

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

For

PC Smart S.A.

Carrera 116 no.15-25, Bogota, Colombia

FCC ID: 2ABFV-P50K15

Report Type: Original Report	Product Type: Smart Phone
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Note: This test report is prepared for the customer shown above and for the equipment described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *PC Smart S.A.* 's product, model number: *Touch Smart Krone 5(FCC ID: 2ABFV-P50K15)* or the "EUT" in this report was a *Smart Phone*, which was measured approximately: 144 mm (L) × 72 mm (W) × 9 mm (H), rated with input voltage: DC 3.8 V rechargeable Li-ion battery or DC 5.0 V from adapter.

Adapter Information:

Model: A98A-050100U-US1

Input AC: 100-240V, 50/60Hz, 0.2A.

Output DC: 5V, 1000mA

**All measurement and test data in this report was gathered from production sample serial number: 1507254. (Assigned by Shenzhen BACL). The EUT supplied by the applicant was received on 2015-12-02.*

Objective

This type approval report is prepared on behalf of *PC Smart S.A.* in accordance with Part 2, Part 22-Subpart H, Part 24-Subpart E and Part 27 of the Federal Communication Commissions rules.

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

Related Submittal(s)/Grant(s)

FCC Part 15B JBP, Part 15.247 DSS&DTS submissions with FCC ID: 2ABFV-P50K15.

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, ANSI C63.10-2013.

All radiated and conducted emissions measurements were performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement uncertainty with radiated emission is 5.91 dB for 30MHz-1GHz.and 4.92 dB for above 1GHz, 1.95dB for conducted measurement.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp.(Shenzhen) to collect test data is located in the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication 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 October 31, 2103. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.10-2013.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

Justification

The EUT was configured for testing according to TIA/EIA-603-D.
The final qualification test was performed with the EUT operating at normal mode.

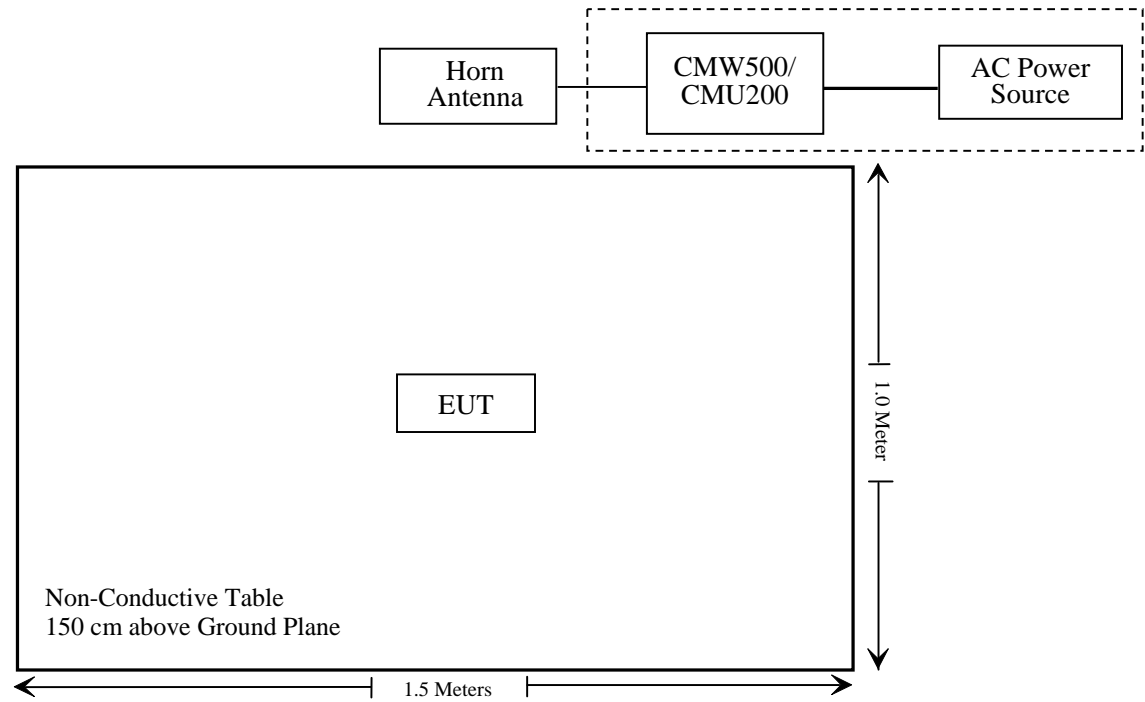
Equipment Modifications

No modifications were made to the EUT.

Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	1201.0002K50
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	106891

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1307 (b)(1), §2.1093	RF Exposure Information	Compliance*
§2.1046; § 22.913 (a); § 24.232 (c); §27.50 (d) (i)	RF Output Power	Compliance
§ 2.1047	Modulation Characteristics	Not Applicable
§ 2.1049; § 22.905; § 22.917; § 24.238; §27.53 (c)	Occupied Bandwidth	Compliance
§ 2.1051; § 22.917 (a); § 24.238 (a); §27.53(c) (g)	Spurious Emissions at Antenna Terminal	Compliance
§ 2.1053; § 22.917 (a); § 24.238 (a); §27.53 (c) (g)	Spurious Radiated Emissions	Compliance
§ 22.917 (a); § 24.238 (a); §27.53 (c) (g);	Band Edge	Compliance
§ 2.1055; § 22.355; § 24.235; §27.54;	Frequency stability	Compliance

Note: * Please refer to SAR report released by BACL, report number: RSZ151202001-20.

FCC §1.1307(b) & §2.1093 - RF EXPOSURE INFORMATION

Applicable Standard

FCC§1.1307, §2.1093.

Test Result

Compliance, please refer to the SAR report: RSZ151202001-20

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.

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

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

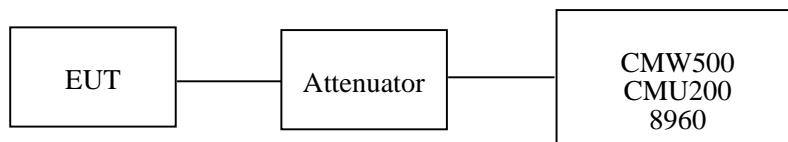
According to FCC §2.1046 and §24.232 (C), mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

According to §27.50(d), the maximum EIRP must not exceed 1Watts (30dBm) for 1710-1755MHz. According to §27.50(h), the maximum EIRP must not exceed 2Watts (33dBm) for 2500-2570MHz.

The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB.

Test Procedure*Conducted method:*

The RF output of the transmitter was connected to the CMW500/CMU200 through sufficient attenuation.

*Radiated method:*

TIA603-D section 2.2.17

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2015-11-03	2016-11-03
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2014-12-07	2017-12-06
HP	Synthesized Sweeper	8341B	2624A00116	2015-06-03	2016-06-03
COM POWER	Dipole Antenna	AD-100	041000	2015-08-18	2016-08-18
A.H. System	Horn Antenna	SAS-200/571	135	2013-02-11	2016-02-10
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2014-12-11	2015-12-11
Sunol Sciences	Horn Antenna	DRH-118	A052304	2015-12-01	2016-11-30
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	106891	2015-11-23	2016-11-23
Agilent	WIRELESS COMMUNICATIONS TEST SET	8960	MY50266471	2015-01-13	2016-01-13
R&S	Wideband Radio Communication tester	CMW500	1201.002K50-146520-wh	2015-11-23	2016-11-23

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

Test Data**Environmental Conditions**

Temperature:	25 °C
Relative Humidity:	50 %
ATM Pressure:	101.0kPa

The testing was performed by William Li on 2015-12-10.

Conducted Power**Cellular Band (Part 22H)**

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	128	824.2	32.26	38.45
	190	836.6	32.39	38.45
	251	848.8	32.34	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	128	824.2	32.35	31.62	29.78	28.81	38.45
	190	836.6	32.37	31.47	29.73	28.75	38.45
	251	848.8	32.31	31.64	29.77	28.77	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
EGPRS	128	824.2	26.56	25.46	23.29	22.07	38.45
	190	836.6	26.62	25.50	23.32	22.05	38.45
	251	848.8	26.56	25.46	23.21	22.02	38.45

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band V)	Normal	RMC12.2k		22.14	22.47	22.42
		Rel 6 HSDPA	1	21.15	21.29	21.25
			2	21.23	21.10	21.11
			3	20.93	20.82	20.51
			4	20.98	20.87	20.64
		Rel 6 HSUPA	1	21.45	21.52	21.34
			2	21.21	21.20	21.15
			3	20.98	21.09	20.76
			4	20.91	21.05	20.81
			5	20.93	21.08	20.84
		DC-HSDPA	1	20.95	20.97	20.94
			2	20.91	20.96	20.95
			3	20.91	20.93	20.87
			4	20.82	20.88	20.86
		HSPA+	1	20.84	20.88	20.83

PCS Band (Part 24E)

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	512	1850.2	28.83	33
	661	1880.0	28.90	33
	810	1909.8	28.87	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	512	1850.2	28.85	27.93	26.04	25.03	33
	661	1880.0	28.91	27.99	26.25	25.07	33
	810	1909.8	28.90	27.99	26.15	25.11	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
EGPRS	512	1850.2	25.02	23.72	21.69	20.64	33
	661	1880.0	24.59	23.35	21.32	20.17	33
	810	1909.8	25.05	23.70	21.62	20.33	33

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band II)	Normal	RMC12.2k		21.51	21.59	20.98
		Rel 6 HSDPA	1	20.44	20.58	20.49
			2	20.39	20.19	20.14
			3	20.38	20.42	20.28
			4	20.43	20.22	20.14
		Rel 6 HSUPA	1	20.77	20.78	20.69
			2	20.49	20.42	20.28
			3	20.61	20.58	20.49
			4	20.44	20.42	20.35
			5	20.61	20.57	20.46
		DC-HSDPA	1	20.81	20.87	20.68
			2	20.79	20.42	20.54
			3	20.71	20.48	20.56
			4	20.74	20.49	20.54
		HSPA+	1	20.62	20.69	20.64

Peak-to-average ratio (PAR)**Cellular Band**

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	0.28	13
	Middle	0.26	13
	High	0.29	13

Mode	Channel	PAR (dB)	Limit (dB)
EGPRS	Low	2.26	13
	Middle	2.48	13
	High	2.51	13

Mode	Channel	PAR (dB)	Limit (dB)
WCDMA (BPSK)	Low	3.28	13
	Middle	3.32	13
	High	3.36	13
HSDPA (16QAM)	Low	3.21	13
	Middle	3.18	13
	High	3.15	13
HSUPA (BPSK)	Low	3.16	13
	Middle	3.14	13
	High	3.11	13

PCS Band

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	0.22	13
	Middle	0.26	13
	High	0.24	13

Mode	Channel	PAR (dB)	Limit (dB)
EGPRS	Low	2.26	13
	Middle	2.39	13
	High	2.31	13

Mode	Channel	PAR (dB)	Limit (dB)
WCDMA (BPSK)	Low	2.98	13
	Middle	3.02	13
	High	2.95	13
HSDPA (16QAM)	Low	2.96	13
	Middle	2.94	13
	High	2.99	13
HSUPA (BPSK)	Low	2.86	13
	Middle	2.84	13
	High	2.81	13

Radiated Power (Measured at Max. conducted power channel)**ERP & EIRP****GSM Mode:**

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 22H/24E	
			Height (m)	Polar (H/V)	S.G. Level (dBm)	Cable loss (dB)	Antenna Gain (dB)		Limit (dBm)	Margin (dB)
ERP for Cellular Band (Part 22H)										
836.60	98.92	153	2.1	H	29.9	0.67	0	29.23	38.45	9.22
836.60	97.54	221	1.8	V	28.5	0.67	0	27.83	38.45	10.62
ERP for PCS Band (Part 24E)										
1880	92.39	53	1.7	H	21.7	1.4	7.3	27.6	33	5.4
1880	90.86	270	2.2	V	20.2	1.4	7.3	26.1	33	6.9

EDGE Mode:

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 22H/24E	
			Height (m)	Polar (H/V)	S.G. Level (dBm)	Cable loss (dB)	Antenna Gain (dB)		Limit (dBm)	Margin (dB)
ERP for Cellular Band (Part 22H)										
836.60	93.47	169	2.0	H	24.8	0.67	0	24.13	38.45	14.32
836.60	92.19	15	1.9	V	23.2	0.67	0	22.53	38.45	15.92
EIRP for PCS Band (Part 24E)										
1880	88.21	15	1.7	H	17.5	1.4	7.3	23.4	33	9.6
1880	86.14	260	1.2	V	16.3	1.4	7.3	22.2	33	10.8

WCDMA Mode:

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 22H/24E	
			Height (m)	Polar (H/V)	S.G. Level (dBm)	Cable loss (dB)	Antenna Gain (dB)		Limit (dBm)	Margin (dB)
WCDMA Band V (Part 22H)										
836.6	89.51	320	1.8	H	20.6	0.67	0	19.93	38.45	18.52
836.6	88.14	247	1.9	V	19.3	0.67	0	18.63	38.45	19.82
WCDMA Band II (Part 24E)										
1880.00	83.62	180	2.4	H	12.5	1.40	7.30	18.4	33	14.6
1880.00	81.25	324	2.1	V	11.2	1.40	7.30	17.1	33	15.9

Note:

All above data were tested with no amplifier.

Absolute Level = SG Level - Cable loss + Antenna Gain

Margin = Limit- Absolute Level

LTE Band 4:**Maximum Output Power**

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4	QPSK	RB Size=1, RB Offset=0	21.32	21.37	21.34
		RB Size=1, RB Offset=2	21.35	21.40	21.38
		RB Size=1, RB Offset=5	21.32	21.41	21.30
		RB Size=3, RB Offset=0	21.15	21.52	21.31
		RB Size=3, RB Offset=1	21.22	21.24	21.21
		RB Size=3, RB Offset=2	21.18	21.28	21.22
		RB Size=6, RB Offset=0	20.93	21.29	21.16
	16QAM	RB Size=1, RB Offset=0	20.93	21.01	21.22
		RB Size=1, RB Offset=2	21.36	21.00	20.98
		RB Size=1, RB Offset=5	21.10	21.39	20.94
		RB Size=3, RB Offset=0	21.37	21.23	21.31
		RB Size=3, RB Offset=1	21.09	21.45	21.16
		RB Size=3, RB Offset=2	21.42	21.19	21.36
		RB Size=6, RB Offset=0	21.13	21.38	21.17
3.0	QPSK	RB Size=1, RB Offset=0	21.24	21.29	21.21
		RB Size=1, RB Offset=7	20.61	20.99	21.21
		RB Size=1, RB Offset=14	21.26	21.34	20.93
		RB Size=8, RB Offset=0	21.06	21.11	20.67
		RB Size=8, RB Offset=4	20.60	20.63	21.28
		RB Size=8, RB Offset=7	21.01	21.04	21.08
		RB Size=15, RB Offset=0	20.86	20.96	20.59
	16QAM	RB Size=1, RB Offset=0	20.94	21.03	21.02
		RB Size=1, RB Offset=7	21.60	20.97	20.97
		RB Size=1, RB Offset=14	20.97	20.99	21.05
		RB Size=8, RB Offset=0	21.00	21.06	21.07
		RB Size=8, RB Offset=4	21.28	21.31	21.35
		RB Size=8, RB Offset=7	21.10	21.18	21.27
		RB Size=15, RB Offset=0	20.95	20.97	21.04

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5.0	QPSK	RB Size=1, RB Offset=0	20.87	20.99	20.96
		RB Size=1, RB Offset=12	21.24	21.33	21.43
		RB Size=1, RB Offset=24	21.23	21.30	21.36
		RB Size=12, RB Offset=0	20.91	20.92	20.97
		RB Size=12, RB Offset=6	20.82	20.89	20.94
		RB Size=12, RB Offset=11	20.86	20.90	20.90
		RB Size=25, RB Offset=0	20.75	20.83	20.84
	16QAM	RB Size=1, RB Offset=0	20.87	20.96	20.99
		RB Size=1, RB Offset=12	20.88	20.94	20.97
		RB Size=1, RB Offset=24	20.83	20.93	21.02
		RB Size=12, RB Offset=0	20.86	20.90	20.92
		RB Size=12, RB Offset=6	19.94	20.04	20.10
		RB Size=12, RB Offset=11	19.73	19.82	19.89
		RB Size=25, RB Offset=0	20.86	20.91	21.00
10.0	QPSK	RB Size=1, RB Offset=0	21.13	21.23	21.32
		RB Size=1, RB Offset=24	21.37	21.40	21.35
		RB Size=1, RB Offset=49	21.28	21.38	21.34
		RB Size=25, RB Offset=0	21.25	21.34	21.36
		RB Size=25, RB Offset=12	21.01	21.01	21.07
		RB Size=25, RB Offset=24	21.27	21.34	21.35
		RB Size=50, RB Offset=0	21.03	21.06	21.15
	16QAM	RB Size=1, RB Offset=0	20.84	20.90	20.92
		RB Size=1, RB Offset=24	20.91	20.94	21.02
		RB Size=1, RB Offset=49	20.88	20.97	20.98
		RB Size=25, RB Offset=0	20.94	21.03	21.12
		RB Size=25, RB Offset=12	21.15	20.95	21.02
		RB Size=25, RB Offset=24	20.85	20.89	20.97
		RB Size=50, RB Offset=0	21.51	21.40	21.31

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
15.0	QPSK	RB Size=1, RB Offset=0	20.89	20.96	20.92
		RB Size=1, RB Offset=37	21.19	21.27	21.31
		RB Size=1, RB Offset=74	21.03	21.03	21.11
		RB Size=36, RB Offset=0	20.88	20.92	20.94
		RB Size=36, RB Offset=18	21.07	21.07	21.15
		RB Size=36, RB Offset=37	20.92	20.96	20.98
		RB Size=75, RB Offset=0	21.28	21.37	21.34
	16QAM	RB Size=1, RB Offset=0	21.02	21.10	21.09
		RB Size=1, RB Offset=37	20.94	21.02	20.99
		RB Size=1, RB Offset=74	21.20	21.23	21.26
		RB Size=36, RB Offset=0	21.24	21.29	21.26
		RB Size=36, RB Offset=18	21.28	21.32	21.33
		RB Size=36, RB Offset=37	21.60	21.36	21.24
		RB Size=75, RB Offset=0	21.19	21.20	21.17
20.0	QPSK	RB Size=1, RB Offset=0	21.46	21.53	21.50
		RB Size=1, RB Offset=49	20.93	20.96	20.96
		RB Size=1, RB Offset=99	21.33	20.99	20.98
		RB Size=50, RB Offset=0	20.64	20.73	20.71
		RB Size=50, RB Offset=24	21.23	21.25	21.20
		RB Size=50, RB Offset=49	21.02	21.07	21.09
		RB Size=100, RB Offset=0	20.54	20.62	20.66
	16QAM	RB Size=1, RB Offset=0	20.94	21.03	21.10
		RB Size=1, RB Offset=49	20.84	20.94	21.02
		RB Size=1, RB Offset=99	20.89	20.94	20.99
		RB Size=50, RB Offset=0	21.05	21.27	20.92
		RB Size=50, RB Offset=24	20.87	20.92	20.94
		RB Size=50, RB Offset=49	20.89	20.99	21.05
		RB Size=100, RB Offset=0	20.05	20.10	20.15

EIRP:**QPSK:**

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 27
			Height (m)	Polar (H/V)	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		Limit (dBm)
Middle Channel									
1.4 MHz Bandwidth									
1732.50	84.58	118	2.3	H	15.6	1.62	6.90	20.88	30
1732.50	83.32	271	1.2	V	14.3	1.62	6.90	19.58	30
3 MHz Bandwidth									
1732.50	84.53	40	2.5	H	15.5	1.62	6.90	20.78	30
1732.50	83.37	264	2.4	V	14.4	1.62	6.90	19.68	30
5 MHz Bandwidth									
1732.50	84.59	111	2.4	H	15.6	1.62	6.90	20.88	30
1732.50	83.51	326	1.9	V	14.5	1.62	6.90	19.78	30
10MHz Bandwidth									
1732.50	84.69	23	2.0	H	15.7	1.62	6.90	20.98	30
1732.50	83.47	260	1.4	V	14.5	1.62	6.90	19.78	30
15 MHz Bandwidth									
1732.50	84.21	299	1.1	H	15.2	1.62	6.90	20.48	30
1732.50	83.68	189	2.2	V	14.7	1.62	6.90	19.98	30
20 MHz Bandwidth									
1732.50	84.42	330	1.8	H	15.4	1.62	6.90	20.78	30
1732.50	83.59	153	1.8	V	14.6	1.62	6.90	19.88	30

16QAM:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 27
			Height (m)	Polar (H/V)	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		Limit (dBm)
Middle Channel									
1.4 MHz Bandwidth									
1732.50	84.73	125	1.8	H	15.7	1.62	6.90	20.98	30
1732.50	83.21	214	2.1	V	14.2	1.62	6.90	19.48	30
3 MHz Bandwidth									
1732.50	84.72	176	1.8	H	15.7	1.62	6.90	20.98	30
1732.50	83.12	308	2.2	V	14.1	1.62	6.90	19.38	30
5 MHz Bandwidth									
1732.50	84.63	85	1.9	H	15.6	1.62	6.90	20.88	30
1732.50	83.01	13	1.7	V	14.0	1.62	6.90	19.28	30
10 MHz Bandwidth									
1732.50	84.91	11	2.2	H	15.9	1.62	6.90	21.18	30
1732.50	83.12	135	2.0	V	14.1	1.62	6.90	19.38	30
15 MHz Bandwidth									
1732.50	84.42	2	1.8	H	15.4	1.62	6.90	20.68	30
1732.50	83.23	267	1.1	V	14.2	1.62	6.90	19.48	30
20 MHz Bandwidth									
1732.50	84.63	214	2.1	H	15.6	1.62	6.90	20.88	30
1732.50	83.11	56	1.9	V	14.1	1.62	6.90	19.38	30

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
16QAM (1RB Size)	4.87	≤ 13	Pass
16QAM (100RB Size)	7.01	≤ 13	Pass

LTE Band 7:**Maximum Output Power**

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5.0	QPSK	RB Size=1, RB Offset=0	21.24	21.31	21.36
		RB Size=1, RB Offset=12	21.32	21.40	21.42
		RB Size=1, RB Offset=24	21.71	21.64	21.75
		RB Size=12, RB Offset=0	21.62	21.55	21.67
		RB Size=12, RB Offset=6	21.73	21.70	21.77
		RB Size=12, RB Offset=11	21.73	21.72	21.85
		RB Size=25, RB Offset=0	21.67	21.58	21.66
	16QAM	RB Size=1, RB Offset=0	21.70	21.62	21.71
		RB Size=1, RB Offset=12	20.82	20.82	20.92
		RB Size=1, RB Offset=24	20.59	20.56	20.62
		RB Size=12, RB Offset=0	21.71	21.69	21.77
		RB Size=12, RB Offset=6	21.85	21.94	21.93
		RB Size=12, RB Offset=11	21.77	21.69	21.78
		RB Size=25, RB Offset=0	21.72	21.66	21.82
10.0	QPSK	RB Size=1, RB Offset=0	21.38	21.32	21.45
		RB Size=1, RB Offset=24	21.74	21.74	21.81
		RB Size=1, RB Offset=49	21.42	21.36	21.48
		RB Size=25, RB Offset=0	21.42	21.50	21.56
		RB Size=25, RB Offset=12	21.49	21.55	21.52
		RB Size=25, RB Offset=24	21.31	21.33	21.39
		RB Size=50, RB Offset=0	21.29	21.36	21.39
	16QAM	RB Size=1, RB Offset=0	21.76	21.76	21.76
		RB Size=1, RB Offset=24	21.66	21.72	21.75
		RB Size=1, RB Offset=49	21.79	21.81	21.87
		RB Size=25, RB Offset=0	21.71	21.77	21.79
		RB Size=25, RB Offset=12	21.70	21.78	21.81
		RB Size=25, RB Offset=24	21.73	21.80	21.90
		RB Size=50, RB Offset=0	20.83	20.92	20.95

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
15.0	QPSK	RB Size=1, RB Offset=0	21.95	21.98	22.00
		RB Size=1, RB Offset=37	21.82	21.80	21.85
		RB Size=1, RB Offset=74	21.79	21.73	21.90
		RB Size=36, RB Offset=0	21.66	21.84	21.80
		RB Size=36, RB Offset=18	21.72	21.97	21.83
		RB Size=36, RB Offset=37	21.70	21.44	21.53
		RB Size=75, RB Offset=0	21.92	21.62	21.63
	16QAM	RB Size=1, RB Offset=0	21.35	21.41	21.44
		RB Size=1, RB Offset=37	21.54	21.42	21.51
		RB Size=1, RB Offset=74	21.26	21.70	21.79
		RB Size=36, RB Offset=0	21.27	21.54	21.58
		RB Size=36, RB Offset=18	21.64	21.50	21.52
		RB Size=36, RB Offset=37	21.39	22.01	22.09
		RB Size=75, RB Offset=0	21.36	21.84	21.91
20.0	QPSK	RB Size=1, RB Offset=0	22.11	21.44	21.53
		RB Size=1, RB Offset=49	21.79	21.41	21.48
		RB Size=1, RB Offset=99	21.43	21.44	21.50
		RB Size=50, RB Offset=0	21.41	21.34	21.41
		RB Size=50, RB Offset=24	21.46	21.31	21.38
		RB Size=50, RB Offset=49	21.29	21.78	21.86
		RB Size=100, RB Offset=0	21.31	21.34	21.41
	16QAM	RB Size=1, RB Offset=0	21.75	21.81	21.89
		RB Size=1, RB Offset=49	21.70	21.73	21.74
		RB Size=1, RB Offset=99	21.69	21.79	21.82
		RB Size=50, RB Offset=0	21.66	21.69	21.70
		RB Size=50, RB Offset=24	21.70	21.75	21.75
		RB Size=50, RB Offset=49	20.83	20.89	20.96
		RB Size=100, RB Offset=0	20.95	20.92	20.94

EIRP:**QPSK:**

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 27
			Height (m)	Polar (H/V)	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		Limit (dBm)
Middle Channel									
5 MHz Bandwidth									
2535.00	82.38	112	1.1	H	13.4	1.65	8.60	20.35	33
2535.00	80.96	256	2.0	V	12.0	1.65	8.60	18.95	33
10 MHz Bandwidth									
2535.00	82.33	53	1.5	H	13.3	1.65	8.60	20.25	33
2535.00	81.32	247	1.0	V	12.3	1.65	8.60	19.25	33
15 MHz Bandwidth									
2535.00	82.37	61	2.4	H	13.4	1.65	8.60	20.35	33
2535.00	81.13	204	1.5	V	12.1	1.65	8.60	19.05	33
20 MHz Bandwidth									
2535.00	82.16	60	1.2	H	13.2	1.65	8.60	20.15	33
2535.00	81.48	255	2.3	V	12.5	1.65	8.60	19.45	33

16QAM:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 27
			Height (m)	Polar (H/V)	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		Limit (dBm)
Middle Channel									
5 MHz Bandwidth									
2535.00	82.11	85	1.9	H	13.1	1.65	8.60	20.05	33
2535.00	81.62	288	1.4	V	12.6	1.65	8.60	19.55	33
10 MHz Bandwidth									
2535.00	82.23	305	1.4	H	13.2	1.65	8.60	20.15	33
2535.00	81.51	230	2.2	V	12.5	1.65	8.60	19.45	33
15 MHz Bandwidth									
2535.00	82.32	287	2.1	H	13.3	1.65	8.60	20.25	33
2535.00	81.63	37	1.9	V	12.6	1.65	8.60	19.55	33
20 MHz Bandwidth									
2535.00	82.52	321	1.3	H	13.5	1.65	8.60	20.45	33
2535.00	81.74	222	2.5	V	12.7	1.65	8.60	19.65	33

Note:

All above data were tested with no amplifier.

Absolute Level = SG Level - Cable loss + Antenna Gain

Margin = Limit- Absolute Level

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
16QAM (1RB Size)	5.38	≅ 13	Pass
16QAM (50RB Size)	7.19	≅ 13	Pass

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

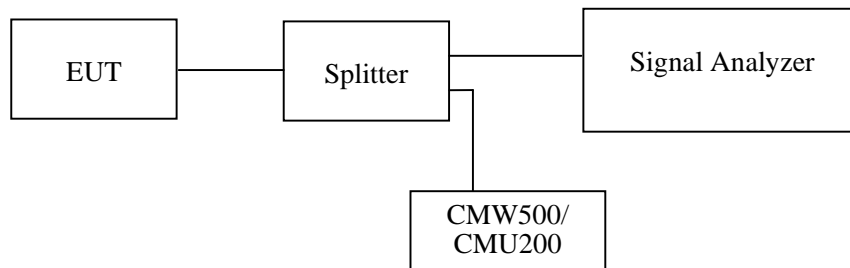
Applicable Standards

FCC 47 §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 resolution bandwidth of the spectrum analyzer was set at 5 kHz (Cellular /PCS) & 100 kHz (WCDMA) and the 26 dB & 99% bandwidth was recorded.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2014-12-11	2015-12-11
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03-101746-zn	2015-06-13	2016-06-13
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	106891	2015-11-23	2016-11-23
R&S	Wideband Radio Communication tester	CMW500	1201.002K50-146520-wh	2015-11-23	2016-11-23

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

Test Data

Environmental Conditions

Temperature:	24~25 °C
Relative Humidity:	48~50 %
ATM Pressure:	100.0~101.0 kPa

The testing was performed by William Li from 2015-12-07 to 2015-12-09.

EUT operation mode: Transmitting

Test Result: Compliance. Please refer to the following tables and plots.

Cellular Band (Part 22H)

Mode	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	836.6	246.5	312.6
EGPRS(8PSK)	836.6	248.5	306.6

Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
WCDMA (BPSK)	836.6	4.208	4.910
HSUPA (BPSK)	836.6	4.228	4.910
HSDPA (16QAM)	836.6	4.228	4.910

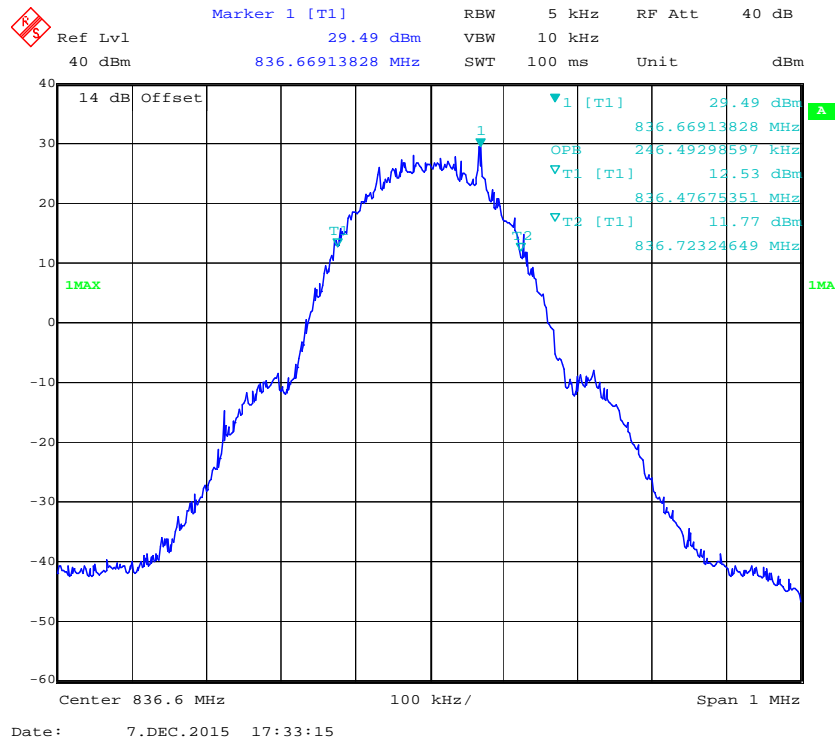
PCS Band (Part 24E)

Mode	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	1880.0	244.5	312.6
EGPRS(8PSK)	1880.0	246.5	314.6

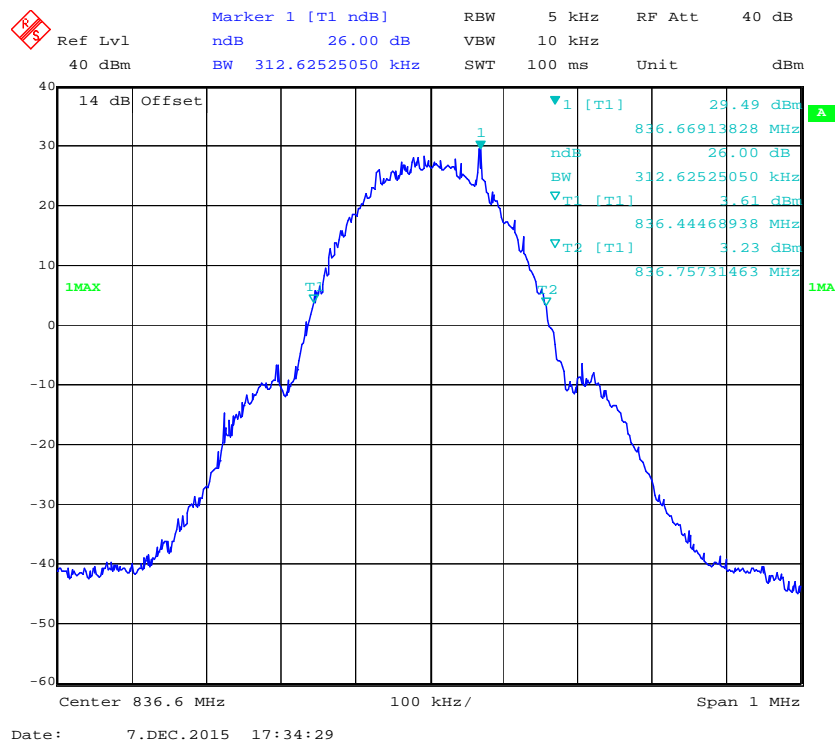
Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
WCDMA (BPSK)	1880.0	4.208	4.910
HSUPA (BPSK)	1880.0	4.208	4.910
HSDPA (16QAM)	1880.0	4.228	4.910

Cellular Band (Part 22H)

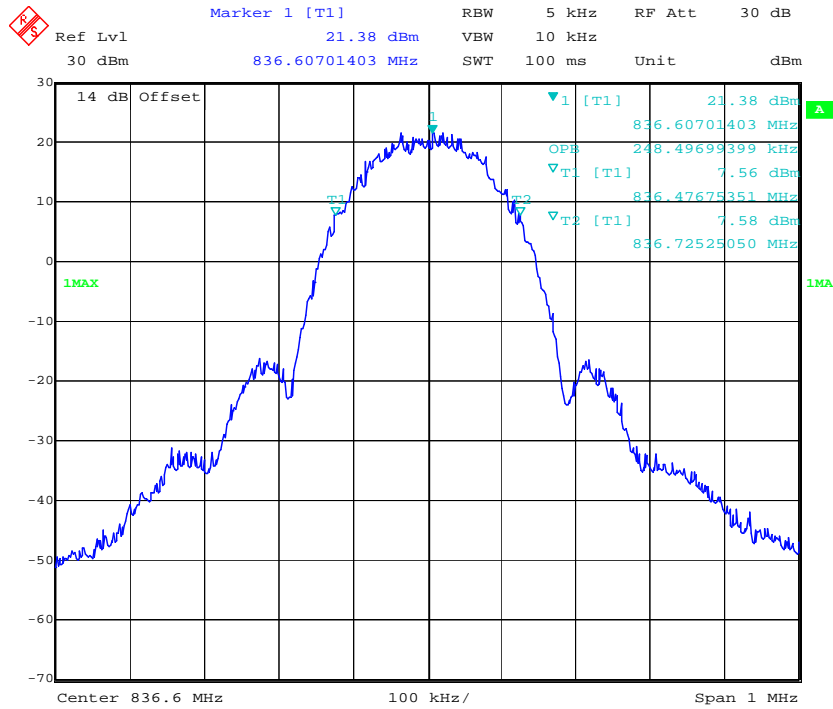
99% Occupied Bandwidth for GSM (GMSK) Mode



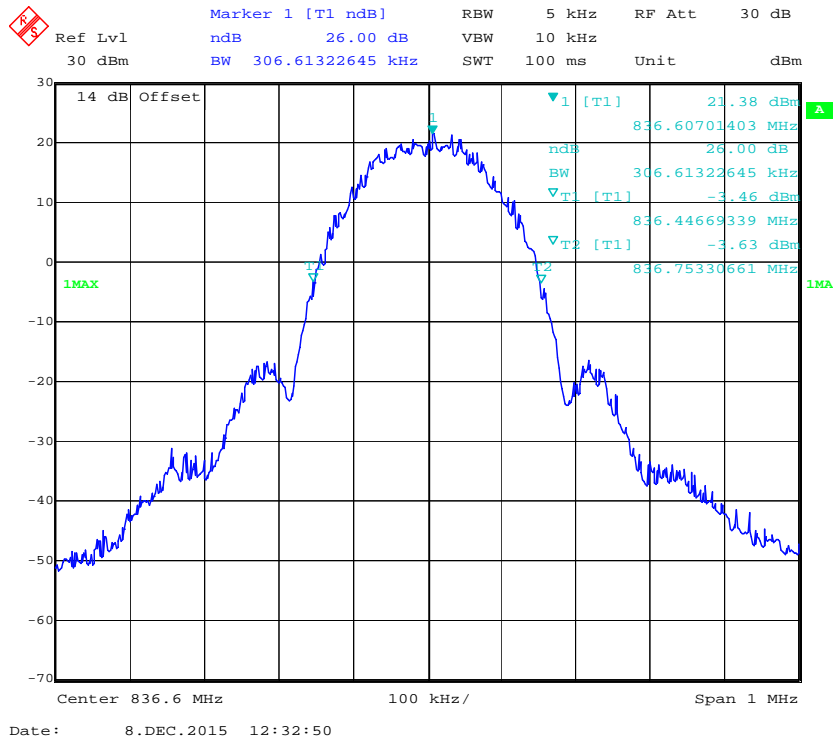
26 dB Emissions Bandwidth for GSM (GMSK) Mode



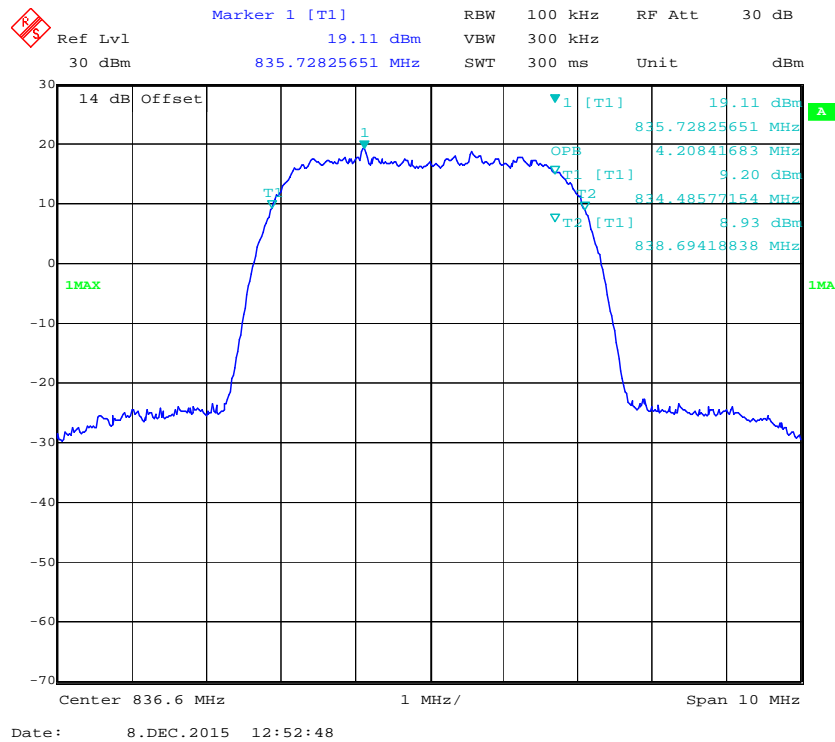
99% Occupied Bandwidth for EDGE Mode



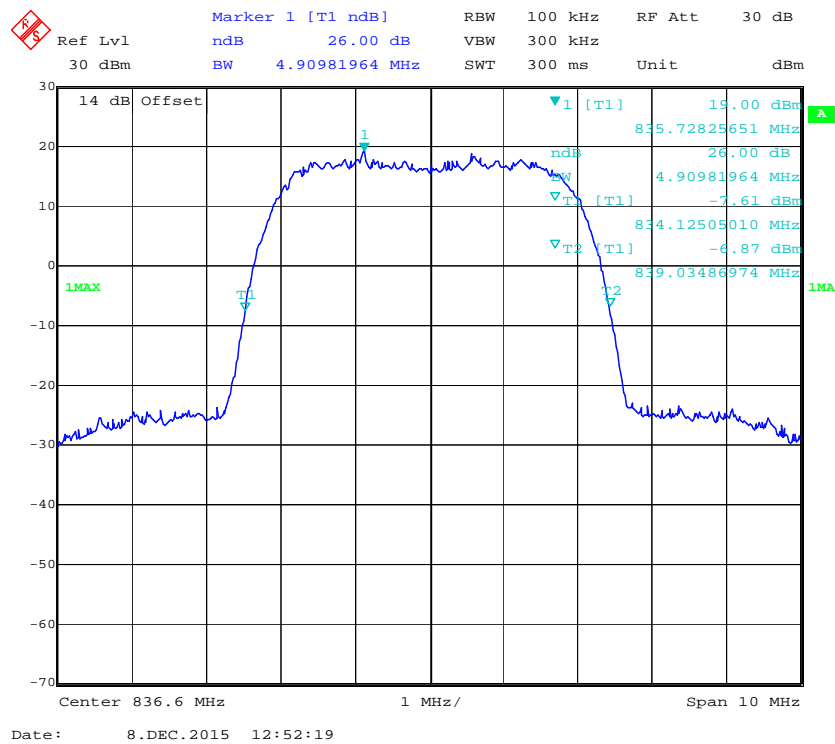
26 dB Emissions Bandwidth for EDGE Mode

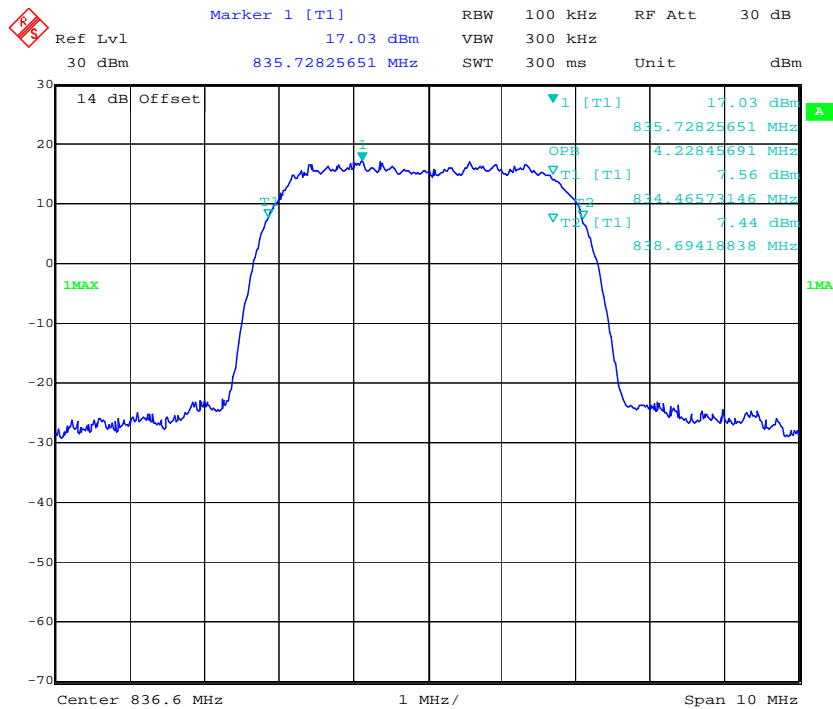
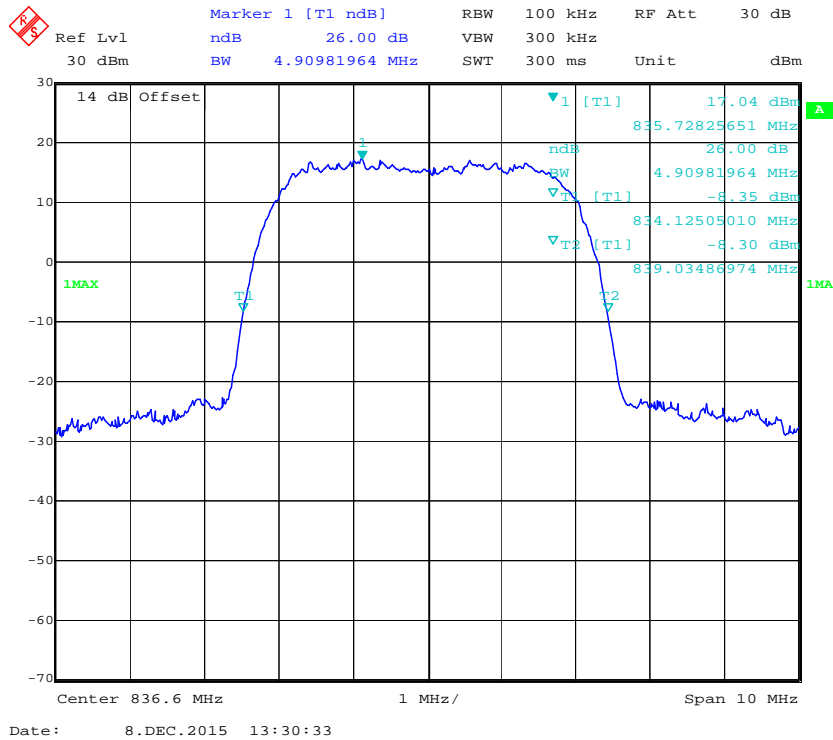


99% Occupied Bandwidth for WCDMA (BPSK) Mode

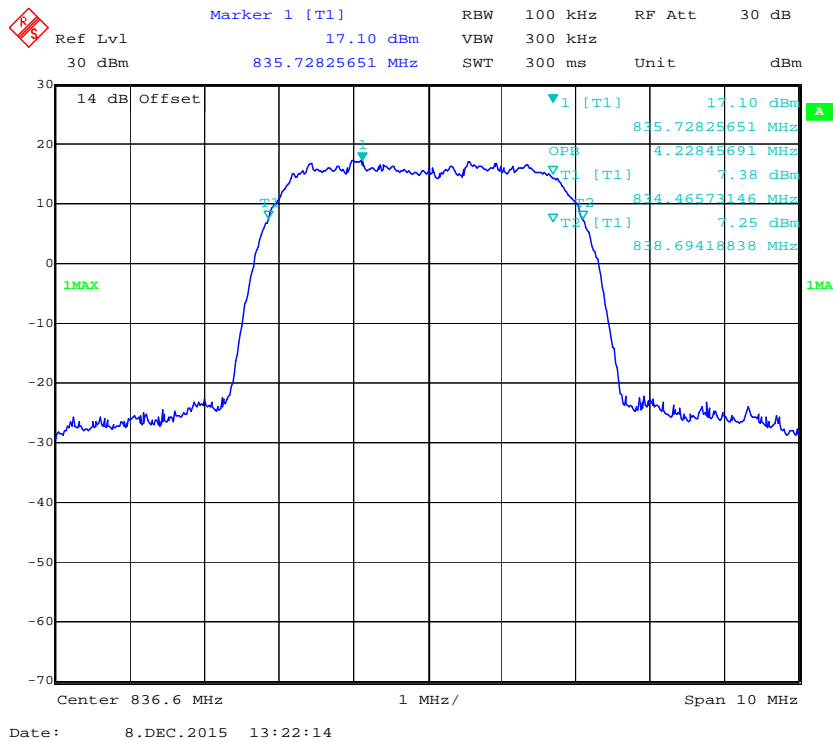


26 dB Emissions Bandwidth for WCDMA (BPSK) Mode

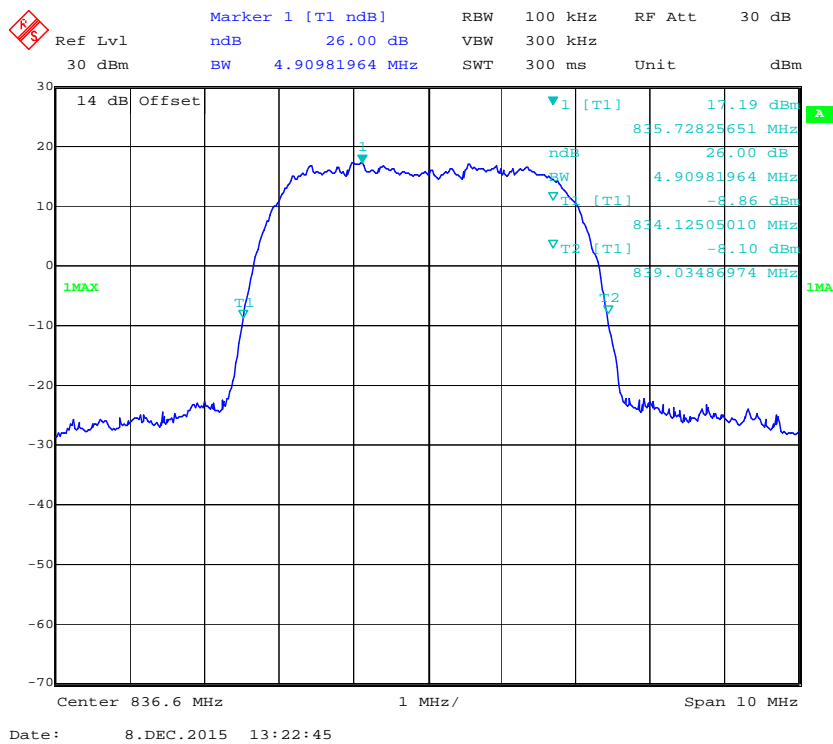


99% Occupied Bandwidth for HSUPA (BPSK) Mode**26 dB Emissions Bandwidth for HSUPA (BPSK) Mode**

99% Occupied Bandwidth for HSDPA (16QAM) Mode

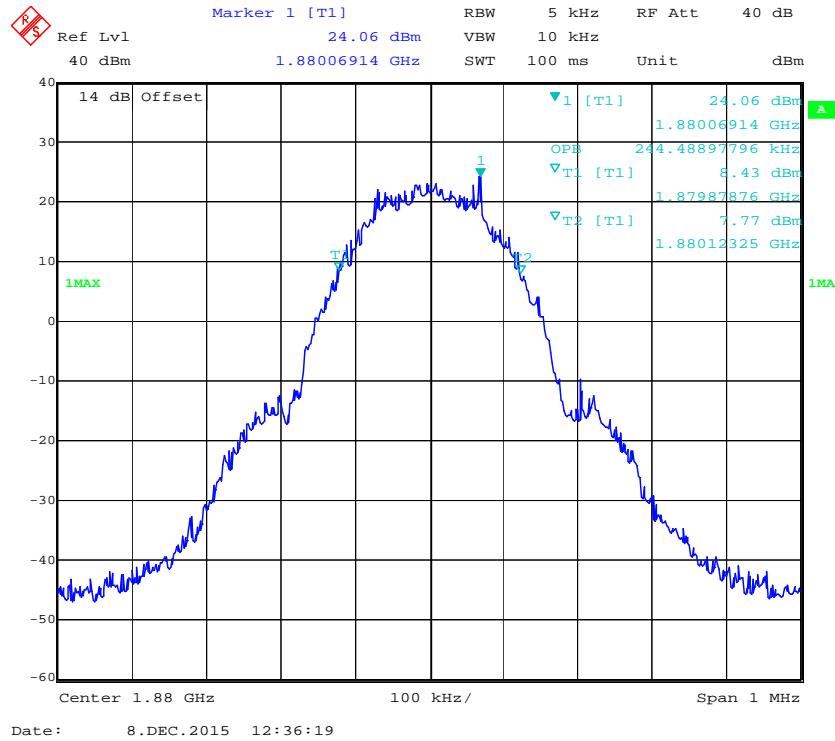


26 dB Emissions Bandwidth for HSDPA (16QAM) Mode

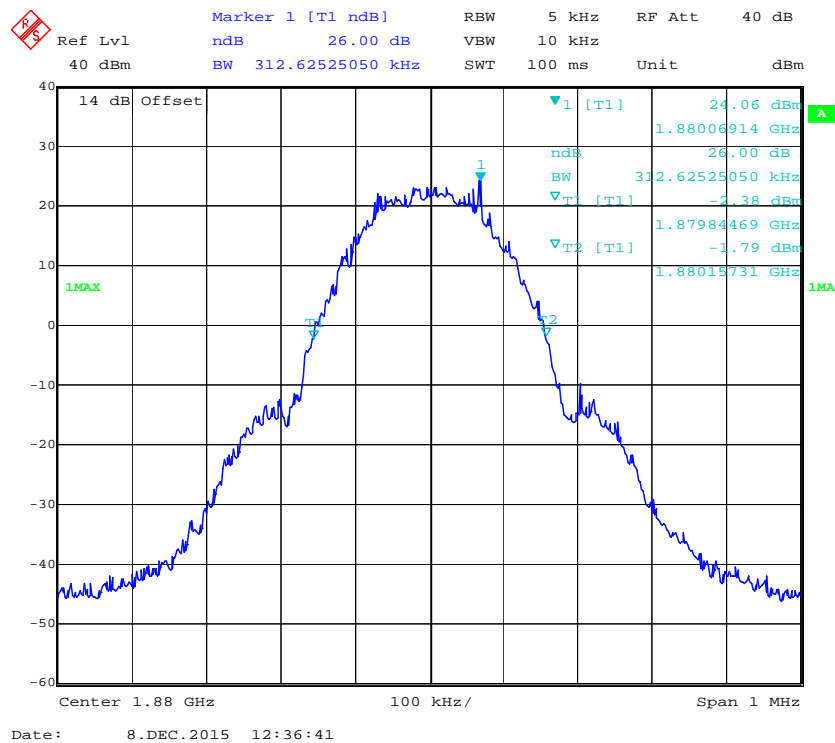


PCS Band (Part 24E)

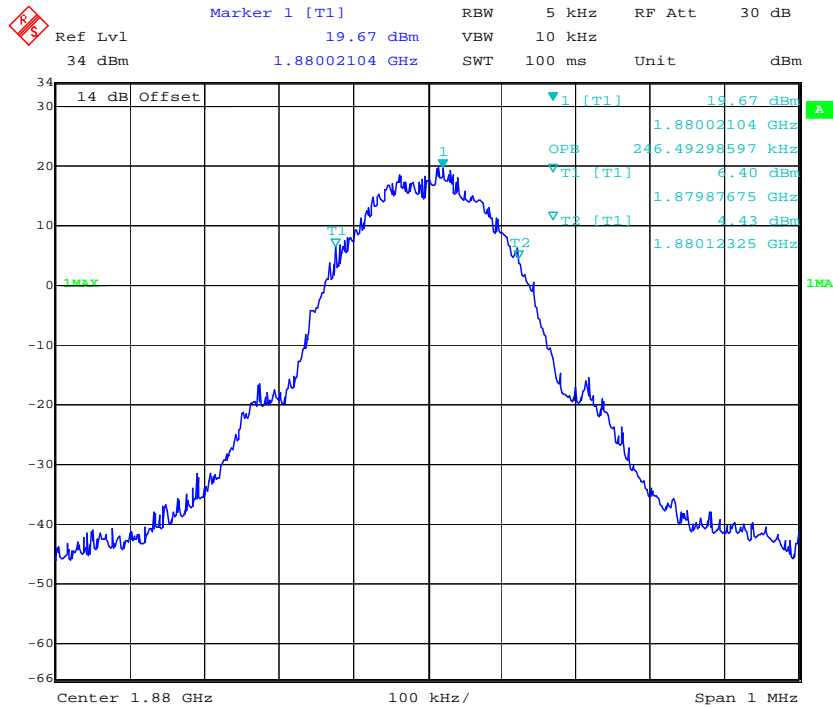
99% Occupied Bandwidth for GSM (GMSK) Mode



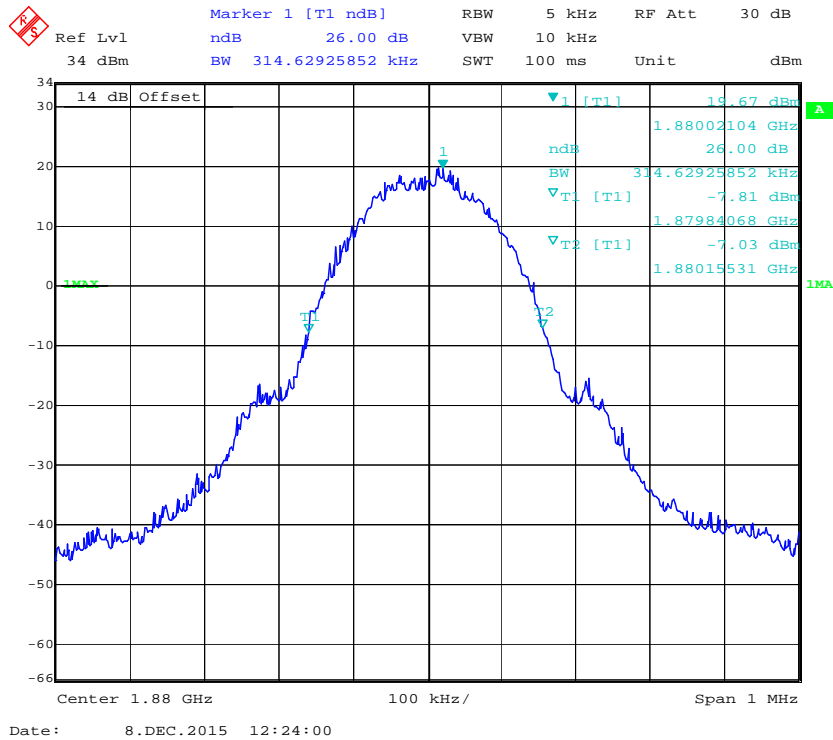
26 dB Emissions Bandwidth for GSM (GMSK) Mode

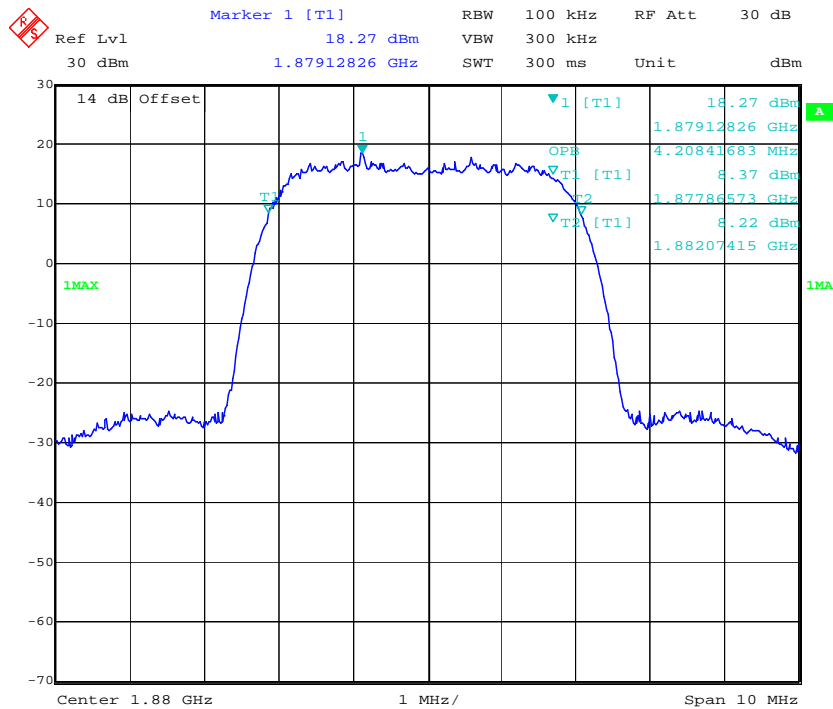
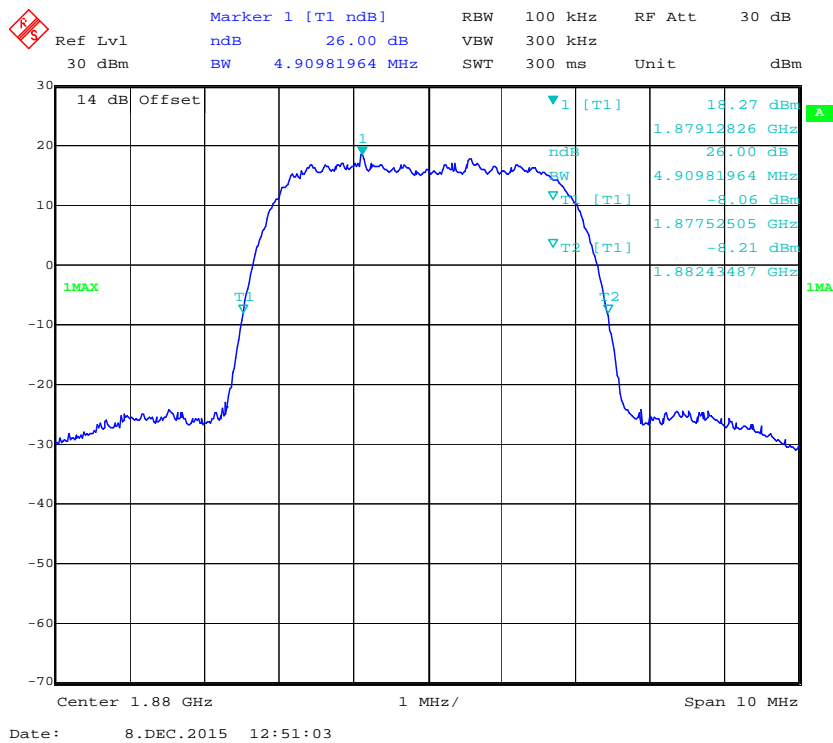


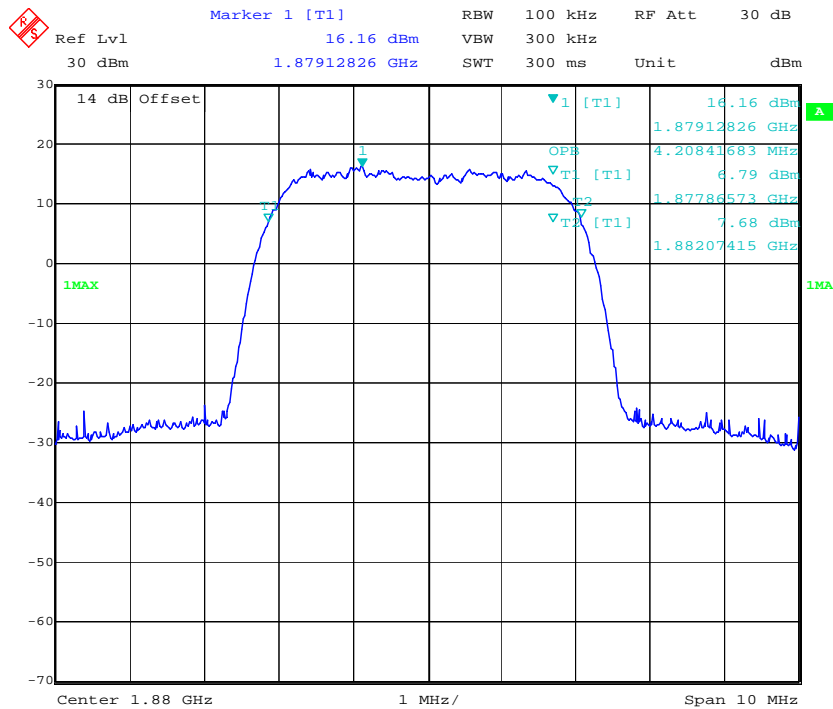
99% Occupied Bandwidth for EDGE Mode



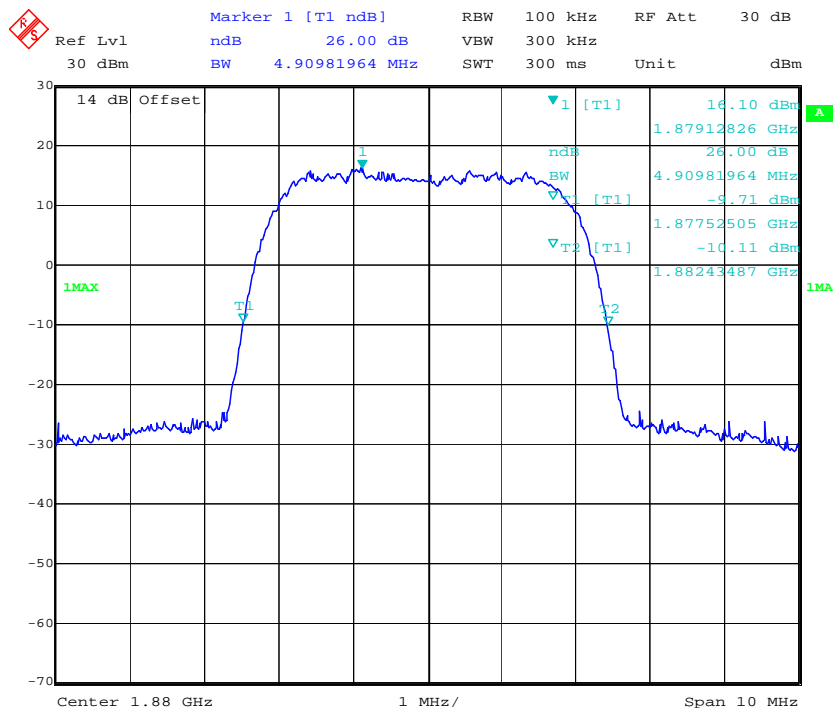
26 dB Emissions Bandwidth for EDGE Mode



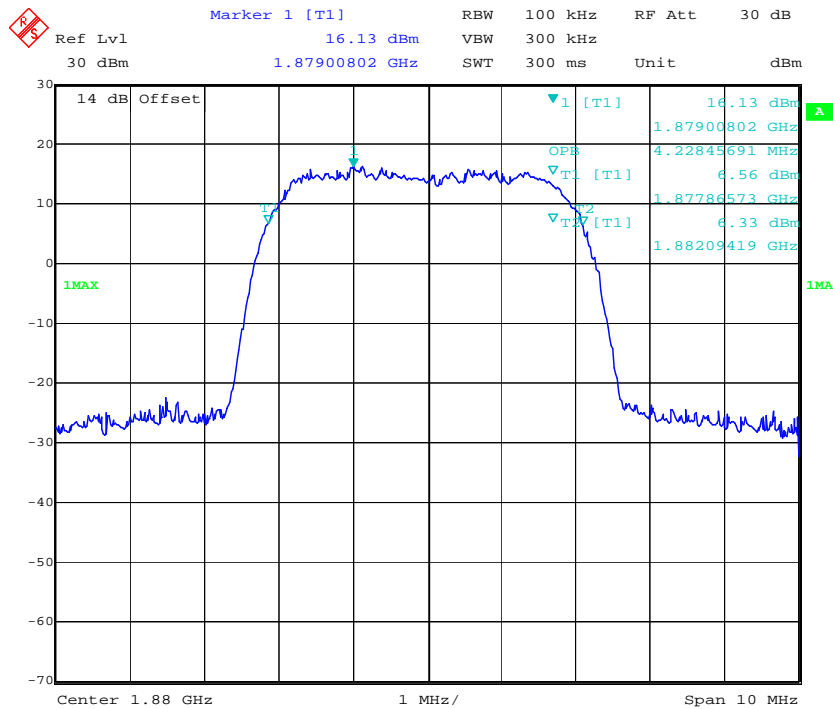
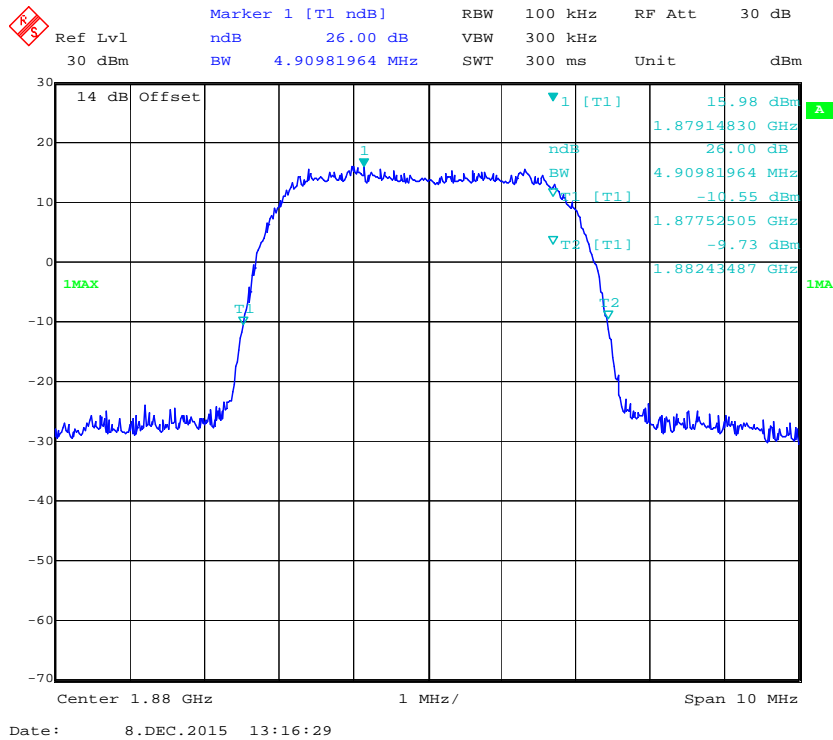
99% Occupied Bandwidth for WCDMA (BPSK) Mode**26 dB Emissions Bandwidth for WCDMA (BPSK) Mode**

99% Occupied Bandwidth for HSUPA (BPSK) Mode

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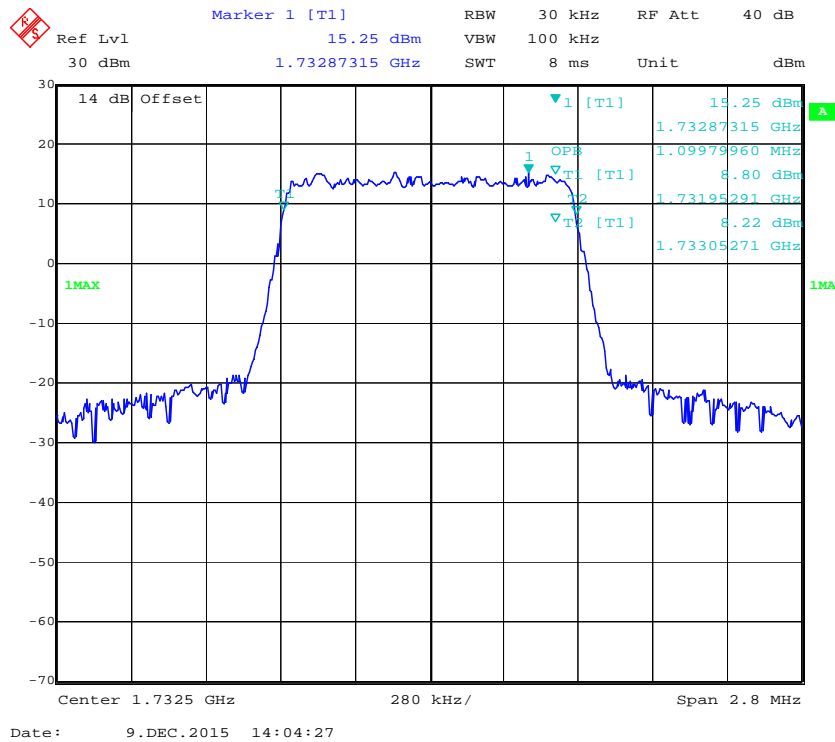
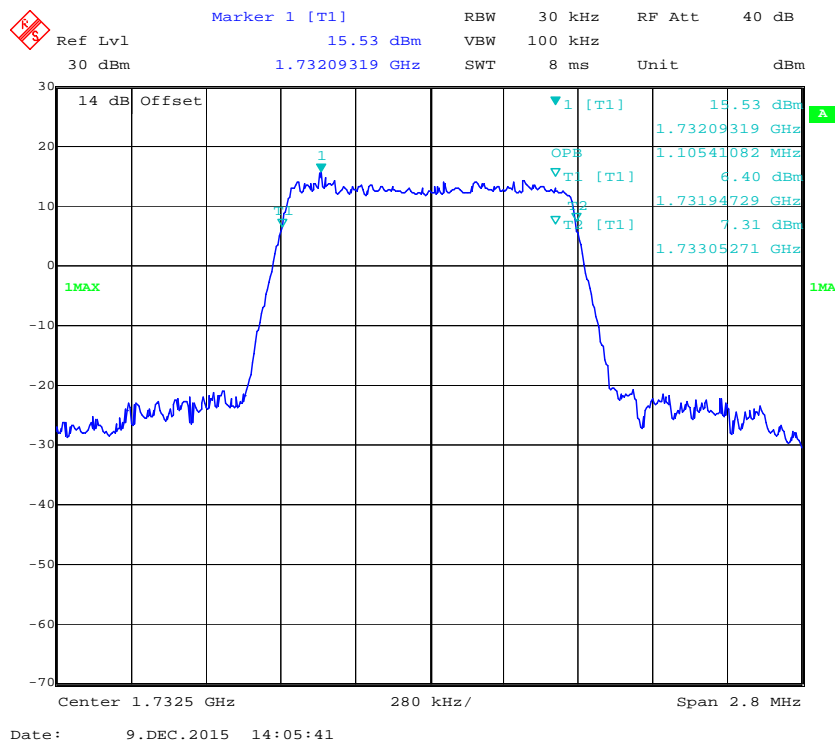
26 dB Emissions Bandwidth for HSUPA (BPSK) Mode

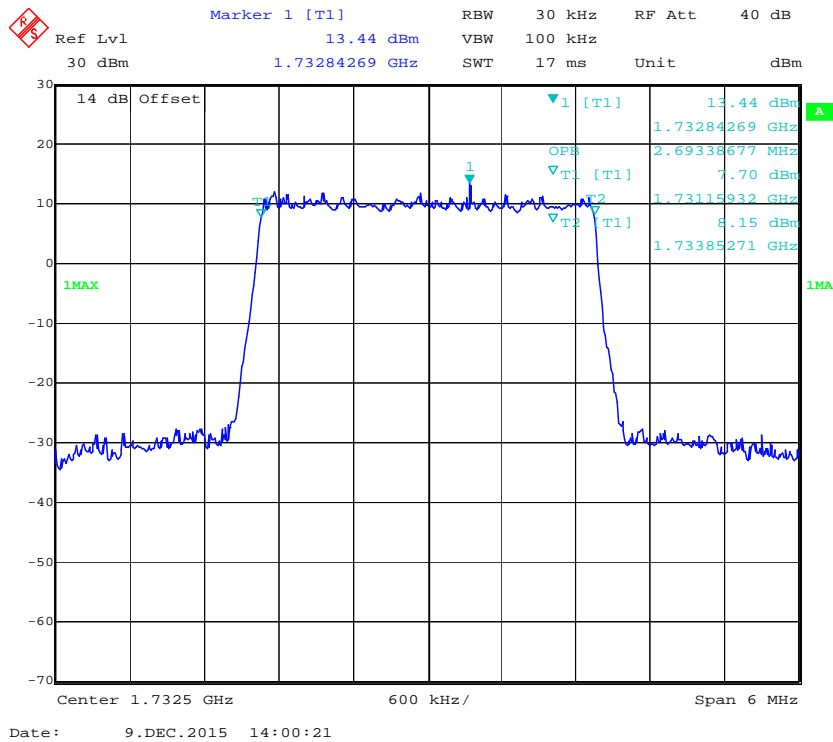
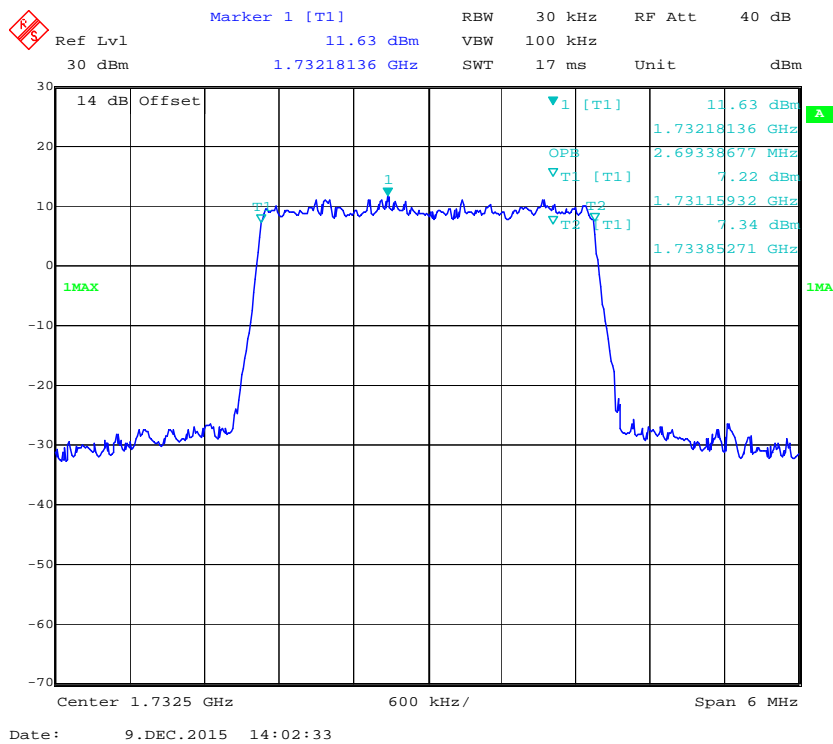
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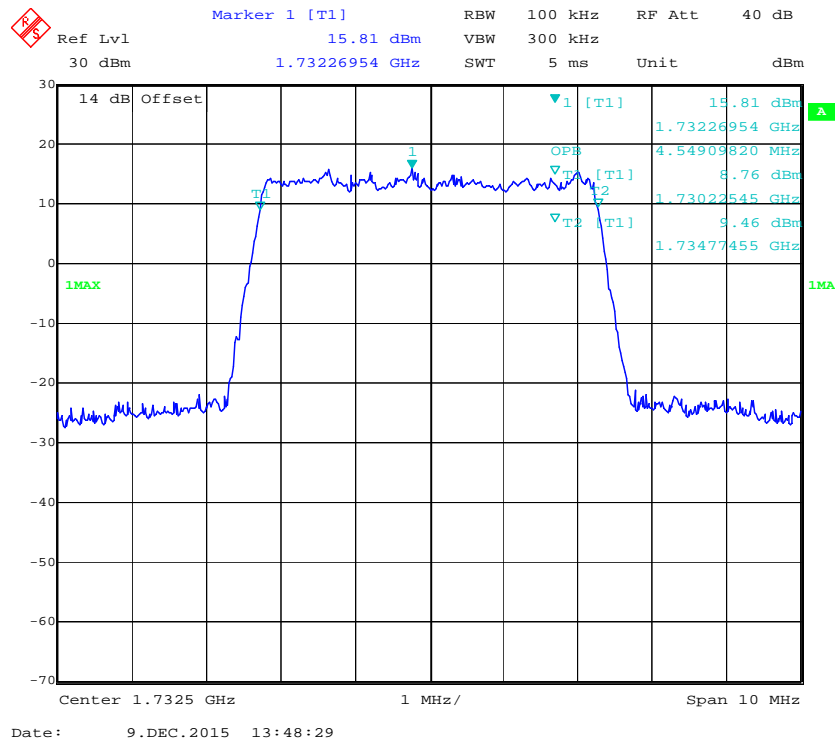
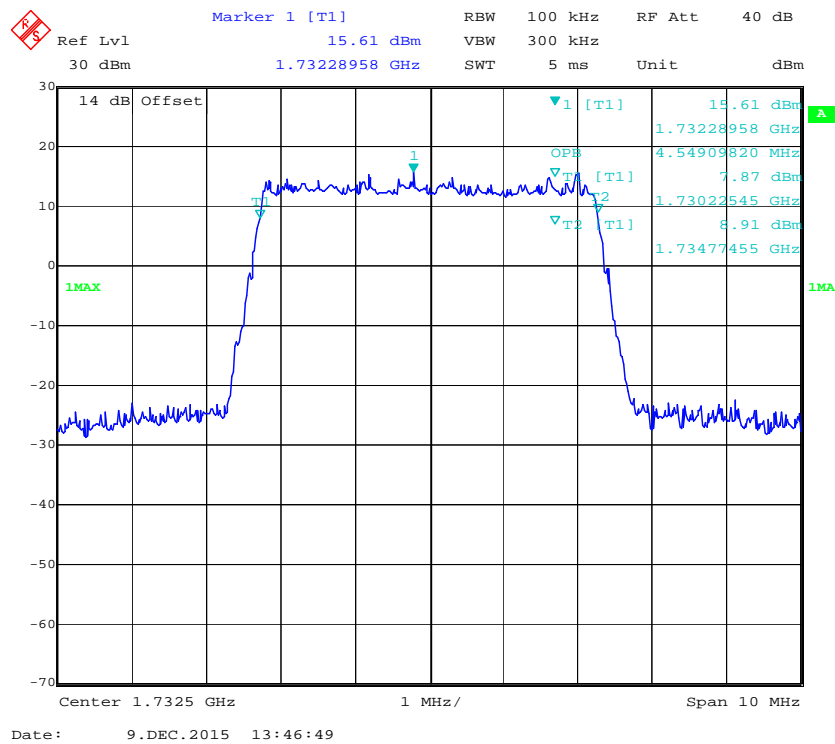
99% Occupied Bandwidth for HSDPA (16QAM) Mode**26 dB Emissions Bandwidth for HSDPA (16QAM) Mode**

LTE Band 4: (Middle Channel)

Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.100	1.279
	16QAM	1.105	1.274
3.0	QPSK	2.693	2.922
	16QAM	2.693	2.946
5.0	QPSK	4.549	5.050
	16QAM	4.549	5.030
10.0	QPSK	8.978	9.900
	16QAM	8.978	9.739
15.0	QPSK	13.587	15.150
	16QAM	13.587	15.030
20.0	QPSK	18.036	19.559
	16QAM	18.036	19.559

QPSK (1.4 MHz) - 99% Occupied Bandwidth, Middle channel**16-QAM (1.4 MHz) - 99% Occupied Bandwidth, Middle channel**

QPSK (3.0 MHz) - 99% Occupied Bandwidth, Middle channel**16-QAM (3.0 MHz) - 99% Occupied Bandwidth, Middle channel**

QPSK (5.0 MHz) - 99% Occupied Bandwidth, Middle channel**16-QAM (5.0 MHz) - 99% Occupied Bandwidth, Middle channel**

Marker 1 [T1] 12.22 dBm

Ref Lvl 30 dBm

1.72843186 GHz

RBW 100 kHz

VBW 300 kHz

RF Att 40 dB

SWT 5 ms

Unit dBm

14 dB Offset

1MAX

Center 1.7325 GHz

2 MHz/

Span 20 MHz

OPB

T1 [T1] 8.60 dBm

T2 [T1] 8.88 dBm

1.72843186 GHz

8.97795591 MHz

1.72803106 GHz

1.73700902 GHz

12.22 dBm

Ref Lvl 30 dBm Marker 1 [T1] 11.26 dBm RBW 100 kHz VBW 300 kHz RF Att 40 dB Unit dBm

14 dB Offset

1MAX

1 [T1] 11.26 dBm

1.72983467 GHz

8.97795591 MHz

7.07 dBm

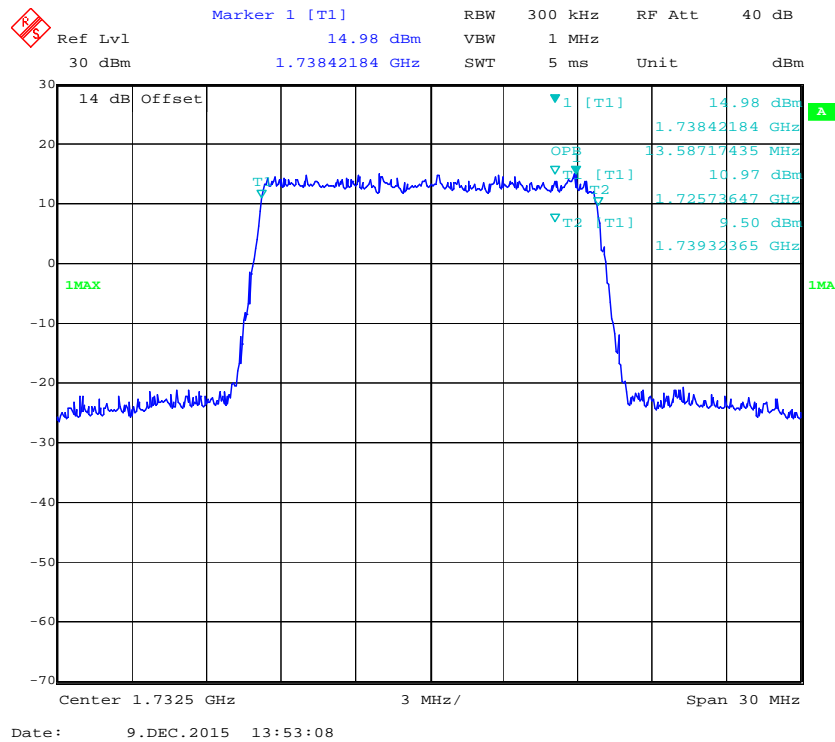
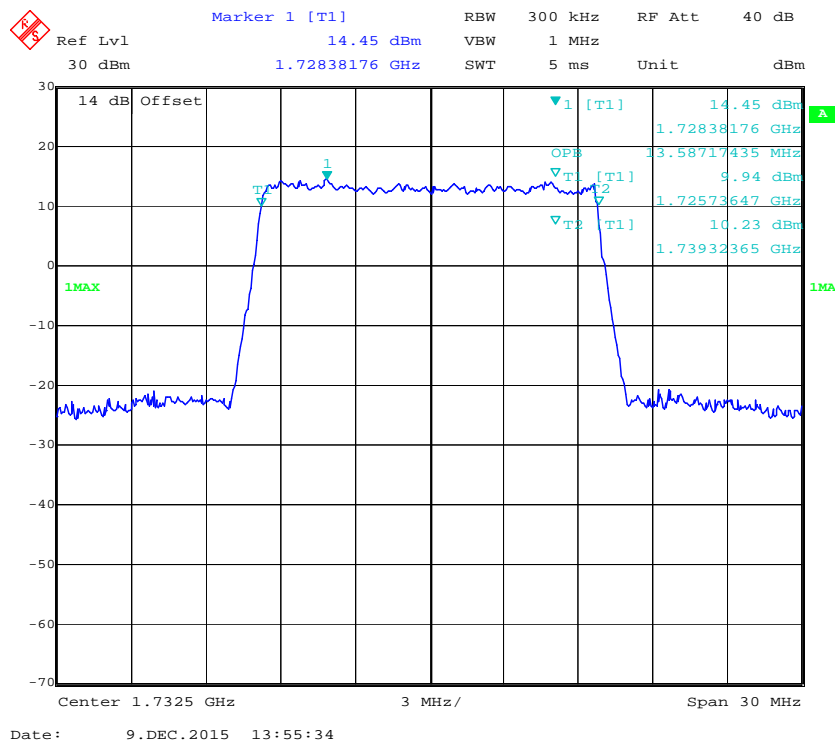
1.72803106 GHz

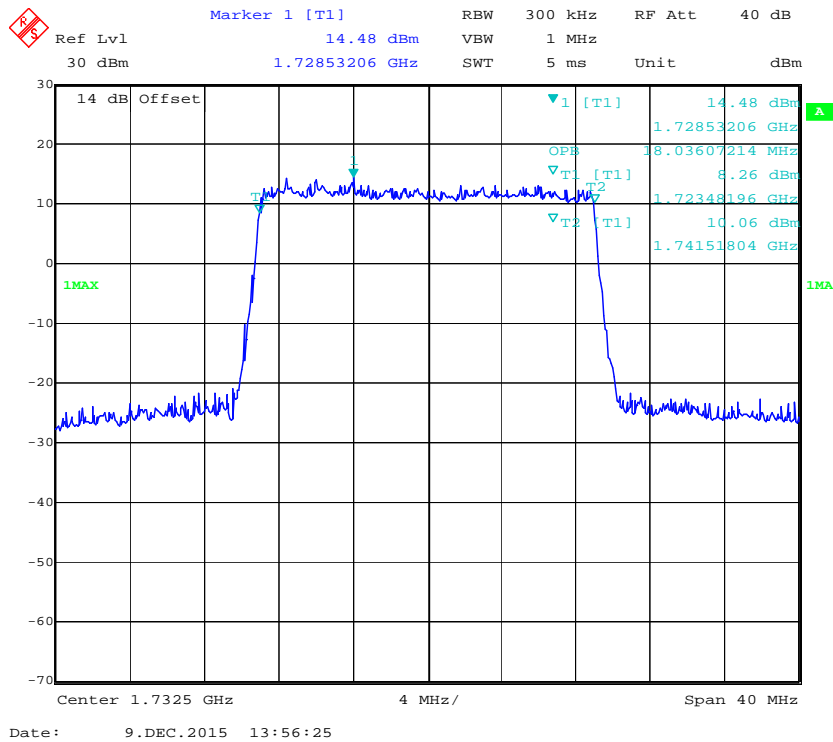
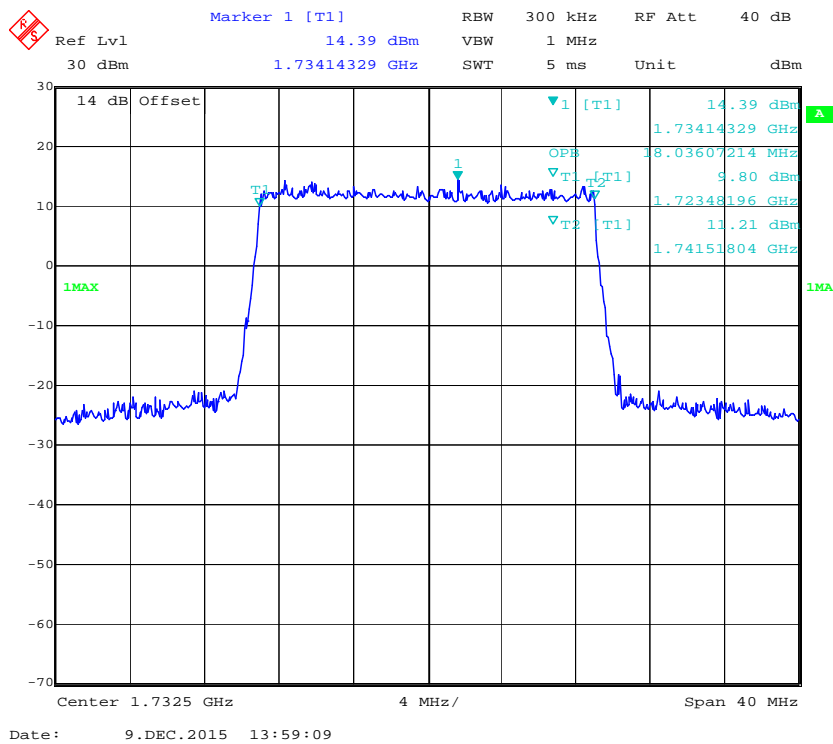
7.97 dBm

1.73700902 GHz

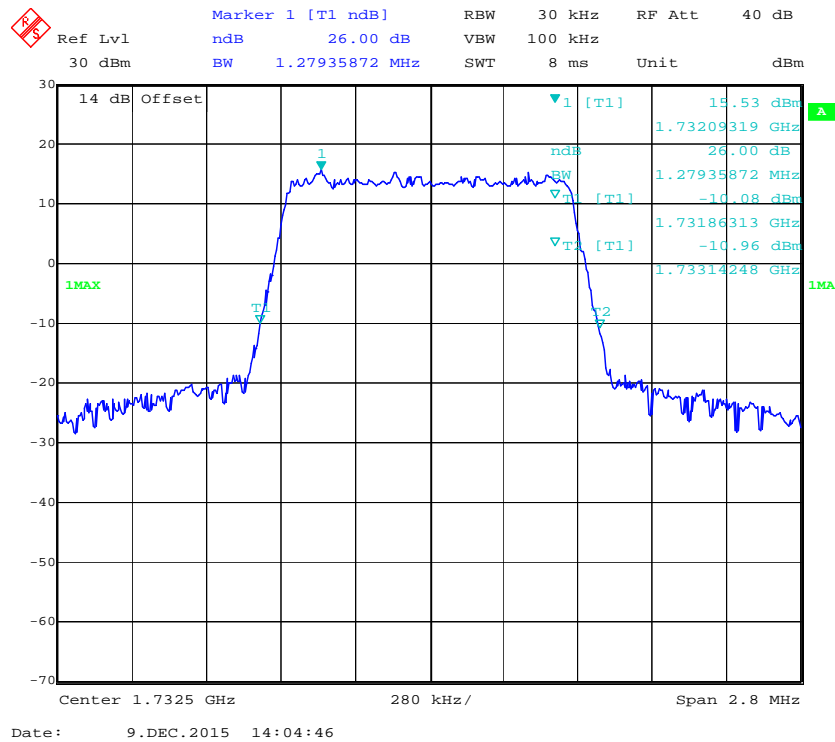
Center 1.7325 GHz 2 MHz/ Span 20 MHz

Date: 9.DEC.2015 13:49:41

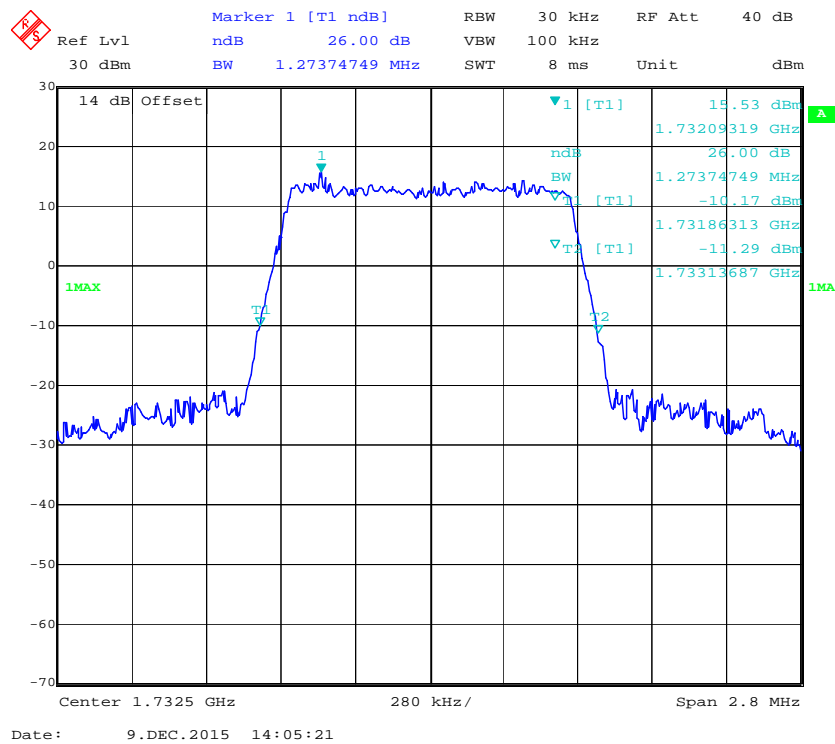
QPSK (15.0 MHz) - 99% Occupied Bandwidth, Middle channel**16-QAM (15.0 MHz) - 99% Occupied Bandwidth, Middle channel**

QPSK (20.0 MHz) - 99% Occupied Bandwidth, Middle channel**16-QAM (20.0 MHz) - 99% Occupied Bandwidth, Middle channel**

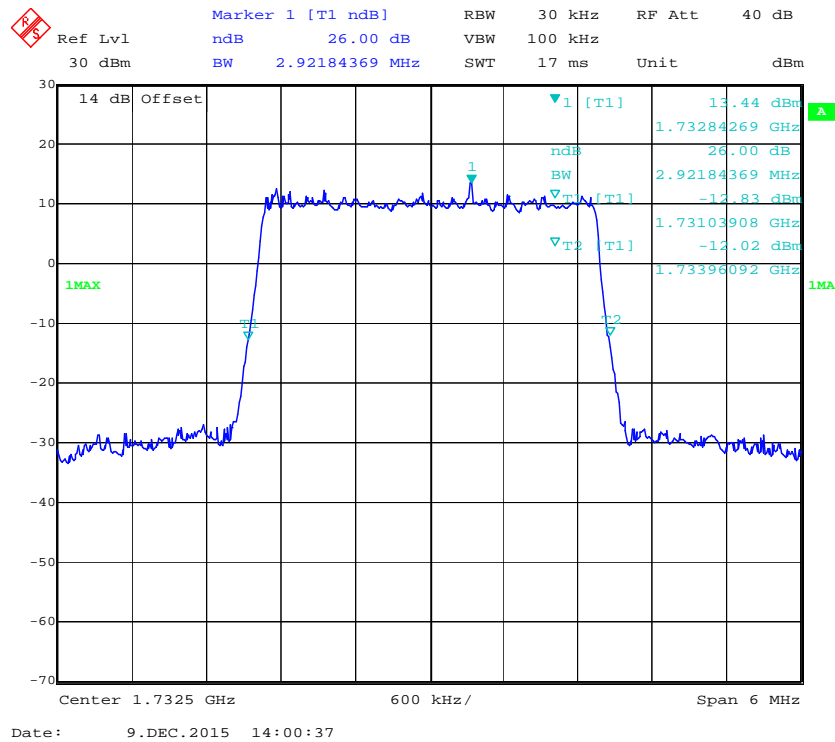
QPSK (1.4 MHz) - 26 dB Bandwidth, Middle channel



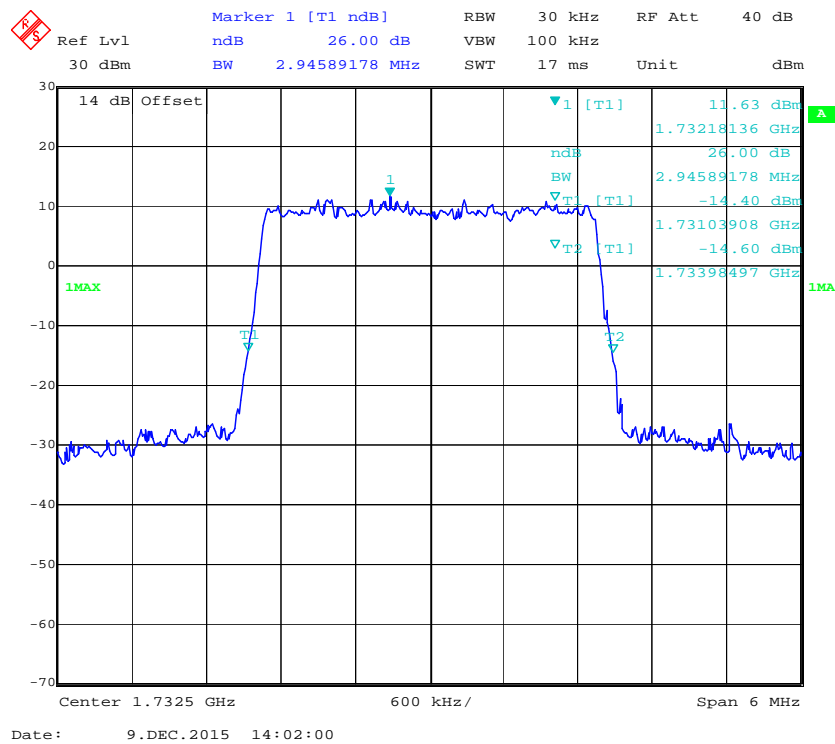
16-QAM (1.4 MHz) - 26 dB Bandwidth, Middle channel

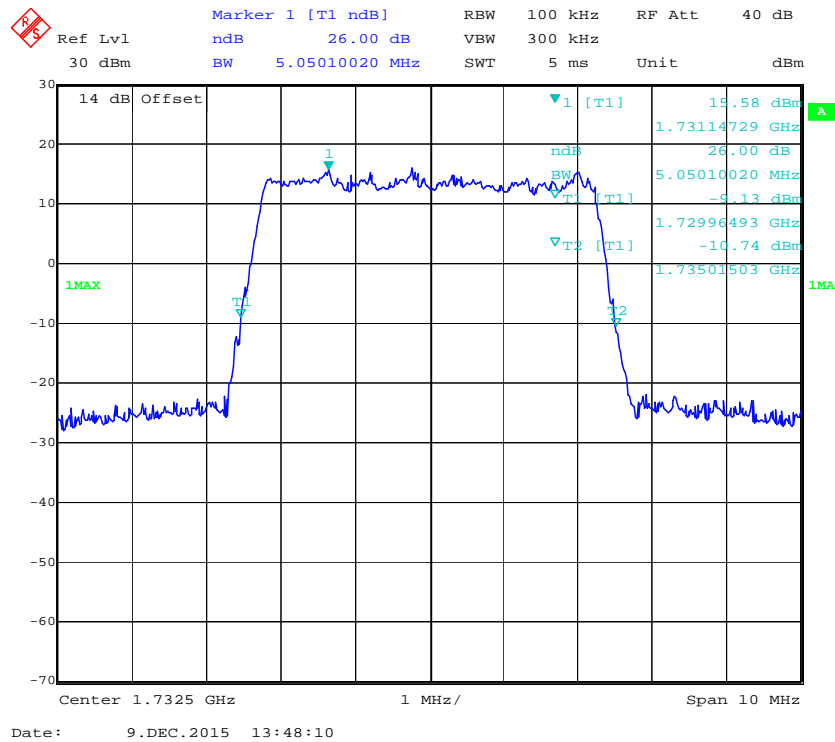
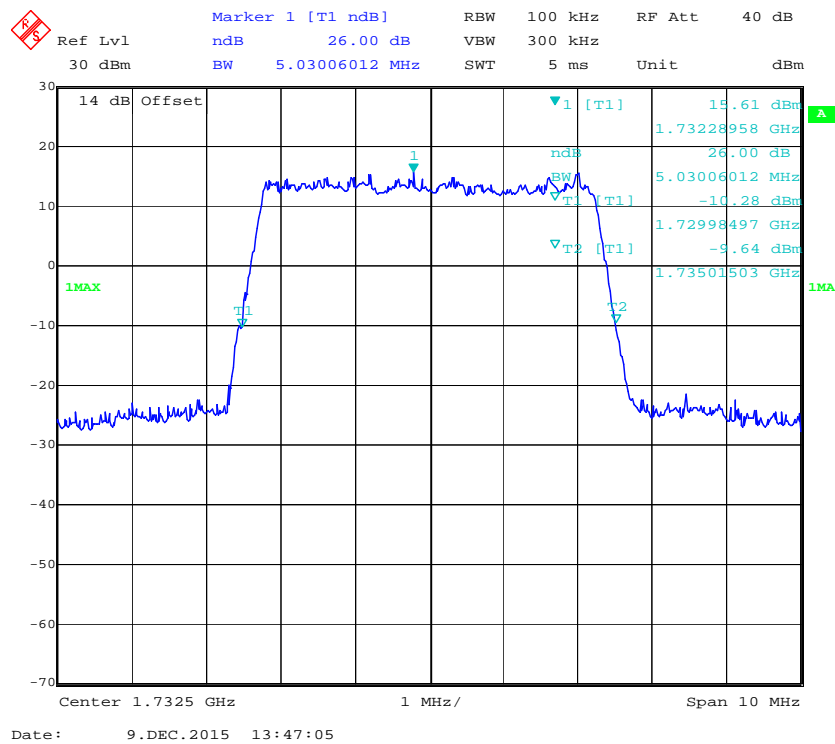


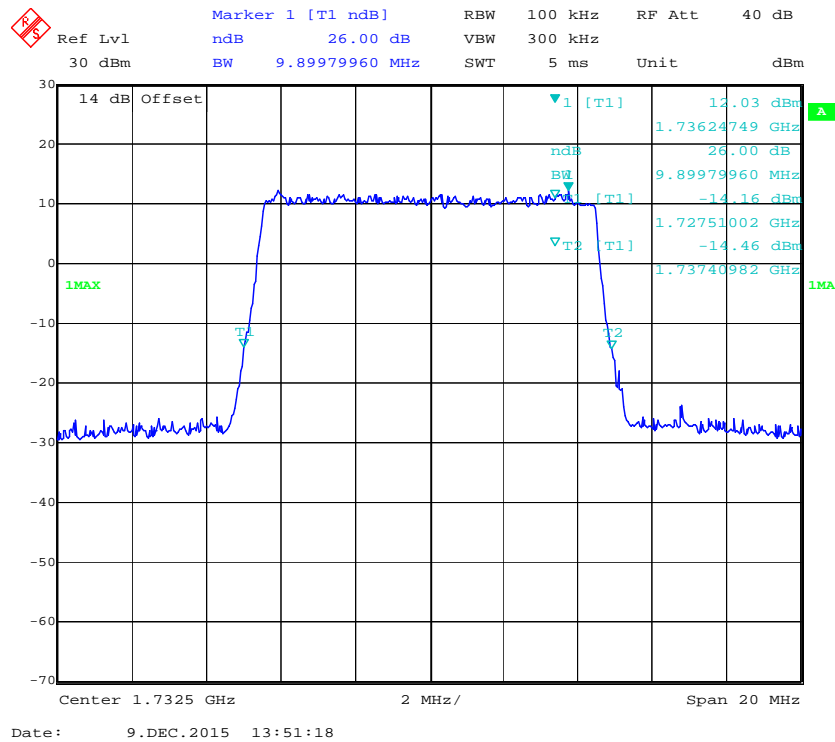
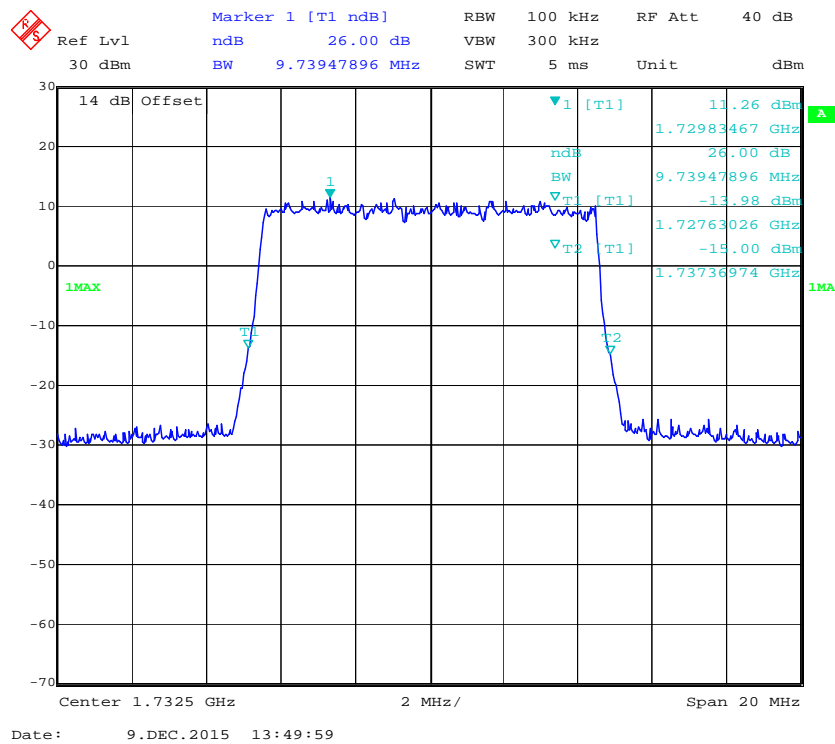
QPSK (3.0 MHz) - 26 dB Bandwidth, Middle channel

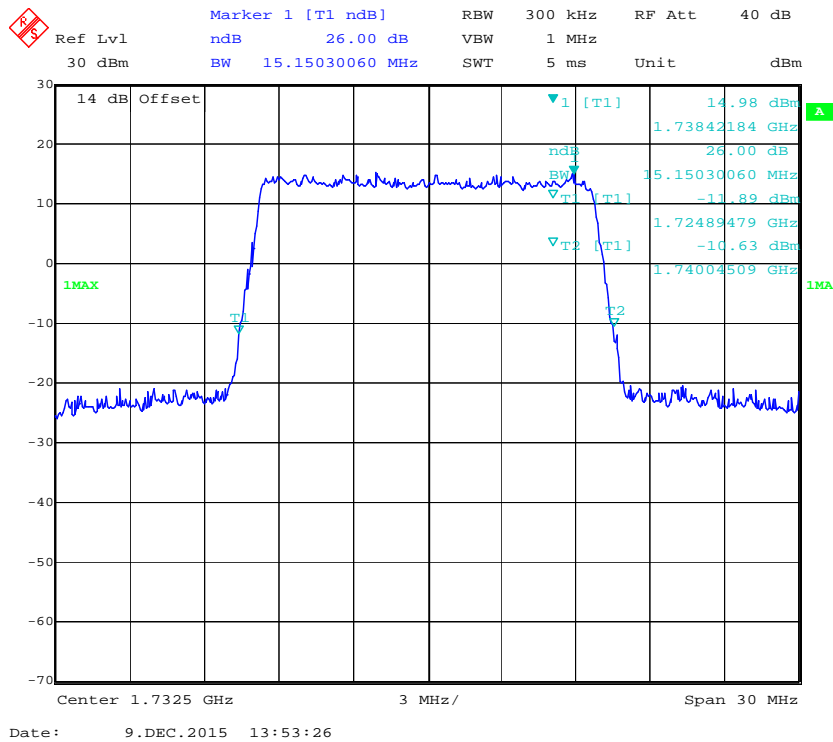
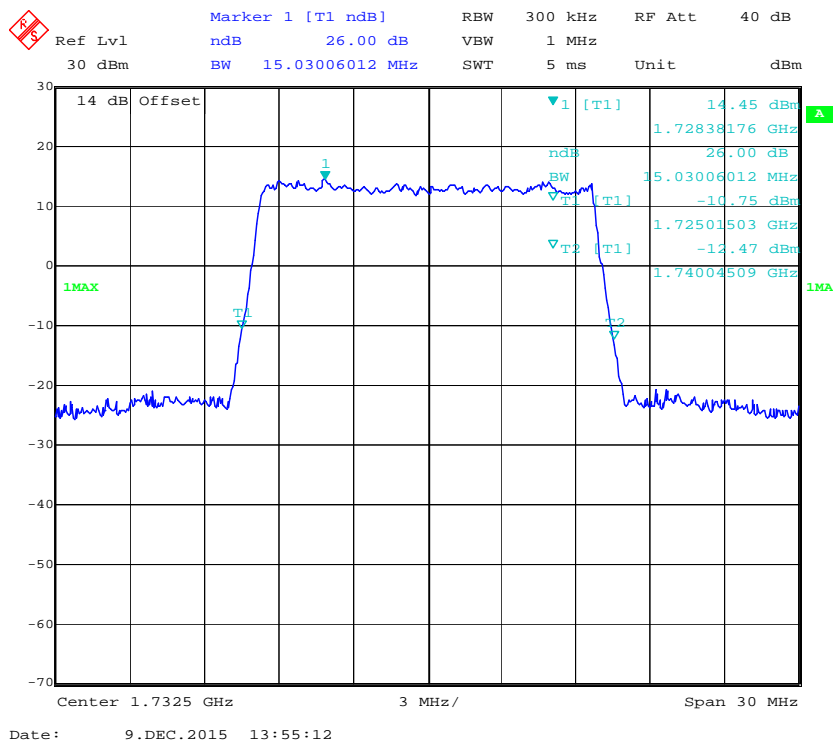


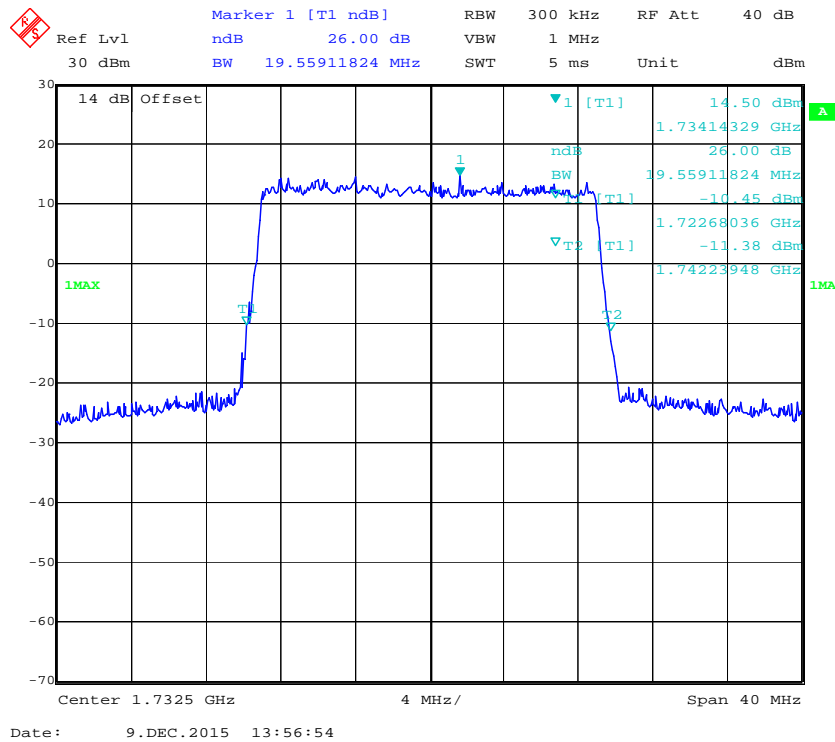
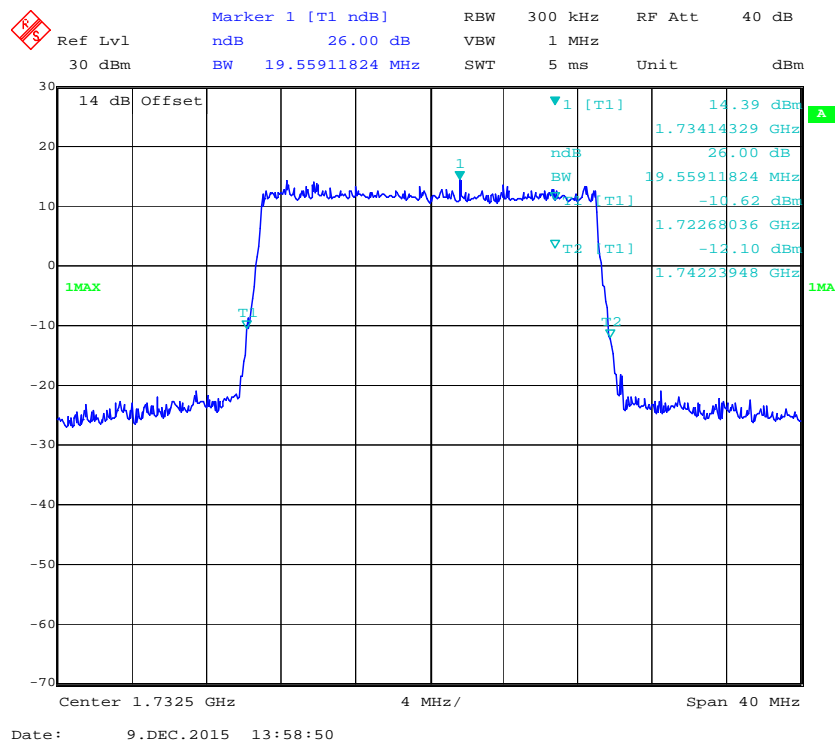
16-QAM (3.0 MHz) - 26 dB Bandwidth, Middle channel



QPSK (5.0 MHz) - 26 dB Bandwidth, Middle channel**16-QAM (5.0 MHz) - 26 dB Bandwidth, Middle channel**

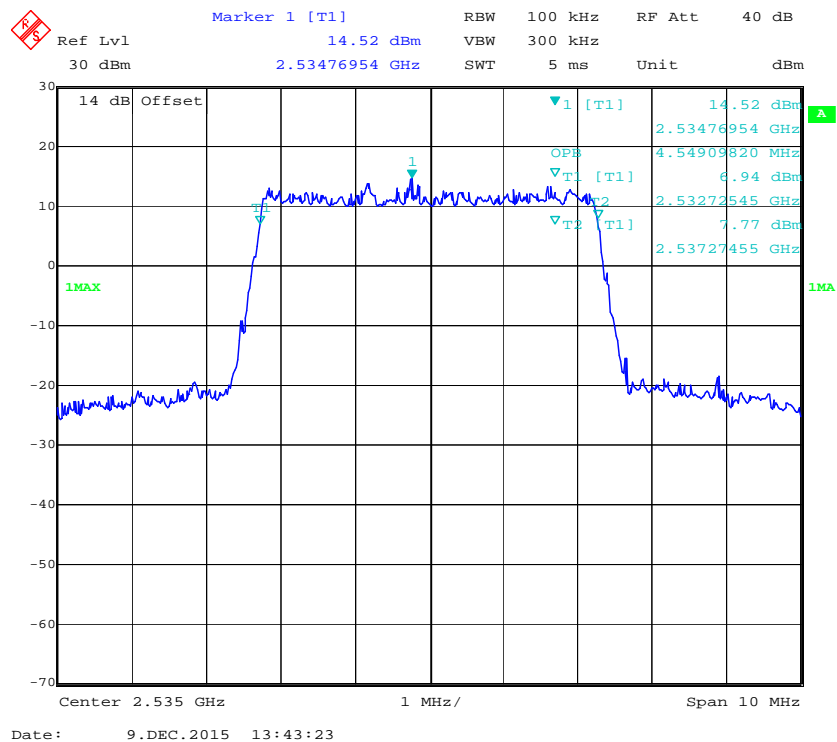
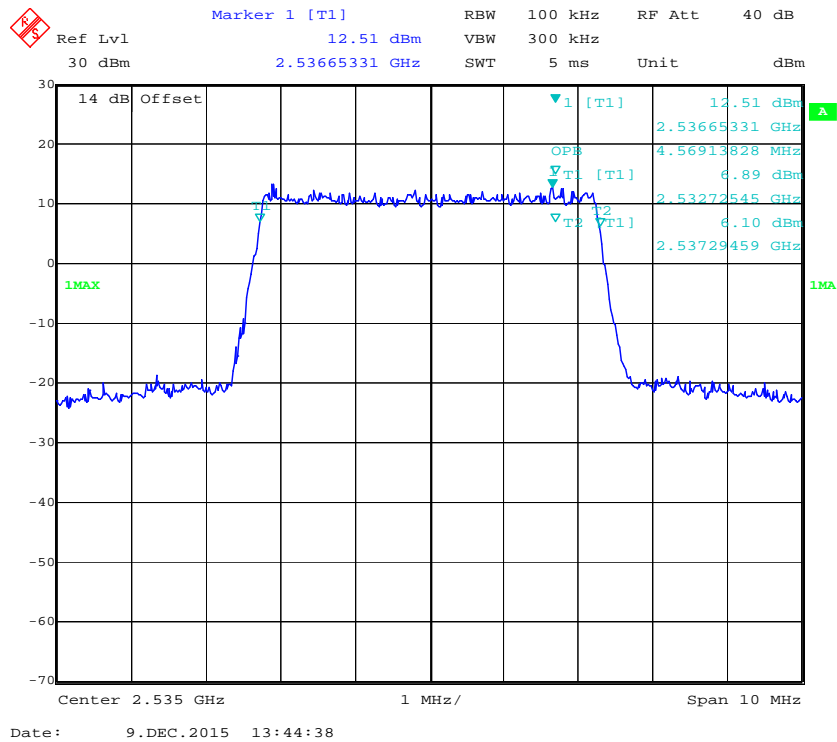
QPSK (10.0 MHz) - 26 dB Bandwidth, Middle channel**16-QAM (10.0 MHz) - 26 dB Bandwidth, Middle channel**

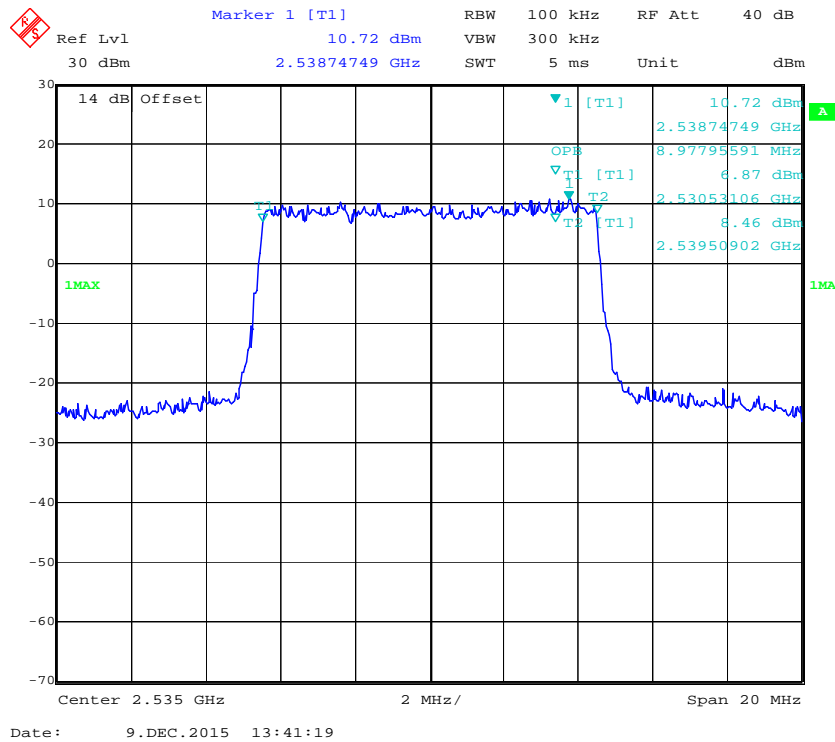
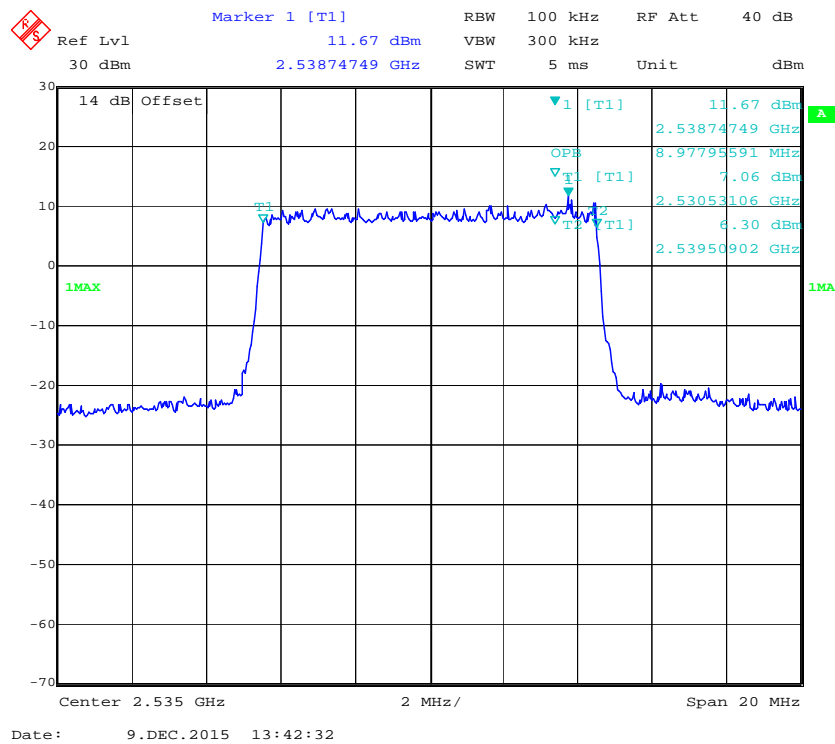
QPSK (15.0 MHz) - 26 dB Bandwidth, Middle channel**16-QAM (15.0 MHz) - 26 dB Bandwidth, Middle channel**

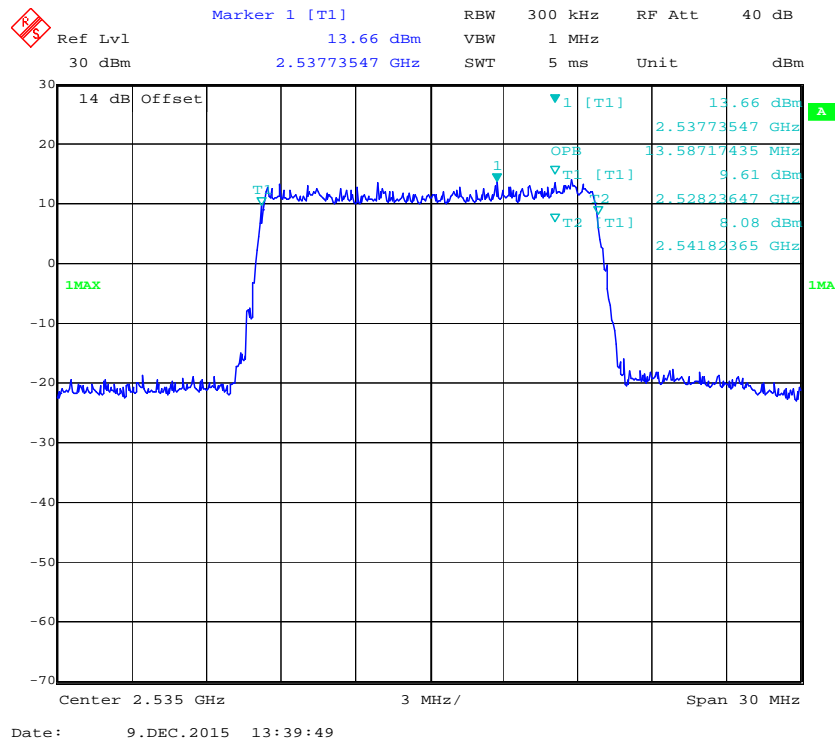
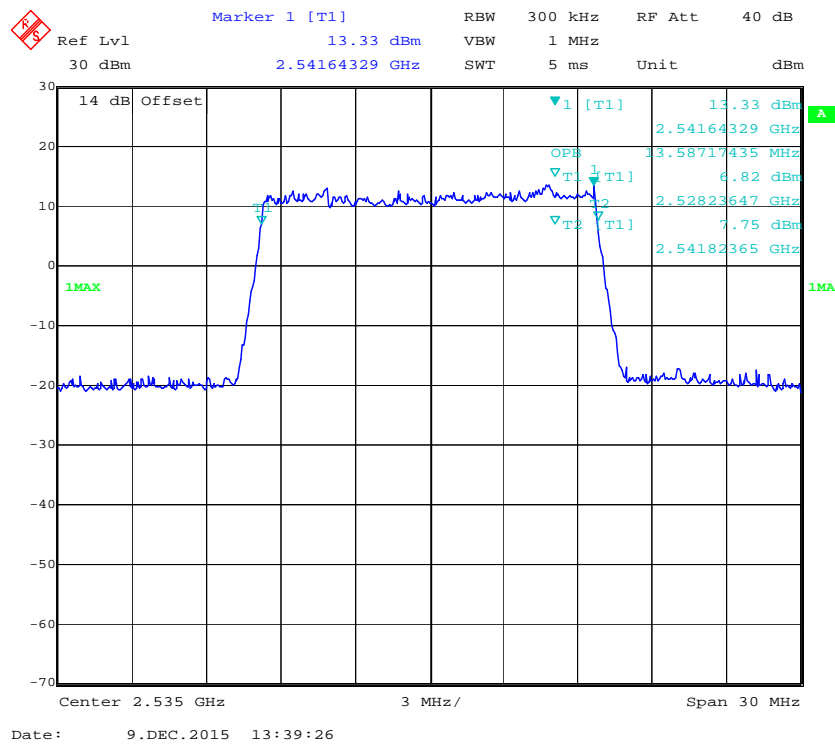
QPSK (20.0 MHz) - 26 dB Bandwidth, Middle channel**16-QAM (20.0 MHz) - 26 dB Bandwidth, Middle channel**

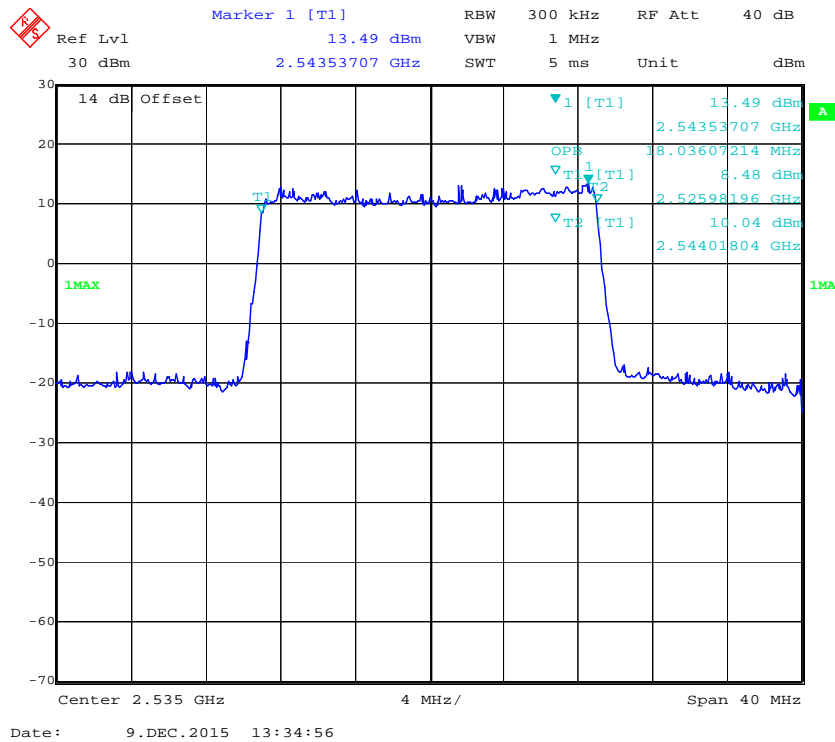
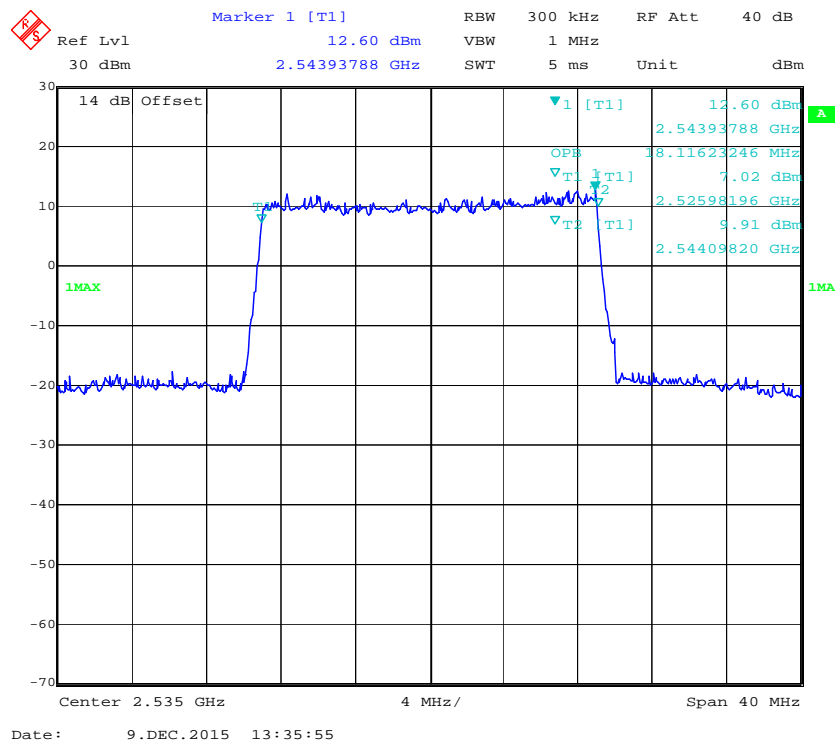
Band 7: (Middle Channel)

Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
5.0	QPSK	4.569	5.030
	16QAM	4.549	5.090
10.0	QPSK	8.978	9.620
	16QAM	8.978	9.700
15.0	QPSK	13.587	14.910
	16QAM	13.587	14.970
20.0	QPSK	18.036	19.639
	16QAM	18.116	19.719



QPSK (10.0 MHz) - 99% Occupied Bandwidth, Middle channel**16-QAM (10.0 MHz) - 99% Occupied Bandwidth, Middle channel**

QPSK (15.0 MHz) - 99% Occupied Bandwidth, Middle channel**16-QAM (15.0 MHz) - 99% Occupied Bandwidth, Middle channel**

QPSK (20.0 MHz) - 99% Occupied Bandwidth, Middle channel**16-QAM (20.0 MHz) - 99% Occupied Bandwidth, Middle channel**

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

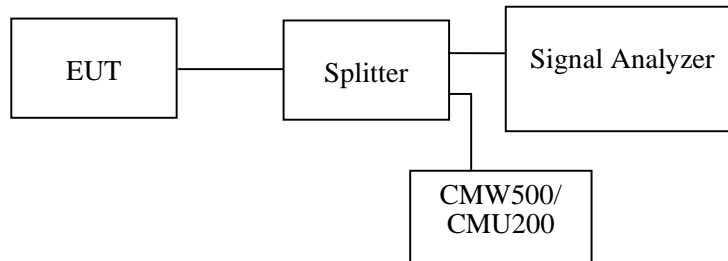
Applicable Standards

FCC §2.1051, §22.917(a) and §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. The resolution bandwidth of the spectrum analyzer was set at 1MHz. 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
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2014-12-11	2015-12-11
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	106891	2015-11-23	2016-11-23
R&S	Wideband Radio Communication tester	CMW500	1201.002K50-146520-wh	2015-11-23	2016-11-23

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

Test Data

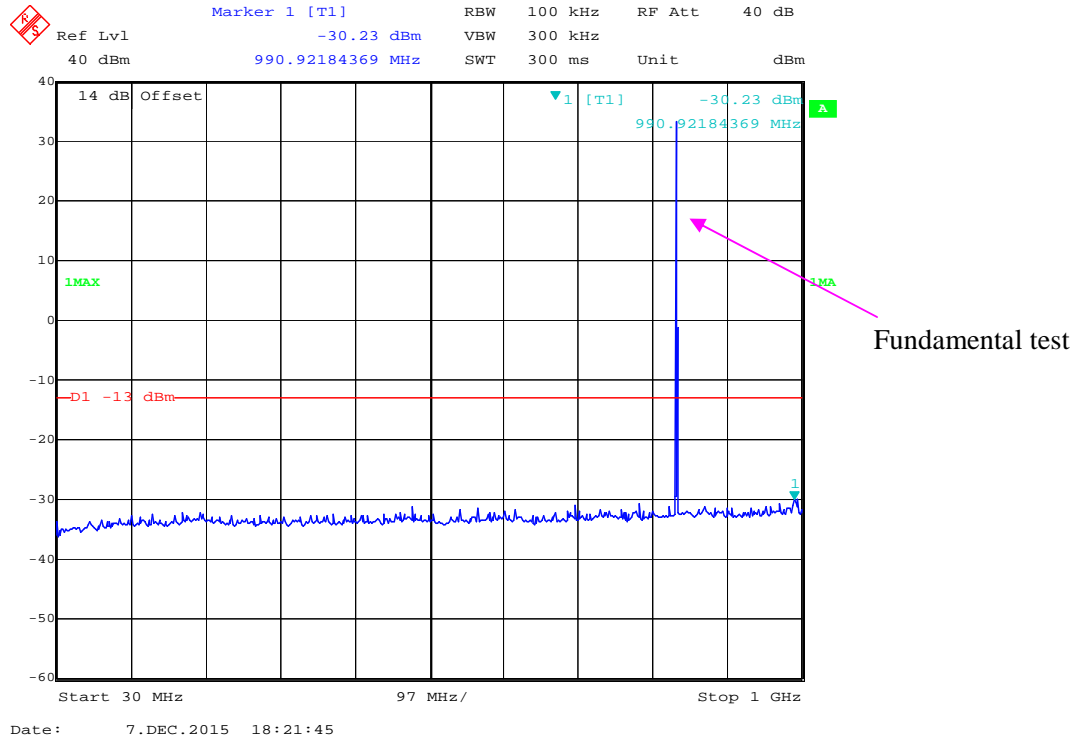
Environmental Conditions

Temperature:	25 °C
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

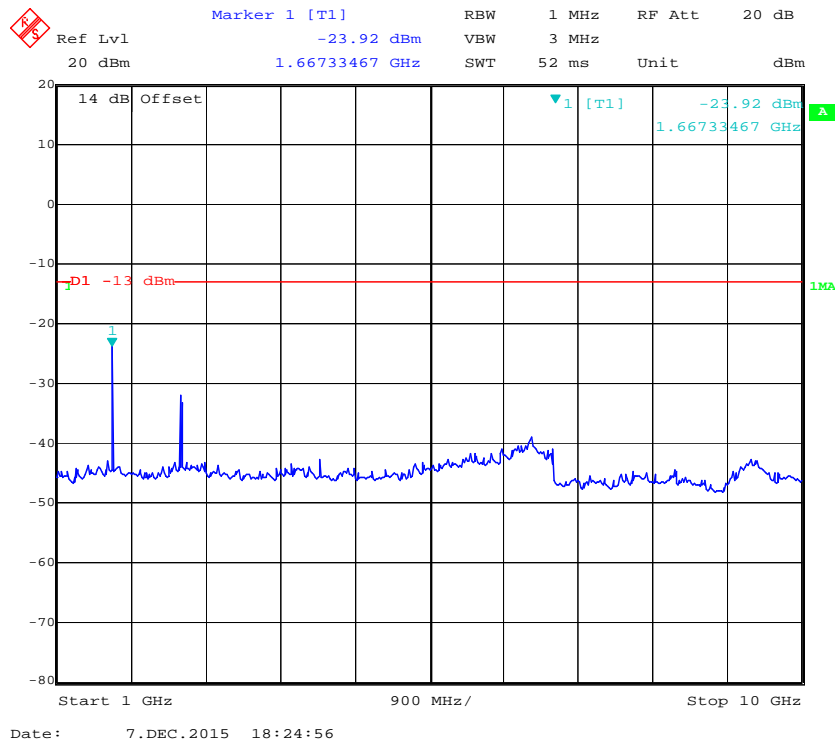
The testing was performed by William Li from 2015-12-07 to 2015-12-09.
Please refer to the following plots.

Cellular Band (Part 22H)

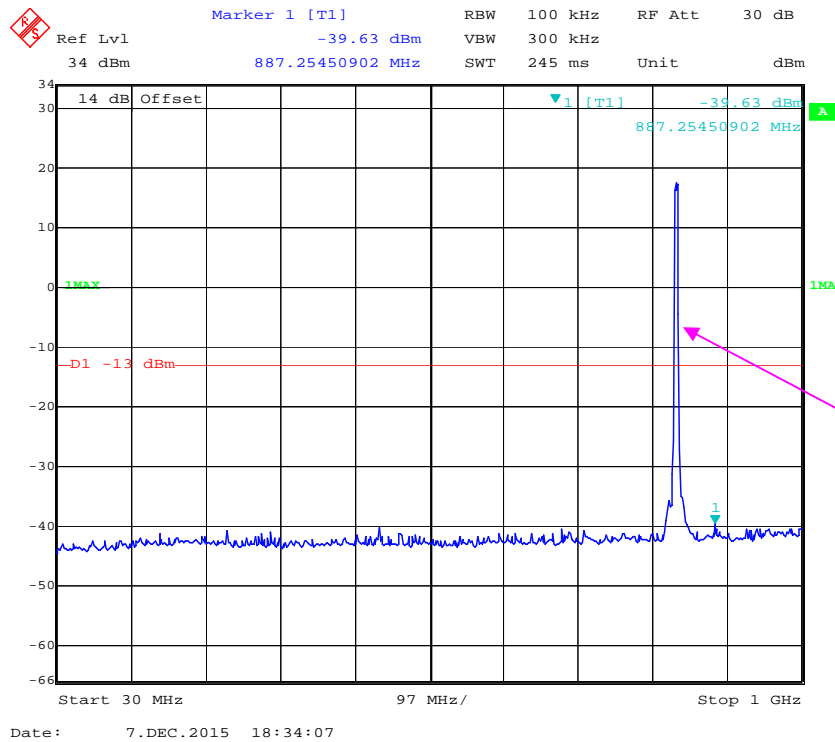
30 MHz – 1 GHz (GSM Mode)



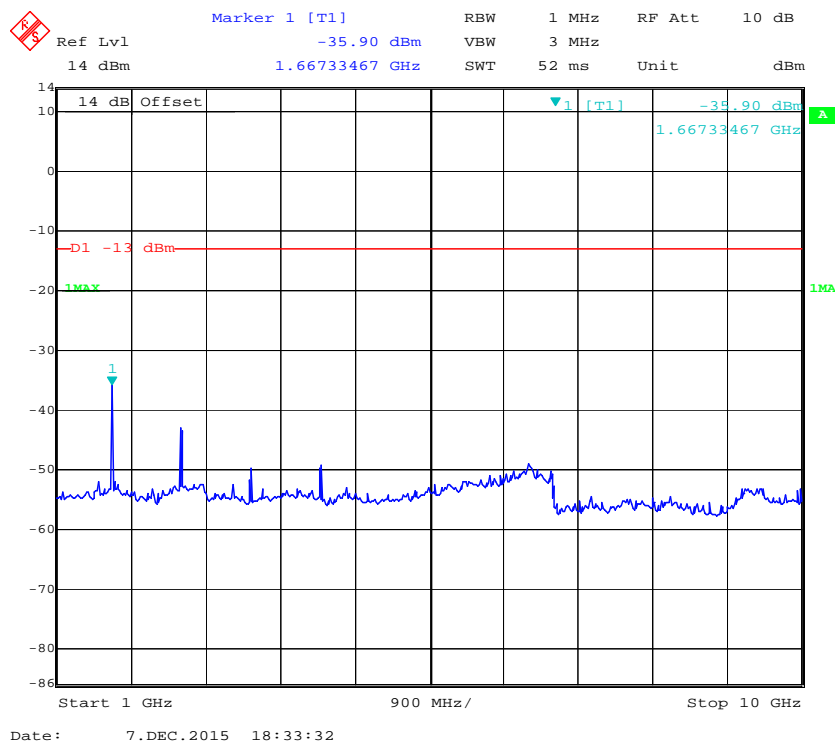
1 GHz – 10 GHz (GSM Mode)



30 MHz – 1 GHz (WCDMA Mode)

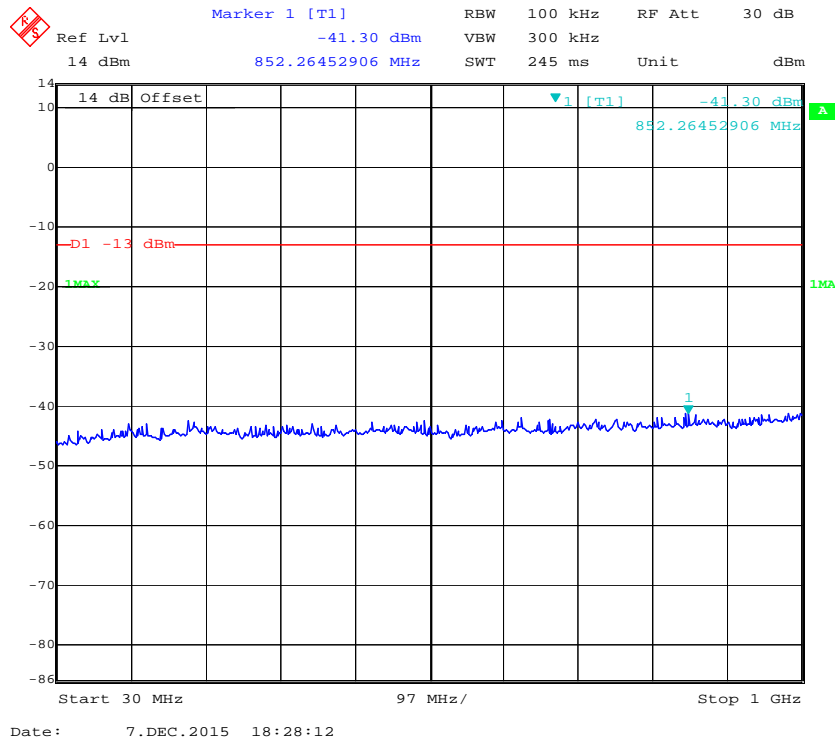


1 GHz – 10 GHz (WCDMA Mode)

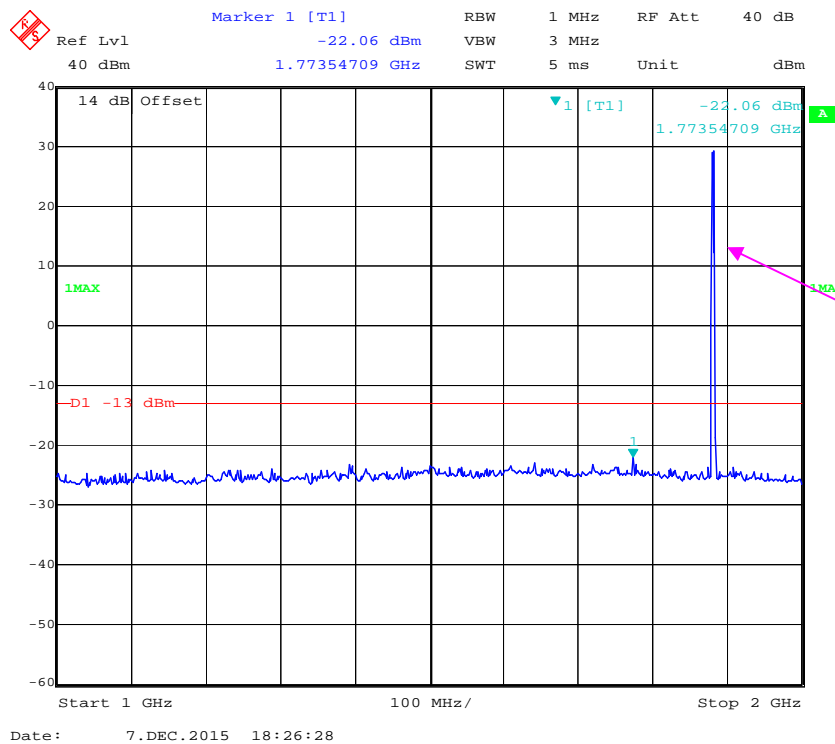


PCS Band (Part 24E)

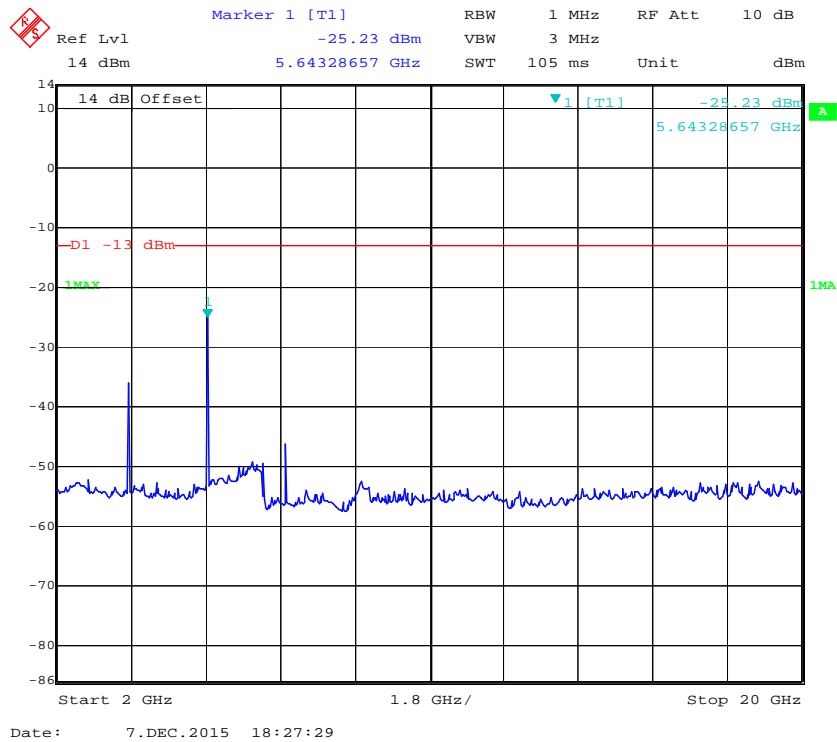
30 MHz – 1 GHz (GSM Mode)



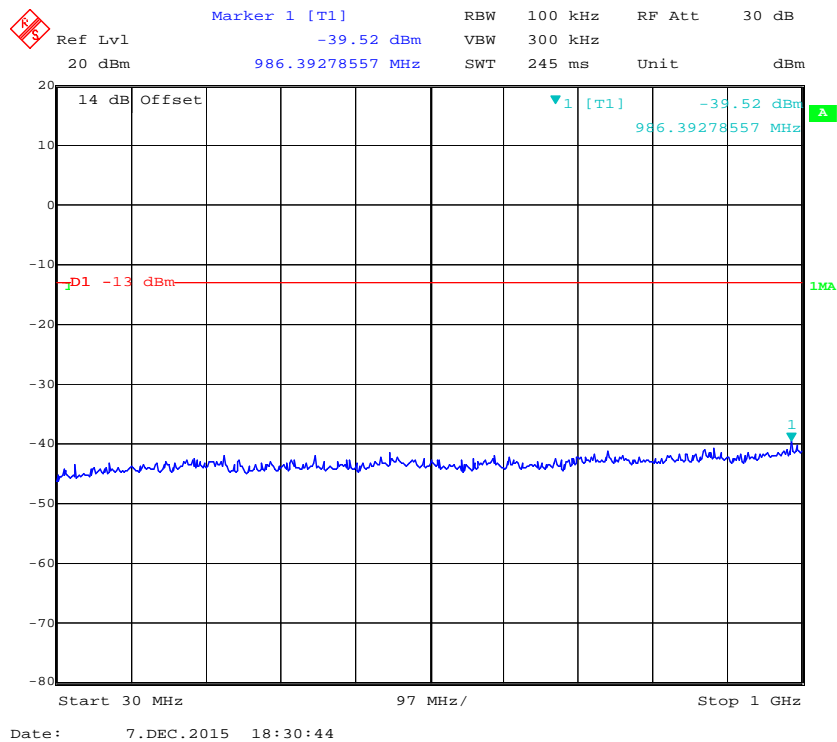
1 GHz – 2 GHz (GSM Mode)



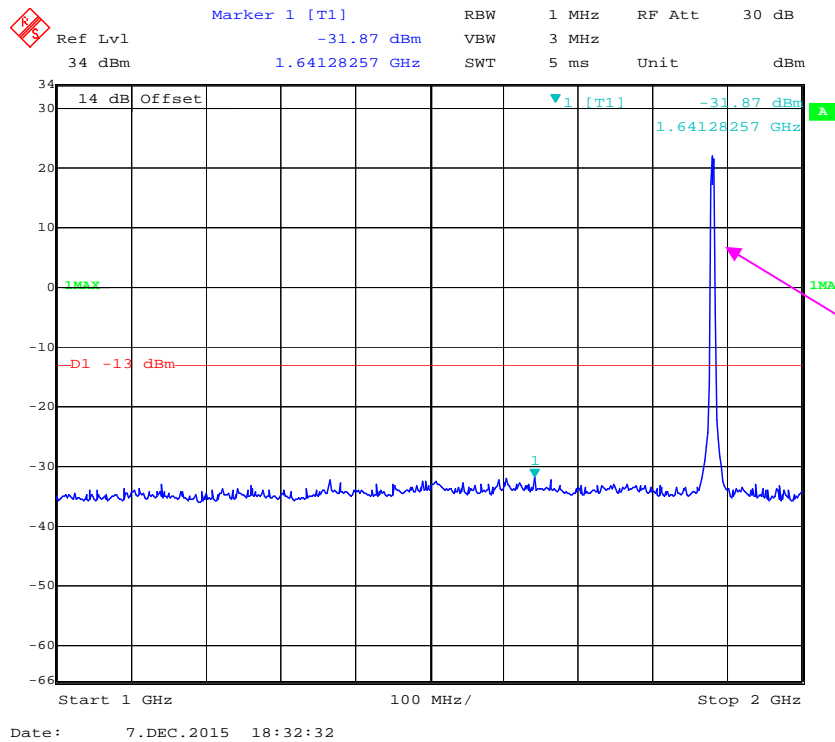
2 GHz – 20 GHz (GSM Mode)



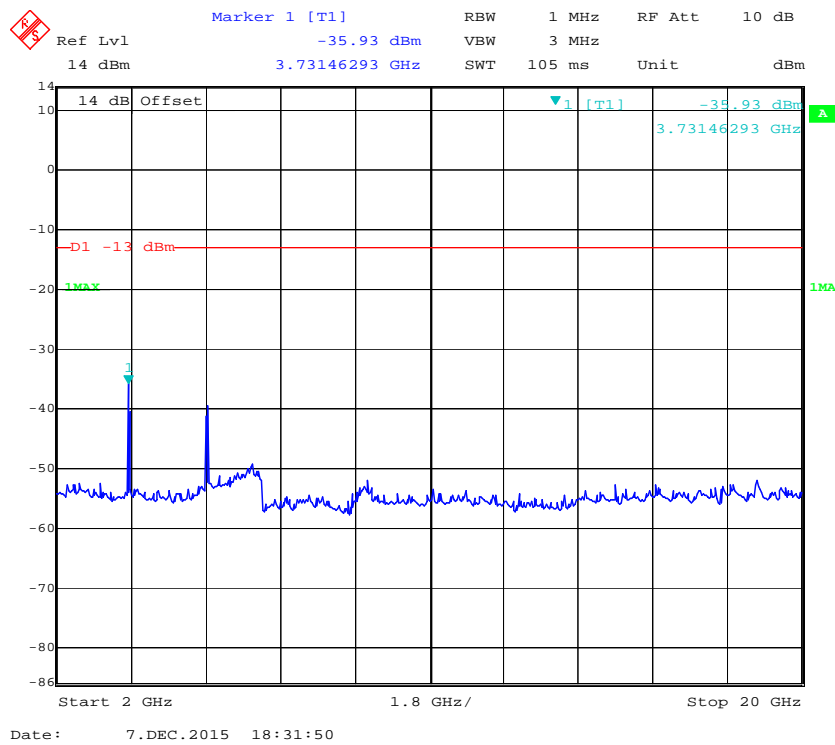
30 MHz – 1 GHz (WCDMA Mode)



1 GHz – 2 GHz (WCDMA Mode)

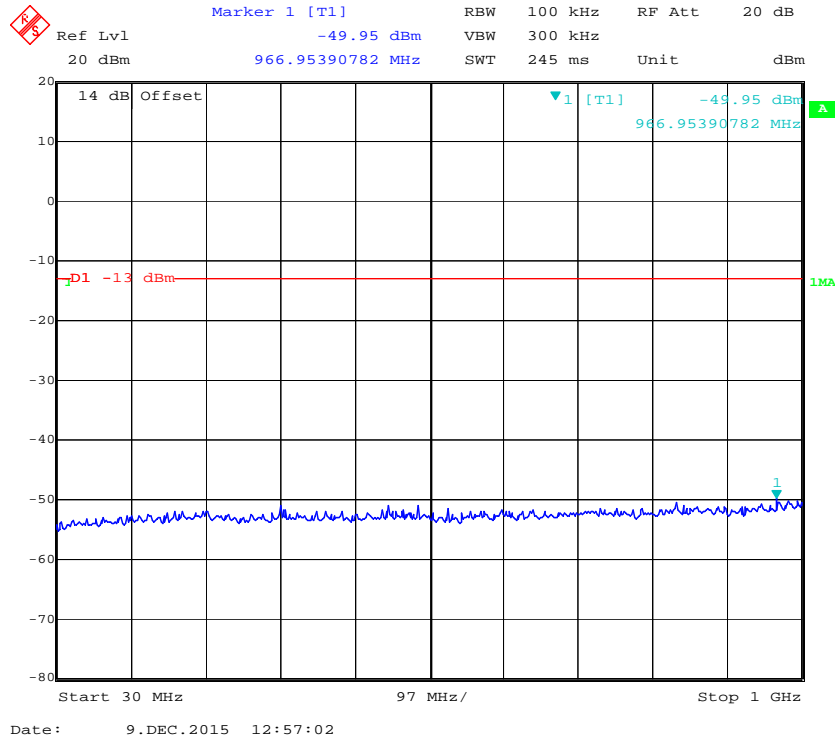


2 GHz – 20 GHz (WCDMA Mode)

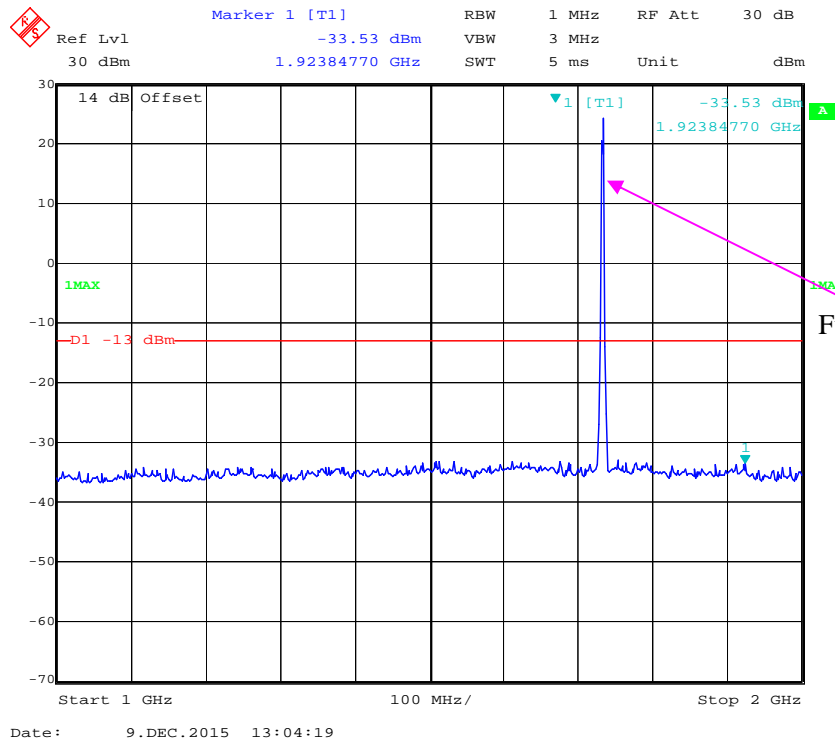


LTE Band 4:

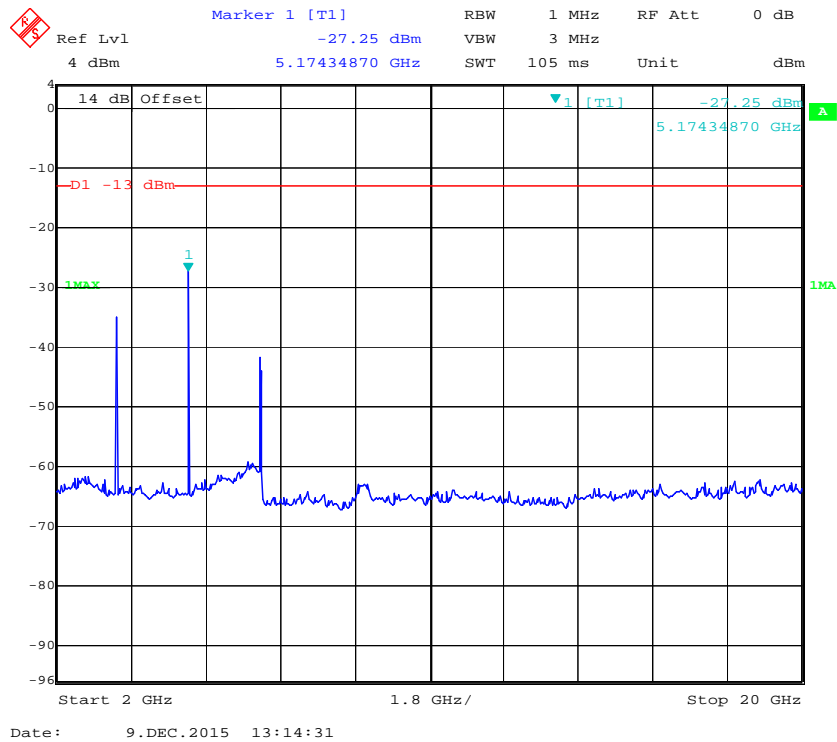
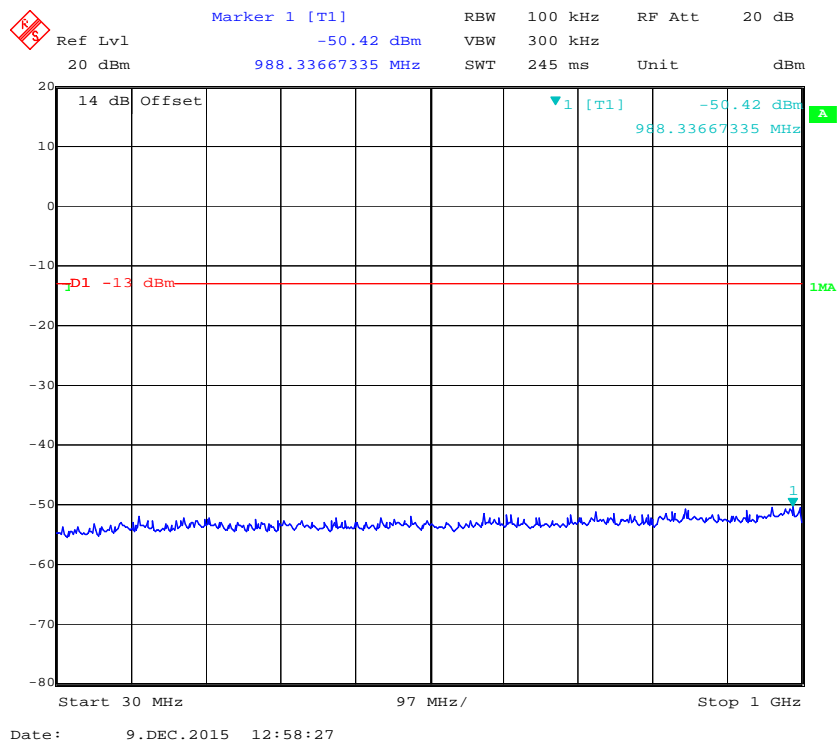
30 MHz - 1 GHz (1.4 MHz, Middle Channel)



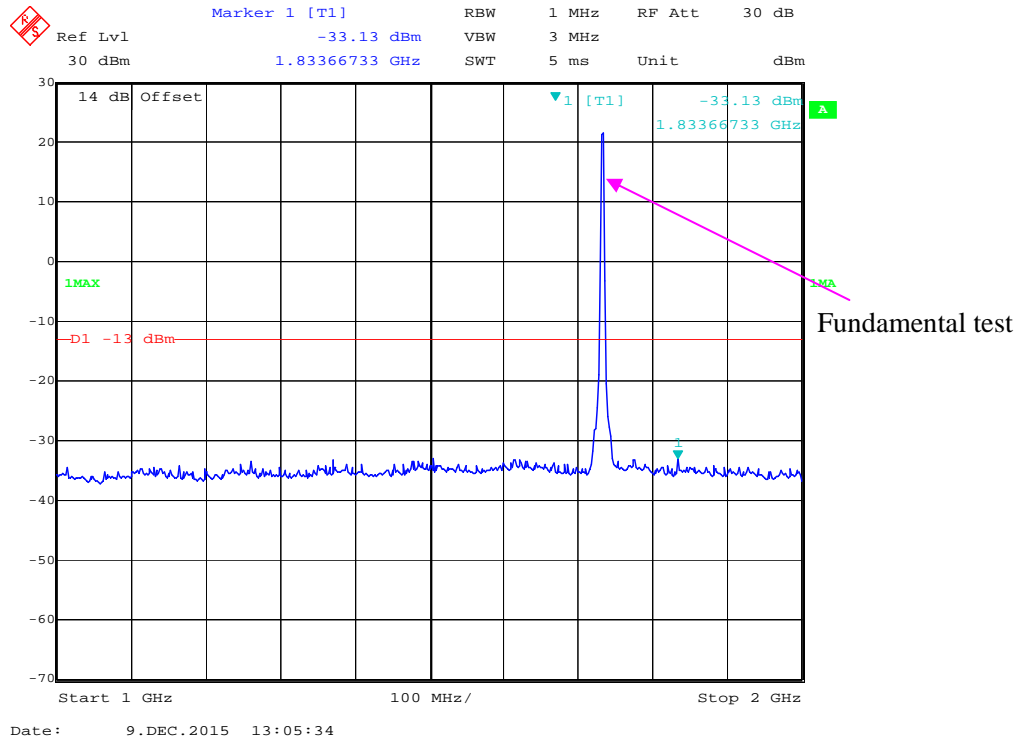
1 GHz - 2 GHz (1.4 MHz, Middle Channel)



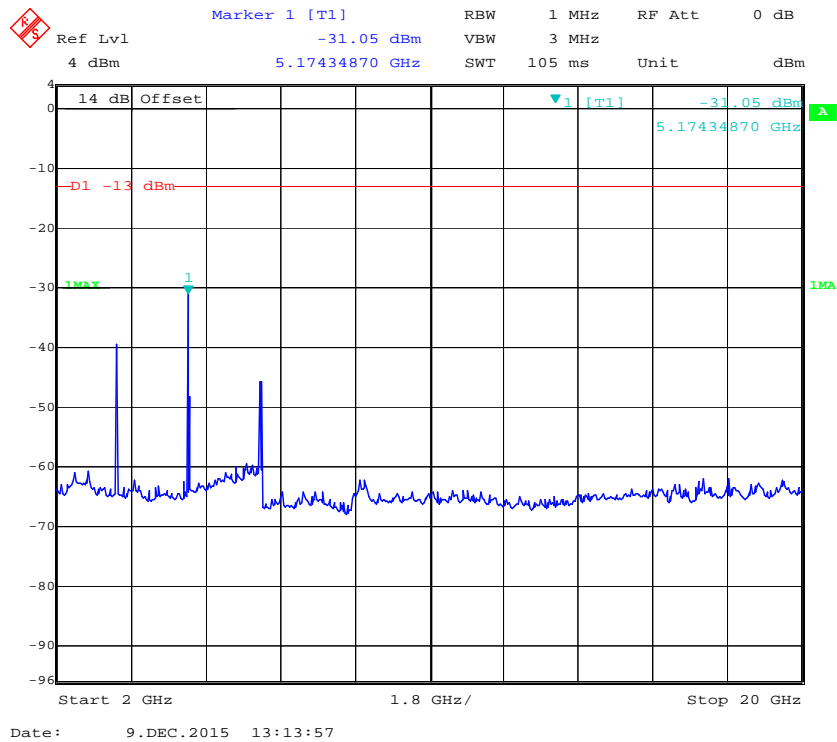
Fundamental test

2 GHz – 20 GHz (1.4 MHz, Middle Channel)**30 MHz - 1 GHz (3.0 MHz, Middle Channel)**

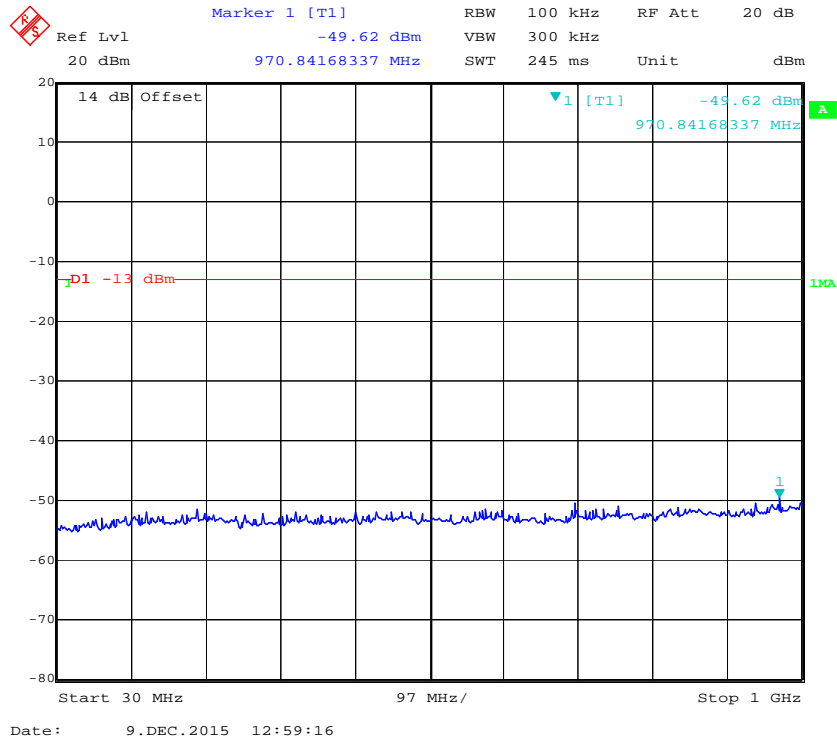
1 GHz – 2 GHz (3.0 MHz, Middle Channel)



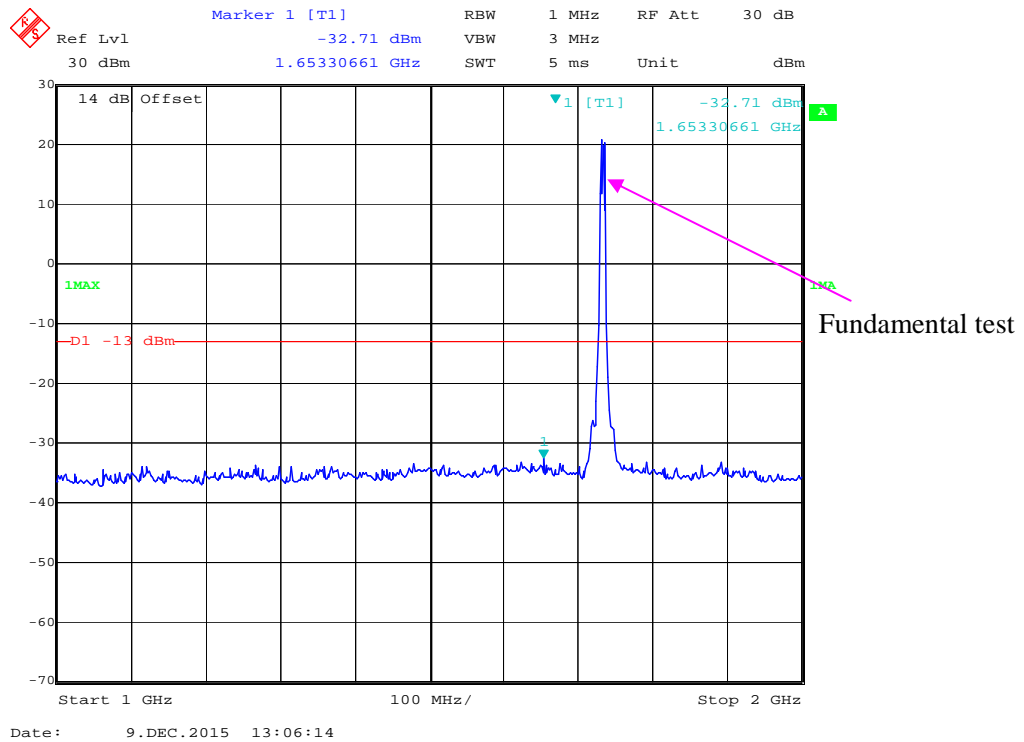
2 GHz – 20 GHz (3.0 MHz, Middle Channel)



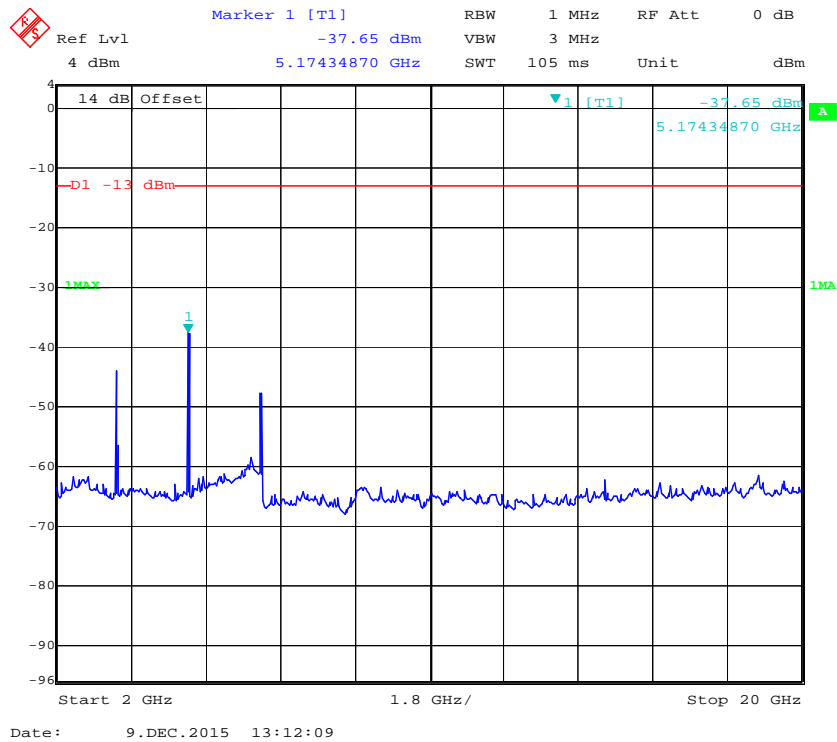
30 MHz - 1 GHz (5.0 MHz, Middle Channel)



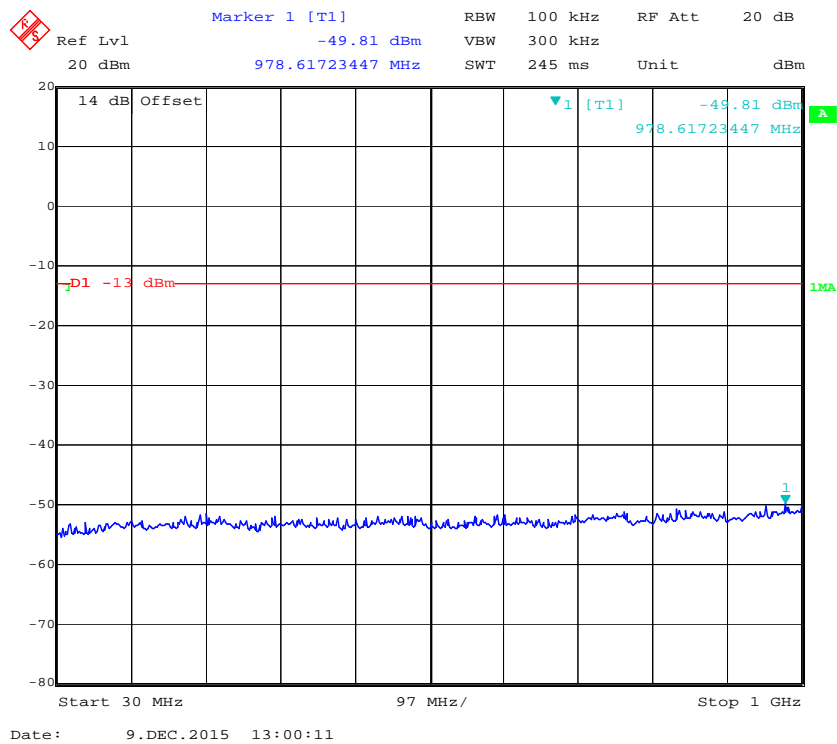
1 GHz - 2 GHz (5.0 MHz, Middle Channel)



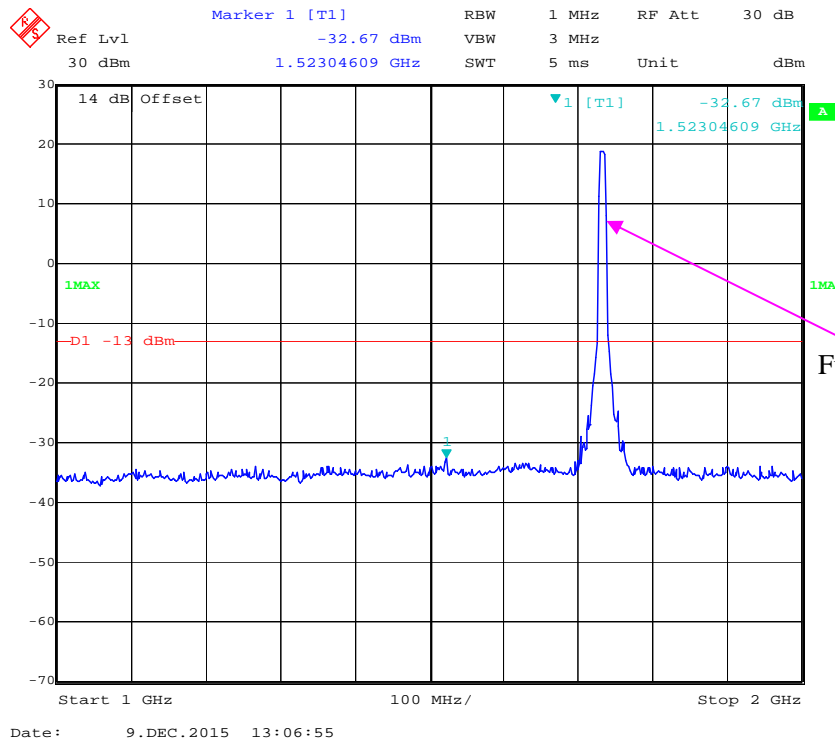
2 GHz – 20 GHz (5.0 MHz, Middle Channel)



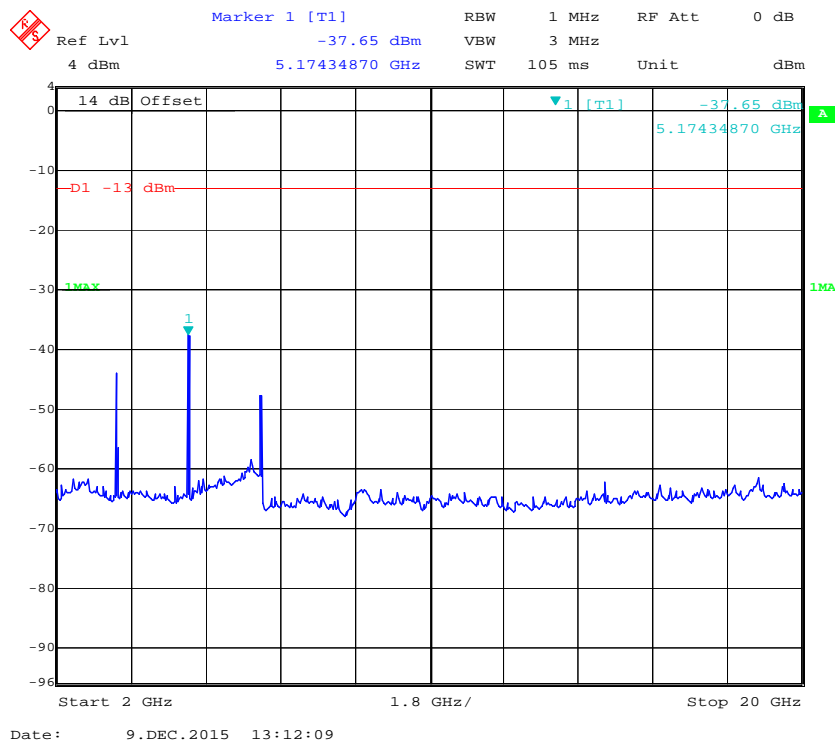
30 MHz - 1 GHz (10.0 MHz, Middle Channel)



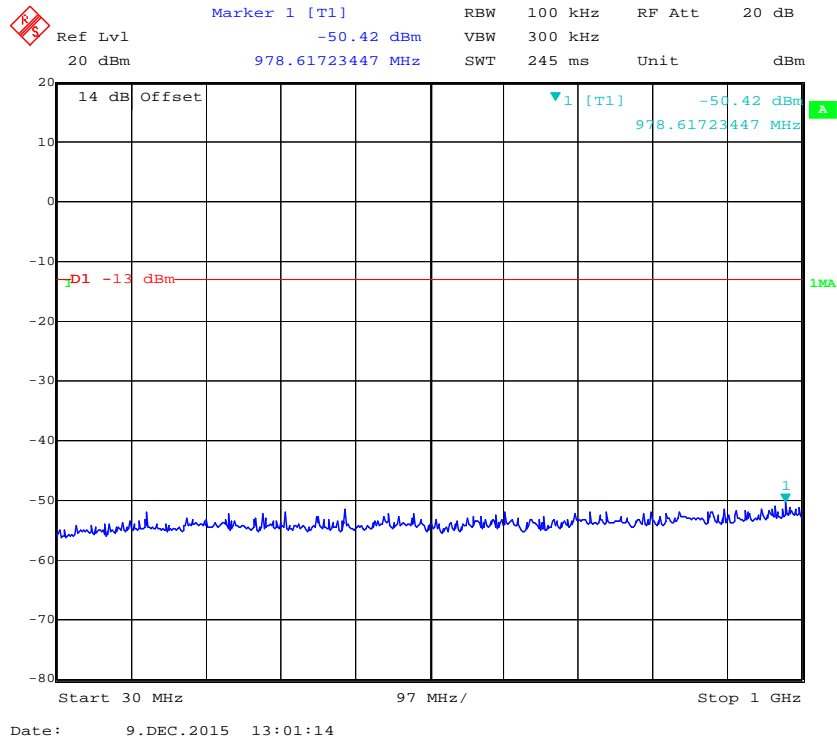
1 GHz – 2 GHz (10.0 MHz, Middle Channel)



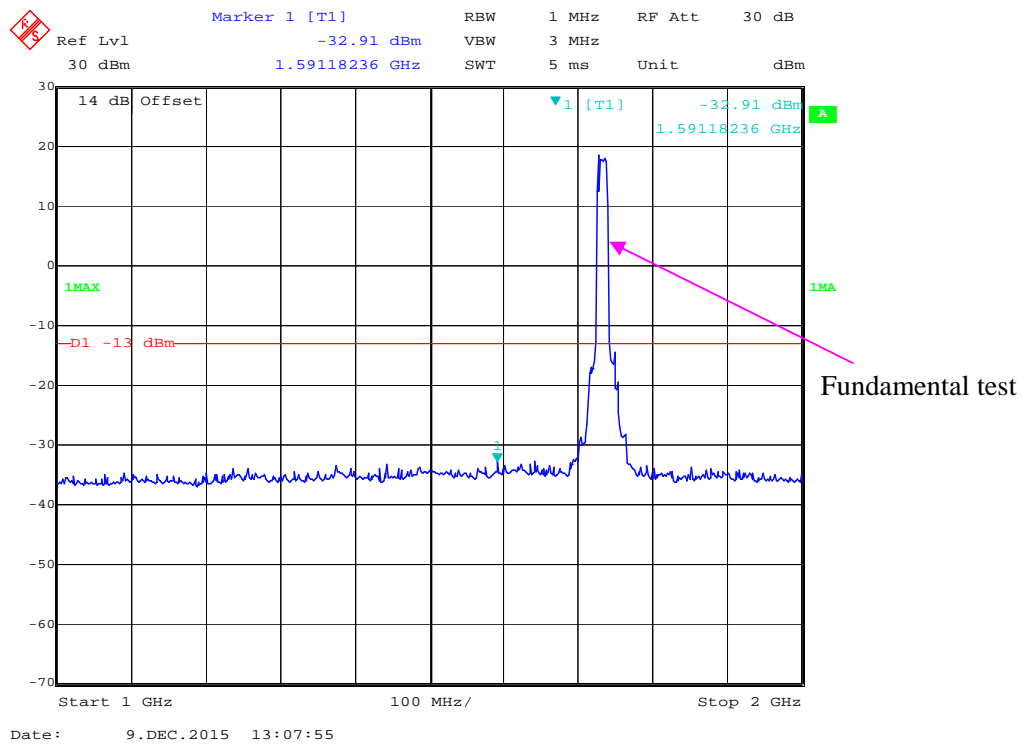
2 GHz – 20 GHz (10.0 MHz, Middle Channel)

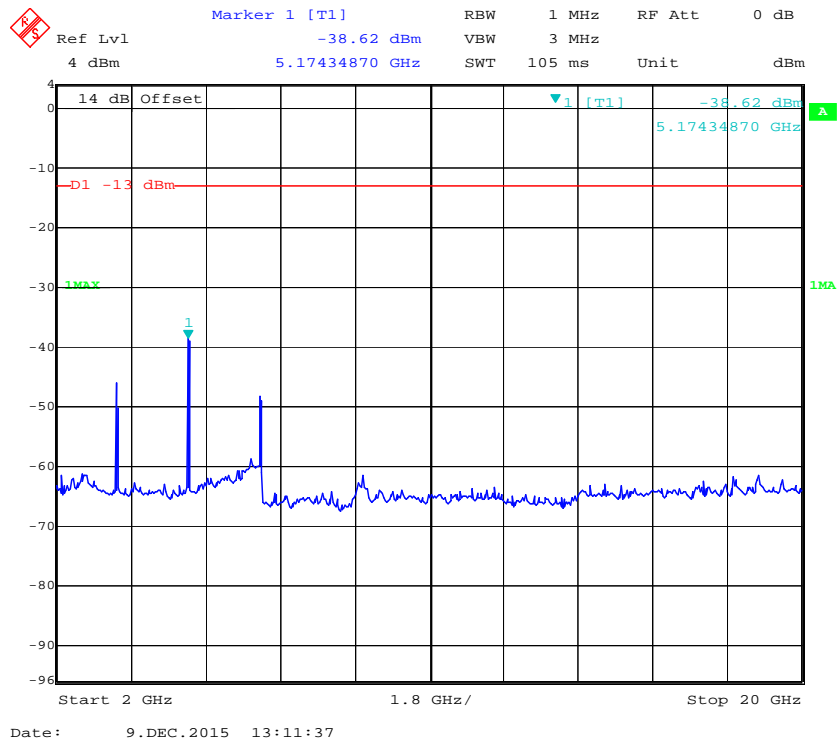
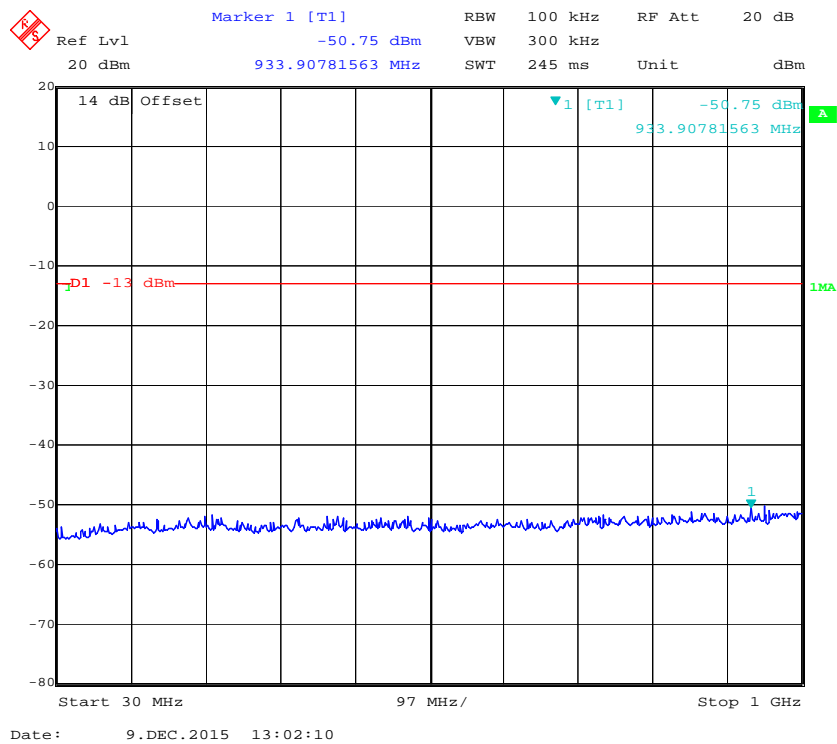


30 MHz - 1 GHz (15.0 MHz, Middle Channel)

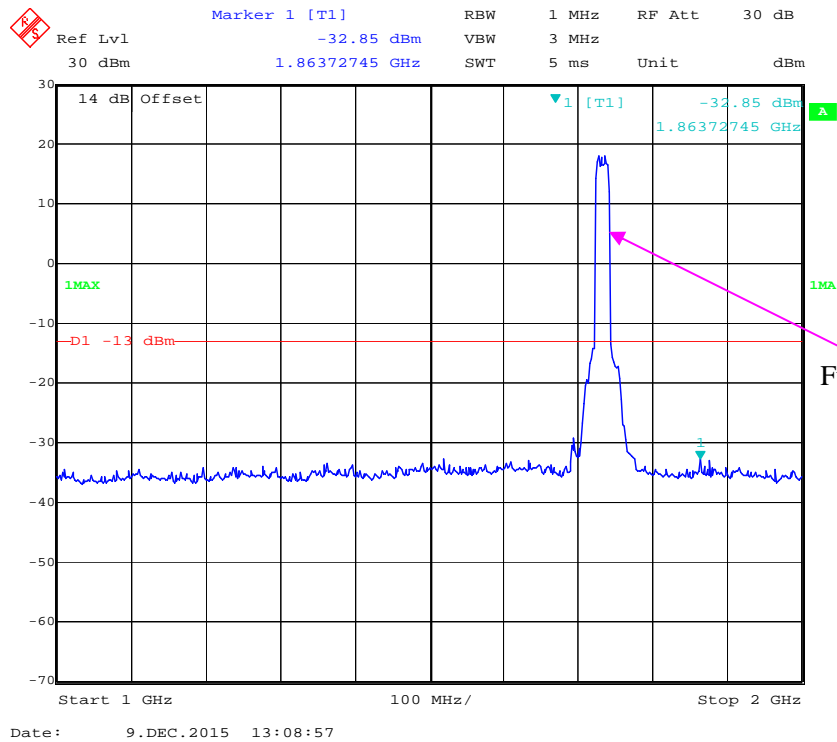


1 GHz - 2 GHz (15.0 MHz, Middle Channel)

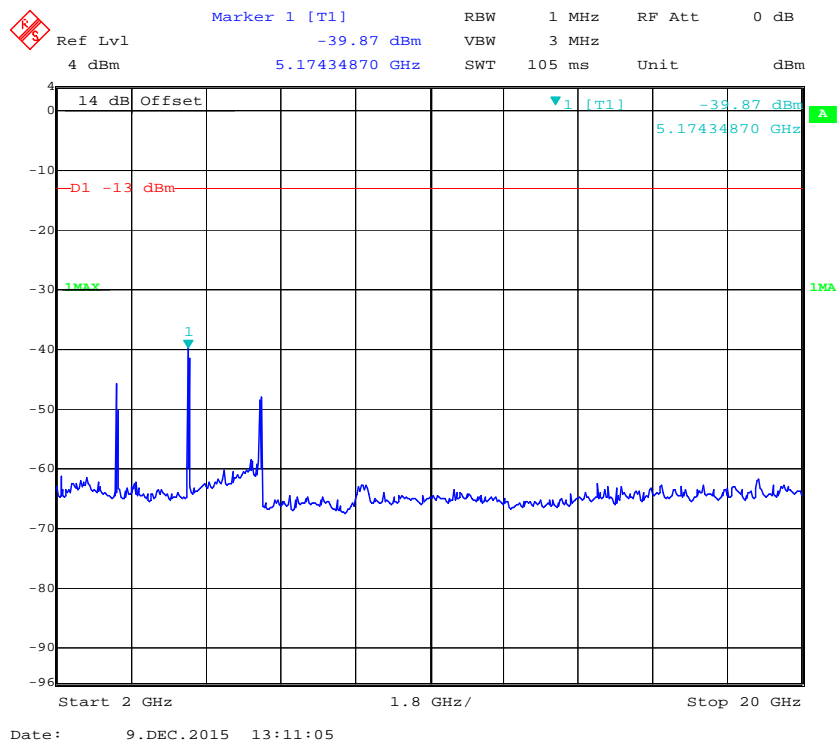


2 GHz – 20GHz (15.0 MHz, Middle Channel)**30 MHz - 1 GHz (20.0 MHz, Middle Channel)**

1 GHz –2 GHz (20.0 MHz, Middle Channel)

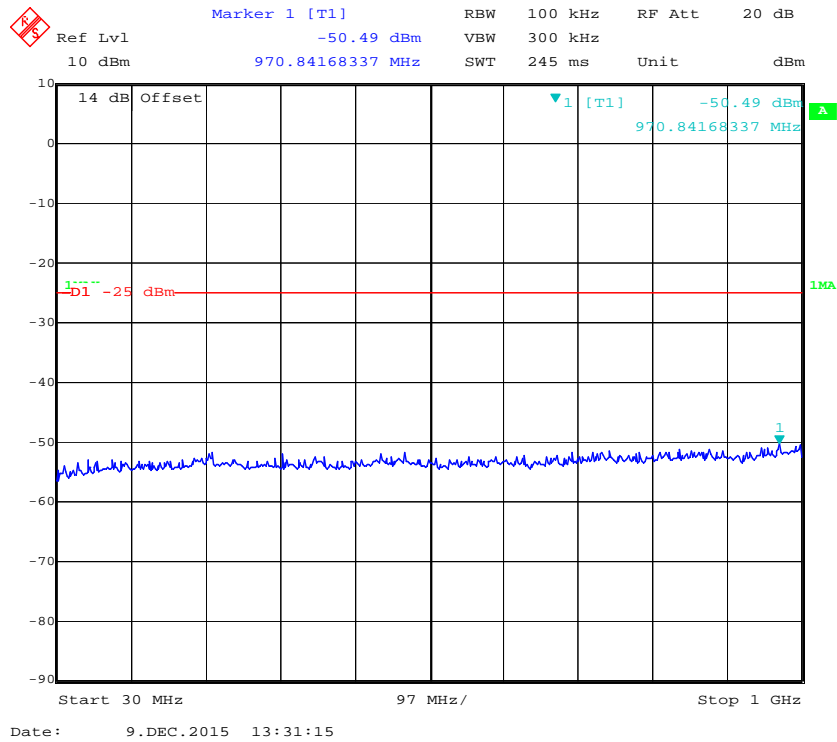


2 GHz –20 GHz (20.0 MHz, Middle Channel)

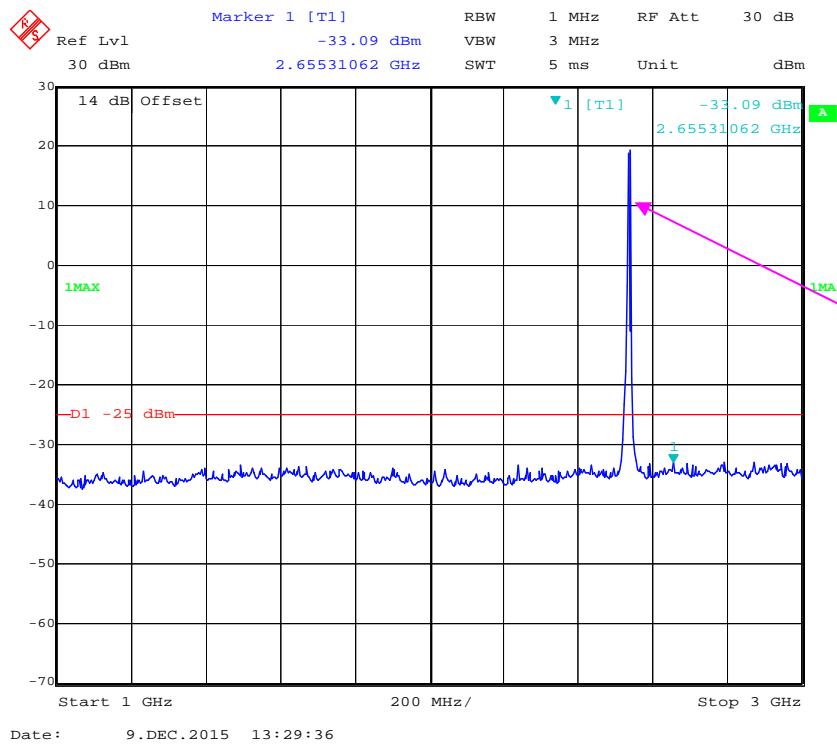


LTE Band 7:

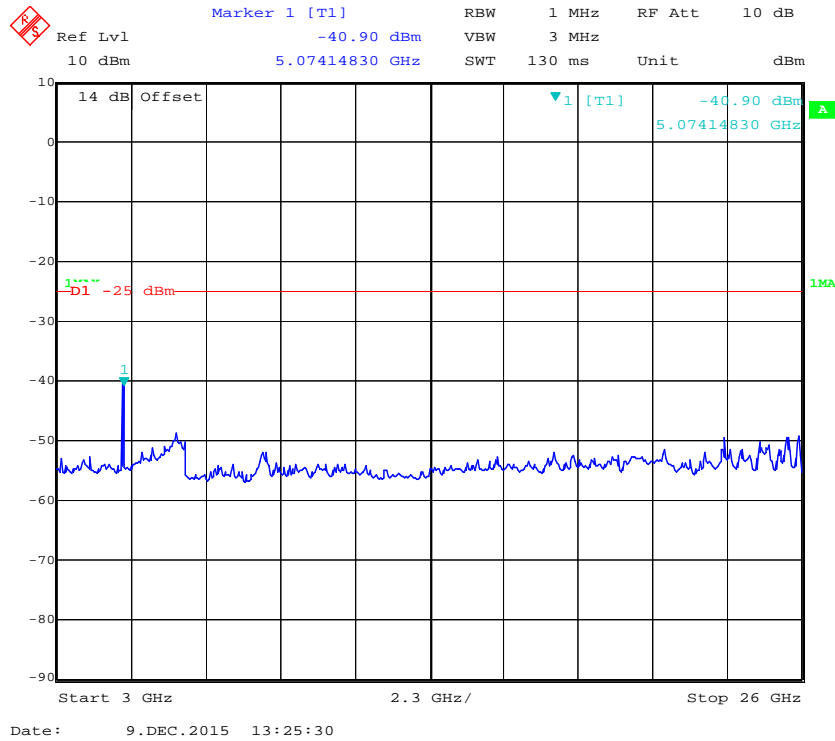
30 MHz - 1 GHz (5.0 MHz, Middle Channel)



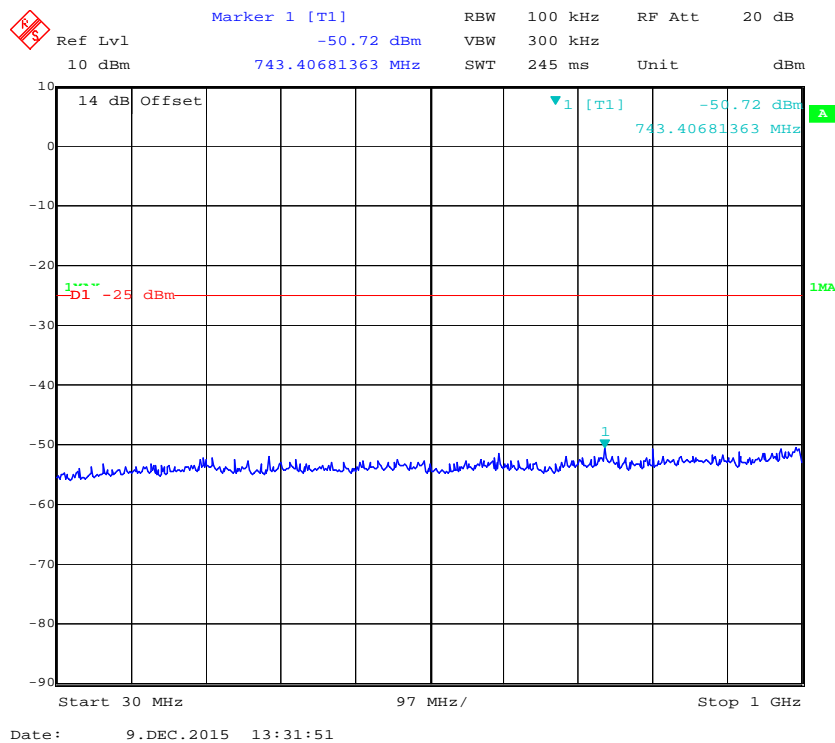
1 GHz - 3 GHz (5.0 MHz, Middle Channel)



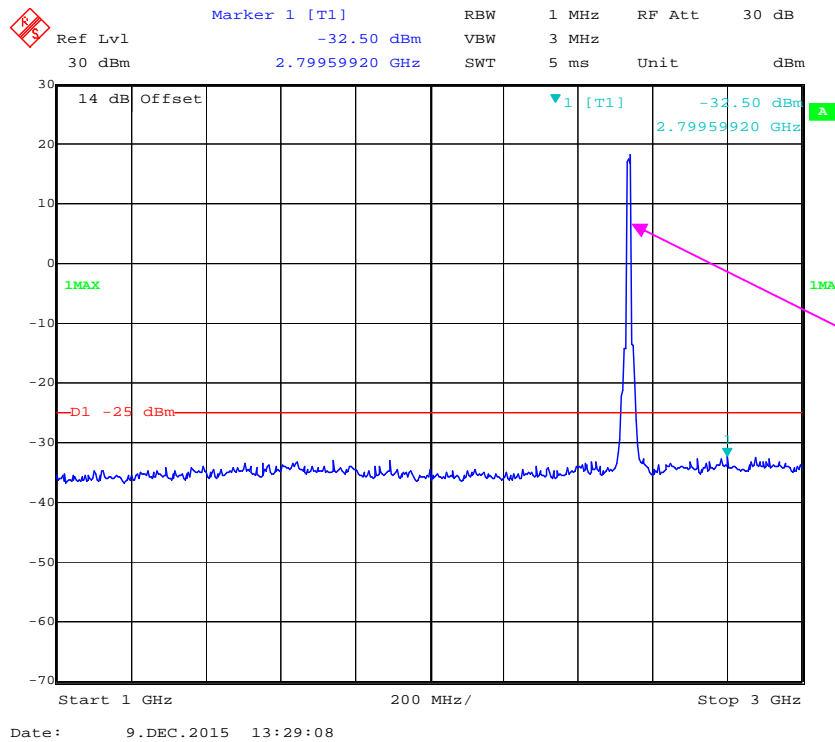
3 GHz – 26 GHz (5.0 MHz, Middle Channel)



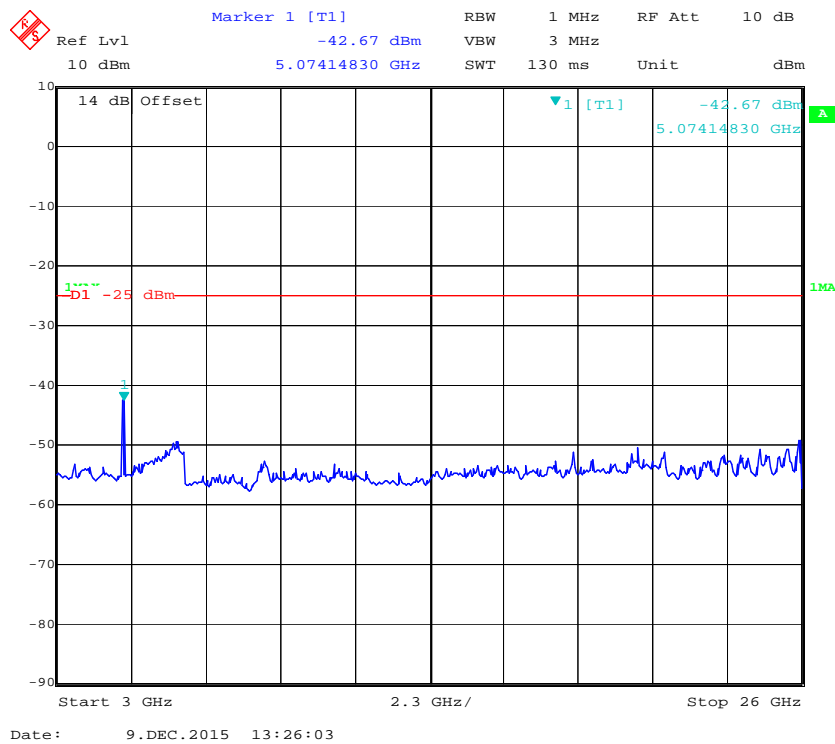
30 MHz - 1 GHz (10.0 MHz, Middle Channel)



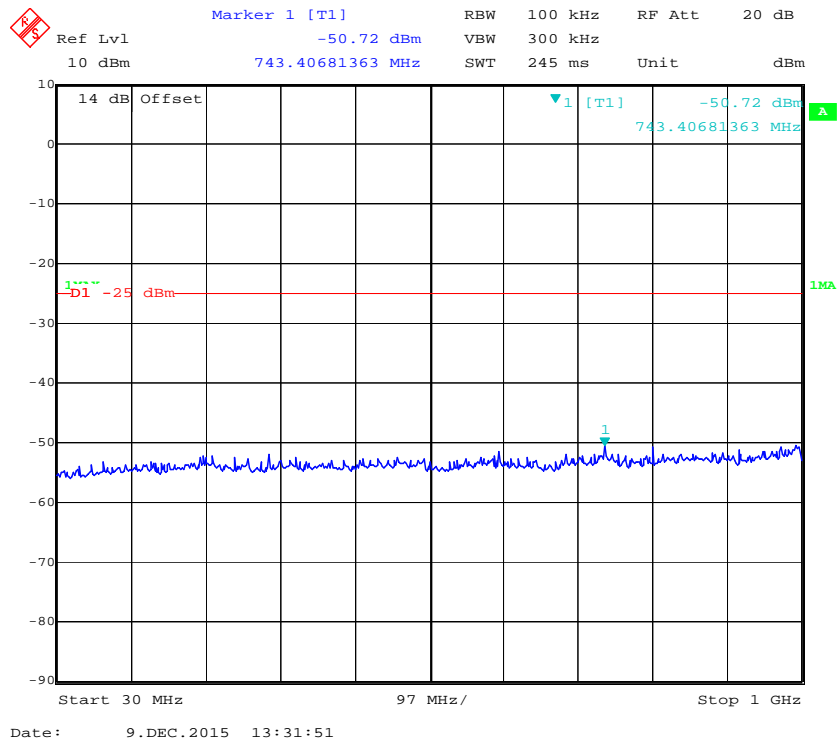
1 GHz – 3 GHz (10.0 MHz, Middle Channel)



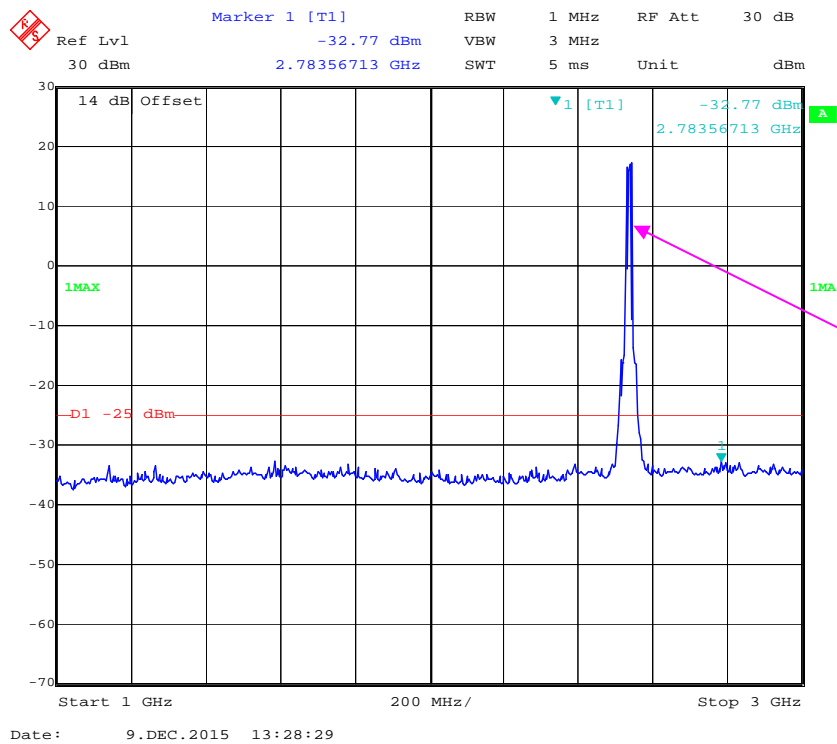
3 GHz – 26 GHz (10.0 MHz, Middle Channel)



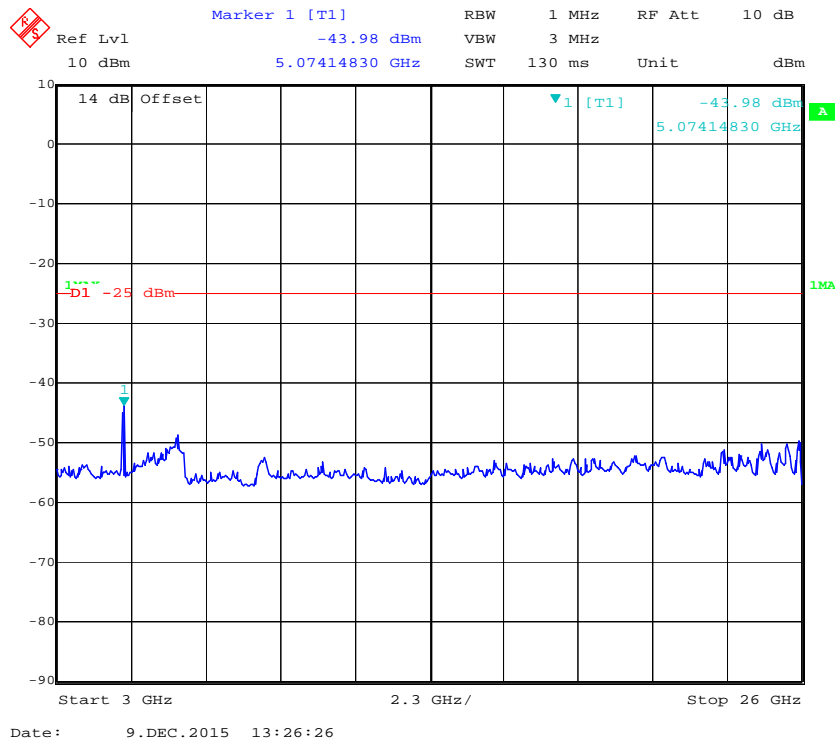
30 MHz - 1 GHz (15.0 MHz, Middle Channel)



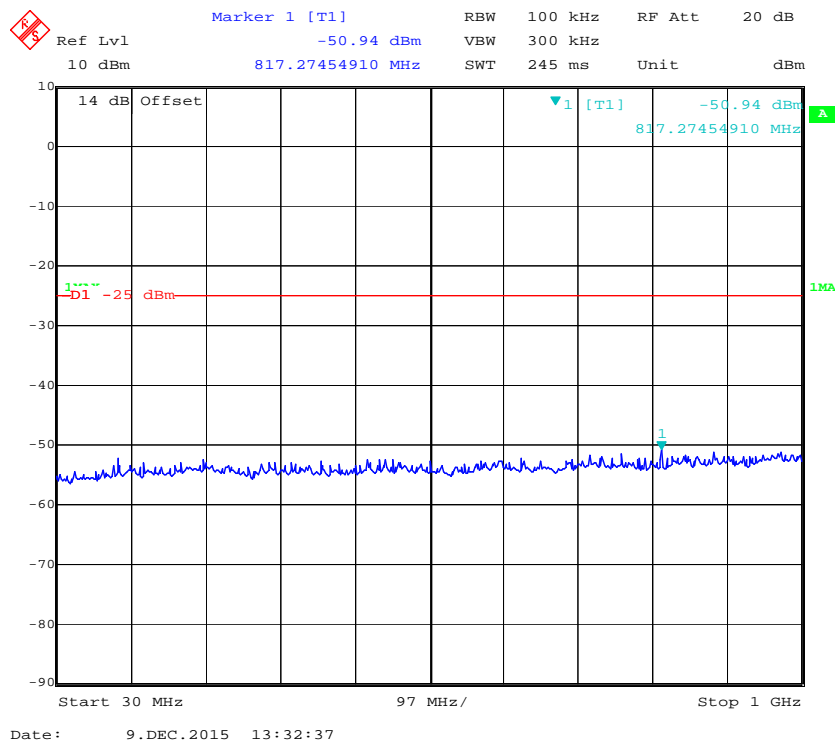
1 GHz - 3 GHz (15.0 MHz, Middle Channel)



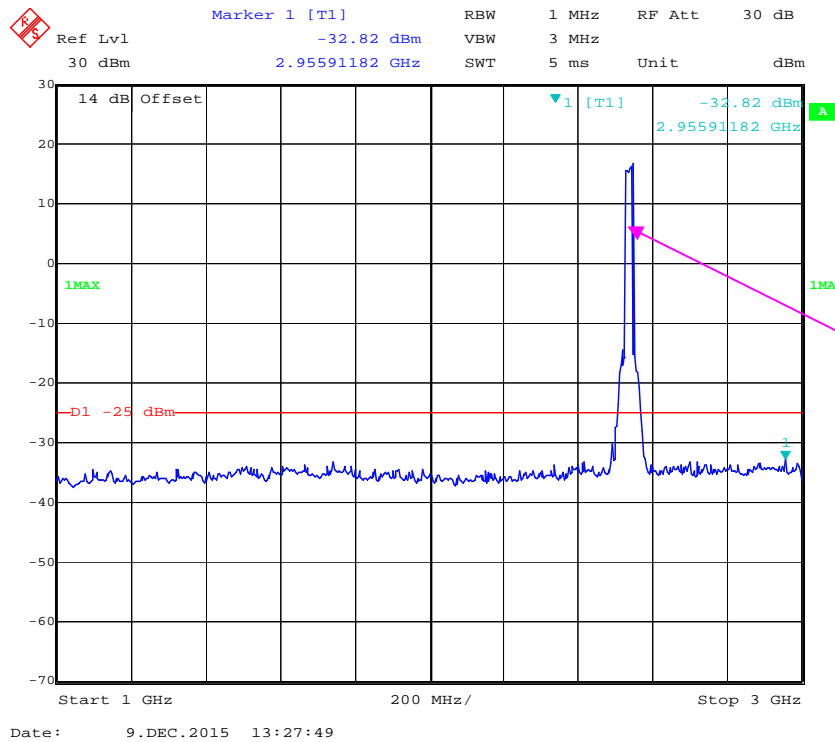
3 GHz –26 GHz (15.0 MHz, Middle Channel)



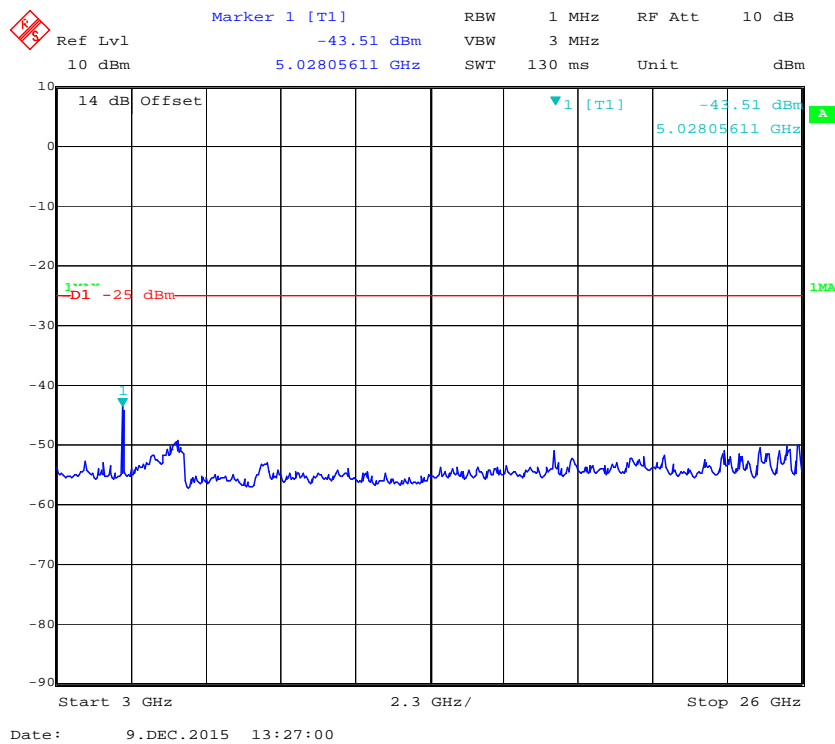
30 MHz - 1 GHz (20.0 MHz, Middle Channel)



1 GHz – 3 GHz (20.0 MHz, Middle Channel)



3 GHz – 26 GHz (20.0 MHz, Middle Channel)



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

Applicable Standards

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

For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

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 = $10 \lg (\text{TX pwr in Watts}/0.001)$ – the absolute level

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sunol Sciences	Horn Antenna	DRH-118	A052304	2015-12-01	2016-11-30
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2014-12-07	2017-12-06
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2014-12-11	2015-12-11
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2015-04-23	2016-04-23
HP	Amplifier	HP8447E	1937A01046	2015-05-06	2016-05-06
HP	Signal Generator	8341B	2624A00116	2015-06-03	2016-06-03
COM POWER	Dipole Antenna	AD-100	041000	2015-08-18	2016-08-18
A.H. System	Horn Antenna	SAS-200/571	135	2013-02-11	2016-02-10
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2015-11-03	2016-11-03
Electro-Mechanics	Horn Antenna	3116	9510-2270	2013-10-14	2016-10-13
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	106891	2015-11-23	2016-11-23
R&S	Wideband Radio Communication tester	CMW500	1201.002K50-146520-wh	2015-11-23	2016-11-23

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

Test Data**Environmental Conditions**

Temperature:	25 °C
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by William Li on 2015-12-07.

Test mode: Transmitting

30 MHz ~ 10 GHz:

Cellular Band (Part 22H)

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 22H	
			Height (m)	Polar (H/V)	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		Limit (dBm)	Margin (dB)
GSM Mode										
219.72	34.92	167	2.0	H	-62.1	0.30	0	-62.40	-13	49.40
219.72	34.70	321	1.4	V	-62.3	0.30	0	-62.60	-13	49.60
1673.20	56.68	317	2.1	H	-39.0	1.60	6.90	-33.70	-13	20.70
1673.20	55.16	212	1.9	V	-41.0	1.60	6.90	-35.70	-13	22.70
2509.80	55.75	52	1.9	H	-37.8	1.70	8.60	-30.90	-13	17.90
2509.80	49.36	288	1.4	V	-44.5	1.70	8.60	-37.60	-13	24.60
WCDMA Mode										
219.72	35.63	294	1.7	H	-61.4	0.30	0	-61.70	-13	48.70
219.72	34.21	204	1.8	V	-62.8	0.30	0	-63.10	-13	50.10
1673.20	38.98	241	2.2	H	-56.7	1.60	6.90	-51.40	-13	38.40
1673.20	38.63	304	2.0	V	-57.5	1.60	6.90	-52.20	-13	39.20
2509.80	35.43	232	2.5	H	-58.1	1.70	8.60	-51.20	-13	38.20
2509.80	34.86	61	2.4	V	-59.0	1.70	8.60	-52.10	-13	39.10

30 MHz ~ 20 GHz:**PCS Band (Part 24E)**

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 24E	
			Height (m)	Polar (H/V)	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		Limit (dBm)	Margin (dB)
GSM Mode										
219.72	35.15	146	1.4	H	-61.8	0.30	0	-62.10	-13	49.10
219.72	34.11	358	1.7	V	-62.9	0.30	0	-63.20	-13	50.20
3760.00	34.53	198	2.4	H	-52.5	1.90	9.90	-44.50	-13	31.50
3760.00	35.41	130	1.2	V	-51.2	1.90	9.90	-43.20	-13	30.20
WCDMA Mode										
219.72	35.92	248	1.3	H	-61.1	0.30	0	-61.40	-13	48.40
219.72	34.70	335	2.2	V	-62.3	0.30	0	-62.60	-13	49.60
3760.00	36.15	148	1.4	H	-50.9	1.90	9.90	-42.90	-13	29.90
3760.00	35.63	230	1.5	V	-51.0	1.90	9.90	-43.00	-13	30.00

Test mode: Transmitting (Pre-scan with all the bandwidth, and worse case as below)

Frequency	Receiver	Turntable	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 27	
(MHz)	Reading (dBμV)	Angle Degree	Height (m)	Polar (H/V)	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		Limit (dBm)	Margin (dB)
Band 4										
219.72	34.69	268	1.3	H	-62.3	0.30	0	-62.60	-13	49.60
219.72	35.85	174	1.1	V	-61.1	0.30	0	-61.40	-13	48.40
3465.00	35.44	312	1.1	H	-48.4	1.90	10.00	-40.30	-13	27.30
3465.00	35.82	58	1.5	V	-48.2	1.90	10.00	-40.10	-13	27.10
Band 7										
219.72	34.53	92	1.3	H	-62.5	0.30	0	-62.80	-25	37.80
219.72	34.41	26	1.9	V	-62.6	0.30	0	-62.90	-25	37.90
5070.00	35.56	229	1.6	H	-48.5	2.30	10.10	-40.70	-25	15.70
5070.00	35.69	70	1.9	V	-47.6	2.30	10.10	-39.80	-25	14.80

Note:

- 1) Absolute Level = SG Level - Cable loss + Antenna Gain
- 2) Margin = Limit- Absolute Level

FCC §22.917(a) & §24.238(a) & §27.53 - BAND EDGES

Applicable Standards

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.

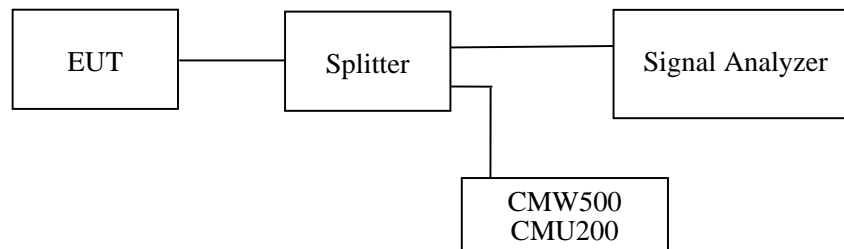
According to FCC §27.53, the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log(P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log(P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log(P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than $43 + 10 \log(P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log(P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

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
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03-101746-zn	2015-06-13	2016-06-13
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2015-12-11	2016-12-11
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	106891	2015-11-23	2016-11-23
R&S	Wideband Radio Communication tester	CMW500	1201.002K50-146520-wh	2015-11-23	2016-11-23

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

Test Data**Environmental Conditions**

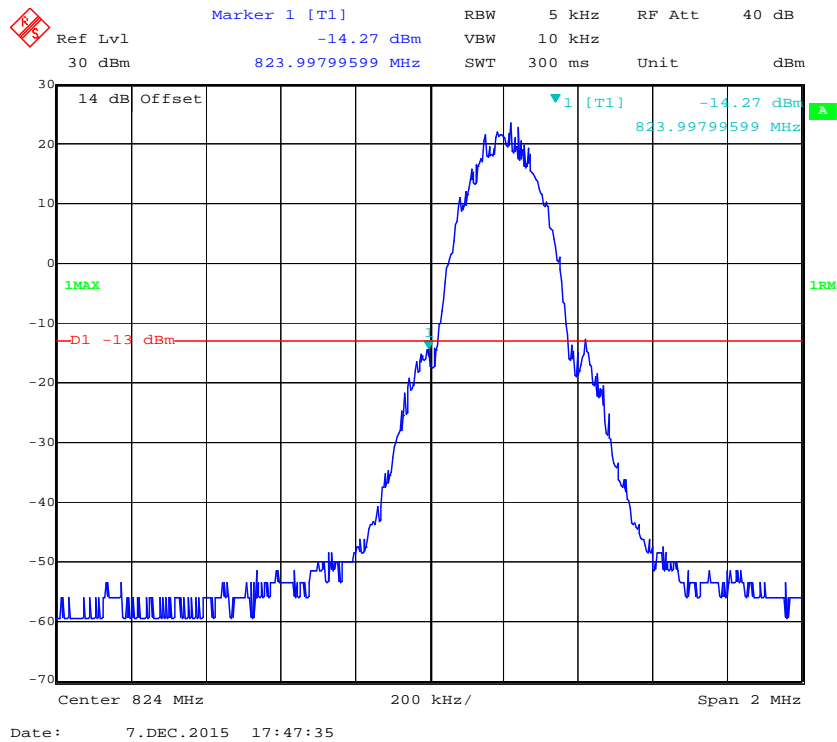
Temperature:	24~25 °C
Relative Humidity:	48~51 %
ATM Pressure:	100.0~101.0 kPa

The testing was performed by William Li from 2015-12-08 to 2015-12-14.

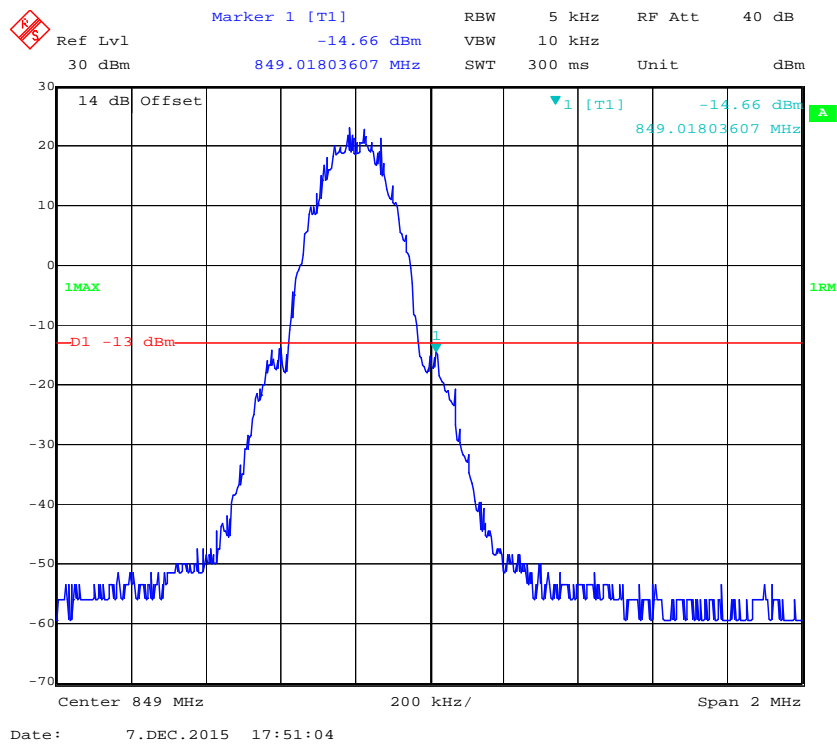
EUT operation mode: Transmitting

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

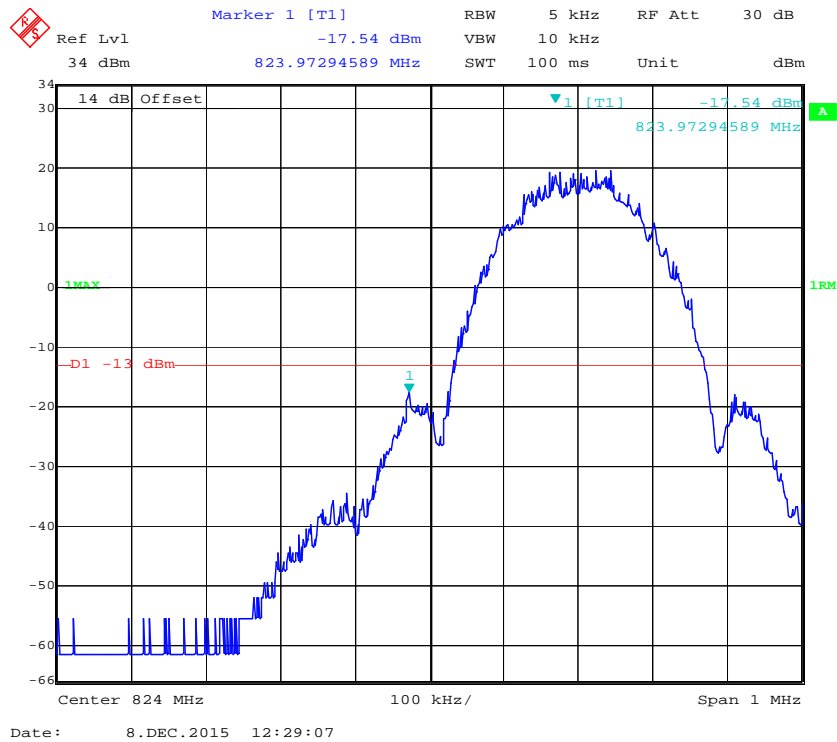
Cellular Band, Left Band Edge for GSM (GMSK) Mode



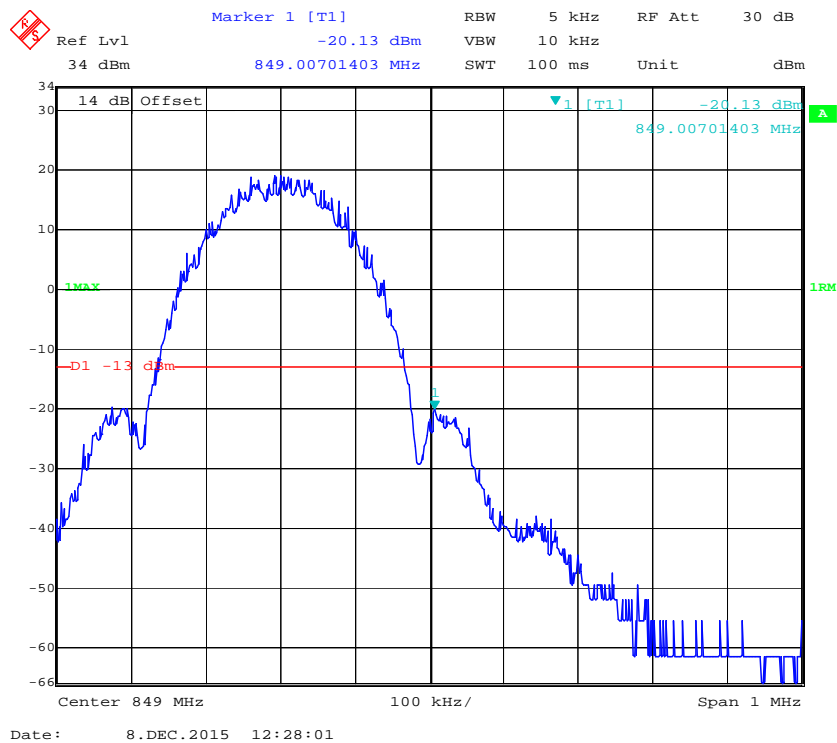
Cellular Band, Right Band Edge for GSM (GMSK) Mode



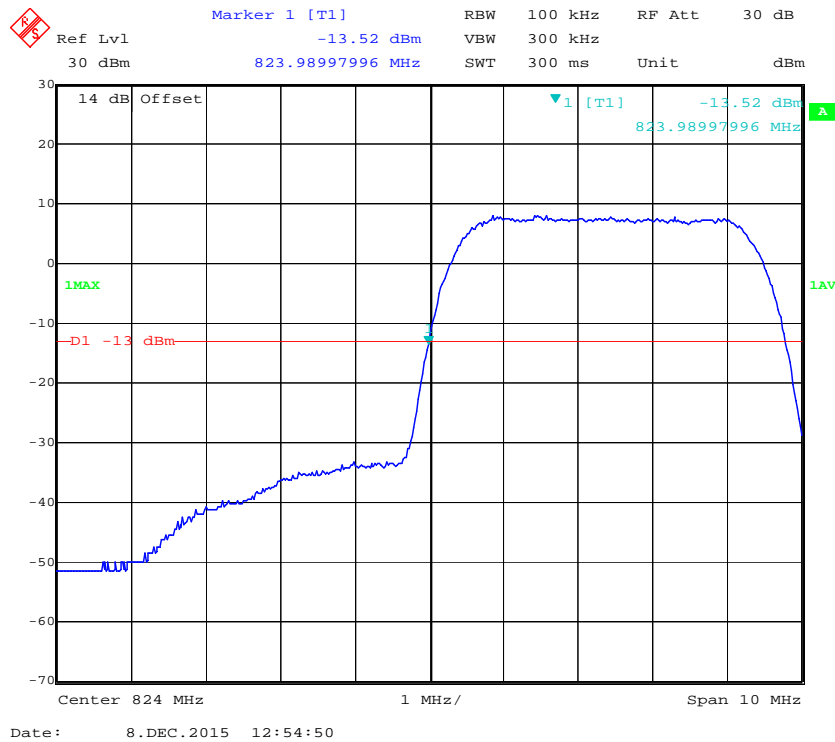
Cellular Band, Left Band Edge for EGPRS Mode



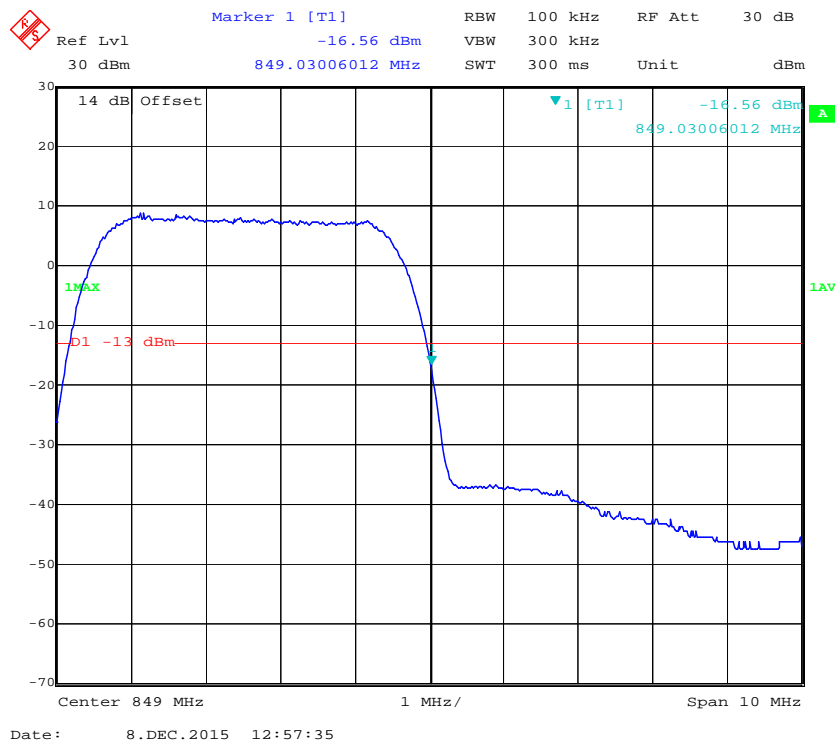
Cellular Band, Right Band Edge for EGPRS Mode



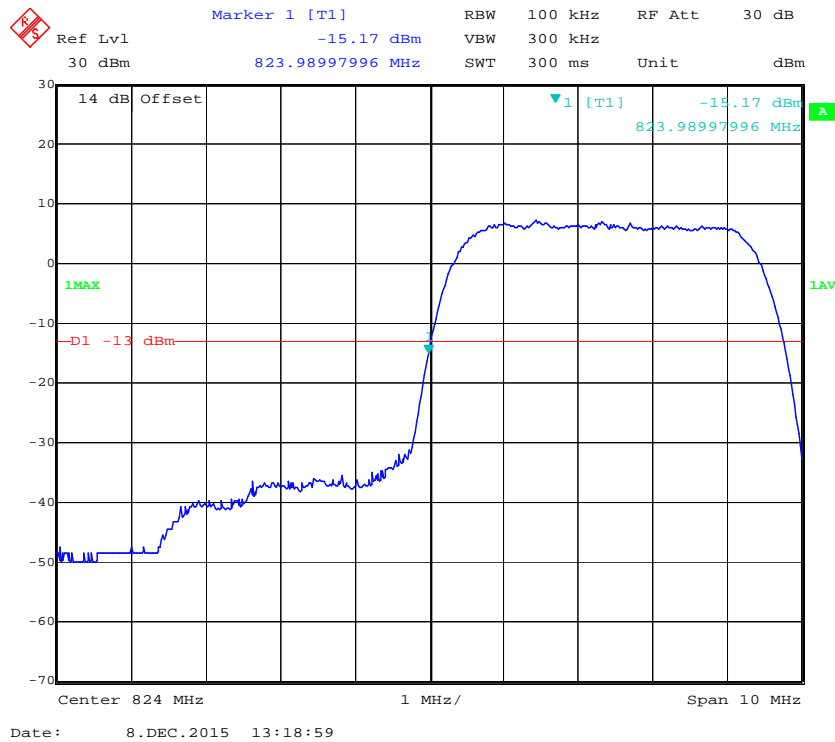
Cellular Band, Left Band Edge for WCDMA (BPSK) Mode



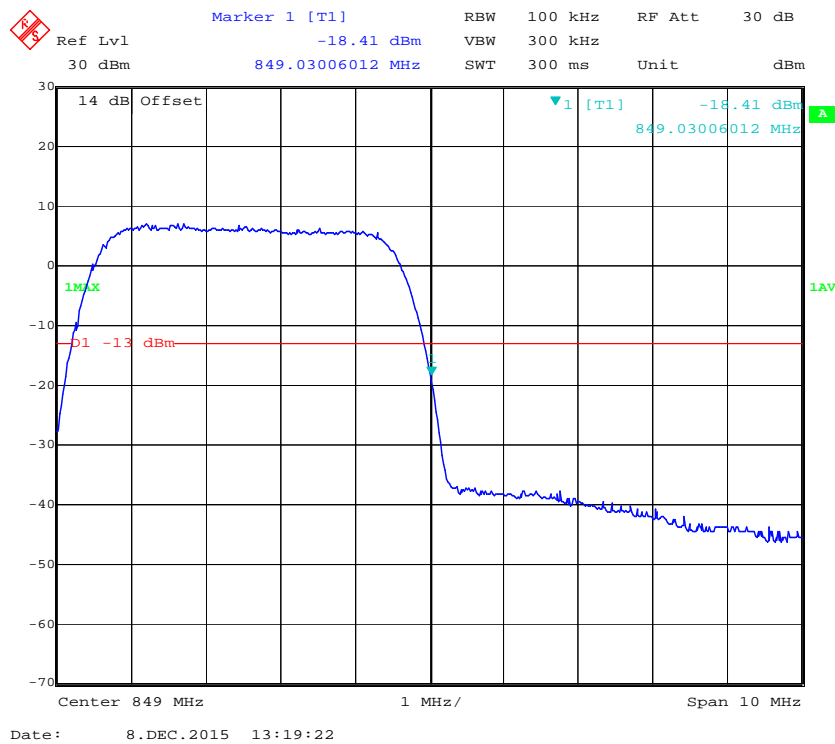
Cellular Band, Right Band Edge for WCDMA (BPSK) Mode



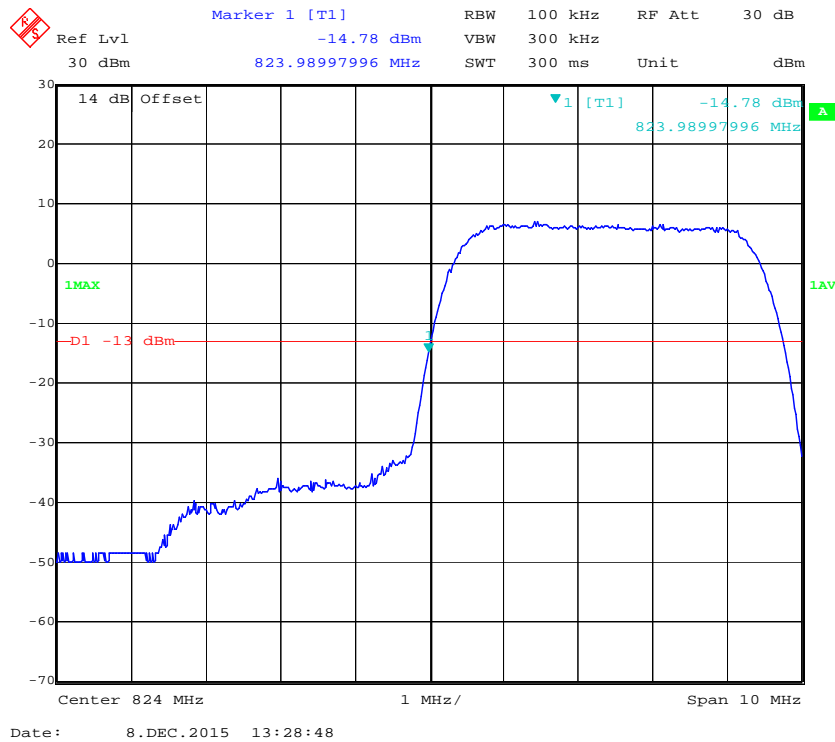
Cellular Band, Left Band Edge for HSDPA (16QAM) Mode



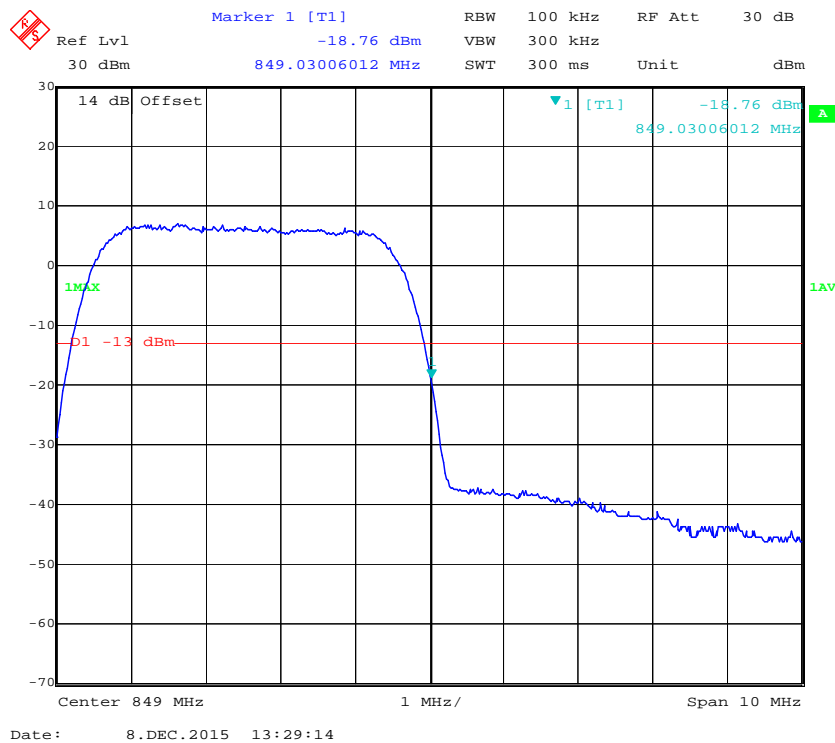
Cellular Band, Right Band Edge for HSDPA (16QAM) Mode



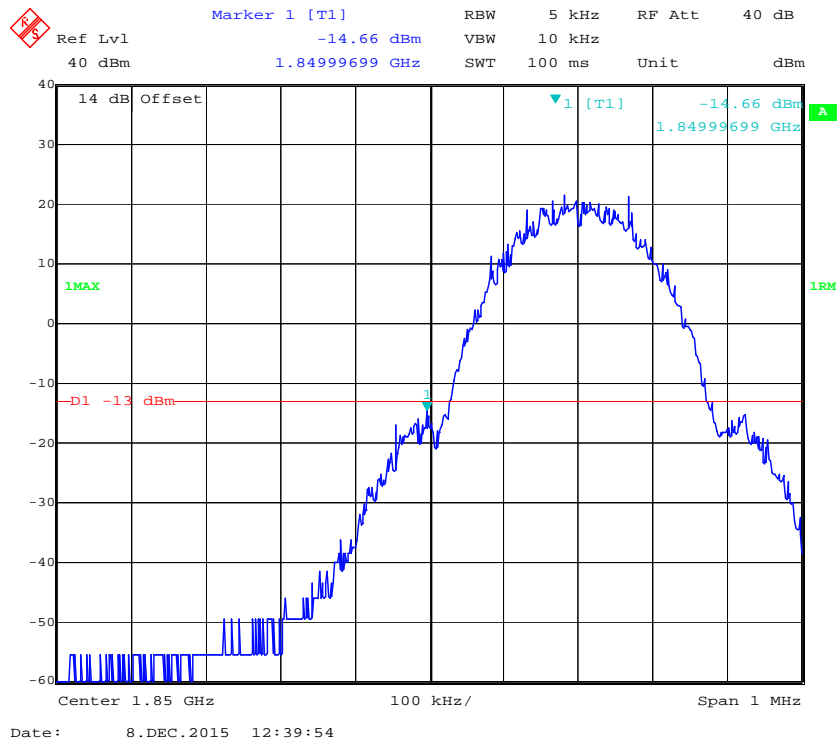
Cellular Band, Left Band Edge for HSUPA (BPSK) Mode



Cellular Band, Right Band Edge for HSUPA (BPSK) Mode



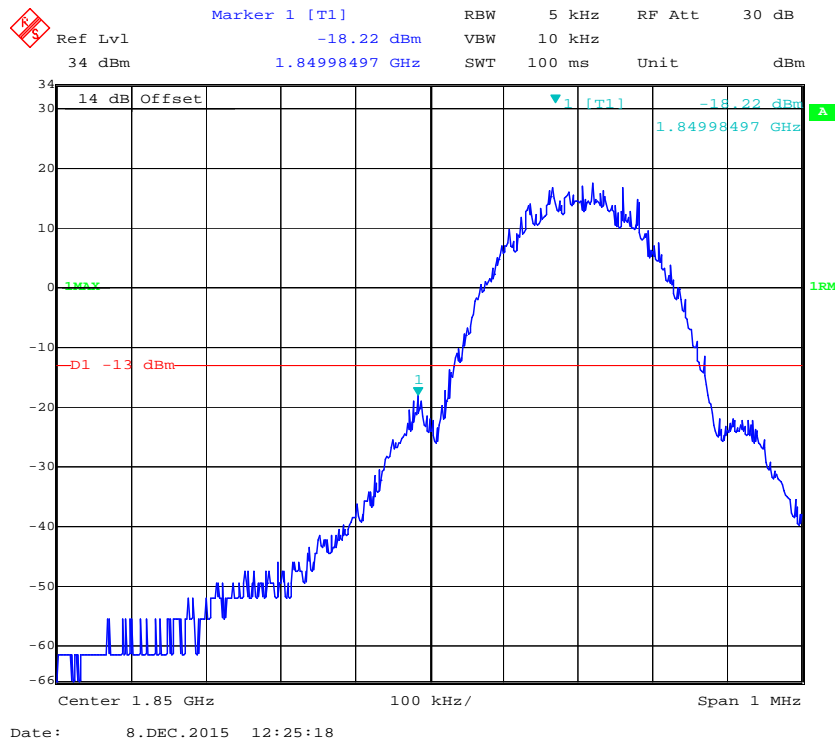
PCS Band, Left Band Edge for GSM (GMSK) Mode



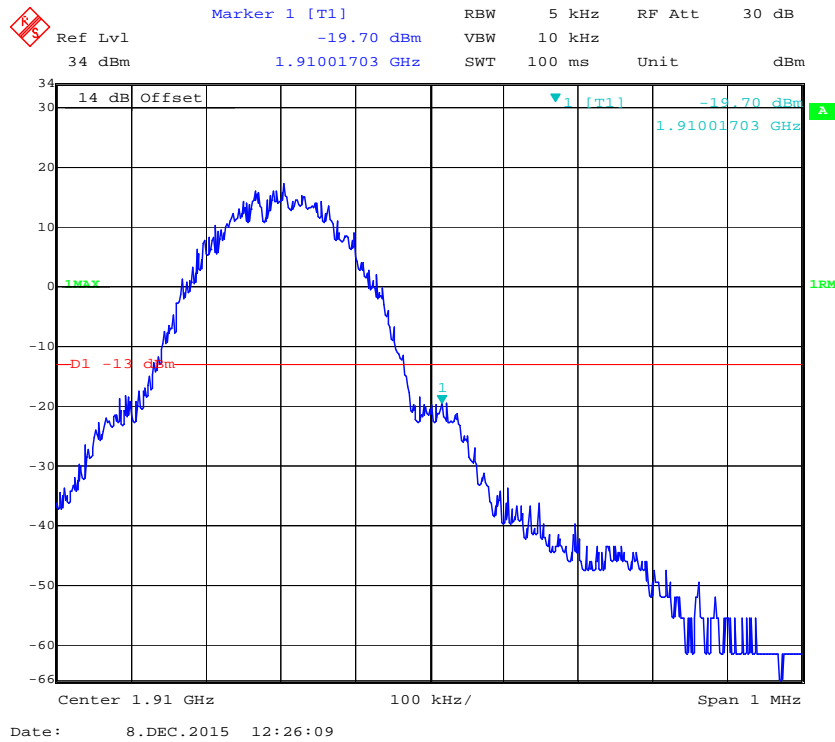
PCS Band, Right Band Edge for GSM (GMSK) Mode



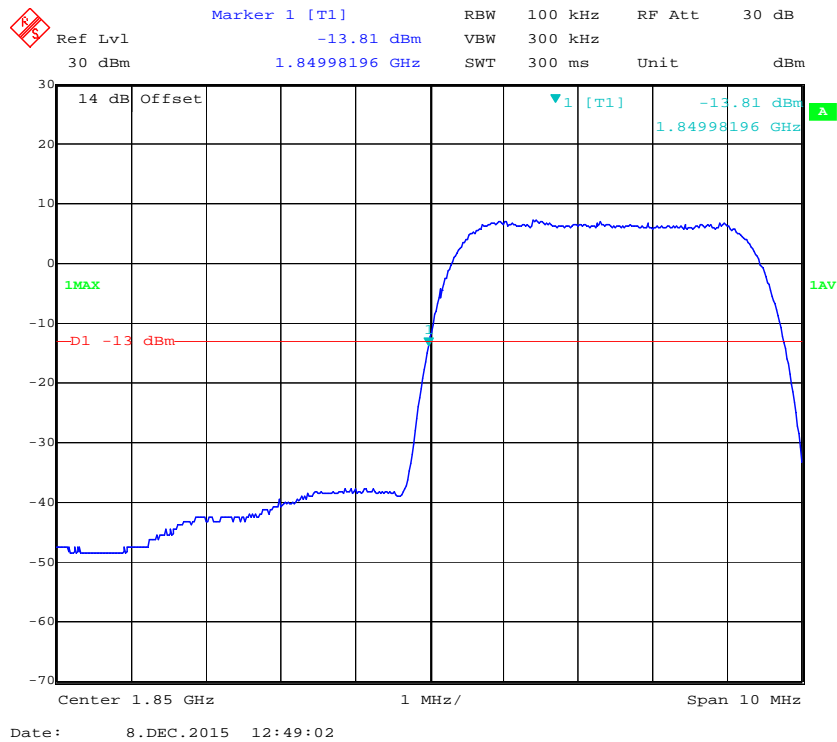
PCS Band, Left Band Edge for EGPRS Mode



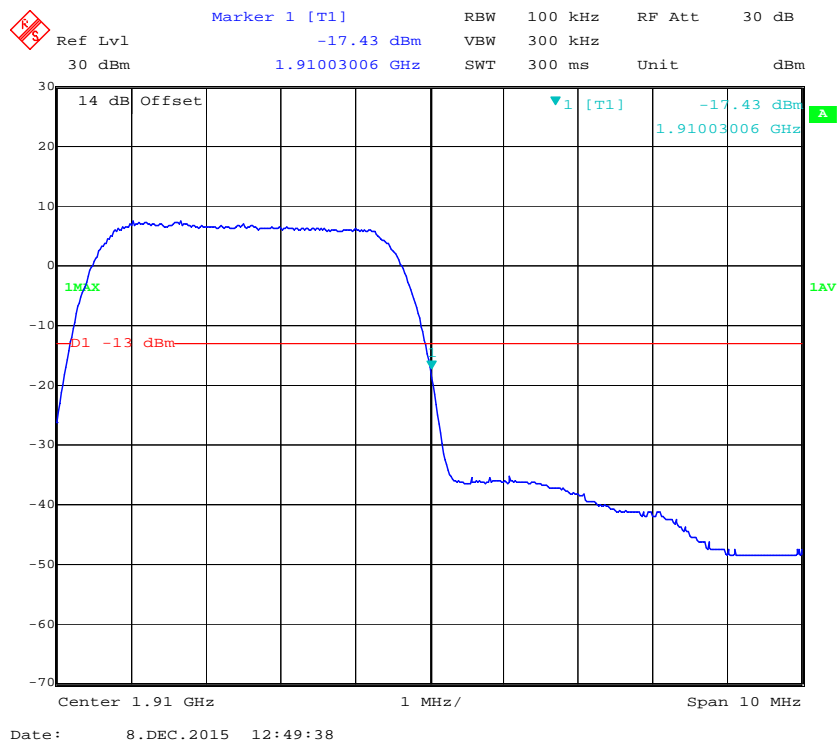
PCS Band, Right Band Edge for EGPRS Mode



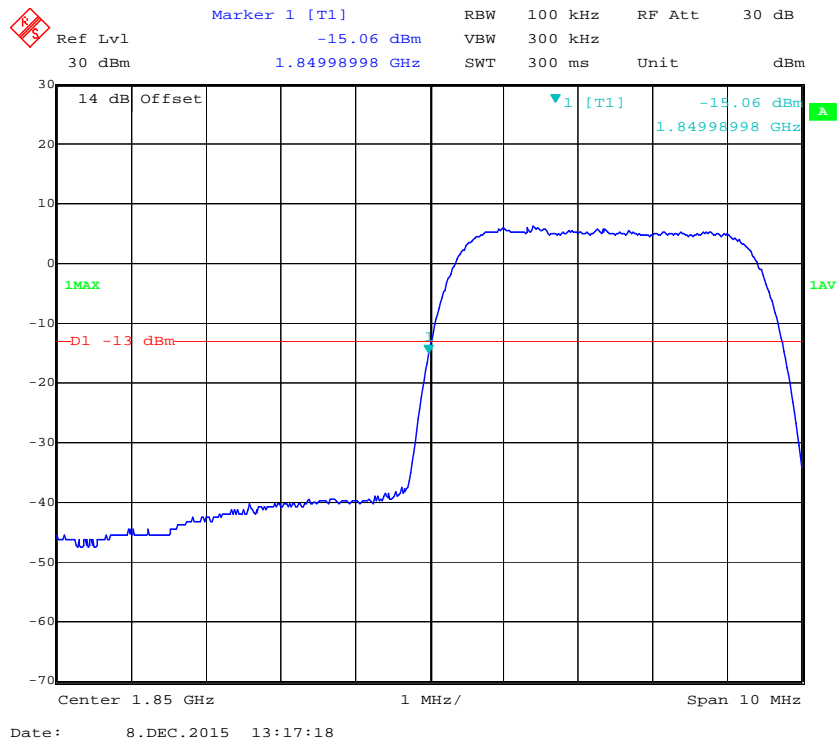
PCS Band, Left Band Edge for WCDMA (BPSK) Mode



PCS Band, Right Band Edge for WCDMA (BPSK) Mode



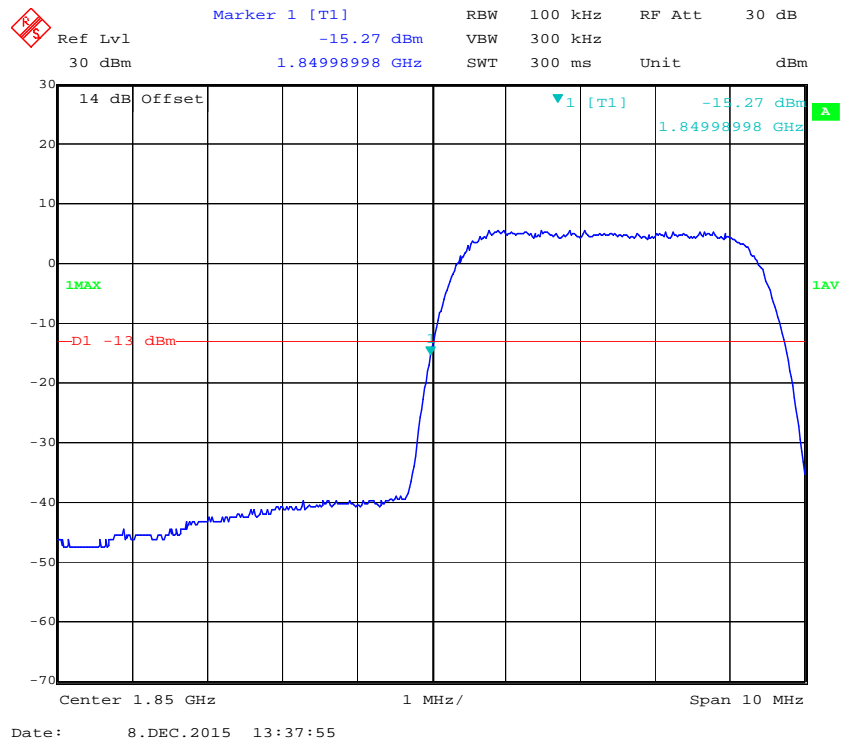
PCS Band, Left Band Edge for HSDPA (16QAM) Mode



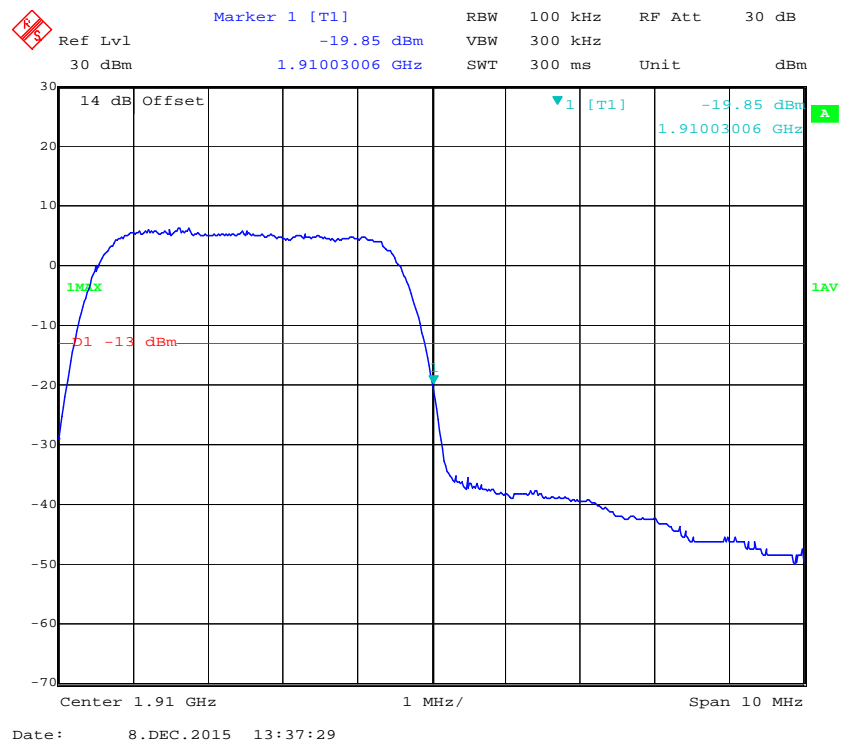
PCS Band, Right Band Edge for HSDPA (16QAM) Mode



PCS Band, Left Band Edge for HSUPA (BPSK) Mode

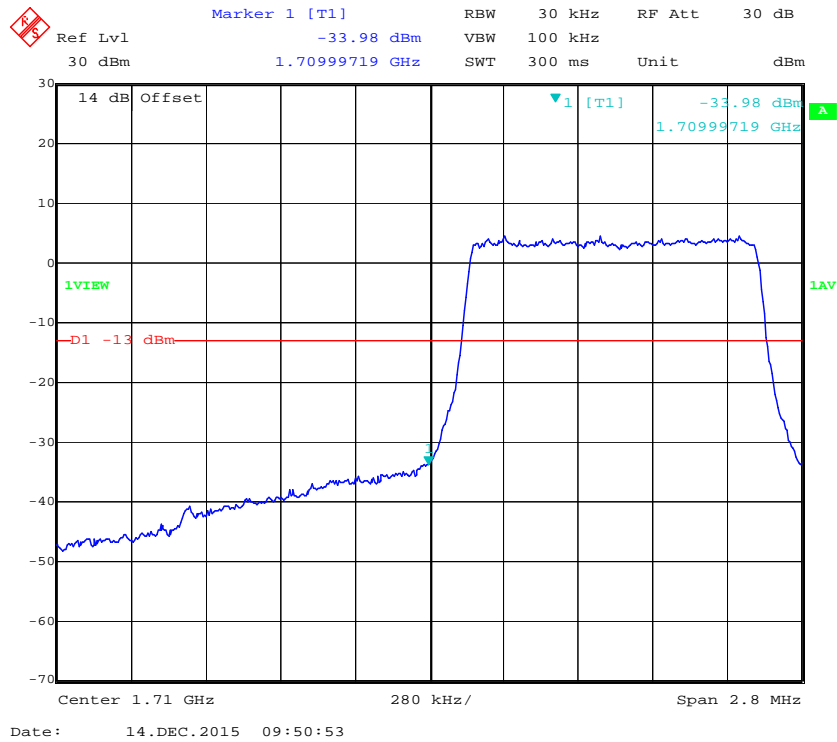


PCS Band, Right Band Edge for HSUPA (BPSK) Mode

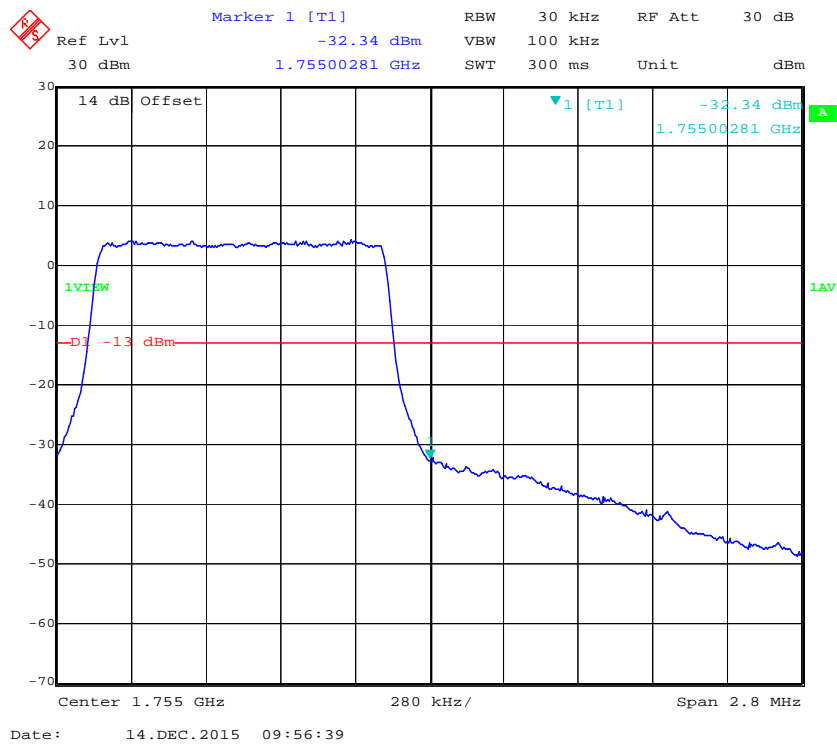


Band 4:

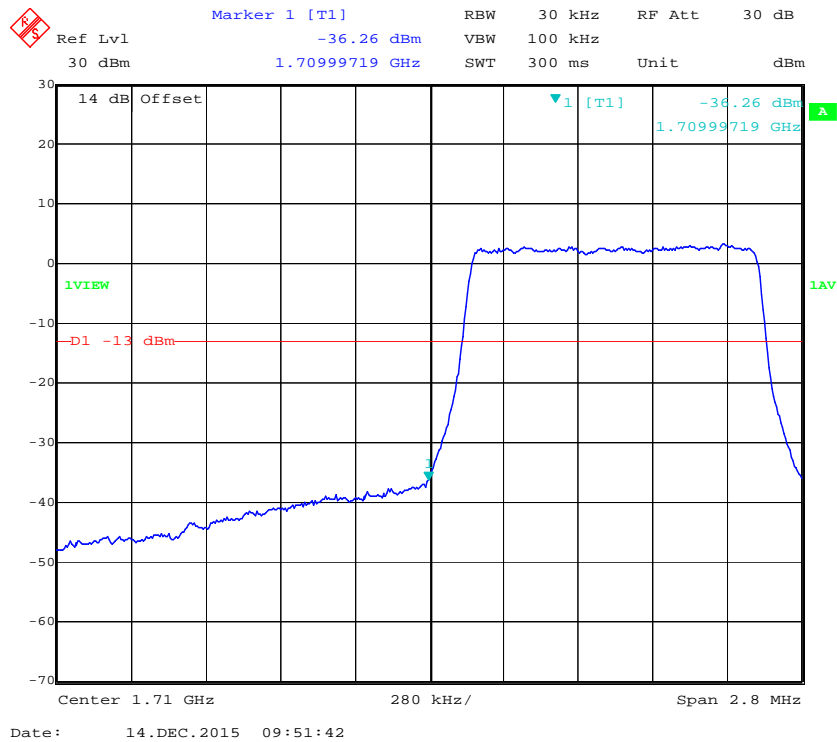
QPSK (1.4 MHz, FULL RB) - Left Band Edge



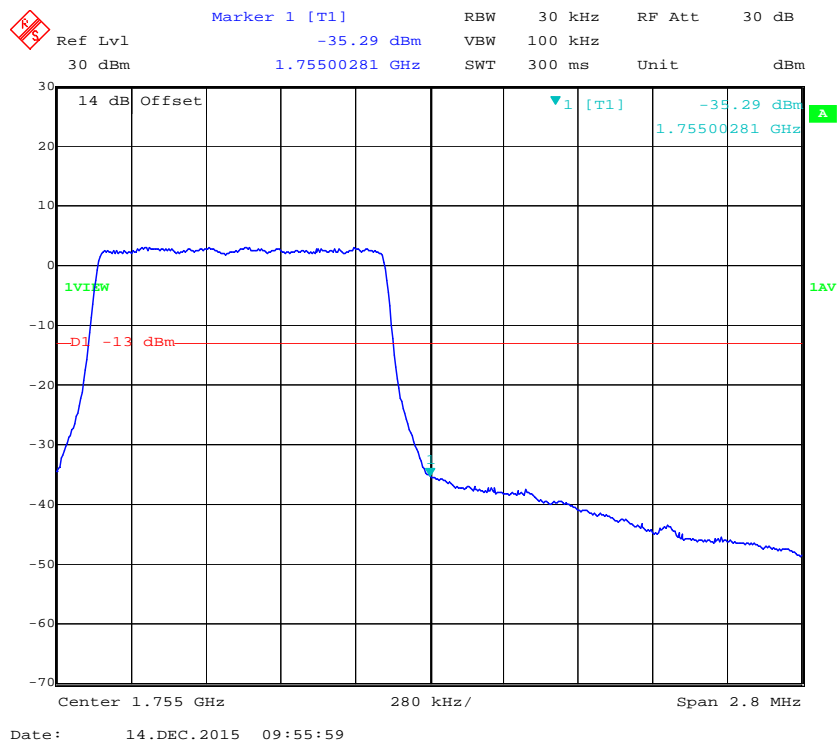
QPSK (1.4 MHz, FULL RB) - Right Band Edge



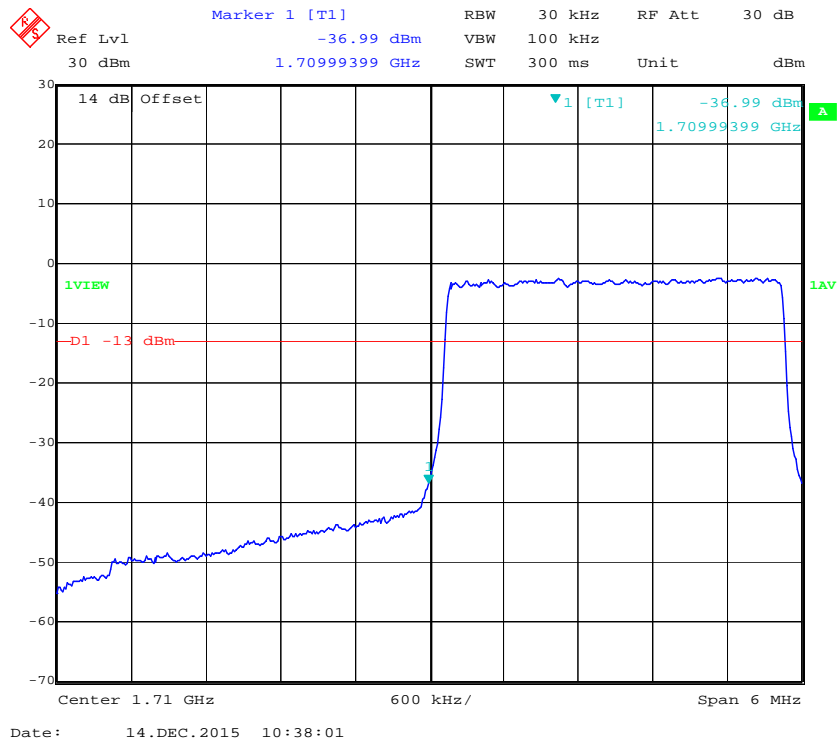
16-QAM (1.4 MHz, FULL RB) - Left Band Edge



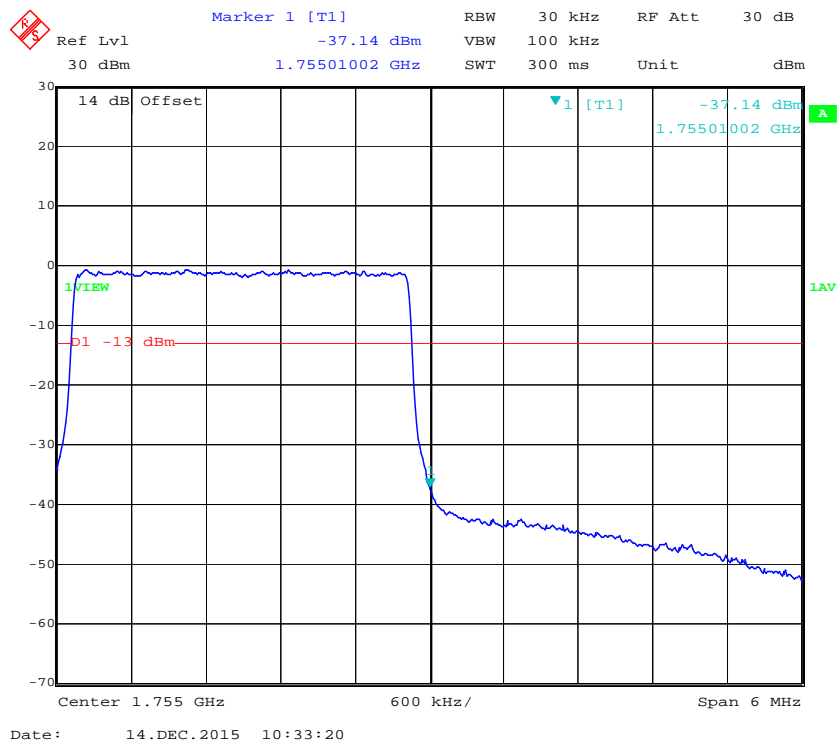
16-QAM (1.4 MHz, FULL RB) - Right Band Edge



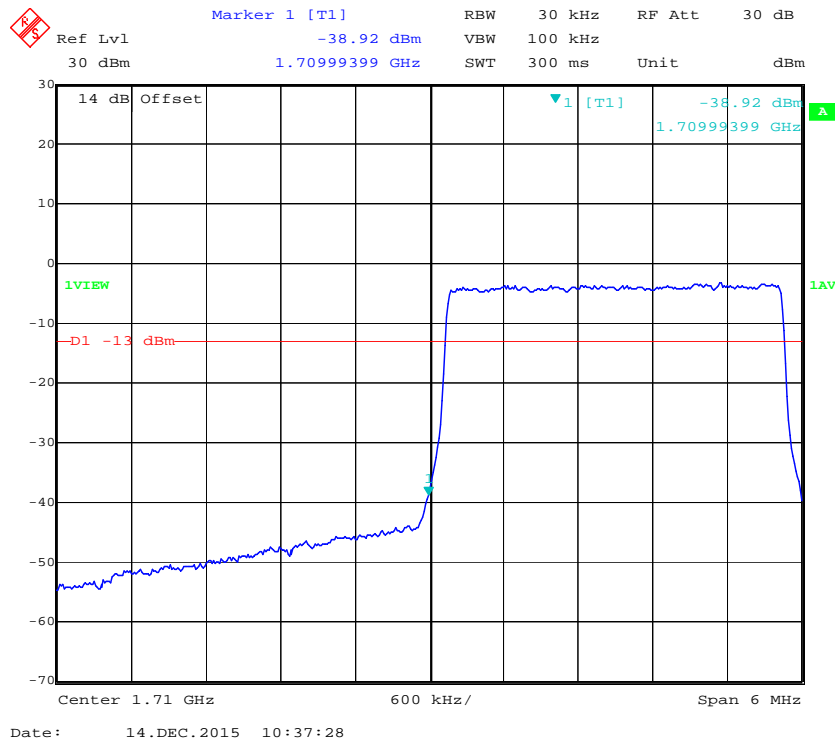
QPSK (3.0 MHz, FULL RB) - Left Band Edge



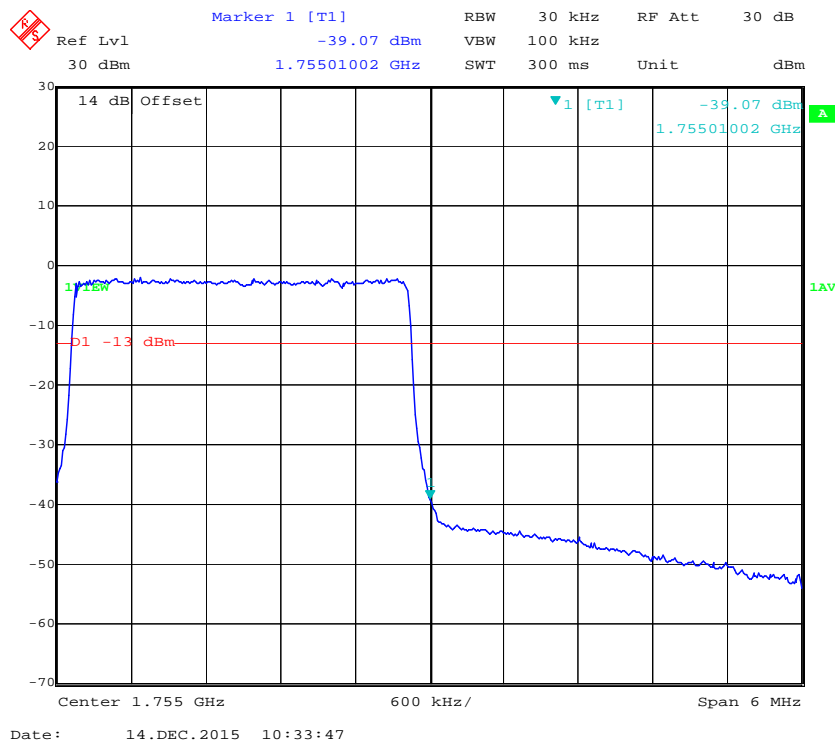
QPSK (3.0 MHz, FULL RB) - Right Band Edge



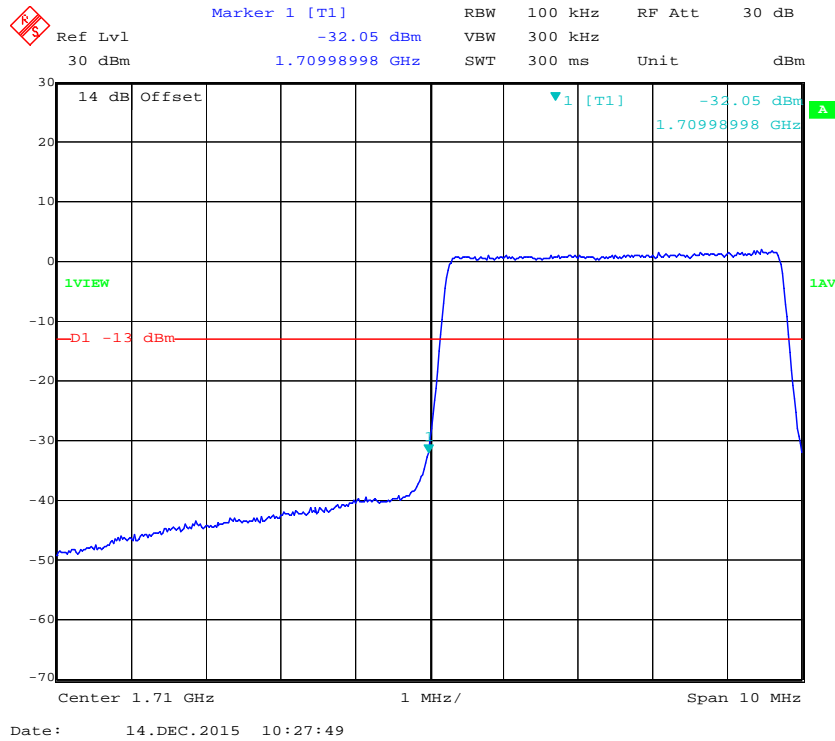
16-QAM (3.0 MHz, FULL RB) - Left Band Edge



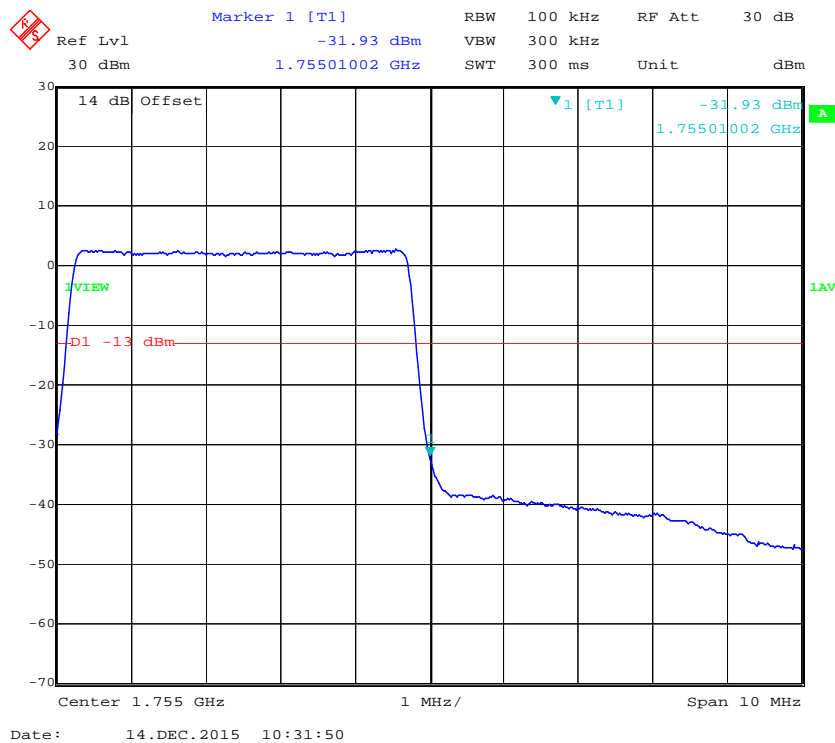
16-QAM (3.0 MHz, FULL RB) - Right Band Edge



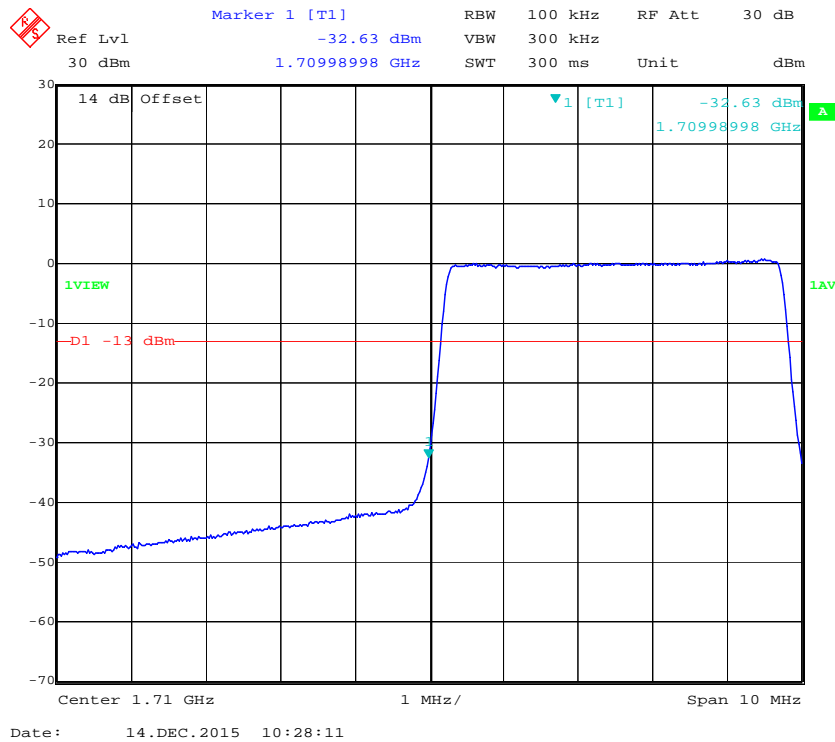
QPSK (5.0 MHz, FULL RB) - Left Band Edge



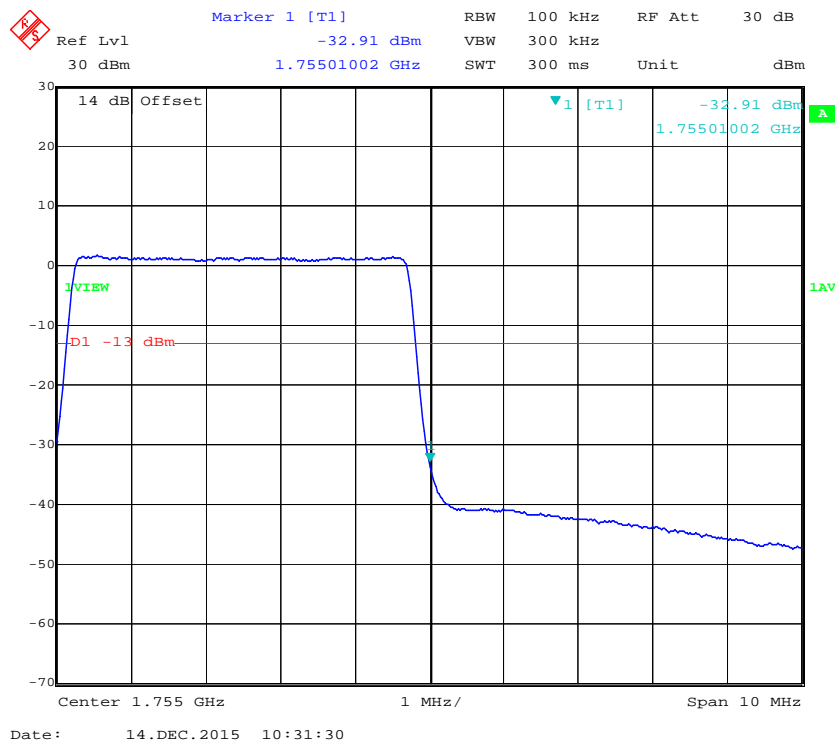
QPSK (5.0 MHz, FULL RB) - Right Band Edge



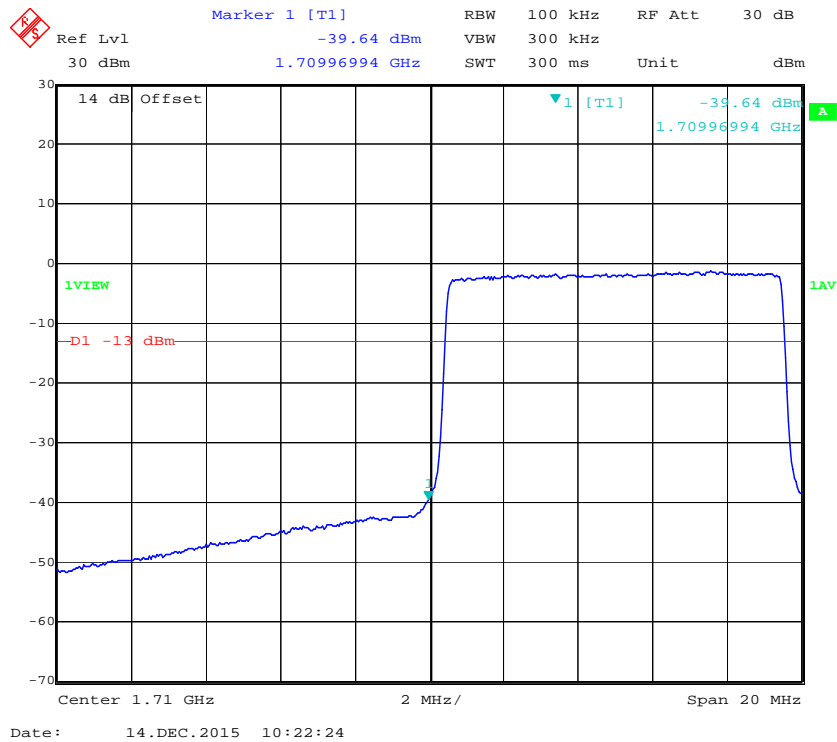
16-QAM (5.0 MHz, FULL RB) - Left Band Edge



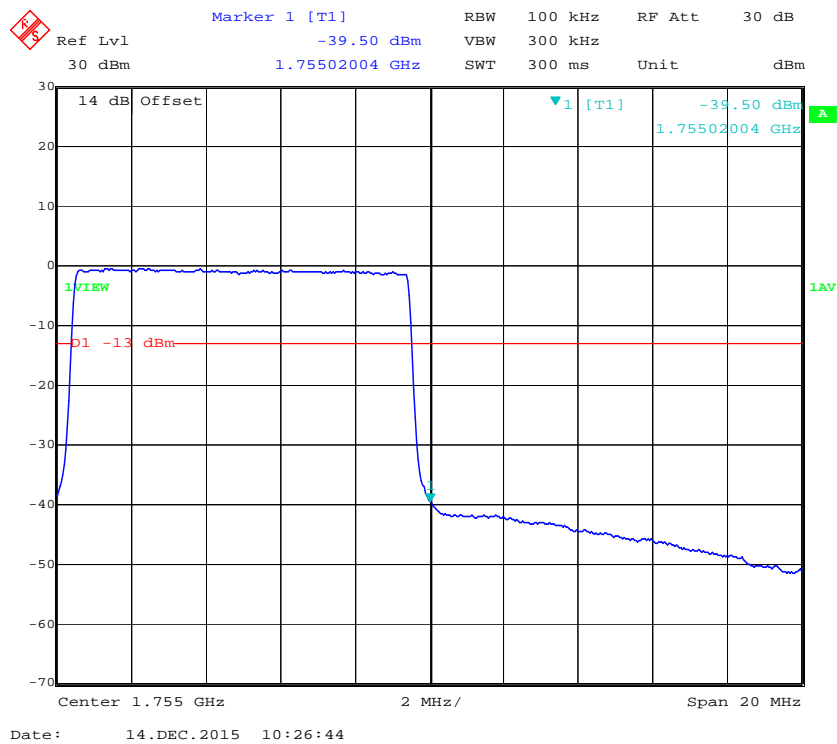
16-QAM (5.0 MHz, FULL RB) - Right Band Edge

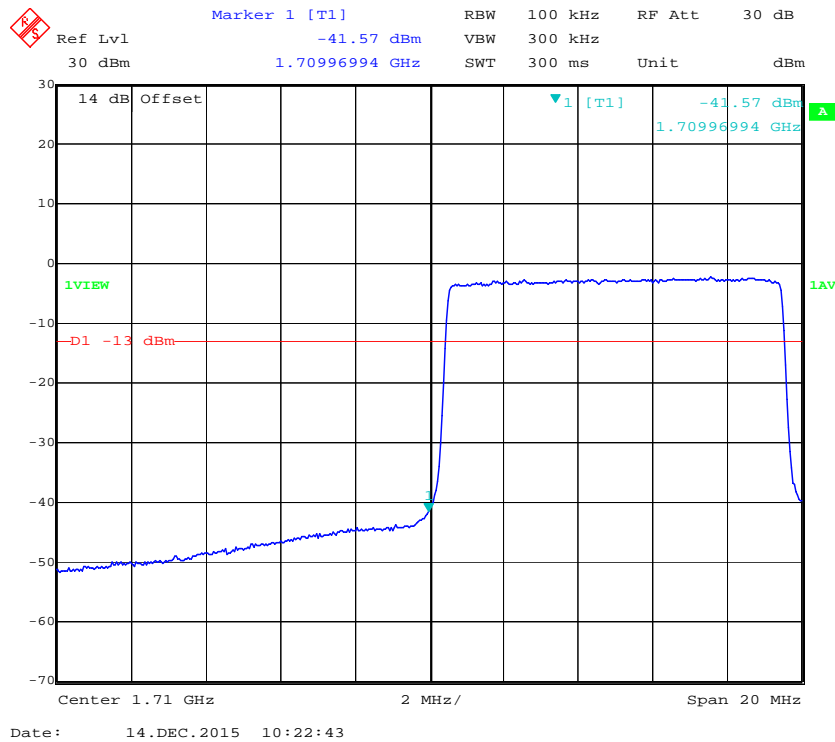
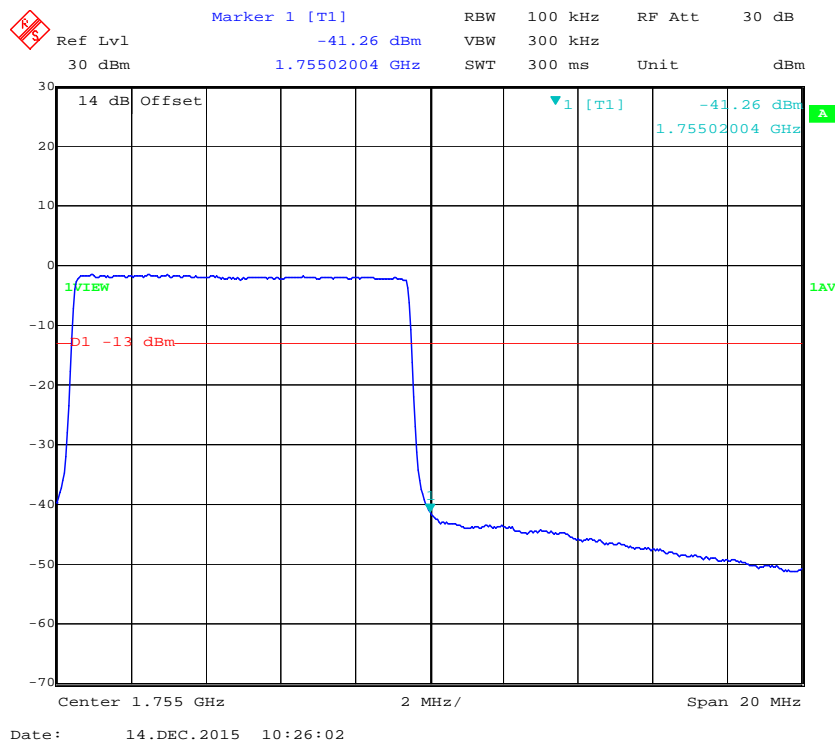


QPSK (10.0 MHz, FULL RB) - Left Band Edge

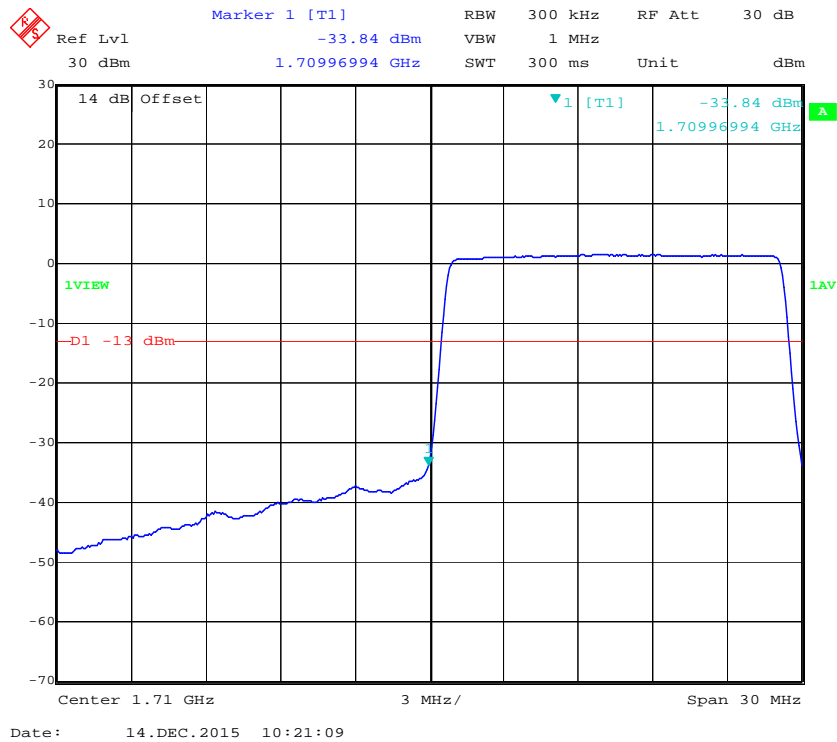


QPSK (10.0 MHz, FULL RB) - Right Band Edge

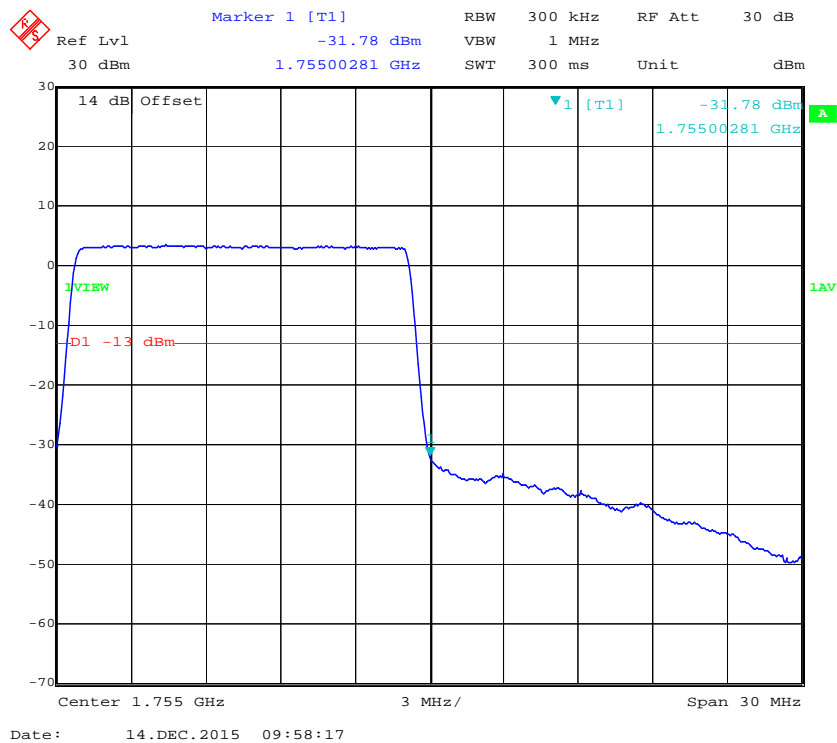


16-QAM (10.0 MHz, FULL RB) - Left Band Edge**16-QAM (10.0 MHz, FULL RB) - Right Band Edge**

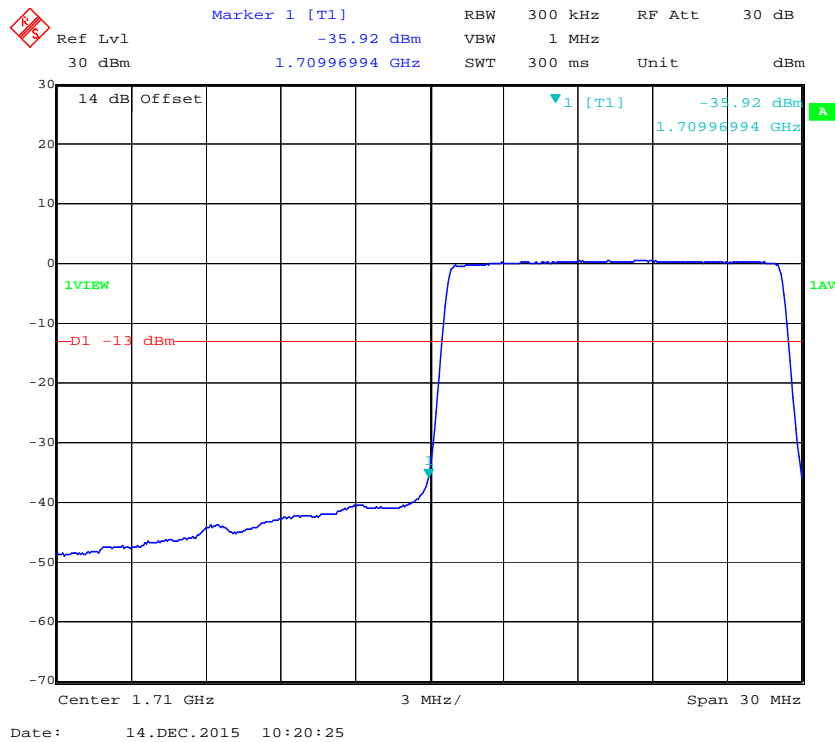
QPSK (15.0 MHz, FULL RB) - Left Band Edge



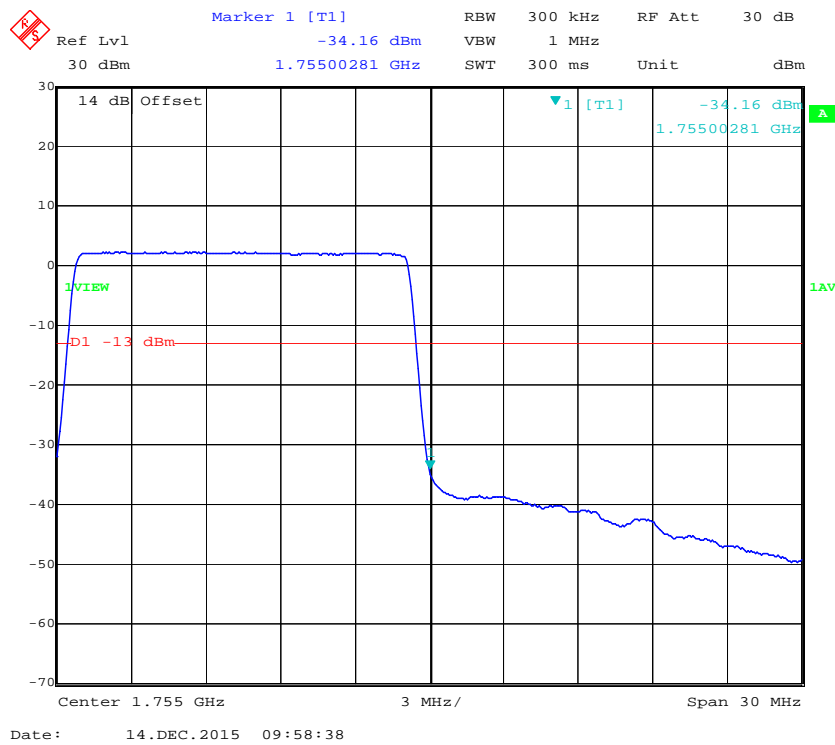
QPSK (15.0 MHz, FULL RB) - Right Band Edge



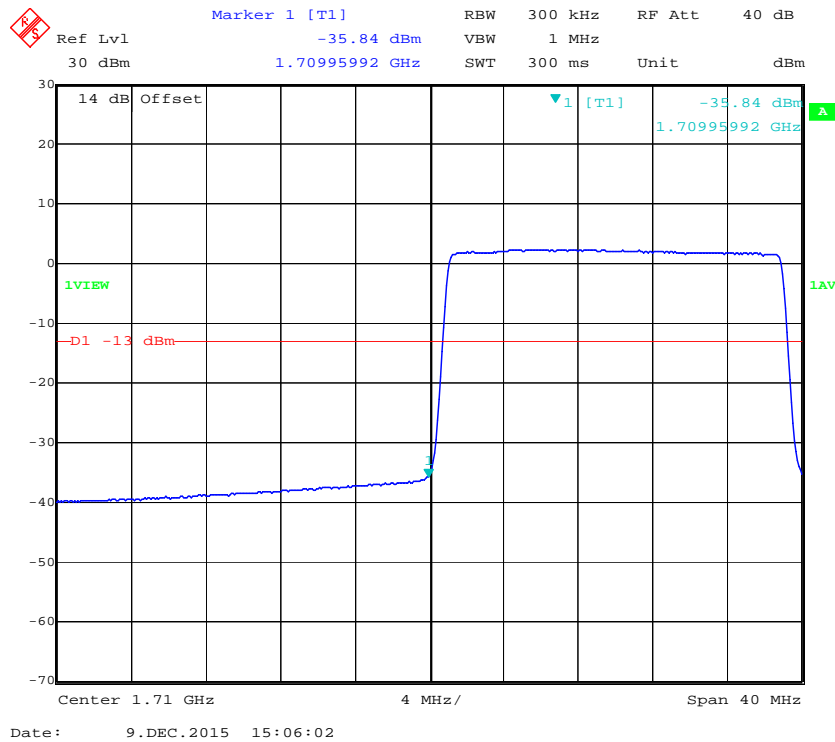
16-QAM (15.0 MHz, FULL RB) - Left Band Edge



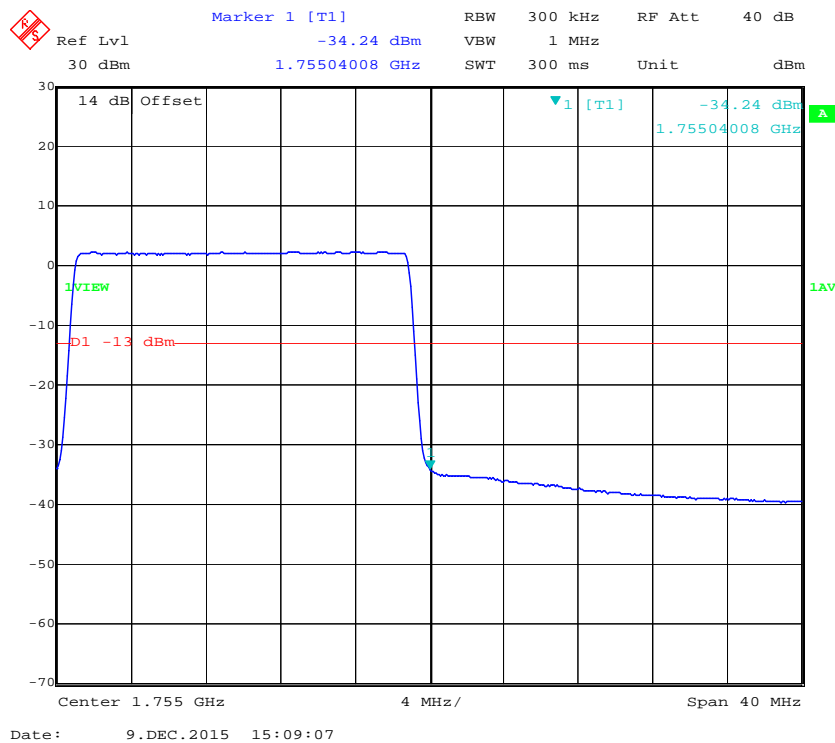
16-QAM (15.0 MHz, FULL RB) - Right Band Edge



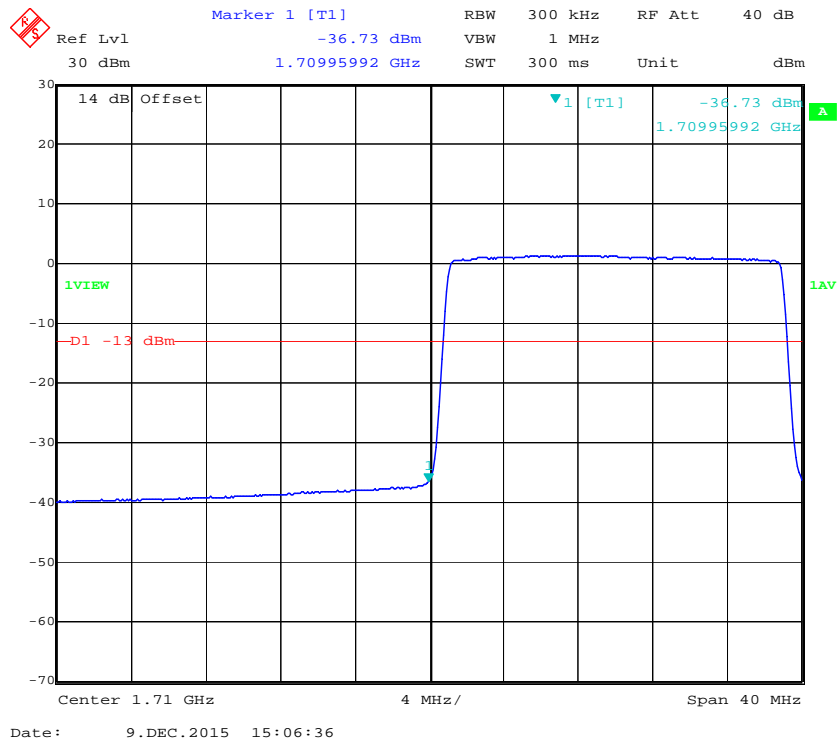
QPSK (20.0 MHz, FULL RB) - Left Band Edge



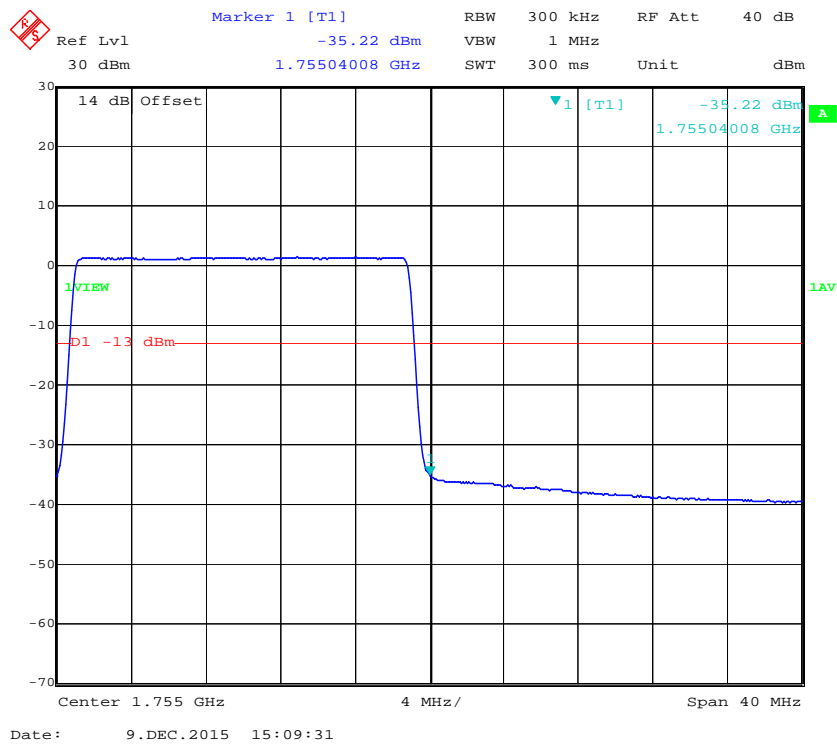
QPSK (20.0 MHz, FULL RB) - Right Band Edge

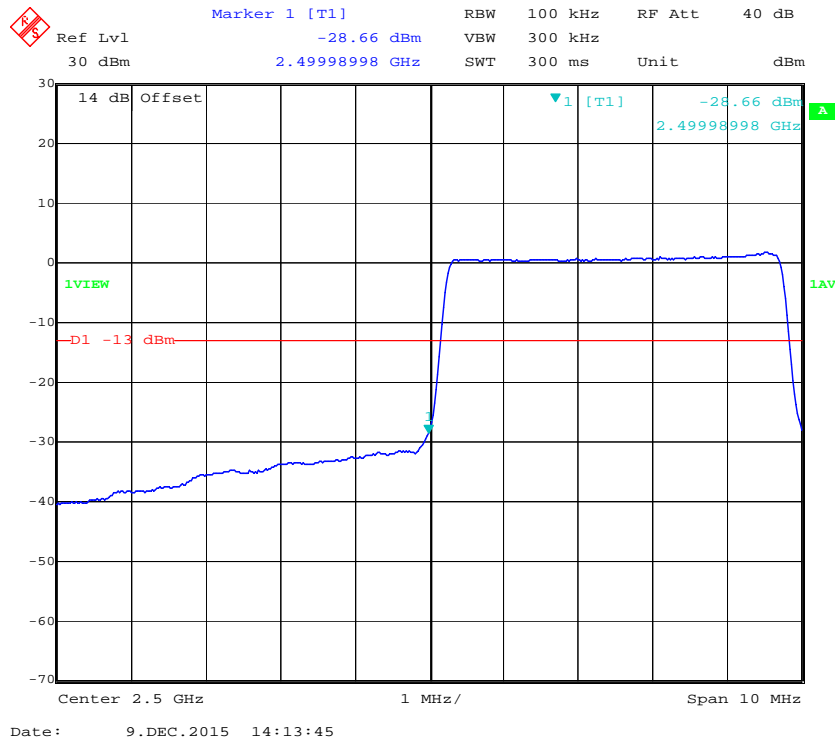


16-QAM (20.0 MHz, FULL RB) - Left Band Edge

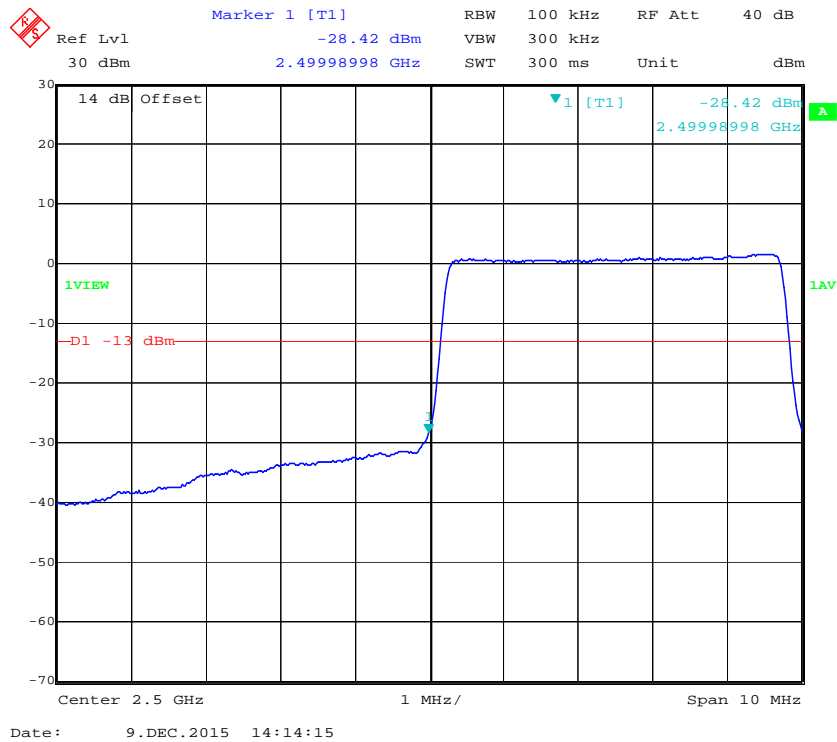


16-QAM (20.0 MHz, FULL RB) - Right Band Edge

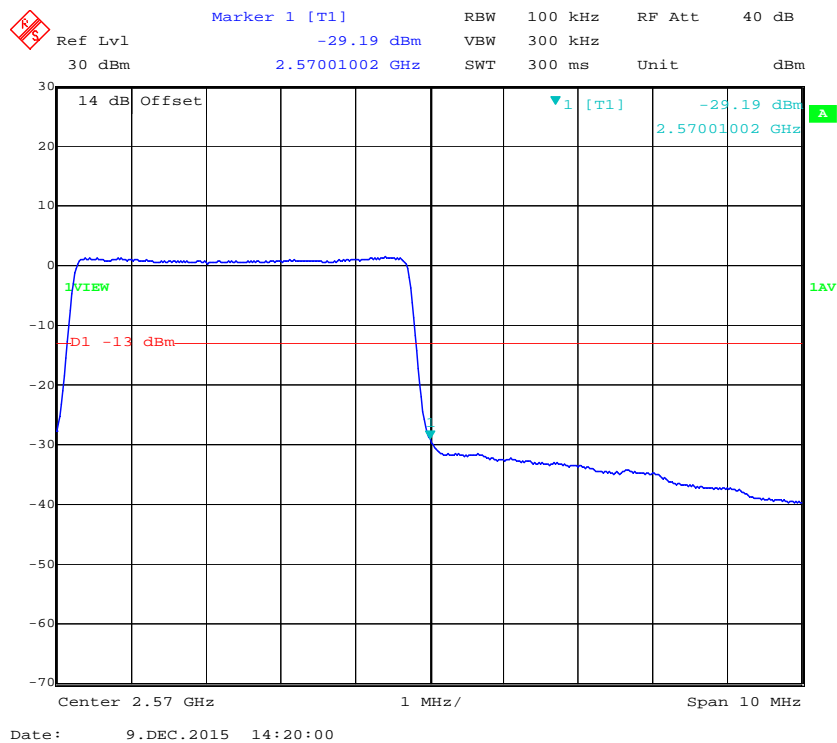


Band 7:**QPSK (5.0 MHz, FULL RB) - Left Band Edge****QPSK (5.0 MHz, FULL RB) - Right Band Edge**

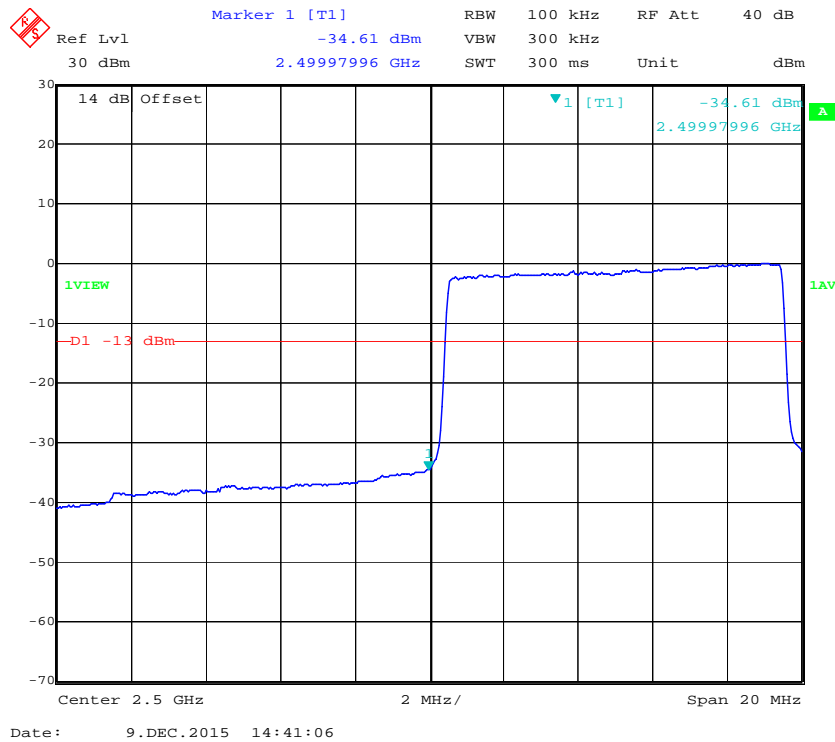
16-QAM (5.0 MHz, FULL RB) - Left Band Edge



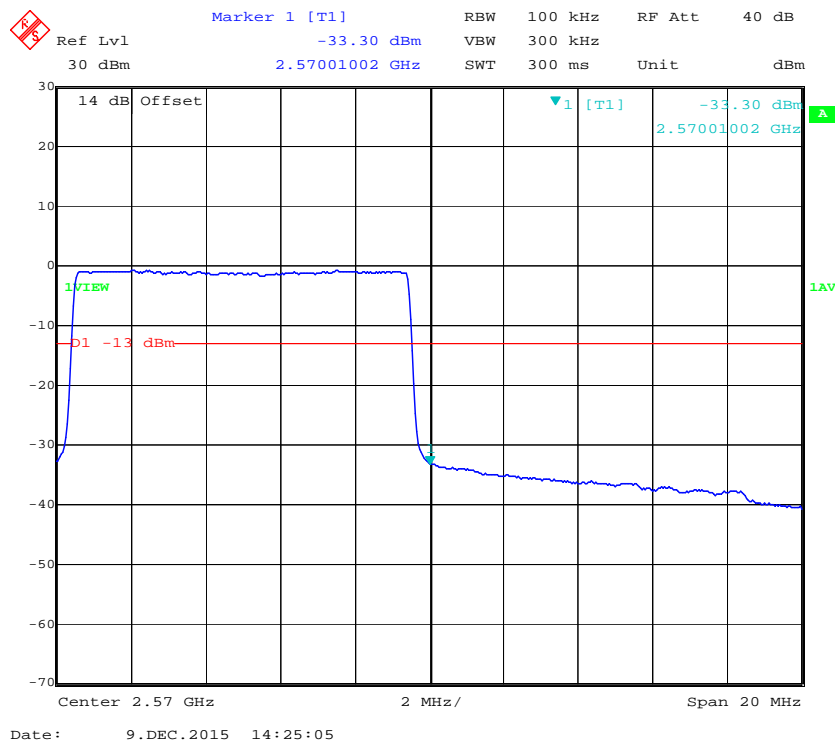
16-QAM (5.0 MHz, FULL RB) - Right Band Edge



QPSK (10.0 MHz, FULL RB) - Left Band Edge



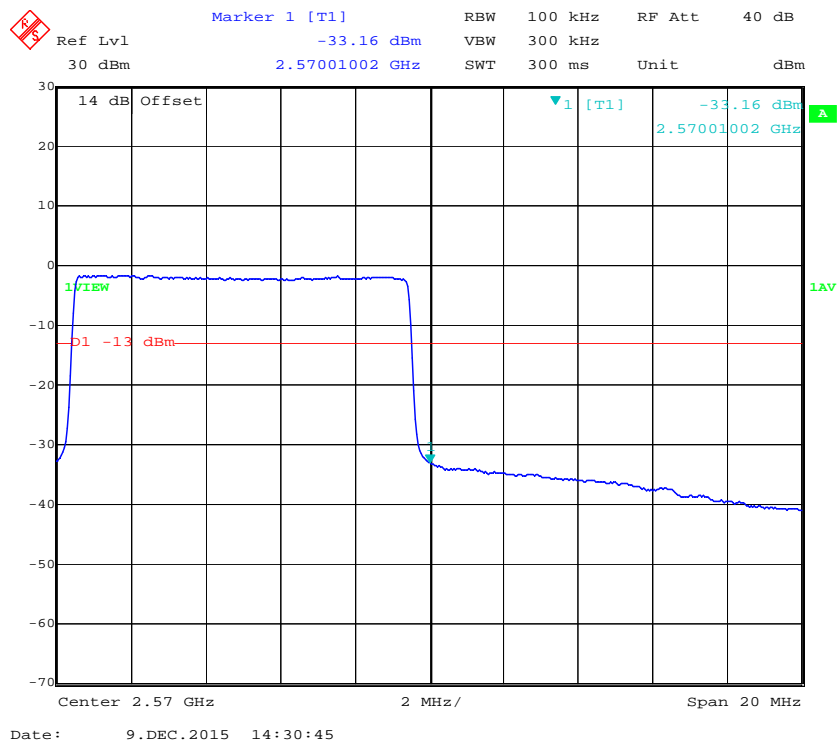
QPSK (10.0 MHz, FULL RB) - Right Band Edge



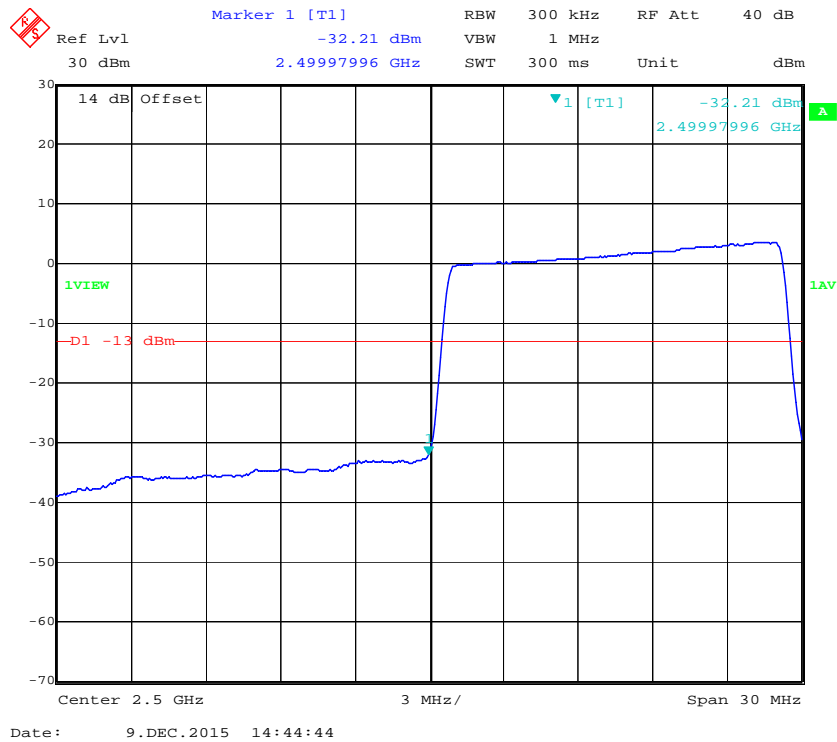
16-QAM (10.0 MHz, FULL RB) - Left Band Edge



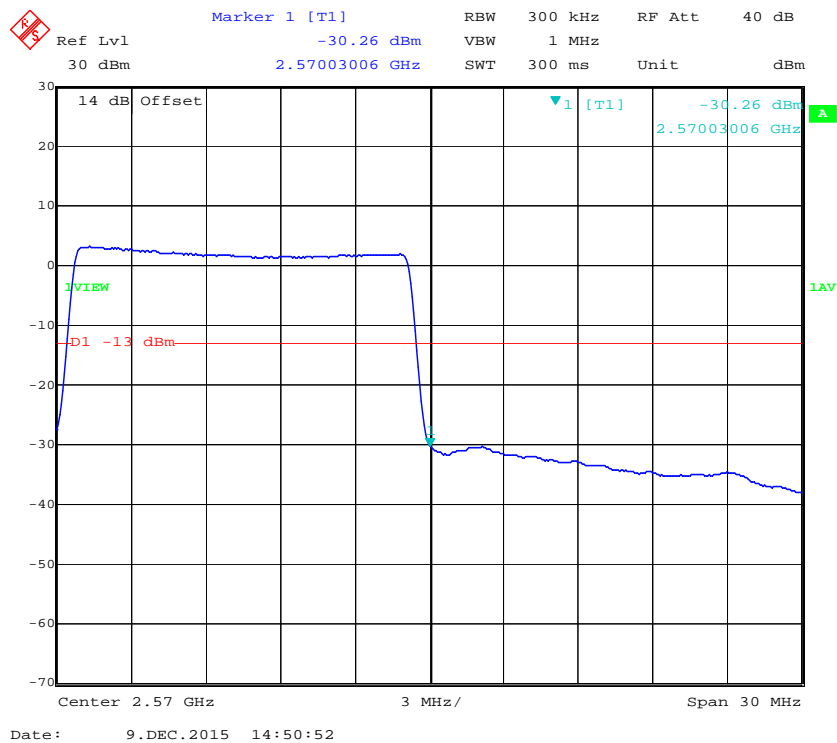
16-QAM (10.0 MHz, FULL RB) - Right Band Edge



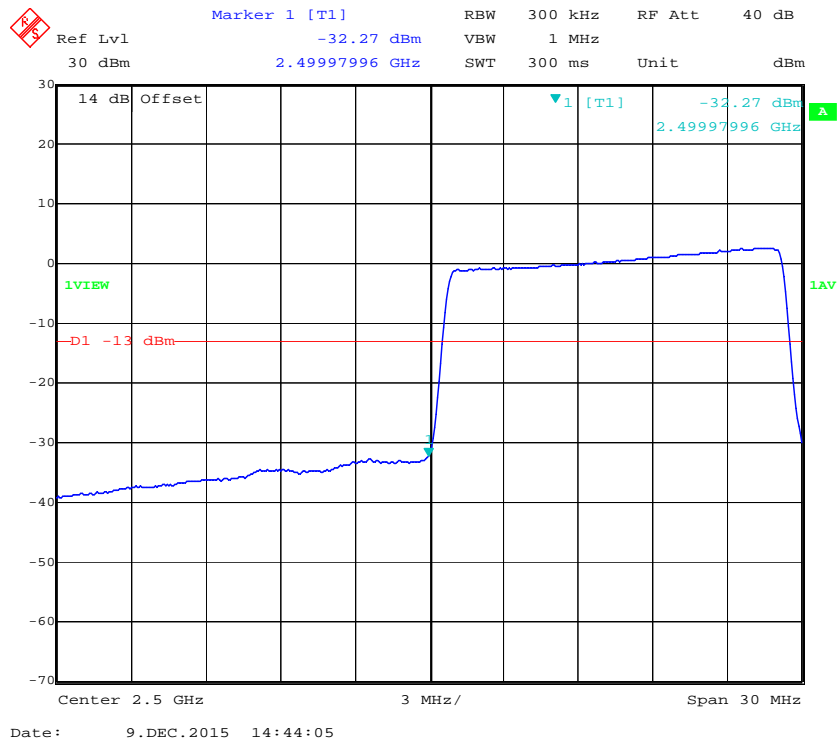
QPSK (15.0 MHz, FULL RB) - Left Band Edge



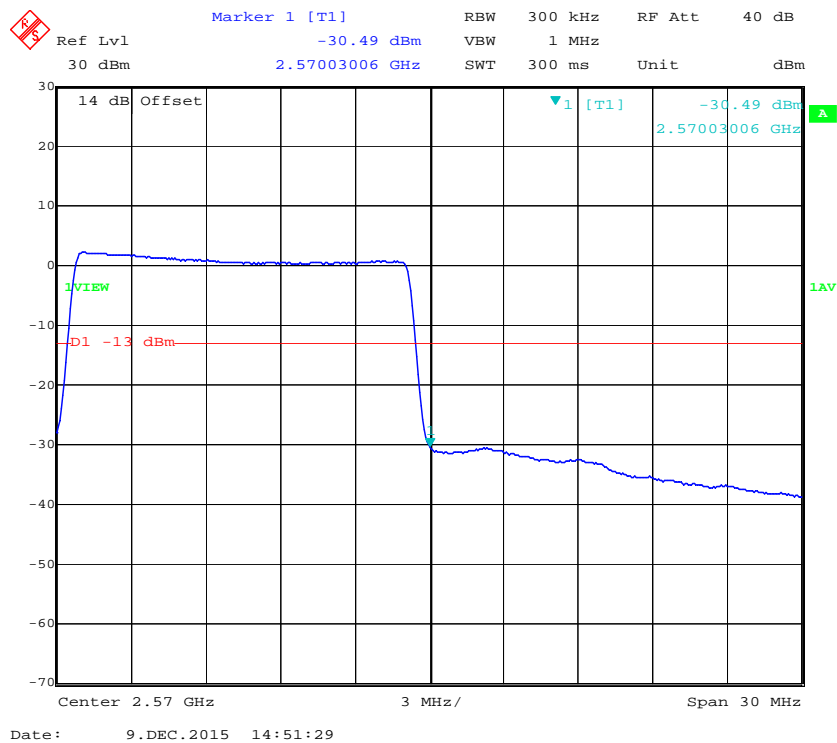
QPSK (15.0 MHz, FULL RB) - Right Band Edge



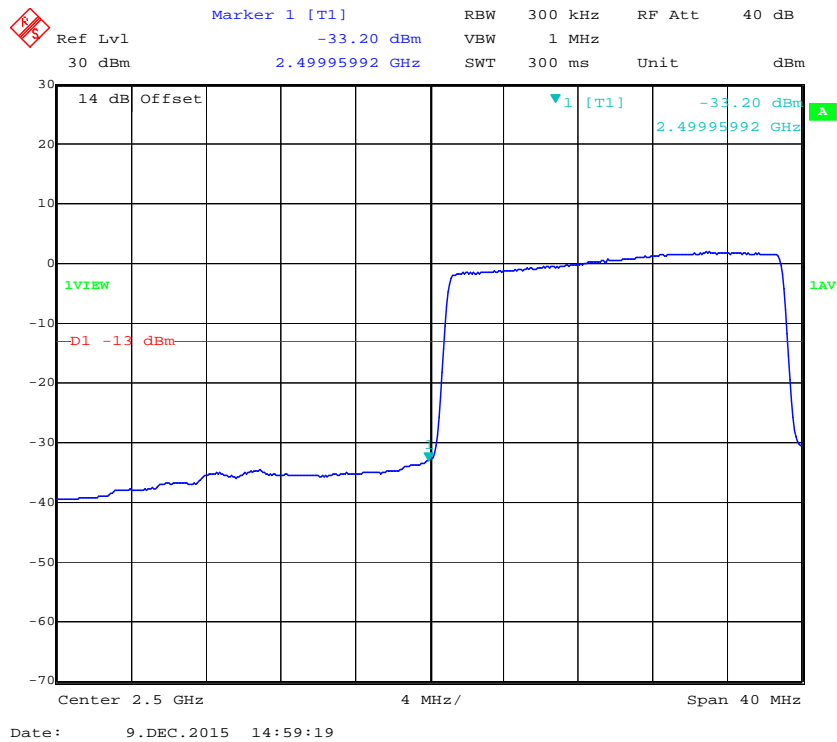
16-QAM (15.0 MHz, FULL RB) - Left Band Edge



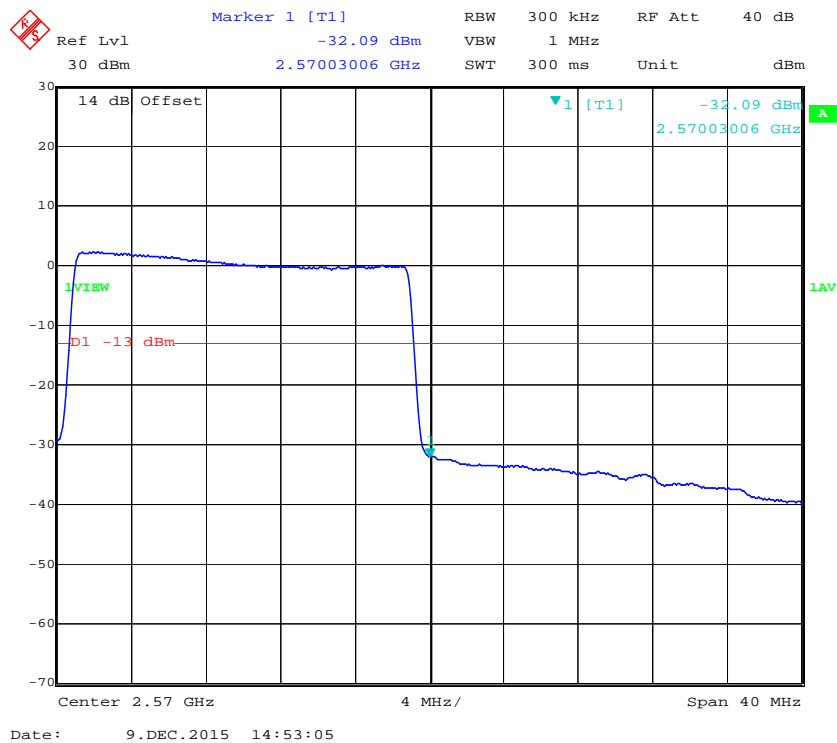
16-QAM (15.0 MHz, FULL RB) - Right Band Edge

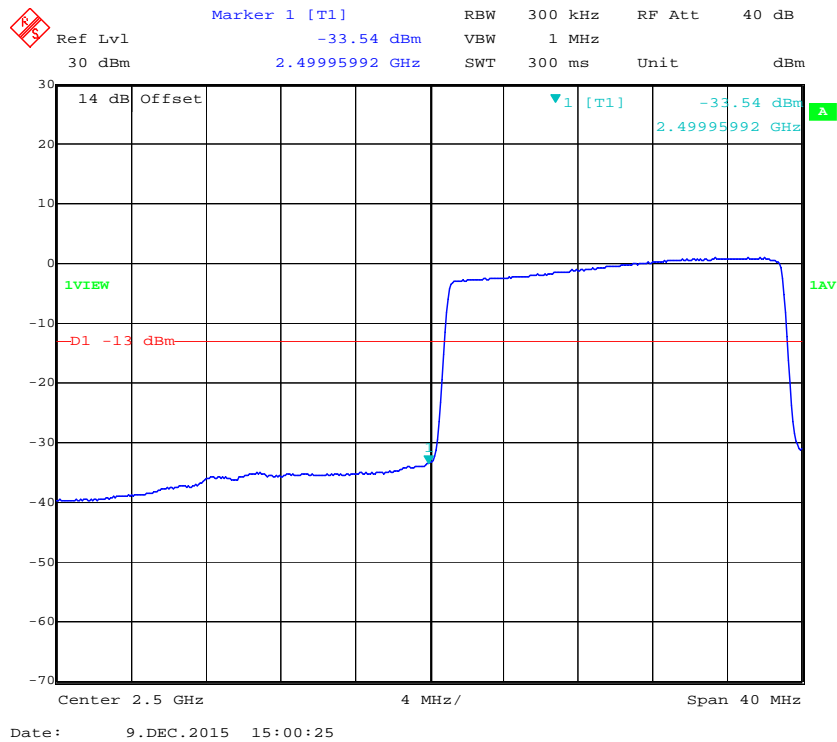
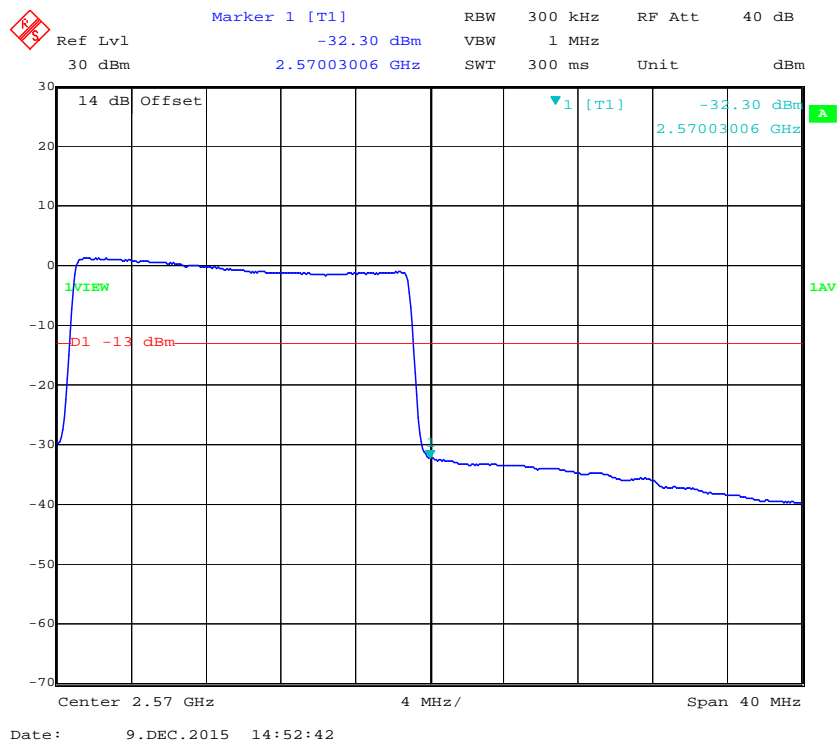


QPSK (20.0 MHz, FULL RB) - Left Band Edge



QPSK (20.0 MHz, FULL RB) - Right Band Edge



16-QAM (20.0 MHz, FULL RB) - Left Band Edge**16-QAM (20.0 MHz, FULL RB) - Right Band Edge**

FCC §2.1055, §22.355 & §24.235 & §27.54 - FREQUENCY STABILITY**Applicable Standards**

FCC § 2.1055, §22.355, §24.235 and § 27.54.

According to FCC §2.1055, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

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

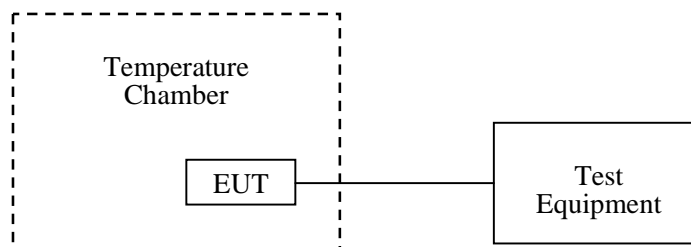
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

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: For hand carried, battery powered equipment; reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
ESPEC	Temperature & Humidity Chamber	EL-10KA	09107726	2015-11-01	2016-11-01
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	106891	2015-11-23	2016-11-23
R&S	Wideband Radio Communication tester	CMW500	1201.002K50-146520-wh	2015-11-23	2016-11-23

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

Test Data**Environmental Conditions**

Temperature:	25 °C
Relative Humidity:	51 %
ATM Pressure:	101.0 kPa

The testing was performed by William Li on 2015-12-07.

EUT operation mode: Transmitting

Test Result: Compliance. Please refer to the following tables.

Cellular Band (Part 22H)**GSM Mode**

Middle Channel, $f_0 = 836.6$ MHz				
Temperature (°C)	Power Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.8	12	0.01434	2.5
-20		10	0.01195	2.5
-10		12	0.01434	2.5
0		14	0.01673	2.5
10		13	0.01554	2.5
20		14	0.01673	2.5
30		11	0.01315	2.5
40		12	0.01434	2.5
50		12	0.01434	2.5
25	V min.= 3.5	13	0.01554	2.5
25	V max.= 4.35	15	0.01793	2.5

EDGE Mode

Middle Channel, $f_0=836.6$ MHz				
Temperature (°C)	Power Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.8	8	0.00956	2.5
-20		6	0.00717	2.5
-10		5	0.00598	2.5
0		6	0.00717	2.5
10		7	0.00837	2.5
20		8	0.00956	2.5
30		9	0.01076	2.5
40		11	0.01315	2.5
50		9	0.01076	2.5
25	V min.= 3.5	10	0.01195	2.5
25	V max.= 4.35	12	0.01434	2.5

WCDMA Mode

Middle Channel, $f_0=836.6$ MHz				
Temperature (°C)	Power Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.8	17	0.02032	2.5
-20		15	0.01793	2.5
-10		14	0.01673	2.5
0		16	0.01913	2.5
10		13	0.01554	2.5
20		15	0.01793	2.5
30		16	0.01913	2.5
40		15	0.01793	2.5
50		16	0.01913	2.5
25	V min.= 3.5	18	0.02152	2.5
25	V max.= 4.35	15	0.01793	2.5

PCS Band (Part 24E)**GSM Mode**

Middle Channel, $f_0 = 1880.0$ MHz				
Temperature (°C)	Power Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.8	24	0.01277	Pass
-20		20	0.01064	Pass
-10		21	0.01117	Pass
0		22	0.01170	Pass
10		23	0.01223	Pass
20		20	0.01064	Pass
30		24	0.01277	Pass
40		26	0.01383	Pass
50		25	0.01330	Pass
25	V min.= 3.5	26	0.01383	Pass
25	V max.= 4.35	28	0.01489	Pass

EDGE Mode

Middle Channel, $f_0 = 1880.0$ MHz				
Temperature (°C)	Power Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.8	16	0.00851	Pass
-20		15	0.00798	Pass
-10		12	0.00638	Pass
0		13	0.00691	Pass
10		15	0.00798	Pass
20		16	0.00851	Pass
30		14	0.00745	Pass
40		16	0.00851	Pass
50		15	0.00798	Pass
25	V min.= 3.5	16	0.00851	Pass
25	V max.= 4.35	18	0.00957	Pass

WCDMA Mode

Middle Channel, $f_0 = 1880.0$ MHz				
Temperature (°C)	Power Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.8	23	0.01223	Pass
-20		25	0.01330	Pass
-10		22	0.01170	Pass
0		24	0.01277	Pass
10		29	0.01543	Pass
20		21	0.01117	Pass
30		29	0.01543	Pass
40		31	0.01649	Pass
50		29	0.01543	Pass
25	V min.= 3.5	26	0.01383	Pass
25	V max.= 4.35	28	0.01489	Pass

Band 4:

	Temperature (°C)	QPSK (Hz)	QPSK (ppm)	Result
20.0 MHz, Middle Channel	-30	29	0.017	Pass
	-20	26	0.015	Pass
	-10	24	0.014	Pass
	0	23	0.013	Pass
	10	24	0.014	Pass
	20	23	0.013	Pass
	30	21	0.012	Pass
	40	26	0.015	Pass
	50	28	0.016	Pass
	Voltage (V _{DC})	QPSK (Hz)	QPSK (ppm)	Result
	3.5	24	0.014	Pass
	3.8	26	0.015	Pass
	4.35	28	0.016	Pass

	Temperature (°C)	16QAM (Hz)	16QAM (ppm)	Result
20.0 MHz, Middle Channel	-30	25	0.014	Pass
	-20	18	0.010	Pass
	-10	32	0.018	Pass
	0	21	0.012	Pass
	10	24	0.014	Pass
	20	26	0.015	Pass
	30	29	0.017	Pass
	40	32	0.018	Pass
	50	17	0.010	Pass
	Voltage (V _{DC})	16QAM (Hz)	16QAM (ppm)	Result
	3.5	30	0.017	Pass
	3.8	24	0.014	Pass
	4.35	21	0.012	Pass

Band 7:

	Temperature (°C)	QPSK (Hz)	QPSK (ppm)	Result
20.0 MHz, Middle Channel	-30	42	0.017	Pass
	-20	38	0.015	Pass
	-10	37	0.015	Pass
	0	34	0.013	Pass
	10	39	0.015	Pass
	20	41	0.016	Pass
	30	38	0.015	Pass
	40	36	0.014	Pass
	50	39	0.015	Pass
	Voltage (V_{DC})	QPSK (Hz)	QPSK (ppm)	Result
	3.5	36	0.014	Pass
	3.8	38	0.015	Pass
	4.35	42	0.017	Pass

	Temperature (°C)	16QAM (Hz)	16QAM (ppm)	Result
20.0 MHz, Middle Channel	-30	34	0.013	Pass
	-20	31	0.012	Pass
	-10	28	0.011	Pass
	0	42	0.017	Pass
	10	36	0.014	Pass
	20	29	0.011	Pass
	30	35	0.014	Pass
	40	37	0.015	Pass
	50	29	0.011	Pass
	Voltage (V_{DC})	16QAM (Hz)	16QAM (ppm)	Result
	3.5	36	0.014	Pass
	3.8	37	0.015	Pass
	4.35	29	0.011	Pass

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