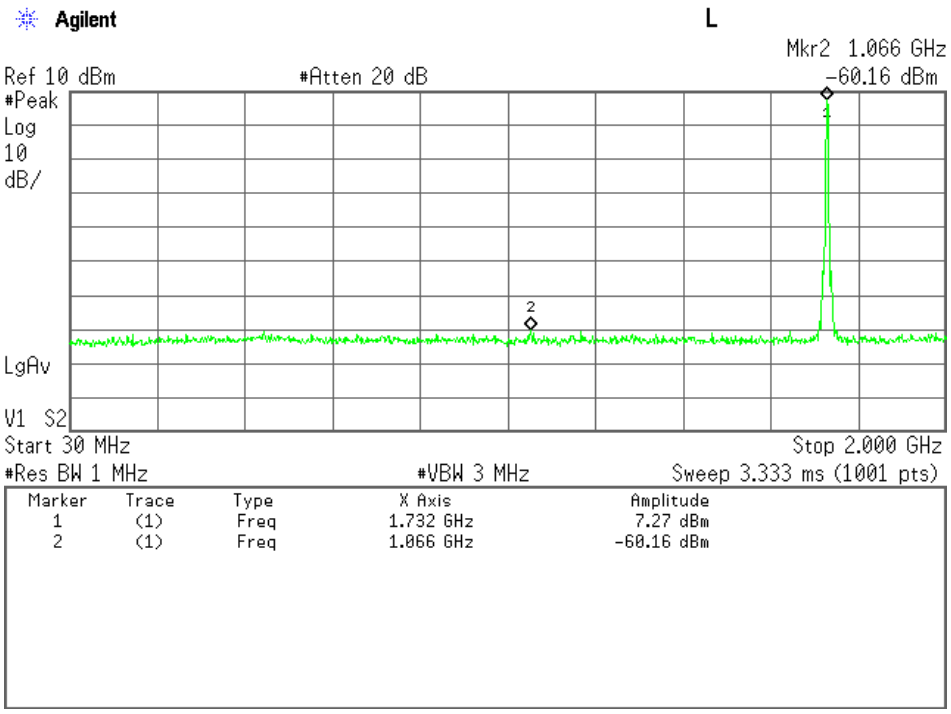
Middle Channel, Out-Of-Band Emissions (9 kHz – 150 kHz)



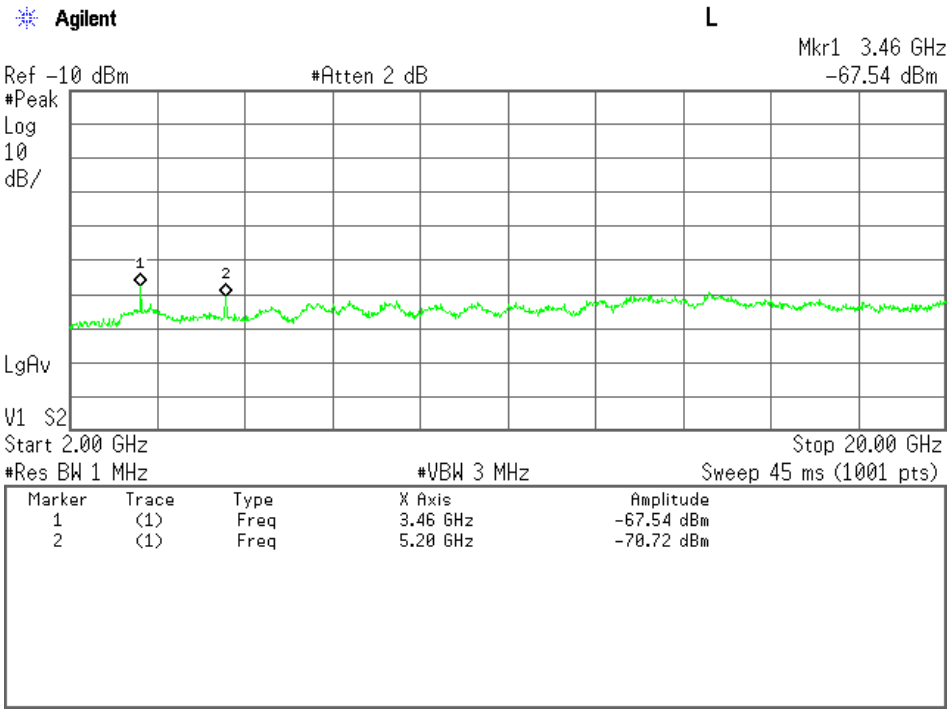
Middle Channel, Out-Of-Band Emissions (150 kHz – 30 MHz)



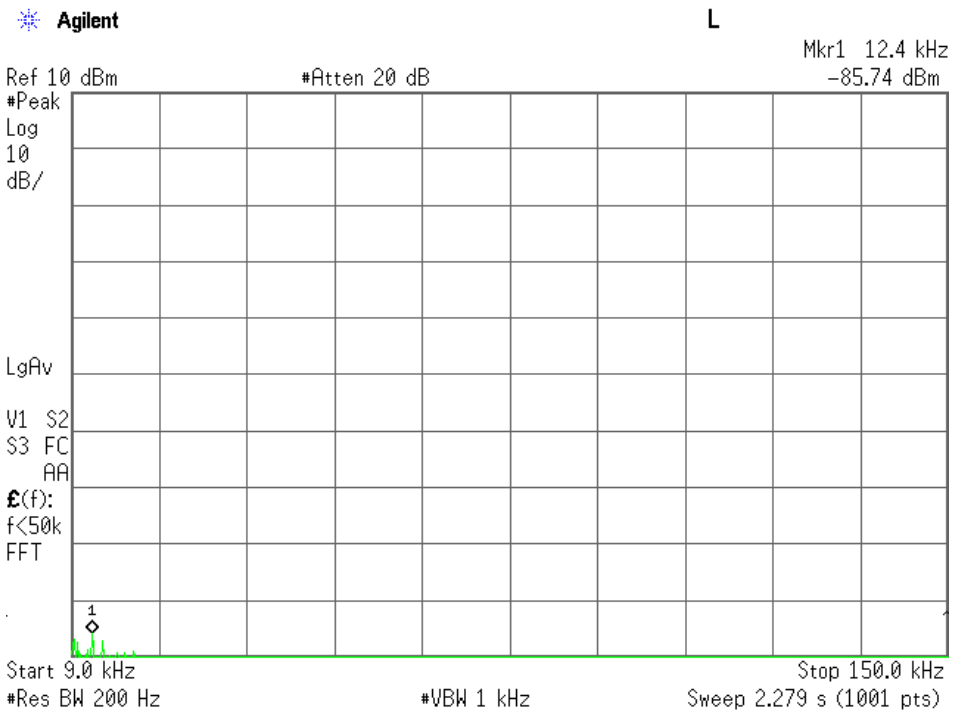
Middle Channel, Out-Of-Band Emissions (30 MHz – 2 GHz)



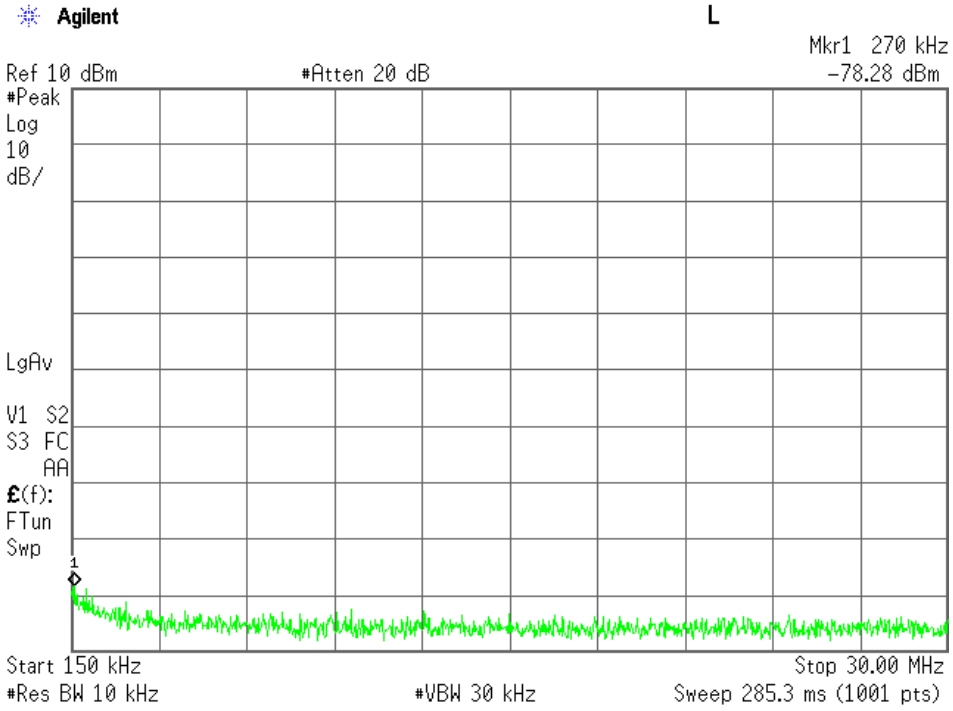
Middle Channel, Out-Of-Band Emissions (2 GHz – 20 GHz)



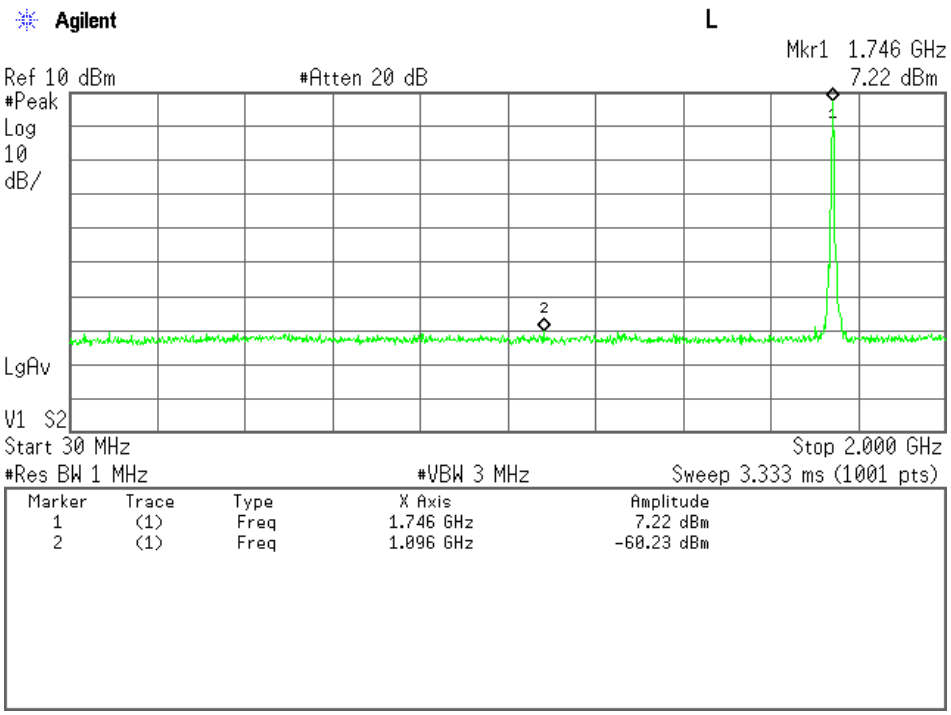
High Channel, Out-Of-Band Emissions (9 kHz – 150 kHz)



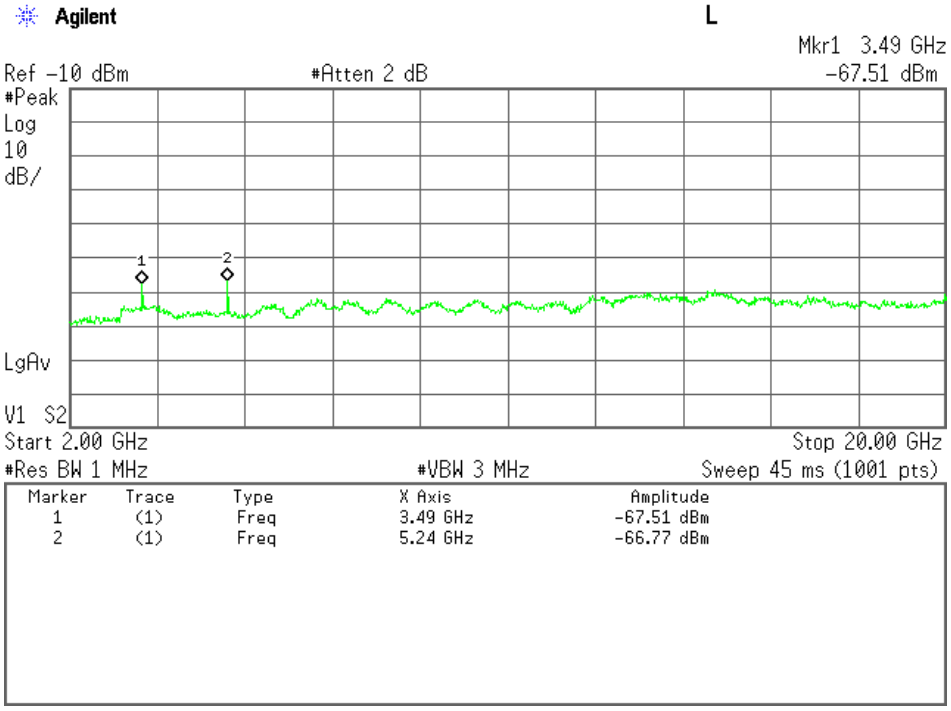
High Channel, Out-Of-Band Emissions (150 kHz – 30 MHz)



High Channel, Out-Of-Band Emissions (30 MHz – 2 GHz)



High Channel, Out-Of-Band Emissions (2 GHz – 20 GHz)



7.6 Band-Edge Emission (§2.1051)

For the requirements, ☑ - Applicable [☑ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

7.6.1 Test Results

For the standard, ☑ - **Passed** ☐ - **Failed** ☐ - **Not judged**

Min. Limit Margin 6.9 dB at 1755.0 MHz

The Band-Edge level is -19.9 dBm at 1755 MHz

Uncertainty of Measurement Results ± 1.7 dB(2σ)

Remarks : BW 3MHz QPSK

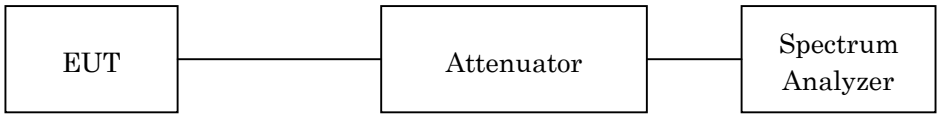
7.6.2 Test Instruments

Shielded Room S4				
Type	**Model**	**Serial No. (ID)**	**Manufacturer**	**Cal. Due**
Spectrum Analyzer	E4446A	US44300388 (A-39)	Agilent	2016/08/11
Attenuator	43KC-20	1418003 (D-41)	Anritsu	2016/07/05
RF Cable	SUCOFLEX102	14253/2 (C-52)	HUBER+SUHNER	2016/08/16

NOTE : The calibration interval of the above test instruments is 12 months.

7.6.3 Test Method and Test Setup (Diagrammatic illustration)

The test system is shown as follows:



The setting of the spectrum analyzer are shown as follows:

LTE Bandwidth	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Band-Edge Frequency	1850 MHz / 1910 MHz					
Res. Bandwidth	20 kHz	30 kHz	51 kHz	100 kHz	150 kHz	200 kHz
Video Bandwidth	62 kHz	100 kHz	160 kHz	300 kHz	470 kHz	620 kHz
Span	5 MHz	10 MHz	20 MHz	20 MHz	30 MHz	40 MHz
Sweep Time	100 ms					
Detector	Power Average(RMS)					
Trace	Average					

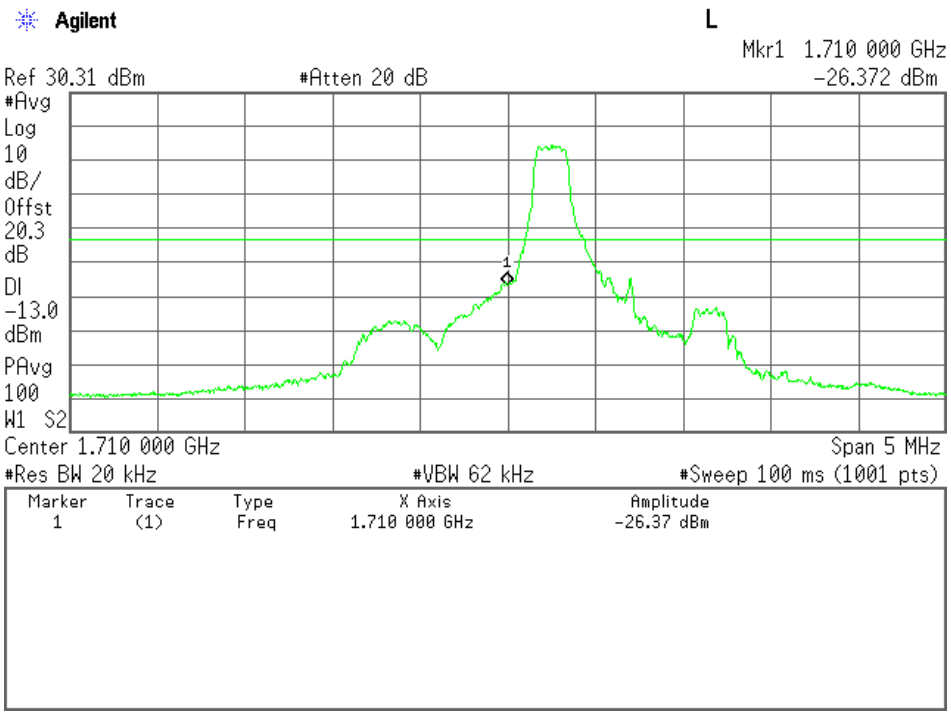
7.6.4 Test Data

Test Date : September 16, 2015
Temp.:26°C, Humi:62%

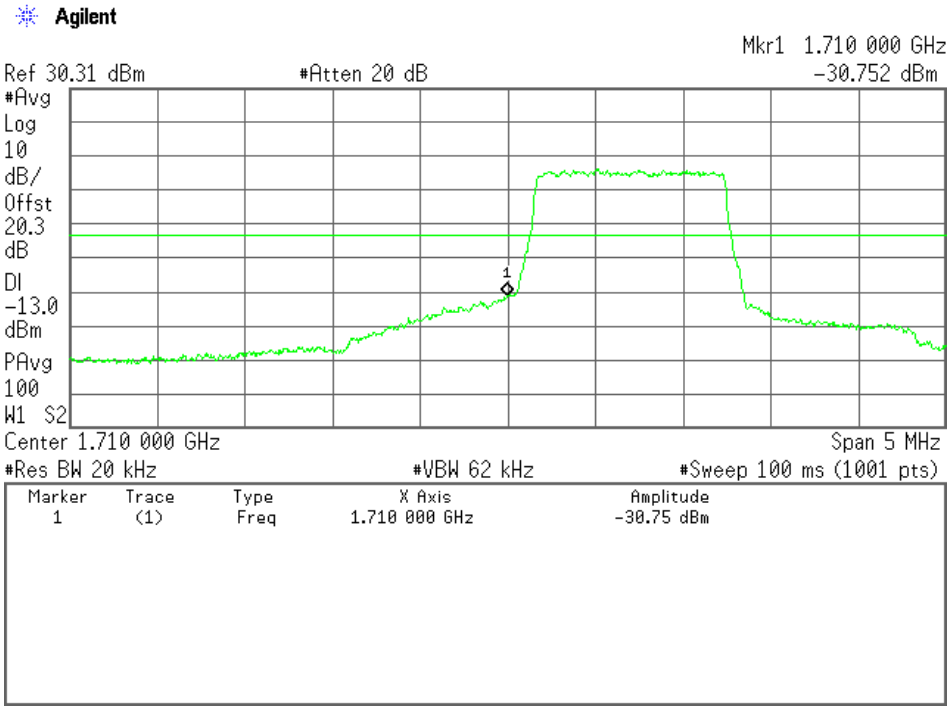
1-1) BW 1.4MHz
Mode: QPSK

Channel	Frequency (MHz)	Band-Edge Frequency (MHz)	Level (dBm)	Limits (dBm)	Margin (dB)
19957	1710.70	1710.0	-26.4 (at 1710.0 MHz)	-13.0	+13.4
20393	1754.30	1755.0	-24.2 (at 1755.0 MHz)	-13.0	+11.2

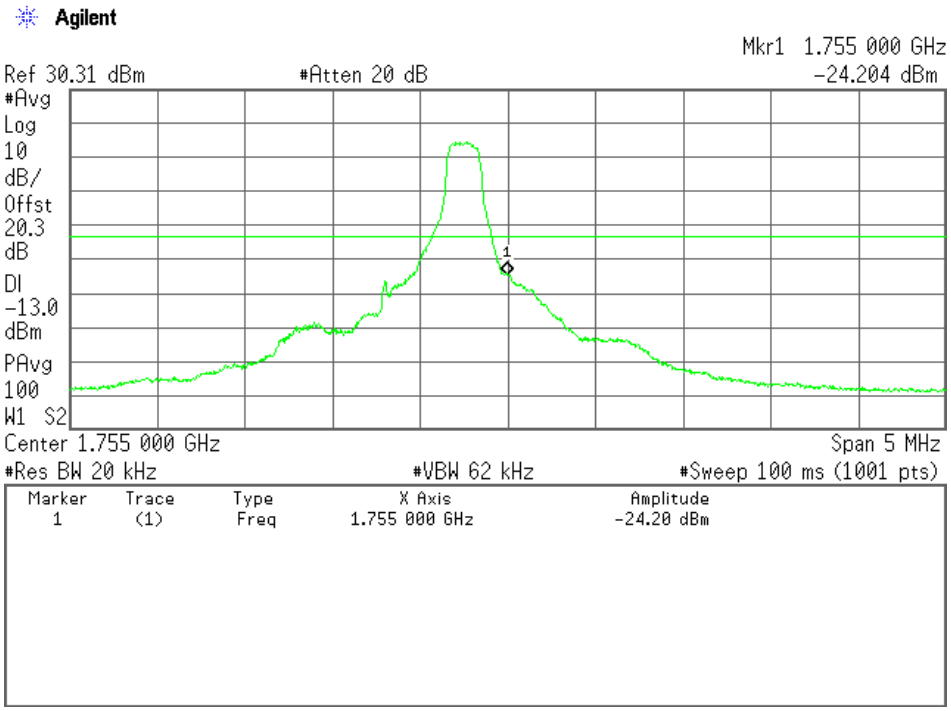
Low Channel(1RB Offset 0), Band-Edge Emission



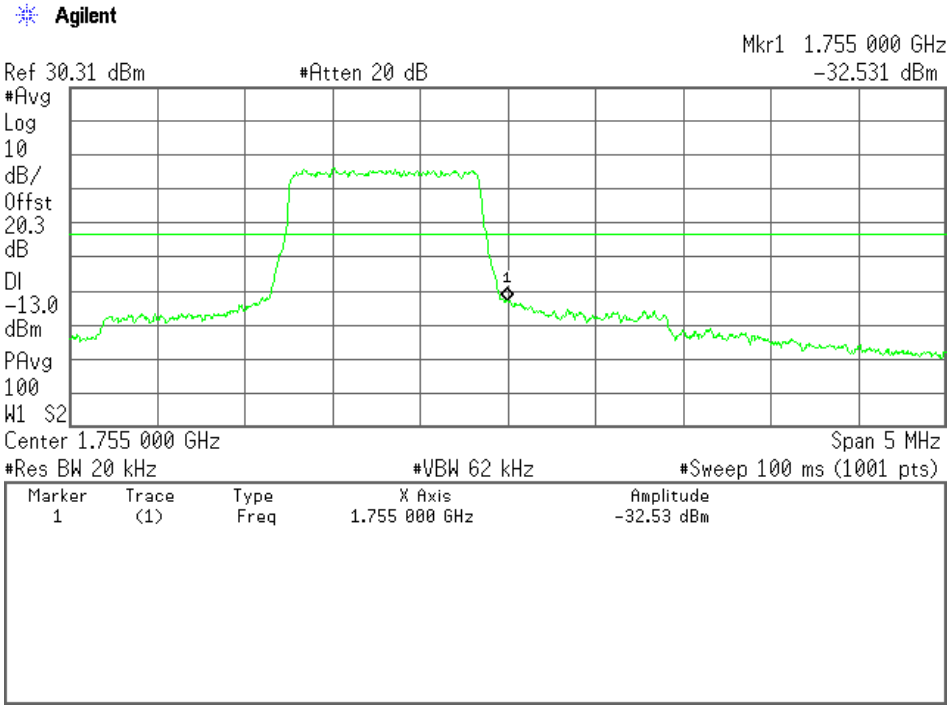
Low Channel(Full RB), Band-Edge Emission



High Channel(1RB Offset Max), Band-Edge Emission



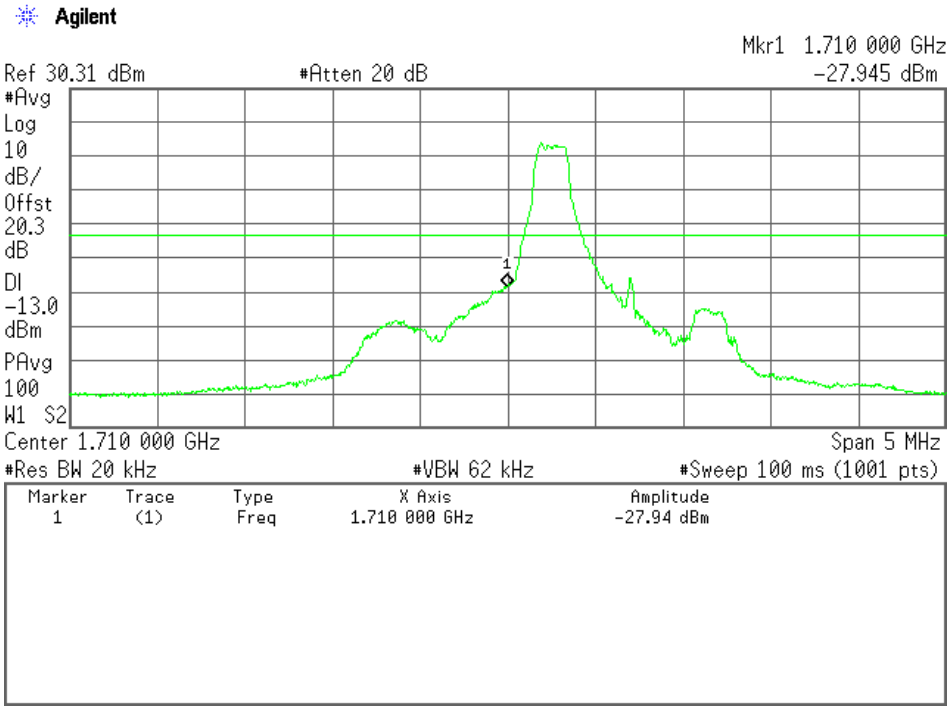
High Channel(Full RB), Band-Edge Emission



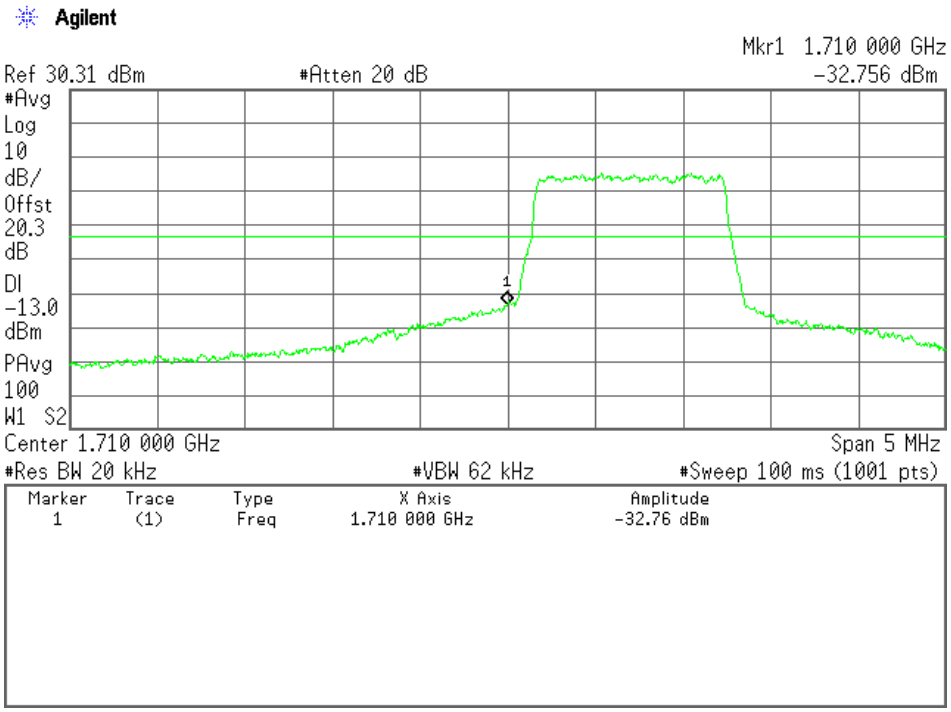
1-2) BW 1.4MHz
Mode:16 QAM

Channel	Frequency (MHz)	Band-Edge Frequency (MHz)	Level (dBm)	Limits (dBm)	Margin (dB)
19957	1710.70	1710.0	-27.9 (at 1710.0 MHz)	-13.0	+14.9
20393	1754.30	1755.0	-24.9 (at 1755.0 MHz)	-13.0	+11.9

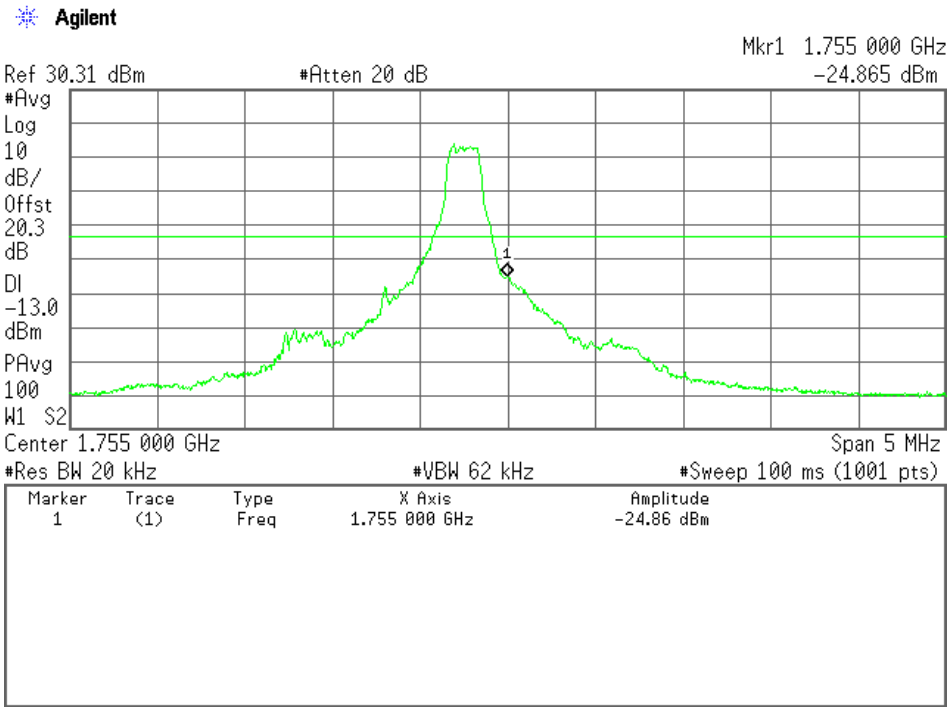
Low Channel(1RB Offset 0), Band-Edge Emission



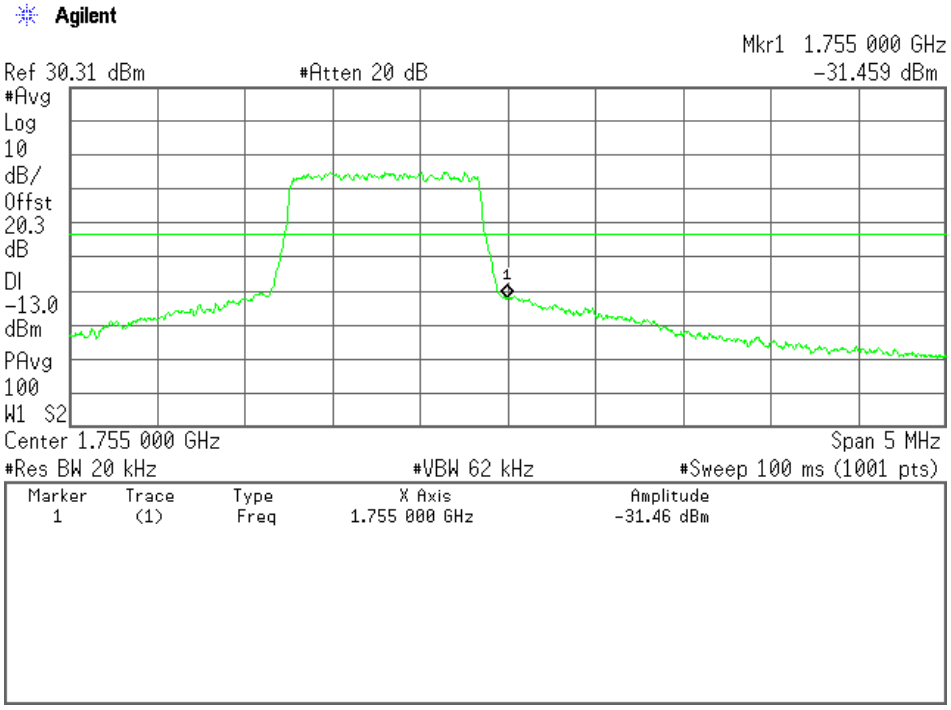
Low Channel(Full RB), Band-Edge Emission



High Channel(1RB Offset Max), Band-Edge Emission



High Channel(Full RB), Band-Edge Emission

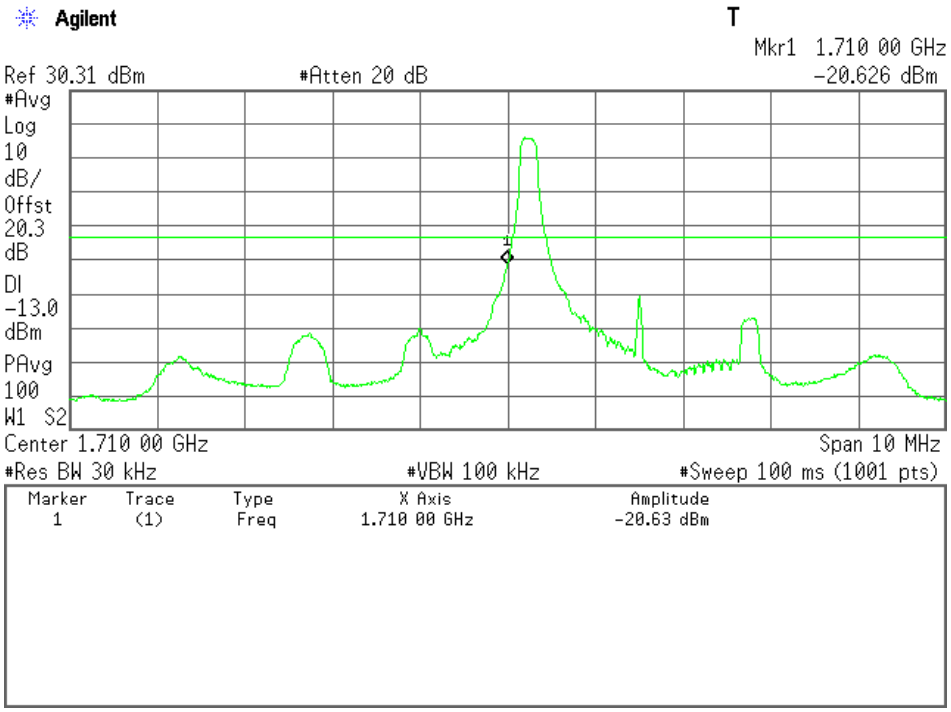


2-1) BW 3MHz

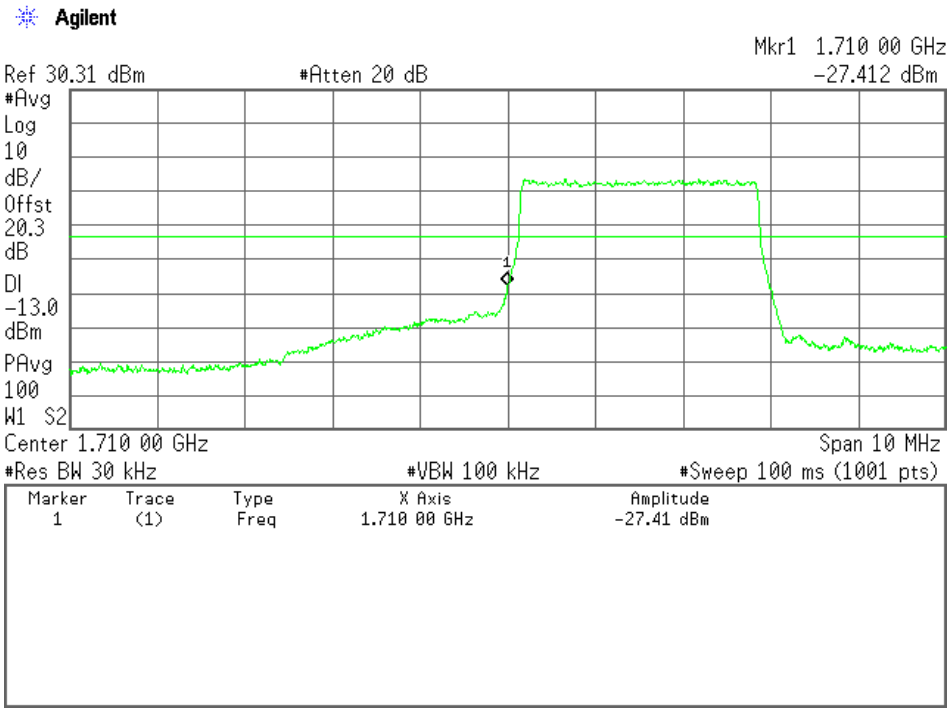
Mode: QPSK

Channel	Frequency (MHz)	Band-Edge Frequency (MHz)	Level (dBm)	Limits (dBm)	Margin (dB)
19965	1711.50	1710.0	-20.6 (at 1710.0 MHz)	-13.0	+7.6
20385	1753.50	1755.0	-19.9 (at 1755.0 MHz)	-13.0	+6.9

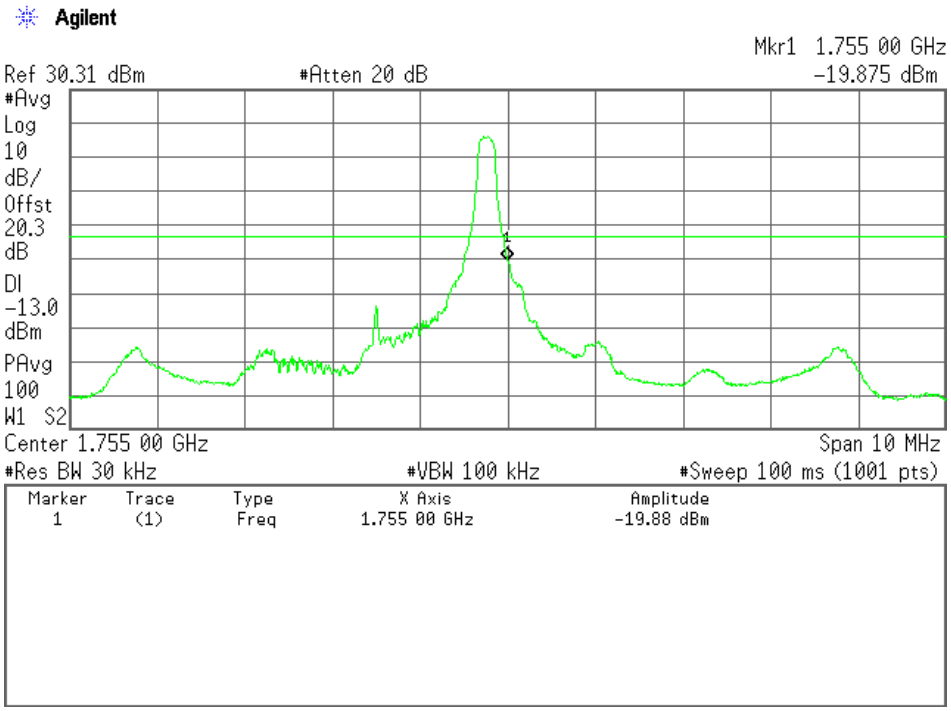
Low Channel(1RB Offset 0), Band-Edge Emission



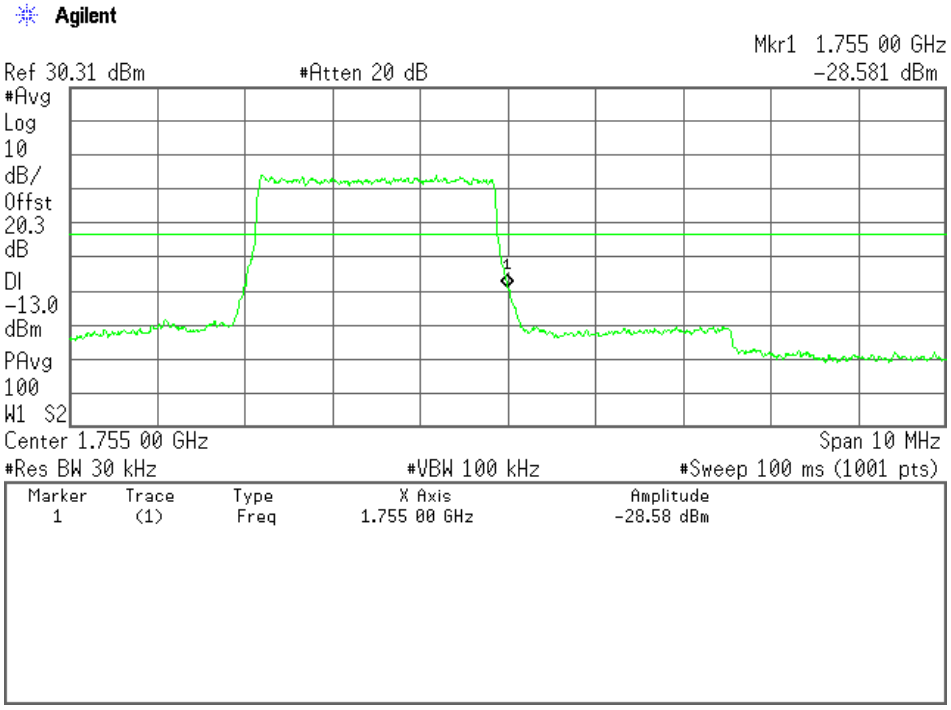
Low Channel(Full RB), Band-Edge Emission



High Channel(1RB Offset Max), Band-Edge Emission



High Channel(Full RB), Band-Edge Emission

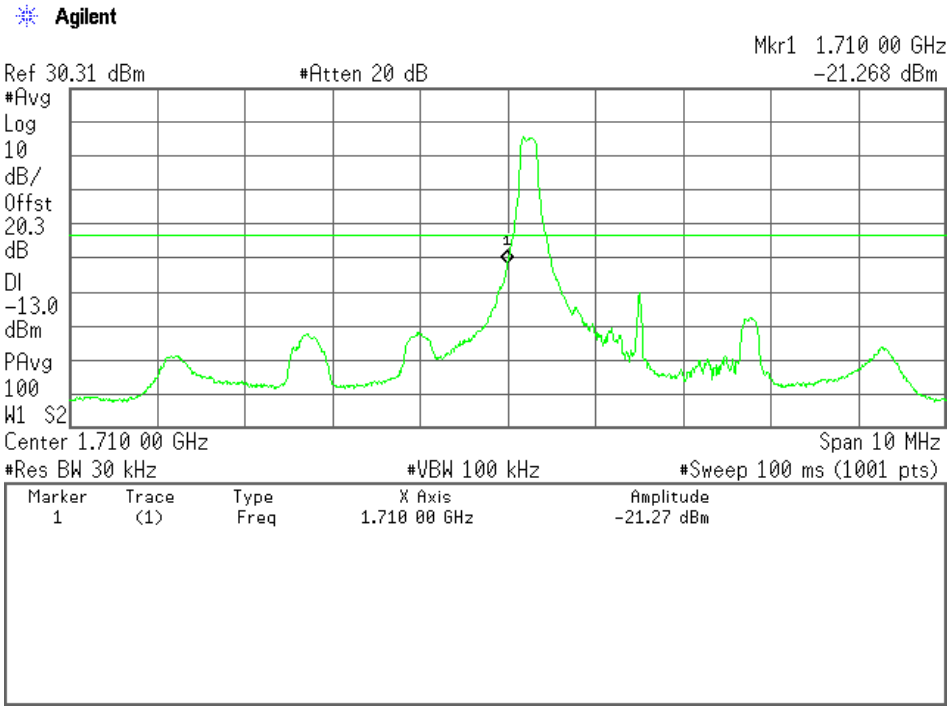


2-2) BW 3MHz

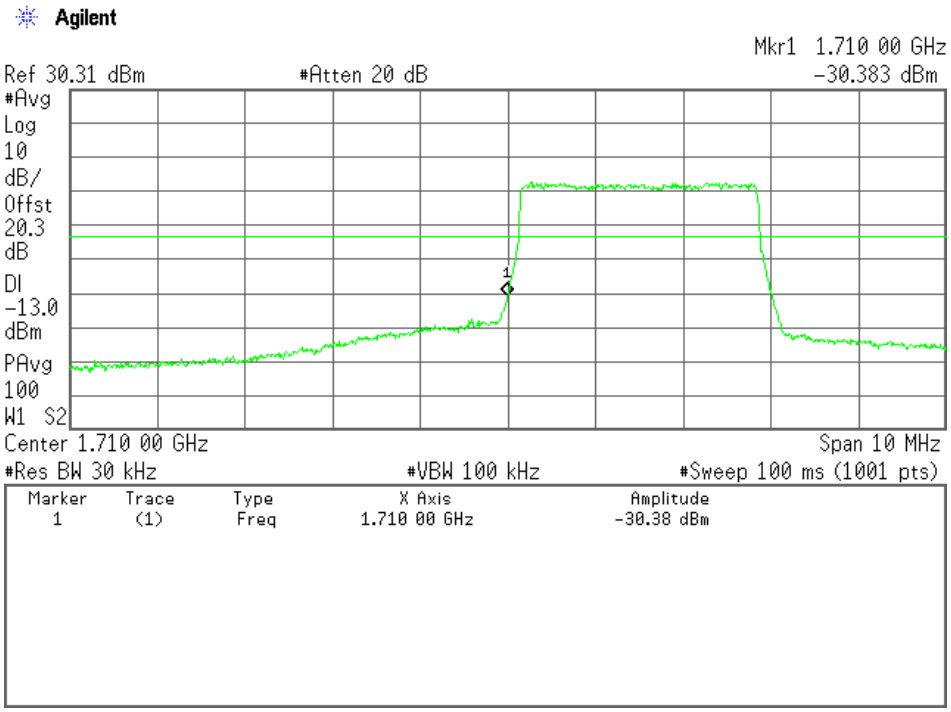
Mode:16 QAM

Channel	Frequency (MHz)	Band-Edge Frequency (MHz)	Level (dBm)	Limits (dBm)	Margin (dB)
19965	1711.50	1710.0	-21.3 (at 1710.0 MHz)	-13.0	+8.3
20385	1753.50	1755.0	-20.6 (at 1755.0 MHz)	-13.0	+7.6

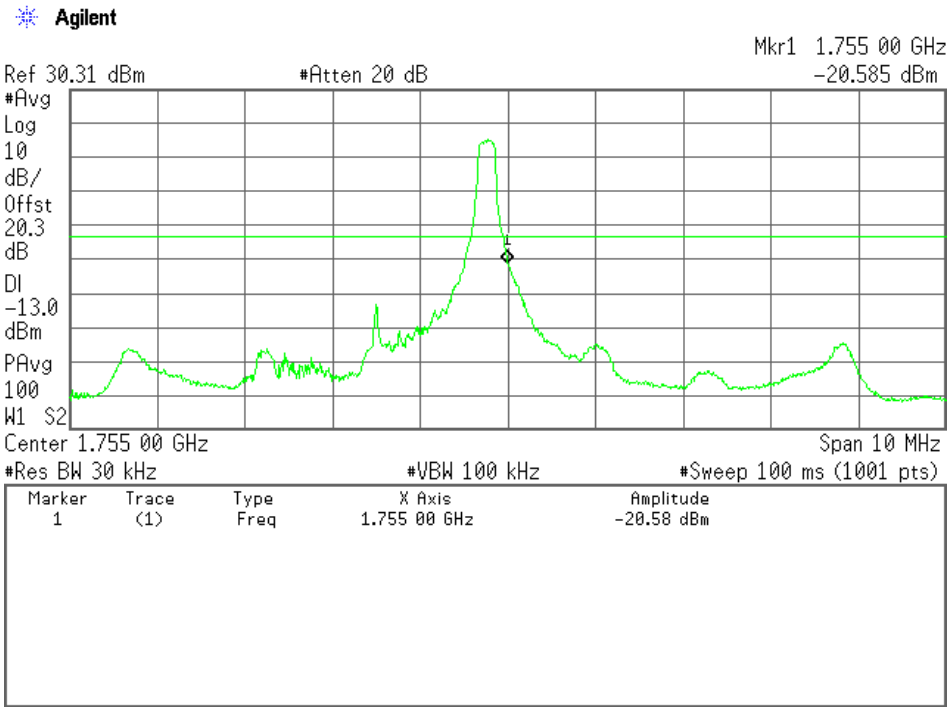
Low Channel(1RB Offset 0), Band-Edge Emission



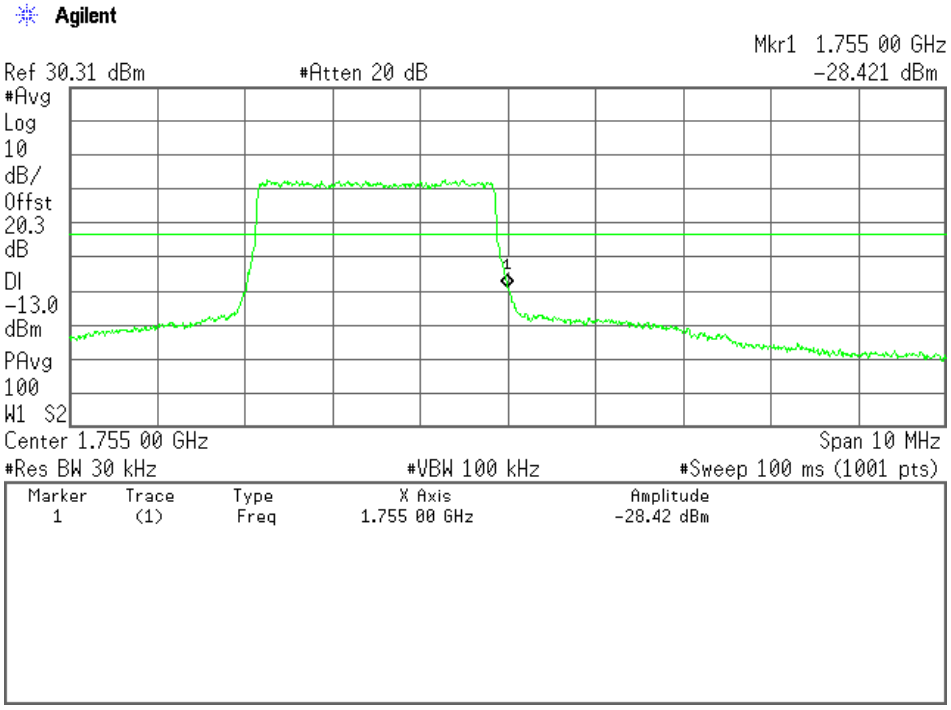
Low Channel(Full RB), Band-Edge Emission



High Channel(1RB Offset Max), Band-Edge Emission



High Channel(Full RB), Band-Edge Emission

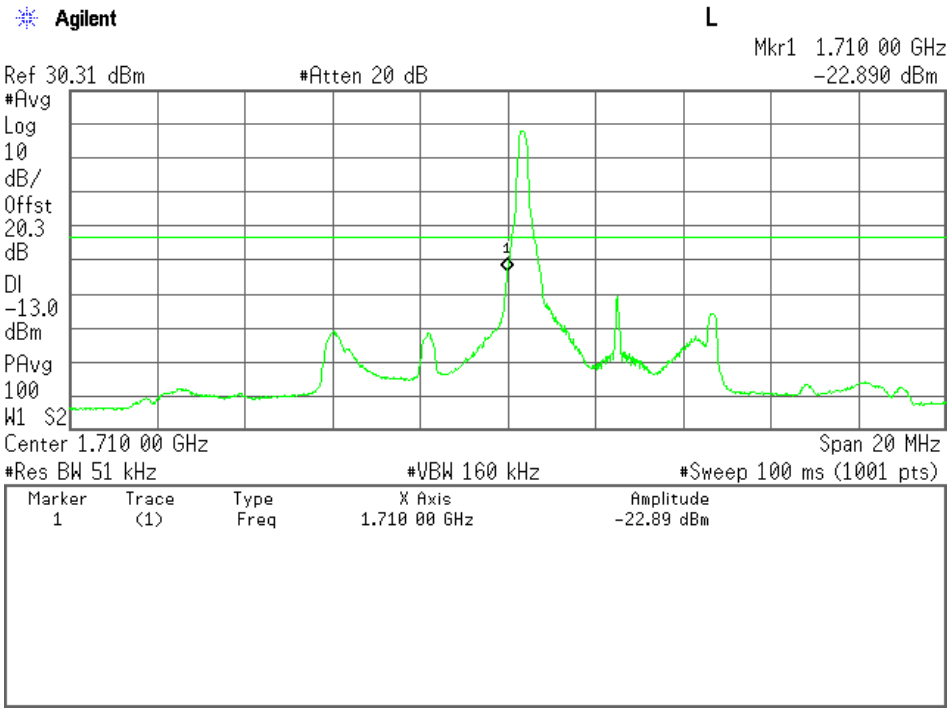


3-1) BW 5MHz

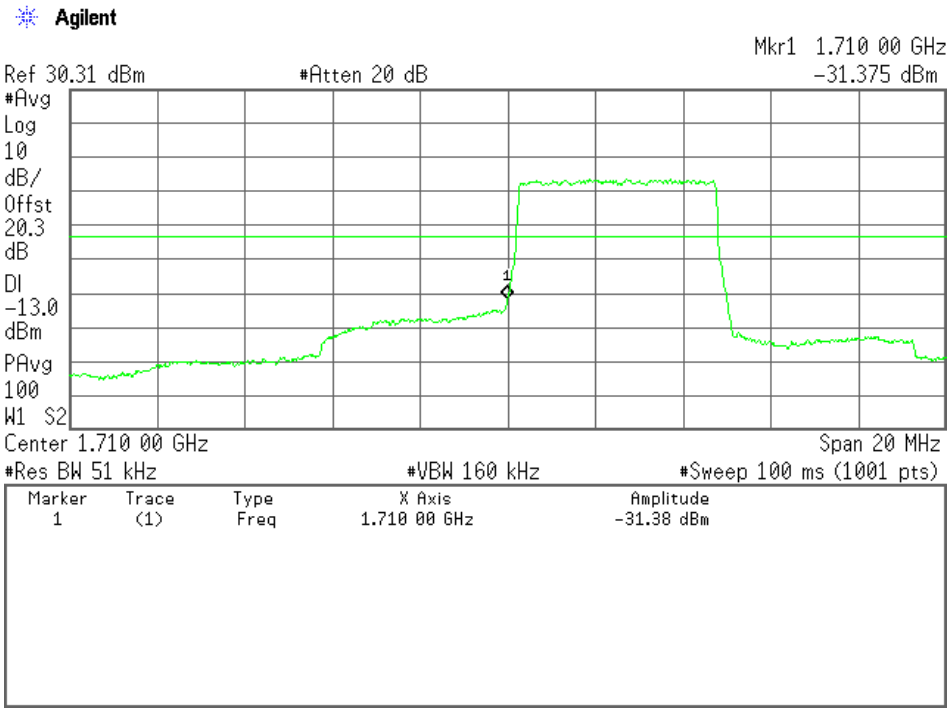
Mode: QPSK

Channel	Frequency (MHz)	Band-Edge Frequency (MHz)	Level (dBm)	Limits (dBm)	Margin (dB)
19975	1712.50	1710.0	-22.9 (at 1710.0 MHz)	-13.0	+9.9
20375	1752.50	1755.0	-22.1 (at 1755.0 MHz)	-13.0	+9.1

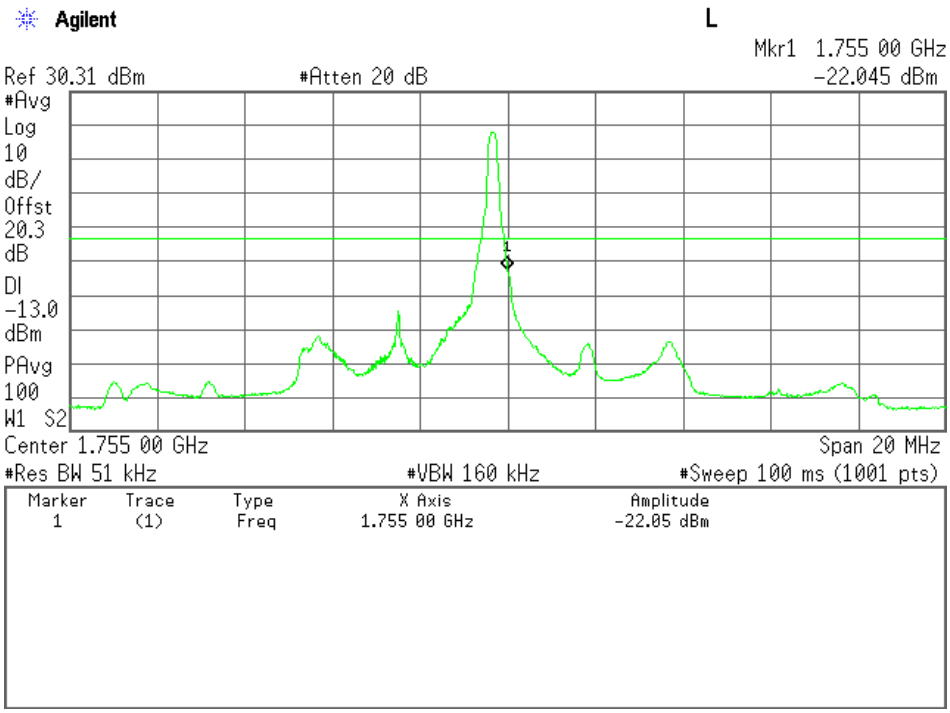
Low Channel(1RB Offset 0), Band-Edge Emission



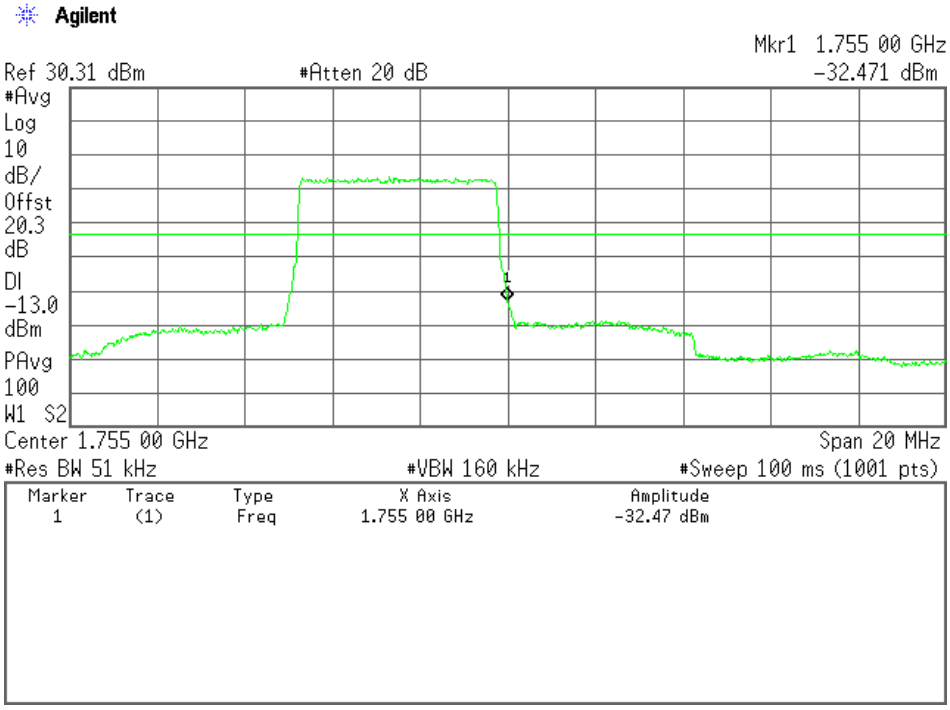
Low Channel(Full RB), Band-Edge Emission



High Channel(1RB Offset Max), Band-Edge Emission



High Channel(Full RB), Band-Edge Emission

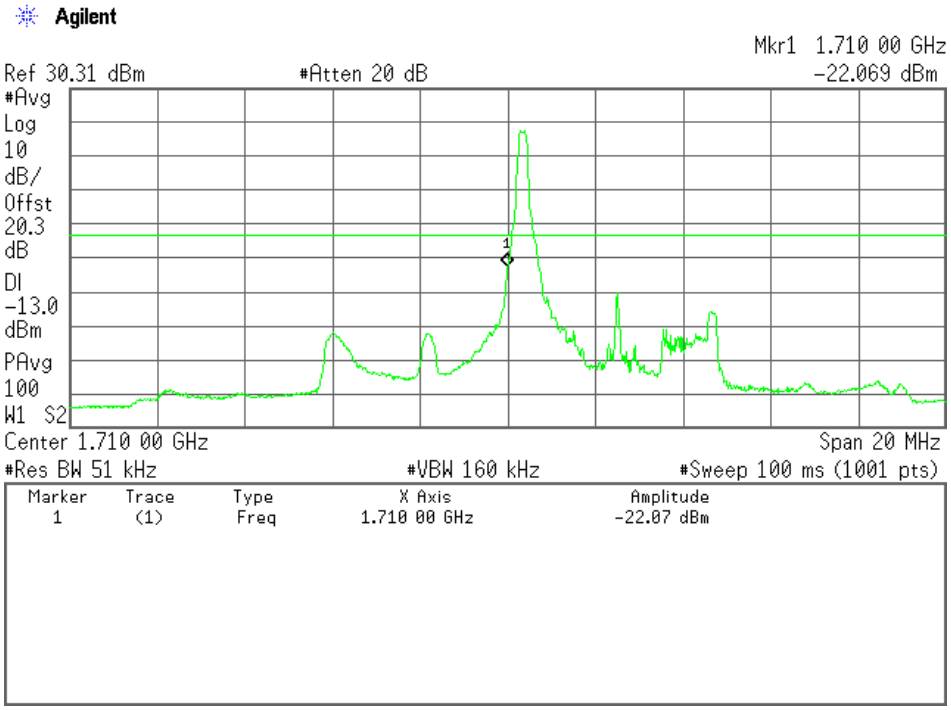


3-2) BW 5MHz

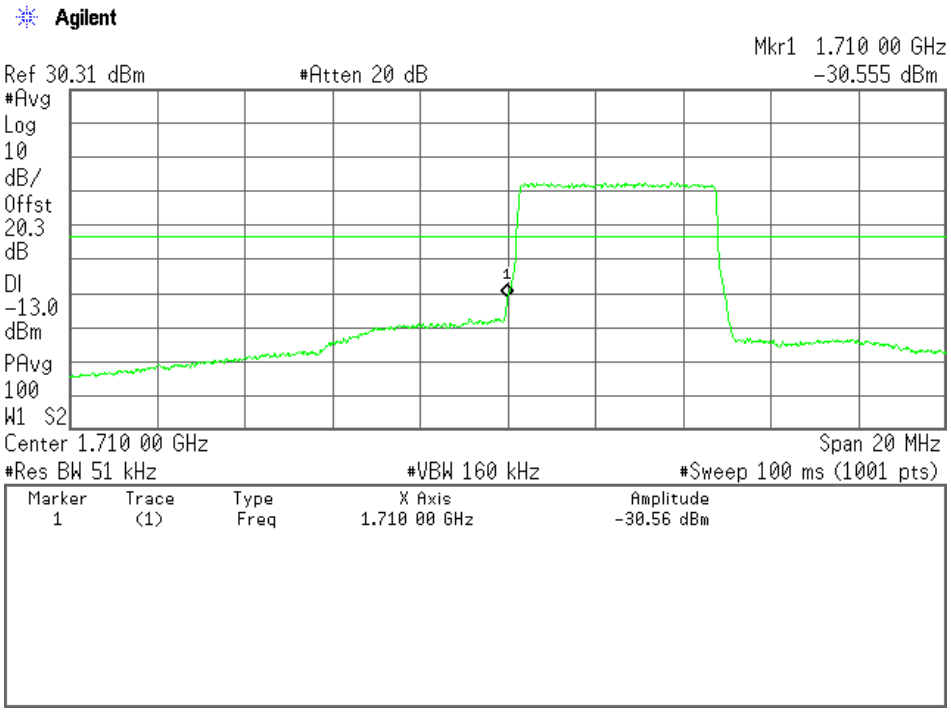
Mode:16 QAM

Channel	Frequency (MHz)	Band-Edge Frequency (MHz)	Level (dBm)	Limits (dBm)	Margin (dB)
19975	1712.50	1710.0	-22.1 (at 1710.0 MHz)	-13.0	+9.1
20375	1752.50	1755.0	-21.3 (at 1755.0 MHz)	-13.0	+8.3

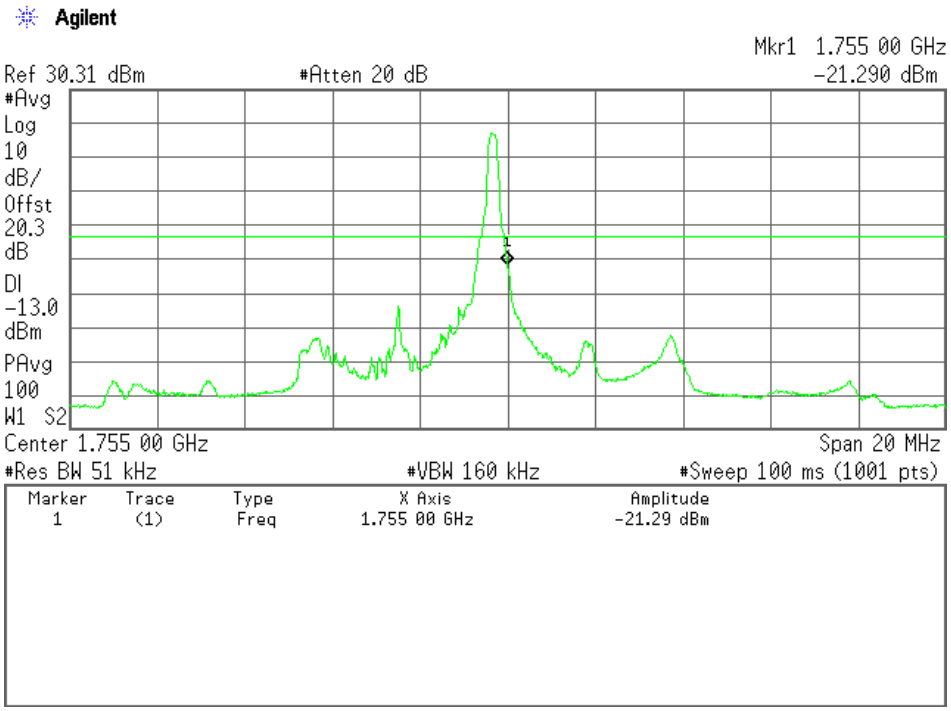
Low Channel(1RB Offset 0), Band-Edge Emission



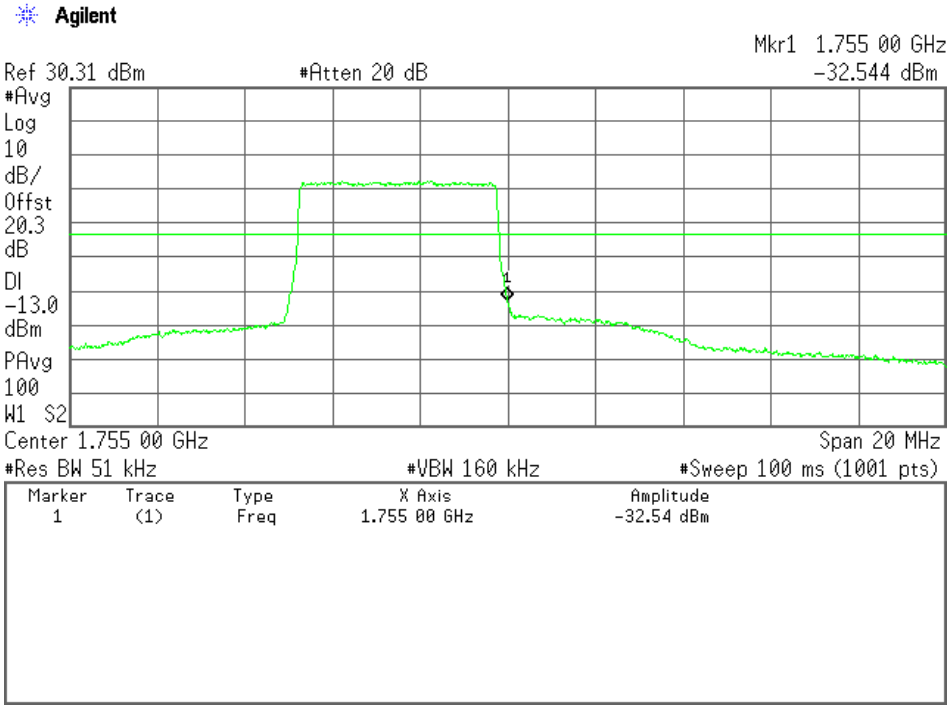
Low Channel(Full RB), Band-Edge Emission



High Channel(1RB Offset Max), Band-Edge Emission



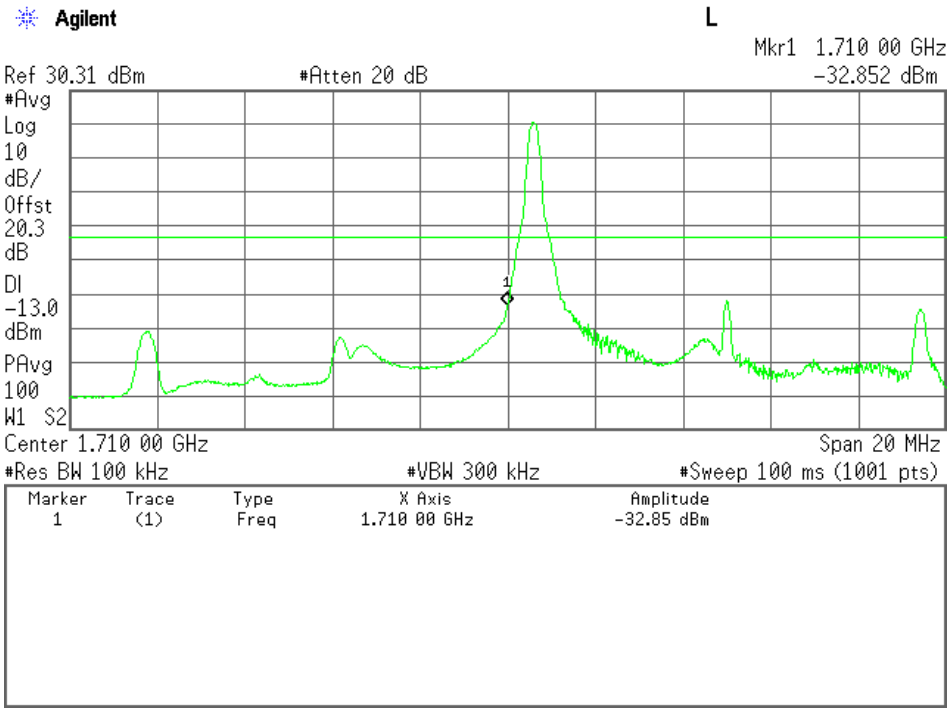
High Channel(Full RB), Band-Edge Emission



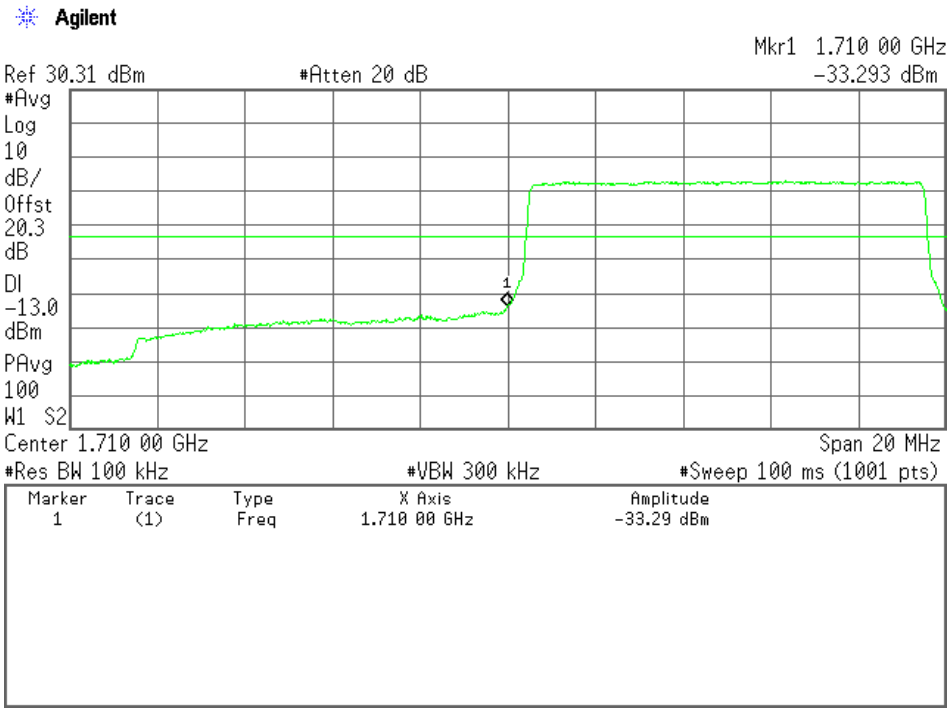
4-1) BW 10MHz
Mode: QPSK

Channel	Frequency (MHz)	Band-Edge Frequency (MHz)	Level (dBm)	Limits (dBm)	Margin (dB)
20000	1715.00	1710.0	-32.9 (at 1710.0 MHz)	-13.0	+19.9
20350	1750.00	1755.0	-32.4 (at 1755.0 MHz)	-13.0	+19.4

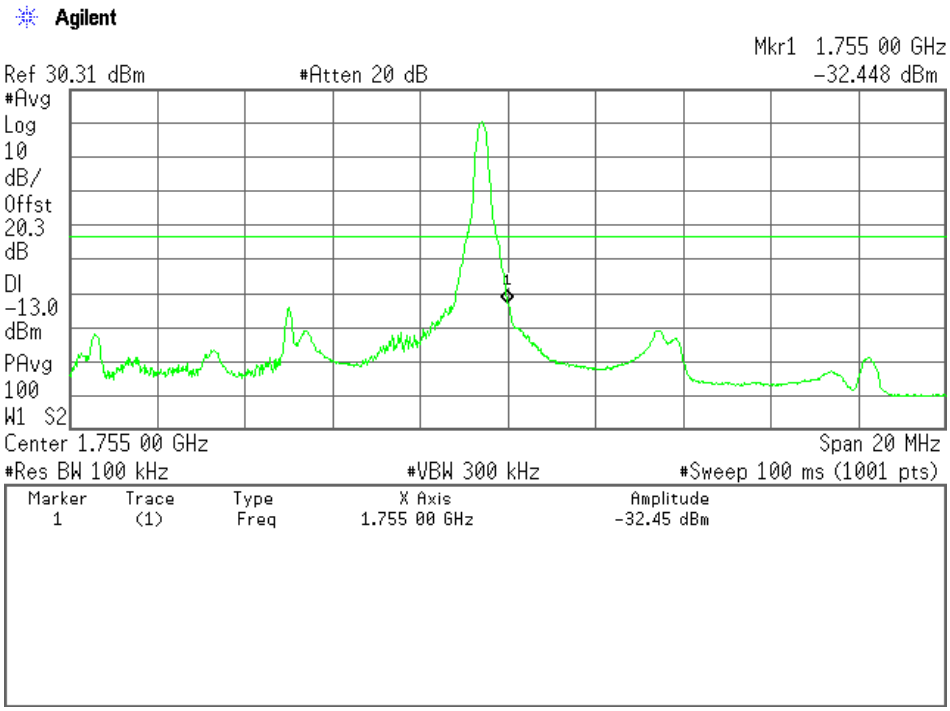
Low Channel(1RB Offset 0), Band-Edge Emission



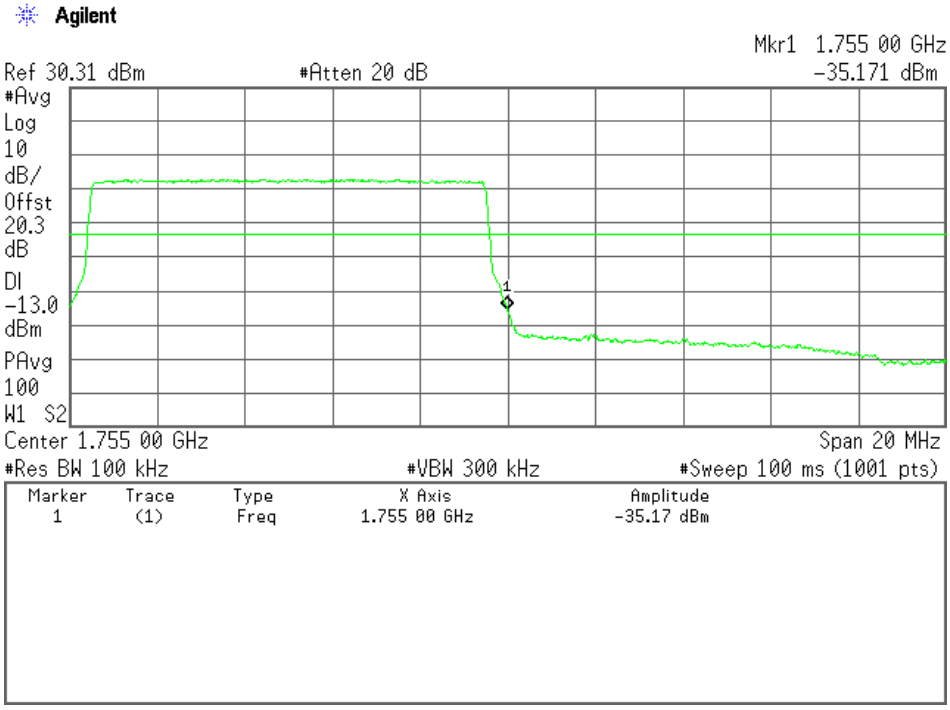
Low Channel(Full RB), Band-Edge Emission



High Channel(1RB Offset Max), Band-Edge Emission



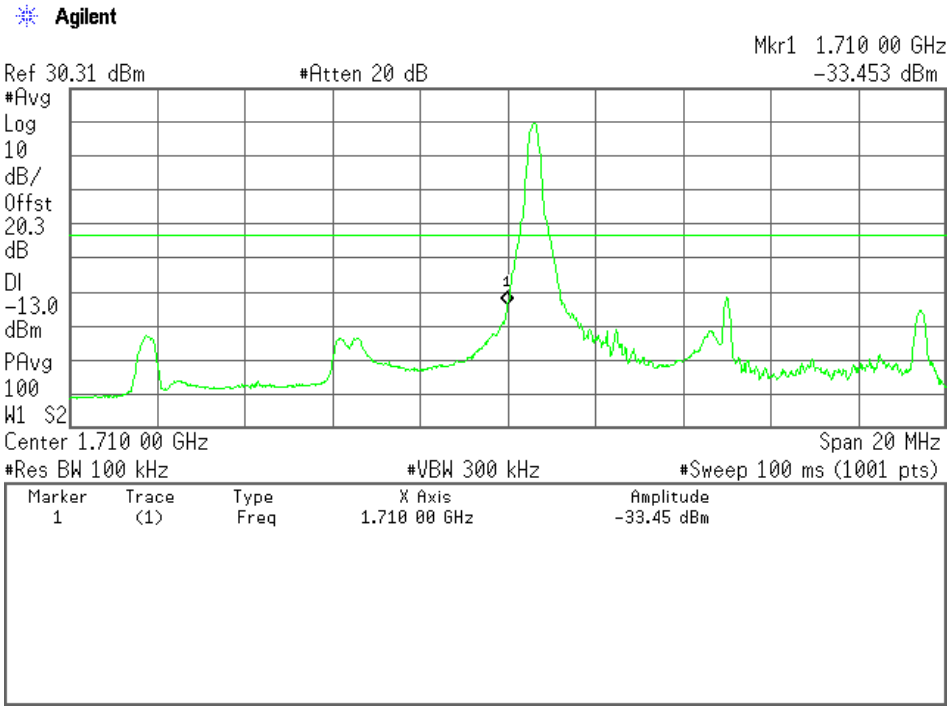
High Channel(Full RB), Band-Edge Emission



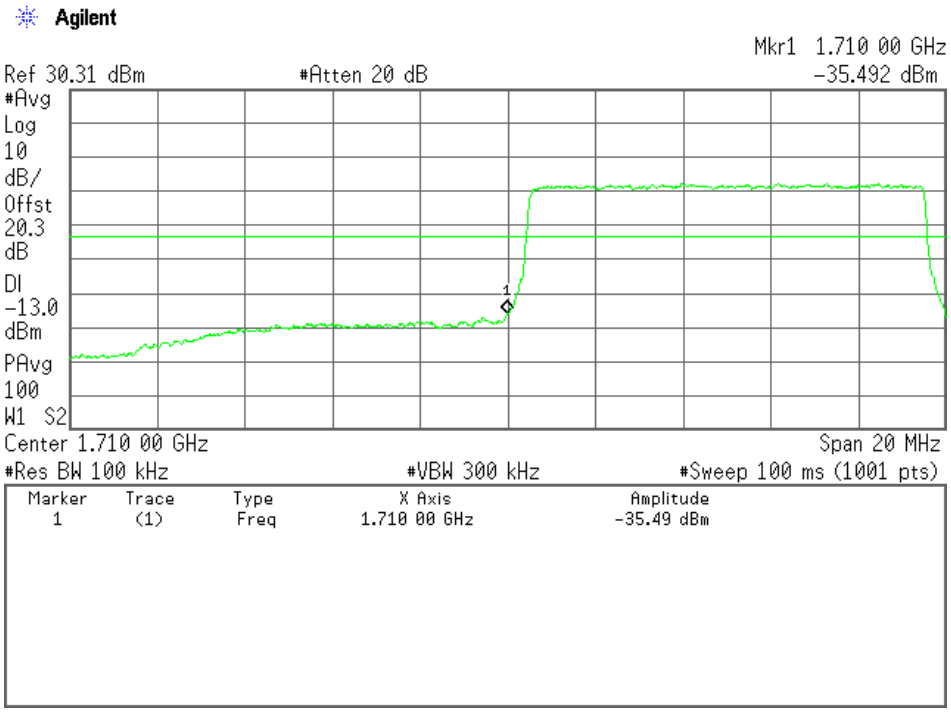
4-2) BW 10MHz
Mode:16 QAM

Channel	Frequency (MHz)	Band-Edge Frequency (MHz)	Level (dBm)	Limits (dBm)	Margin (dB)
20000	1715.00	1710.0	-33.5 (at 1710.0 MHz)	-13.0	+20.5
20350	1750.00	1755.0	-33.2 (at 1755.0 MHz)	-13.0	+20.2

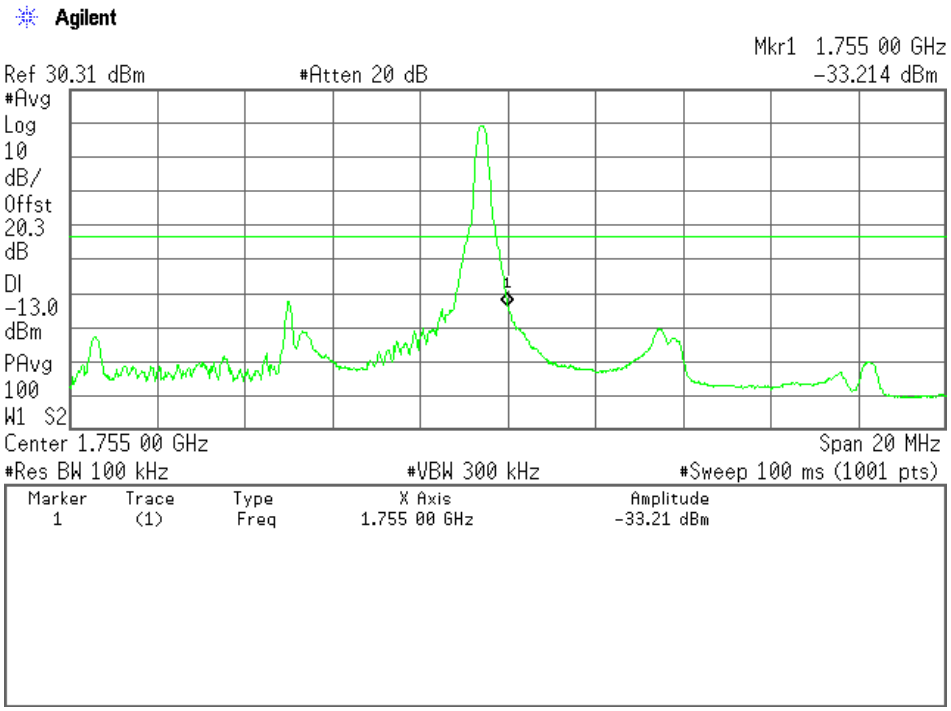
Low Channel(1RB Offset 0), Band-Edge Emission



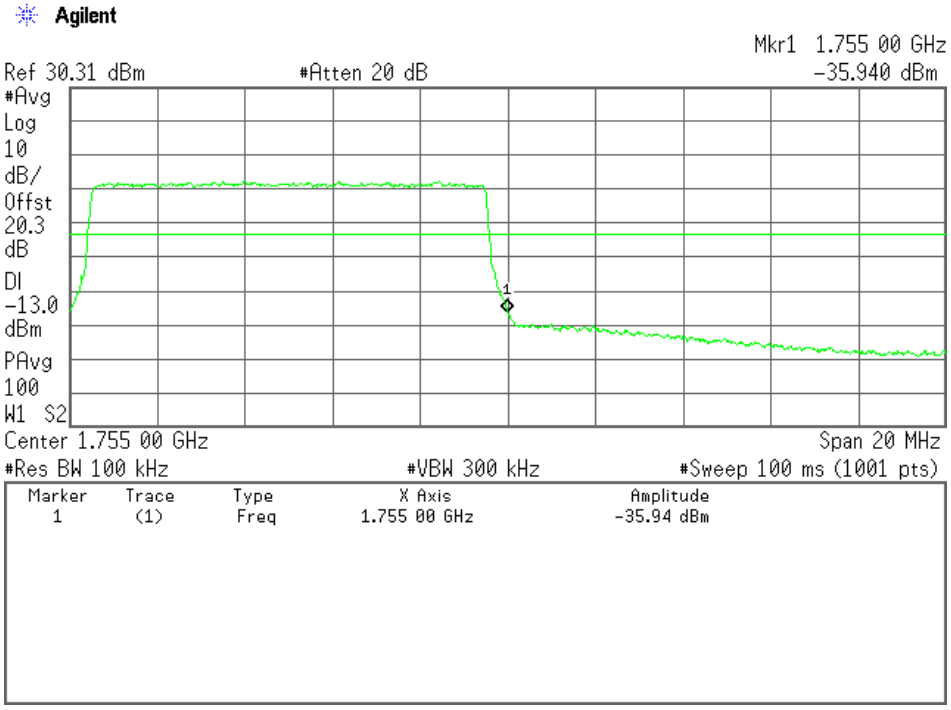
Low Channel(Full RB), Band-Edge Emission



High Channel(1RB Offset Max), Band-Edge Emission



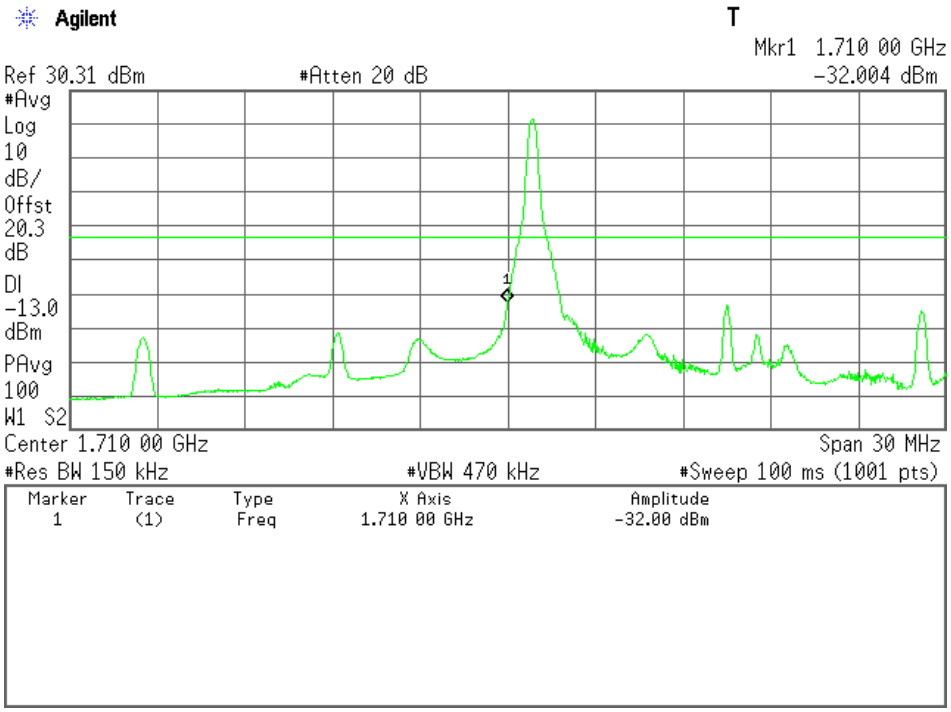
High Channel(Full RB), Band-Edge Emission



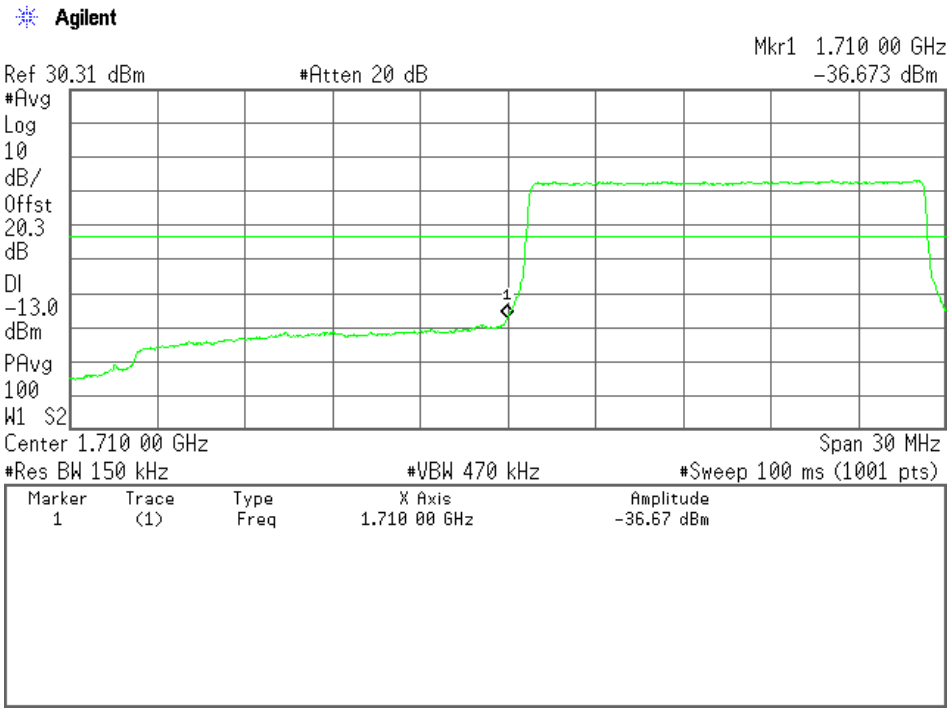
5-1) BW 15MHz
Mode: QPSK

Channel	Frequency (MHz)	Band-Edge Frequency (MHz)	Level (dBm)	Limits (dBm)	Margin (dB)
20025	1717.50	1710.0	-32.0 (at 1710.0 MHz)	-13.0	+19.0
20325	1747.50	1755.0	-30.8 (at 1755.0 MHz)	-13.0	+17.8

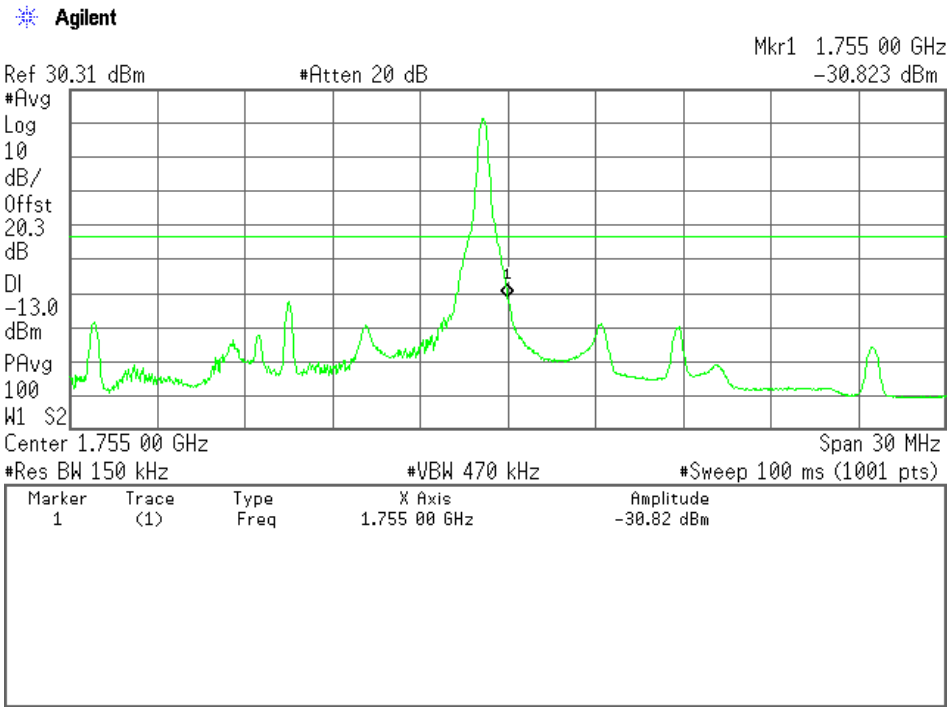
Low Channel(1RB Offset 0), Band-Edge Emission



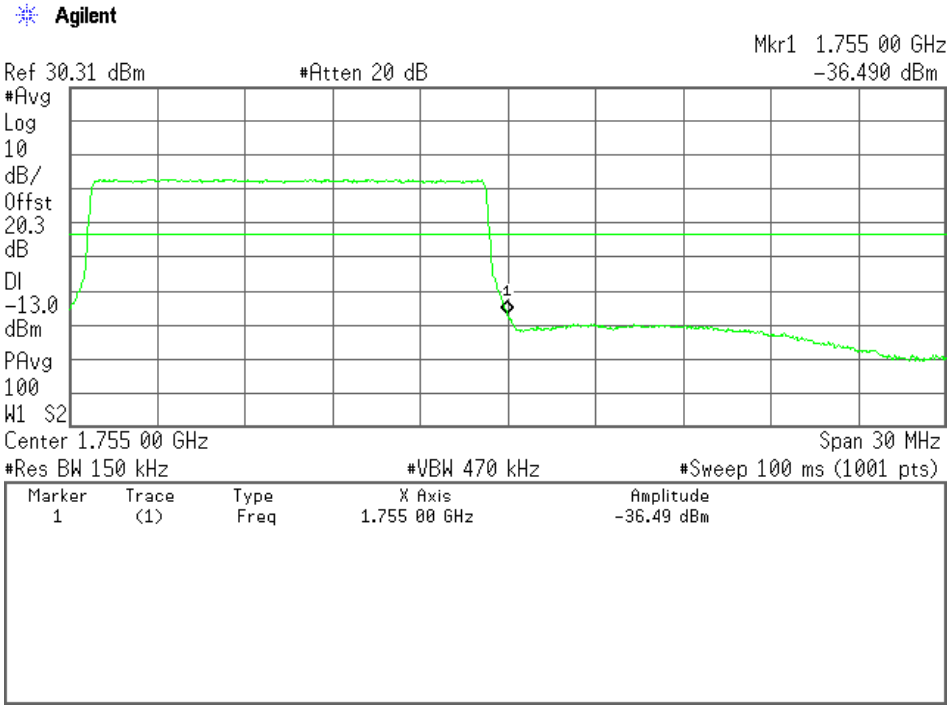
Low Channel(Full RB), Band-Edge Emission



High Channel(1RB Offset Max), Band-Edge Emission



High Channel(Full RB), Band-Edge Emission

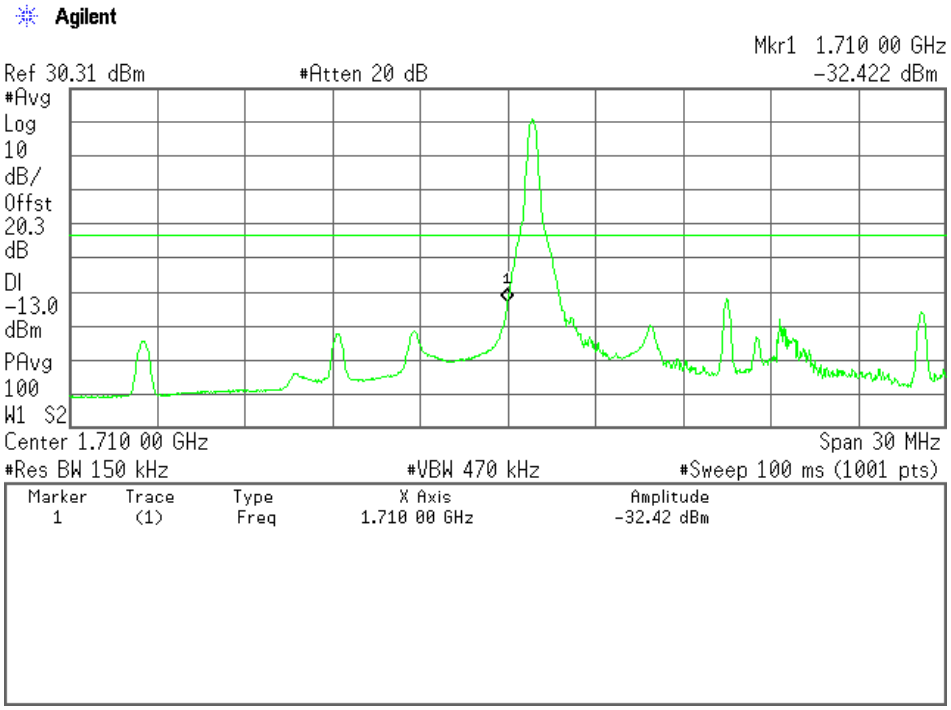


5-2) BW 15MHz

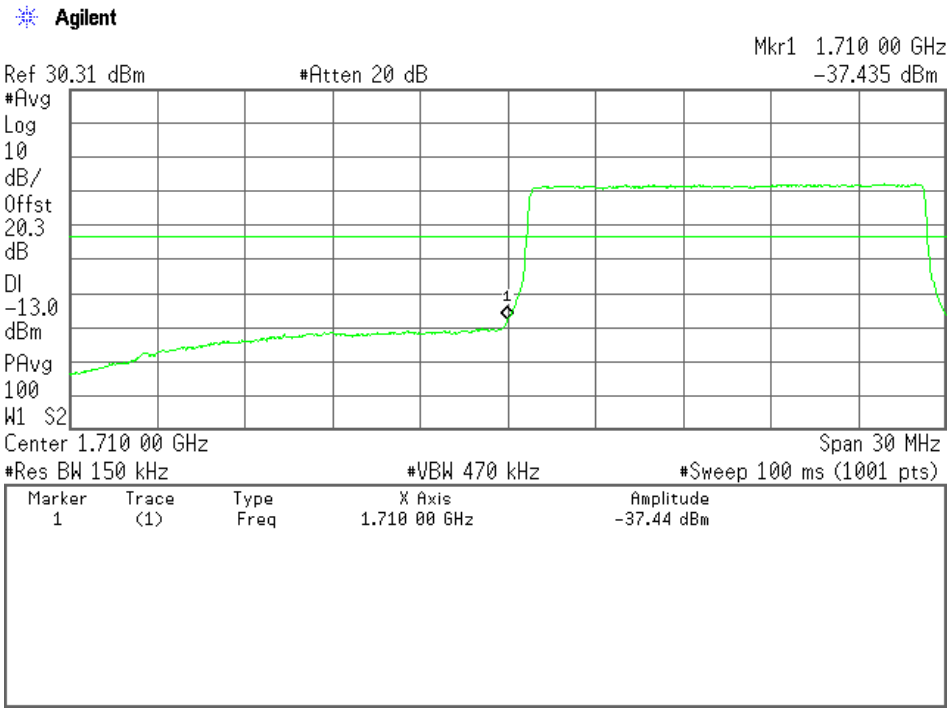
Mode:16 QAM

Channel	Frequency (MHz)	Band-Edge Frequency (MHz)	Level (dBm)	Limits (dBm)	Margin (dB)
20025	1717.50	1710.0	-32.4 (at 1710.0 MHz)	-13.0	+19.4
20325	1747.50	1755.0	-30.4 (at 1755.0 MHz)	-13.0	+17.4

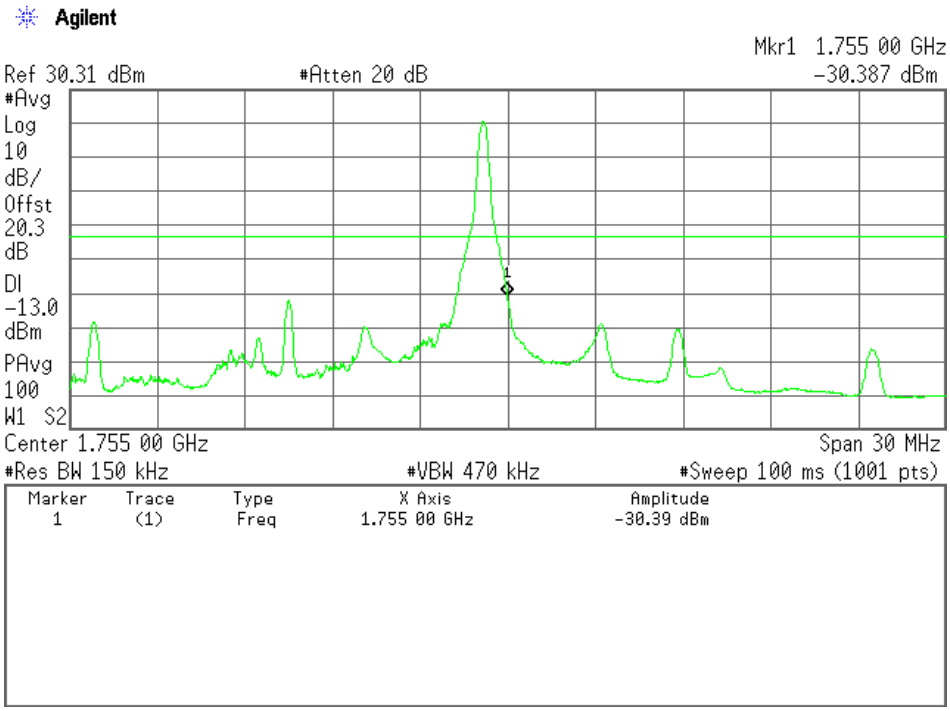
Low Channel(1RB Offset 0), Band-Edge Emission



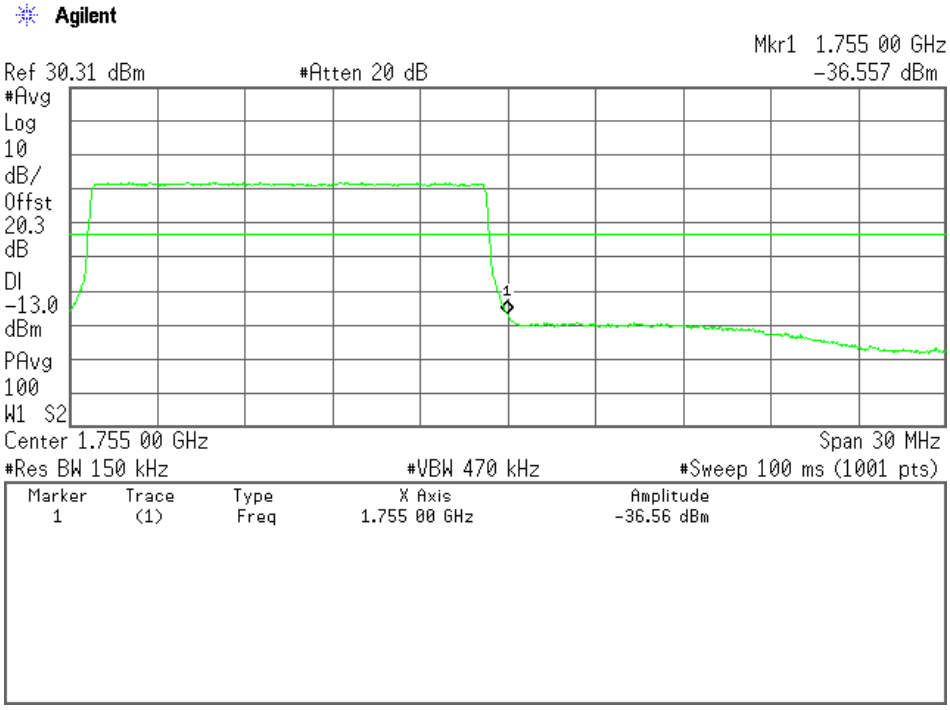
Low Channel(Full RB), Band-Edge Emission



High Channel(1RB Offset Max), Band-Edge Emission



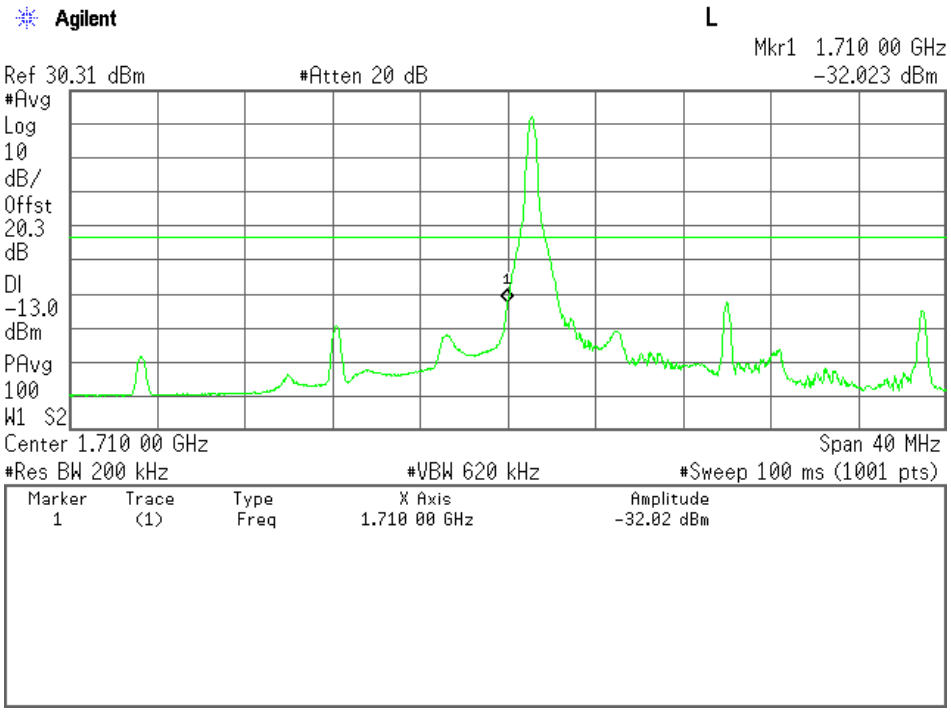
High Channel(Full RB), Band-Edge Emission



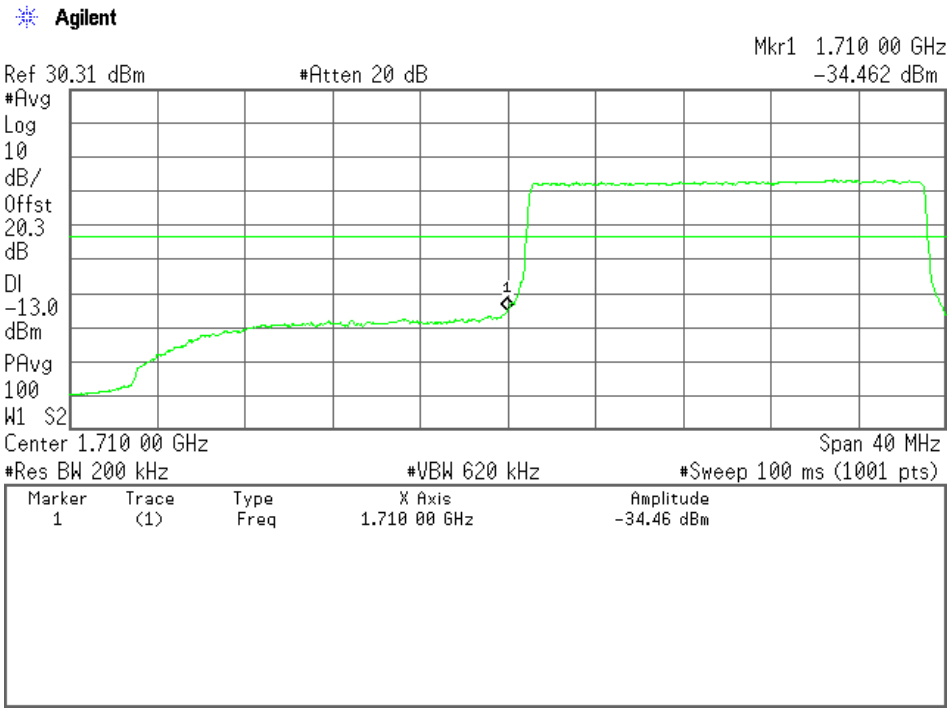
6-1) BW 20MHz
Mode: QPSK

Channel	Frequency (MHz)	Band-Edge Frequency (MHz)	Level (dBm)	Limits (dBm)	Margin (dB)
20050	1720.00	1710.0	-32.0 (at 1710.0 MHz)	-13.0	+19.0
20300	1745.00	1755.0	-31.6 (at 1755.0 MHz)	-13.0	+18.6

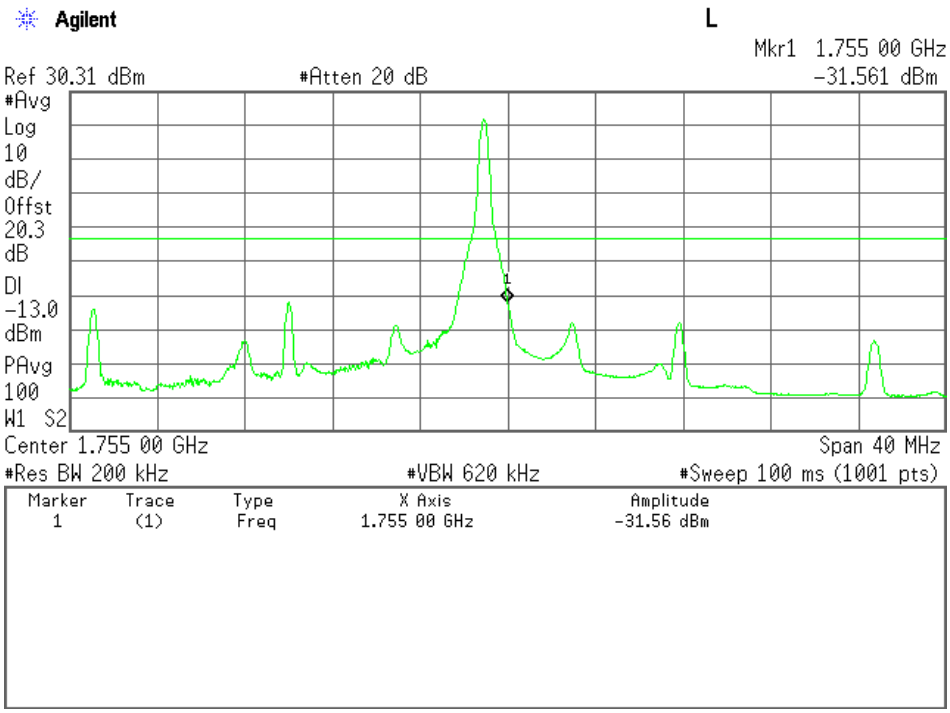
Low Channel(1RB Offset 0), Band-Edge Emission



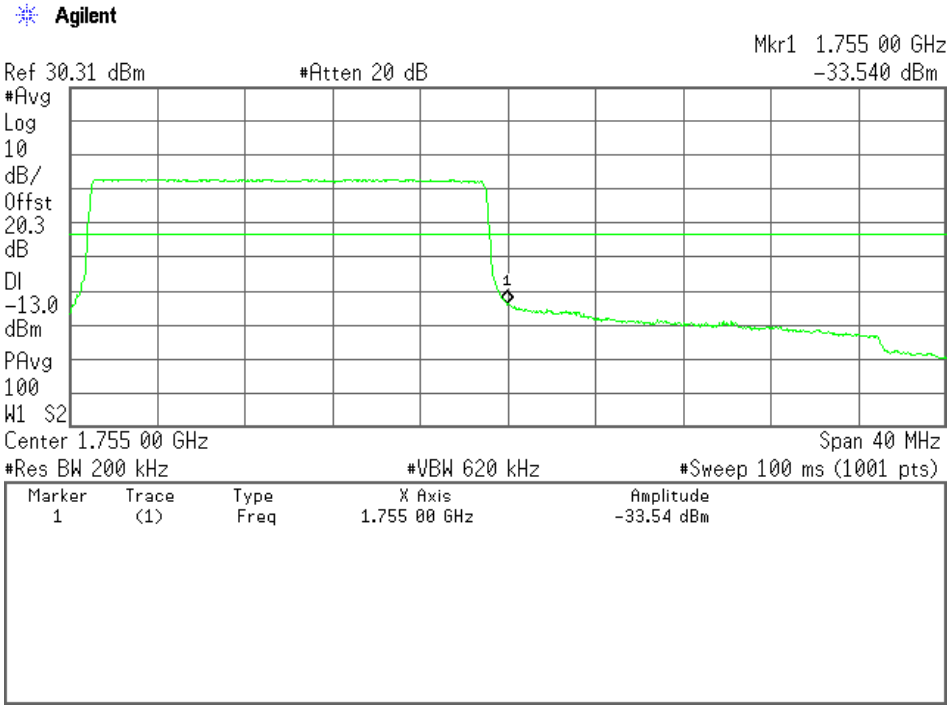
Low Channel(Full RB), Band-Edge Emission



High Channel(1RB Offset Max), Band-Edge Emission



High Channel(Full RB), Band-Edge Emission

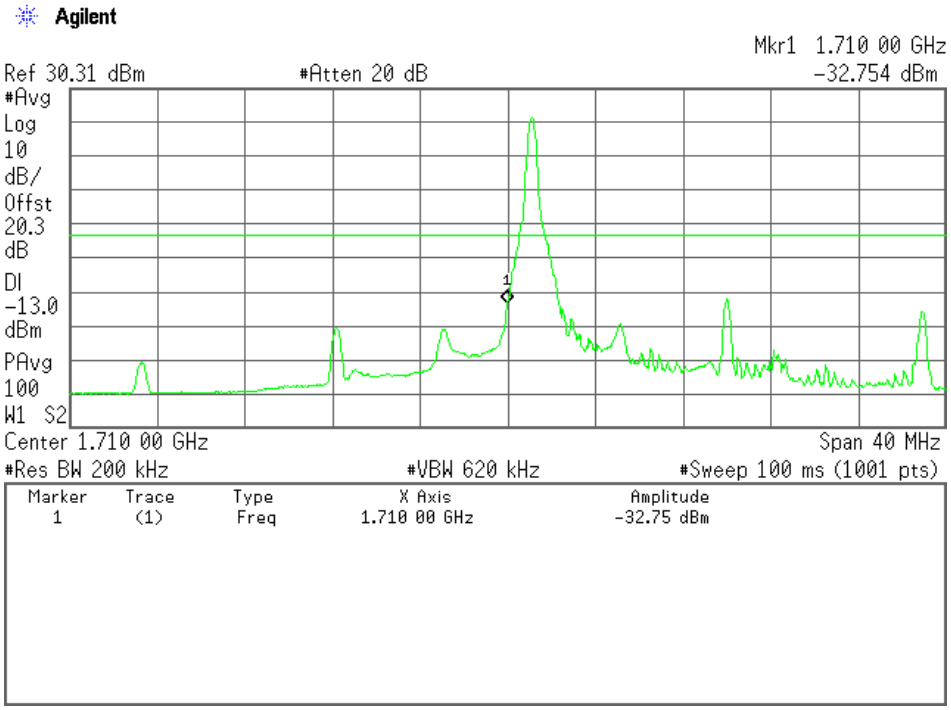


6-2) BW 20MHz

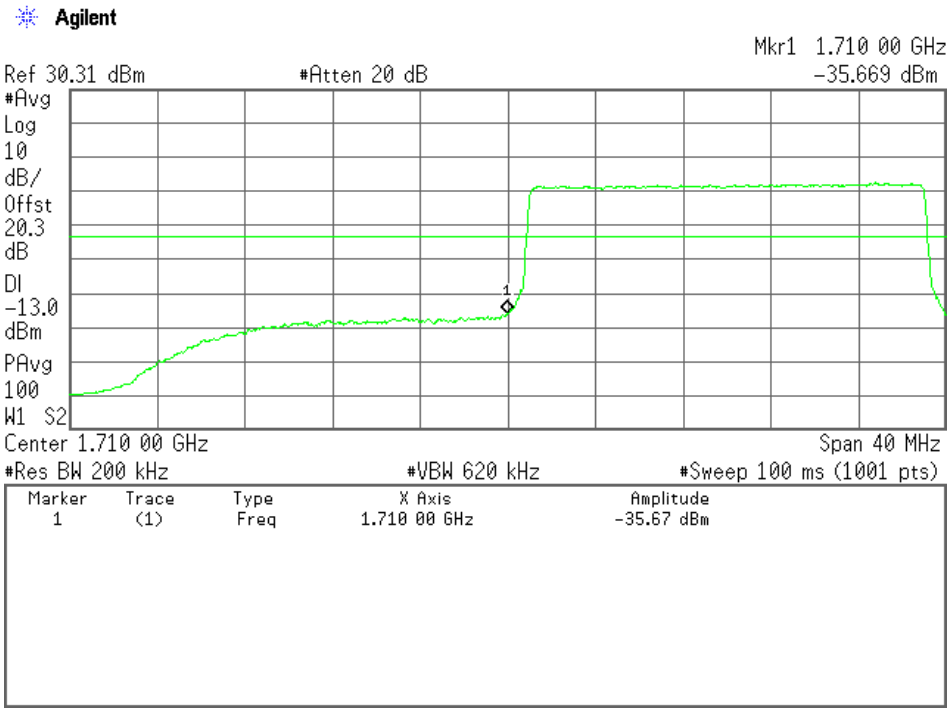
Mode:16 QAM

Channel	Frequency (MHz)	Band-Edge Frequency (MHz)	Level (dBm)	Limits (dBm)	Margin (dB)
18700	1860.00	1710.0	-32.8 (at 1710.0 MHz)	-13.0	+19.8
19100	1900.00	1755.0	-33.6 (at 1755.0 MHz)	-13.0	+20.6

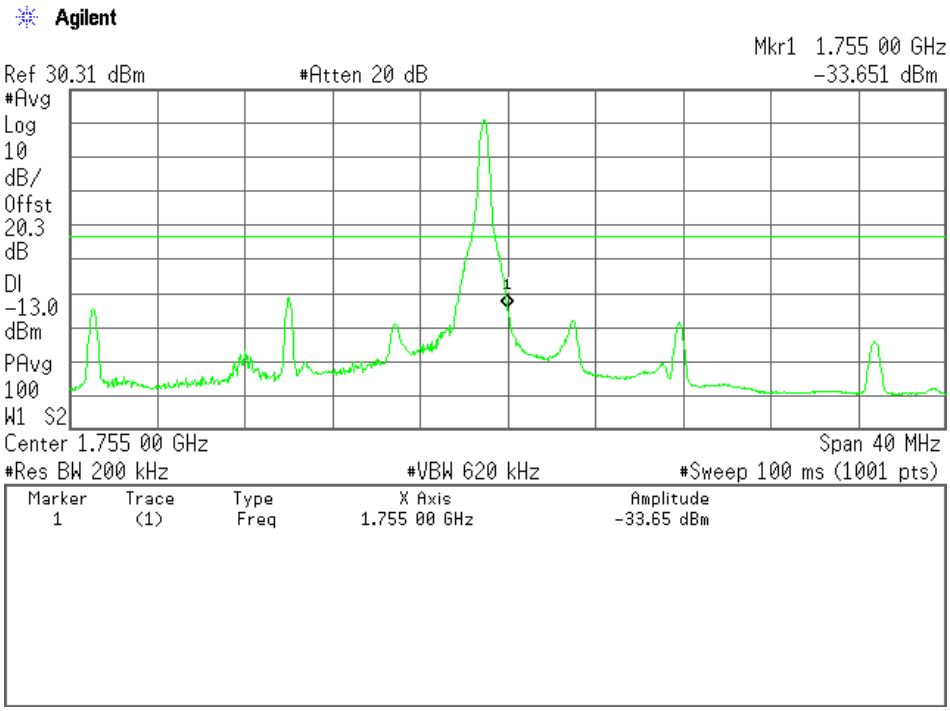
Low Channel(1RB Offset 0), Band-Edge Emission



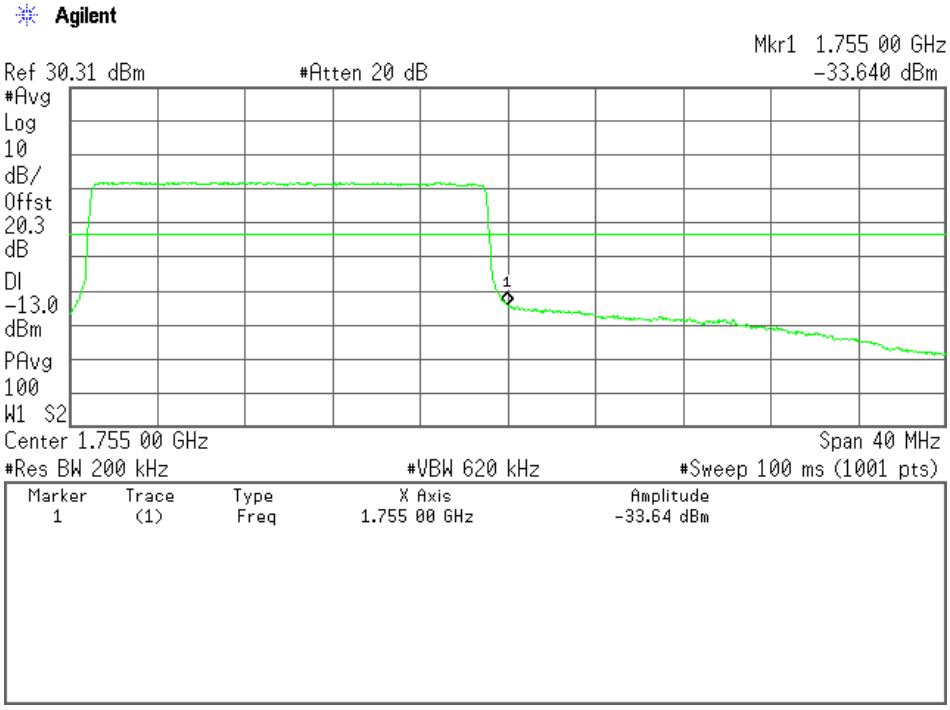
Low Channel(Full RB), Band-Edge Emission



High Channel(1RB Offset Max), Band-Edge Emission



High Channel(Full RB), Band-Edge Emission



7.7 Field Strength of Spurious Radiation (§2.1053)

For the requirements, ☑ - Applicable [☑ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

7.7.1 Test Results

For the standard, ☑ - **Passed** ☐ - **Failed** ☐ - **Not judged**

Min. Limit Margin >19.9 dB at 17543/17535 MHz

Uncertainty of Measurement Results		
30 MHz – 1000 MHz	± 1.6	dB(2σ)
1 GHz – 18 GHz	± 1.8	dB(2σ)
18 GHz – 40 GHz	± 2.7	dB(2σ)

Remarks :

7.7.2 Test Instruments

Anechoic Chamber A2				
Type	**Model**	**Serial No. (ID)**	**Manufacturer**	**Cal. Due**
Test Receiver	ESU 26	100170 (A-6)	Rohde & Schwarz	2016/04/25
Signal Generator	E8257D	MY45140309 (B-39)	Agilent	2016/08/10
Power Meter	N1911A	GB45100291 (B-63)	Agilent	2016/07/16
Power Sensor	N1921A	US44510470 (B-64)	Agilent	2016/07/16
Biconical Antenna	VHA9103/BBA9106	2355 (C-30)	Schwarzbeck	2016/05/24
Log-periodic Antenna	UHALP9108-A1	0694 (C-31)	Schwarzbeck	2016/05/24
Dipole Antenna (TX)	KBA-511A	0-273-2 (C-17)	Kyoritsu	2016/05/20
Dipole Antenna (TX)	KBA-611	0-248-2 (C-20)	Kyoritsu	2016/05/20
RF Cable	S 10162 B-11 etc.	--- (H-4)	HUBER+SUHNER	2016/04/15
Pre-Amplifier	TPA0118-36	1010 (A-37)	TOYO	2016/05/11
Horn Antenna	91888-2	562 (C-41-1)	EATON	2016/06/16
Horn Antenna	91889-2	568 (C-41-2)	EATON	2016/06/16
Horn Antenna	3160-04	9903-1053 (C-55)	EMCO	2016/06/29
Horn Antenna	3160-05	9902-1061 (C-56)	EMCO	2016/06/29
Horn Antenna	3160-06	9712-1045 (C-57)	EMCO	2016/06/29
Horn Antenna	3160-07	9902-1113 (C-58)	EMCO	2016/06/29
Horn Antenna	3160-08	9904-1099 (C-59)	EMCO	2016/06/29
Horn Antenna	3160-09	9808-1117 (C-48)	EMCO	2016/06/28
Attenuator	2-10	AW7937 (D-40)	Weinschel	2015/10/26
Attenuator	54A-10	W5713 (D-29)	Weinschel	2016/08/16
Attenuator	2-10	BA6214 (D-79)	Weinschel	2015/11/18
RF Cable	SUCOFLEX102E	6683/2E (C-70)	HUBER+SUHNER	2015/11/18
RF Cable	SUCOFLEX104	267479/4 (C-66)	HUBER+SUHNER	2016/01/19
RF Cable	SUCOFLEX104	267414/4 (C-67)	HUBER+SUHNER	2016/01/19
RF Cable	SUCOFLEX102EA	3041/2EA (C-69)	HUBER+SUHNER	2016/01/19
High Pass Filter	HPM13899	001 (D-96)	MICRO-TRONICS	2016/02/08

NOTE : The calibration interval of the above test instruments is 12 months.

7.7.3 Test Method and Test Setup (Diagrammatic illustration)

Step 1) The spurious radiation for transmitter were measured at the distance 3 m away from the EUT which was placed on a non-conducted support 0.8 m in height and was varying at three orthogonal axes. The receiving antenna was oriented for vertical polarization and varied from 1 m to 4 m until the maximum emission level was detected on the measuring instrument. The EUT was rotated 360 degrees until the maximum emission was received. The measurement was also repeated with the receiving antenna in the horizontal polarization.
This test was carried out using the half-wave dipole antenna for up to 1GHz and using the horn antenna for above 1 GHz.

Step 2)

A) Up to 1 GHz
The ERP measurement was carried out with according to Step 2 in Clause 7.2.3. Then the RF power in the substitution antenna half-wave dipole antenna for up to 1 GHz and the substitution horn antenna for above 1 GHz.

The ERP is calculated in the following equation.

ERP (dBm) = P (dBm) - (Balun Loss of the half-wave dipole Ant. (dB)) + Cable Loss (dB)

B) Above 1 GHz
The ERP is calculated from the maximum emission level by the following formula.

$$\frac{e^2}{120\pi} = \frac{eirp}{4\pi d^2} \quad \text{----(Eq.1)}$$

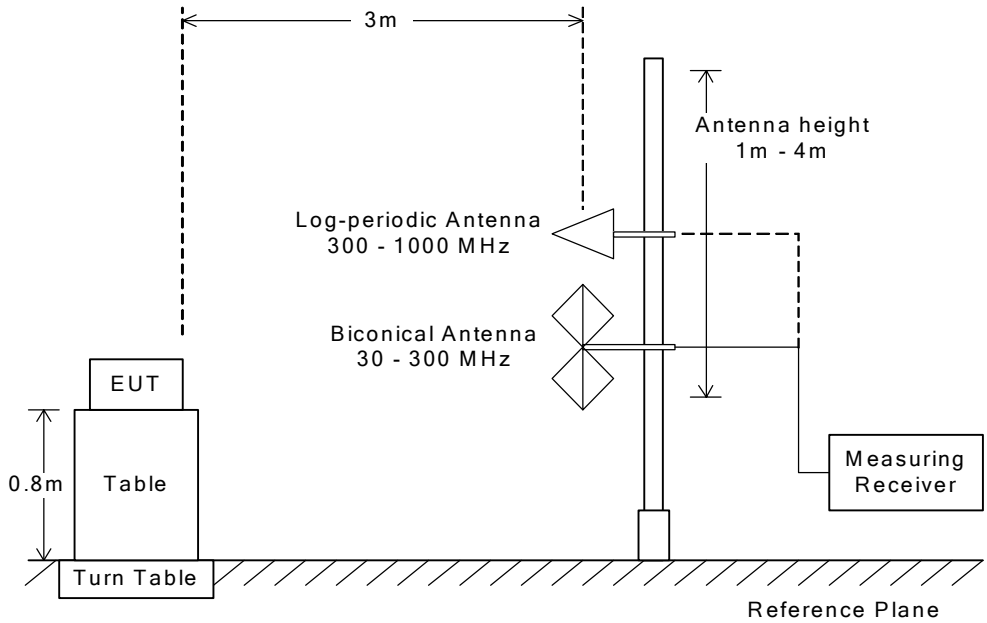
$$erp = eirp - Gd \quad \text{----(Eq.2)}$$

Where, $e[V/m]$: : Field Strength at measuring distance(d=3m)
$eirp[W]$: Equivalent Isotropic Radiated Power
$erp[W]$: Effective Radiated Power
$Gd(dBi)$: Gain of the substitution half-wave dipole antenna(2.15dBi)

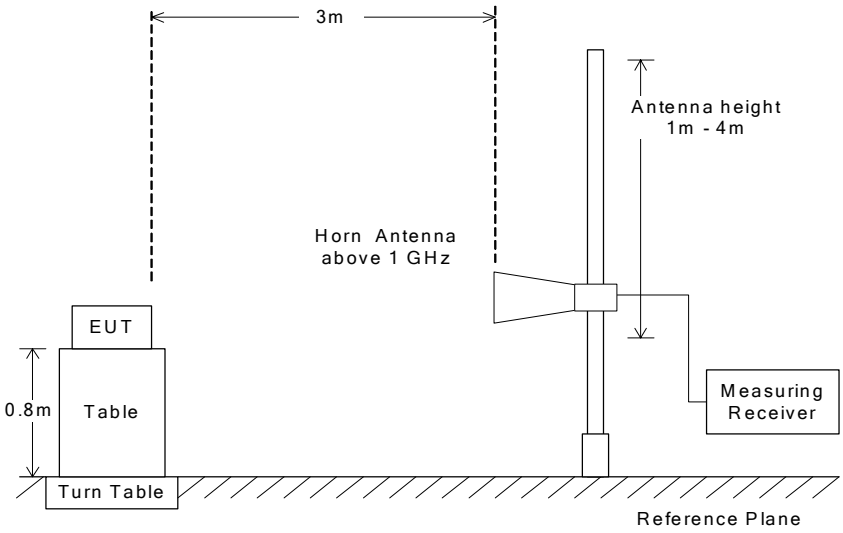
$$eirp = \frac{(de)^2}{30} = \frac{3}{10}e^2$$
$$\therefore 10\log(eirp) = 20\log(e) + 10\log(3/10) = 20\log(e) - 5.23$$
$$10\log(eirp) = EIRP[dBm] - 30$$
$$20\log(e) = E[dB(\mu V/m)] - 120$$
$$\therefore EIRP = E - 120 + 30 - 5.23 = E - 95.23$$
$$\therefore ERP[dBm] = EIRP - 2.15 = E - 97.38$$

The respective calculated ERP of the spurious and harmonics were compared with the ERP of fundamental frequency by specified attenuation limits, $43+10\log_{10}$ (TP in watt)[dB]. Where, TP = Transmitter power at the ANT OUT under test configuration as the hands free unit used.

Radiated Emission 30 MHz to 1000 MHz

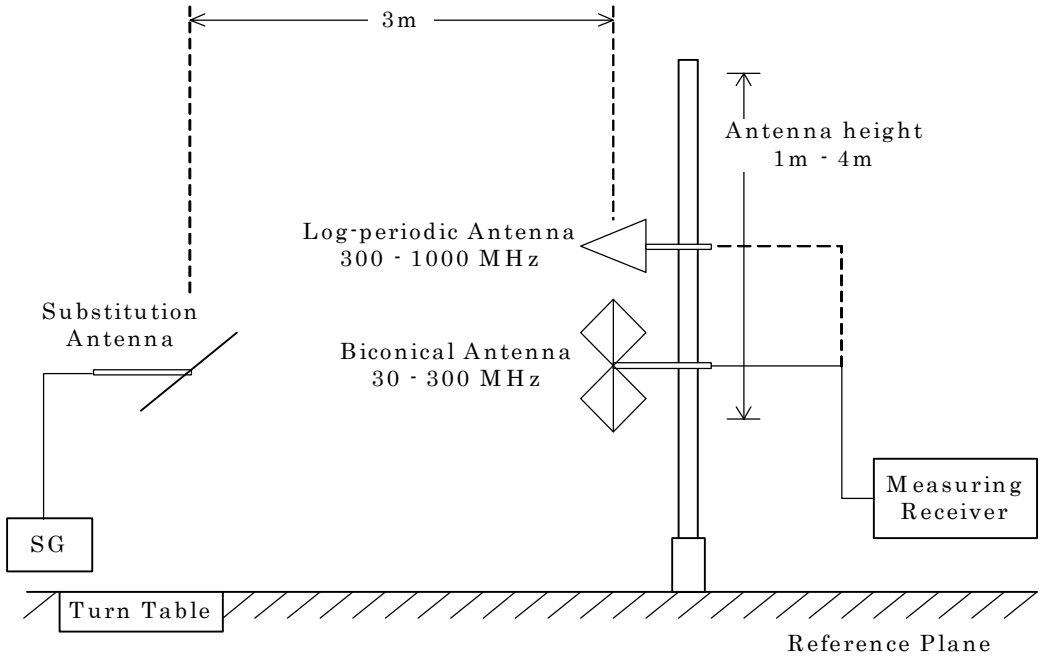


Radiated Emission above 1 GHz



NOTE
The antenna height is scanned depending on the EUT's size and mounting height.

Radiated Emission 30 to 1000 MHz – Substitution Method



7.7.4 Test Data

1) BW 1.4MHz(1RB)

(LTE 1.4MHz)

Test Date: September 18, 2015
Temp.: 24 °C, Humi: 70 %

Test Configuration : Single Unit

Transmitting Frequency CH	Transmitting Frequency [MHz]	Measured Frequency [MHz]	ERP [dBm] Hori.	ERP [dBm] Vert.	Limits [dBm]	Margin [dB]	Remarks
19957	1710.700	3421.400	< -54.1	< -54.1	-13.0	> +41.1	C
		5132.100	< -47.3	< -47.3	-13.0	> +34.3	C
		6842.800	< -45.5	< -45.5	-13.0	> +32.5	C
		8553.500	< -42.5	< -42.5	-13.0	> +29.5	C
		10264.200	< -41.3	< -41.3	-13.0	> +28.3	C
		11974.900	< -40.6	< -40.6	-13.0	> +27.6	C
		13685.600	< -38.7	< -38.7	-13.0	> +25.7	C
		15396.300	< -37.9	< -37.9	-13.0	> +24.9	C
		17107.000	< -34.1	< -34.1	-13.0	> +21.1	C
20175	1732.500	3465.000	< -54.1	< -54.1	-13.0	> +41.1	C
		5197.500	< -47.3	< -47.3	-13.0	> +34.3	C
		6930.000	< -45.6	< -45.6	-13.0	> +32.6	C
		8662.500	< -42.6	< -42.6	-13.0	> +29.6	C
		10395.000	< -41.0	< -41.0	-13.0	> +28.0	C
		12127.500	< -41.1	< -41.1	-13.0	> +28.1	C
		13860.000	< -38.4	< -38.4	-13.0	> +25.4	C
		15592.500	< -37.8	< -37.8	-13.0	> +24.8	C
		17325.000	< -33.3	< -33.3	-13.0	> +20.3	C
20393	1754.300	3508.600	< -54.0	< -54.0	-13.0	> +41.0	C
		5262.900	< -47.2	< -47.2	-13.0	> +34.2	C
		7017.200	< -45.5	< -45.5	-13.0	> +32.5	C
		8771.500	< -42.5	< -42.5	-13.0	> +29.5	C
		10525.800	< -40.8	< -40.8	-13.0	> +27.8	C
		12280.100	< -41.5	< -41.5	-13.0	> +28.5	C
		14034.400	< -38.2	< -38.2	-13.0	> +25.2	C
		15788.700	< -37.7	< -37.7	-13.0	> +24.7	C
		17543.000	< -32.9	< -32.9	-13.0	> +19.9	C

Calculated result at 17543.0 MHz, as the worst point shown on underline:
Minimum Margin: -13.0 - (<-32.9) = >19.9 (dB)

NOTES
1. Test Distance : 3 m
2. The spectrum was checked from 30 MHz to 20 GHz.
3. All emissions not reported were more than 20 dB below the applied limits.
4. Applied limits : -13.0 [dBm] = 10log(TP[mW]) - (43 + 10log(tp[W])) = 10log(TP[mW]) - (43 + (10 log(TP[mW]) - 30))
   where, tp[W] = TP[mW] / 1000 : Transmitter power at anttena terminal
5. The symbol of "<" means "or less".
6. The symbol of ">" means "more than".
7. Setting of measuring instrument(s) :

	Detector Function	RES B.W.	V.B.W.	Sweep Time
A	Peak	10 kHz	30 kHz	20 msec.
B	Peak	100 kHz	300 kHz	20 msec.
C	Peak	1 MHz	3 MHz	20 msec.

2) BW 3MHz(1RB)

(LTE 3MHz)

Test Date: September 18, 2015
Temp.: 24 °C, Humi: 70 %

Test Configuration : Single Unit

Transmitting Frequency CH	Transmitting Frequency [MHz]	Measured Frequency [MHz]	ERP [dBm] Hori.	ERP [dBm] Vert.	Limits [dBm]	Margin [dB]	Remarks
19965	1711.500	3423.000	< -54.1	< -54.1	-13.0	> +41.1	C
		5134.500	< -47.3	< -47.3	-13.0	> +34.3	C
		6846.000	< -45.5	< -45.5	-13.0	> +32.5	C
		8557.500	< -42.5	< -42.5	-13.0	> +29.5	C
		10269.000	< -41.3	< -41.3	-13.0	> +28.3	C
		11980.500	< -40.6	< -40.6	-13.0	> +27.6	C
		13692.000	< -38.7	< -38.7	-13.0	> +25.7	C
		15403.500	< -37.9	< -37.9	-13.0	> +24.9	C
		17115.000	< -34.1	< -34.1	-13.0	> +21.1	C
20175	1732.500	3465.000	< -54.1	< -54.1	-13.0	> +41.1	C
		5197.500	< -47.3	< -47.3	-13.0	> +34.3	C
		6930.000	< -45.6	< -45.6	-13.0	> +32.6	C
		8662.500	< -42.6	< -42.6	-13.0	> +29.6	C
		10395.000	< -41.0	< -41.0	-13.0	> +28.0	C
		12127.500	< -41.1	< -41.1	-13.0	> +28.1	C
		13860.000	< -38.4	< -38.4	-13.0	> +25.4	C
		15592.500	< -37.8	< -37.8	-13.0	> +24.8	C
		17325.000	< -33.3	< -33.3	-13.0	> +20.3	C
20385	1753.500	3507.000	< -54.0	< -54.0	-13.0	> +41.0	C
		5260.500	< -47.2	< -47.2	-13.0	> +34.2	C
		7014.000	< -45.5	< -45.5	-13.0	> +32.5	C
		8767.500	< -42.5	< -42.5	-13.0	> +29.5	C
		10521.000	< -40.8	< -40.8	-13.0	> +27.8	C
		12274.500	< -41.5	< -41.5	-13.0	> +28.5	C
		14028.000	< -38.2	< -38.2	-13.0	> +25.2	C
		15781.500	< -37.7	< -37.7	-13.0	> +24.7	C
		17535.000	< -32.9	< -32.9	-13.0	> +19.9	C

Calculated result at 17535.0 MHz, as the worst point shown on underline:
Minimum Margin: -13.0 - (<-32.9) = >19.9 (dB)

NOTES
1. Test Distance : 3 m
2. The spectrum was checked from 30 MHz to 10 GHz.
3. All emissions not reported were more than 20 dB below the applied limits.
4. Applied limits : -13.0 [dBm] = 10log(TP[mW]) - (43 + 10log(tp[W])) = 10log(TP[mW]) - (43 + (10 log(TP[mW]) - 30))
   where, tp[W] = TP[mW] / 1000 : Transmitter power at anttena terminal
5. The symbol of "<" means "or less".
6. The symbol of ">" means "more than".
7. Setting of measuring instrument(s) :

	Detector Function	RES B.W.	V.B.W.	Sweep Time
A	Peak	10 kHz	30 kHz	20 msec.
B	Peak	100 kHz	300 kHz	20 msec.
C	Peak	1 MHz	3 MHz	20 msec.

3) BW 5MHz(1RB)

(LTE 5MHz)

Test Date: September 18, 2015
Temp.: 24 °C, Humi: 70 %

Test Configuration : Single Unit

Transmitting Frequency CH	Transmitting Frequency [MHz]	Measured Frequency [MHz]	ERP [dBm] Hori.	ERP [dBm] Vert.	Limits [dBm]	Margin [dB]	Remarks
19975	1712.500	3425.000	< -54.1	< -54.1	-13.0	> +41.1	C
		5137.500	< -47.3	< -47.3	-13.0	> +34.3	C
		6850.000	< -45.5	< -45.5	-13.0	> +32.5	C
		8562.500	< -42.5	< -42.5	-13.0	> +29.5	C
		10275.000	< -41.3	< -41.3	-13.0	> +28.3	C
		11987.500	< -40.6	< -40.6	-13.0	> +27.6	C
		13700.000	< -38.6	< -38.6	-13.0	> +25.6	C
		15412.500	< -37.9	< -37.9	-13.0	> +24.9	C
		17125.000	< -34.1	< -34.1	-13.0	> +21.1	C
20175	1732.500	3465.000	< -54.1	< -54.1	-13.0	> +41.1	C
		5197.500	< -47.3	< -47.3	-13.0	> +34.3	C
		6930.000	< -45.6	< -45.6	-13.0	> +32.6	C
		8662.500	< -42.6	< -42.6	-13.0	> +29.6	C
		10395.000	< -41.0	< -41.0	-13.0	> +28.0	C
		12127.500	< -41.1	< -41.1	-13.0	> +28.1	C
		13860.000	< -38.4	< -38.4	-13.0	> +25.4	C
		15592.500	< -37.8	< -37.8	-13.0	> +24.8	C
		17325.000	< -33.3	< -33.3	-13.0	> +20.3	C
20375	1752.500	3505.000	< -54.0	< -54.0	-13.0	> +41.0	C
		5257.500	< -47.2	< -47.2	-13.0	> +34.2	C
		7010.000	< -45.5	< -45.5	-13.0	> +32.5	C
		8762.500	< -42.5	< -42.5	-13.0	> +29.5	C
		10515.000	< -40.8	< -40.8	-13.0	> +27.8	C
		12267.500	< -41.4	< -41.4	-13.0	> +28.4	C
		14020.000	< -38.2	< -38.2	-13.0	> +25.2	C
		15772.500	< -37.7	< -37.7	-13.0	> +24.7	C
		17525.000	< -33.0	< -33.0	-13.0	> +20.0	C

Calculated result at 17525.0 MHz, as the worst point shown on underline:
Minimum Margin: -13.0 - (<-33.0) = >20.0 (dB)

NOTES
1. Test Distance : 3 m
2. The spectrum was checked from 30 MHz to 20 GHz.
3. All emissions not reported were more than 20 dB below the applied limits.
4. Applied limits : -13.0 [dBm] = 10log(TP[mW]) - (43 + 10log(tp[W])) = 10log(TP[mW]) - (43 + (10 log(TP[mW]) - 30))
   where, tp[W] = TP[mW] / 1000 : Transmitter power at anttena terminal
5. The symbol of "<" means "or less".
6. The symbol of ">" means "more than".
7. Setting of measuring instrument(s) :

	Detector Function	RES B.W.	V.B.W.	Sweep Time
A	Peak	10 kHz	30 kHz	20 msec.
B	Peak	100 kHz	300 kHz	20 msec.
C	Peak	1 MHz	3 MHz	20 msec.

4) BW 10MHz(1RB)

(LTE 10MHz)

Test Date: September 18, 2015
Temp.: 24 °C, Humi: 70 %

Test Configuration : Single Unit

CH	Transmitting Frequency [MHz]	Measured Frequency [MHz]	ERP [dBm] Hori.	ERP [dBm] Vert.	Limits [dBm]	Margin [dB]	Remarks
20000	1715.000	3430.000	< -54.1	< -54.1	-13.0	> +41.1	C
		5145.000	< -47.3	< -47.3	-13.0	> +34.3	C
		6860.000	< -45.5	< -45.5	-13.0	> +32.5	C
		8575.000	< -42.6	< -42.6	-13.0	> +29.6	C
		10290.000	< -41.2	< -41.2	-13.0	> +28.2	C
		12005.000	< -40.7	< -40.7	-13.0	> +27.7	C
		13720.000	< -38.6	< -38.6	-13.0	> +25.6	C
		15435.000	< -37.9	< -37.9	-13.0	> +24.9	C
		17150.000	< -34.0	< -34.0	-13.0	> +21.0	C
20175	1732.500	3465.000	< -54.1	< -54.1	-13.0	> +41.1	C
		5197.500	< -47.3	< -47.3	-13.0	> +34.3	C
		6930.000	< -45.6	< -45.6	-13.0	> +32.6	C
		8662.500	< -42.6	< -42.6	-13.0	> +29.6	C
		10395.000	< -41.0	< -41.0	-13.0	> +28.0	C
		12127.500	< -41.1	< -41.1	-13.0	> +28.1	C
		13860.000	< -38.4	< -38.4	-13.0	> +25.4	C
		15592.500	< -37.8	< -37.8	-13.0	> +24.8	C
		17325.000	< -33.3	< -33.3	-13.0	> +20.3	C
20350	1750.000	3500.000	< -54.0	< -54.0	-13.0	> +41.0	C
		5250.000	< -47.2	< -47.2	-13.0	> +34.2	C
		7000.000	< -45.5	< -45.5	-13.0	> +32.5	C
		8750.000	< -42.5	< -42.5	-13.0	> +29.5	C
		10500.000	< -40.8	< -40.8	-13.0	> +27.8	C
		12250.000	< -41.4	< -41.4	-13.0	> +28.4	C
		14000.000	< -38.3	< -38.3	-13.0	> +25.3	C
		15750.000	< -37.8	< -37.8	-13.0	> +24.8	C
		17500.000	< -33.0	< -33.0	-13.0	> +20.0	C

Calculated result at 17500.0 MHz, as the worst point shown on underline:
Minimum Margin: -13.0 - (<-33.0) = >20.0 (dB)

NOTES
1. Test Distance : 3 m
2. The spectrum was checked from 30 MHz to 20 GHz.
3. All emissions not reported were more than 20 dB below the applied limits.
4. Applied limits : -13.0 [dBm] = 10log(TP[mW]) - (43 + 10log(tp[W])) = 10log(TP[mW]) - (43 + (10 log(TP[mW]) - 30))
   where, tp[W] = TP[mW] / 1000 : Transmitter power at anttena terminal
5. The symbol of "<" means "or less".
6. The symbol of ">" means "more than".
7. Setting of measuring instrument(s) :

	Detector Function	RES B.W.	V.B.W.	Sweep Time
A	Peak	10 kHz	30 kHz	20 msec.
B	Peak	100 kHz	300 kHz	20 msec.
C	Peak	1 MHz	3 MHz	20 msec.

5) BW 15MHz(1RB)

(LTE 15MHz)

Test Date: September 18, 2015
Temp.: 24 °C, Humi: 70 %

Test Configuration : Single Unit

CH	Transmitting Frequency [MHz]	Measured Frequency [MHz]	ERP [dBm] Hori.	ERP [dBm] Vert.	Limits [dBm]	Margin [dB]	Remarks
20025	1717.500	3435.000	< -54.1	< -54.1	-13.0	> +41.1	C
		5152.500	< -47.3	< -47.3	-13.0	> +34.3	C
		6870.000	< -45.5	< -45.5	-13.0	> +32.5	C
		8587.500	< -42.6	< -42.6	-13.0	> +29.6	C
		10305.000	< -41.2	< -41.2	-13.0	> +28.2	C
		12022.500	< -40.8	< -40.8	-13.0	> +27.8	C
		13740.000	< -38.5	< -38.5	-13.0	> +25.5	C
		15457.500	< -37.9	< -37.9	-13.0	> +24.9	C
		17175.000	< -33.8	< -33.8	-13.0	> +20.8	C
20175	1732.500	3465.000	< -54.1	< -54.1	-13.0	> +41.1	C
		5197.500	< -47.3	< -47.3	-13.0	> +34.3	C
		6930.000	< -45.6	< -45.6	-13.0	> +32.6	C
		8662.500	< -42.6	< -42.6	-13.0	> +29.6	C
		10395.000	< -41.0	< -41.0	-13.0	> +28.0	C
		12127.500	< -41.1	< -41.1	-13.0	> +28.1	C
		13860.000	< -38.4	< -38.4	-13.0	> +25.4	C
		15592.500	< -37.8	< -37.8	-13.0	> +24.8	C
		17325.000	< -33.3	< -33.3	-13.0	> +20.3	C
20325	1747.500	3495.000	< -54.0	< -54.0	-13.0	> +41.0	C
		5242.500	< -47.3	< -47.3	-13.0	> +34.3	C
		6990.000	< -45.5	< -45.5	-13.0	> +32.5	C
		8737.500	< -42.5	< -42.5	-13.0	> +29.5	C
		10485.000	< -40.8	< -40.8	-13.0	> +27.8	C
		12232.500	< -41.3	< -41.3	-13.0	> +28.3	C
		13980.000	< -38.3	< -38.3	-13.0	> +25.3	C
		15727.500	< -37.8	< -37.8	-13.0	> +24.8	C
		17475.000	< -33.0	< -33.0	-13.0	> +20.0	C

Calculated result at 17475.0 MHz, as the worst point shown on underline:
Minimum Margin: -13.0 - (<-33.0) = >20.0 (dB)

NOTES
1. Test Distance : 3 m
2. The spectrum was checked from 30 MHz to 20 GHz.
3. All emissions not reported were more than 20 dB below the applied limits.
4. Applied limits : -13.0 [dBm] = 10log(TP[mW]) - (43 + 10log(tp[W])) = 10log(TP[mW]) - (43 + (10 log(TP[mW]) - 30))
   where, tp[W] = TP[mW] / 1000 : Transmitter power at anttena terminal
5. The symbol of "<" means "or less".
6. The symbol of ">" means "more than".
7. Setting of measuring instrument(s) :

	Detector Function	RES B.W.	V.B.W.	Sweep Time
A	Peak	10 kHz	30 kHz	20 msec.
B	Peak	100 kHz	300 kHz	20 msec.
C	Peak	1 MHz	3 MHz	20 msec.

6) BW 20MHz(1RB)

(LTE 20MHz)

Test Date: September 18, 2015
Temp.: 24 °C, Humi: 70 %

Test Configuration : Single Unit

CH	Transmitting Frequency [MHz]	Measured Frequency [MHz]	ERP [dBm] Hori.	ERP [dBm] Vert.	Limits [dBm]	Margin [dB]	Remarks
20050	1720.000	3440.000	< -54.1	< -54.1	-13.0	> +41.1	C
		5160.000	< -47.3	< -47.3	-13.0	> +34.3	C
		6880.000	< -45.5	< -45.5	-13.0	> +32.5	C
		8600.000	< -42.6	< -42.6	-13.0	> +29.6	C
		10320.000	< -41.1	< -41.1	-13.0	> +28.1	C
		12040.000	< -40.9	< -40.9	-13.0	> +27.9	C
		13760.000	< -38.5	< -38.5	-13.0	> +25.5	C
		15480.000	< -37.8	< -37.8	-13.0	> +24.8	C
		17200.000	< -33.8	< -33.8	-13.0	> +20.8	C
20175	1732.500	3465.000	< -54.1	< -54.1	-13.0	> +41.1	C
		5197.500	< -47.3	< -47.3	-13.0	> +34.3	C
		6930.000	< -45.6	< -45.6	-13.0	> +32.6	C
		8662.500	< -42.6	< -42.6	-13.0	> +29.6	C
		10395.000	< -41.0	< -41.0	-13.0	> +28.0	C
		12127.500	< -41.1	< -41.1	-13.0	> +28.1	C
		13860.000	< -38.4	< -38.4	-13.0	> +25.4	C
		15592.500	< -37.8	< -37.8	-13.0	> +24.8	C
		17325.000	< -33.3	< -33.3	-13.0	> +20.3	C
20300	1745.000	3490.000	< -54.0	< -54.0	-13.0	> +41.0	C
		5235.000	< -47.3	< -47.3	-13.0	> +34.3	C
		6980.000	< -45.6	< -45.6	-13.0	> +32.6	C
		8725.000	< -42.5	< -42.5	-13.0	> +29.5	C
		10470.000	< -40.8	< -40.8	-13.0	> +27.8	C
		12215.000	< -41.3	< -41.3	-13.0	> +28.3	C
		13960.000	< -38.3	< -38.3	-13.0	> +25.3	C
		15705.000	< -37.8	< -37.8	-13.0	> +24.8	C
		17450.000	< -33.1	< -33.1	-13.0	> +20.1	C

Calculated result at 17450.0 MHz, as the worst point shown on underline:
Minimum Margin: -13.0 - (<-33.1) = >20.1 (dB)

NOTES
1. Test Distance : 3 m
2. The spectrum was checked from 30 MHz to 20 GHz.
3. All emissions not reported were more than 20 dB below the applied limits.
4. Applied limits : -13.0 [dBm] = 10log(TP[mW]) - (43 + 10log(tp[W])) = 10log(TP[mW]) - (43 + (10 log(TP[mW]) - 30))
   where, tp[W] = TP[mW] / 1000 : Transmitter power at anttena terminal
5. The symbol of "<" means "or less".
6. The symbol of ">" means "more than".
7. Setting of measuring instrument(s) :

	Detector Function	RES B.W.	V.B.W.	Sweep Time
A	Peak	10 kHz	30 kHz	20 msec.
B	Peak	100 kHz	300 kHz	20 msec.
C	Peak	1 MHz	3 MHz	20 msec.

7.8 Frequency Stability (§2.1055)

For the requirements, ☑ - Applicable [☑ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

7.8.1 Test Results

For the standard, ☑ - **Passed** ☐ - **Failed** ☐ - **Not judged**

The Frequency Stability level is +0.01 ppm at 1732.500 MHz

Uncertainty of Measurement Results ± 0.03 ppm(2σ)

Remarks : _____

7.8.2 Test Instruments

Shielded Room S4				
Type	**Model**	**Serial No. (ID)**	**Manufacturer**	**Cal. Due**
Base Station Simulator	MT8820C	6200918329 (B-5)	Anritsu	2016/03/02
Environmental Chamber	SH-641	92010990 (F-32)	ESPEC	2016/07/06
DC Voltage Meter	2011	02247S (B-33)	YOKOGAWA	2016/04/07
DC Power Supply	NL035-10	35883293 (F-4)	TAKASAGO	N/A

NOTE : The calibration interval of the above test instruments is 12 months.

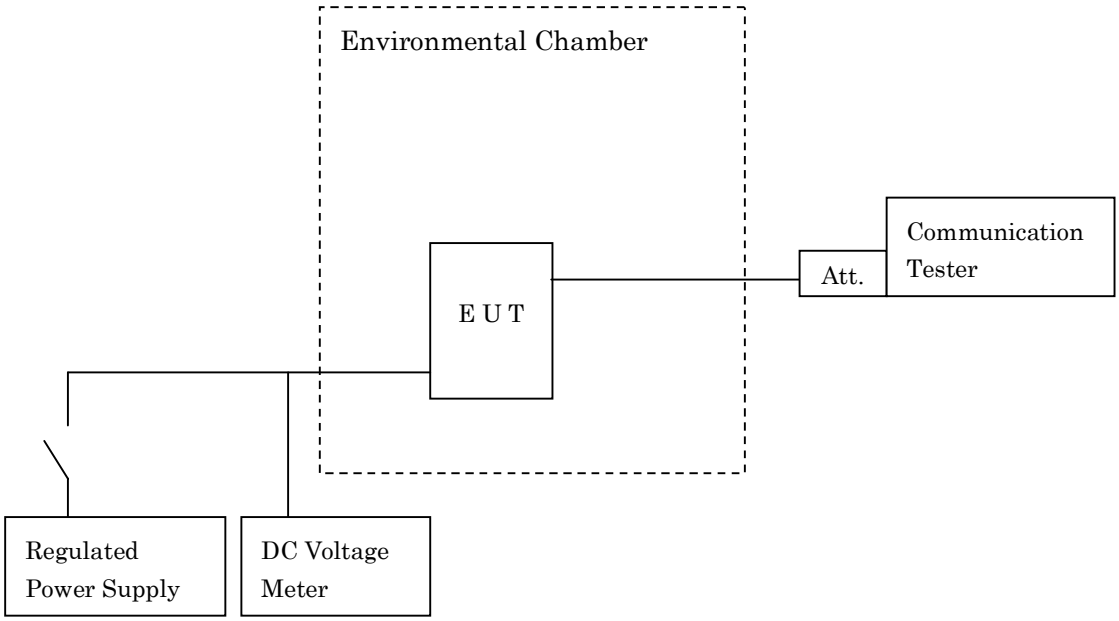
7.8.3 Test Method and Test Setup (Diagrammatic illustration)

Frequency Stability versus Temperature

The EUT was placed in an environmental chamber and was tested in the range from –30 to +50 degrees Celsius. The EUT was stabilized at each temperature. The power (4.0VDC) supplied was applied to the transmitter and allowed to stabilize for 10 minutes. The transmitting frequency was measured at startup and 2 minutes, 5 minutes and 10 minutes after startup. This procedure was repeated from –30 to +50 degrees Celsius at the interval of 10 degrees.

Frequency Stability versus Power Supply Voltage

The EUT was placed in an environmental chamber and was tested at the temperature of +20 degrees Celsius. The EUT was stabilized at the temperature. The power (4.0VDC) and the power (3.7VDC, the ending voltage) was applied to the EUT allowed to stabilize for 10 minutes. The transmitting frequency was measured at startup and 2 minutes, 5 minutes and 10 minutes after startup.



7.8.4 Test Data

(LTE)

Test Date: September 18, 2015
- September 19, 2015

1. Frequency Stability Measurement versus Temperature

Transmitting Frequency : 1732.500 MHz (20175 ch)
DC Supply Voltage : 4.0 VDC

Ambient Temperature [°C]	Deviation [ppm] Startup	2 minutes	5 minutes	10 minutes	Limits [ppm]	Margin [ppm]
-30	**+ 0.01**	**+ 0.01**	+ 0.00	+ 0.00	N/A	N/A
-20	**+ 0.01**	**+ 0.01**	+ 0.00	+ 0.00	N/A	N/A
-10	+ 0.00	**+ 0.01**	**+ 0.01**	+ 0.00	N/A	N/A
0	**+ 0.01**	**+ 0.01**	+ 0.00	**+ 0.01**	N/A	N/A
10	+ 0.00	+ 0.00	+ 0.00	+ 0.00	N/A	N/A
20	+ 0.00	+ 0.00	+ 0.00	+ 0.00	N/A	N/A
30	+ 0.00	+ 0.00	+ 0.00	+ 0.00	N/A	N/A
40	+ 0.00	+ 0.00	+ 0.00	+ 0.00	N/A	N/A
50	+ 0.00	+ 0.00	+ 0.00	+ 0.00	N/A	N/A

2. Frequency Stability Measurement versus Power Supply Voltage

Transmitting Frequency : 1732.500 MHz (20175 ch)
Ambient Temperature: : 20 °C

DC Supply Voltage [V]	Deviation [ppm] Startup	2 minutes	5 minutes	10 minutes	Limits [ppm]	Margin [ppm]
4.0	+ 0.00	+ 0.00	+ 0.00	+ 0.00	N/A	N/A
3.7(Ending)	+ 0.00	+ 0.00	+ 0.00	+ 0.00	N/A	N/A

Test condition example as the maximum deviation point shown on underline:
Ambient Temperature : -30 °C / Startup
DC Supply Voltage : 4 VDC

NOTE : The measurement were made after all of components of the oscillator sufficiently stabilized at each temperature.