

FCC PART 22H, PART 24E
FCC PART 27
MEASUREMENT AND TEST REPORT

For

DT Research Inc.

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FCC ID: YE3800I
Model: DT301

Report Type: Original Report	Product Type: Mobile Tablet
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Report Number: RDG160608001-00C	
Report Date: 2016-07-11	
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Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Dongguan).

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *DT Research Inc.*'s product, model number: *DT301 (FCC ID: YE3800I)* (the "EUT") in this report was a *Mobile Tablet*, which was measured approximately: 27.2 cm (L) x 19.0 cm (W) x 2.2 cm (H), rated input voltage: DC 7.2V rechargeable Li-ion battery or DC19V charging from adapter. The device used SIERRA WIRELESS™'s MC7354 module, FCC ID: N7NMC7355, which support CDMA2000(850/1900 band) 1xRTT and EVDO Rev.A and LTE band 4/band 13, all of the other functions eg.GSM,GRPS,EDGE, WCDMA R99,HSPA,HSPA+ and other band were disabled by software.

Adapter information:

Model: A11-065N1A

Input: 100-240V~50/60Hz, 1.7A

Output: 19V, 3.42A

All measurement and test data in this report was gathered from production sample serial number: 160608001 (Assigned by BACL, Dongguan). The EUT was received on 2016-06-08.

Objective

This report is prepared on behalf of *DT Research Inc.* in accordance with: Part 2-Subpart J, Part 22-Subpart H, Part 24-Subpart E and part 27 of the Federal Communications Commission's rules.

The objective is to determine compliance with FCC rules for output power, modulation characteristic, occupied bandwidth, spurious emissions at antenna terminal, spurious radiated emission, frequency stability and band edge.

Related Submittal(s)/Grant(s)

FCC Part 15C DSS, DTS, and 15E NII submissions with FCC ID: YE3800I.

Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Sub-part J as well as the following parts:

Part 22 Subpart H - Public Mobile Services

Part 24 Subpart E - Personal Communication Services

Part 27 – Miscellaneous wireless communications services

Applicable Standards: TIA/EIA 603-D-2010.

All radiated and conducted emissions measurements were performed at Bay Area Compliance Laboratories Corp.(Dongguan).

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China

Test site at Bay Area Compliance Laboratories Corp. (Dongguan) has been fully described in reports submitted to the Federal Communications Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 06, 2015.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 273710. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

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SYSTEM TEST CONFIGURATION

Justification

The EUT was configured for testing according to TIA/EIA-603-D-2010.

The test items were performed with the EUT operating at testing mode.

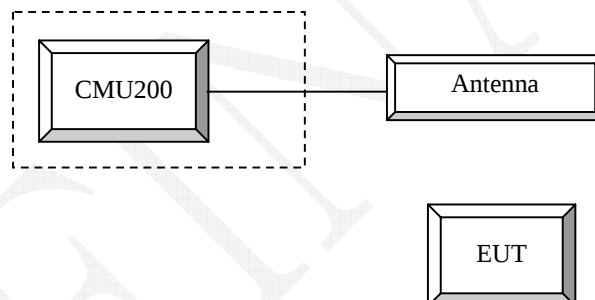
Equipment Modifications

No modification was made to the EUT.

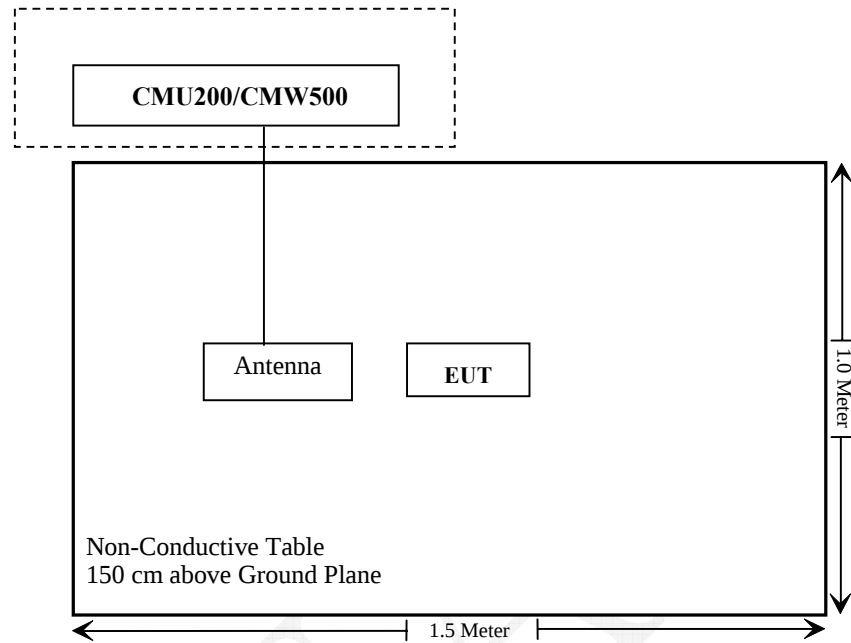
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
R&S	Universal Radio Communication Tester	CMU200	109038
R&S	Wideband Radio Communication Tester	CMW500	106891
N/A	ANTENNA	N/A	N/A

Configuration of Test Setup



Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1310, §2.1093	RF Exposure	Compliance
§2.1046; § 22.913 (a); § 24.232 (c); §27.50	RF Output Power	Compliance
§ 2.1047	Modulation Characteristics	Not Applicable
§ 2.1049; § 22.905 § 22.917; § 24.238; §27.53	Occupied Bandwidth	Compliance
§ 2.1051, § 22.917 (a); § 24.238 (a); §27.53	Spurious Emissions at Antenna Terminal	Compliance
§ 2.1053 § 22.917 (a); § 24.238 (a); §27.53	Field Strength of Spurious Radiation	Compliance
§ 22.917 (a); § 24.238 (a); §27.53	Out of band emission, Band Edge	Compliance
§ 2.1055 § 22.355; § 24.235; §27.54	Frequency stability vs. temperature Frequency stability vs. voltage	Compliance

FCC §1.1310 & §2.1093- RF EXPOSURE

Applicable Standard

FCC§1.1310 and §2.1093.

Test Result

Compliant, please refer to the SAR report: RDG160608001-20.

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FCC §2.1047 - MODULATION CHARACTERISTIC

According to FCC § 2.1047(d), Part 22H & 24E, Part 27 there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

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FCC § 2.1046, § 22.913 (a) & § 24.232 (c) & § 27.50 - RF OUTPUT POWER

Applicable Standard

According to FCC §2.1046 and §22.913 (a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

According to FCC §2.1046 and §24.232 (C), mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications..

According to FCC §2.1046 and §27.50 (d), (4) Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP. Fixed stations operating in the 1710-1755 MHz band are limited to a maximum antenna height of 10 meters above ground. Mobile and portable stations operating in these bands must employ a means for limiting power to the minimum necessary for successful communications.

According to §24.232 (d) Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

Test Procedure

CDMA 1x RTT

Maximum output power is verified on the high, middle and low channels according to procedures in section 4.4.5.2 of 3GPP2 C.S0011/TIA-98-E. Steps 3 and 4 are measured using Loopback Service Option SO55 with power control bits in “All Up” condition. Step 10 is measured using TDSO/SO32 with power control bits in the “Bits Hold” condition (i.e. alternative Up/Down Bits).

Table 4.4.5.2-1. Test Parameters for Maximum RF Output Power with a Single Traffic Code Channel, Spreading Rate 1

Parameter	Units	Value
$\bar{I}_{or}$	dBm/1.23 MHz	-104
$\frac{\text{Pilot } E_c}{I_{or}}$	dB	-7
$\frac{\text{Traffic } E_c}{I_{or}}$	dB	-7.4

Table 4.4.5.2-2. Test Parameters for Maximum RF Output Power with Multiple Traffic Code Channels, Spreading Rate 1

Parameter	Units	Value
$\frac{\text{Pilot } E_c}{I_{or}}$	dB	-7
$\frac{\text{Traffic } E_c}{I_{or}}$	dB	-7.4

EVDO

Maximum output power is verified on the high, middle and low channels according to procedures in section 3.1.2.3.4 of 3GPP2 C.S0033-0/TIA-866 for Rev. 0, section 4.3.4 of 3GPP2 C.S0033-A for Rev. A.

Maximum output power is measured for Rev. 0 and Rev. A in Subtype 0/1 and Subtype 2 Physical Layer configurations, respectively.

LTE:

The following tests were conducted according to the test requirements in 3GPP TS36.101

The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS36.101 specification.

UE Power Class: 3 (23 +/- 2dBm). The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1 of the 3GPP TS36.101.

Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3

Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS36.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signaling Value of "NS_01".

Table 6.2.4-1: Additional Maximum Power Reduction (A-MPR)

Network Signalling value	Requirements (sub-clause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N_{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	NA
NS_03	6.6.2.2.1	2, 4, 10, 23, 25, 35, 36	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
			20	>10	≤ 1
NS_04	6.6.2.2.2	41	5	>6	≤ 1
			10, 15, 20	See Table 6.2.4-4	
NS_05	6.6.3.3.1	1	10,15,20	≥ 50	≤ 1
NS_06	6.6.2.2.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.6-1	n/a
NS_07	6.6.2.2.3	13	10	Table 6.2.4-2	Table 6.2.4-2
	6.6.3.3.2				
NS_08	6.6.3.3.3	19	10, 15	> 44	≤ 3
NS_09	6.6.3.3.4	21	10, 15	> 40	≤ 1
				> 55	≤ 2
NS_10		20	15, 20	Table 6.2.4-3	Table 6.2.4-3
NS_11	6.6.2.2.1	23 ¹	1.4, 3, 5, 10	Table 6.2.4-5	Table 6.2.4-5
..					
NS_32	"	"	"	"	"

Note 1: Applies to the lower block of Band 23, i.e. a carrier placed in the 2000-2010 MHz region.

Radiated method:

ANSI/TIA 603-D section 2.2.17

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2015-08-03	2016-08-02
Sunol Sciences	Antenna	JB3	A060611-3	2014-11-06	2017-11-05
HP	Amplifier	8447E	2434A02181	2015-09-01	2016-09-01
R&S	Spectrum Analyzer	FSEM	831259/019	2015-07-28	2016-07-27
ETS LINDGREN	Horn Antenna	3115	000 527 35	2015-09-06	2018-09-06
Mini-Circuit	Amplifier	ZVA-213-S+	054201245	2016-02-19	2017-02-19
Giga	Signal Generator	1026	320408	2015-11-23	2016-11-22
EMCO	Adjustable Dipole Antenna	3121C	9109-753	N/A	N/A
TDK RF	Horn Antenna	HRN-0118	130 084	2015-09-06	2018-09-06
N/A	Coaxial Cable	14m	N/A	2016-05-06	2017-05-06
N/A	Coaxial Cable	8m	N/A	2016-05-06	2017-05-06
N/A	Coaxial Cable	0.1m	N/A	2016-05-06	2017-05-06
E-Microwave	DC Blocking	EMDCB-00036	0E01201047	2016-05-06	2017-05-06
E-Microwave	Attenuator	EMCA10-5RN	OE01203239	2016-05-08	2017-05-08
Pasternack	RF Coaxial Cable	RF-01	N/A	2016-05-06	2017-05-06
Pasternack	RF Coaxial Cable	RF-02	N/A	2016-05-06	2017-05-06
N/A	Two-way Splitter	ODP-1-6-2S	OE0120142	2016-05-06	2017-05-06

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data**Environmental Conditions**

Temperature:	27.5 – 28.5 °C
Relative Humidity:	39 - 45 %
ATM Pressure:	100.1 – 100.4 kPa

The testing was performed by Costa Dong from 2016-06-24 to 2016-06-30.

Conducted Output Power:

CDMA 1x RTT

Band	Channel No.	Frequency (MHz)	RF Output Power (dBm)			
			RC1+SO55	RC3+SO55	RC3+SO32 (FCH)	RC3+SO32 (SCH)
BC0	1013	824.7	23.13	23.28	23.21	22.73
	384	833.49	23.21	23.22	23.20	23.10
	777	848.31	23.15	23.36	23.18	23.18
BC1	25	1851.25	22.52	22.29	22.38	22.41
	600	1880	22.41	22.43	22.34	22.25
	1175	1908.75	22.41	22.29	22.27	22.27

EVDO

Band	Channel No.	Frequency (MHz)	RF Output Power (dBm)	
			RTAP 153.6kbps Subtype 0	RETAP 4096pbs Subtype 2
BC0	1013	824.7	23.12	23.26
	384	833.49	23.21	23.17
	777	848.31	23.15	23.16
BC1	25	1851.25	22.50	22.21
	600	1880	22.44	22.06
	1175	1908.75	22.33	22.14

LTE Band 4

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4 MHz	QPSK	1#0	22.45	22.47	22.46
		1#3	22.46	22.44	22.43
		1#5	22.43	22.41	22.41
		3#0	22.37	22.34	22.38
		3#1	22.30	22.31	22.32
		3#3	22.34	22.32	22.36
		6#0	21.39	21.41	21.40
	16QAM	1#0	21.17	21.18	21.24
		1#3	21.13	21.12	21.14
		1#5	21.16	21.16	21.17
		3#0	21.22	21.20	21.23
		3#1	21.17	21.20	21.17
		3#3	21.14	21.19	21.12
		6#0	20.39	20.41	20.33
3 MHz	QPSK	1#0	22.36	22.37	22.37
		1#7	22.39	22.39	22.34
		1#14	22.40	22.38	22.40
		8#0	21.38	21.41	21.40
		8#4	21.37	21.39	21.39
		8#7	21.36	21.38	21.31
		15#0	21.36	21.35	21.35
	16QAM	1#0	21.58	21.58	21.58
		1#7	21.59	21.55	21.61
		1#14	21.56	21.55	21.58
		8#0	20.36	20.30	20.38
		8#4	20.32	20.33	20.32
		8#7	20.32	20.32	20.33
		15#0	20.45	20.43	20.48
5 MHz	QPSK	1#0	22.48	22.48	22.42
		1#12	22.43	22.44	22.46
		1#24	22.39	22.41	22.42
		12#0	21.34	21.35	21.34
		12#6	21.38	21.40	21.34
		12#11	21.48	21.43	21.44
		25#0	21.34	21.33	21.37
	16QAM	1#0	21.25	21.26	21.26
		1#12	21.25	21.27	21.24
		1#24	21.24	21.27	21.23
		12#0	20.40	20.40	20.42
		12#6	20.41	20.40	20.36
		12#11	20.39	20.36	20.32
		25#0	20.29	20.32	20.23

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
10 MHz	QPSK	1#0	22.38	22.37	22.36
		1#24	22.36	22.35	22.37
		1#49	22.34	22.35	22.34
		25#0	21.31	21.30	21.29
		25#12	21.28	21.29	21.32
		25#24	21.30	21.29	21.25
		50#0	21.26	21.22	21.25
	16QAM	1#0	21.53	21.55	21.54
		1#24	21.58	21.57	21.58
		1#49	21.60	21.58	21.59
		25#0	20.35	20.40	20.36
		25#12	20.34	20.34	20.29
		25#24	20.37	20.36	20.34
		50#0	20.20	20.18	20.18
15 MHz	QPSK	1#0	22.41	22.43	22.37
		1#37	22.48	22.47	22.48
		1#74	22.47	22.48	22.50
		36#0	21.20	21.19	21.17
		36#17	21.19	21.24	21.18
		36#35	21.20	21.22	21.19
		75#0	21.12	21.17	21.14
	16QAM	1#0	21.68	21.68	21.67
		1#37	21.67	21.70	21.67
		1#74	21.72	21.73	21.72
		36#0	20.48	20.48	20.43
		36#17	20.45	20.46	20.49
		36#35	20.47	20.50	20.48
		75#0	20.13	20.13	20.12
20 MHz	QPSK	1#0	22.36	22.36	22.33
		1#49	22.33	22.35	22.37
		1#99	22.35	22.33	22.32
		50#0	21.29	21.27	21.31
		50#24	21.25	21.25	21.23
		50#49	21.28	21.28	21.29
		100#0	21.21	21.20	21.23
	16QAM	1#0	21.90	21.88	21.90
		1#49	21.82	21.83	21.80
		1#99	21.85	21.85	21.85
		50#0	20.36	20.33	20.36
		50#24	20.37	20.34	20.35
		50#49	20.32	20.34	20.33
		100#0	20.27	20.25	20.30

Band 13

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5 MHz	QPSK	1#0	22.26	22.58	22.56
		1#12	22.37	22.83	22.93
		1#24	22.47	22.64	22.54
		12#0	20.68	21.22	21.25
		12#6	21.51	21.66	21.79
		12#11	21.40	21.54	21.53
		25#0	21.11	21.60	21.00
	16QAM	1#0	21.81	22.01	22.01
		1#12	22.04	21.66	21.43
		1#24	21.47	21.60	21.53
		12#0	21.44	21.38	21.57
		12#6	21.52	21.53	21.51
		12#11	21.28	21.48	21.33
		25#0	21.24	21.38	21.42
10 MHz	QPSK	1#0	\	22.19	\
		1#24	\	22.59	\
		1#49	\	22.32	\
		25#0	\	21.39	\
		25#12	\	21.47	\
		25#24	\	21.38	\
		50#0	\	21.35	\
	16QAM	1#0	\	21.83	\
		1#24	\	21.26	\
		1#49	\	22.18	\
		25#0	\	21.44	\
		25#12	\	21.40	\
		25#24	\	21.39	\
		50#0	\	21.38	\

Peak-to-average ratio (PAR):**CDMA2000:**

Frequency Band	Test Mode	Test Status	Low Channel (dB)	Middle Channel (dB)	High Channel (dB)	Limits (dB)
BC0	1x RTT	RC1+SO55	4.28	4.16	3.60	13
	1xEVDO Rev. 0	RTAP 153.6kbps	4.24	4.16	3.60	13
BC0	1x RTT	RC1+SO55	3.80	3.84	3.64	13
	1xEVDO Rev. 0	RTAP 153.6kbps	3.80	3.88	3.60	13

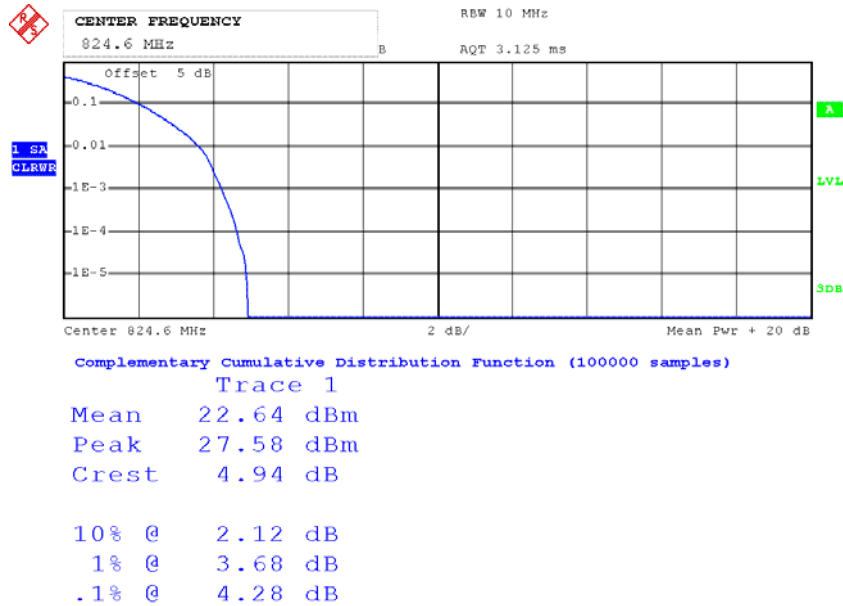
LTE:

Frequency Band	Test Modulation		Channel Bandwidth	Low Channel (dB)	Middle Channel (dB)	High Channel (dB)	Limits (dB)
Band 4	QPSK	1 RB	20 MHz	3.04	3.96	4.44	13
		100 RB		5.24	5.36	5.44	13
	16QAM	1 RB	20 MHz	3.88	4.44	5.24	13
		100 RB		5.72	5.80	5.92	13
Band 13	QPSK	1 RB	20 MHz	/	4.08	/	13
		100 RB		/	4.40	/	13
	16QAM	1 RB	20 MHz	/	4.84	/	13
		100 RB		/	5.08	/	13

Note: peak-to-average ratio (PAR) <13 dB.

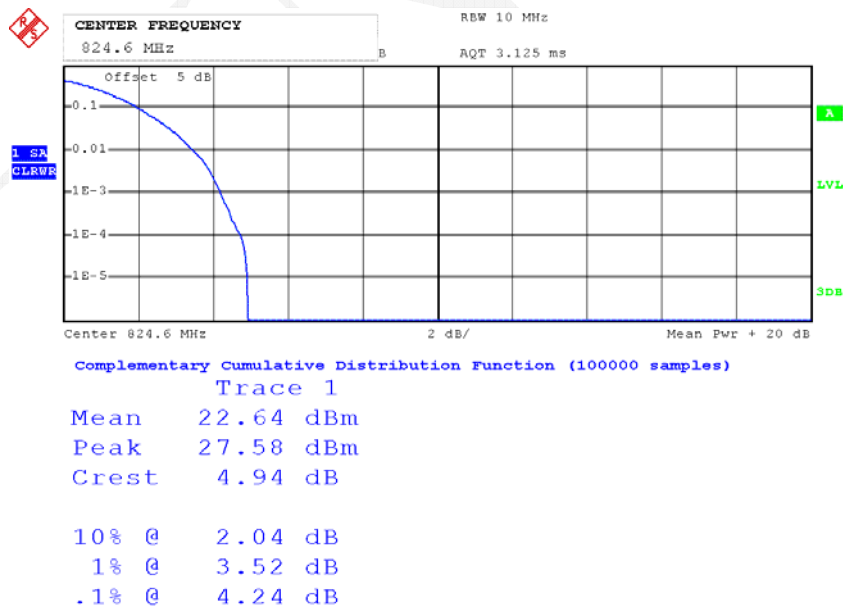
Peak-to-average ratio (PAR)

BC0 Low Channel: 1x RTT



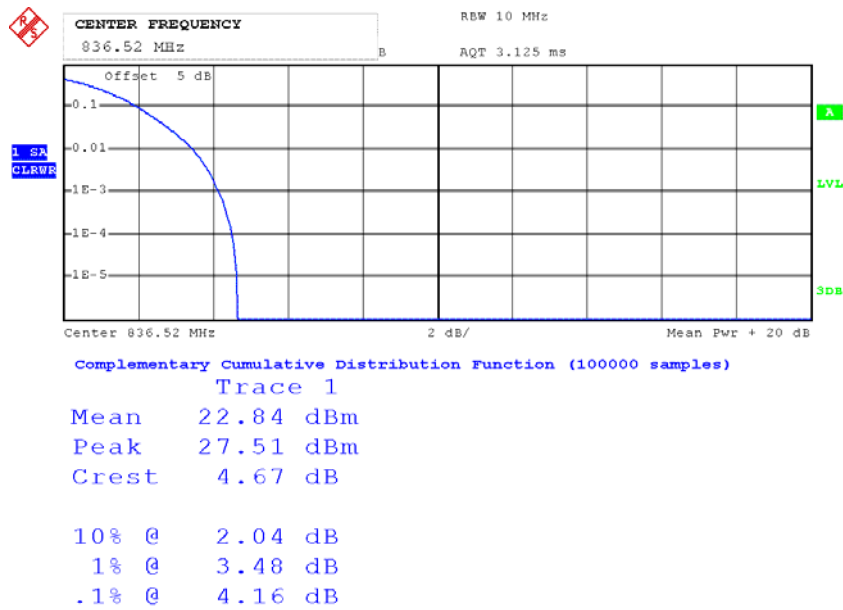
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BC0 Low Channel: 1xEVDO Rev. 0



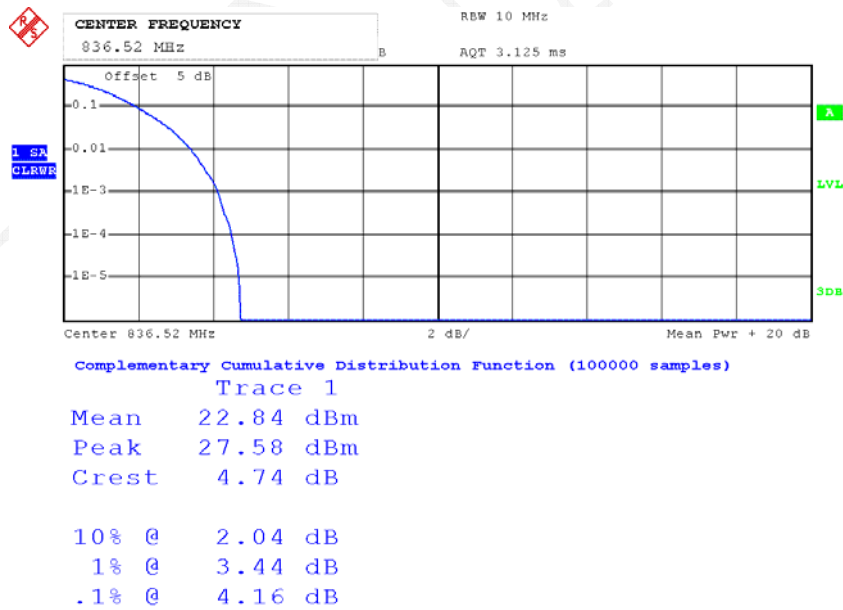
Date: 30.JUN.2016 00:33:34

BC0 Middle Channel: 1x RTT



Date: 30.JUN.2016 00:32:37

BC0 Middle Channel: 1xEVDO Rev. 0



Date: 30.JUN.2016 00:32:39

REFERENCE LEVEL
30 dBm

RBW 10 MHz
AQT 3.125 ms

Offset 5 dB

0.1
0.01
1E-3
1E-4
1E-5

1 SA
CLAWR

Center 948.4 MHz

2 dB/

Mean Pwr + 20 dB

Complementary Cumulative Distribution Function (100000 samples)

Trace 1

Mean 22.77 dBm

Peak 26.66 dBm

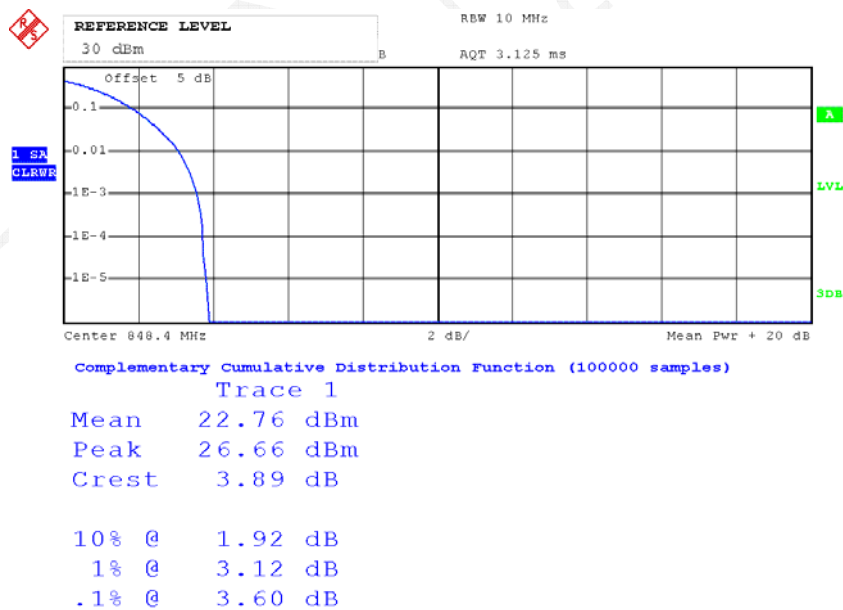
Crest 3.89 dB

10% @ 1.96 dB

1% @ 3.12 dB

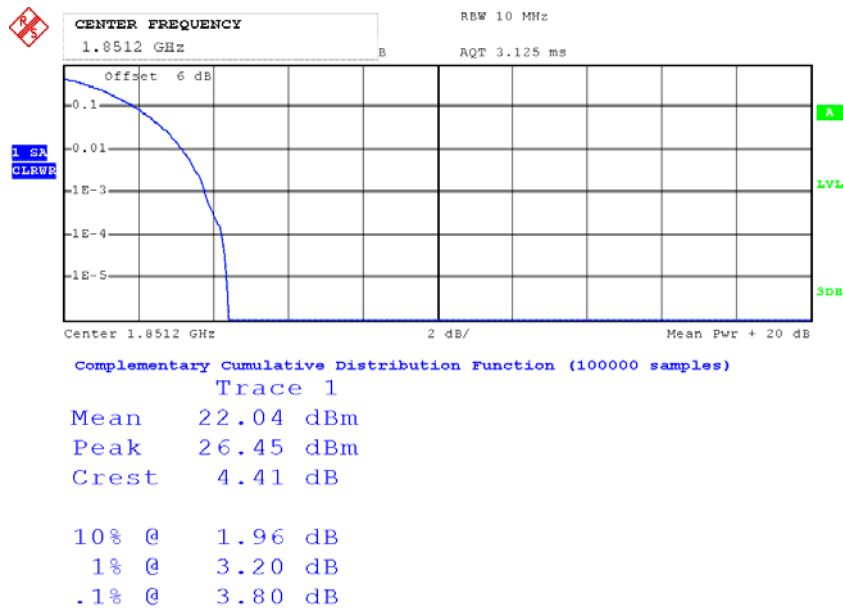
.1% @ 3.60 dB

BC0 High Channel: 1xEVDO Rev. 0



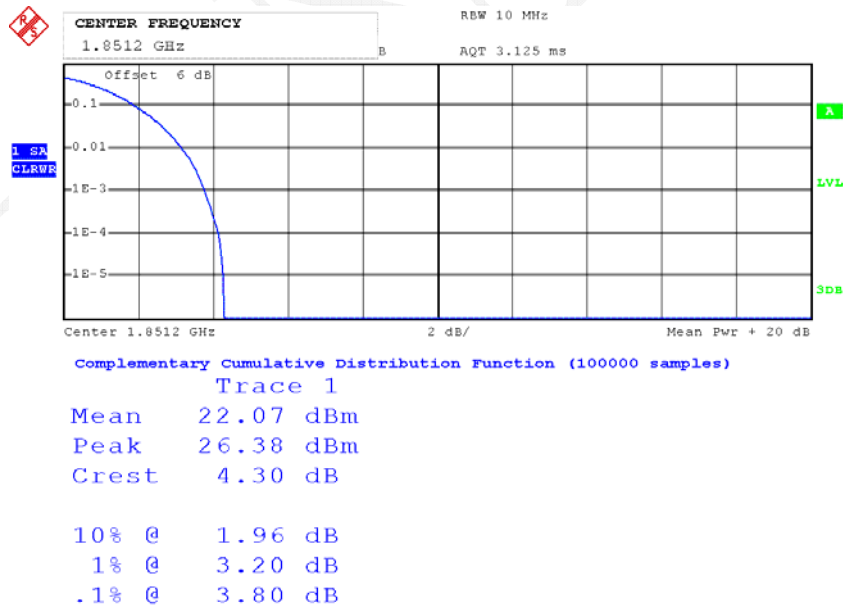
Page 21 of 104

BC1 Low Channel: 1x RTT

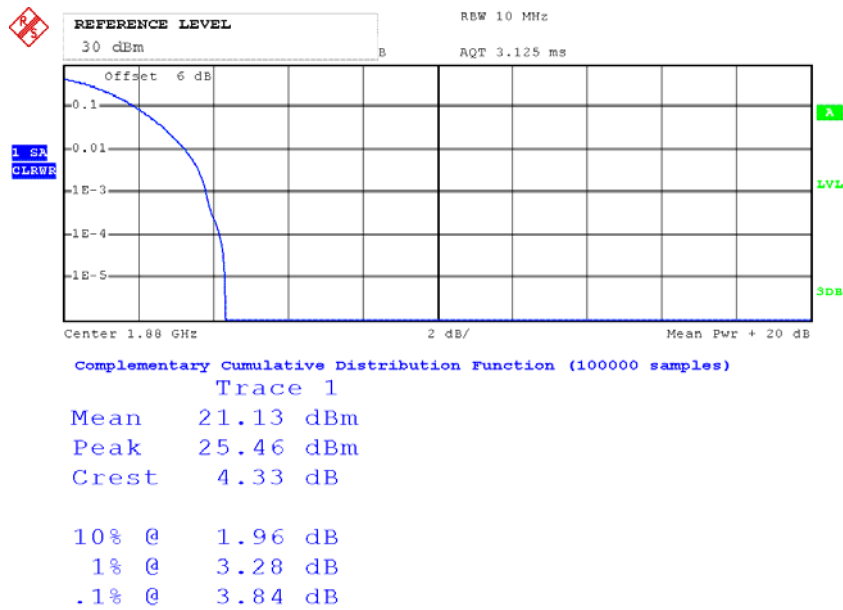


Date: 30.JUN.2016 00:31:03

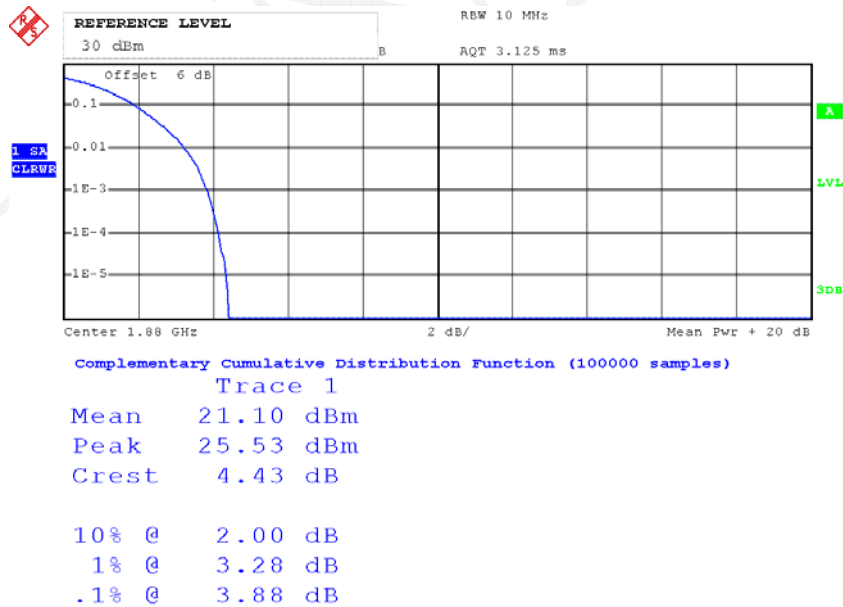
BC1 Low Channel: 1xEVDO Rev. 0



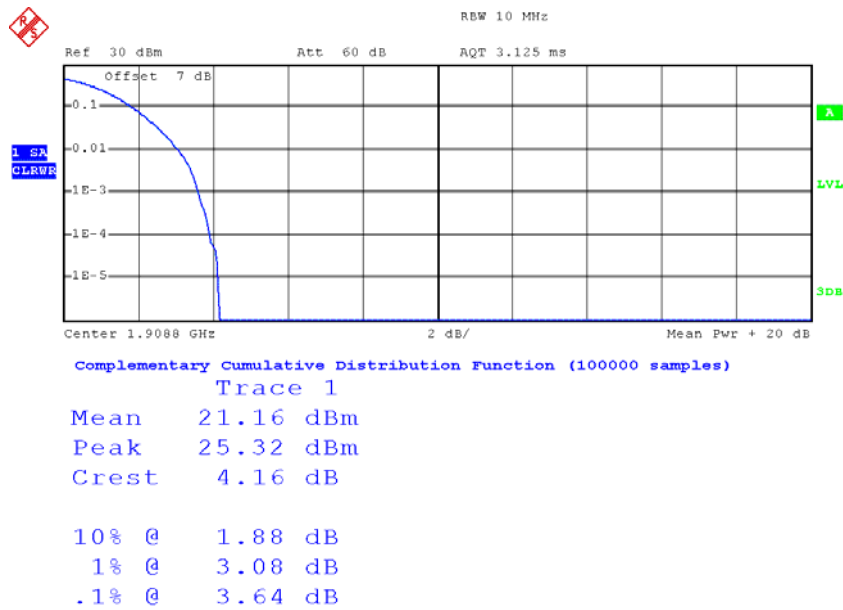
Date: 30.JUN.2016 00:31:06

BC1 Middle Channel: 1x RTT

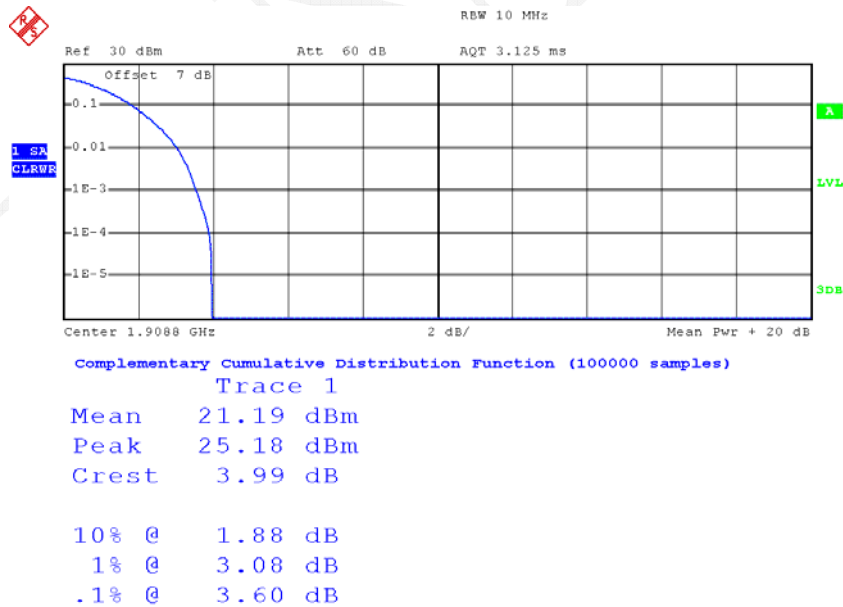
Date: 30.JUN.2016 00:30:18

BC1 Middle Channel: 1xEVDO Rev. 0

Date: 30.JUN.2016 00:30:21

BC1 High Channel: 1x RTT

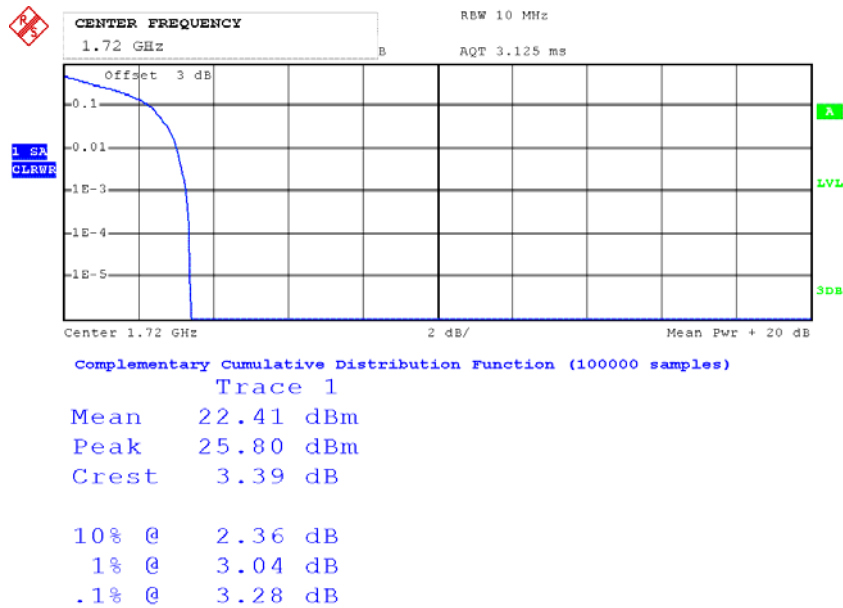
Date: 30.JUN.2016 00:27:43

BC1 High Channel: 1xEVDO Rev. 0

Date: 30.JUN.2016 00:27:36

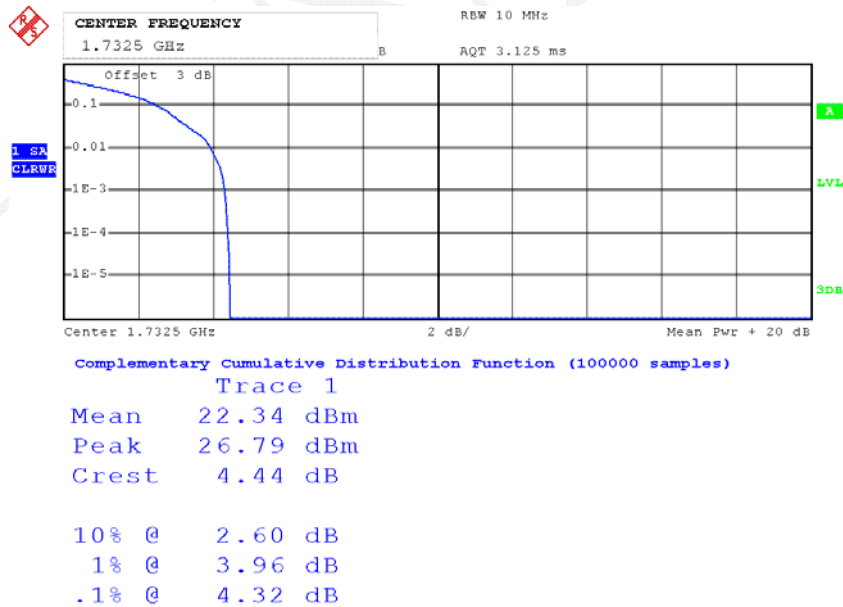
LTE Band 4 (PART 27)

QPSK_20MHz_1RB_Low Channel

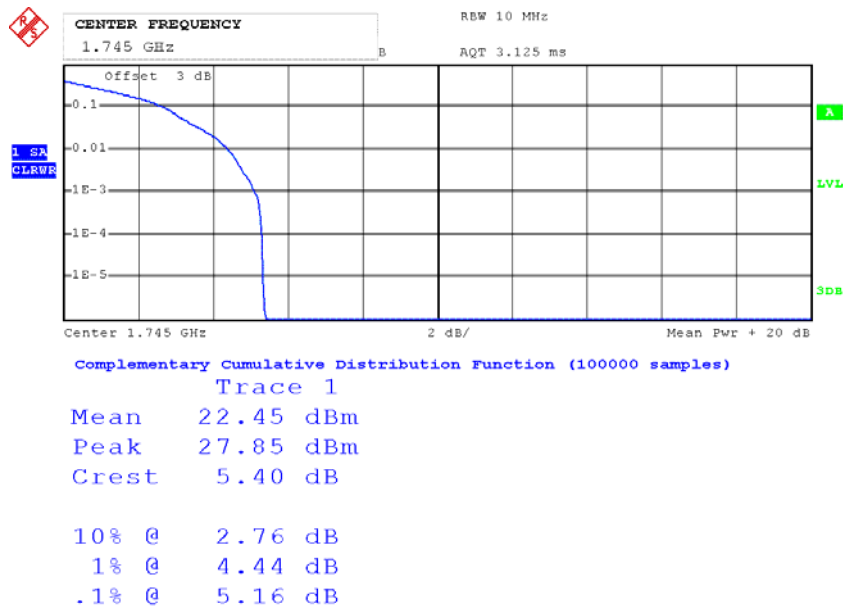


Date: 24.JUN.2016 23:59:29

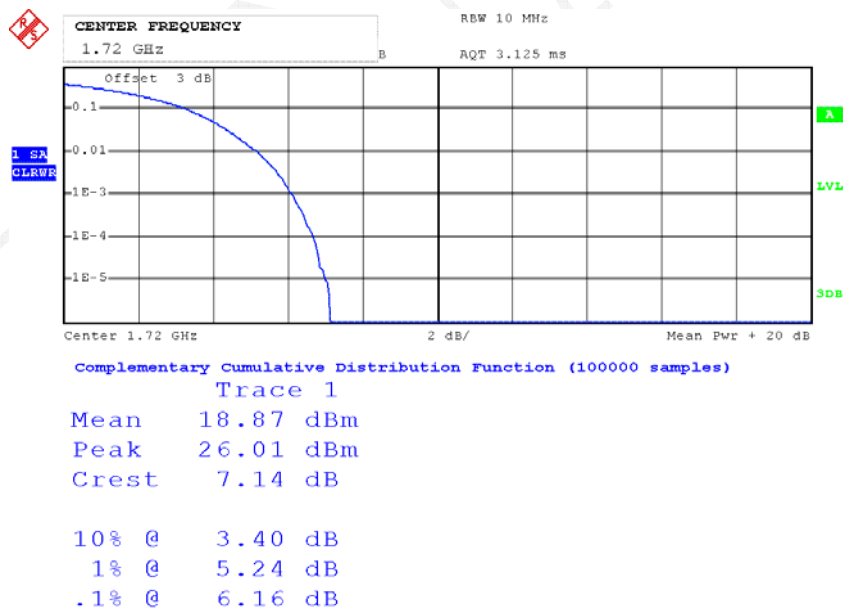
QPSK_20MHz_1RB Middle Channel



Date: 25.JUN.2016 00:00:34

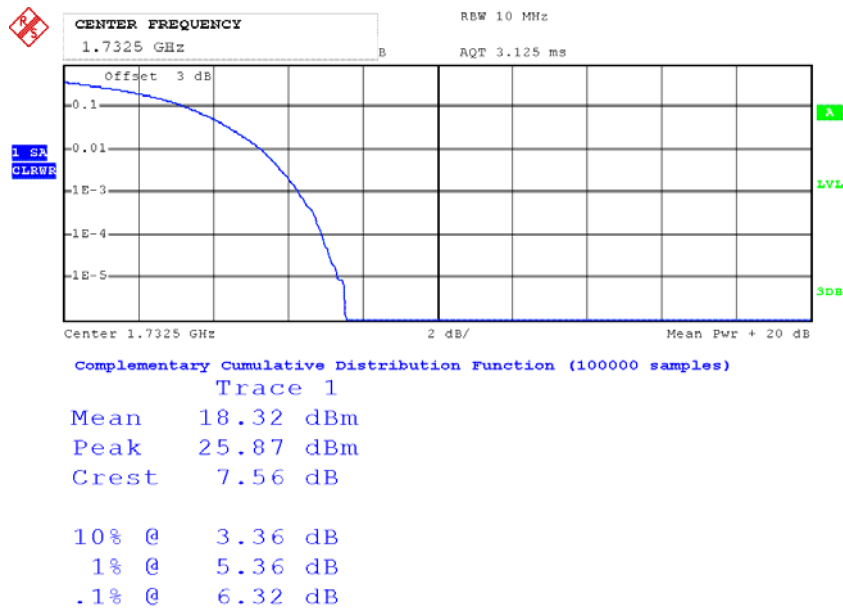
QPSK_20MHz_1RB High Channel

Date: 25.JUN.2016 00:01:40

QPSK_20MHz_FULL RB Low Channel

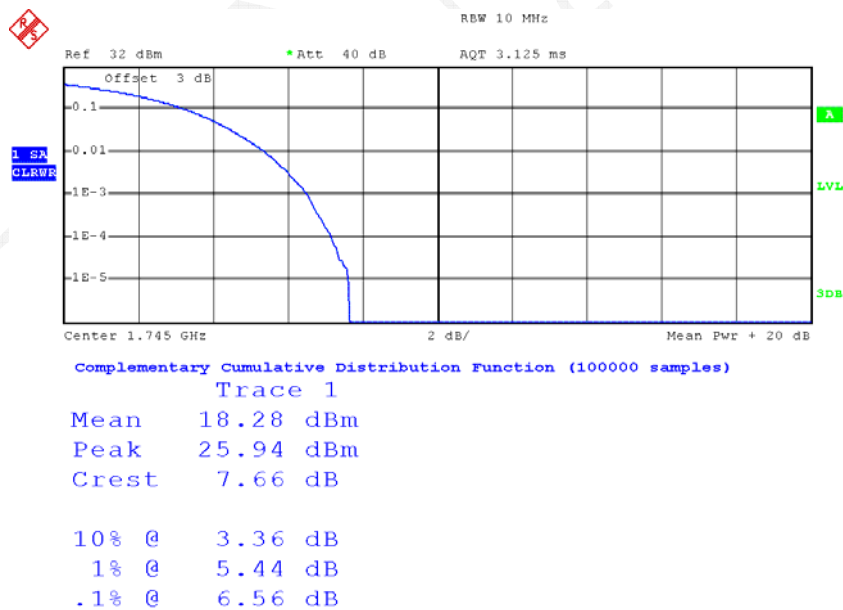
Date: 24.JUN.2016 23:51:51

QPSK_20MHz_FULL RB Middle Channel

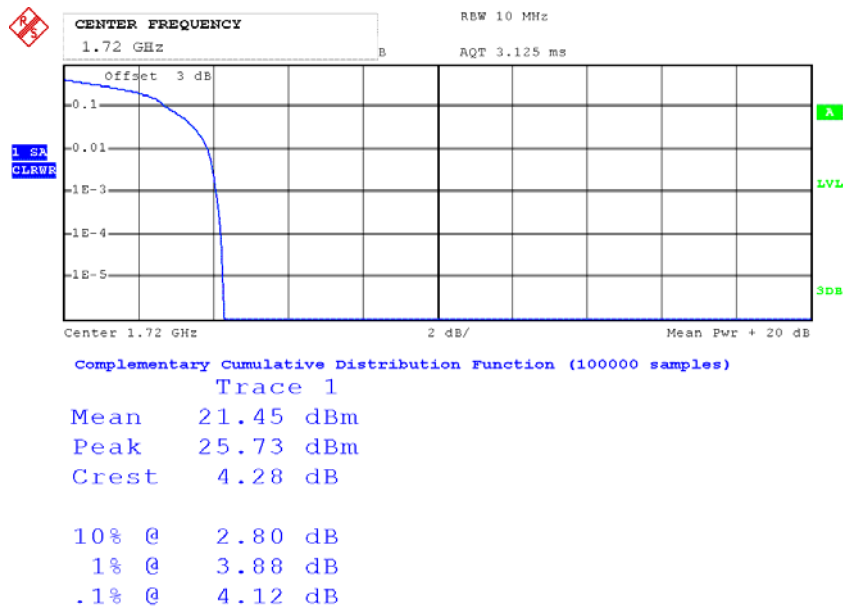


Date: 24.JUN.2016 23:50:52

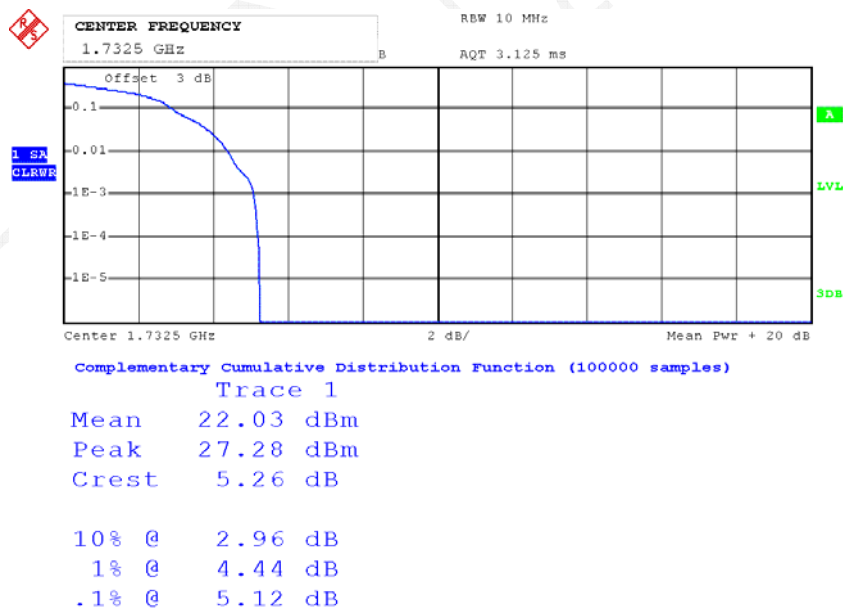
QPSK 20MHz_FULL RB High Channel



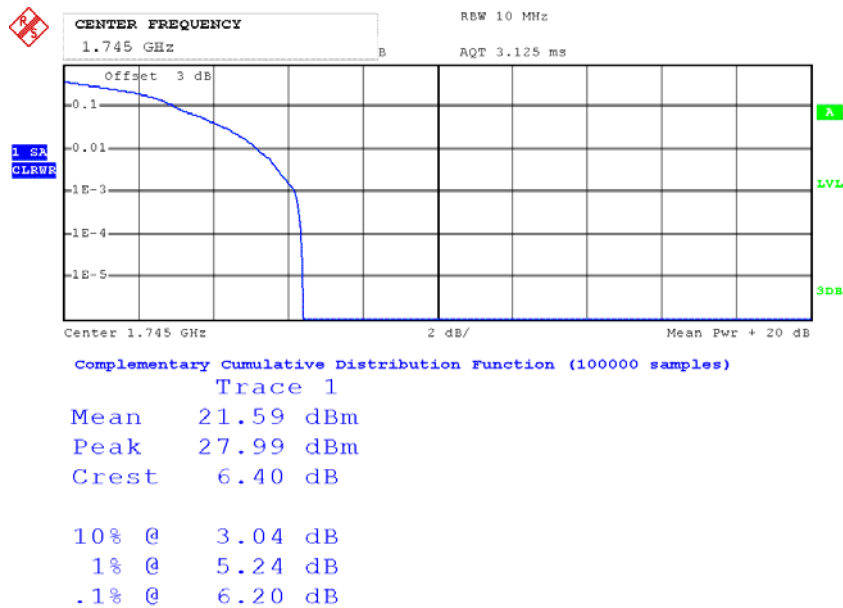
Date: 24.JUN.2016 23:48:28

16QAM_20MHz_1RB_Low Channel

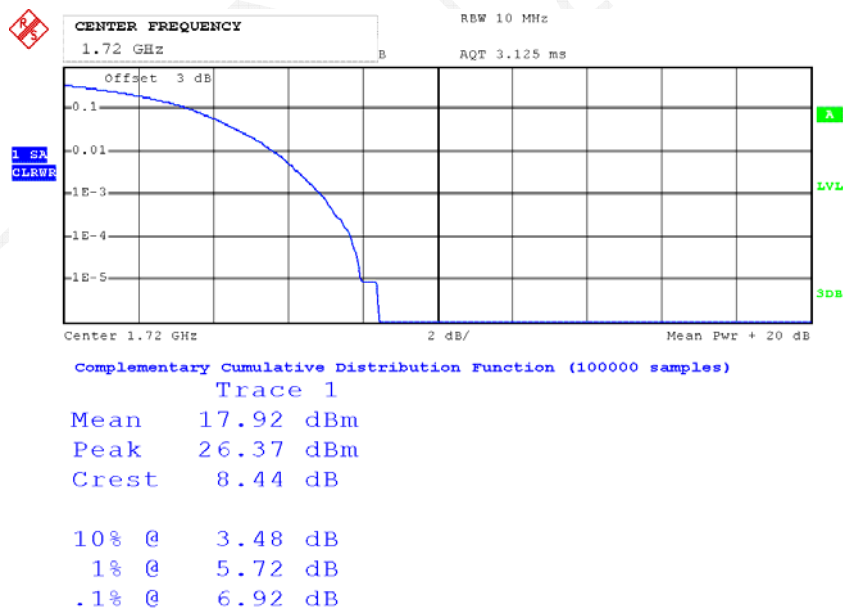
Date: 24.JUN.2016 23:59:18

16QAM 20MHz_1RB Middle Channel

Date: 25.JUN.2016 00:00:40

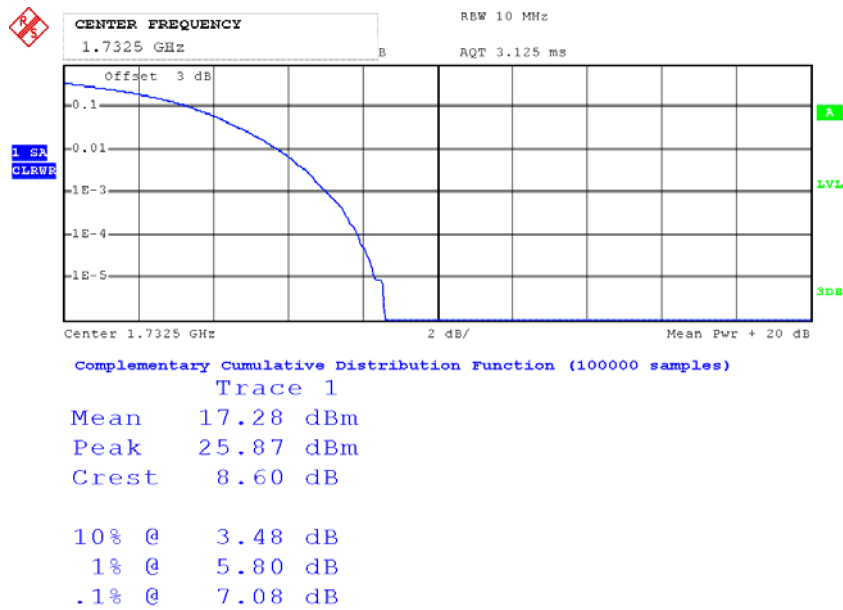
16QAM 20MHz_1RB High Channel

Date: 25.JUN.2016 00:01:32

16QAM 20MHz_FULL RB Low Channel

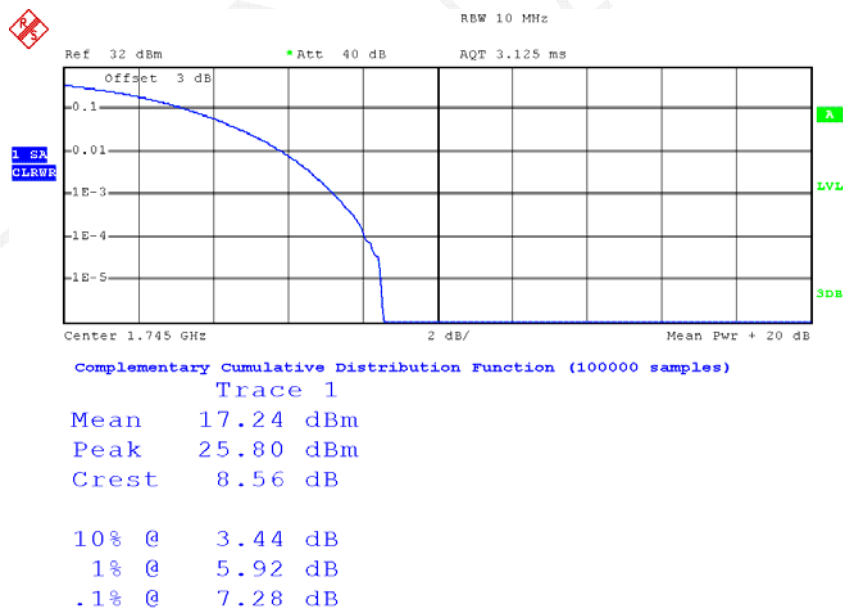
Date: 24.JUN.2016 23:52:07

16QAM 20MHz_FULL RB Middle Channel



Date: 24.JUN.2016 23:50:42

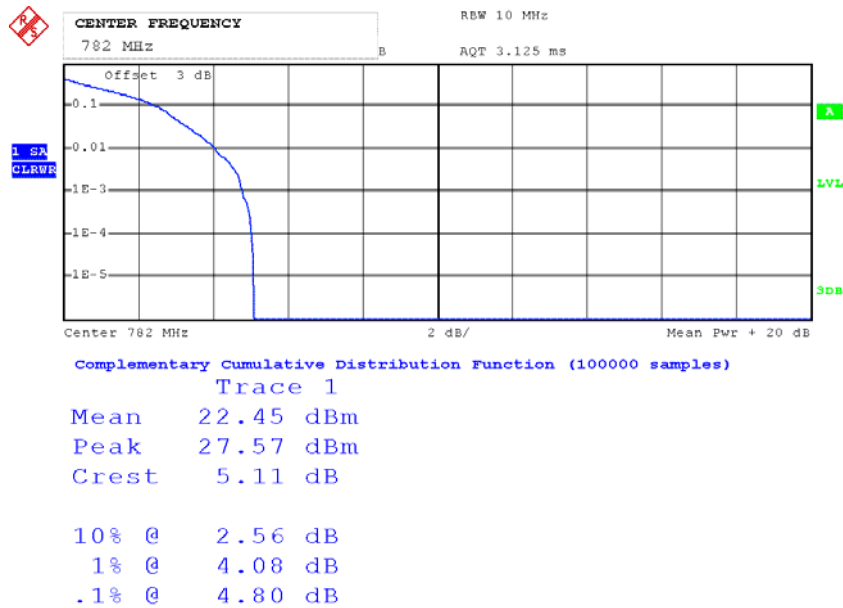
16QAM 20MHz_FULL RB High Channel



Date: 24.JUN.2016 23:48:58

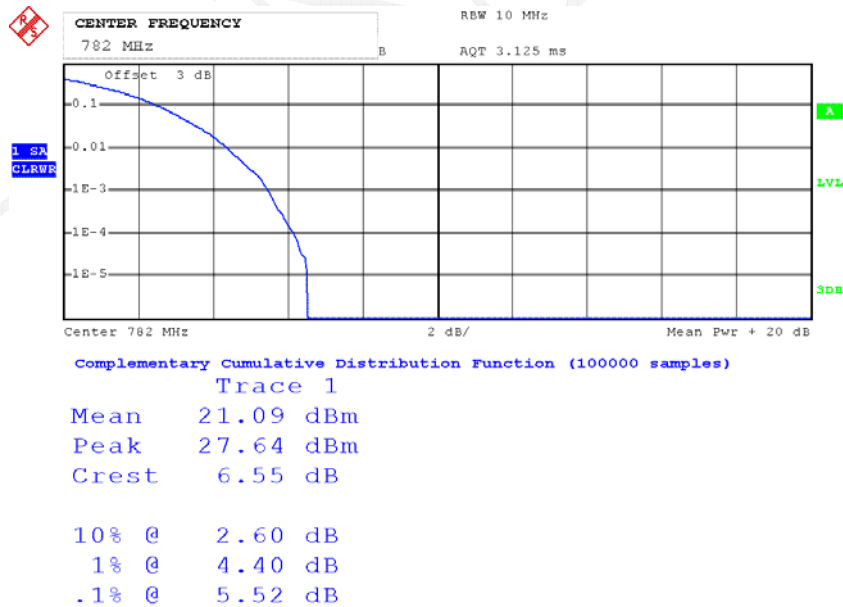
LTE Band 13(PART 27)

QPSK_10MHz_1RB Middle Channel



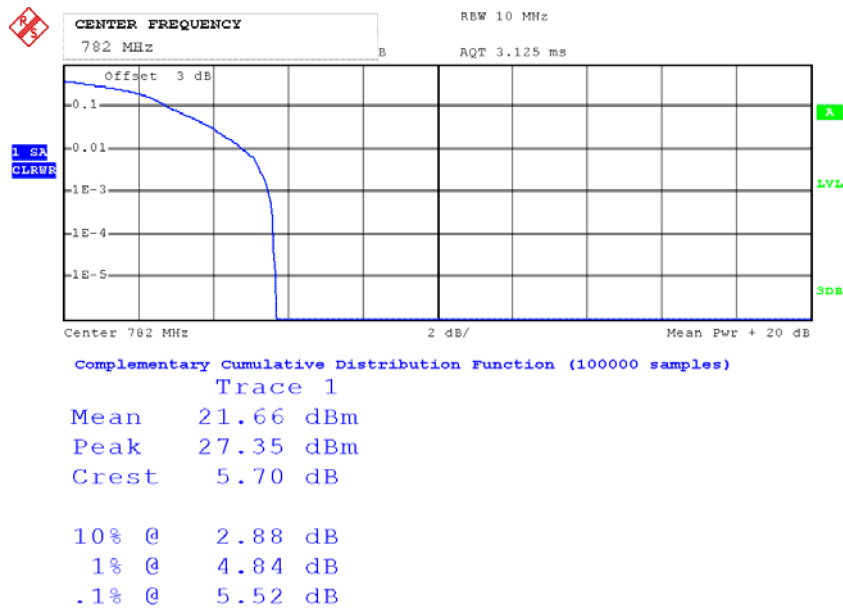
Date: 25.JUN.2016 00:03:27

QPSK_10MHz_FULL RB Middle Channel



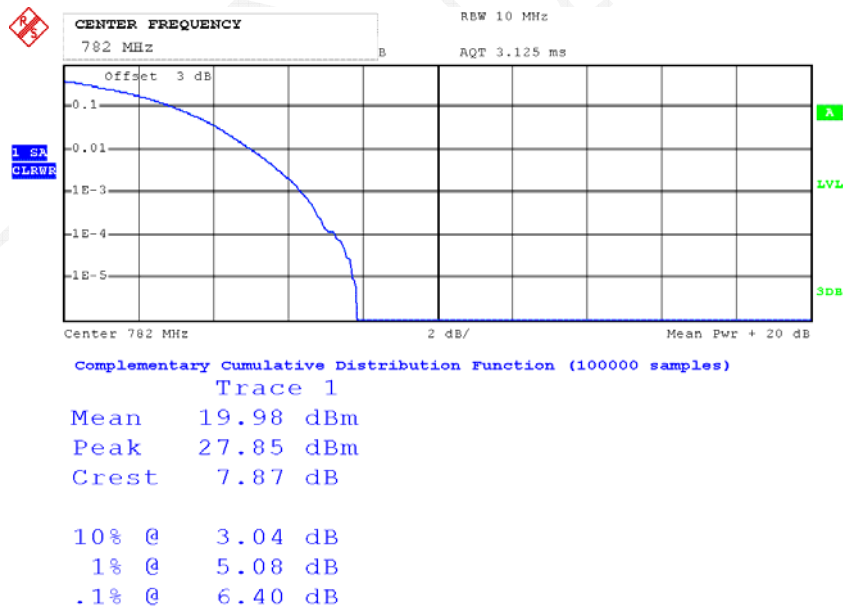
Date: 25.JUN.2016 00:02:54

16QAM 10MHz_1RB Middle Channel



Date: 25.JUN.2016 00:03:19

16QAM 10MHz_FULL RB Middle Channel



Date: 25.JUN.2016 00:03:03

ERP & EIRP**CDMA 2000:**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			S.G. Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
BC0 1xRTT RC1+SO55 Middle Channel (836.52MHz)								
836.520	H	97.34	22.4	0.0	1	21.4	38.5	17.1
836.520	V	86.40	14.6	0.0	1	13.6	38.5	24.9
BC0 1xEvDO RTAP 153.6kbps Middle Channel (836.52MHz)								
836.520	H	97.11	22.2	0.0	1	21.2	38.5	17.3
836.520	V	87.69	15.9	0.0	1	14.9	38.5	23.6
BC1 1xRTT RC1+SO55 Middle Channel(1880MHz)								
1880.000	H	87.15	15.6	11.7	1.4	25.9	33.0	7.1
1880.000	V	85.11	13.7	11.7	1.4	24.0	33.0	9.0
BC1 1xEvDO RTAP 153.6kbps Middle Channel (1880MHz)								
1880.000	H	87.23	15.6	11.7	1.4	25.9	33.0	7.1
1880.000	V	85.55	14.1	11.7	1.4	24.4	33.0	8.6

LTE Band 13

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			S.G. Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK 5MHz Bandwidth Middle Channel (782MHz)								
782.000	H	97.24	21.7	0.0	0.9	20.8	33.00	12.2
782.000	V	92.96	20.4	0.0	0.9	19.5	33.00	13.5
16QAM 5MHz Bandwidth Middle Channel (782MHz)								
782.000	H	96.65	21.1	0.0	0.9	20.2	33.00	12.8
782.000	V	91.77	19.2	0.0	0.9	18.3	33.00	14.7
QPSK 10MHz Bandwidth Middle Channel(782MHz)								
782.000	H	96.56	21	0.0	0.9	20.1	33.00	12.9
782.000	V	90.84	18.2	0.0	0.9	17.3	33.00	15.7
16QAM 10MHz Bandwidth Middle Channel (782MHz)								
782.000	H	95.91	20.4	0.0	0.9	19.5	33.00	13.5
782.000	V	90.13	17.5	0.0	0.9	16.6	33.00	16.4

LTE Band 4

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			S.G. Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK 1.4MHz Bandwidth Middle Channel (1732.5MHz)								
1732.500	H	90.01	17	10.9	1.4	26.5	30.00	3.5
1732.500	V	83.41	10.1	10.9	1.4	19.6	30.00	10.4
16QAM 1.4MHz Bandwidth Middle Channel (1732.5MHz)								
1732.500	H	90.24	17.2	10.9	1.4	26.7	30.00	3.3
1732.500	V	83.61	10.3	10.9	1.4	19.8	30.00	10.2
QPSK 3Hz Bandwidth Middle Channel (1732.5MHz)								
1732.500	H	88.06	15.1	10.9	1.4	24.6	30.00	5.4
1732.500	V	81.55	8.2	10.9	1.4	17.7	30.00	12.3
16QAM 3Hz Bandwidth Middle Channel (1732.5MHz)								
1732.500	H	88.66	15.7	10.9	1.4	25.2	30.00	4.8
1732.500	V	82.00	8.7	10.9	1.4	18.2	30.00	11.8
QPSK 5MHz Bandwidth Middle Channel (1732.5MHz)								
1732.500	H	87.33	14.3	10.9	1.4	23.8	30.00	6.2
1732.500	V	81.15	7.8	10.9	1.4	17.3	30.00	12.7
16QAM 5MHz Bandwidth Middle Channel (1732.5MHz)								
1732.500	H	87.55	14.5	10.9	1.4	24.0	30.00	6.0
1732.500	V	80.85	7.5	10.9	1.4	17.0	30.00	13.0
QPSK 10MHz Bandwidth Middle Channel (1732.5MHz)								
1732.500	H	86.95	13.9	10.9	1.4	23.4	30.00	6.6
1732.500	V	80.29	7	10.9	1.4	16.5	30.00	13.5
16QAM 10MHz Bandwidth Middle Channel (1732.5MHz)								
1732.500	H	86.41	13.4	10.9	1.4	22.9	30.00	7.1
1732.500	V	80.26	6.9	10.9	1.4	16.4	30.00	13.6
QPSK 15MHz Bandwidth Middle Channel (1732.5MHz)								
1732.500	H	86.38	13.4	10.9	1.4	22.9	30.00	7.1
1732.500	V	80.73	7.4	10.9	1.4	16.9	30.00	13.1
16QAM 15MHz Bandwidth Middle Channel (1732.5MHz)								
1732.500	H	85.35	12.3	10.9	1.4	21.8	30.00	8.2
1732.500	V	80.14	6.8	10.9	1.4	16.3	30.00	13.7
QPSK 20MHz Bandwidth Middle Channel (1732.5MHz)								
1732.500	H	85.43	12.4	10.9	1.4	21.9	30.00	8.1
1732.500	V	80.15	6.8	10.9	1.4	16.3	30.00	13.7
16QAM 20MHz Bandwidth Middle Channel (1732.5MHz)								
1732.500	H	85.09	12.1	10.9	1.4	21.6	30.00	8.4
1732.500	V	79.21	5.9	10.9	1.4	15.4	30.00	14.6

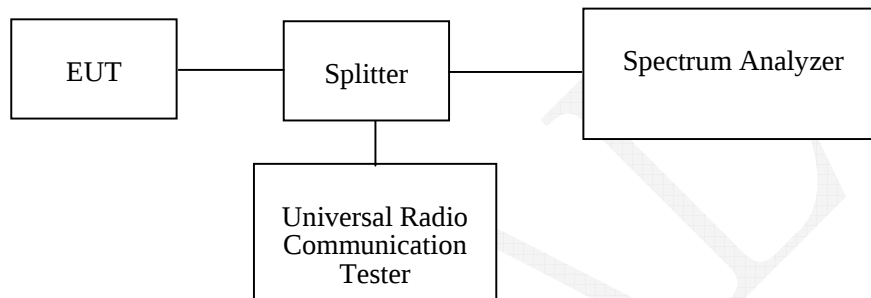
FCC §2.1049, §22.917, §22.905 & §24.238 & §27.53- OCCUPIED BANDWIDTH**Applicable Standard**

FCC §2.1049, §22.917, §22.905, §24.238 and §27.53.

Test Procedure

The RF output of the transmitter was connected to the simulator and the spectrum analyzer through sufficient attenuation.

The 26 dB & 99% bandwidth was recorded.

**Test Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2015-11-23	2016-11-22
R&S	Spectrum Analyzer	FSEM	DE23437	2015-11-23	2016-11-22

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data**Environmental Conditions**

Temperature:	27.5 – 28.5 °C
Relative Humidity:	39 - 45%
ATM Pressure:	100.1 – 100.4 kPa

The testing was performed by Costa Dong from 2016-06-24 to 2016-06-30.

Test Mode: Transmitting

Test Result: Compliant. Please refer to the following table and plots.

CDMA 2000:

Band	Channel	Configuration		99% Occupied Bandwidth	26 dB Bandwidth
				MHz	MHz
BC0	384	1xRTT	RC1+SO55	1.275	1.425
			RC3+SO55	1.275	1.431
		1xEvDO	RTAP 153.6kbps	1.275	1.431
BC1	600	1xRTT	RC1+SO55	1.281	1.437
			RC3+SO55	1.275	1.437
		1xEvDO	RTAP 153.6kbps	1.275	1.437

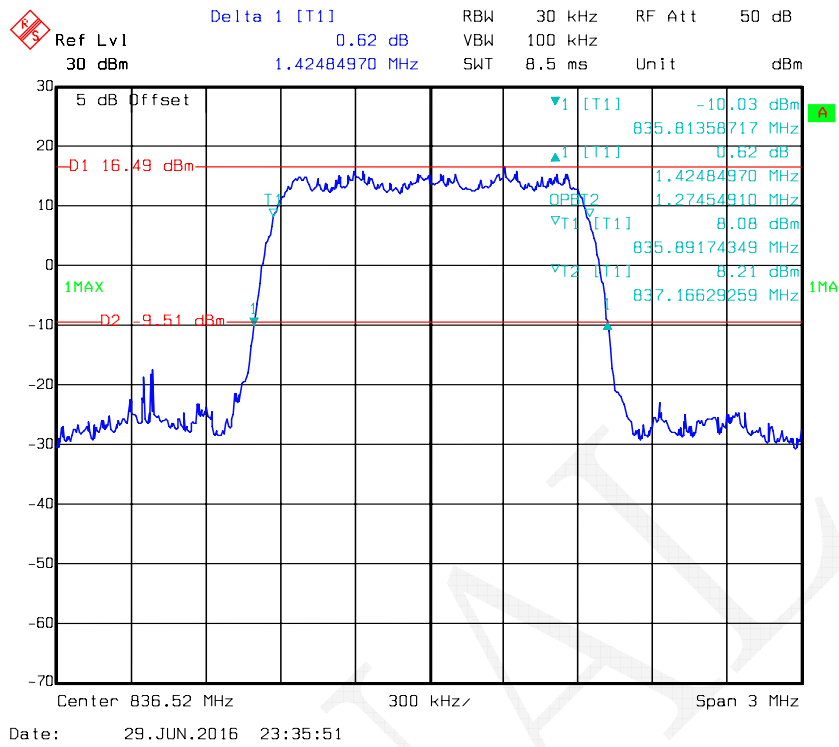
LTE Band 4:

Test Modulation	Test Bandwidth	Test Channel	99% Occupied Bandwidth	26 dB Bandwidth
			MHz	MHz
QPSK	1.4M	M	1.11	1.33
	3M		2.76	3.18
	5M		4.54	5.14
	10M		9.16	10.40
	15M		13.62	15.36
	20M		18.08	19.76
16-QAM	1.4M	M	1.10	1.33
	3M		2.76	3.17
	5M		4.52	5.14
	10M		9.16	10.40
	15M		13.56	15.18
	20M		18.08	19.76

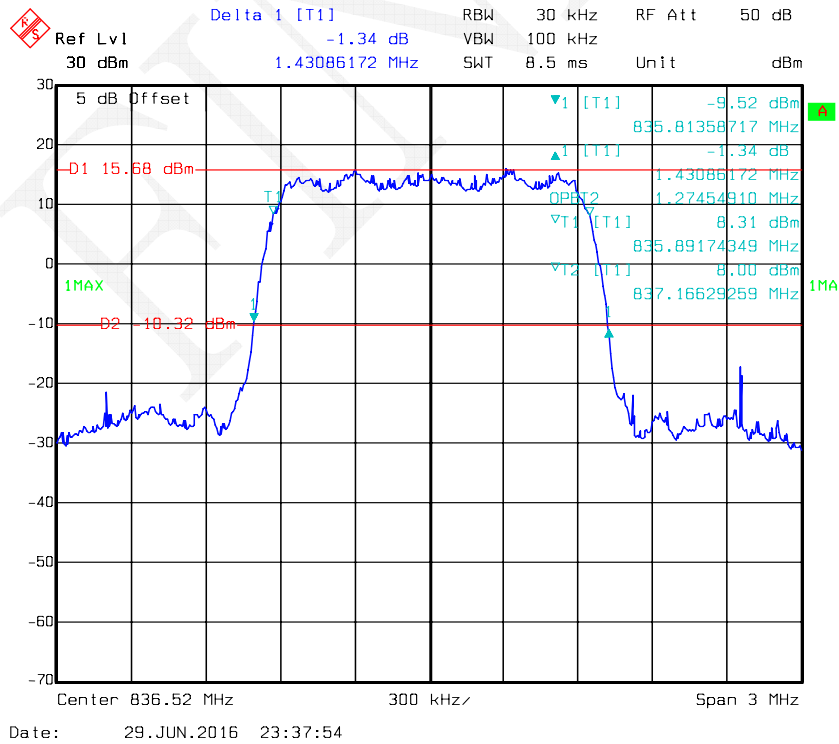
LTE Band 13:

Test Modulation	Test Bandwidth	Test Channel	99% Occupied Bandwidth	26 dB Bandwidth
			MHz	MHz
QPSK	5M	M	4.54	5.10
	10M		9.08	10.32
16QAM	5M		4.54	5.12
	10M		9.08	10.28

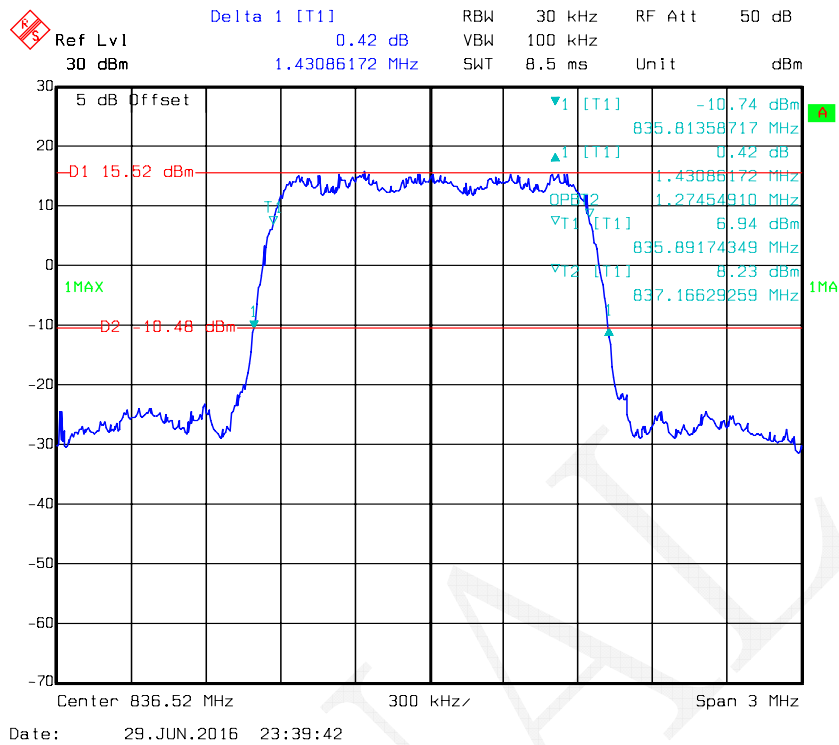
BC0- RC1+SO55



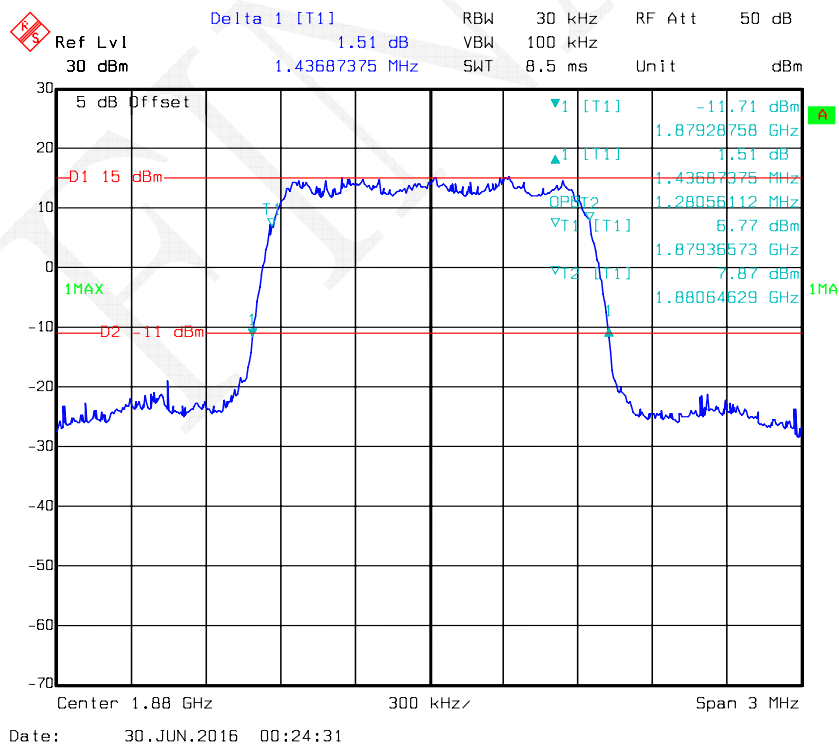
BC0- RC3+SO55



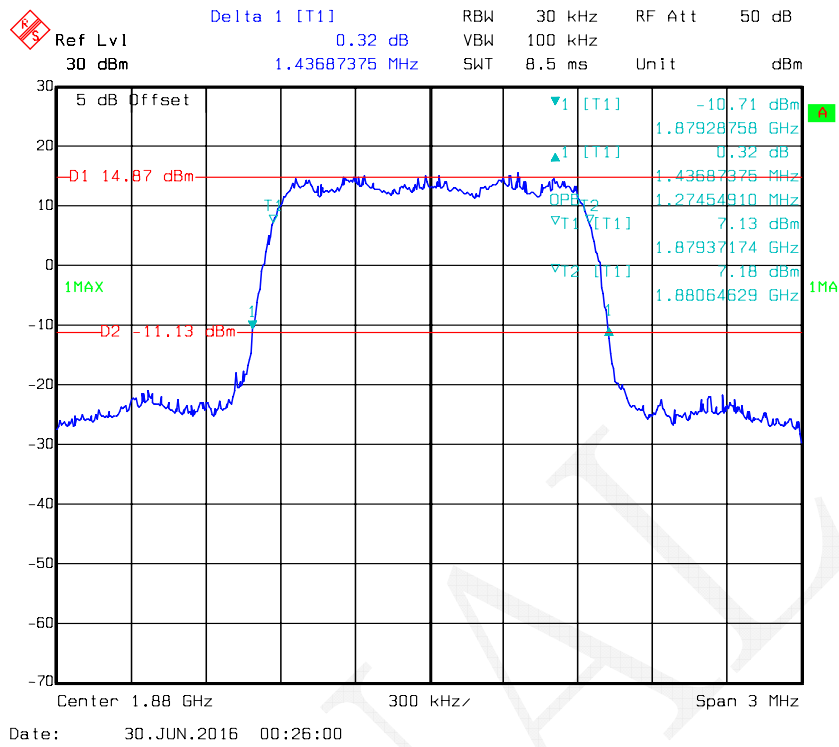
BC0- RTAP 153.6kbps



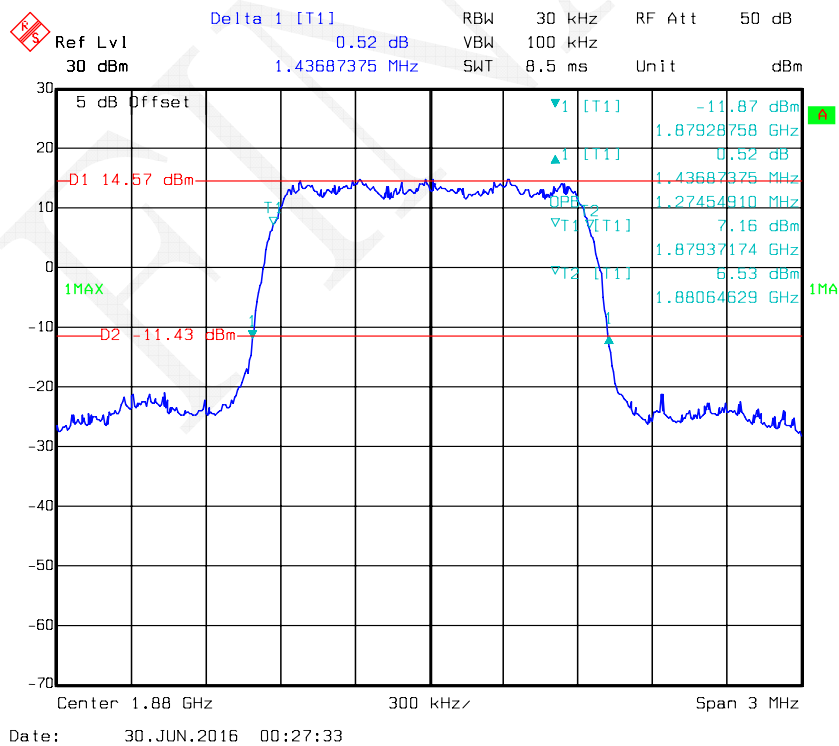
BC1- RC1+SO55



BC1- RC3+SO55

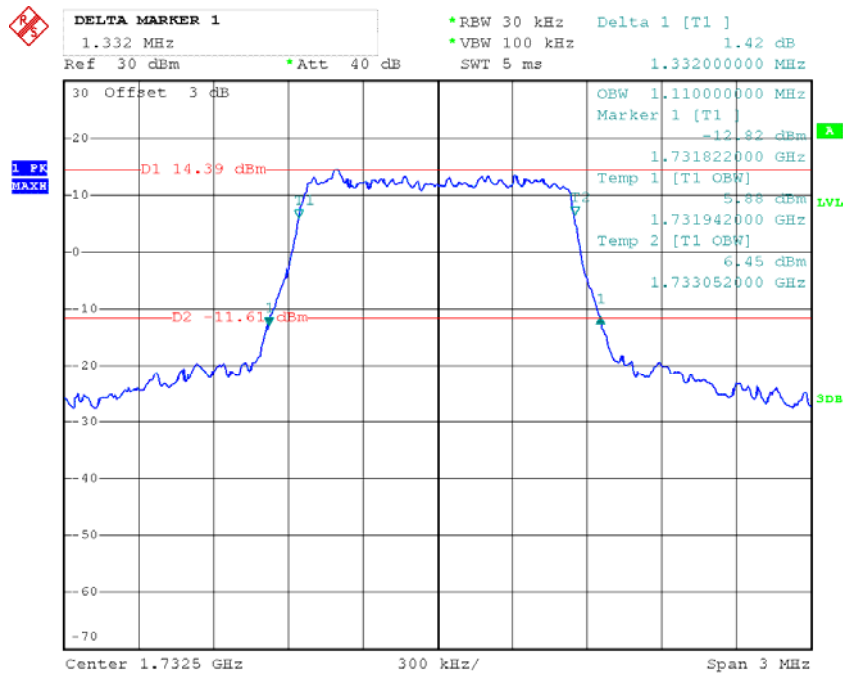


BC1- RTAP 153.6kbps



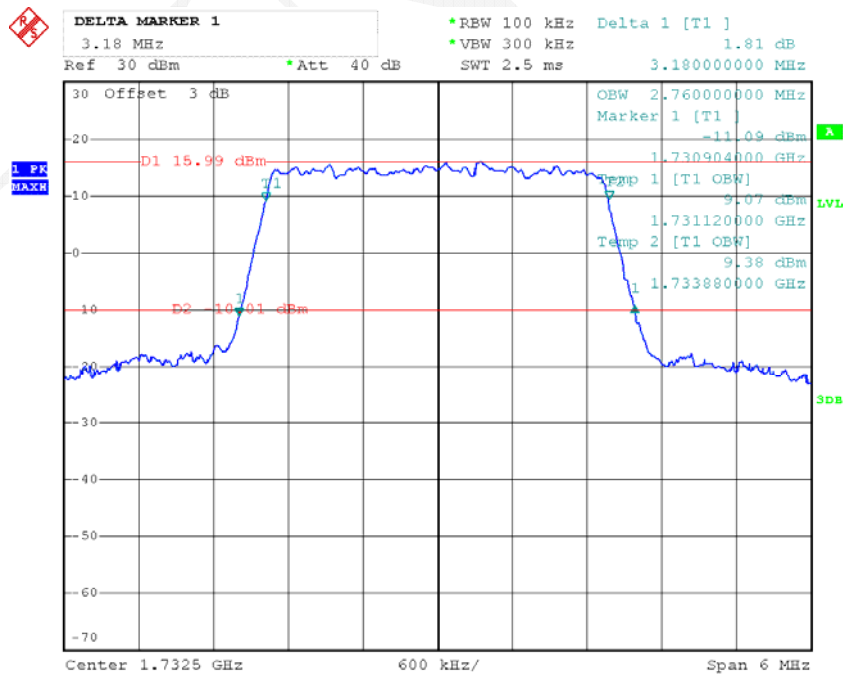
LTE Band 4

QPSK_1.4 MHz



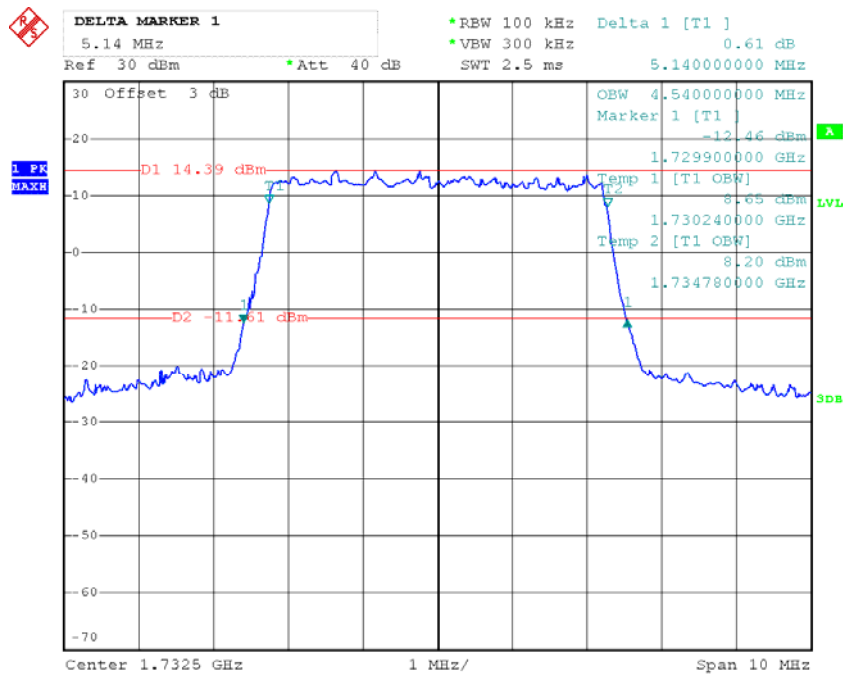
Date: 24.JUN.2016 21:44:49

QPSK_3 MHz



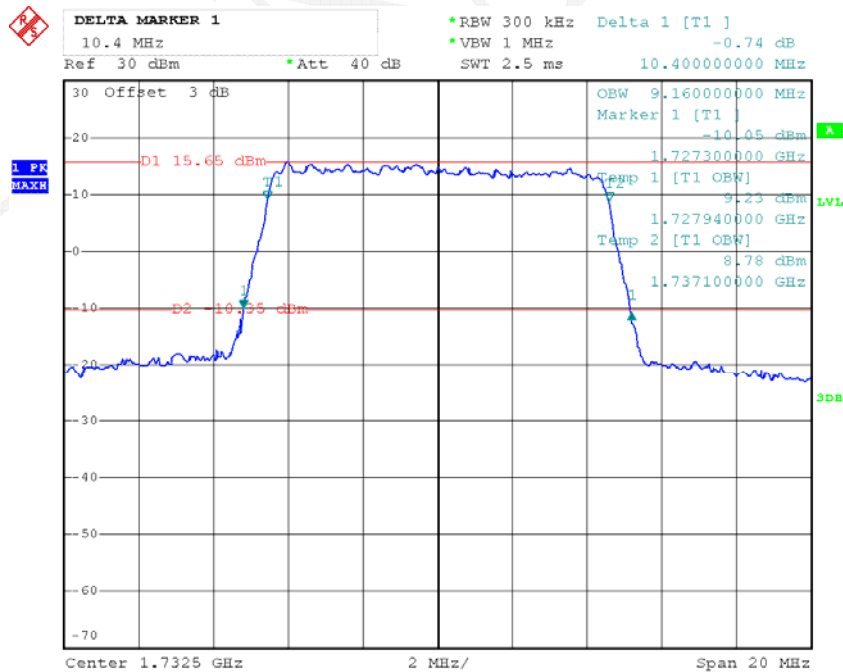
Date: 24.JUN.2016 21:50:51

QPSK_5 MHz



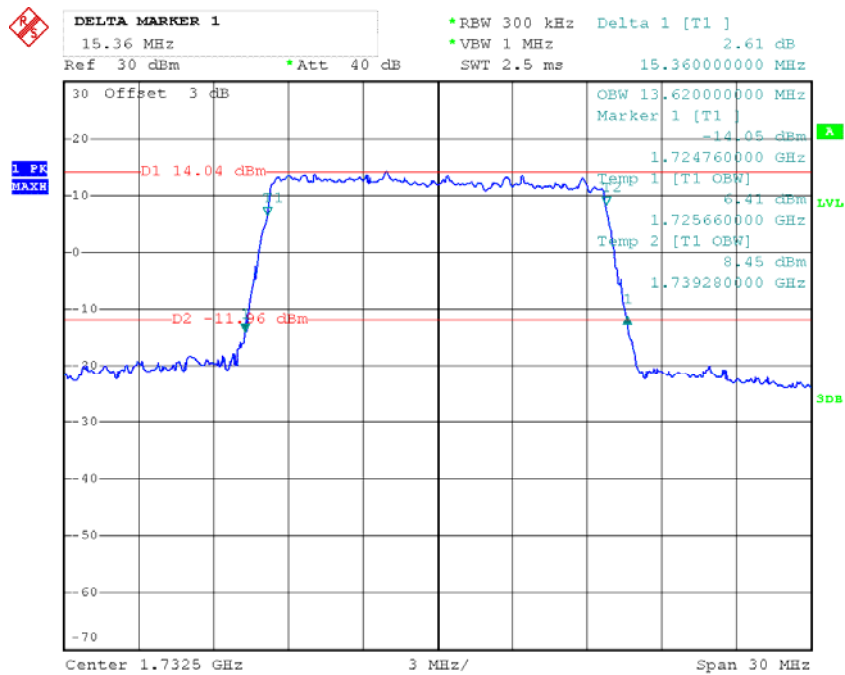
Date: 24.JUN.2016 21:55:38

QPSK_10 MHz



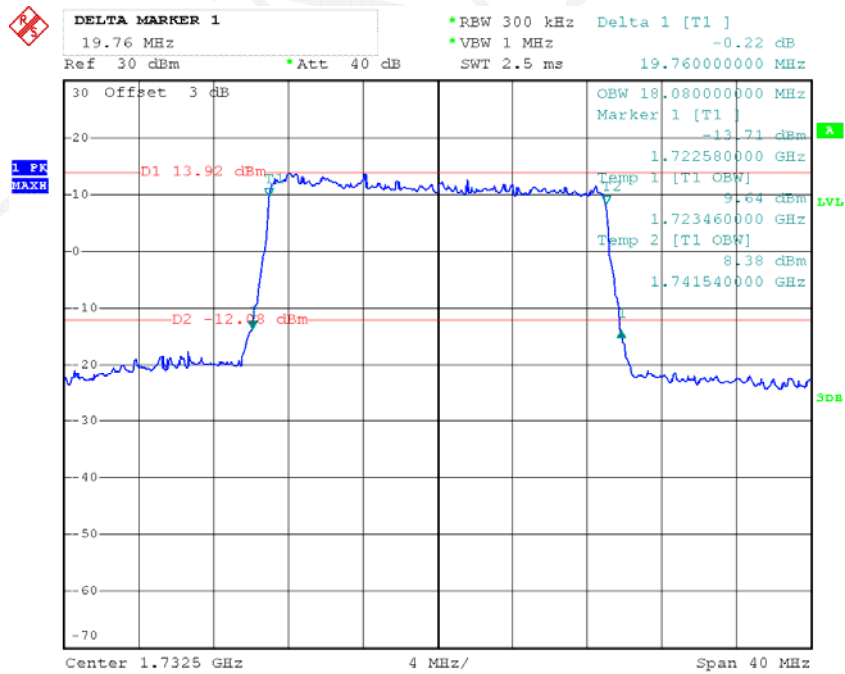
Date: 24.JUN.2016 21:59:54

QPSK_15 MHz



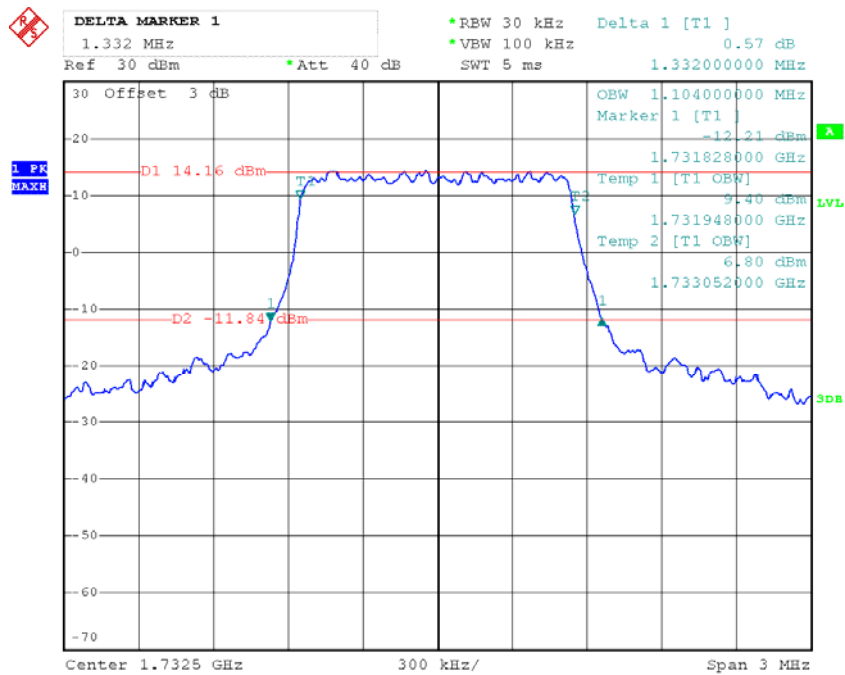
Date: 24.JUN.2016 22:03:12

QPSK_20 MHz



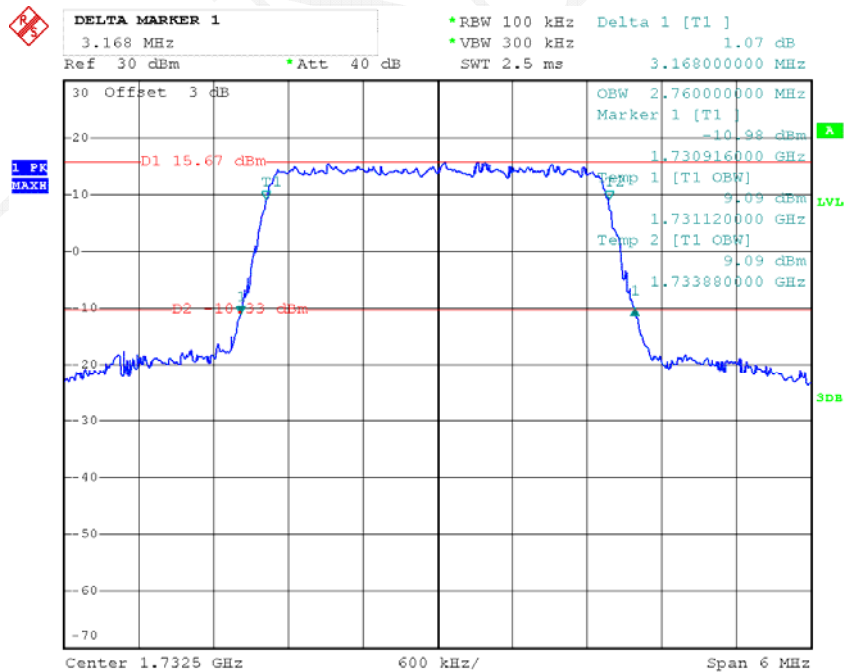
Date: 24.JUN.2016 22:05:12

16QAM_1.4 MHz



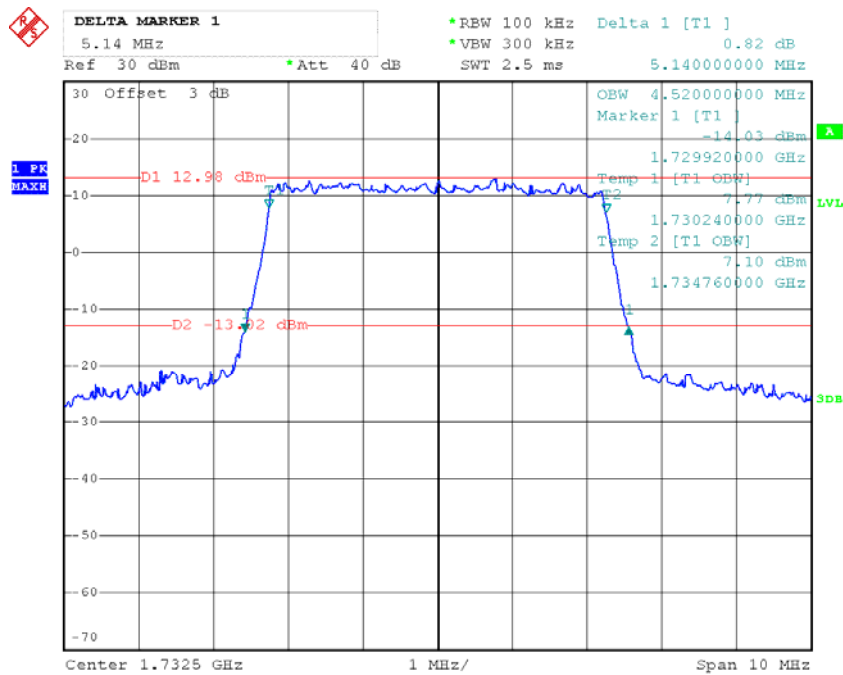
Date: 24.JUN.2016 21:47:46

16QAM_3 MHz



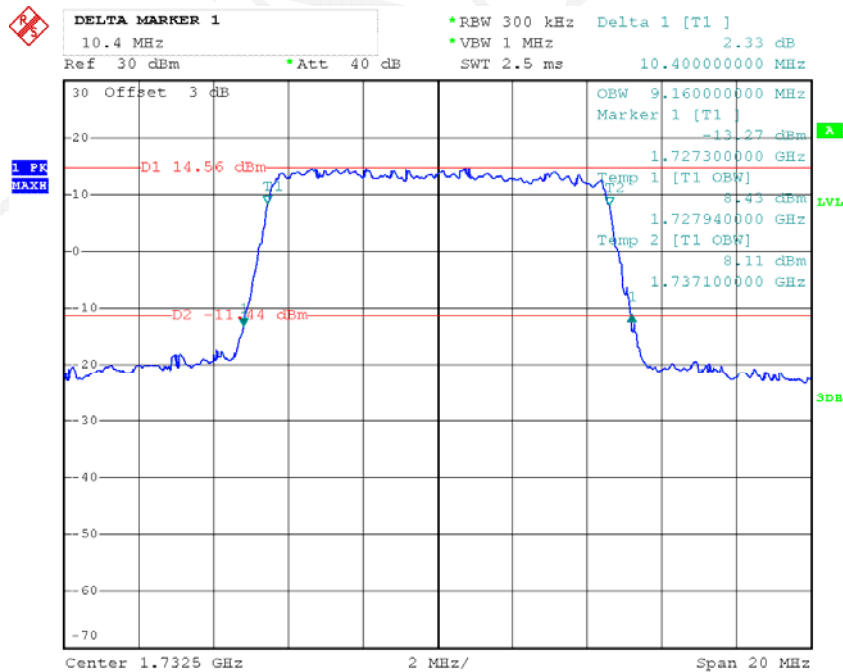
Date: 24.JUN.2016 21:52:10

16QAM_5 MHz



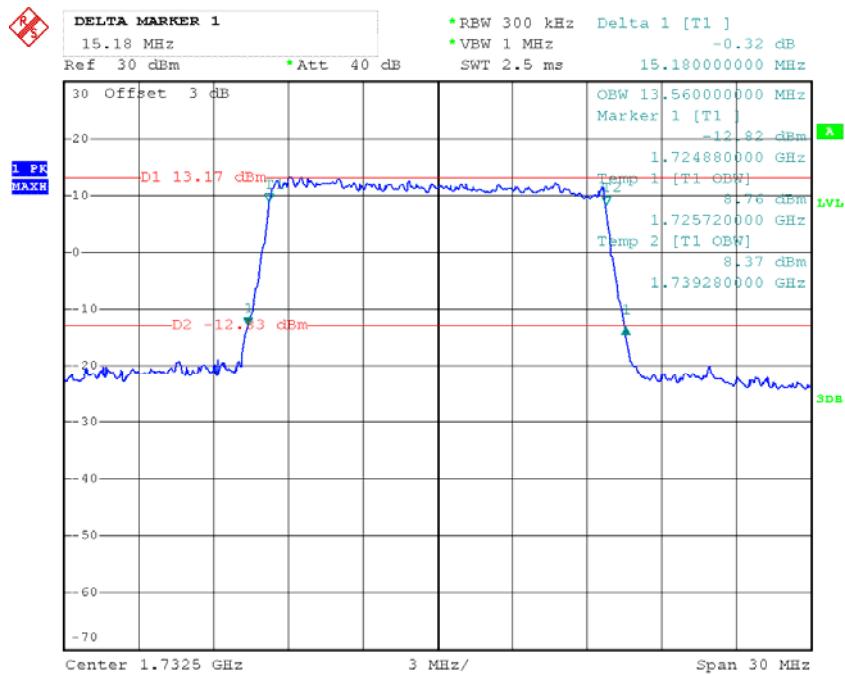
Date: 24.JUN.2016 21:54:13

16QAM_10 MHz



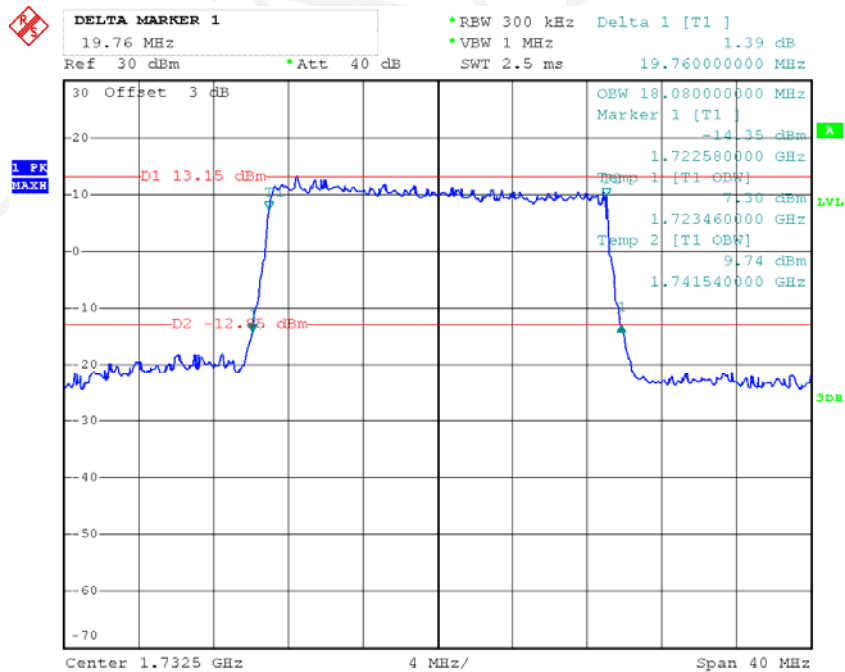
Date: 24.JUN.2016 21:58:09

16QAM_15 MHz



Date: 24.JUN.2016 22:01:56

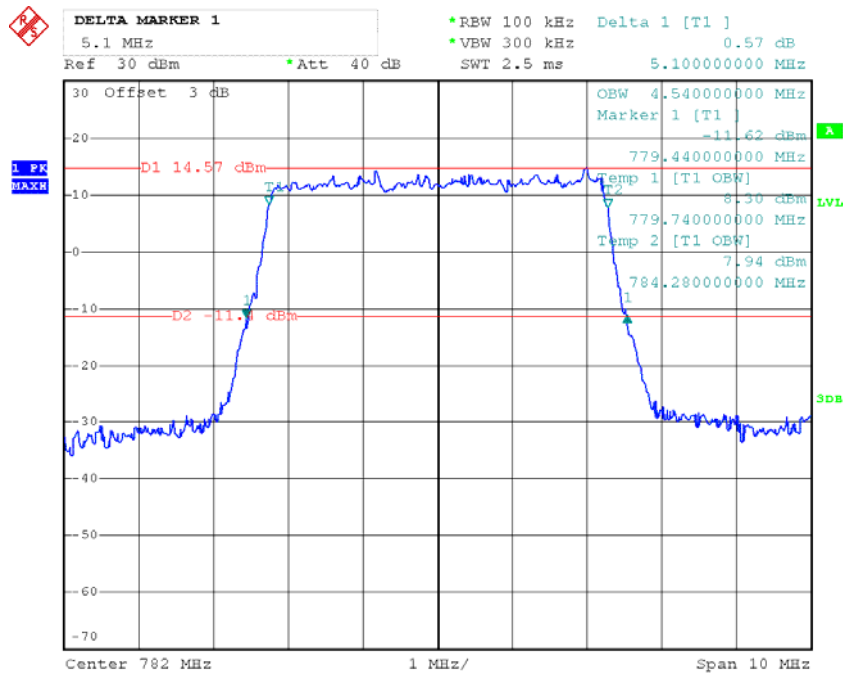
16QAM_20 MHz



Date: 24.JUN.2016 22:06:19

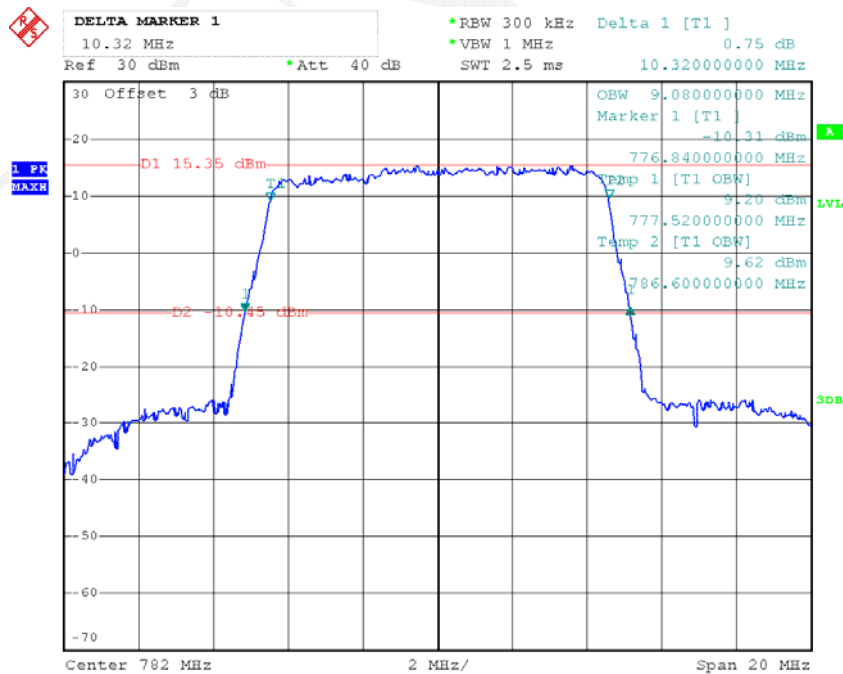
Band 13

QPSK_5 MHz



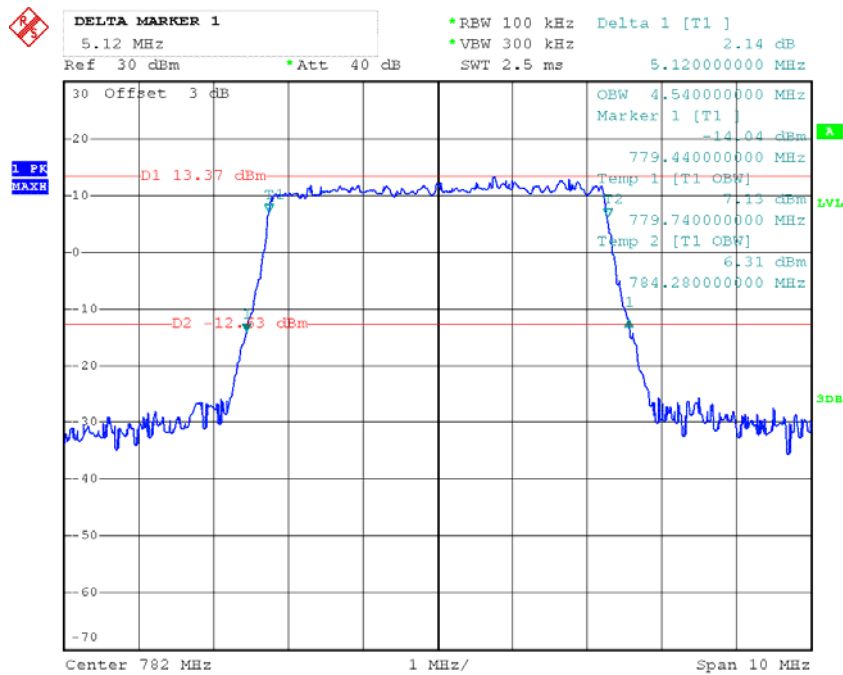
Date: 24.JUN.2016 22:08:51

QPSK_10 MHz



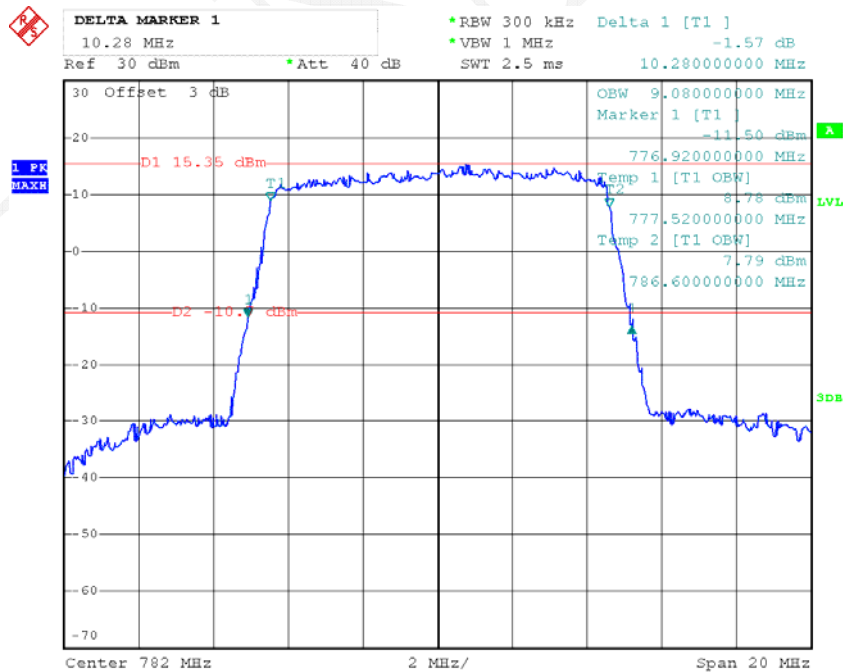
Date: 24.JUN.2016 22:12:33

16QAM_5 MHz



Date: 24.JUN.2016 22:09:58

16QAM_10 MHz



Date: 24.JUN.2016 22:13:32

FCC §2.1051, §22.917(a) & §24.238(a) & §27.53- SPURIOUS EMISSIONS AT ANTENNA TERMINALS

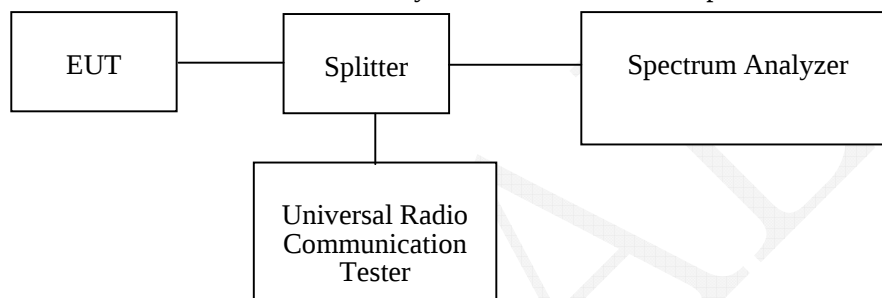
Applicable Standard

FCC §2.1051, §22.917(a) , §24.238(a) and §27.53.

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in § 2.1051.

Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer and simulator through appropriate attenuation. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2015-05-09	2016-05-09

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

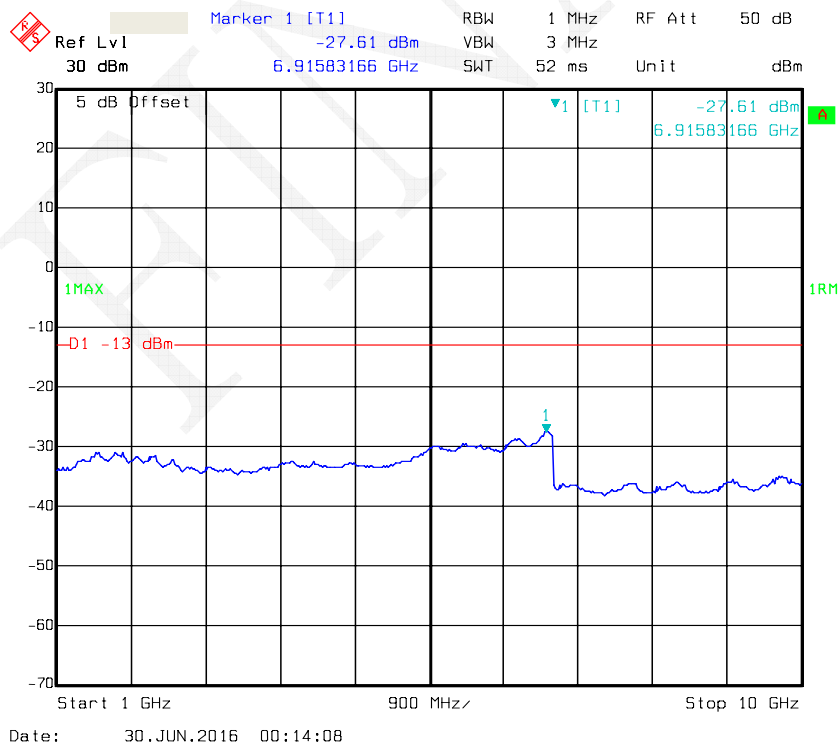
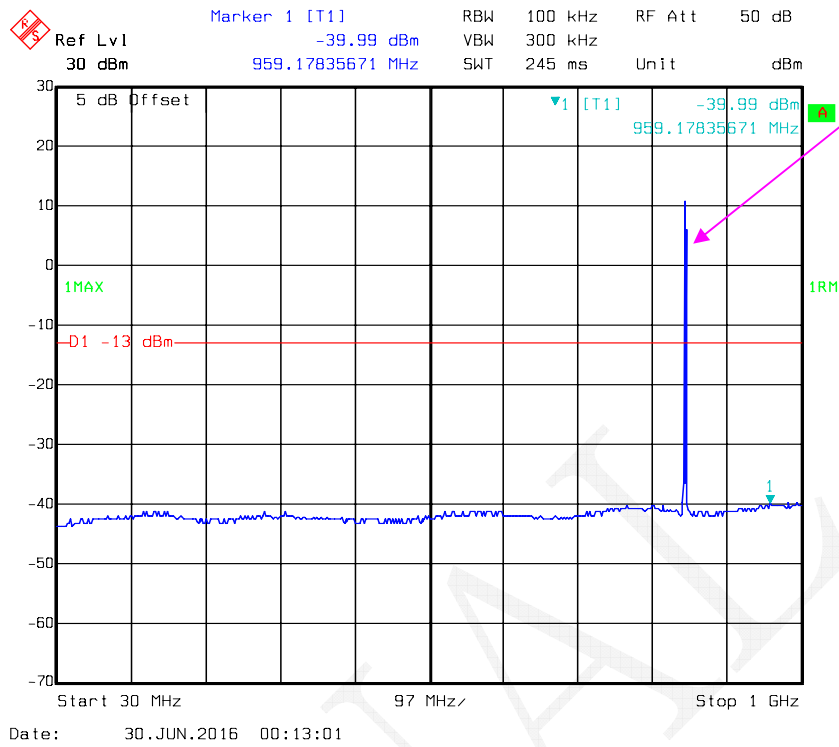
Environmental Conditions

Temperature:	27.5 – 28.6 °C
Relative Humidity:	39 - 46 %
ATM Pressure:	100.1 – 100.4 kPa

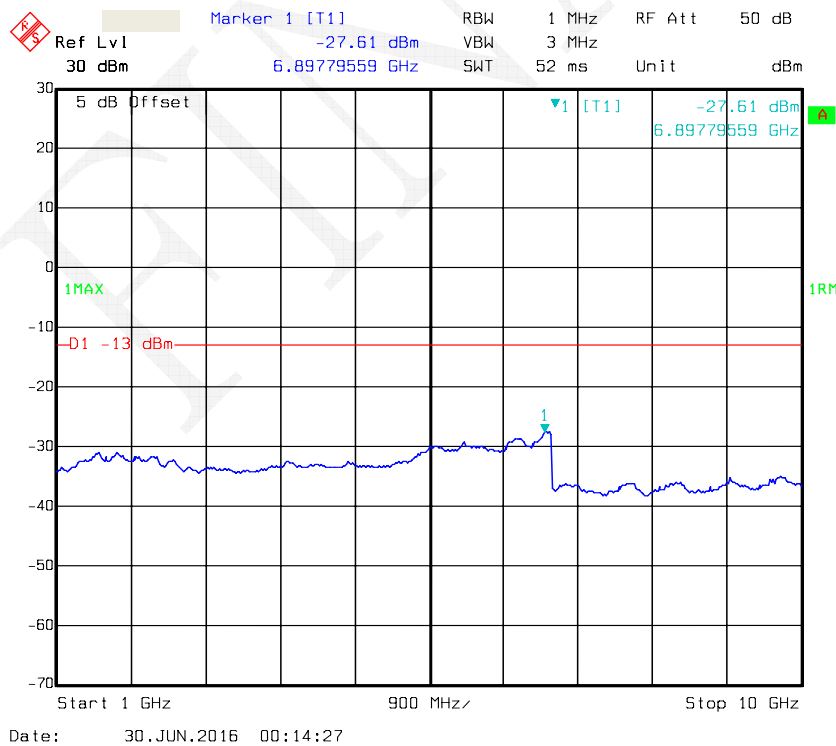
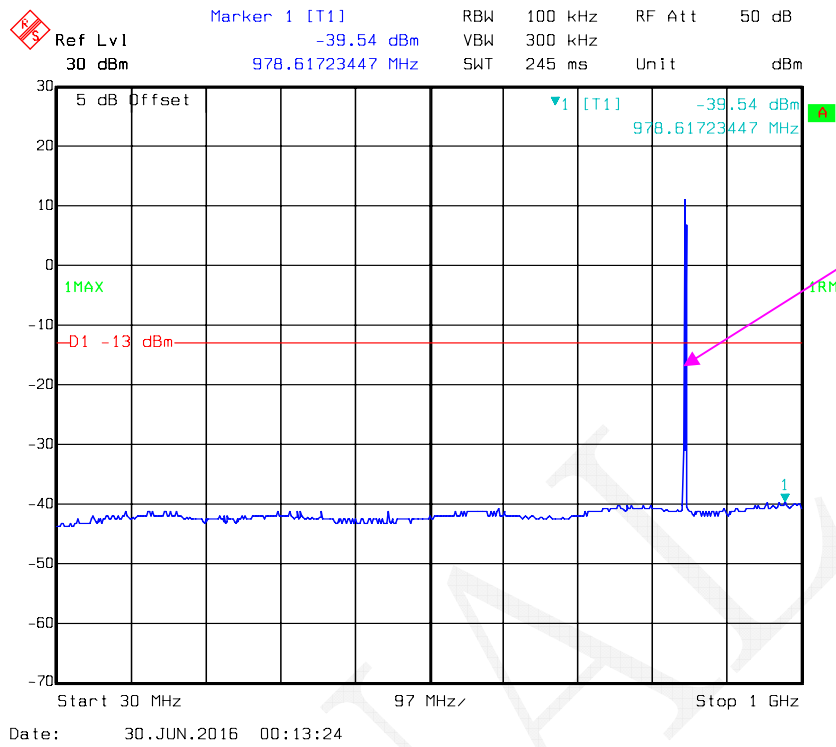
The testing was performed by Costa Dong from 2016-06-20 to 2016-06-30.

Please refer to the following plots.

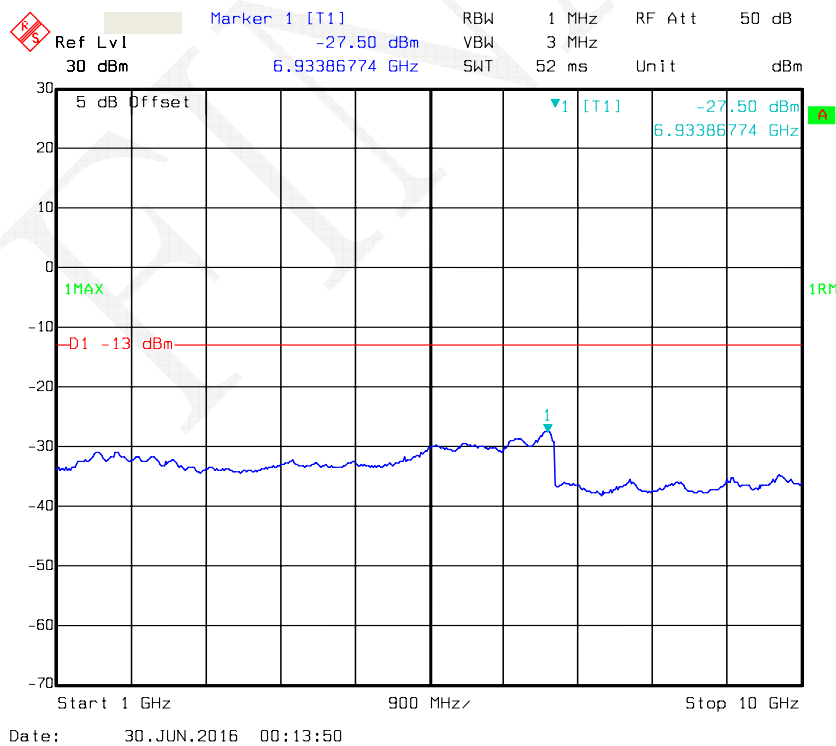
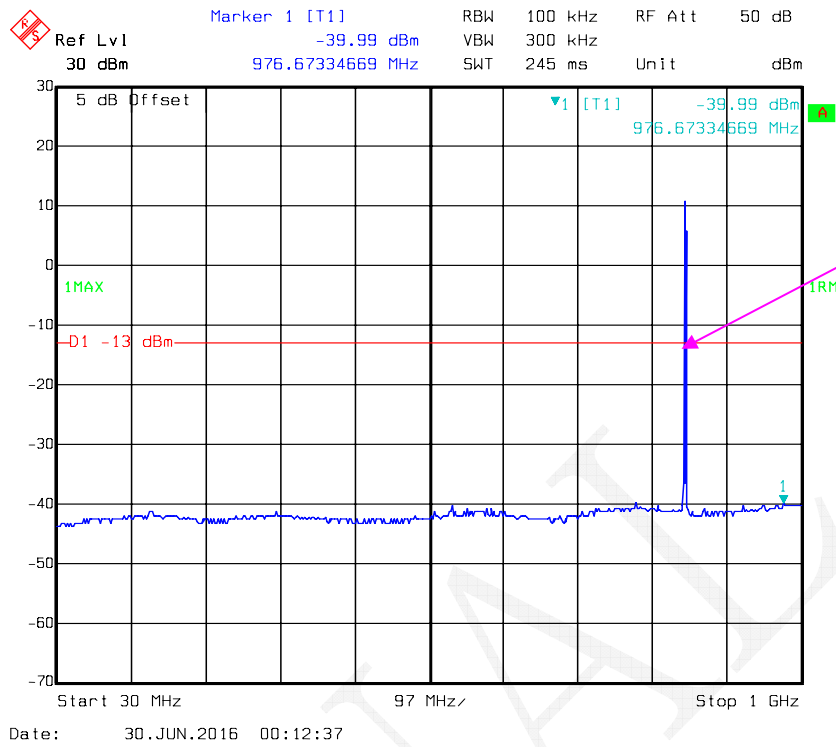
BC0-RC1_Middle Channel



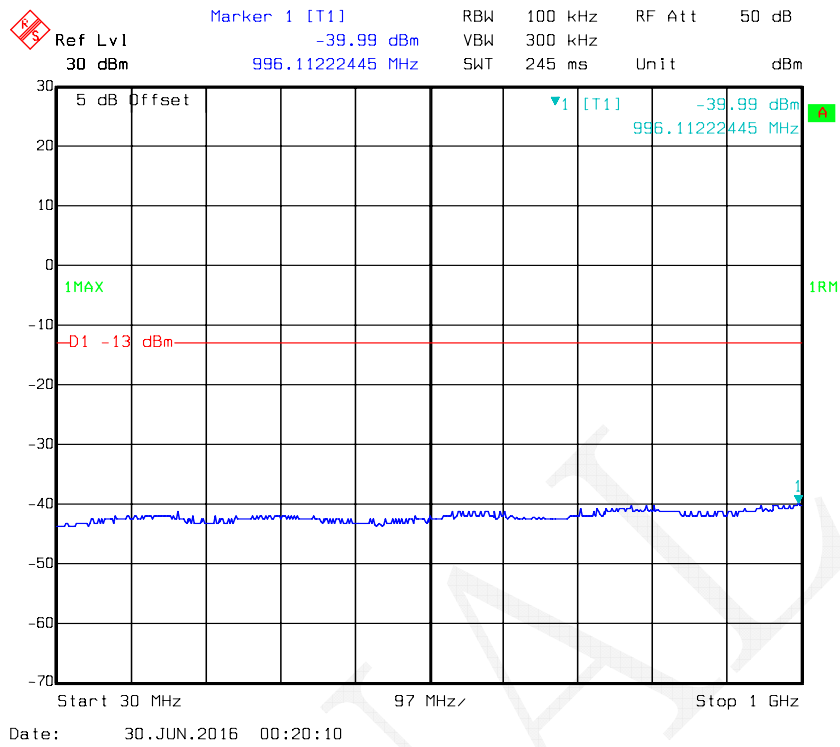
BC0-RC3_Middle Channel



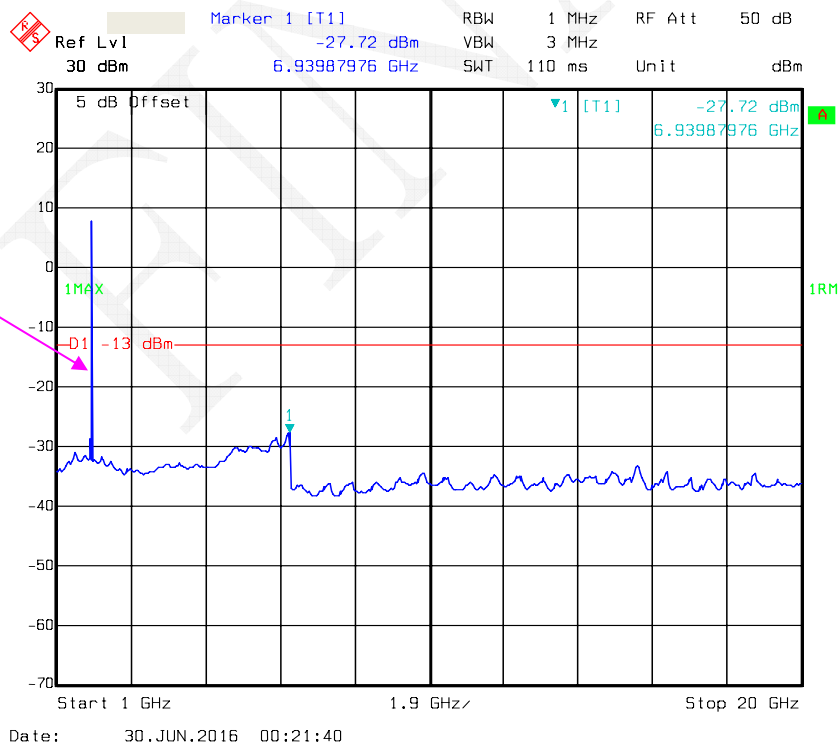
BC0- RTAP _Middle Channel



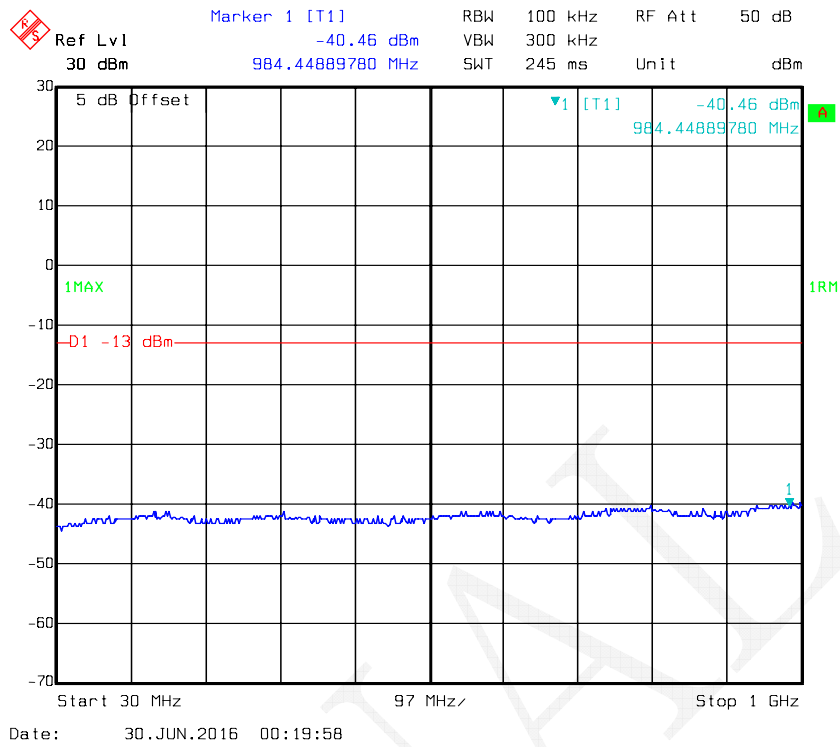
BC1-RC1 _Middle Channel



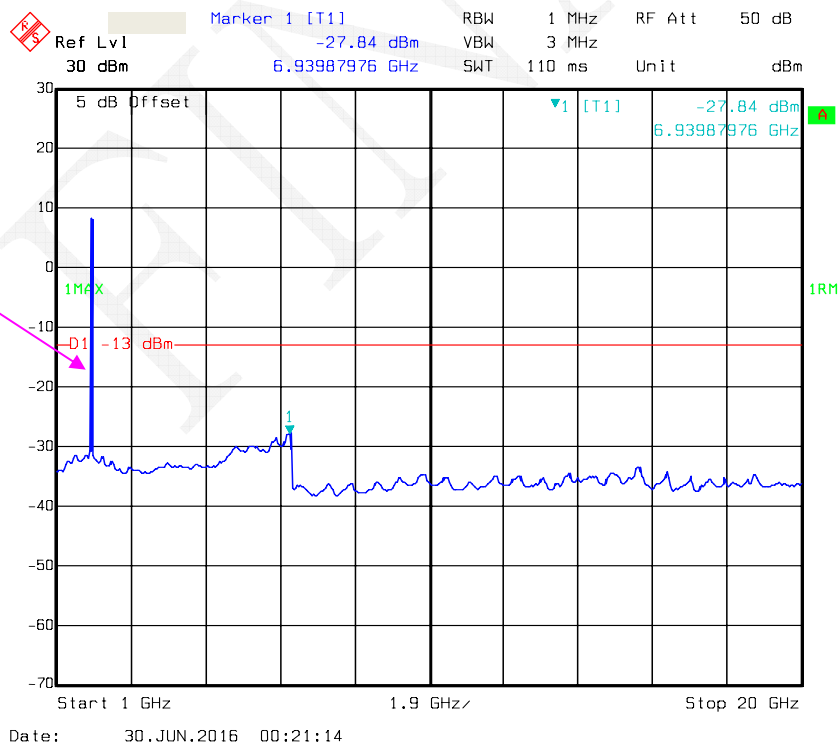
Fundamental



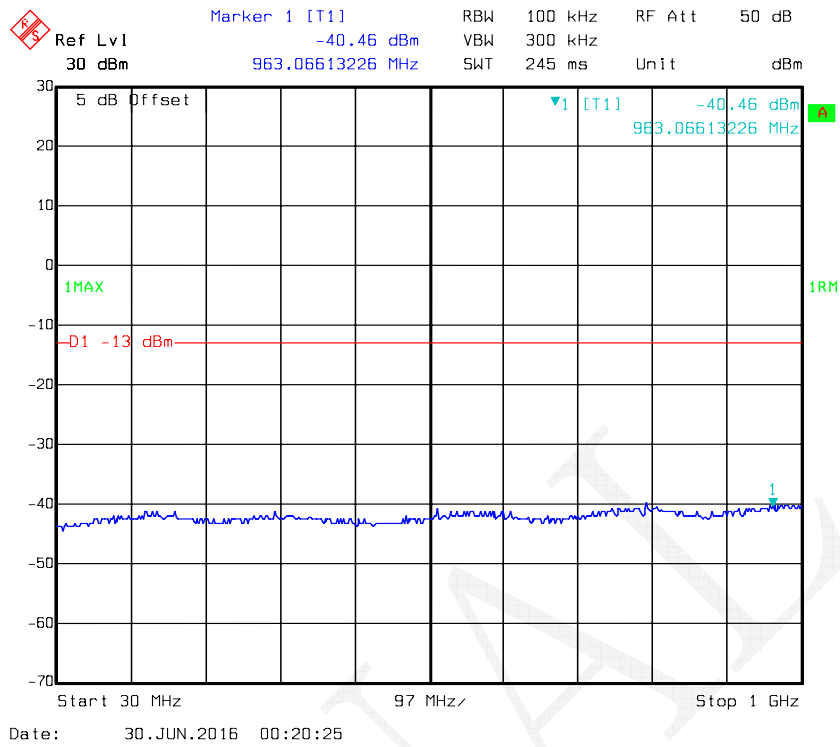
BC1-RC3 _Middle Channel



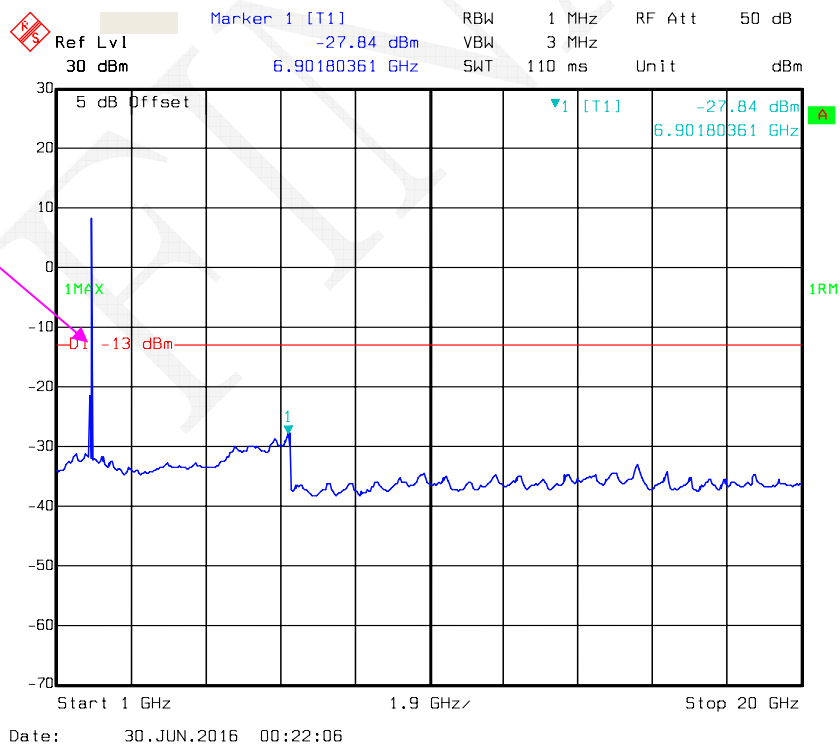
Fundamental



BC1- RTAP _Middle Channel

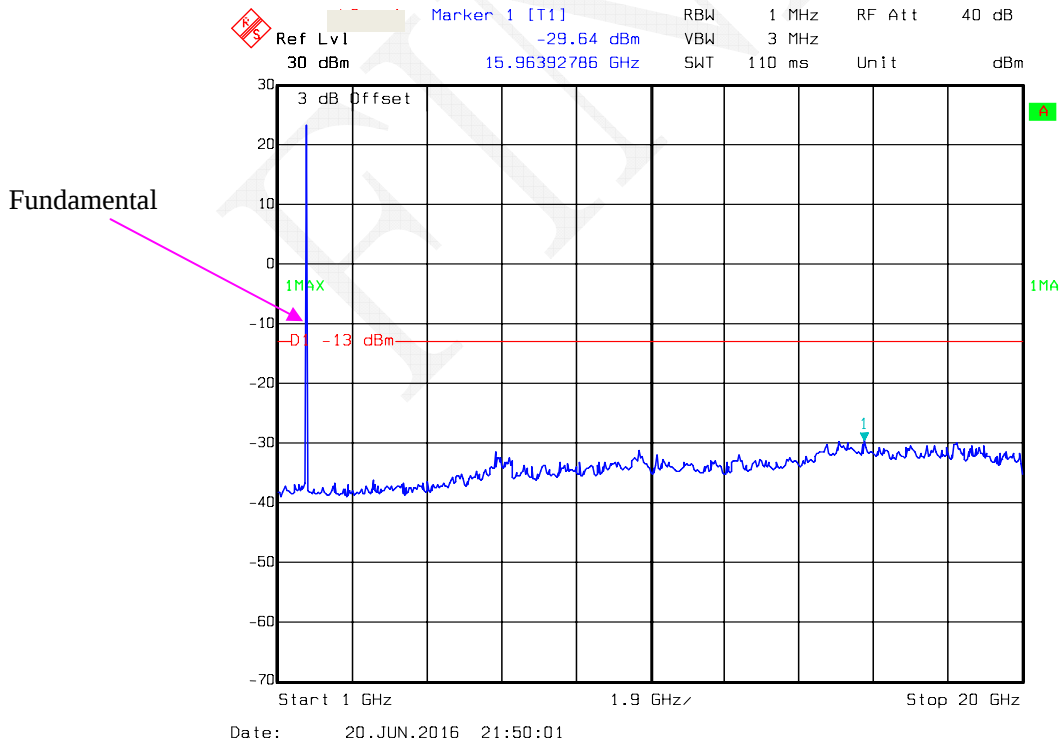
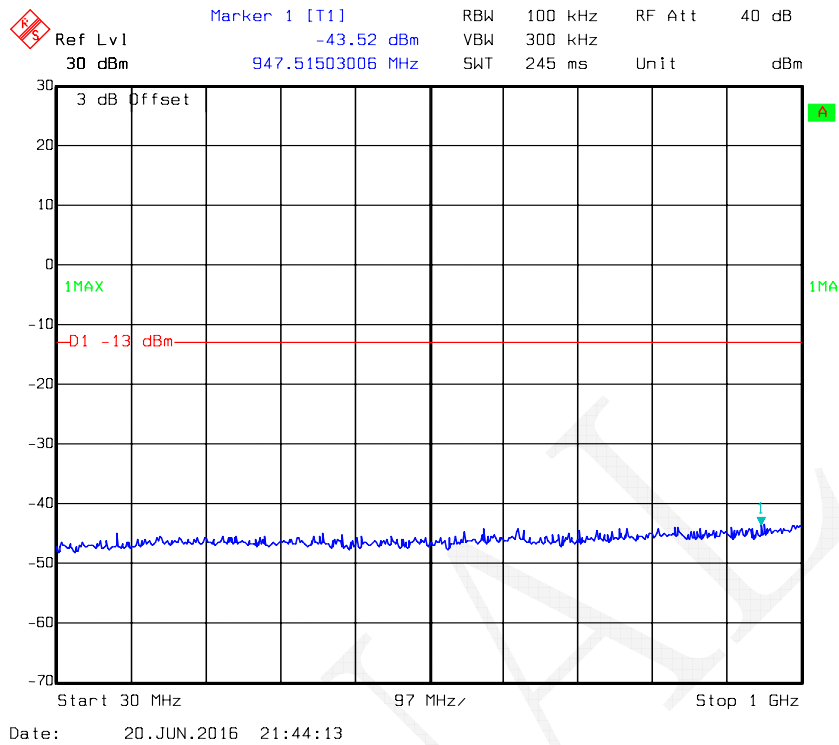


Fundamental

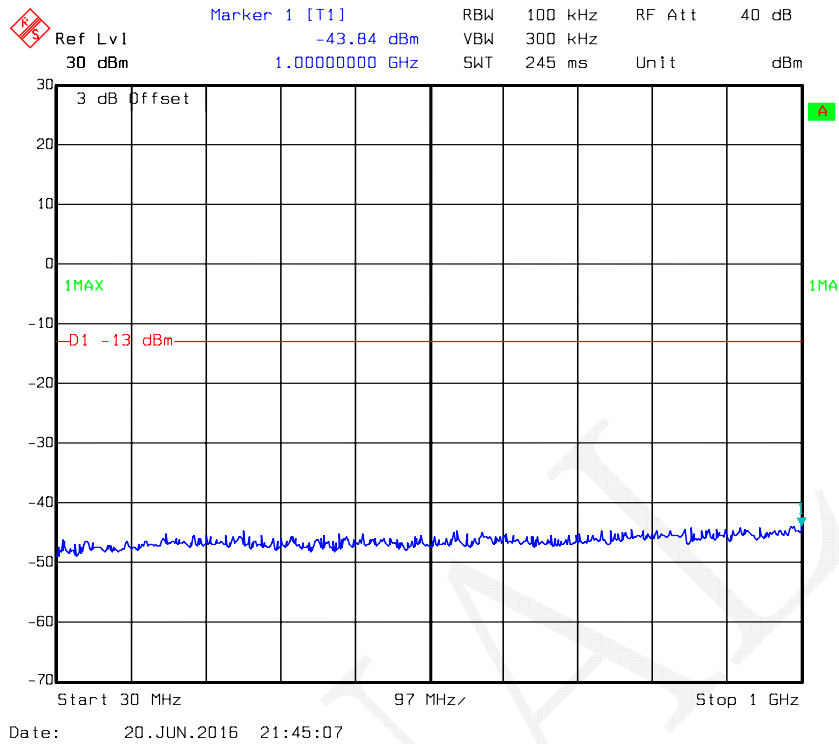


LTE Band 4, Middle Channel

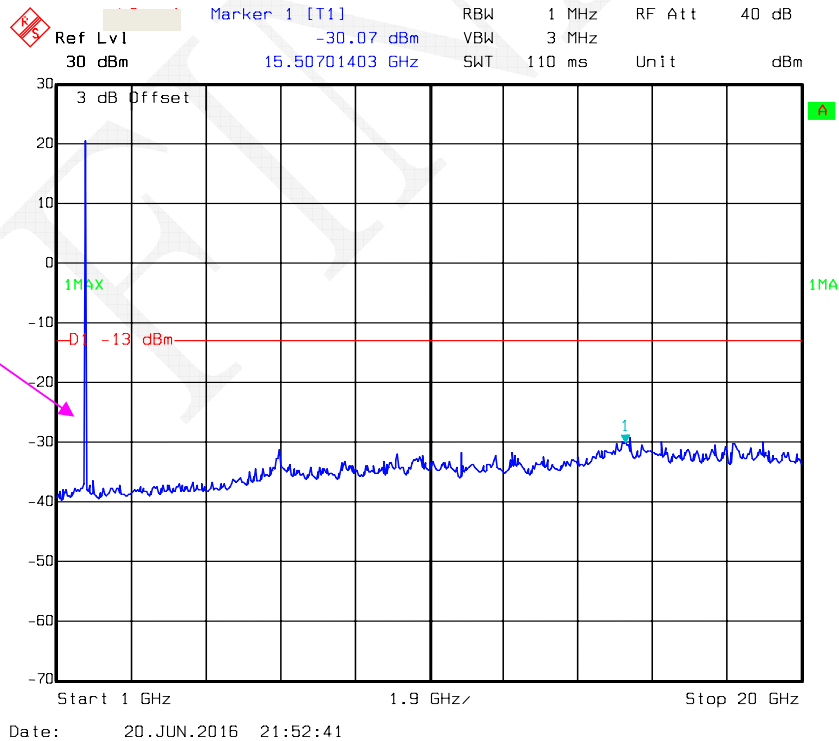
QPSK-1.4 MHz



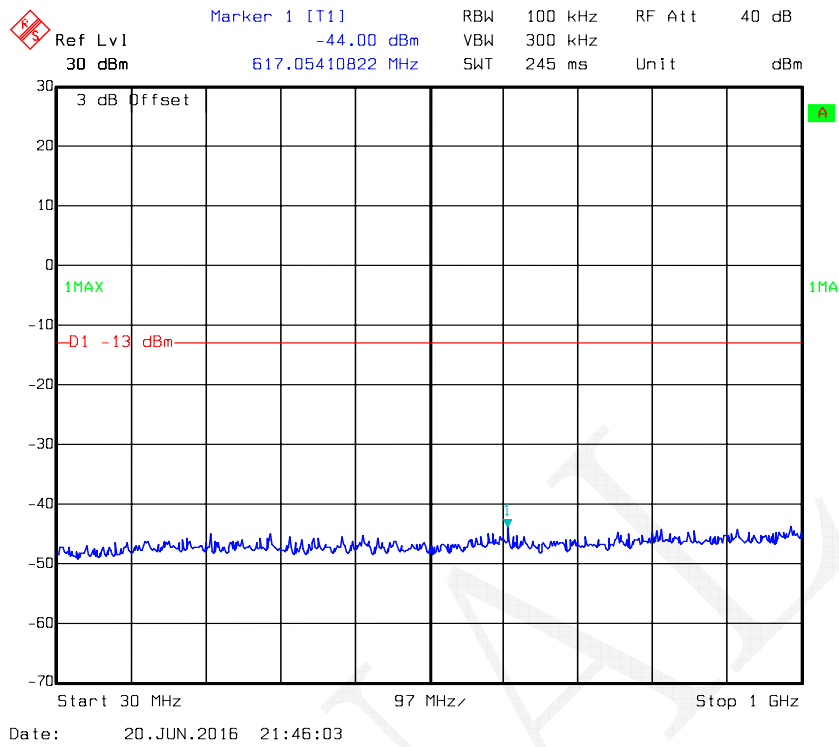
QPSK_3MHz



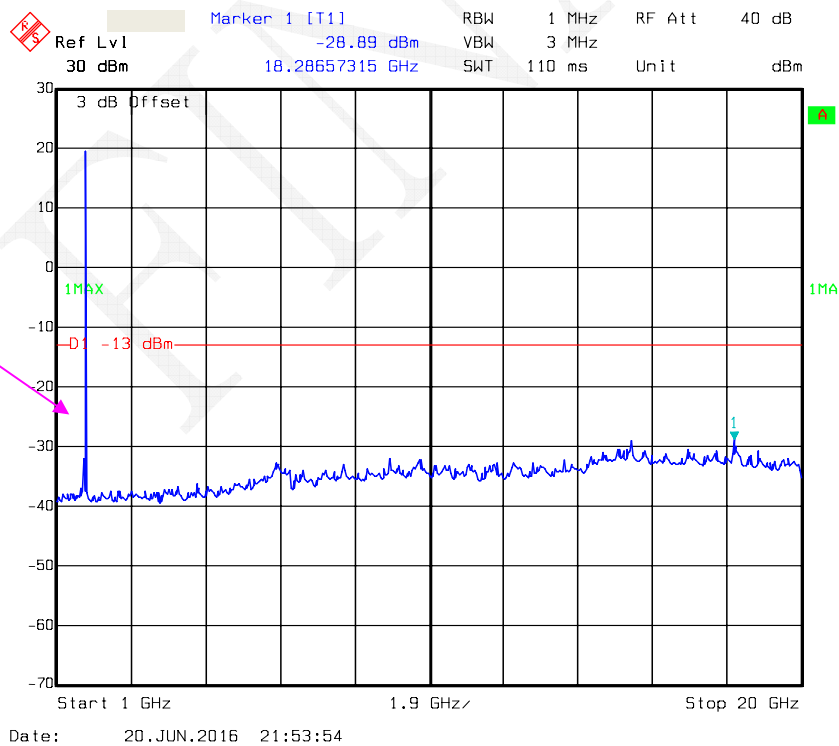
Fundamental



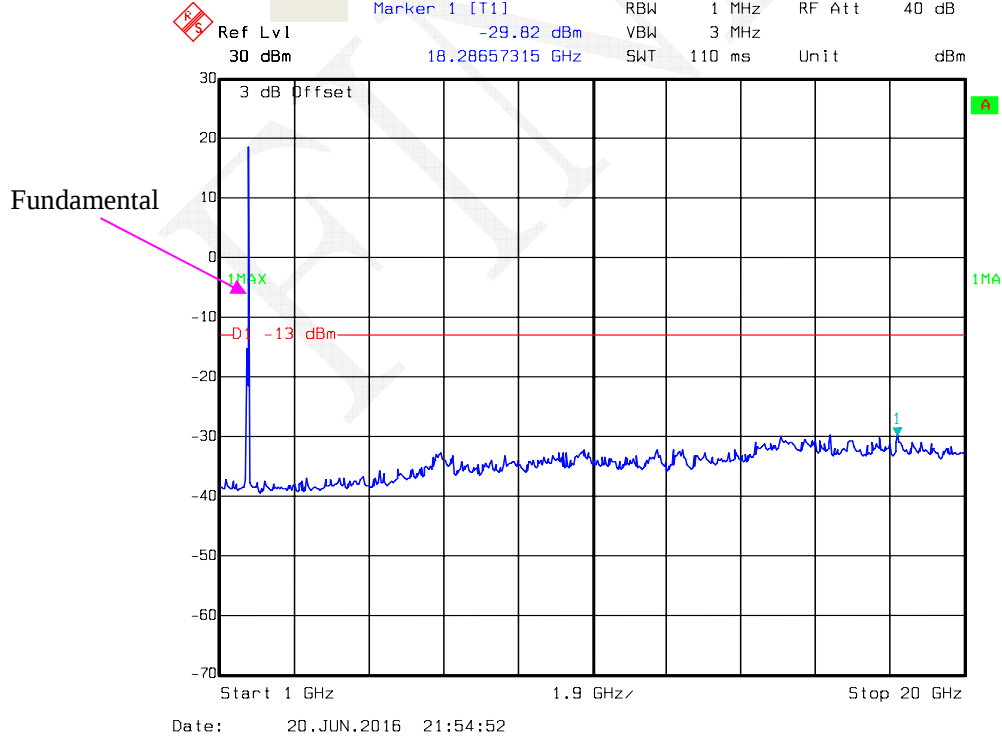
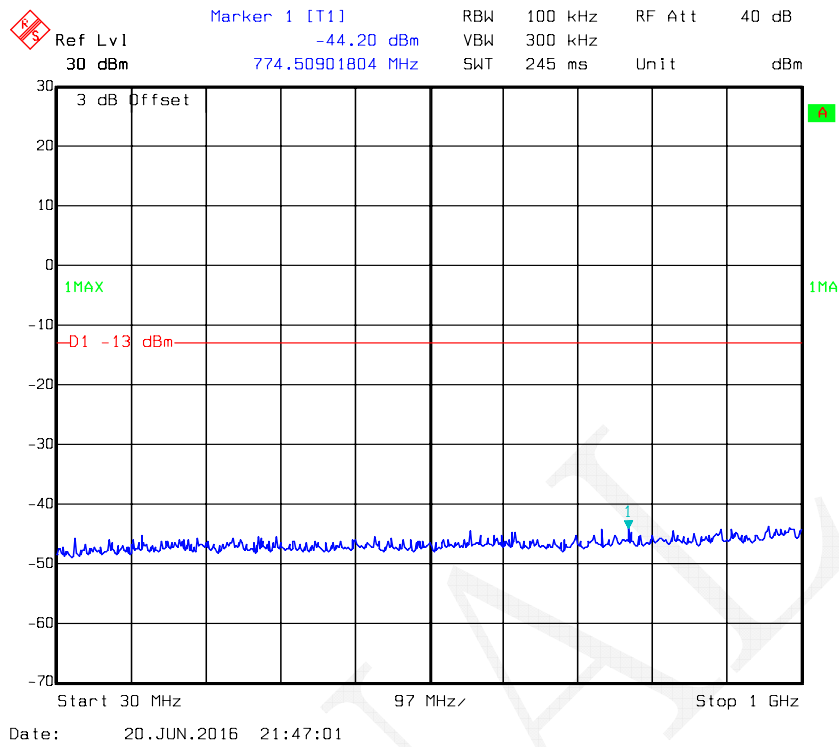
QPSK_5MHz



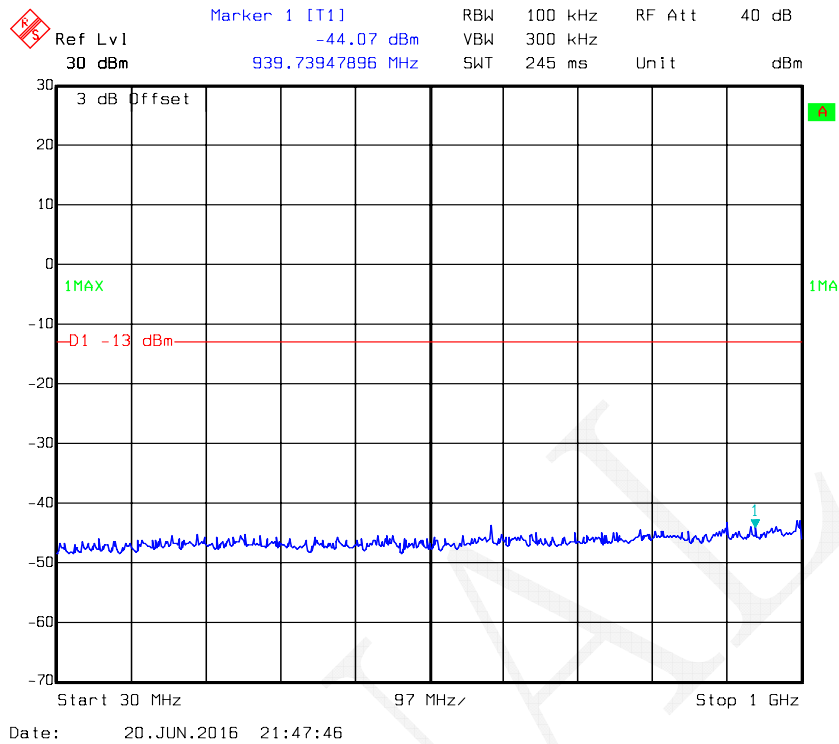
Fundamental



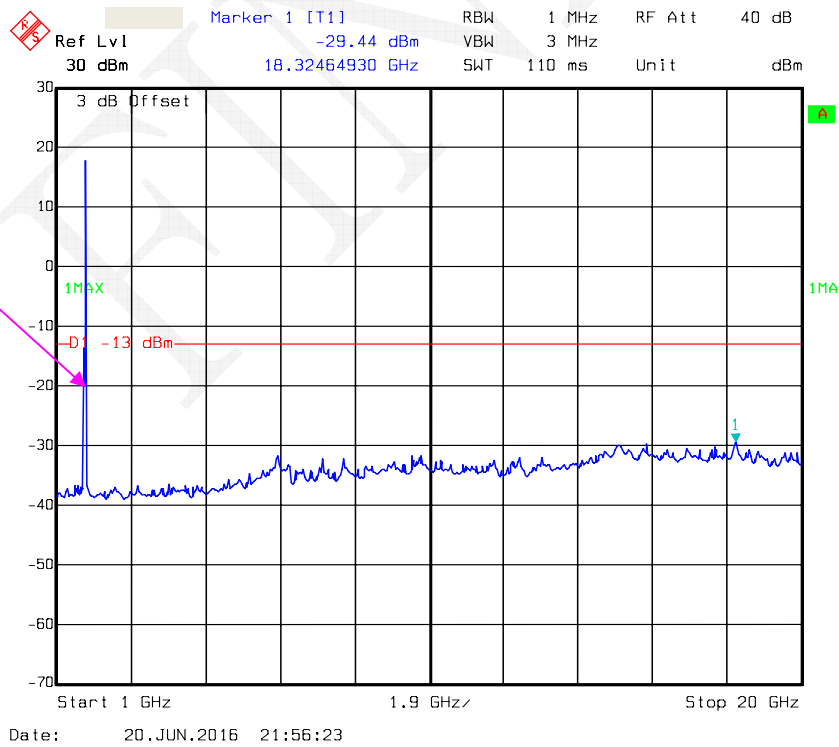
QPSK_10MHz



QPSK_15MHz



Fundamental

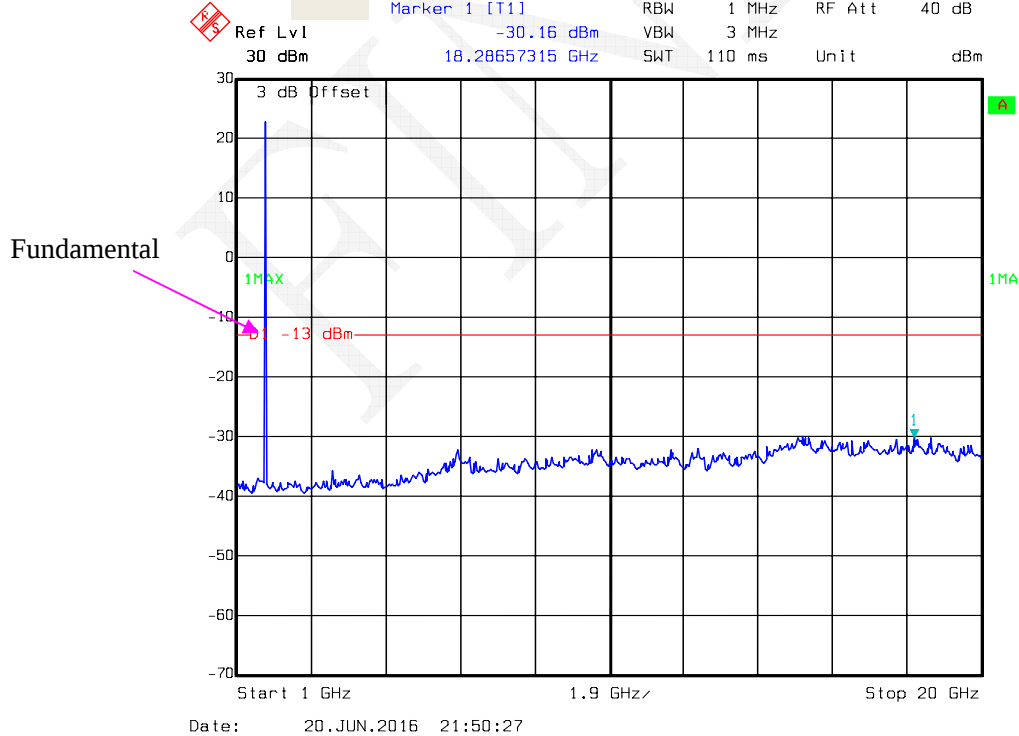
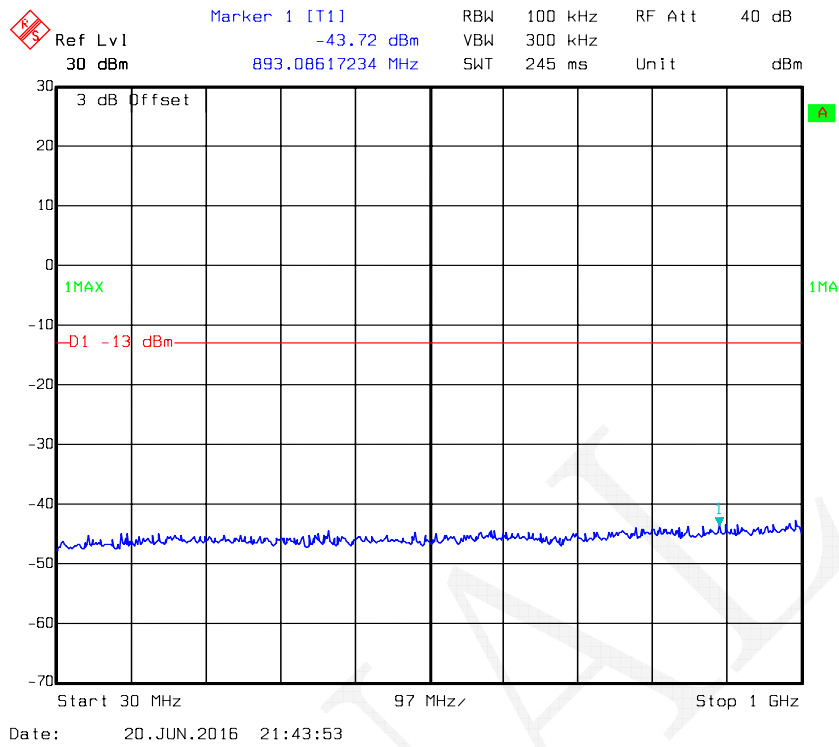


Ref Lvl 30 dBm
 Marker 1 [T1] -43.70 dBm
 RBW 100 kHz
 VBW 300 kHz
 SWT 245 ms
 RF Att 40 dB
 Unit dBm

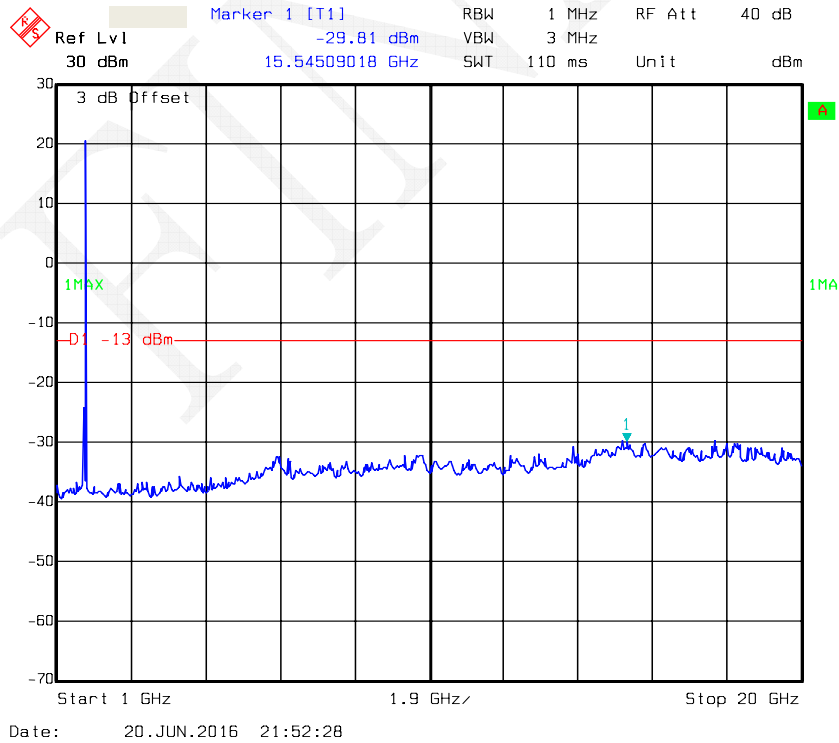
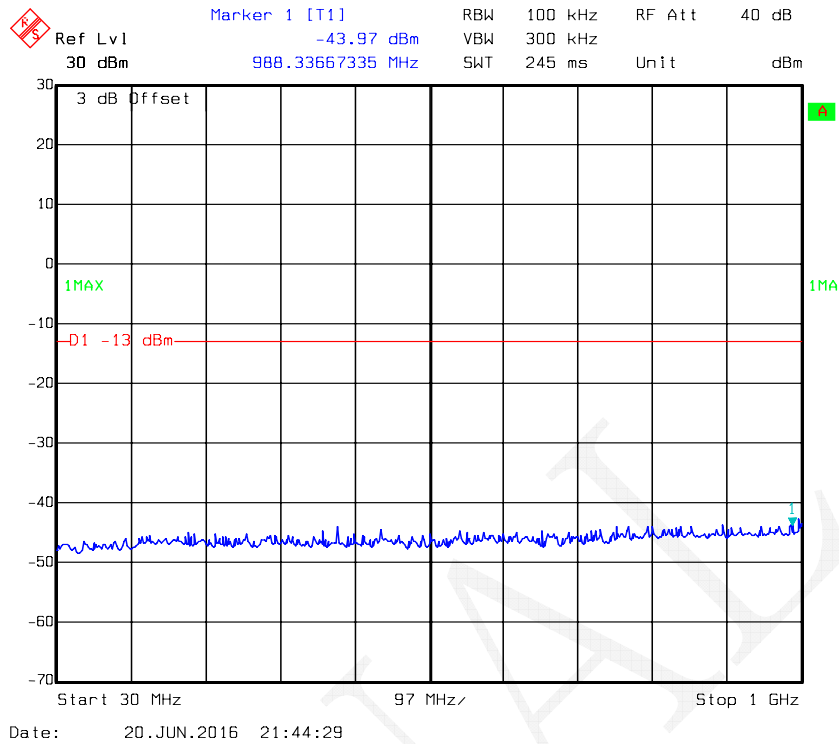
3 dB Offset
 1MAX
 -D1 -13 dBm
 Start 30 MHz
 97 MHz
 Stop 1 GHz
 Date: 20.JUN.2016 21:48:53

Ref Lvl 30 dBm Marker 1 [T1] -28.95 dBm RBW 1 MHz RF Att 40 dB
 3 dB Offset 18.32464930 GHz VBW 3 MHz Unit dBm
 3 dB Offset
 1MAX
 -13 dBm
 Start 1 GHz 1.9 GHz/ Stop 20 GHz
 Date: 20.JUN.2016 21:57:22

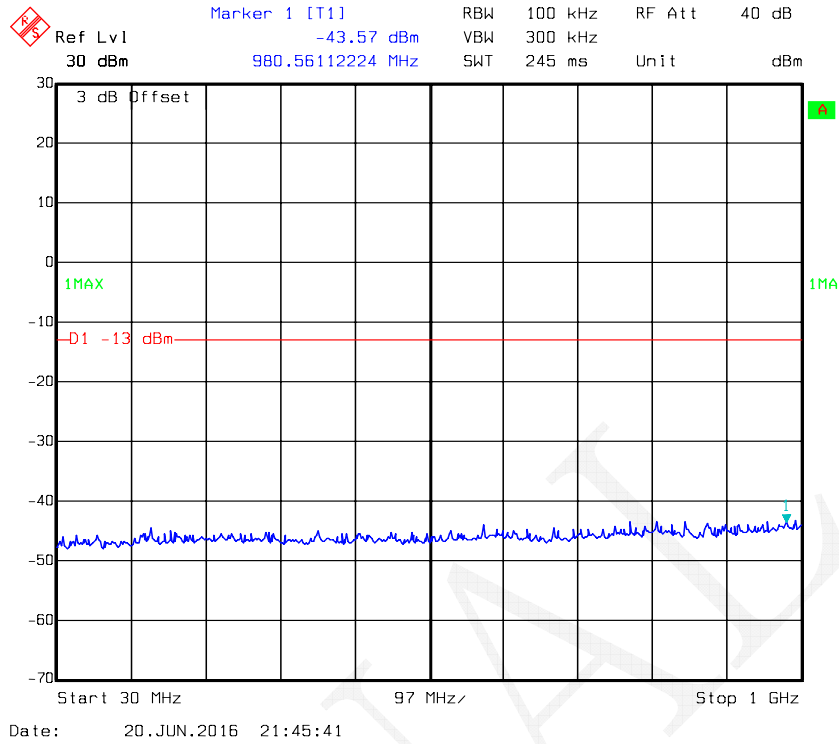
16QAM_1.4 MHz



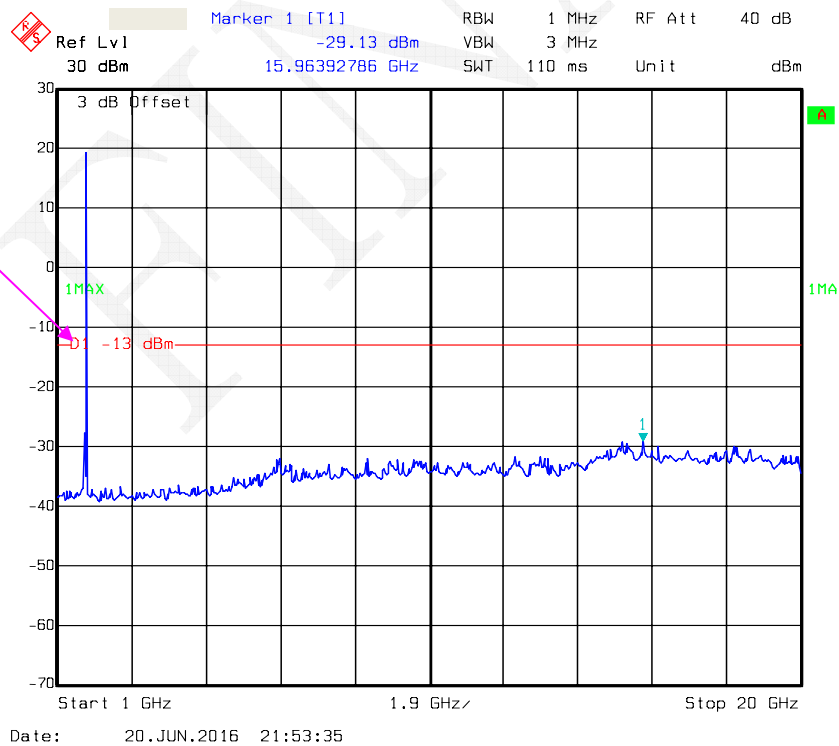
16QAM_3 MHz



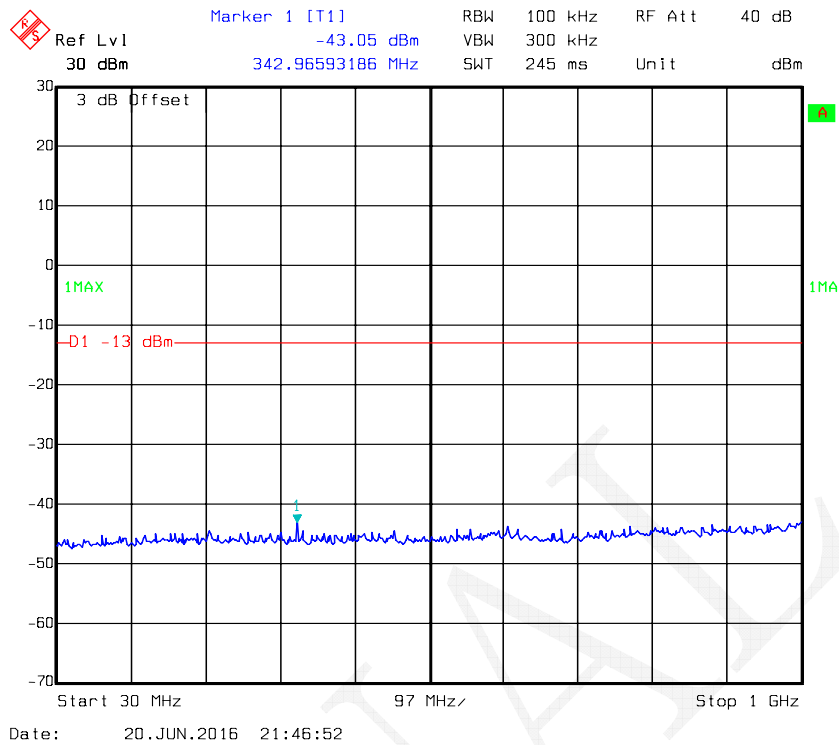
16QAM_5 MHz



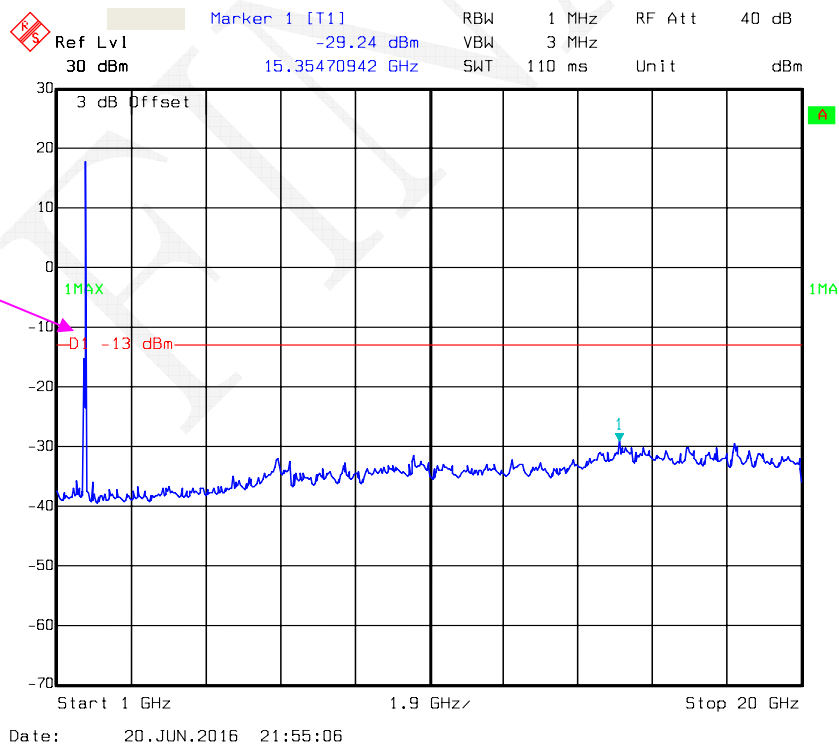
Fundamental



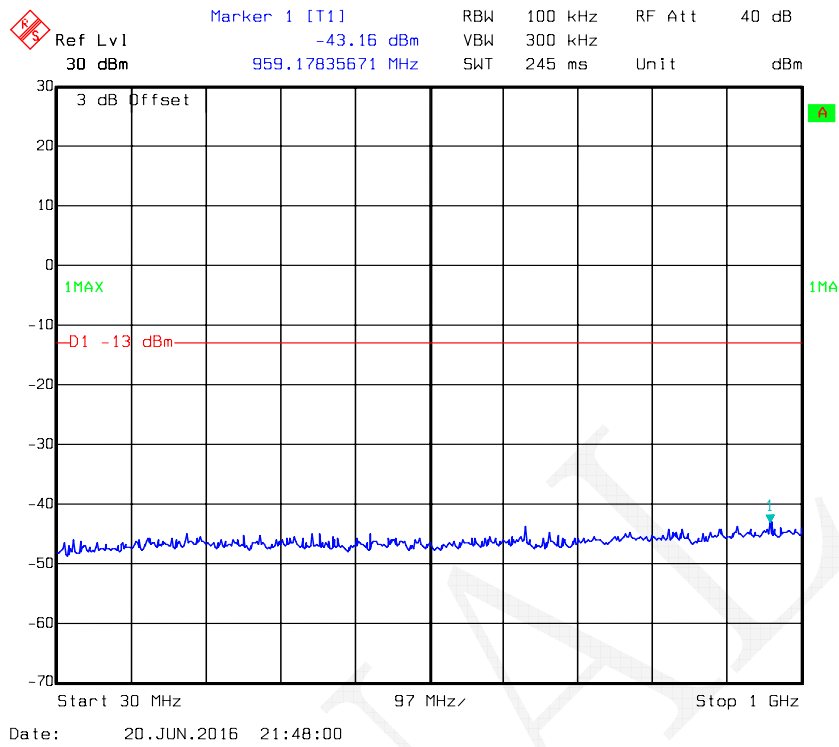
16QAM_10MHz



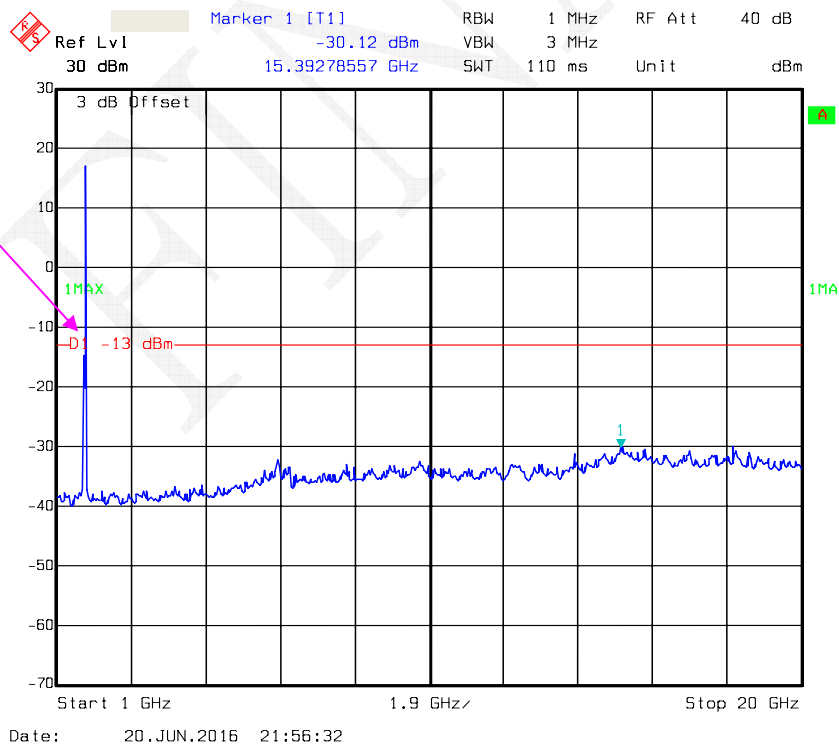
Fundamental



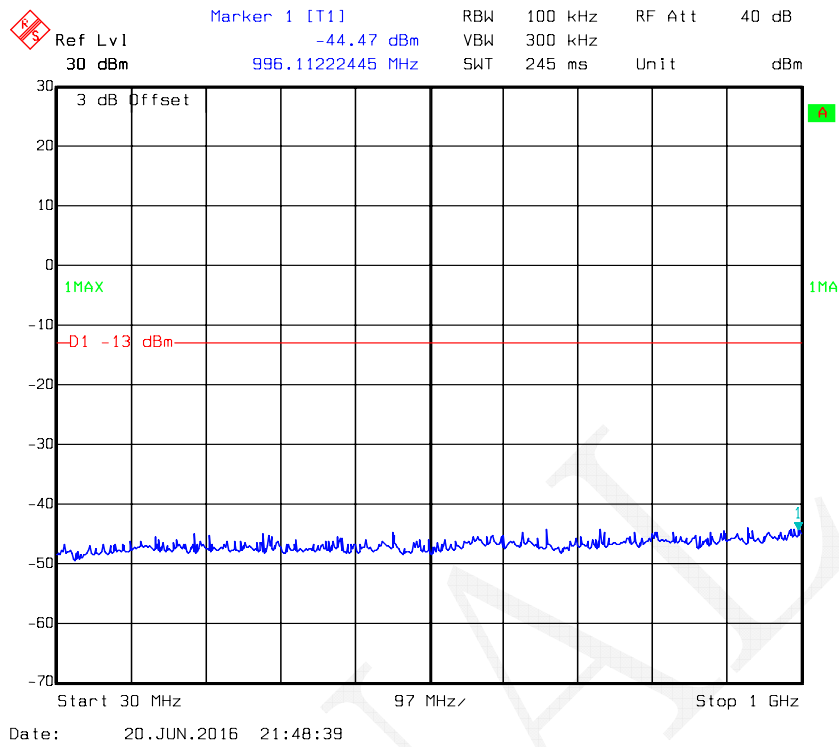
16QAM_15 MHz



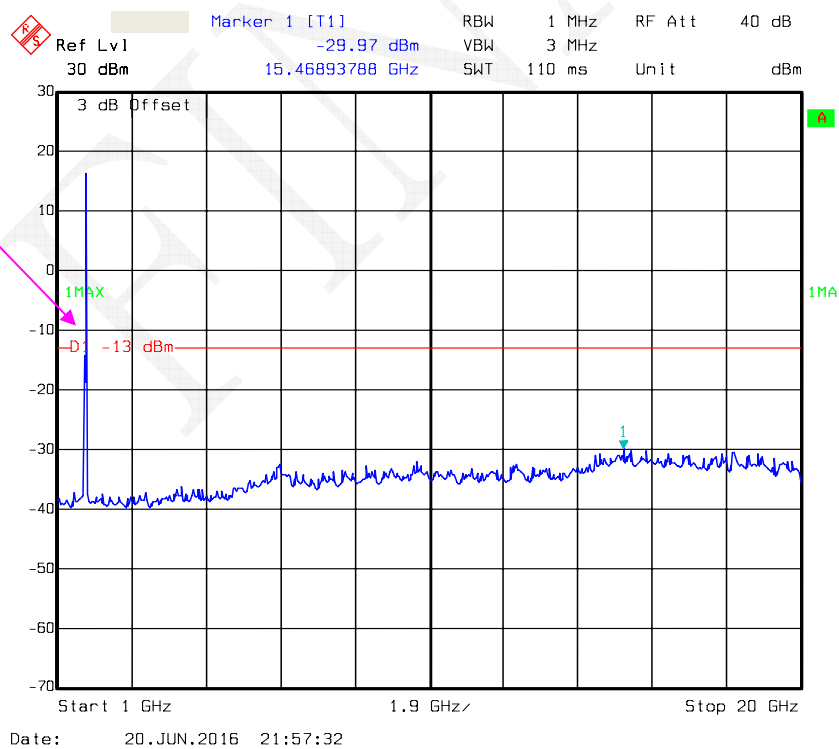
Fundamental



16QAM_20 MHz

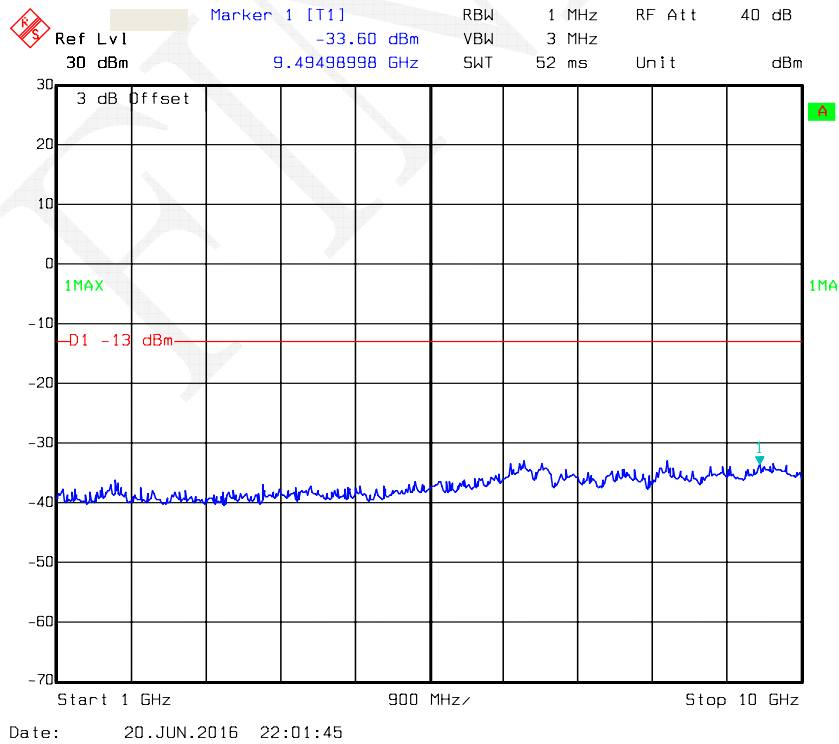
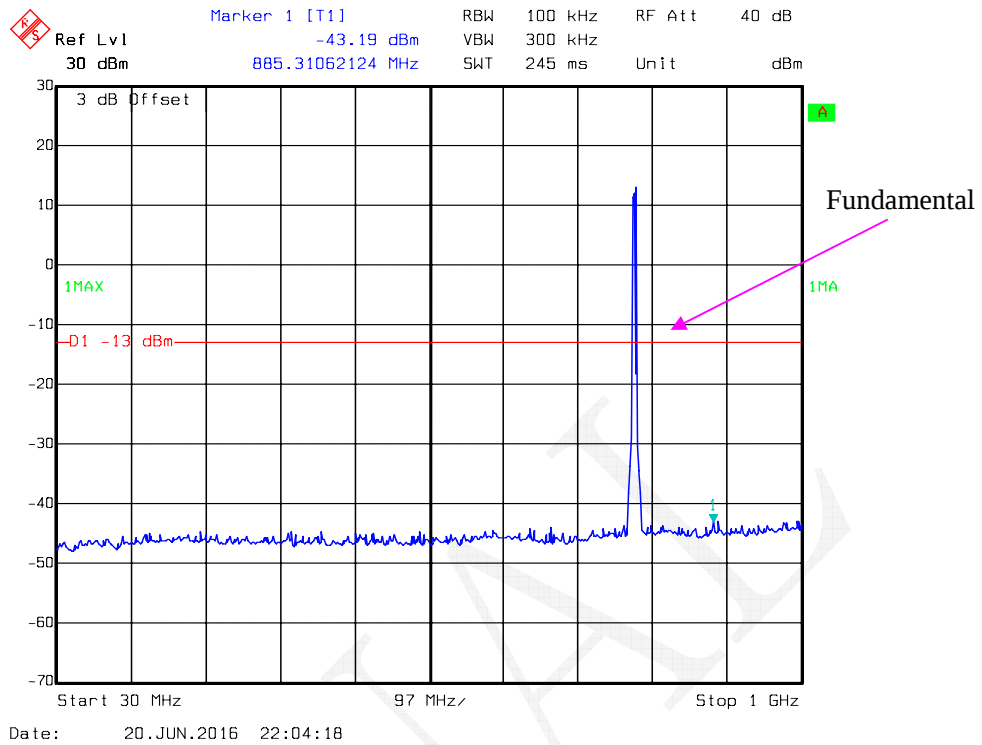


Fundamental



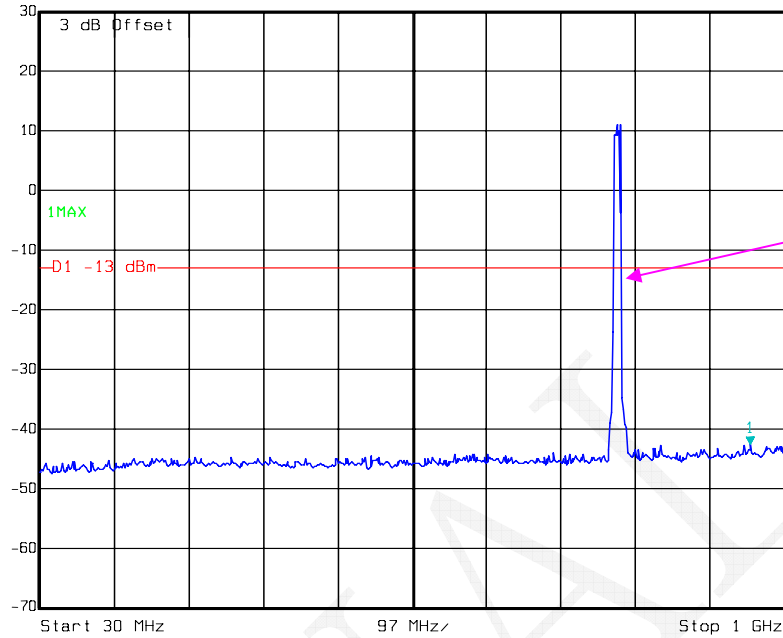
LTE BAND 13

QPSK_5MHz



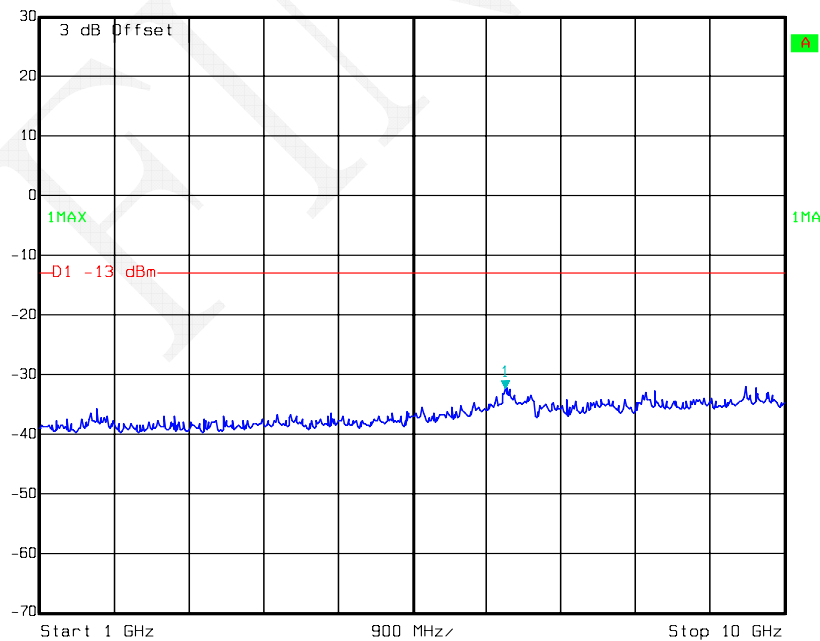
QPSK_10MHz


 Ref Lvl 30 dBm
 Marker 1 [T1] -42.74 dBm
 955.29058116 MHz
 RBW 100 kHz RF Att 40 dB
 VBW 300 kHz
 SWT 245 ms Unit dBm



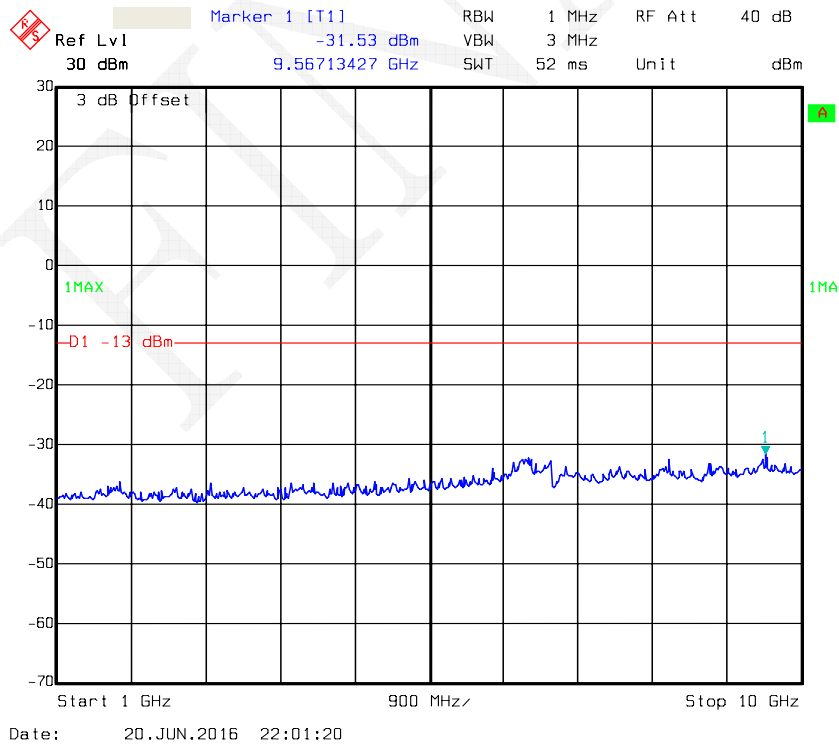
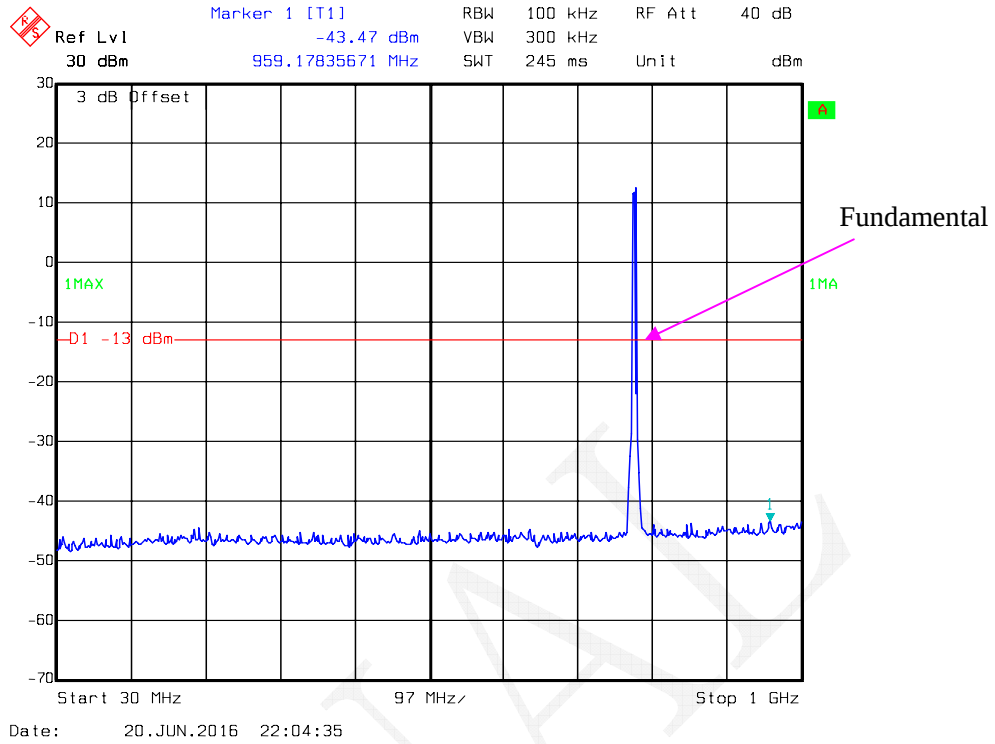
Date: 20.JUN.2016 22:05:59


 Ref Lvl 30 dBm
 Marker 1 [T1] -32.37 dBm
 6.62725451 GHz
 RBW 1 MHz RF Att 40 dB
 VBW 3 MHz
 SWT 52 ms Unit dBm

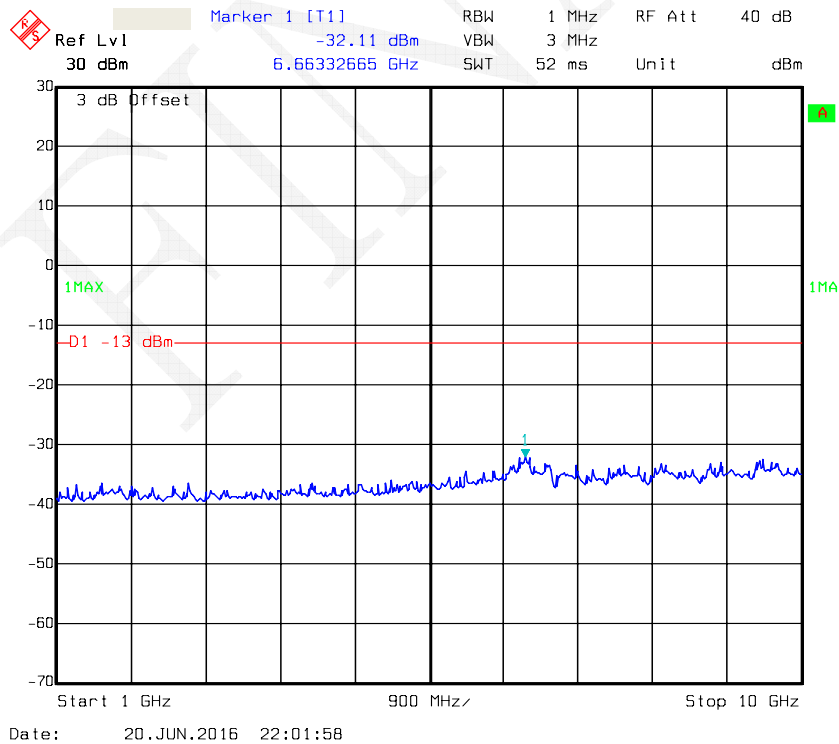
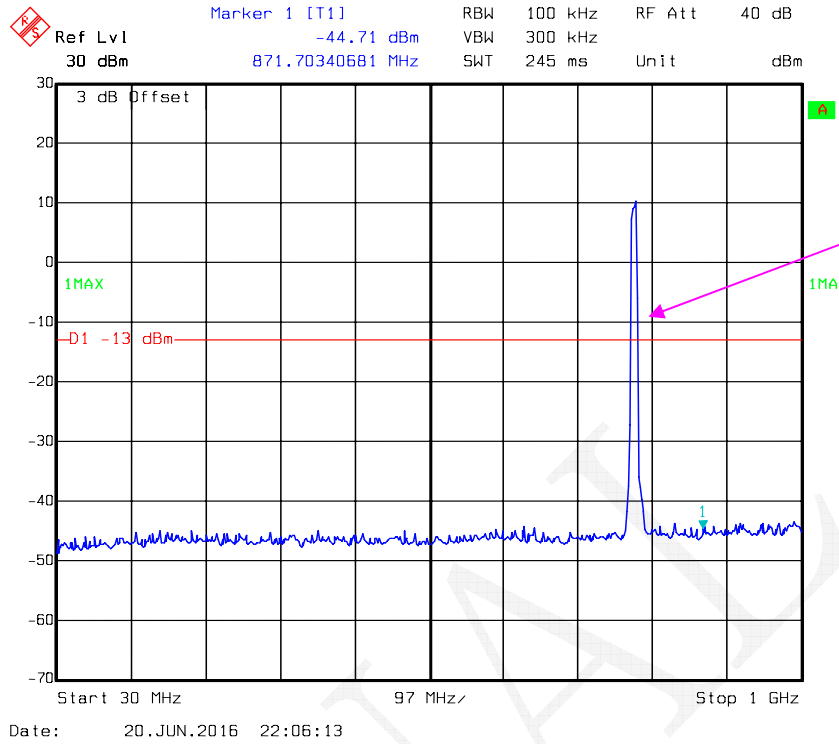


Date: 20.JUN.2016 22:02:12

16QAM_5 MHz



16QAM_10 MHz



FCC §2.1053, §22.917 & §24.238 & §27.53- SPURIOUS RADIATED EMISSIONS

Applicable Standard

FCC § 2.1053, §22.917, § 24.238 and § 27.53.

Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB = $10 \lg (\text{TXpwr in Watts}/0.001)$ – the absolute level

Spurious attenuation limit in dB = $43 + 10 \log_{10} (\text{power out in Watts})$

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2015-08-03	2016-08-02
Sunol Sciences	Antenna	JB3	A060611-3	2014-07-28	2017-07-27
HP	Amplifier	8447E	2434A02181	2015-09-01	2016-09-01
R&S	Spectrum Analyzer	FSEM	DE23437	2015-11-23	2016-11-22
ETS LINDGREN	Horn Antenna	3115	000 527 35	2015-09-06	2018-09-06
Mini-Circuit	Amplifier	ZVA-213-S+	054201245	2016-02-19	2017-02-19
Agilent	MXG Vector Signal Generator	N5182B	MY51350142	2016-03-30	2017-03-29
EMCO	Adjustable Dipole Antenna	3121C	9109-753	N/A	N/A
TDK RF	Horn Antenna	HRN-0118	130 084	2015-09-06	2018-09-06
N/A	Coaxial Cable	14m	N/A	2016-05-06	2017-05-06
N/A	Coaxial Cable	8m	N/A	2016-05-06	2017-05-06
N/A	Coaxial Cable	2m	N/A	2016-05-06	2017-05-06
Mini Circuit	High Pass Filter	VHF-3100+	31251	2016-05-06	2017-05-06
Mini Circuit	High Pass Filte	VHF-1200+	N/A	2016-05-06	2017-05-06

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	27.8 °C
Relative Humidity:	45 %
ATM Pressure:	100.4 kPa

The testing was performed by Costa Dong on 2016-06-30.

EUT Operation Mode: Transmitting

Test Frequency Range: 30MHz -10GHz

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			S.G. Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
BC0 RC1 Middle Channel (836.52MHz)								
1673.040	H	43.87	-57.2	10.6	1.5	-48.1	-13.0	35.1
1673.040	V	44.76	-56.6	10.6	1.5	-47.5	-13.0	34.5
2509.560	H	42.33	-55.7	13.1	2.8	-45.4	-13.0	32.4
2509.560	V	44.19	-52.9	13.1	2.8	-42.6	-13.0	29.6
359.800	H	30.38	-69.8	0.0	0.6	-70.4	-13.0	57.4
200.700	V	32.97	-72.3	0.0	0.5	-72.8	-13.0	59.8
BC0 RC3 Middle Channel (836.52MHz)								
1673.040	H	43.81	-57.3	10.6	1.5	-48.2	-13.0	35.2
1673.040	V	45.11	-56.3	10.6	1.5	-47.2	-13.0	34.2
2509.560	H	42.69	-55.3	13.1	2.8	-45.0	-13.0	32.0
2509.560	V	43.30	-53.8	13.1	2.8	-43.5	-13.0	30.5
359.800	H	29.73	-70.5	0.0	0.6	-71.1	-13.0	58.1
200.700	V	32.03	-73.2	0.0	0.5	-73.7	-13.0	60.7
BC0 RTAP Middle Channel (836.52MHz)								
1673.040	H	43.39	-57.7	10.6	1.5	-48.6	-13.0	35.6
1673.040	V	44.94	-56.4	10.6	1.5	-47.3	-13.0	34.3
2509.560	H	42.15	-55.9	13.1	2.8	-45.6	-13.0	32.6
2509.560	V	42.43	-54.7	13.1	2.8	-44.4	-13.0	31.4
359.800	H	30.25	-70	0.0	0.6	-70.6	-13.0	57.6
200.700	V	32.51	-72.8	0.0	0.5	-73.3	-13.0	60.3

Test Frequency Range: 30MHz -20GHz

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			S.G. Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
BC1 RC1 Middle Channel (1880MHz)								
3760.000	H	34.41	-59.9	13.8	2.9	-49.0	-13.0	36.0
3760.000	V	35.26	-57.8	13.8	2.9	-46.9	-13.0	33.9
5640.000	H	41.87	-49.8	14.0	2.1	-37.9	-13.0	24.9
5640.000	V	45.93	-45.7	14.0	2.1	-33.8	-13.0	20.8
359.800	H	30.47	-69.8	0.0	0.6	-70.4	-13.0	57.4
200.700	V	32.55	-72.7	0.0	0.5	-73.2	-13.0	60.2
BC1 RC3 Middle Channel (1880MHz)								
3760.000	H	35.01	-59.3	13.8	2.9	-48.4	-13.0	35.4
3760.000	V	35.03	-58	13.8	2.9	-47.1	-13.0	34.1
5640.000	H	42.37	-49.3	14.0	2.1	-37.4	-13.0	24.4
5640.000	V	48.45	-43.2	14.0	2.1	-31.3	-13.0	18.3
359.800	H	30.25	-70	0.0	0.6	-70.6	-13.0	57.6
200.700	V	33.02	-72.2	0.0	0.5	-72.7	-13.0	59.7
BC1 RTAP Middle Channel (1880MHz)								
3760.000	H	35.29	-59	13.8	2.9	-48.1	-13.0	35.1
3760.000	V	35.23	-57.8	13.8	2.9	-46.9	-13.0	33.9
5640.000	H	42.24	-49.5	14.0	2.1	-37.6	-13.0	24.6
5640.000	V	46.27	-45.4	14.0	2.1	-33.5	-13.0	20.5
359.800	H	31.45	-68.8	0.0	0.6	-69.4	-13.0	56.4
200.700	V	32.18	-73.1	0.0	0.5	-73.6	-13.0	60.6

LTE Band 4**Test Frequency Range: 30MHz -20GHz**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			S.G. Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK 20MHz Bandwidth Middle Channel (1732.5MHz)								
3465.000	H	32.39	-64.5	13.9	1.9	-52.5	-13.0	39.5
3465.000	V	33.96	-62.2	13.9	1.9	-50.2	-13.0	37.2
5197.500	H	30.06	-60.9	14.0	2.3	-49.2	-13.0	36.2
5197.500	V	30.78	-61.8	14.0	2.3	-50.1	-13.0	37.1
359.800	H	31.47	-68.8	0.0	0.6	-69.4	-13.0	56.4
200.700	V	32.58	-72.7	0.0	0.5	-73.2	-13.0	60.2
16-QAM 20MHz Bandwidth Middle Channel (1732.5MHz)								
3465.000	H	31.16	-65.8	13.9	1.9	-53.8	-13.0	40.8
3465.000	V	32.21	-64	13.9	1.9	-52.0	-13.0	39.0
5197.500	H	29.70	-61.3	14.0	2.3	-49.6	-13.0	36.6
5197.500	V	30.59	-61.9	14.0	2.3	-50.2	-13.0	37.2
359.800	H	31.75	-68.5	0.0	0.6	-69.1	-13.0	56.1
200.700	V	33.16	-72.1	0.0	0.5	-72.6	-13.0	59.6

LTE Band 13**Test Frequency Range: 30MHz-10GHz**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			S.G. Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK 10MHz Bandwidth Middle Channel (782MHz)								
1564.000	H	31.91	-69.4	9.9	1.4	-60.9	-13.0	47.9
1564.000	V	32.19	-69.7	9.9	1.4	-61.2	-13.0	48.2
2346.000	H	30.08	-66.5	11.7	2	-56.8	-13.0	43.8
2346.000	V	30.85	-65	11.7	2	-55.3	-13.0	42.3
359.800	H	31.46	-68.8	0.0	0.6	-69.4	-13.0	56.4
200.700	V	32.58	-72.7	0.0	0.5	-73.2	-13.0	60.2
16-QAM 10MHz Bandwidth Middle Channel (782MHz)								
1564.000	H	32.19	-69.1	9.9	1.4	-60.6	-13.0	47.6
1564.000	V	32.64	-69.3	9.9	1.4	-60.8	-13.0	47.8
2346.000	H	30.11	-66.5	11.7	2	-56.8	-13.0	43.8
2346.000	V	30.66	-65.2	11.7	2	-55.5	-13.0	42.5
359.800	H	30.58	-69.6	0.0	0.6	-70.2	-13.0	57.2
200.700	V	31.63	-73.6	0.0	0.5	-74.1	-13.0	61.1

Note:

- 1) The unit of Antenna Gain is dBd for frequency below 1GHz, and the unit of Antenna Gain is dBi for frequency above 1GHz.
- 2) Absolute Level = SG Level - Cable loss + Antenna Gain
- 3) Margin = Limit-Absolute Level

FCC §22.917(a) & §24.238(a) & §27.53(h)- BAND EDGES**Applicable Standard**

According to § 22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

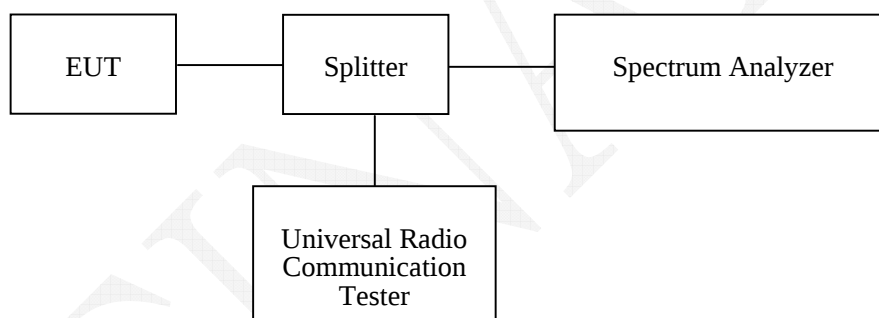
According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

According to §27.53 (h), AWS emission limits—(1) General protection levels. Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ dB.

Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The center of the spectrum analyzer was set to block edge frequency.

**Test Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSEM	DE23437	2015-11-23	2016-11-22

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

Test Data**Environmental Conditions**

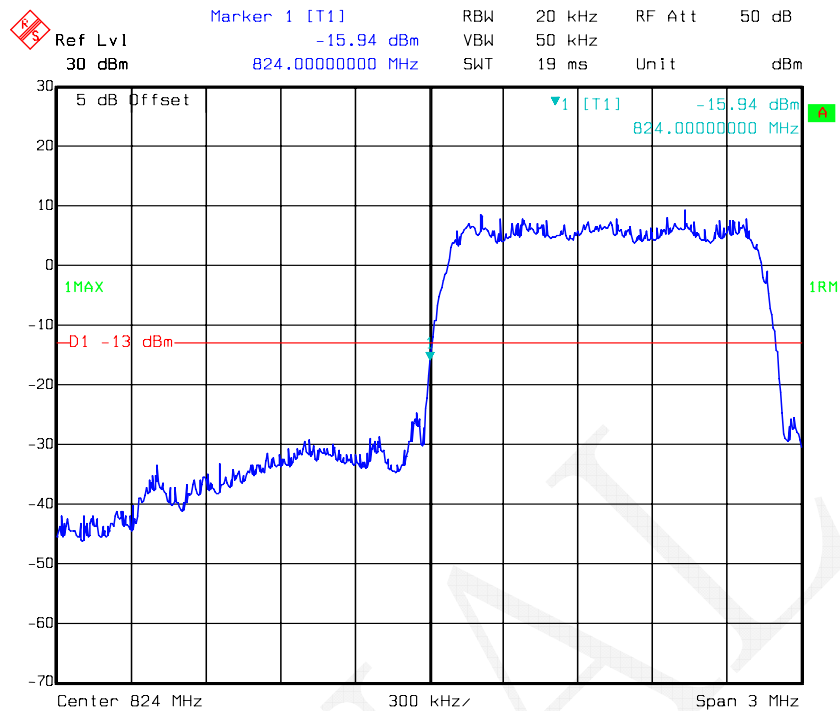
Temperature:	27.5 – 28.5 °C
Relative Humidity:	39 - 45 %
ATM Pressure:	100.1 – 100.4 kPa

The testing was performed by Costa Dong from 2016-06-24 to 2016-06-30.

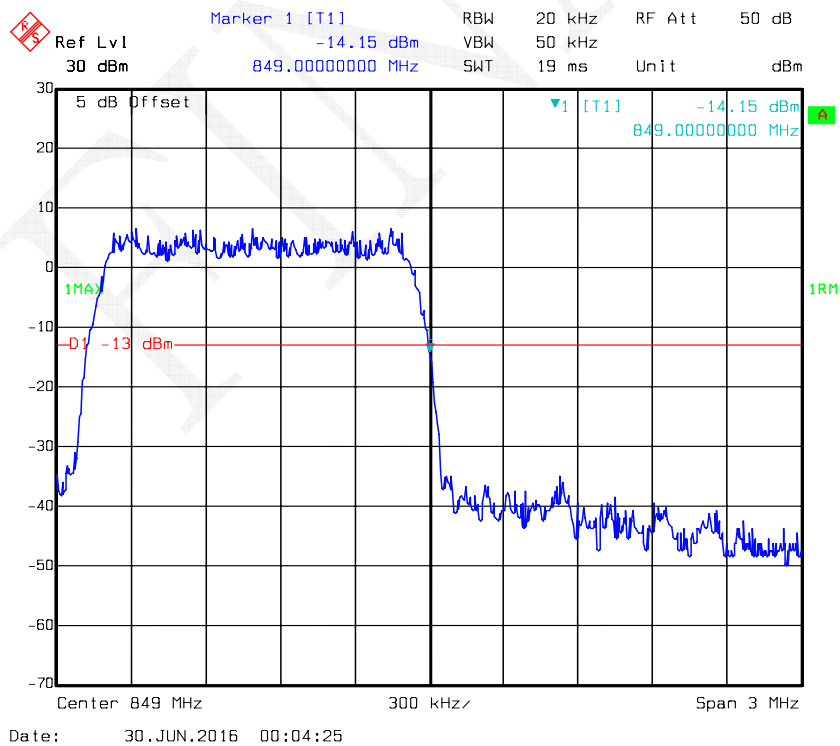
Test Mode: Transmitting

Test Result: Compliant. Please refer to the following plots.

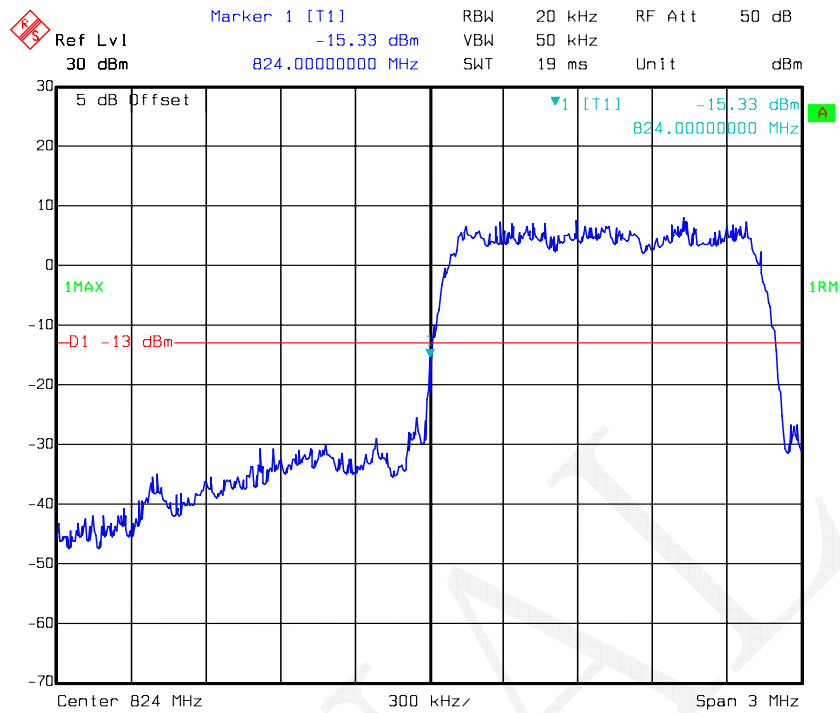
BC0-RC1, Left Band Edge



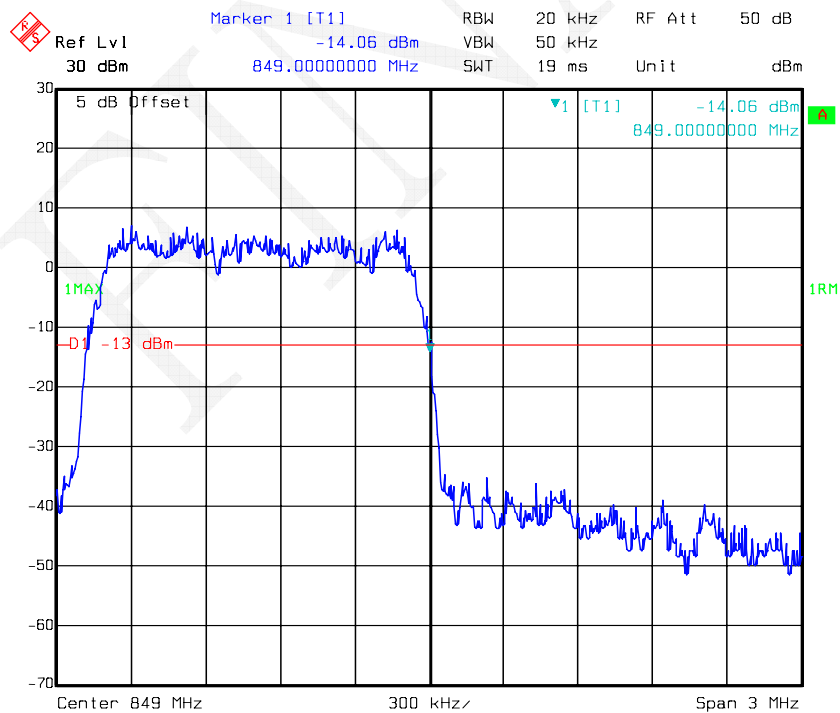
BC0-RC1, Right Band Edge



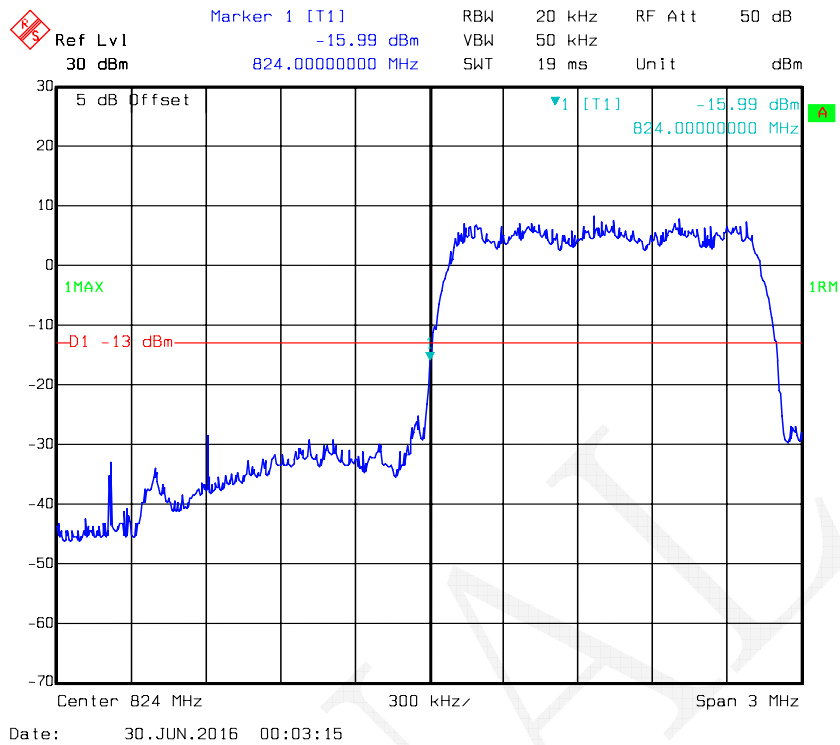
BC0-RC3, Left Band Edge



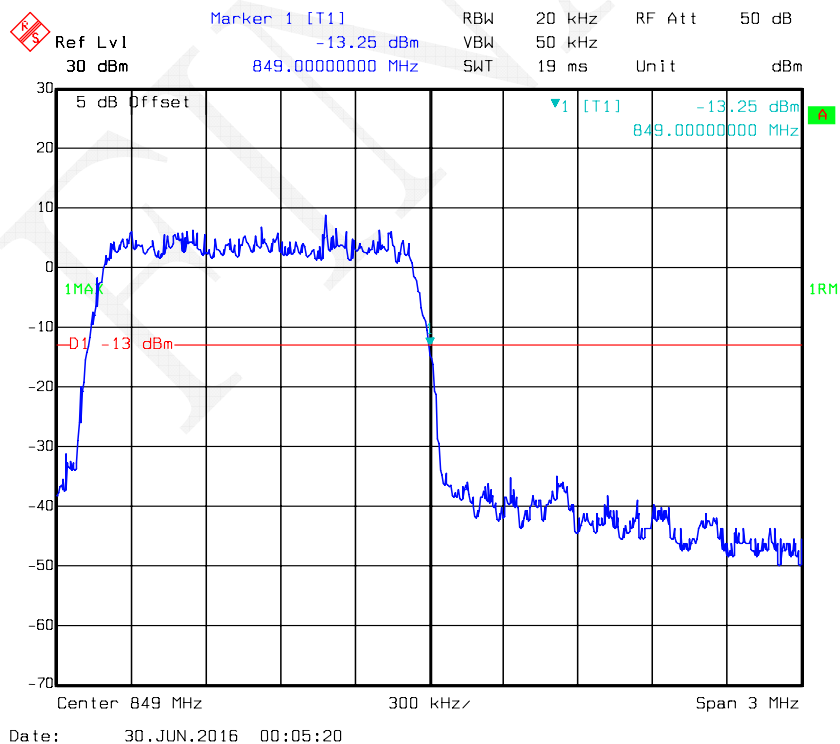
BC0-RC3, Right Band Edge



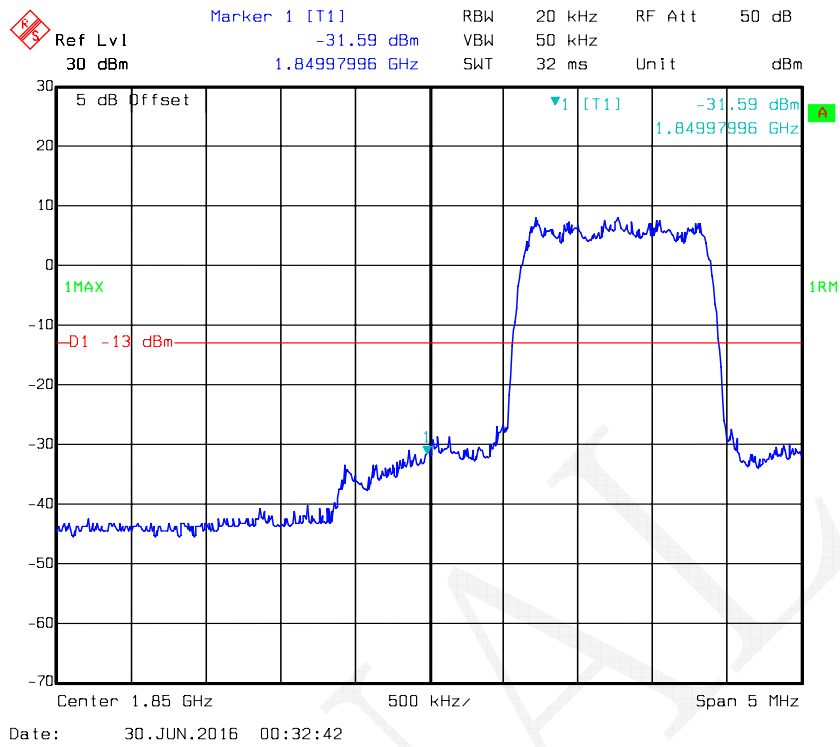
BC0-Rel. A, Left Band Edge



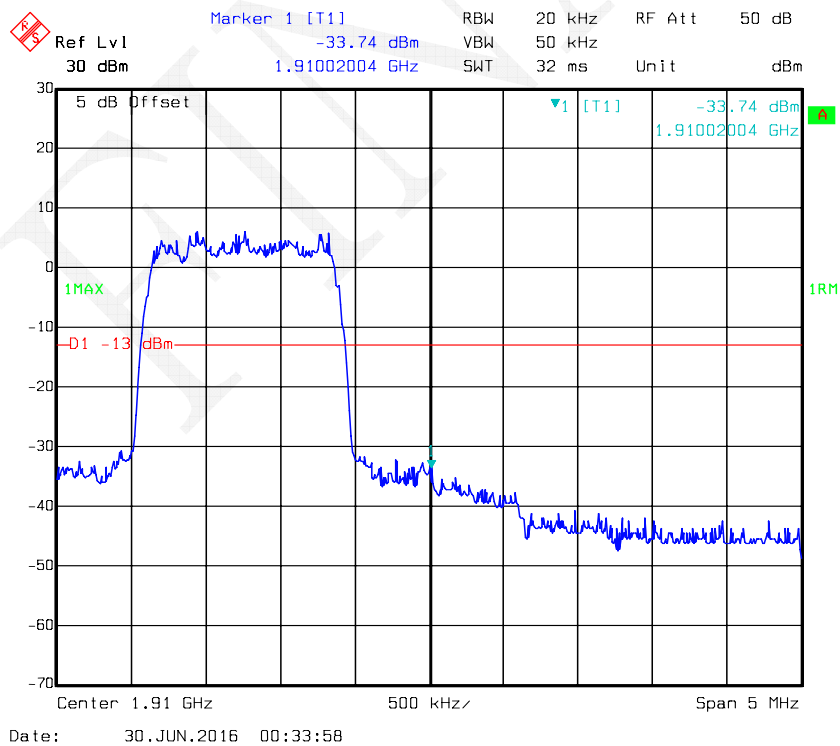
BC0-Rel. A, Right Band Edge



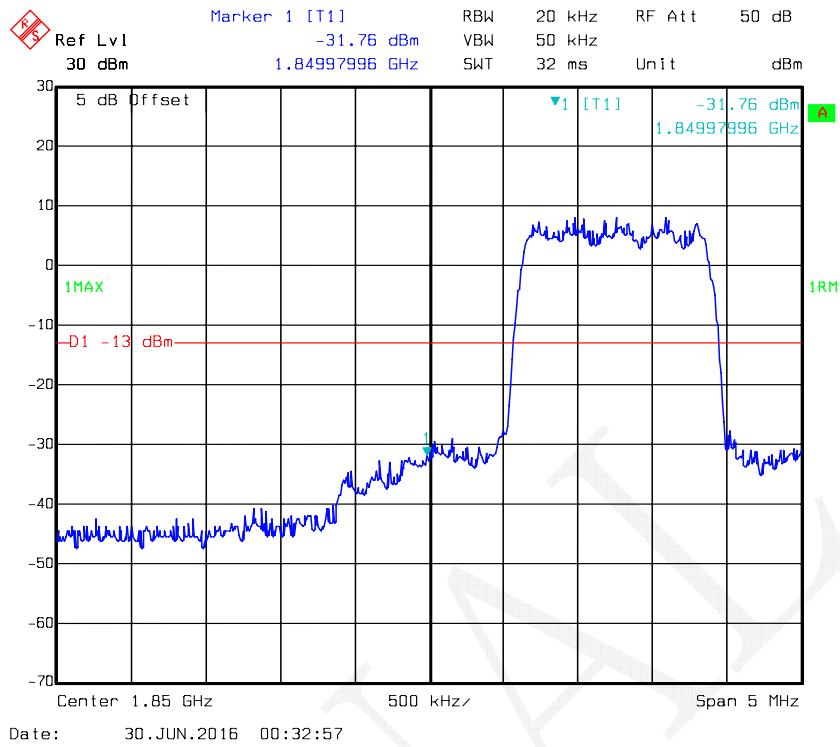
BC1-RC1, Left Band Edge



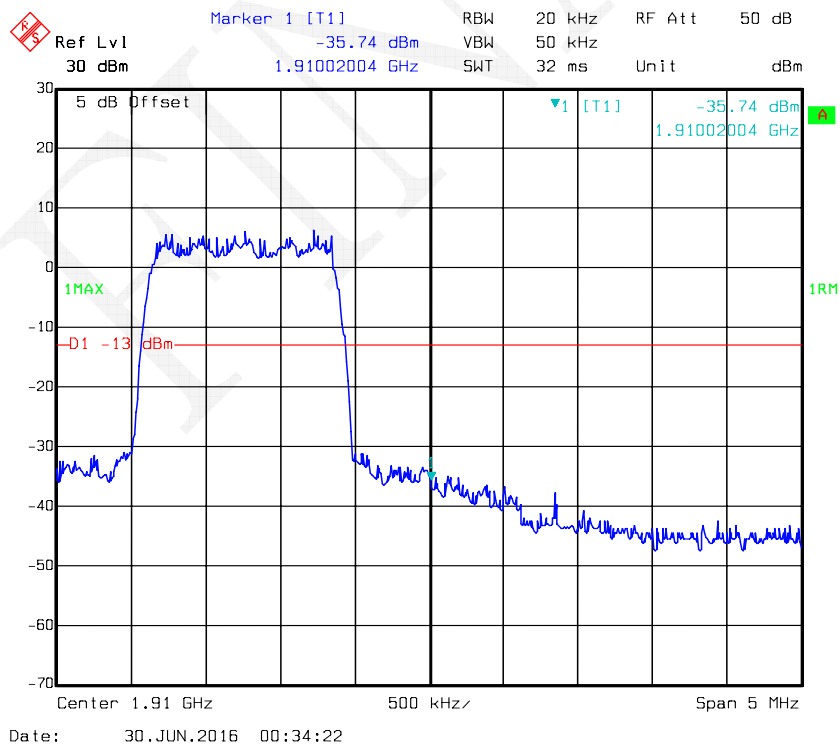
BC1-RC1, Right Band Edge



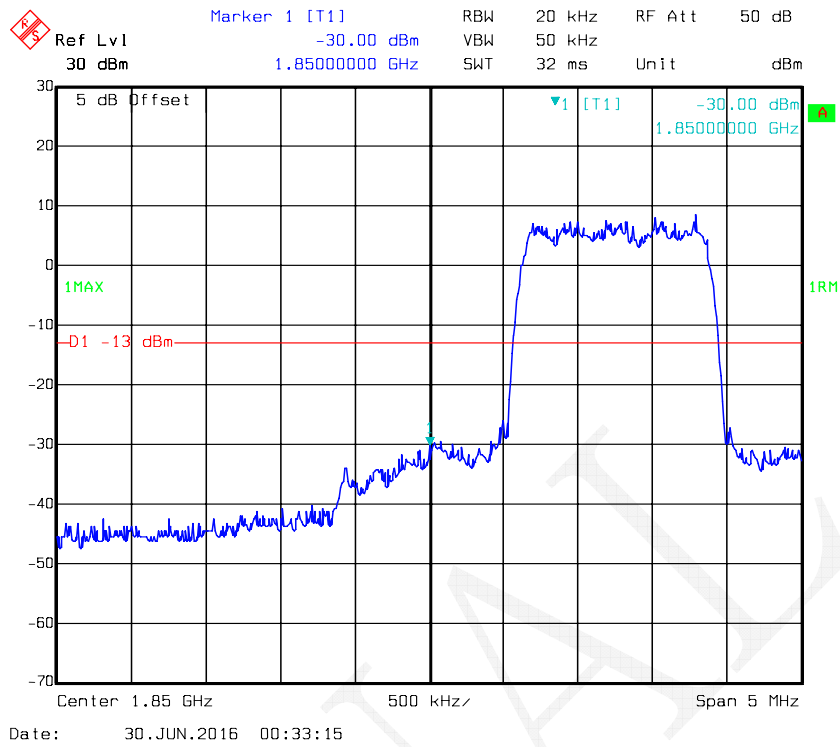
BC1-RC3, Left Band Edge



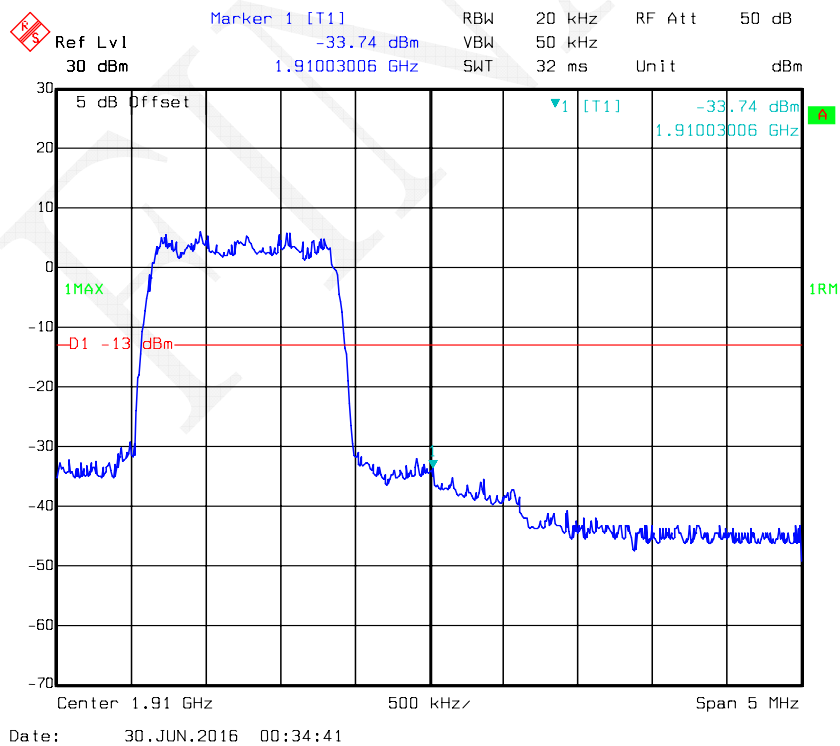
BC1-RC3, Right Band Edge



BC1-Rel.A, Left Band Edge

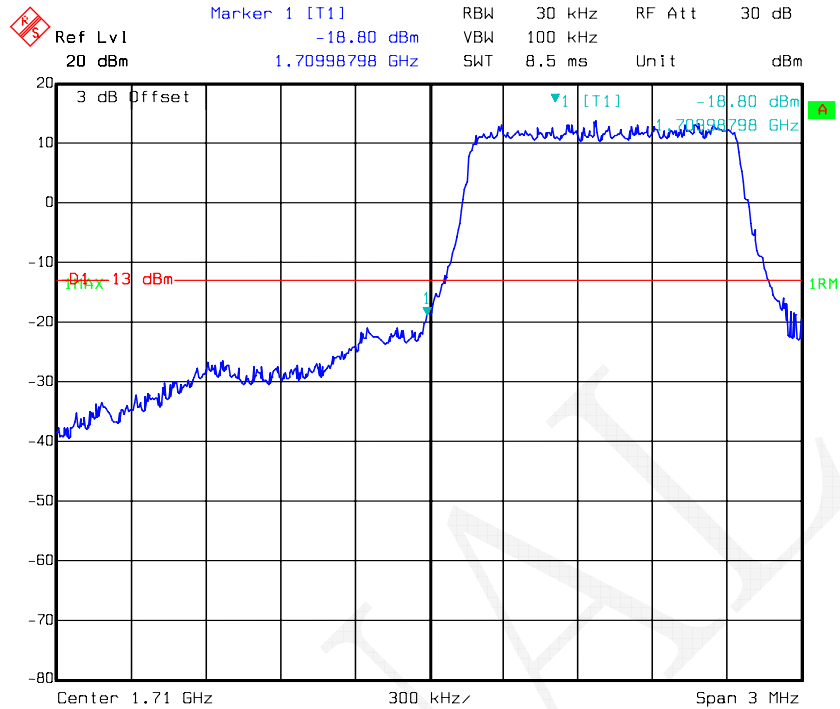


BC1-Rel.A, Right Band Edge



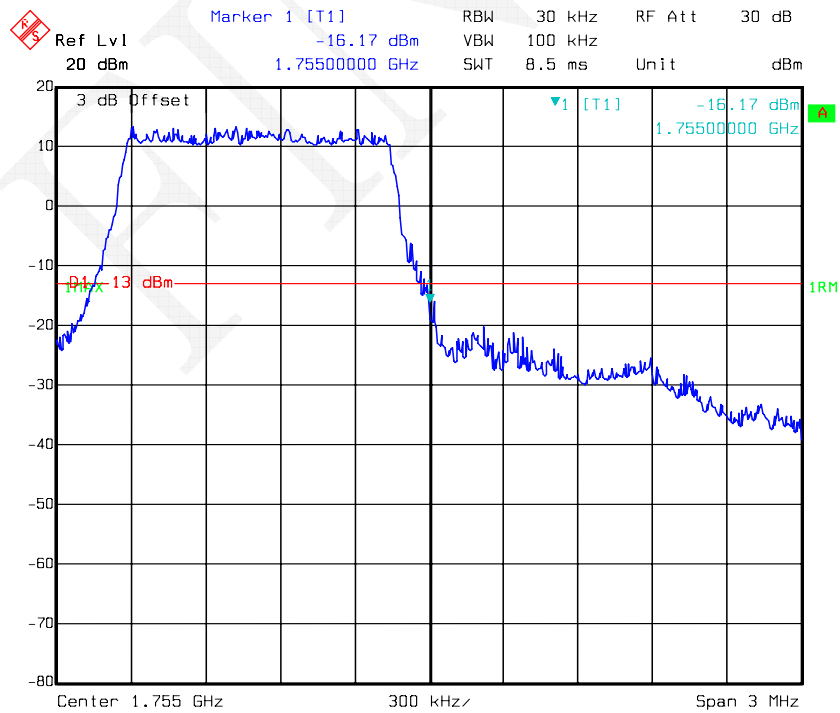
LTE Band 4:

QPSK_1.4MHz_Left



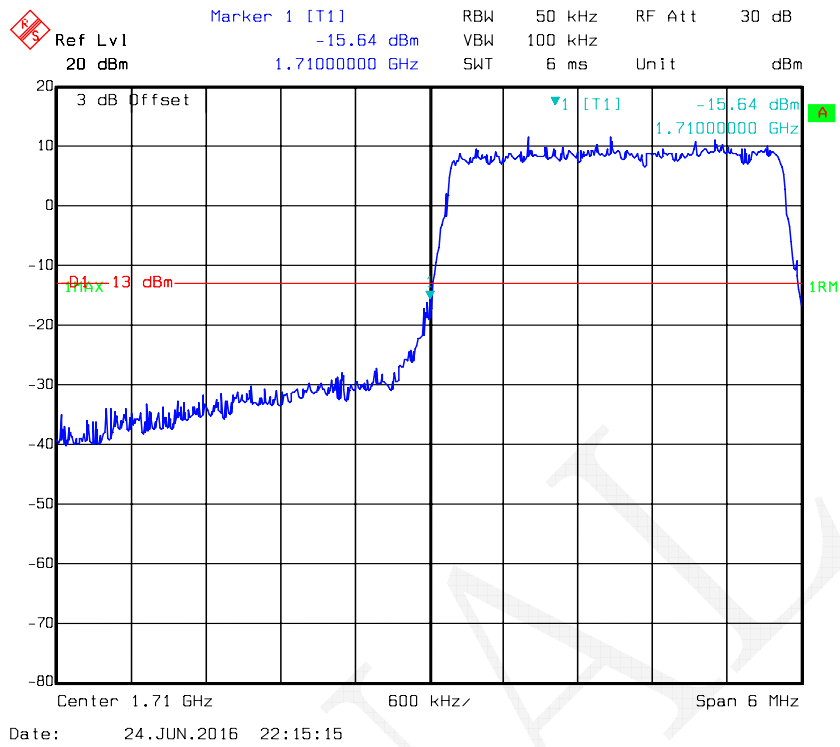
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QPSK_1.4MHz_Right

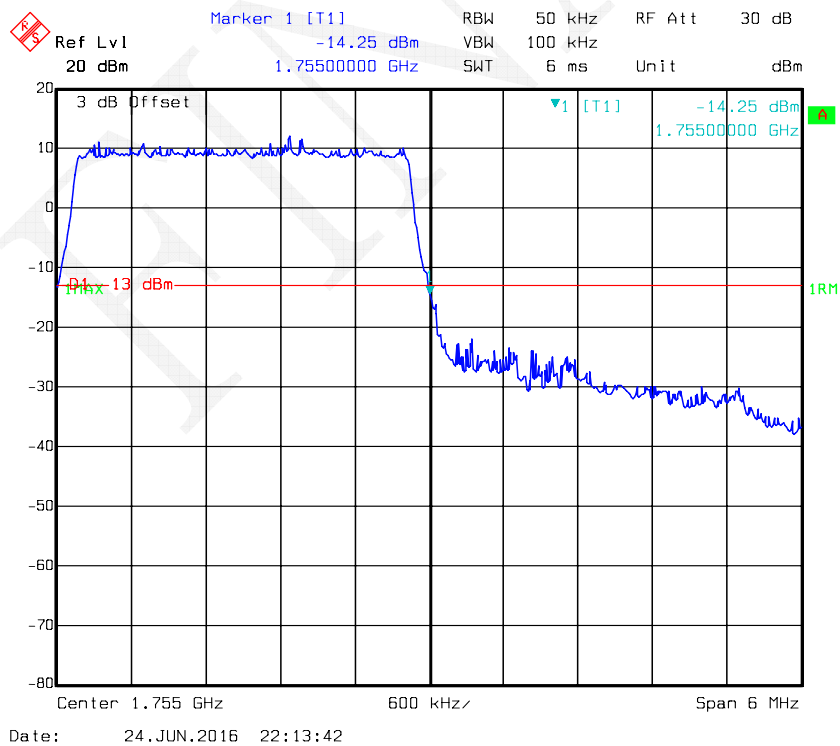


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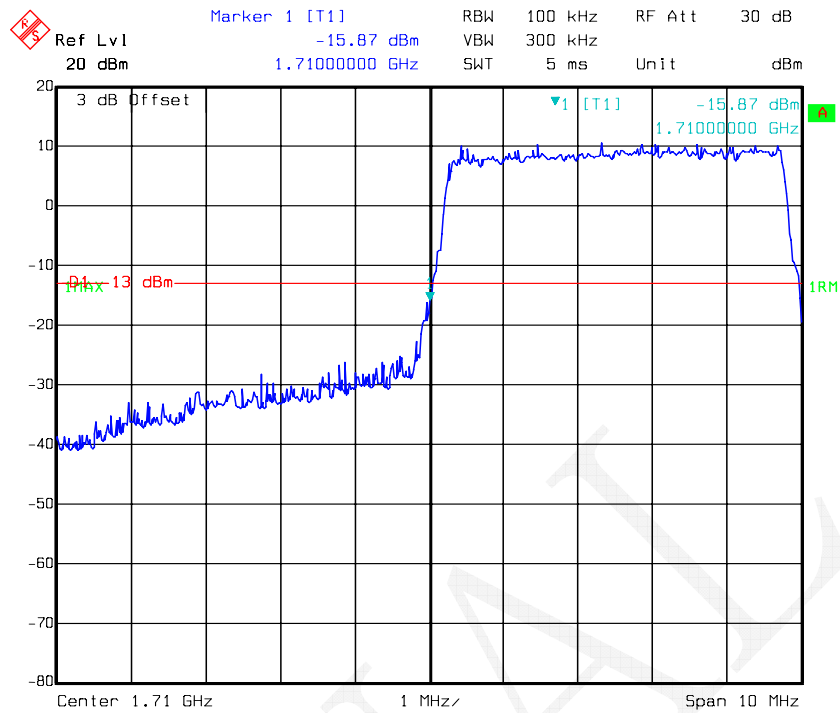
QPSK_3MHz_Left



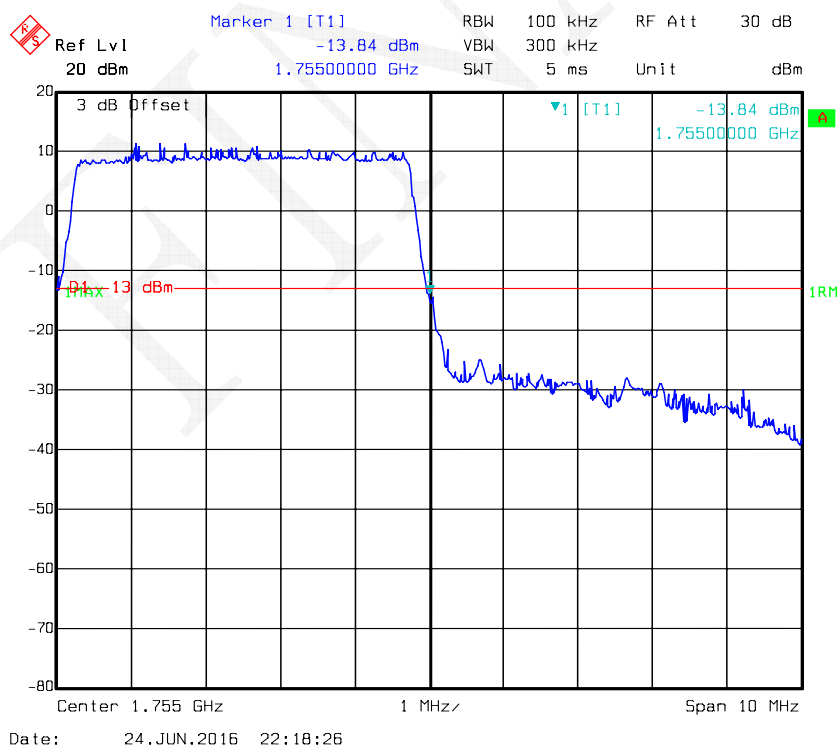
QPSK_3MHz_Right



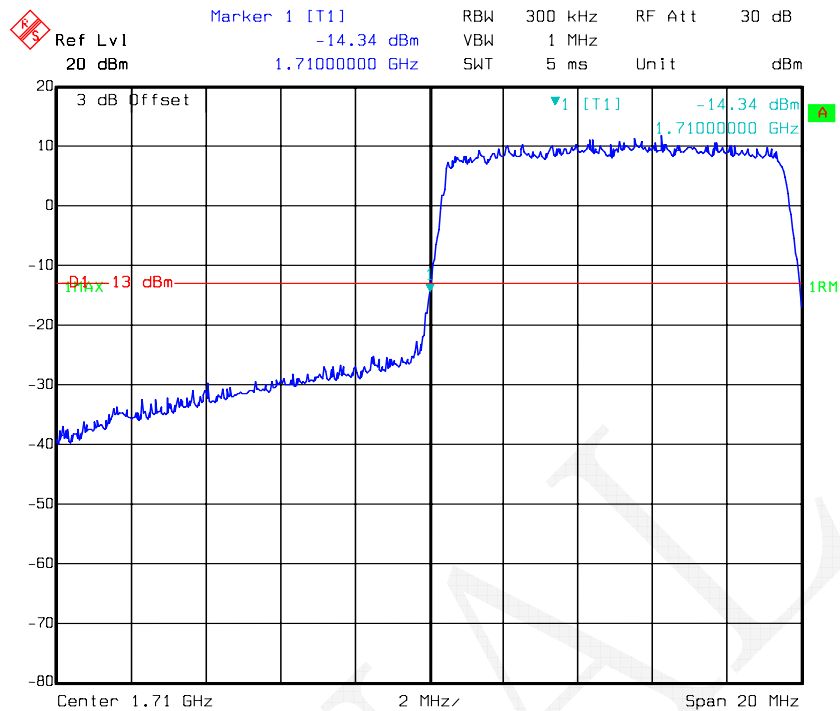
QPSK_5MHz_Left



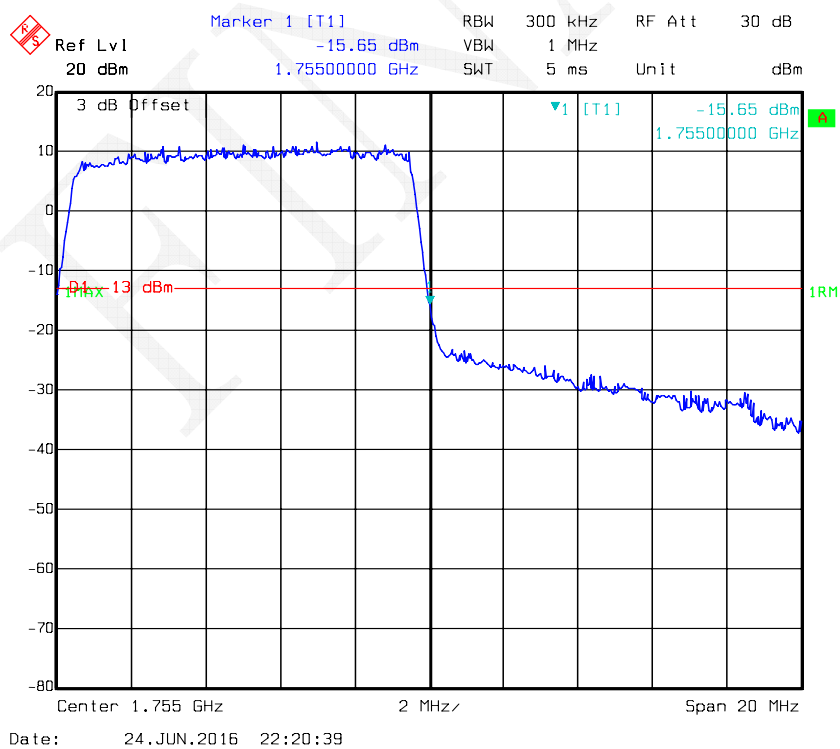
QPSK_5MHz_Right



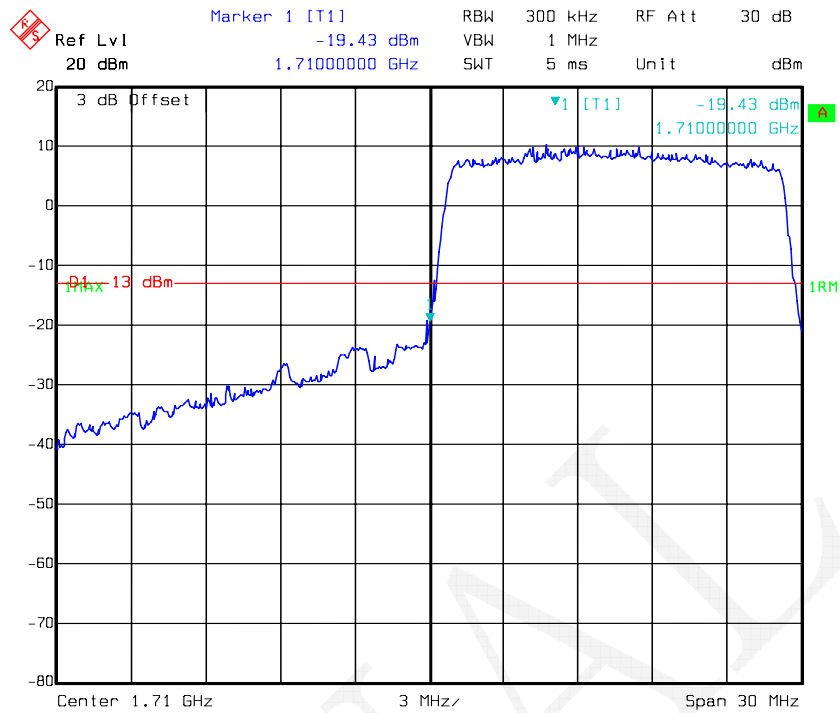
QPSK_10MHz_ Left



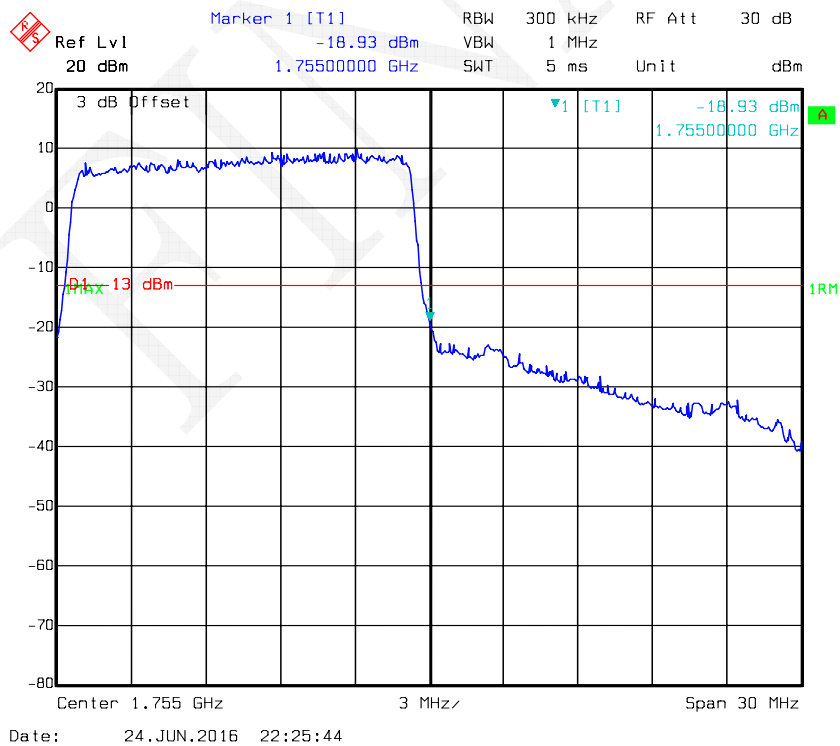
QPSK_10MHz_ Right



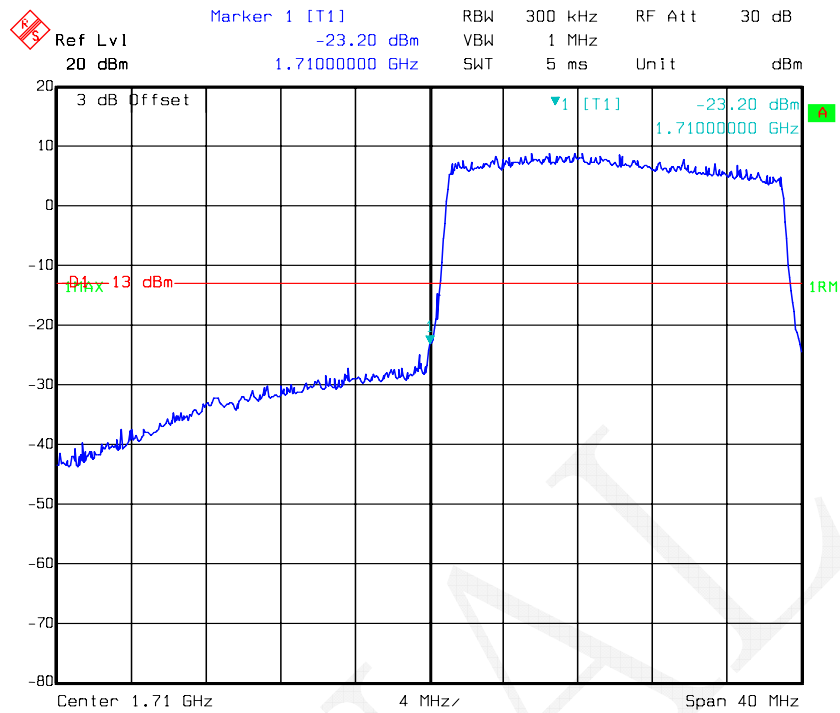
QPSK_15MHz_Left



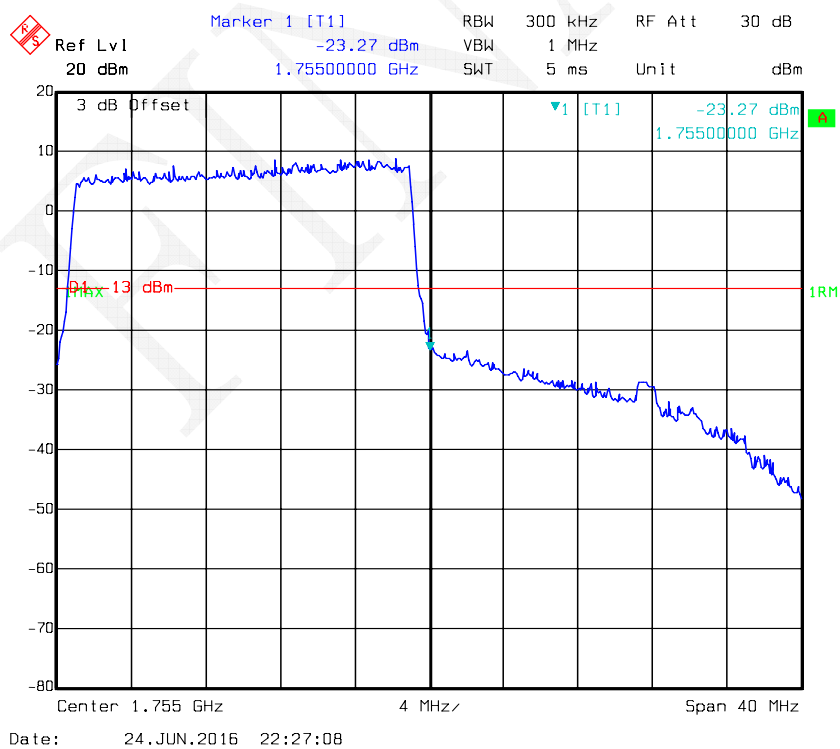
QPSK_15MHz_Right



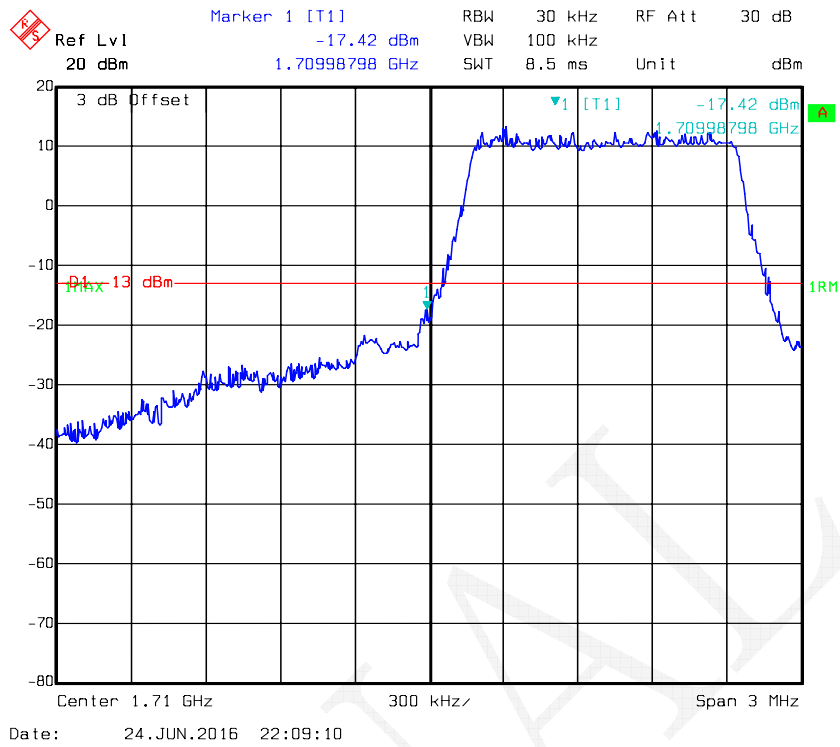
QPSK_20MHz_ Left



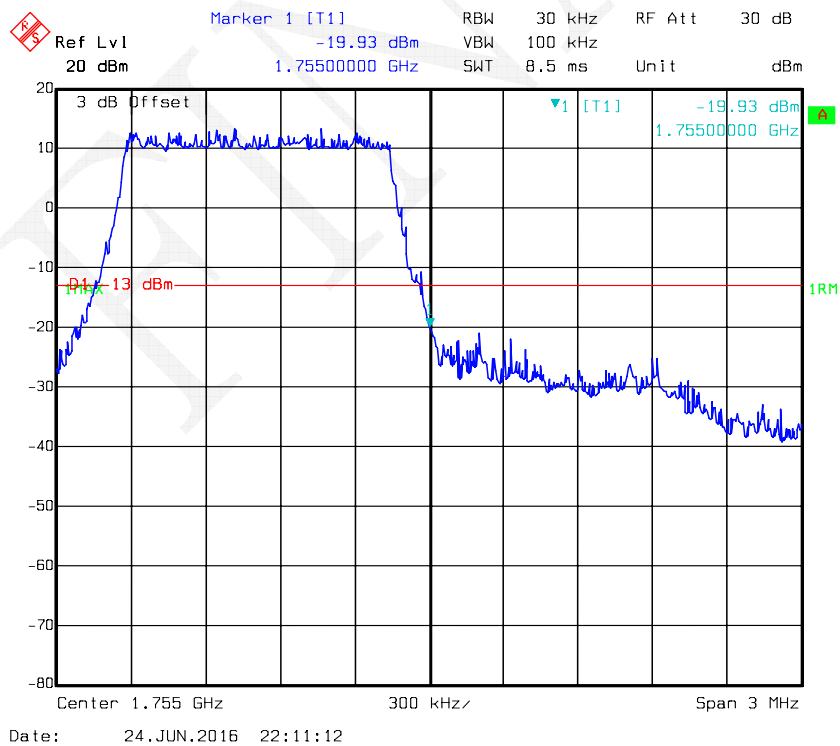
QPSK_10MHz_ Right



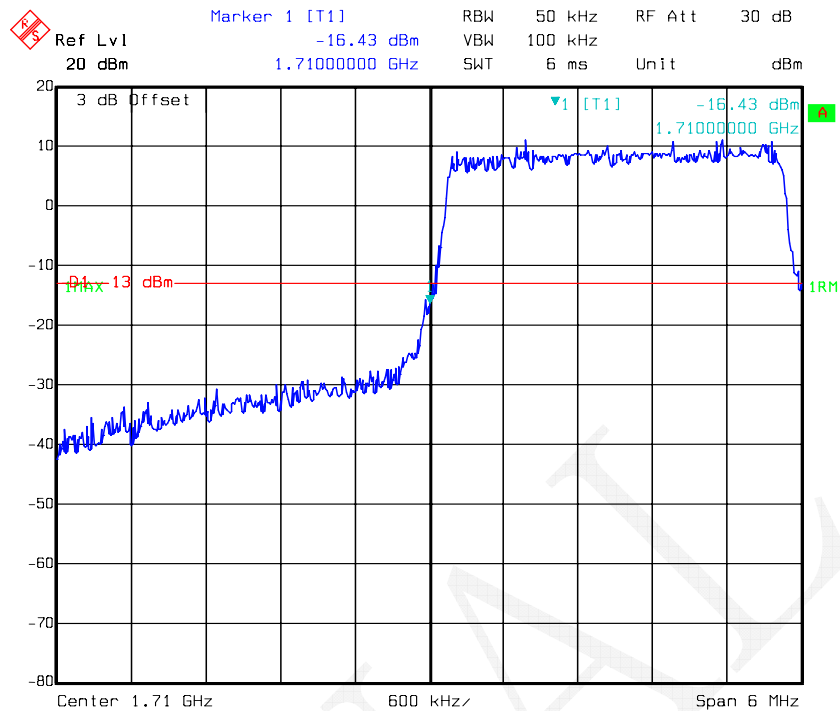
16QAM_1.4MHz_ Left



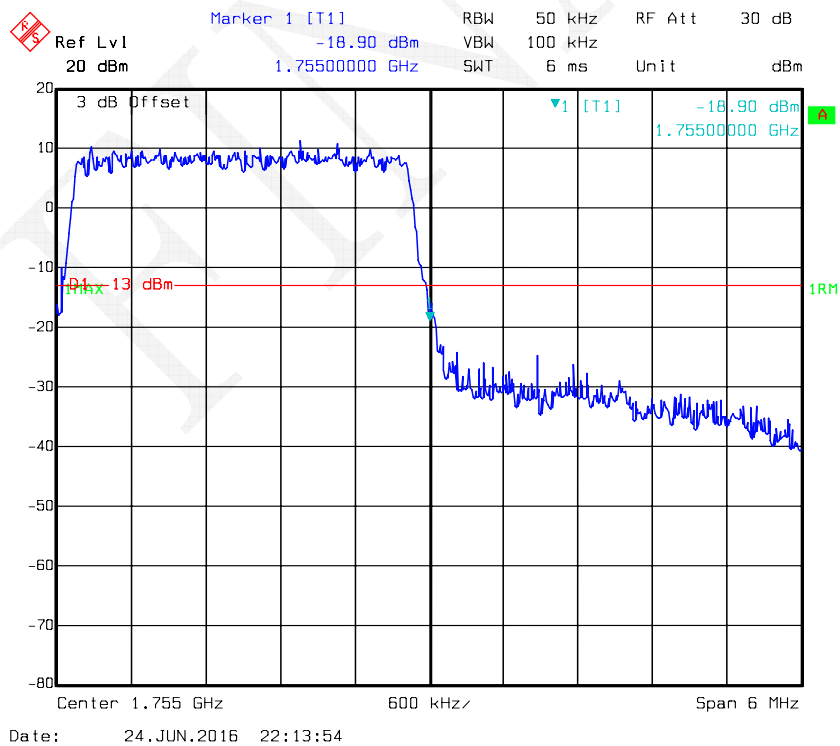
16QAM_1.4MHz_ Right



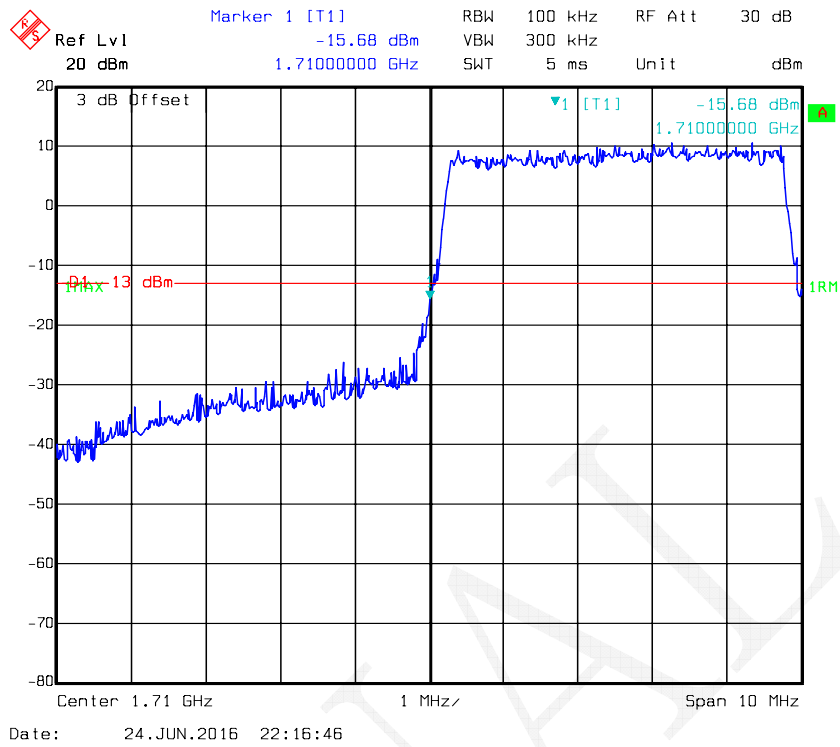
16QAMHz_3MHz_Left



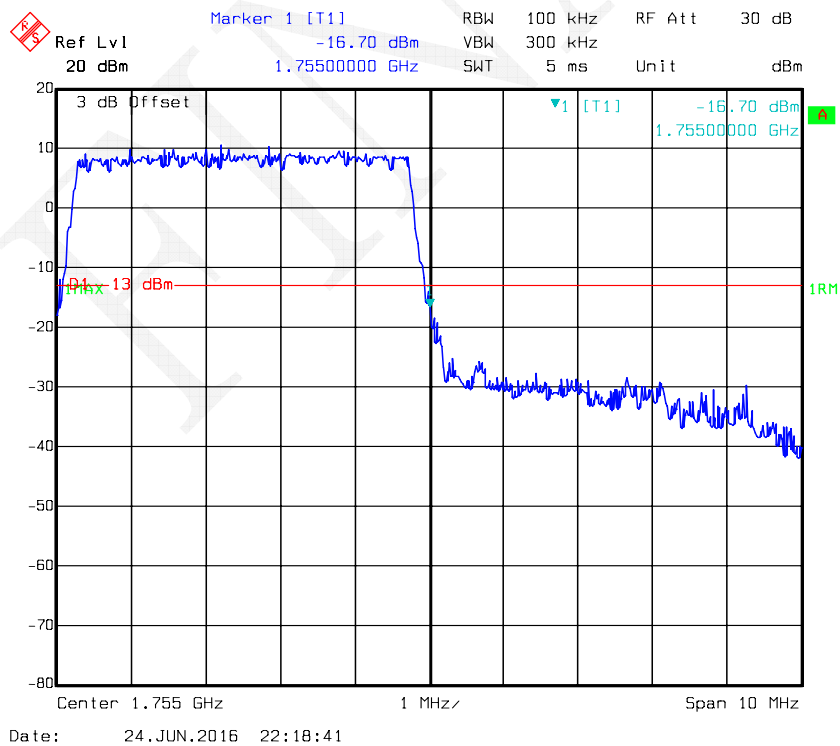
16QAMHz_3MHz_Right



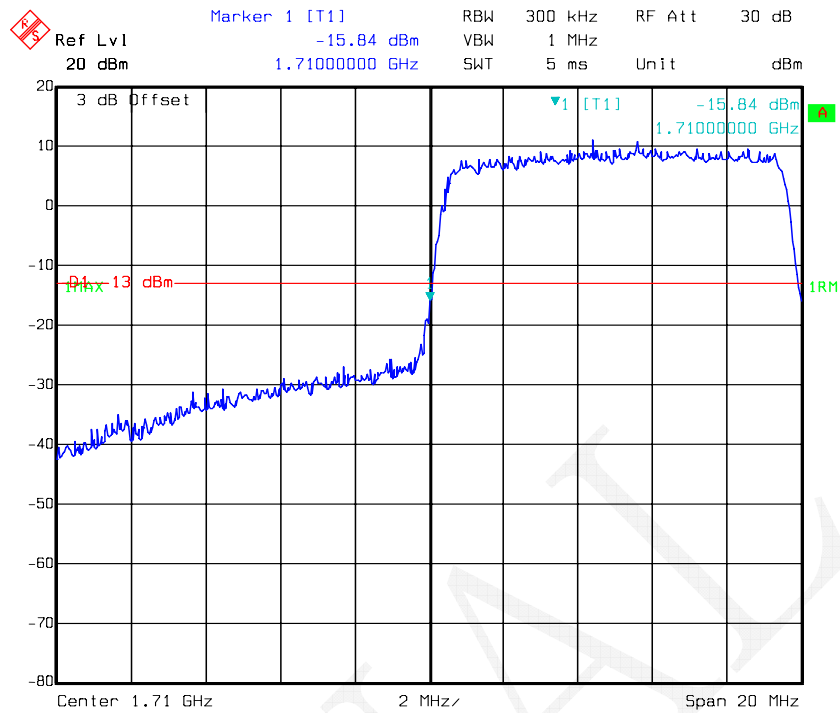
16QAM_5MHz_Left



16QAM_5MHz_Right

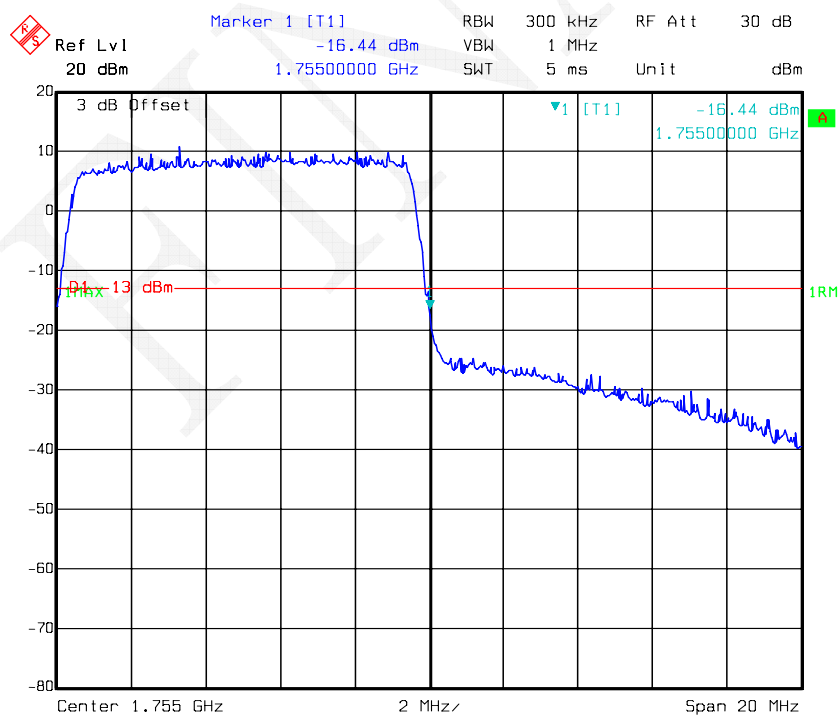


16QAM_10MHz_Left



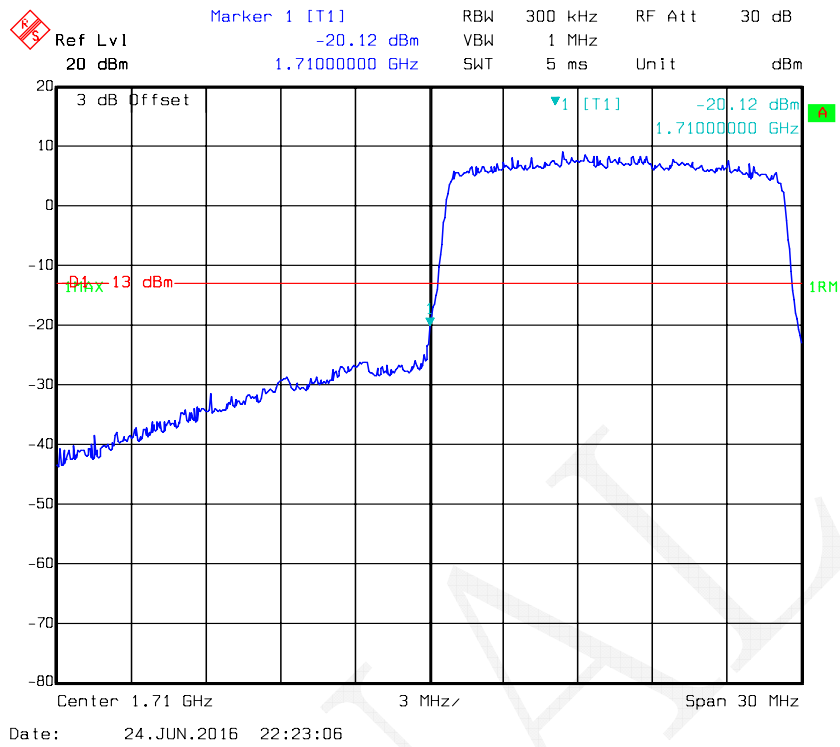
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16QAM_10MHz_Right

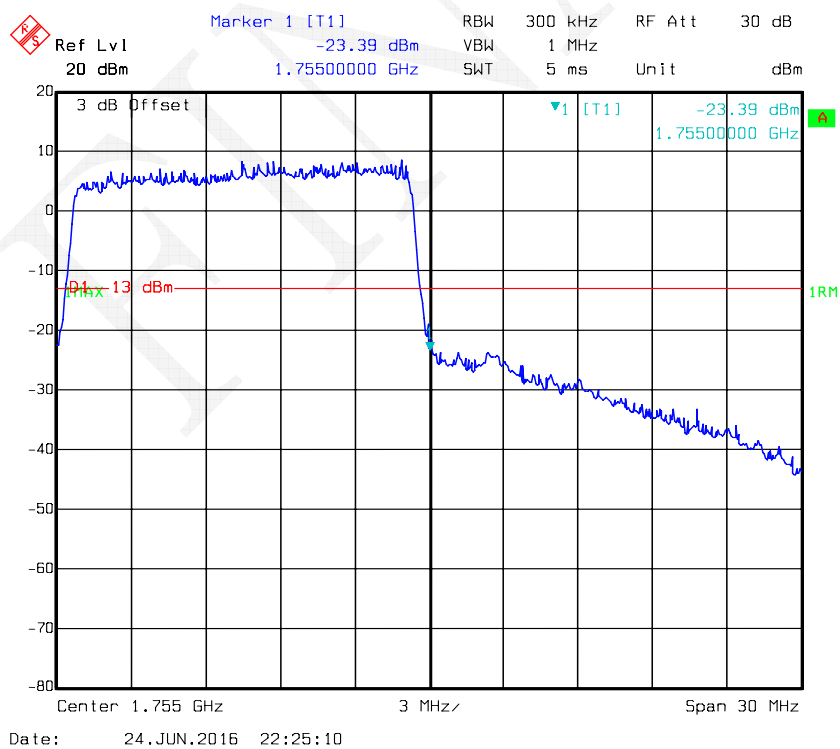


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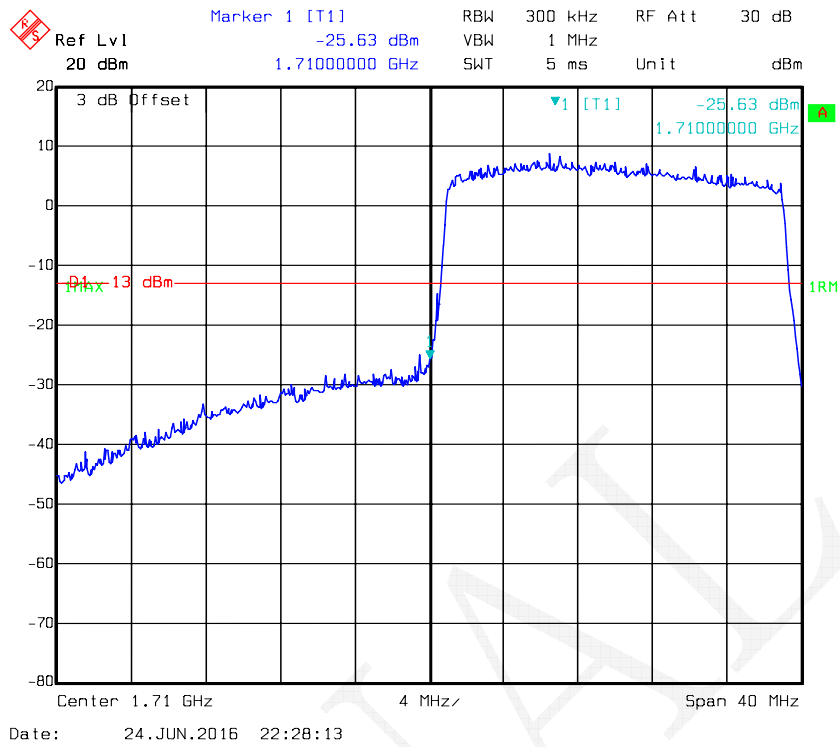
16QAM_15MHz_Left



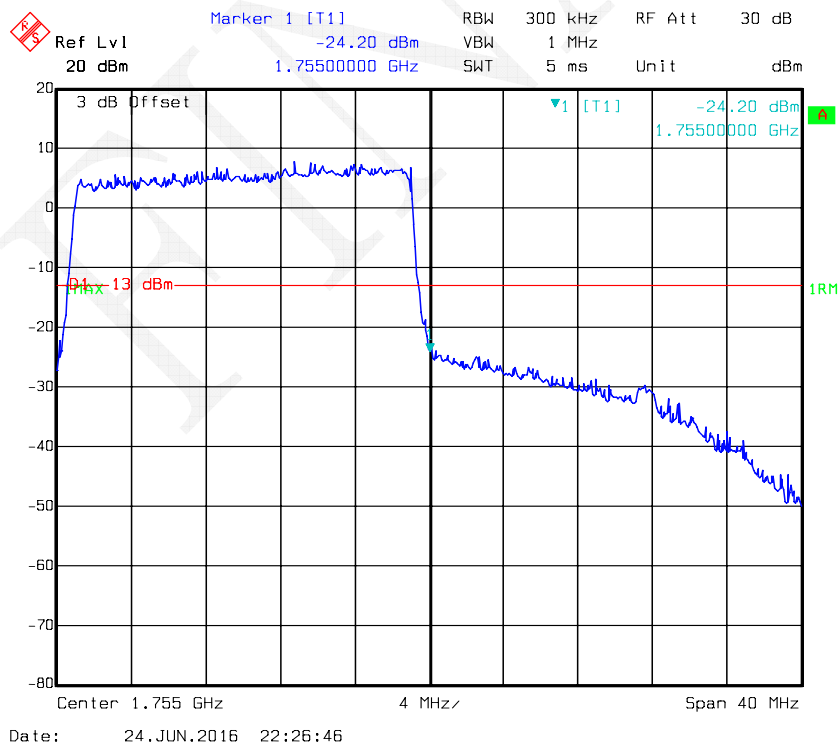
16QAM_15MHz_Right



16QAM_20MHz_Left

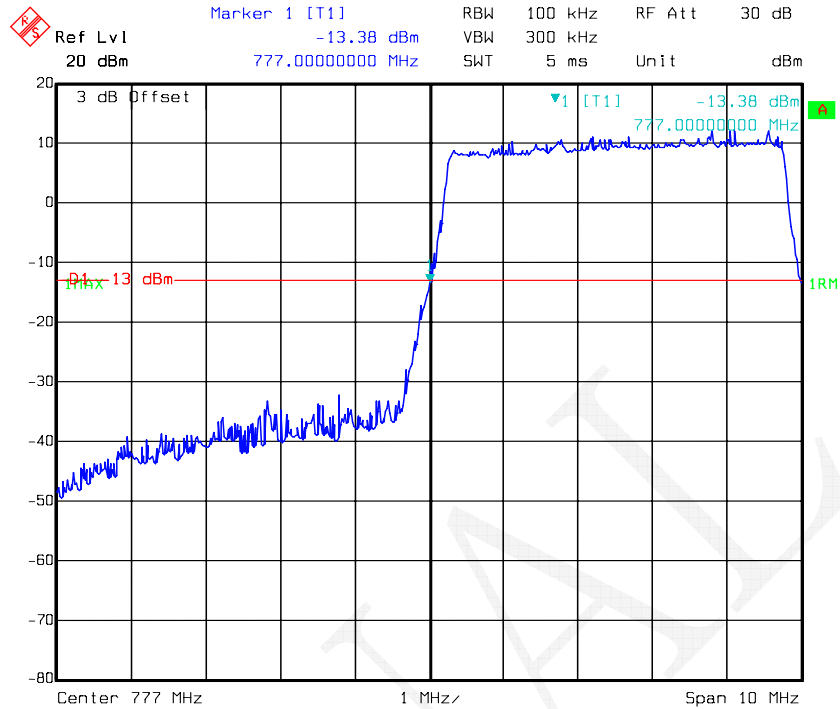


16QAM_20M_Right



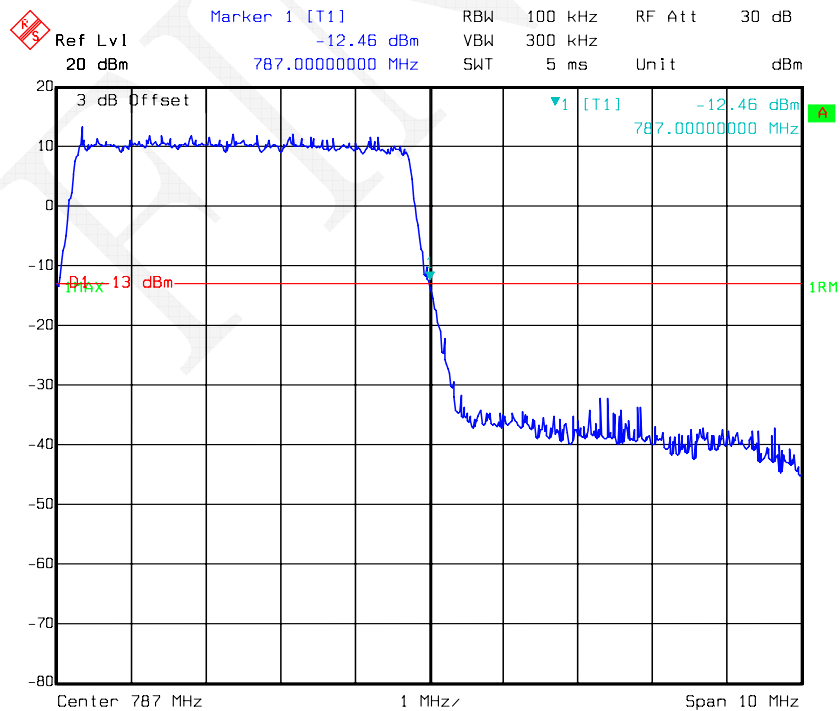
LTE Band 13

QPSK_5MHz_Left



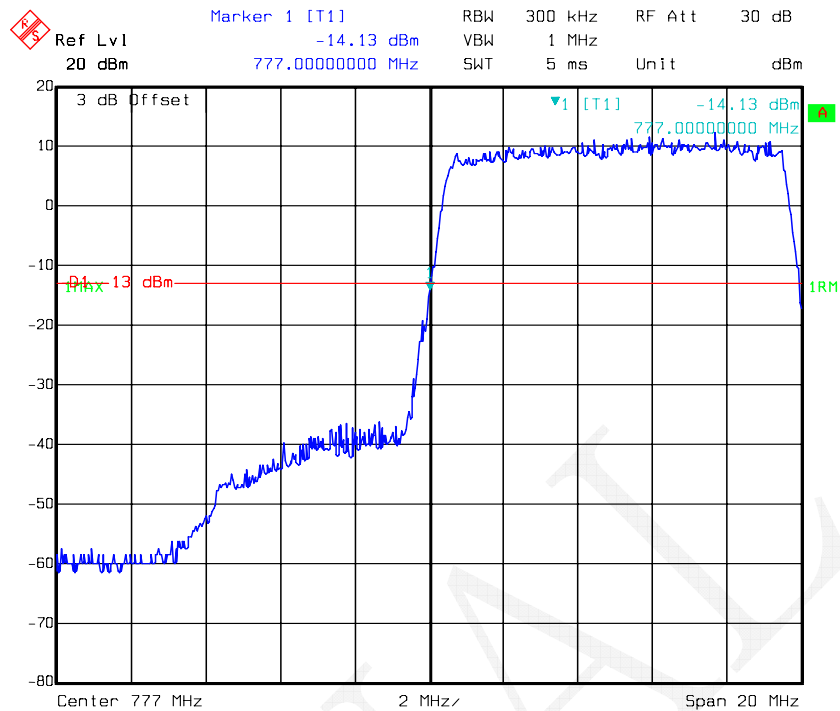
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QPSK_5MHz_Right

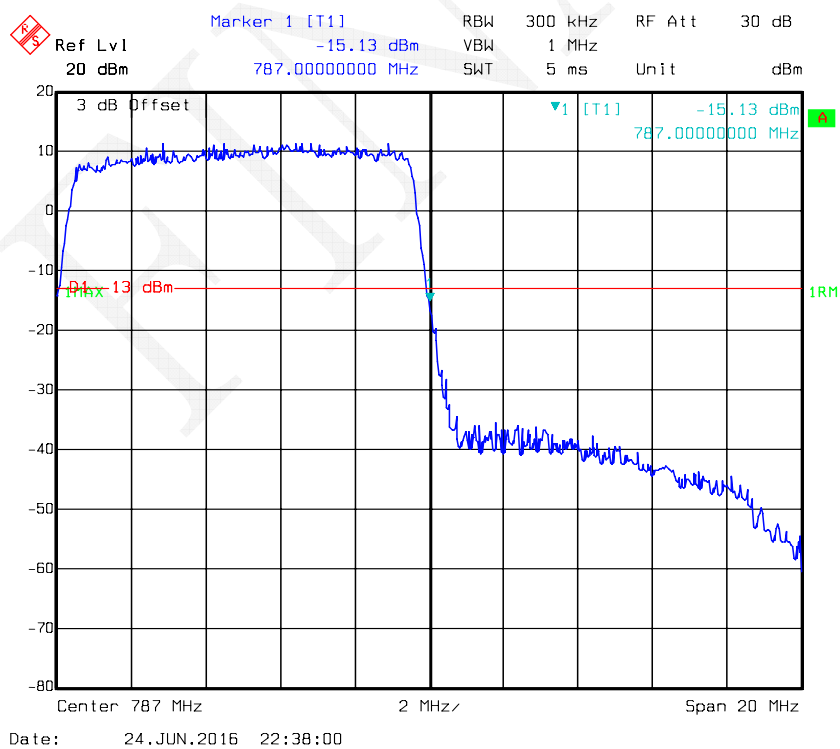


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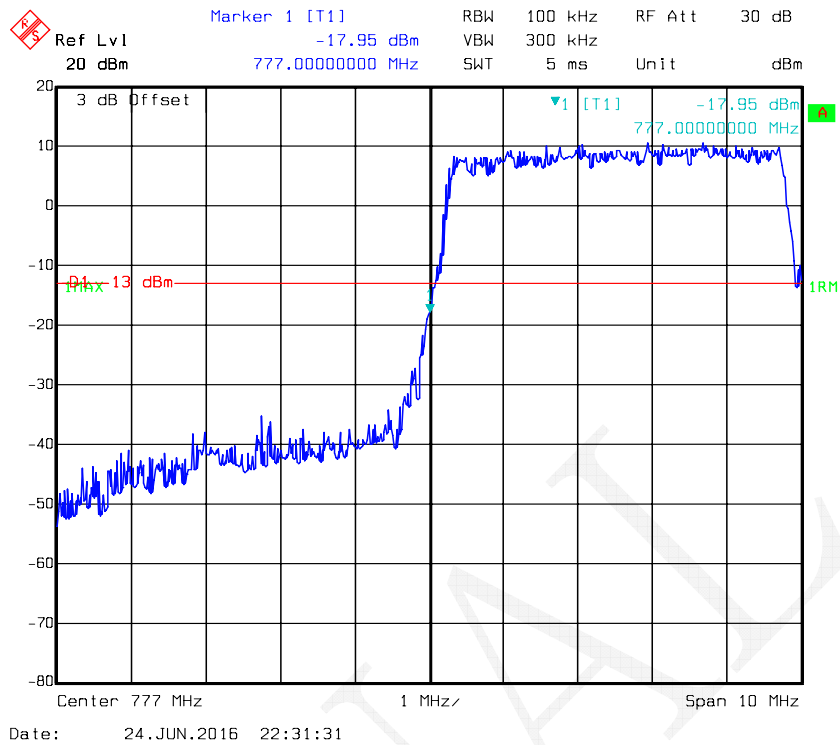
QPSK_10MHz_ Left



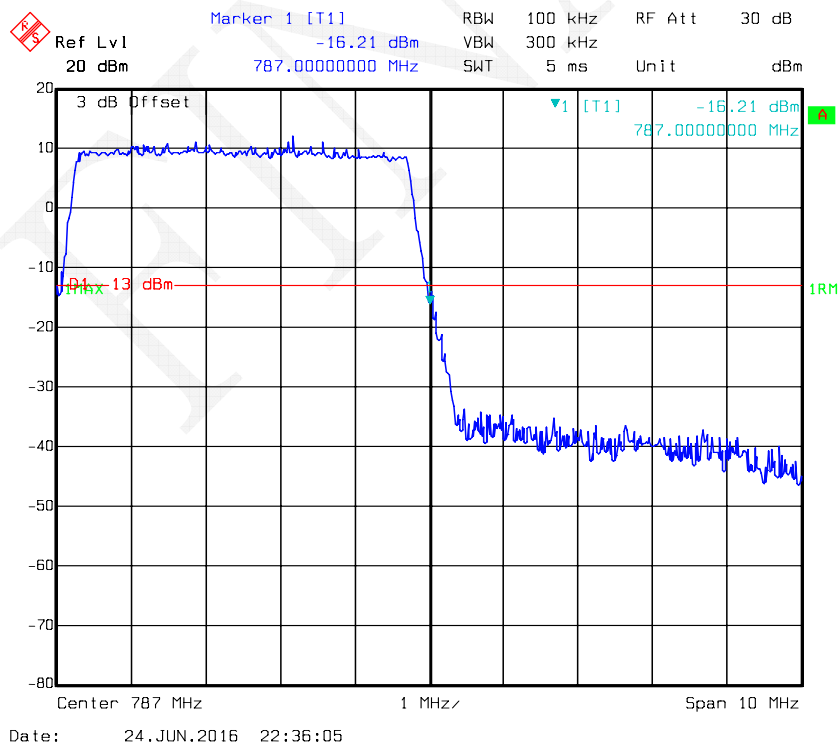
QPSK_10MHz_ Right



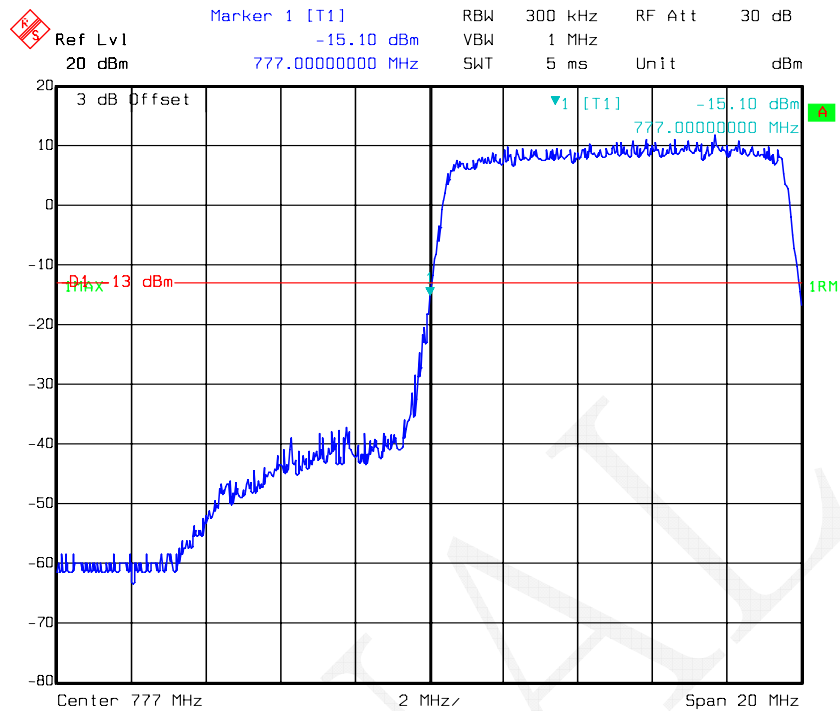
16QAM_5MHz_RB_Left



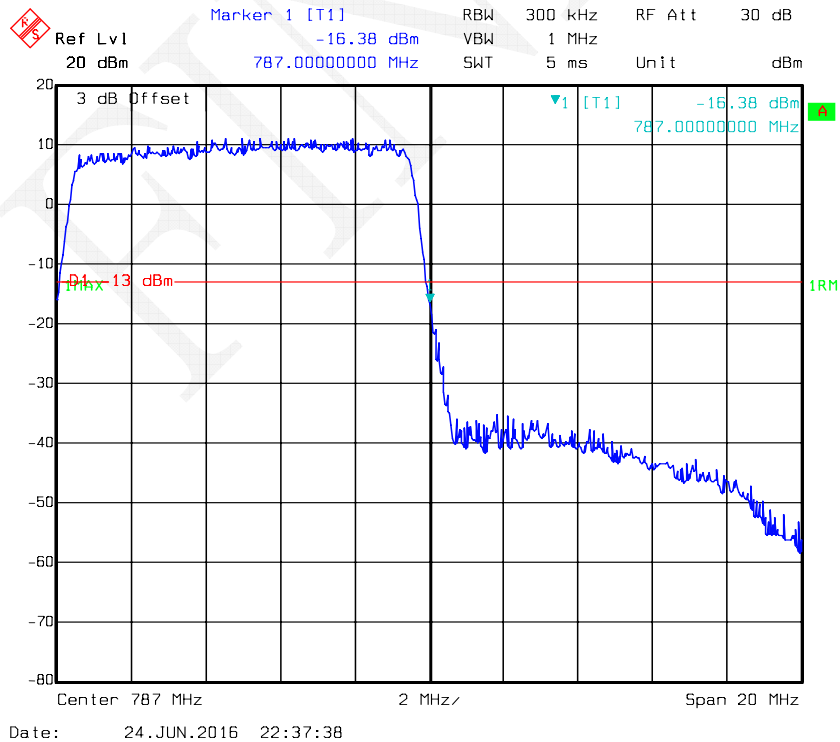
16QAM_5MHz_Right



16QAM_10MHz_Left



16QAM_10MHz_Right



FCC §2.1055, §22.355 & §24.235 & §27.54 - FREQUENCY STABILITY

Applicable Standard

FCC § 2.1055 (a), § 2.1055 (d), §22.355, §24.235, §27.54

According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table below:

Frequency Tolerance for Transmitters in the Public Mobile Services

Frequency Range (MHz)	Base, fixed (ppm)	Mobile ≤ 3 watts (ppm)	Mobile ≤ 3 watts (ppm)
25 to 50	20.0	20.0	50.0
50 to 450	5.0	5.0	50.0
450 to 512	2.5	5.0	5.0
821 to 896	1.5	2.5	2.5
928 to 929.	5.0	N/A	N/A
929 to 960.	1.5	N/A	N/A
2110 to 2220	10.0	N/A	N/A

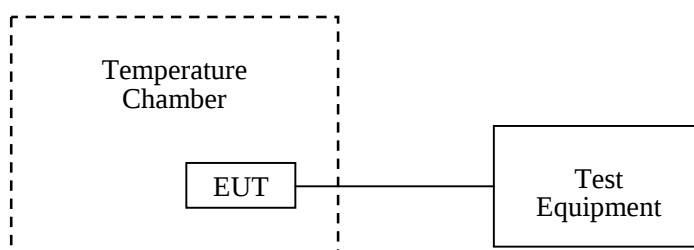
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to communication test set via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the communication test set.

Frequency Stability vs. Voltage: An external variable DC power supply was connected to the battery terminals of the equipment under test. The voltage was set from 85% to 115% of the nominal value and was then decreased until the transmitter light no longer illuminated; i.e., the battery end point. The output frequency was recorded for each battery voltage.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Dongzhixu	High Temperature Test Chamber	DP1000	201105083-3	2015-09-10	2016-09-09
R&S	Universal Radio Communication Tester	CMU200	109 038	2016-05-09	2017-05-09
R&S	Wideband Radio Communication Tester	CMW500	1201.002K50-146520-wh	2015-12-19	2016-12-19

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data**Environmental Conditions**

Temperature:	25.6 °C
Relative Humidity:	57%
ATM Pressure:	99.9kPa

The testing was performed by Costa Dong on 2015-06-30.

BC0 RC1,Middle Channel			
Power Supplied	Temperature	Frequency Error	Frequency Error
Vdc	°C	Hz	ppm
7.2	-30	-20	-0.0239
	-20	-17.8	-0.0213
	-10	-14	-0.0167
	0	-9.4	-0.0112
	10	-8	-0.0096
	20	-3.7	-0.0044
	30	-4.7	-0.0056
	40	-7.1	-0.0085
	50	-7.4	-0.0088
6.2	25	-12.8	-0.0153
8.3	25	-9.2	-0.0110

BC0Rel.A, Middle Channel,			
Power Supplied	Temperature	Frequency Error	Frequency Error
Vdc	℃	Hz	ppm
7.2	-30	-18.4	-0.0220
	-20	-14.9	-0.0178
	-10	-7.9	-0.0094
	0	-12	-0.0143
	10	-8.5	-0.0102
	20	-7.9	-0.0094
	30	-6	-0.0072
	40	-5.9	-0.0071
	50	-8.5	-0.0102
6.2	25	-10.5	-0.0126
8.3	25	-6.9	-0.0082

BC1 RC1,Middle Channel			
Power Supplied	Temperature	Frequency Error	Frequency Error
Vdc	℃	Hz	ppm
7.2	-30	-13.8	-0.0165
	-20	-16.5	-0.0197
	-10	-14.4	-0.0172
	0	-9.8	-0.0117
	10	-9.9	-0.0118
	20	-4.6	-0.0055
	30	-11	-0.0131
	40	-9.1	-0.0109
	50	-5.9	-0.0071
6.2	25	-10.8	-0.0129
8.3	25	-9.4	-0.0112

BC1 Rel.A, Middle Channel			
Power Supplied	Temperature	Frequency Error	Frequency Error
Vdc	°C	Hz	ppm
7.2	-30	-14.8	-0.0177
	-20	-6.2	-0.0074
	-10	-13.8	-0.0165
	0	-12.1	-0.0145
	10	-10	-0.0120
	20	-8.7	-0.0104
	30	-9.7	-0.0116
	40	-13.8	-0.0165
	50	-7.4	-0.0088
6.2	25	-12	-0.0143
8.3	25	-10.2	-0.0122

LTE Band 4:

10MHz,Middle Channel, QPSK			
Power Supplied	Temperature	Frequency Error	Frequency Error
Vdc	°C	Hz	ppm
7.2	-30	19	0.0081
	-20	24	0.0102
	-10	16	0.0068
	0	23	0.0098
	10	19	0.0081
	20	10	0.0043
	30	20	0.0085
	40	18	0.0077
	50	24	0.0102
6.2	25	23	0.0098
8.3	25	23	0.0098

10MHz,Middle Channel,16-QAM			
Power Supplied	Temperature	Frequency Error	Frequency Error
Vdc	℃	Hz	ppm
7.2	-30	10	0.0043
	-20	12	0.0051
	-10	5	0.0021
	0	9	0.0038
	10	14	0.0060
	20	14	0.0060
	30	9	0.0038
	40	8	0.0034
	50	11	0.0047
6.2	25	5	0.0021
8.3	25	13	0.0055

Band 13

10MHz,Middle Channel, QPSK			
Power Supplied	Temperature	Frequency Error	Frequency Error
Vdc	℃	Hz	ppm
7.2	-30	11	0.0141
	-20	9	0.0115
	-10	14	0.0179
	0	13	0.0166
	10	7	0.0090
	20	9	0.0115
	30	12	0.0153
	40	13	0.0166
	50	8	0.0102
6.2	25	14	0.0179
8.3	25	14	0.0179

10MHz,Middle Channel,16-QAM			
Power Supplied	Temperature	Frequency Error	Frequency Error
Vdc	°C	Hz	ppm
7.2	-30	14	0.0179
	-20	13	0.0166
	-10	14	0.0179
	0	10	0.0128
	10	11	0.0141
	20	6	0.0077
	30	9	0.0115
	40	6	0.0077
	50	9	0.0115
6.2	25	14	0.0179
8.3	25	12	0.0153

Note: The fundamental emissions stay within the authorized bands of operation based on the frequency deviation measured is small.

***** END OF REPORT *****