

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

For

Amgoo Telecom Co., Ltd.

3/F, Block R2-A(North), Gaoxin S. Ave. 4th, Hi-Tech Industrial Park, Nanshan District,
Shenzhen, China

FCC ID: UOSAM509B

Report Type: Original Report	Product Type: Smartphone
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Amgoo Telecom Co., Ltd.* 's product, model number: *AM509 (FCC ID: UOSAM509B)* or the "EUT" in this report was a *Smartphone*, which was measured approximately: 145.6 mm (L) × 73.2 mm (W) × 10.2 mm (H), rated with input voltage: DC 3.7V battery or DC 5V from adapter.

Adapter Information:

Model: CH5

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

Output: DC 5V, 1000 mA

**All measurement and test data in this report was gathered from production sample serial number: 1701949 (Assigned by BACL, Shenzhen) .The EUT supplied by the applicant was received on 2017-08-18.*

Objective

This type approval report is prepared on behalf of *Amgoo Telecom Co., Ltd.* in accordance with Part 2, Part 22-Subpart H, Part 24-Subpart E and Part 27 of the Federal Communication Commission's 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: UOSAM509B.

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.

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

Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		±5%
RF output power, conducted		±1.5dB
Unwanted Emission, conducted		±1.5dB
Emissions, radiated	Below 1GHz	±4.70dB
	Above 1GHz	±4.80dB
Temperature		±1 °C
Supply voltages		±0.4%

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, Guangdong, China.

Bay Area Compliance Laboratories Corp. (Shenzhen) has been accredited to ISO/IEC 17025 by CNAS(Lab code: L2408). And accredited to ISO/IEC 17025 by NVLAP(Lab code: 200707-0), the FCC Designation No. CN5001 under the KDB 974614 D01.

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.

Bay Area Compliance Laboratories Corp. (Shenzhen) was registered with ISED Canada under ISED Canada Registration Number 3062B.

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.

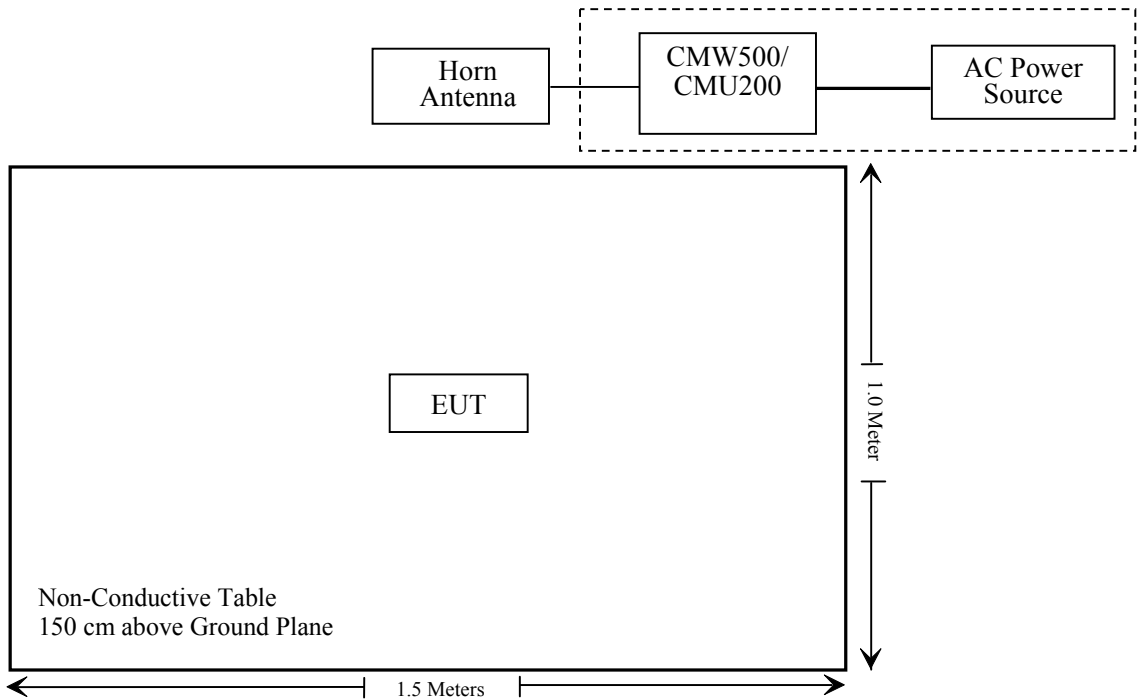
Equipment Modifications

No modifications were made to the EUT.

Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	1201.002K50-146520-wh
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) (h)	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 (h)(m)	Spurious Emissions at Antenna Terminal	Compliance
§ 2.1053; § 22.917 (a); § 24.238 (a); §27.53 (h)(m)	Spurious Radiated Emissions	Compliance
§ 22.917 (a); § 24.238 (a); §27.53 (h)(m)	Band Edge	Compliance
§ 2.1055; § 22.355; § 24.235; §27.54;	Frequency stability	Compliance

Compliance*: Please refer to SAR report released by BACL, report number: RSZ170818001-20.

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test					
Sunol Sciences	Horn Antenna	DRH-118	A052604	2014-12-29	2017-12-28
Rohde & Schwarz	Signal Generator	FSIQ26	8386001028	2017-04-24	2018-04-24
Sunol Sciences	Bi-log Antenna	JB1	A040904-2	2014-12-17	2017-12-16
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2017-02-14	2018-02-14
HP	Amplifier	HP8447E	1937A01046	2017-05-21	2017-11-19
Anritsu	Signal Generator	68369B	004114	2016-12-05	2017-12-05
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2016-12-07	2017-12-07
COM POWER	Dipole Antenna	AD-100	041000	NCR	NCR
A.H. System	Horn Antenna	SAS-200/571	135	2015-08-18	2018-08-17
R & S	Wideband Radio Communication Tester	CMW500	146520	2017-02-14	2018-02-14
Ducommun technologies	RF Cable	UFA210A-1-4724-30050U	MFR64369223410-001	2017-05-21	2017-11-19
Ducommun technologies	RF Cable	104PEA	218124002	2017-05-21	2017-11-19
Ducommun technologies	RF Cable	RG-214	1	2017-05-21	2017-11-19
Ducommun technologies	RF Cable	RG-214	2	2017-05-22	2017-11-22
Ducommun technologies	Horn Antenna	ARH-4223-02	1007726-04	2014-12-29	2017-12-28
Ducommun technologies	Horn Antenna	ARH-4223-02	1007726-03	2014-12-29	2017-12-28
Ducommun technologies	Pre-amplifier	ALN-22093530-01	991373-01	2017-08-03	2018-08-03

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RF Conducted Test					
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2017-04-24	2018-04-24
ESPEC	Temperature & Humidity Chamber	EL-10KA	09107726	2016-11-22	2017-11-22
Long Wei	DC Power Supply	TPR-6420D	398363	NCR	NCR
Aglient	ESG Vector Signal Generator	E4438C	MY42080875	2017-05-09	2018-05-09
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	1201.002K50-146520-wh	2017-04-24	2018-04-24
Rohde & Schwarz	Wideband Radio Communication Tester	CMU200	106891	2016-10-18	2017-10-18
Ducommun technologies	RF Cable	RG-214	3	2017-05-22	2017-11-22
WEINSCHL	10dB Attenuator	5324	AU0709	2017-06-15	2018-06-15

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

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: RSZ170818001-20.

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.

§2.1046; § 22.913 (a); § 24.232 (c); §27.50 (d) (h) - 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.

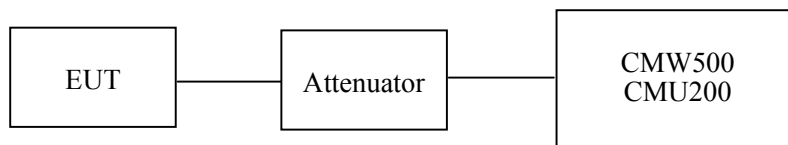
According to §27.50(h), the maximum EIRP must not exceed 2Watts (33dBm) for 2500-2570MHz.

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 Data**Environmental Conditions**

Temperature:	26 °C
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Hill He on 2017-08-24.

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

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	128	824.2	31.88	38.45
	190	836.6	31.90	38.45
	251	848.8	31.86	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	128	824.2	31.88	30.61	28.71	27.55	38.45
	190	836.6	31.90	30.62	28.68	27.53	38.45
	251	848.8	31.88	30.59	28.69	27.51	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
EGPRS	128	824.2	24.76	23.92	21.70	20.35	38.45
	190	836.6	25.04	23.94	21.66	20.33	38.45
	251	848.8	24.92	23.74	21.48	20.13	38.45

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band V)	Normal	RMC		22.69	22.67	22.65
		HSDPA	1	21.44	20.71	20.49
			2	21.31	20.68	20.39
			3	21.27	20.79	20.32
			4	20.94	20.56	20.21
		HSUPA	1	20.40	20.54	20.52
			2	20.30	20.46	20.47
			3	20.26	20.34	20.36
			4	20.19	20.28	20.24
			5	20.17	20.19	20.16

PCS Band (Part 24E)

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	512	1850.2	28.59	33
	661	1880.0	28.49	33
	810	1909.8	28.59	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	512	1850.2	28.62	27.49	26.03	24.93	33
	661	1880.0	28.50	27.39	25.90	24.78	33
	810	1909.8	28.61	27.52	26.01	24.93	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
EGPRS	512	1850.2	24.50	23.61	21.68	20.53	33
	661	1880.0	24.73	23.85	21.91	20.83	33
	810	1909.8	25.14	24.26	22.39	21.26	33

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band 11)	Normal	RMC		22.21	22.22	22.68
		HSDPA	1	21.06	21.32	20.94
			2	21.01	20.99	20.75
			3	21.12	20.93	20.86
			4	21.02	20.95	20.97
		HSUPA	1	21.03	20.99	21.20
			2	21.01	20.93	21.08
			3	20.95	20.82	20.95
			4	20.94	20.74	20.86
			5	20.78	20.77	20.75

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

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	0.25	13
	Middle	0.29	13
	High	0.19	13

Mode	Channel	PAR (dB)	Limit (dB)
EGPRS	Low	0.21	13
	Middle	0.22	13
	High	0.16	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.35	13
	Middle	3.06	13
	High	3.19	13
HSDPA (16QAM)	Low	3.25	13
	Middle	3.04	13
	High	3.31	13
HSUPA (BPSK)	Low	2.17	13
	Middle	1.91	13
	High	2.15	13

PCS Band

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	0.15	13
	Middle	0.18	13
	High	0.33	13

Mode	Channel	PAR (dB)	Limit (dB)
EGPRS	Low	0.34	13
	Middle	0.27	13
	High	0.18	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.18	13
	Middle	3.25	13
	High	3.32	13
HSDPA (16QAM)	Low	3.24	13
	Middle	3.19	13
	High	3.27	13
HSUPA (BPSK)	Low	3.23	13
	Middle	3.27	13
	High	3.34	13

Radiated Power**GSM Mode:**

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable loss (dB)	Antenna Gain (dB)			
ERP, Cellular Band (Part 22H), Middle Channel										
836.60	75.27	177	1.2	H	15.3	0.6	0.0	14.50	38.45	23.95
836.60	90.44	95	2.3	V	30.4	0.6	0.0	29.60	38.45	8.85
EIRP, PCS Band (Part 24E), Middle Channel										
1880.00	88.31	60	1.1	H	18.3	1.30	8.50	25.50	33	7.5
1880.00	91.37	320	1.6	V	21.1	1.30	8.50	28.30	33	4.7

EDGE Mode:

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable loss (dB)	Antenna Gain (dB)			
ERP, Cellular Band (Part 22H), Middle Channel										
836.60	72.17	91	2.1	H	12.1	0.6	0.0	11.32	38.45	27.13
836.60	86.21	177	2.3	V	27.1	0.6	0.0	26.34	38.45	12.11
EIRP, PCS Band (Part 24E), Middle Channel										
1880.00	83.59	165	1.4	H	13.5	1.30	8.50	20.70	33	12.3
1880.00	87.01	277	2.0	V	16.7	1.30	8.50	23.90	33	9.1

WCDMA Mode:

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable loss (dB)	Antenna Gain (dB)			
ERP, WCDMA Band V (Part 22H), Middle Channel										
836.60	79.56	122	1.0	H	19.6	0.6	0.0	18.91	38.45	19.54
836.60	81.03	46	1.7	V	21.0	0.6	0.0	21.36	38.45	17.09
EIRP, WCDMA Band II (Part 24E), Middle Channel										
1880.00	82.81	103	2.4	H	12.8	1.30	8.50	20.00	33	13.0
1880.00	85.49	219	2.0	V	15.2	1.30	8.50	22.40	33	10.6

Note:

All above data were tested with no amplifier.

Absolute Level = Substituted 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	21.85	22.25	21.96
		RB Size=1, RB Offset=2	21.78	22.14	21.91
		RB Size=1, RB Offset=5	21.91	22.34	22.04
		RB Size=3, RB Offset=0	21.35	21.74	21.47
		RB Size=3, RB Offset=1	21.32	21.63	21.40
		RB Size=3, RB Offset=2	21.41	21.83	21.53
		RB Size=6, RB Offset=0	20.86	21.24	20.76
	16QAM	RB Size=1, RB Offset=0	21.79	22.25	21.74
		RB Size=1, RB Offset=2	21.69	22.15	21.65
		RB Size=1, RB Offset=5	21.84	22.35	21.81
		RB Size=3, RB Offset=0	21.39	21.82	21.43
		RB Size=3, RB Offset=1	21.32	21.78	21.40
		RB Size=3, RB Offset=2	21.48	21.90	21.53
		RB Size=6, RB Offset=0	20.75	21.25	20.84
3.0	QPSK	RB Size=1, RB Offset=0	21.73	22.24	21.64
		RB Size=1, RB Offset=7	21.64	22.16	21.58
		RB Size=1, RB Offset=14	21.84	22.32	21.71
		RB Size=8, RB Offset=0	21.31	21.65	21.24
		RB Size=8, RB Offset=4	21.26	21.54	21.12
		RB Size=8, RB Offset=7	21.44	21.77	21.28
		RB Size=15, RB Offset=0	21.12	21.35	21.07
	16QAM	RB Size=1, RB Offset=0	21.62	22.24	21.69
		RB Size=1, RB Offset=7	21.56	22.15	21.59
		RB Size=1, RB Offset=14	21.69	22.37	21.77
		RB Size=8, RB Offset=0	21.34	21.67	21.27
		RB Size=8, RB Offset=4	21.27	21.61	21.16
		RB Size=8, RB Offset=7	21.41	21.78	21.40
		RB Size=15, RB Offset=0	21.15	21.35	21.25

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	21.87	22.37	21.94
		RB Size=1, RB Offset=12	21.77	22.27	21.85
		RB Size=1, RB Offset=24	21.91	22.44	21.98
		RB Size=12, RB Offset=0	21.37	21.78	21.25
		RB Size=12, RB Offset=6	21.26	21.70	21.20
		RB Size=12, RB Offset=11	21.50	21.91	21.33
		RB Size=25, RB Offset=0	21.17	21.34	22.13
	16QAM	RB Size=1, RB Offset=0	21.83	22.38	21.92
		RB Size=1, RB Offset=12	21.73	22.31	21.85
		RB Size=1, RB Offset=24	21.88	22.48	21.99
		RB Size=12, RB Offset=0	21.32	21.84	21.41
		RB Size=12, RB Offset=6	21.27	21.74	21.30
		RB Size=12, RB Offset=11	21.37	21.93	21.52
		RB Size=25, RB Offset=0	21.02	21.35	21.12
10.0	QPSK	RB Size=1, RB Offset=0	22.56	22.41	22.34
		RB Size=1, RB Offset=24	22.35	22.17	22.27
		RB Size=1, RB Offset=49	22.05	22.51	22.18
		RB Size=25, RB Offset=0	22.15	22.17	22.31
		RB Size=25, RB Offset=12	22.13	22.24	22.03
		RB Size=25, RB Offset=24	22.51	22.42	22.38
		RB Size=50, RB Offset=0	22.14	21.39	22.25
	16QAM	RB Size=1, RB Offset=0	22.26	22.41	22.87
		RB Size=1, RB Offset=24	22.44	22.53	22.78
		RB Size=1, RB Offset=49	22.46	22.50	22.91
		RB Size=25, RB Offset=0	22.47	22.54	22.46
		RB Size=25, RB Offset=12	22.01	22.57	22.34
		RB Size=25, RB Offset=24	22.08	22.03	22.19
		RB Size=50, RB Offset=0	21.55	21.40	21.72

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	22.52	22.33	22.73
		RB Size=1, RB Offset=37	22.51	22.68	22.86
		RB Size=1, RB Offset=74	22.41	22.33	22.40
		RB Size=36, RB Offset=0	22.68	22.79	22.59
		RB Size=36, RB Offset=18	22.70	22.32	22.32
		RB Size=36, RB Offset=37	22.66	22.54	22.42
		RB Size=75, RB Offset=0	21.72	21.71	21.86
	16QAM	RB Size=1, RB Offset=0	22.35	22.37	22.74
		RB Size=1, RB Offset=37	22.68	22.43	22.23
		RB Size=1, RB Offset=74	22.36	22.37	22.46
		RB Size=36, RB Offset=0	22.47	22.34	22.53
		RB Size=36, RB Offset=18	22.36	22.30	22.21
		RB Size=36, RB Offset=37	22.18	22.67	22.57
		RB Size=75, RB Offset=0	21.44	21.46	21.77
20.0	QPSK	RB Size=1, RB Offset=0	22.39	22.50	22.44
		RB Size=1, RB Offset=49	22.50	22.41	22.38
		RB Size=1, RB Offset=99	22.32	22.56	22.32
		RB Size=50, RB Offset=0	22.13	22.45	22.32
		RB Size=50, RB Offset=24	22.55	22.50	22.02
		RB Size=50, RB Offset=49	22.09	22.37	22.24
		RB Size=100, RB Offset=0	22.07	21.81	21.73
	16QAM	RB Size=1, RB Offset=0	22.49	22.52	22.55
		RB Size=1, RB Offset=49	22.66	22.29	22.41
		RB Size=1, RB Offset=99	22.45	22.43	22.79
		RB Size=50, RB Offset=0	22.51	22.33	22.38
		RB Size=50, RB Offset=24	22.65	22.68	22.19
		RB Size=50, RB Offset=49	22.49	22.53	22.28
		RB Size=100, RB Offset=0	21.83	21.58	22.02

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
16QAM (1RB Size)	10.96	13	Pass
16QAM (100%RB Size)	7.47	13	Pass

QPSK:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
1.4 MHz Bandwidth									
1732.50	84.33	59	1.7	H	11.2	1.30	9.10	19.00	30
1732.50	84.86	65	2.0	V	12.3	1.30	9.10	20.10	30
3 MHz Bandwidth									
1732.50	83.50	98	1.9	H	10.3	1.30	9.10	18.10	30
1732.50	84.31	340	2.3	V	11.7	1.30	9.10	19.50	30
5 MHz Bandwidth									
1732.50	82.94	321	1.2	H	9.8	1.30	9.10	17.60	30
1732.50	83.67	309	2.1	V	11.1	1.30	9.10	18.90	30
10 MHz Bandwidth									
1732.50	84.67	63	2.3	H	11.5	1.30	9.10	19.30	30
1732.50	83.78	149	1.2	V	11.2	1.30	9.10	19.00	30
15 MHz Bandwidth									
1732.50	83.42	200	1.9	H	10.3	1.30	9.10	18.10	30
1732.50	84.37	278	2.0	V	11.8	1.30	9.10	19.60	30
20 MHz Bandwidth									
1732.50	83.13	186	2.3	H	10.0	1.30	9.10	17.80	30
1732.50	84.38	294	1.6	V	11.8	1.30	9.10	19.60	30

16QAM:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
1.4 MHz Bandwidth									
1732.50	87.50	15	1.8	H	14.3	1.30	9.10	22.10	30
1732.50	84.69	261	1.3	V	12.1	1.30	9.10	19.90	30
3 MHz Bandwidth									
1732.50	86.64	159	1.0	H	13.5	1.30	9.10	21.30	30
1732.50	84.73	43	2.0	V	12.2	1.30	9.10	20.00	30
5 MHz Bandwidth									
1732.50	86.52	175	1.8	H	13.4	1.30	9.10	21.20	30
1732.50	83.34	88	1.3	V	10.8	1.30	9.10	18.60	30
10 MHz Bandwidth									
1732.50	85.91	100	1.9	H	12.7	1.30	9.10	20.50	30
1732.50	83.24	66	1.3	V	10.7	1.30	9.10	18.50	30
15 MHz Bandwidth									
1732.50	87.11	280	1.6	H	13.9	1.30	9.10	21.70	30
1732.50	84.29	94	1.5	V	11.7	1.30	9.10	19.50	30
20 MHz Bandwidth									
1732.50	86.72	46	1.4	H	13.6	1.30	9.10	21.40	30
1732.50	84.36	128	2.0	V	11.8	1.30	9.10	19.60	30

LTE Band 5:**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	22.84	22.89	22.92
		RB Size=1, RB Offset=2	22.54	22.19	22.52
		RB Size=1, RB Offset=5	22.63	23.17	22.54
		RB Size=3, RB Offset=0	22.33	22.69	22.67
		RB Size=3, RB Offset=1	22.25	22.38	22.01
		RB Size=3, RB Offset=2	22.37	22.78	22.56
		RB Size=6, RB Offset=0	21.86	21.90	21.95
	16QAM	RB Size=1, RB Offset=0	22.71	22.89	22.79
		RB Size=1, RB Offset=2	22.70	23.03	22.73
		RB Size=1, RB Offset=5	22.68	22.10	22.38
		RB Size=3, RB Offset=0	22.39	22.31	22.36
		RB Size=3, RB Offset=1	22.59	22.56	22.51
		RB Size=3, RB Offset=2	22.46	22.57	22.91
		RB Size=6, RB Offset=0	22.01	21.91	21.87
3.0	QPSK	RB Size=1, RB Offset=0	22.88	22.86	22.95
		RB Size=1, RB Offset=7	22.75	22.13	22.59
		RB Size=1, RB Offset=14	22.86	23.28	22.74
		RB Size=8, RB Offset=0	22.37	22.51	22.34
		RB Size=8, RB Offset=4	22.25	22.41	22.36
		RB Size=8, RB Offset=7	22.46	22.54	22.57
		RB Size=15, RB Offset=0	21.89	21.94	21.91
	16QAM	RB Size=1, RB Offset=0	22.55	22.86	22.72
		RB Size=1, RB Offset=7	22.70	22.98	22.88
		RB Size=1, RB Offset=14	22.93	22.91	22.90
		RB Size=8, RB Offset=0	22.53	22.78	22.68
		RB Size=8, RB Offset=4	22.19	22.28	22.35
		RB Size=8, RB Offset=7	22.24	22.44	22.26
		RB Size=15, RB Offset=0	21.93	21.95	21.99

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	22.98	23.00	22.96
		RB Size=1, RB Offset=12	22.75	22.79	22.88
		RB Size=1, RB Offset=24	22.26	22.51	22.76
		RB Size=12, RB Offset=0	22.18	22.46	22.35
		RB Size=12, RB Offset=6	22.19	22.27	22.13
		RB Size=12, RB Offset=11	22.16	22.03	22.09
		RB Size=25, RB Offset=0	21.88	21.94	21.80
	16QAM	RB Size=1, RB Offset=0	22.97	23.01	22.96
		RB Size=1, RB Offset=12	22.87	23.02	22.78
		RB Size=1, RB Offset=24	22.75	22.55	22.68
		RB Size=12, RB Offset=0	22.32	22.42	22.28
		RB Size=12, RB Offset=6	22.36	22.26	22.39
		RB Size=12, RB Offset=11	22.35	22.59	22.51
		RB Size=25, RB Offset=0	21.99	21.95	21.94
10.0	QPSK	RB Size=1, RB Offset=0	22.86	23.00	23.01
		RB Size=1, RB Offset=24	22.76	22.74	22.71
		RB Size=1, RB Offset=49	22.85	22.94	22.91
		RB Size=25, RB Offset=0	22.55	22.59	22.72
		RB Size=25, RB Offset=12	22.23	22.26	22.33
		RB Size=25, RB Offset=24	22.19	22.22	22.28
		RB Size=50, RB Offset=0	22.04	21.95	22.15
	16QAM	RB Size=1, RB Offset=0	22.96	22.99	22.97
		RB Size=1, RB Offset=24	22.74	23.13	22.77
		RB Size=1, RB Offset=49	22.94	22.90	22.88
		RB Size=25, RB Offset=0	22.53	22.43	22.49
		RB Size=25, RB Offset=12	22.41	22.39	22.36
		RB Size=25, RB Offset=24	22.32	22.45	22.51
		RB Size=50, RB Offset=0	22.05	22.10	21.96

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
16QAM (1RB Size)	3.89	13	Pass
16QAM (100%RB Size)	6.58	13	Pass

QPSK:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
1.4 MHz Bandwidth									
836.5	76.45	200	1.9	H	16.5	0.6	0	15.9	38.45
836.5	83.37	218	1.5	V	23.3	0.6	0	22.7	38.45
3 MHz Bandwidth									
836.5	76.25	326	1.9	H	16.3	0.6	0	15.7	38.45
836.5	83.17	118	1.5	V	23.1	0.6	0	22.5	38.45
5 MHz Bandwidth									
836.6	75.95	116	1.9	H	16	0.6	0	15.4	38.45
836.6	82.77	279	1.5	V	22.7	0.6	0	22.1	38.45
10 MHz Bandwidth									
836.5	75.15	92	1.9	H	15.2	0.6	0	14.6	38.45
836.5	83.17	235	1.5	V	23.1	0.6	0	22.5	38.45

16QAM:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
1.4 MHz Bandwidth									
836.5	77.75	28	1.9	H	17.8	0.6	0	17.2	38.45
836.5	84.17	91	1.5	V	24.1	0.6	0	23.5	38.45
3 MHz Bandwidth									
836.5	77.55	163	1.9	H	17.6	0.6	0	17	38.45
836.5	83.77	207	1.5	V	23.7	0.6	0	23.1	38.45
5 MHz Bandwidth									
836.5	75.95	141	1.9	H	16	0.6	0	15.4	38.45
836.5	83.17	144	1.5	V	23.1	0.6	0	22.5	38.45
10 MHz Bandwidth									
836.5	76.15	37	1.9	H	16.2	0.6	0	15.6	38.45
836.5	82.47	230	1.5	V	22.4	0.6	0	21.8	38.45

LTE Band 7

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5	QPSK	RB Size=1, RB Offset=0	22.36	22.29	22.39
		RB Size=1, RB Offset=12	22.31	22.28	22.21
		RB Size=1, RB Offset=24	22.34	22.32	22.31
		RB Size=12, RB Offset=0	21.89	22.05	21.98
		RB Size=12, RB Offset=6	21.76	21.78	21.81
		RB Size=12, RB Offset=11	21.99	22.08	21.86
		RB Size=25, RB Offset=0	21.31	21.18	21.27
	16QAM	RB Size=1, RB Offset=0	22.24	22.31	22.25
		RB Size=1, RB Offset=12	22.19	22.28	22.26
		RB Size=1, RB Offset=24	22.75	22.67	22.33
		RB Size=12, RB Offset=0	20.09	22.15	22.12
		RB Size=12, RB Offset=6	21.92	22.07	21.90
		RB Size=12, RB Offset=11	21.95	22.10	22.01
		RB Size=25, RB Offset=0	21.36	21.18	21.37
10	QPSK	RB Size=1, RB Offset=0	22.25	22.30	22.28
		RB Size=1, RB Offset=24	22.09	22.28	22.29
		RB Size=1, RB Offset=49	22.41	22.38	22.19
		RB Size=25, RB Offset=0	21.92	22.09	21.97
		RB Size=25, RB Offset=12	21.96	22.10	21.92
		RB Size=25, RB Offset=24	21.99	22.05	21.92
		RB Size=50, RB Offset=0	21.34	21.24	21.27
	16QAM	RB Size=1, RB Offset=0	22.26	22.31	22.23
		RB Size=1, RB Offset=24	22.18	22.37	22.26
		RB Size=1, RB Offset=49	22.36	22.56	22.31
		RB Size=25, RB Offset=0	21.91	21.75	21.82
		RB Size=25, RB Offset=12	21.73	21.62	21.55
		RB Size=25, RB Offset=24	21.54	21.73	21.41
		RB Size=50, RB Offset=0	21.34	21.32	20.92

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
15	QPSK	RB Size=1, RB Offset=0	22.25	22.37	22.34
		RB Size=1, RB Offset=37	22.27	22.22	22.27
		RB Size=1, RB Offset=74	22.44	22.42	22.41
		RB Size=36, RB Offset=0	21.95	22.13	21.97
		RB Size=36, RB Offset=18	21.91	22.07	21.88
		RB Size=36, RB Offset=37	22.06	22.27	22.09
		RB Size=75, RB Offset=0	21.68	21.45	21.65
	16QAM	RB Size=1, RB Offset=0	22.18	22.19	22.37
		RB Size=1, RB Offset=37	22.12	22.31	22.42
		RB Size=1, RB Offset=74	22.30	22.42	22.36
		RB Size=36, RB Offset=0	22.06	22.08	21.98
		RB Size=36, RB Offset=18	22.10	22.23	22.01
		RB Size=36, RB Offset=37	22.08	22.27	22.09
		RB Size=75, RB Offset=0	21.59	21.30	21.37
20	QPSK	RB Size=1, RB Offset=0	22.34	22.41	22.32
		RB Size=1, RB Offset=49	22.44	22.67	22.35
		RB Size=1, RB Offset=99	22.49	22.63	22.58
		RB Size=50, RB Offset=0	22.32	22.26	22.15
		RB Size=50, RB Offset=24	22.04	22.29	22.35
		RB Size=50, RB Offset=49	22.14	22.08	22.33
		RB Size=100, RB Offset=0	21.96	21.90	21.93
	16QAM	RB Size=1, RB Offset=0	22.15	22.13	22.33
		RB Size=1, RB Offset=49	22.32	22.21	22.17
		RB Size=1, RB Offset=99	22.29	22.35	22.11
		RB Size=50, RB Offset=0	21.97	22.05	21.94
		RB Size=50, RB Offset=24	21.67	21.91	21.88
		RB Size=50, RB Offset=49	21.93	22.15	21.96
		RB Size=100, RB Offset=0	21.45	21.54	21.55

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
16QAM (1RB Size)	10.80	13	Pass
16QAM (100%RB Size)	8.04	13	Pass

EIRP:**QPSK:**

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
5 MHz Bandwidth									
2535.00	78.67	279	1.2	H	9.2	2.60	9.30	15.90	33
2535.00	84.51	22	2.4	V	15.6	2.60	9.30	22.30	33
10 MHz Bandwidth									
2535.00	79.92	355	1.1	H	10.4	2.60	9.30	17.10	33
2535.00	85.38	340	2.1	V	16.5	2.60	9.30	23.20	33
15 MHz Bandwidth									
2535.00	79.62	85	1.3	H	10.1	2.60	9.30	16.80	33
2535.00	85.33	12	1.3	V	16.5	2.60	9.30	23.20	33
20 MHz Bandwidth									
2535.00	79.41	199	2.0	H	9.9	2.60	9.30	16.60	33
2535.00	86.34	110	1.5	V	17.5	2.60	9.30	24.20	33

16QAM:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
5 MHz Bandwidth									
2535.00	80.16	218	2.1	H	10.7	2.60	9.30	17.40	33
2535.00	86.27	355	1.0	V	17.4	2.60	9.30	24.10	33
10 MHz Bandwidth									
2535.00	80.34	311	1.8	H	10.9	2.60	9.30	17.60	33
2535.00	86.81	182	1.6	V	17.9	2.60	9.30	24.60	33
15 MHz Bandwidth									
2535.00	79.66	16	1.4	H	10.2	2.60	9.30	16.90	33
2535.00	85.94	296	1.0	V	17.1	2.60	9.30	23.80	33
20 MHz Bandwidth									
2535.00	79.45	97	1.7	H	10.0	2.60	9.30	16.70	33
2535.00	86.48	352	2.2	V	17.6	2.60	9.30	24.30	33

Note:

All above data were tested with no amplifier

Absolute Level = Substituted Level - Cable loss + Antenna Gain

Margin = Limit- Absolute Level

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

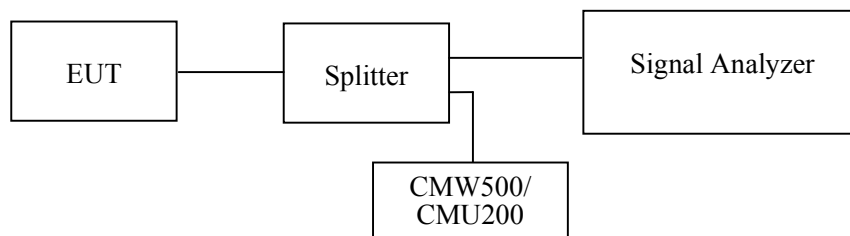
Applicable Standards

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 1% to 5% of the anticipated emission bandwidth and the 26 dB & 99% bandwidth was recorded.



Test Data

Environmental Conditions

Temperature:	23~25 °C
Relative Humidity:	53~55 %
ATM Pressure:	100.0~101.0 kPa

The testing was performed by Hill He from 2017-08-24 to 2017-08-26.

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	244.5	312.6
EGPRS(8PSK)	836.6	244.5	312.6

Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC (BPSK)	836.6	4.188	4.870
HSUPA (BPSK)	836.6	4.188	4.890
HSDPA (16QAM)	836.6	4.188	4.890

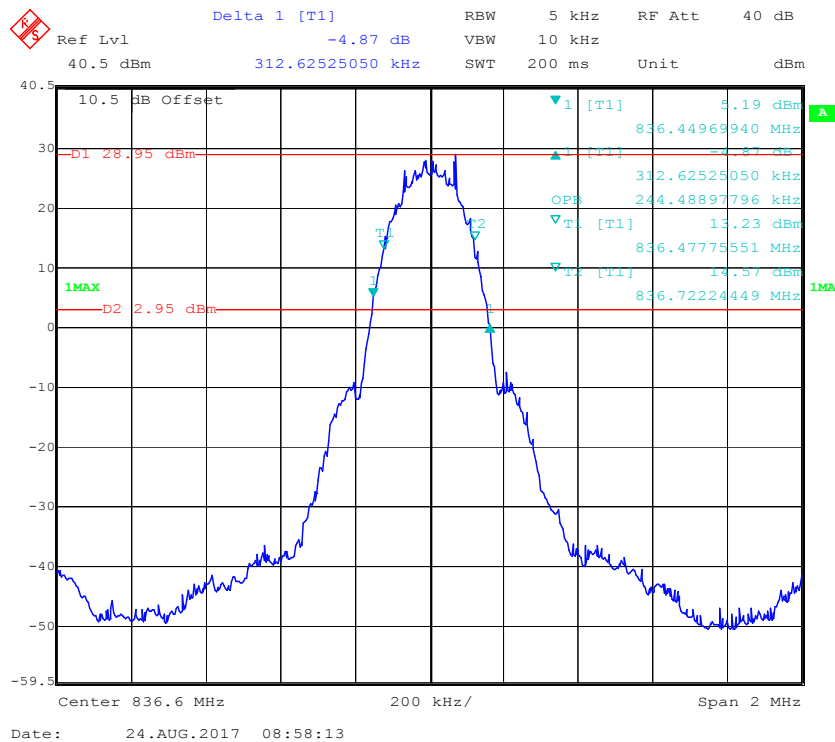
PCS Band (Part 24E)

Mode	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	1880.0	248.5	316.6
EGPRS(8PSK)	1880.0	256.5	324.6

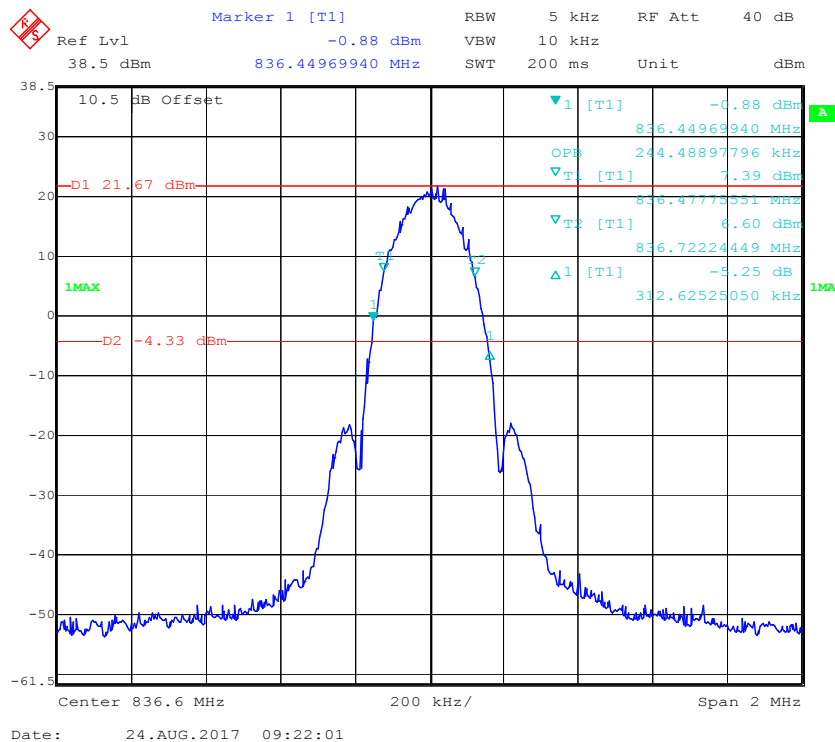
Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC (BPSK)	1880.0	4.208	4.890
HSUPA (BPSK)	1880.0	4.188	4.870
HSDPA (16QAM)	1880.0	4.188	4.890

Cellular Band (Part 22H)

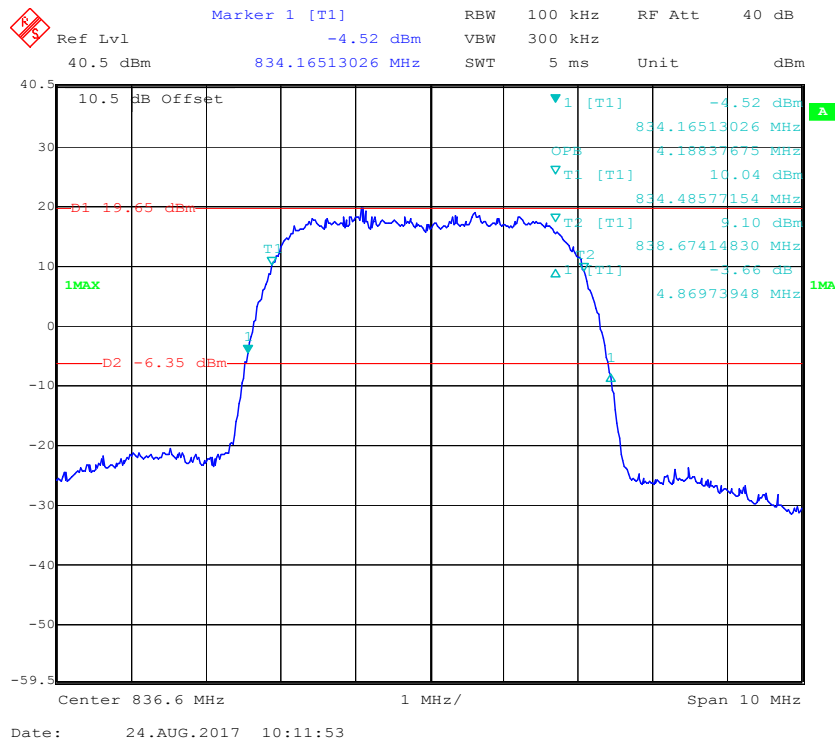
26 dB Emissions & 99% Occupied Bandwidth for GSM (GMSK) Mode



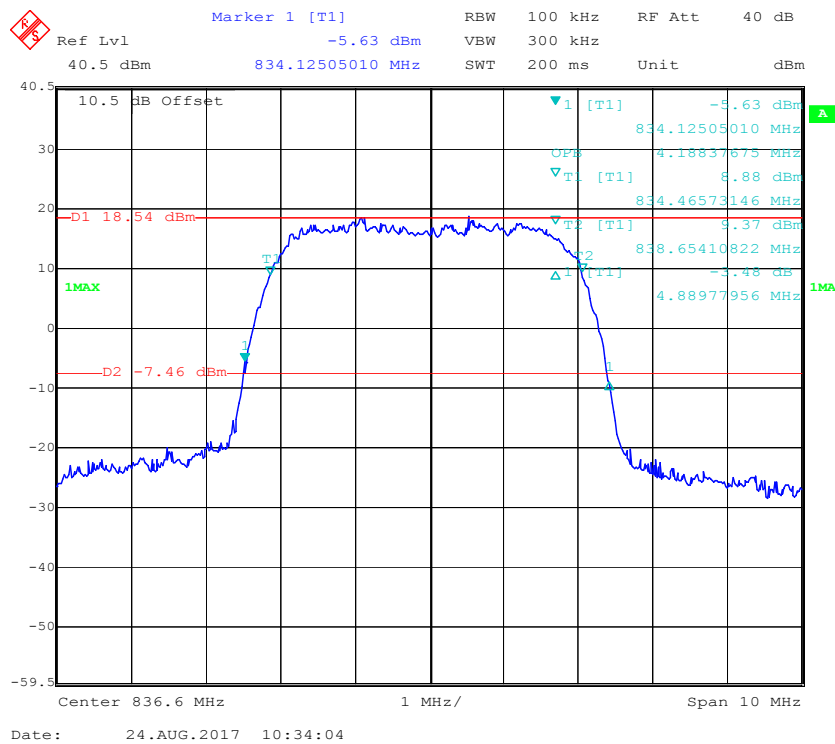
26 dB Emissions & 99% Occupied Bandwidth for EDGE Mode



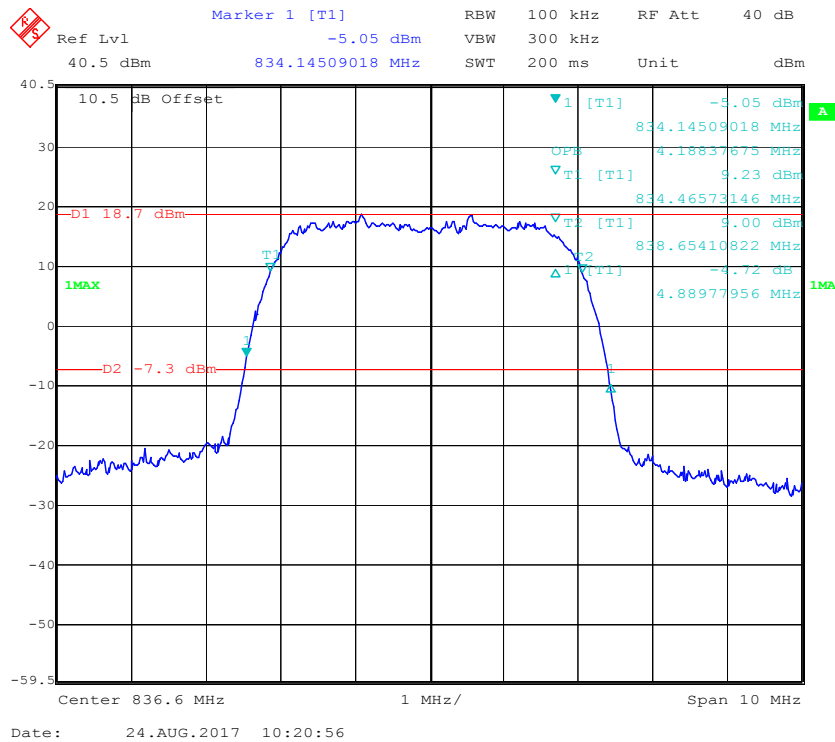
99% Occupied Bandwidth for RMC (BPSK) Mode



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

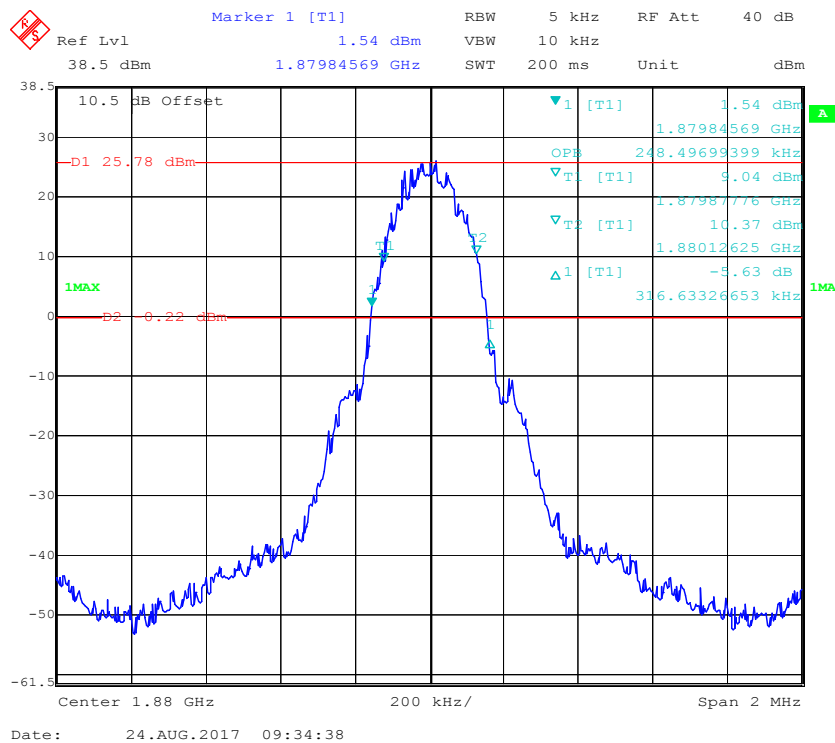


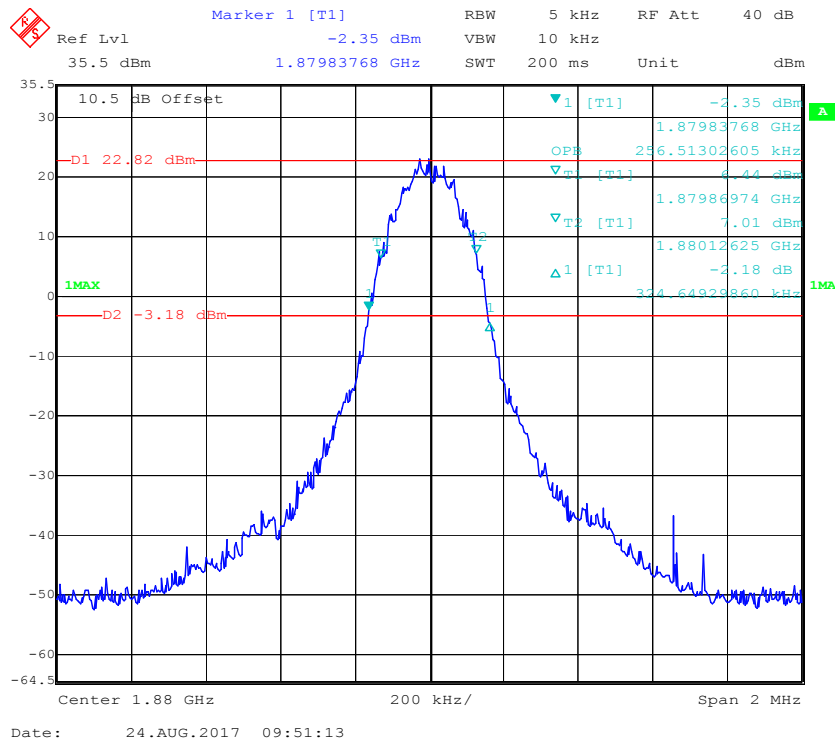
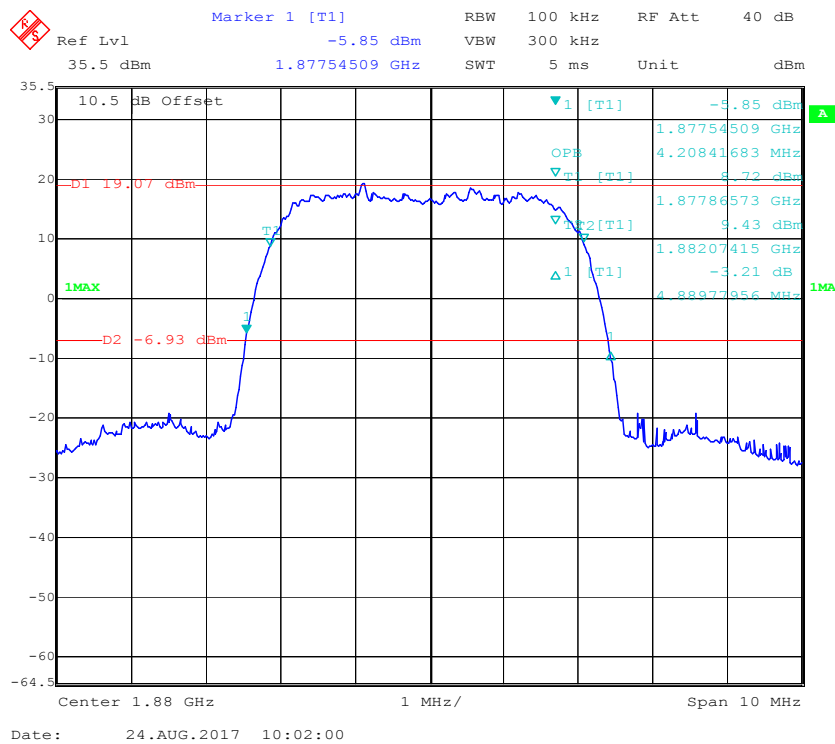
26 dB Emissions & 99% Occupied Bandwidth for HSDPA (16QAM) Mode

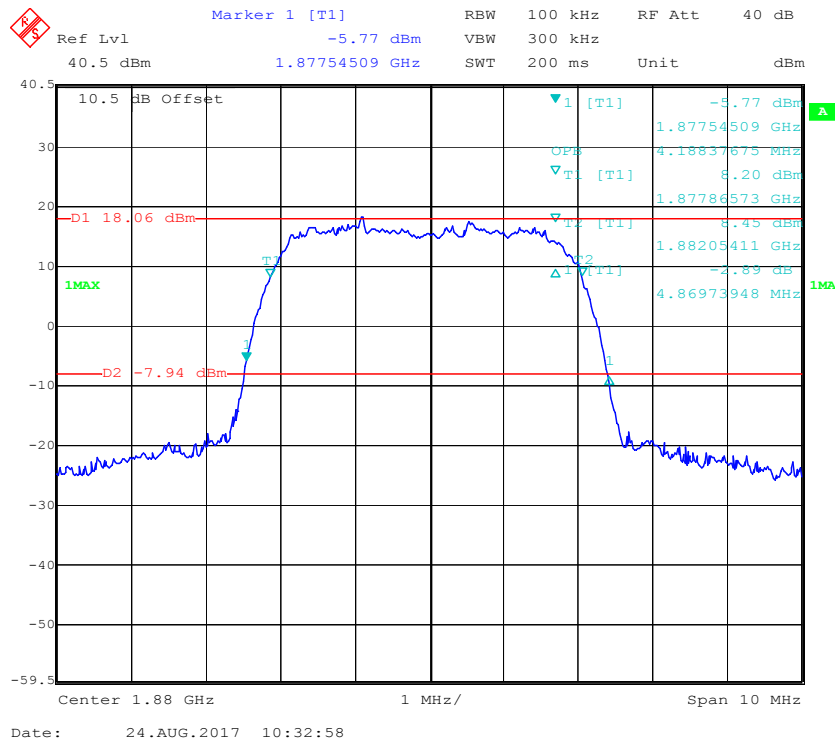
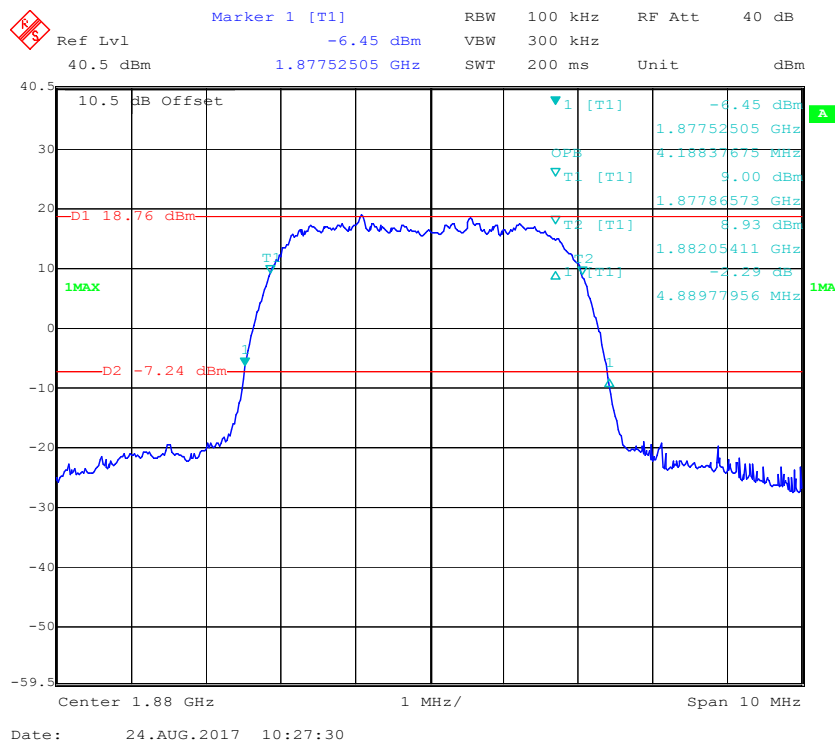


PCS Band (Part 24E)

26 dB Emissions & 99% Occupied Bandwidth for GSM (GMSK) Mode

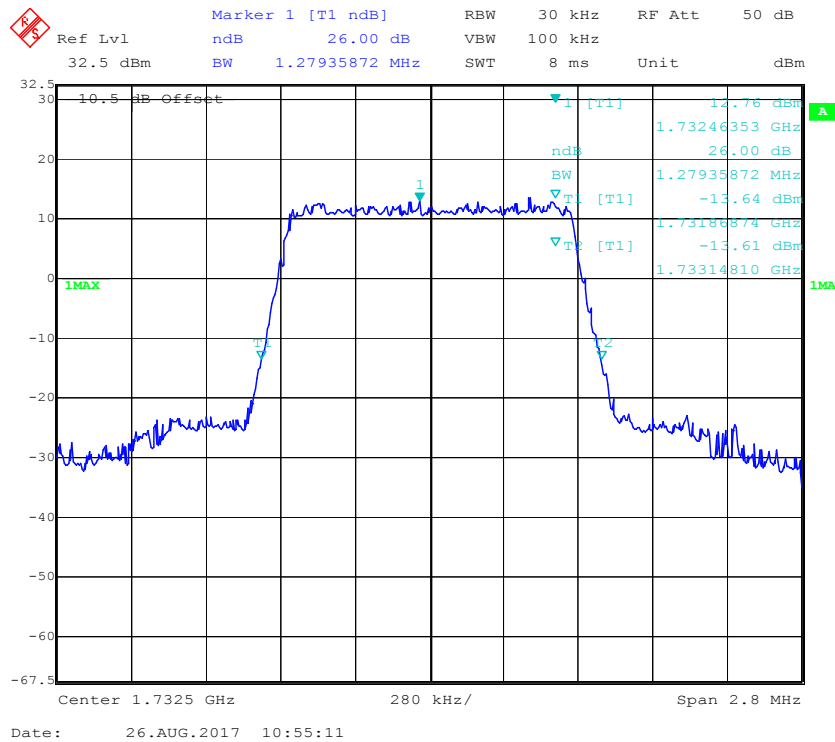
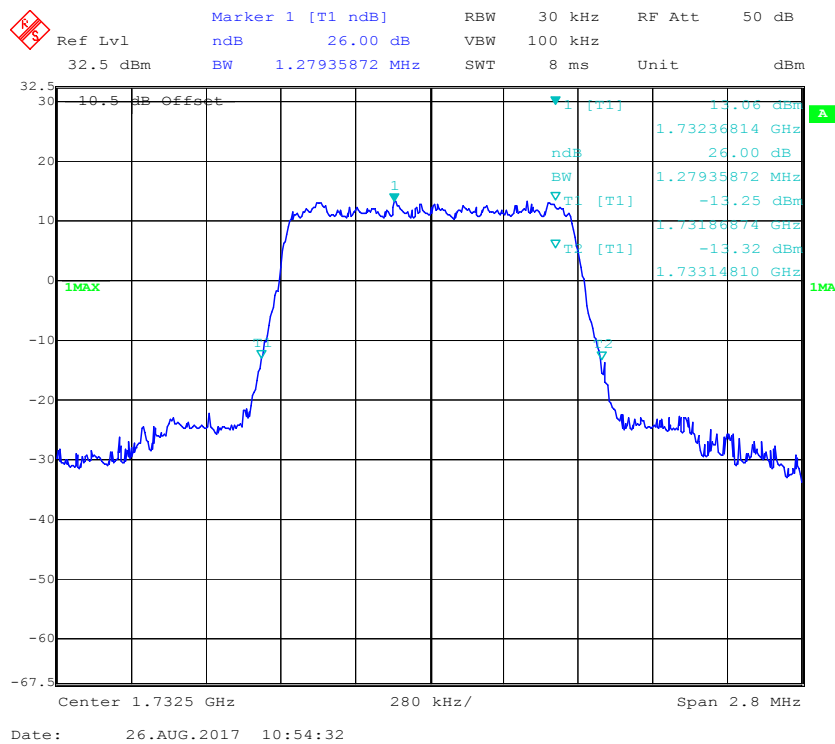


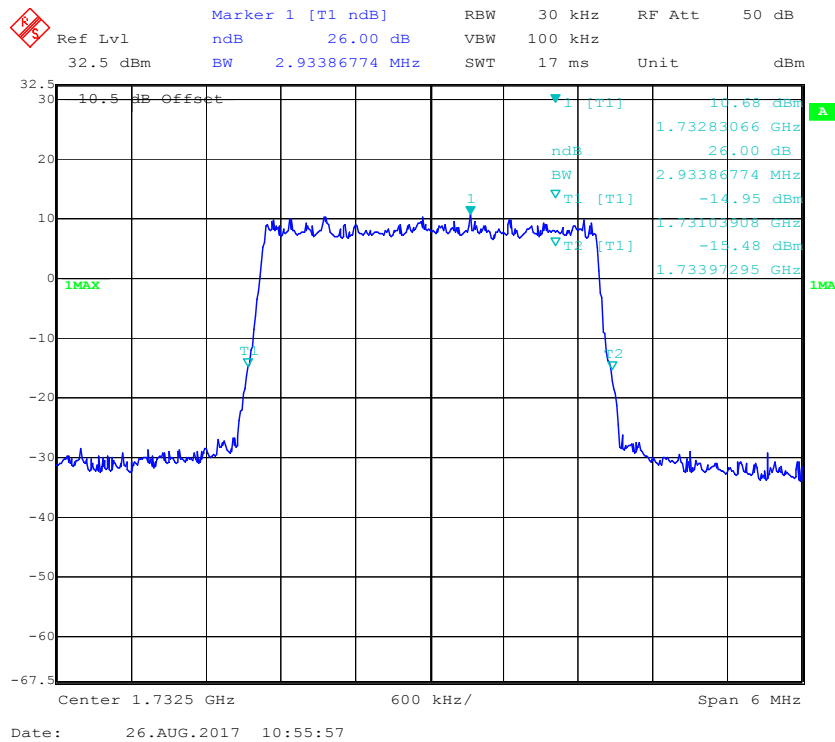
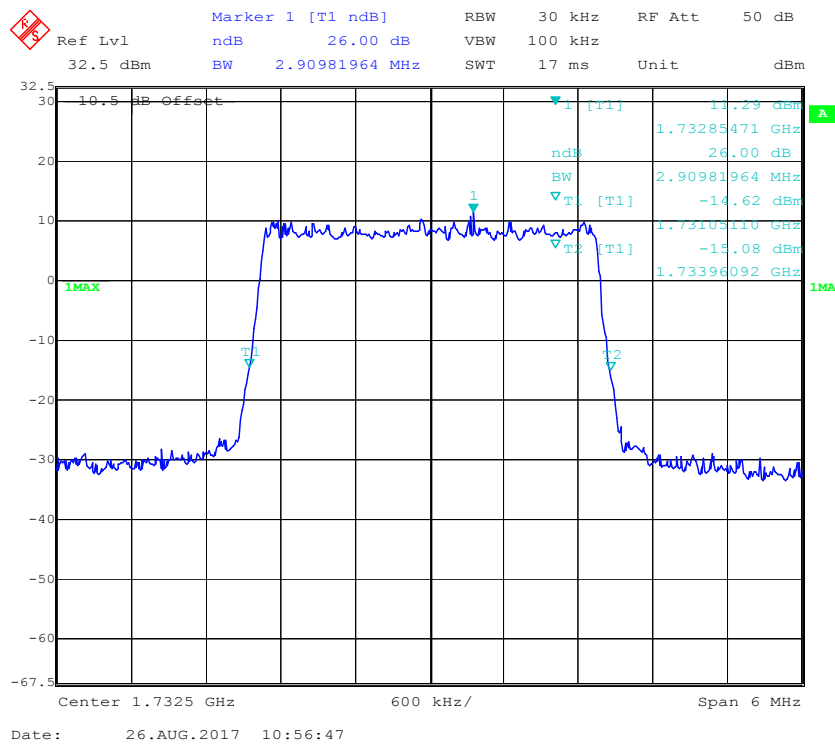
26 dB Emissions & 99% Occupied Bandwidth for EDGE Mode**26 dB Emissions & 99% Occupied Bandwidth for RMC (BPSK) Mode**

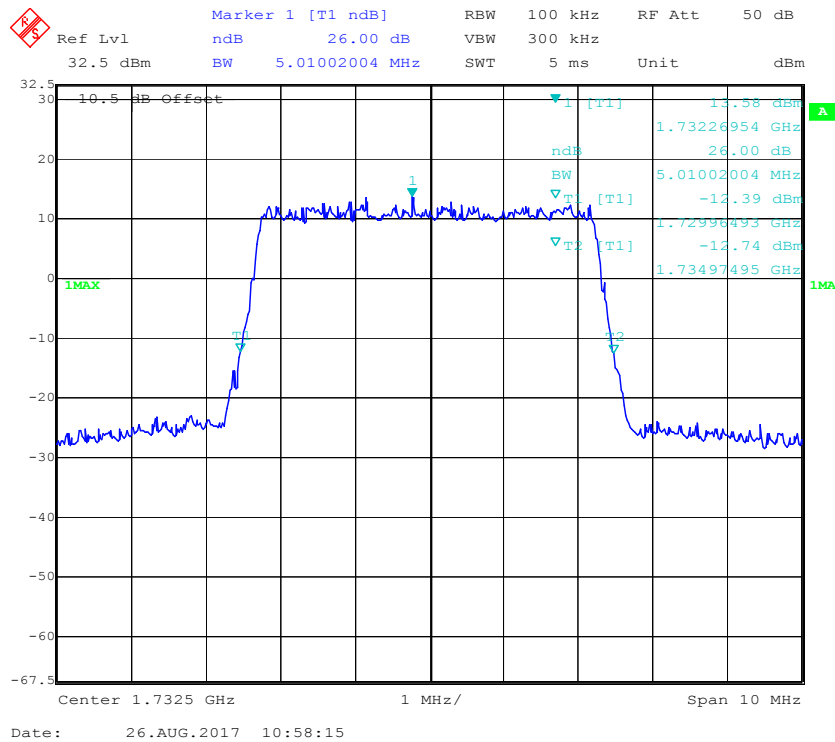
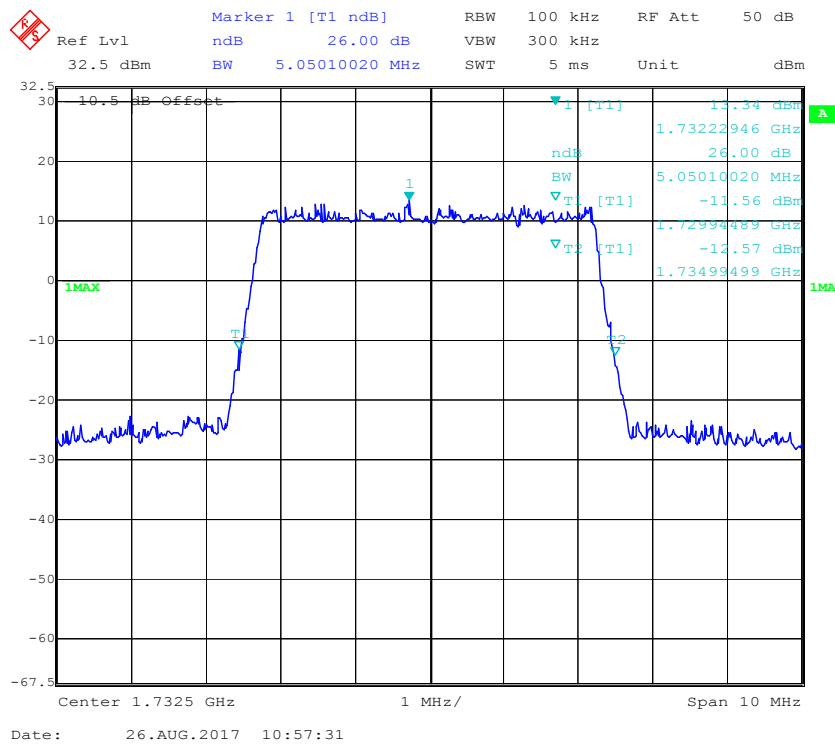
26 dB Emissions & 99% Occupied Bandwidth for HSUPA (BPSK) Mode**26 dB Emissions & 99% Occupied Bandwidth for HSDPA (16QAM) Mode**

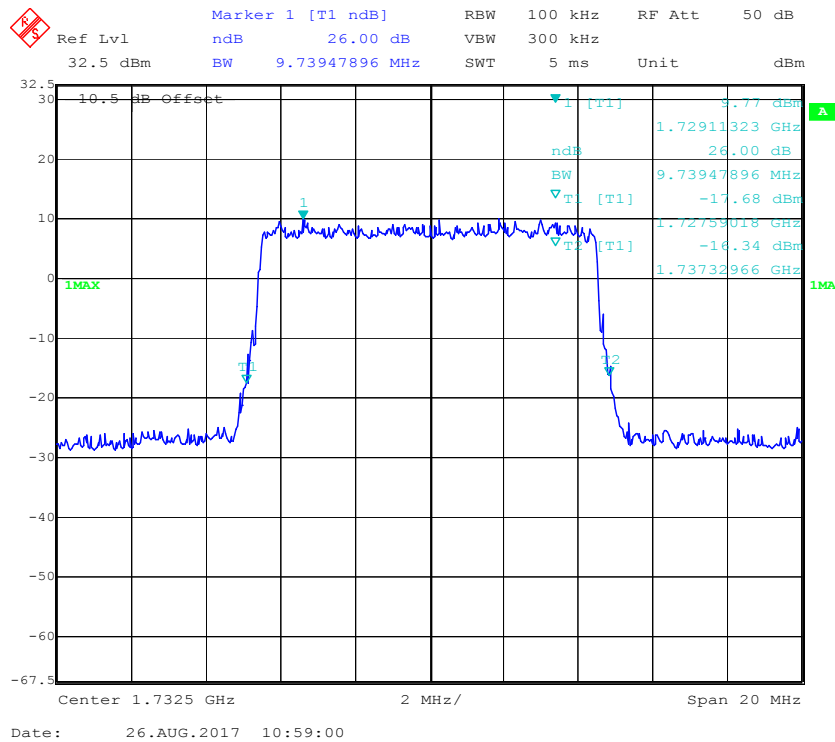
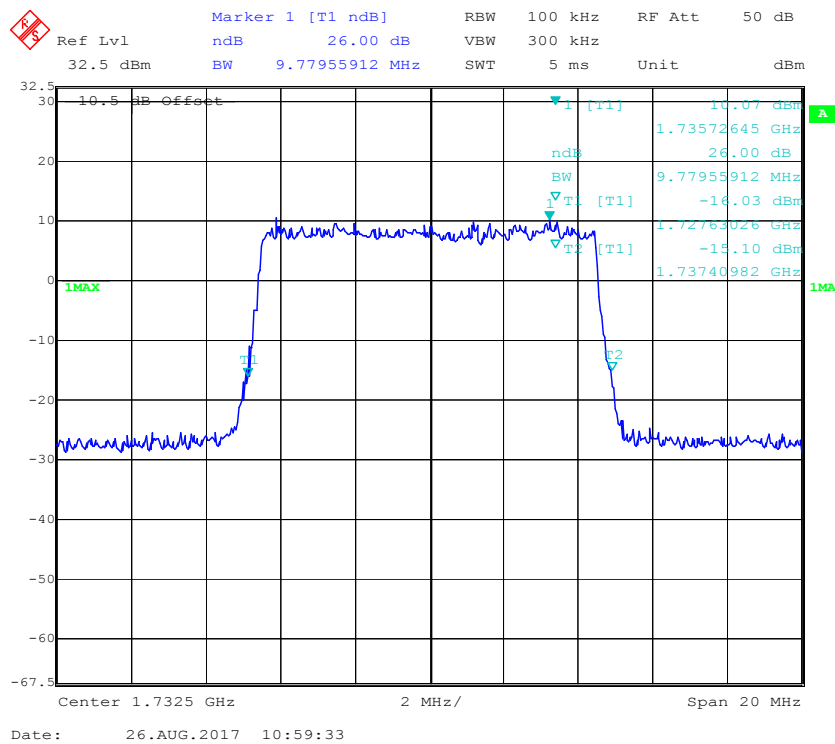
LTE Band 4: (Middle Channel)

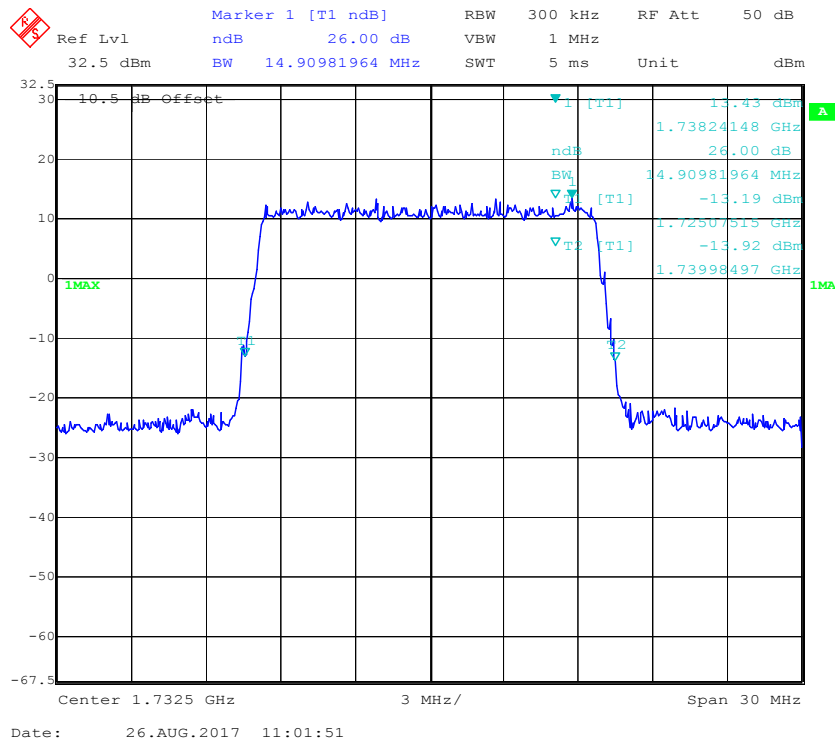
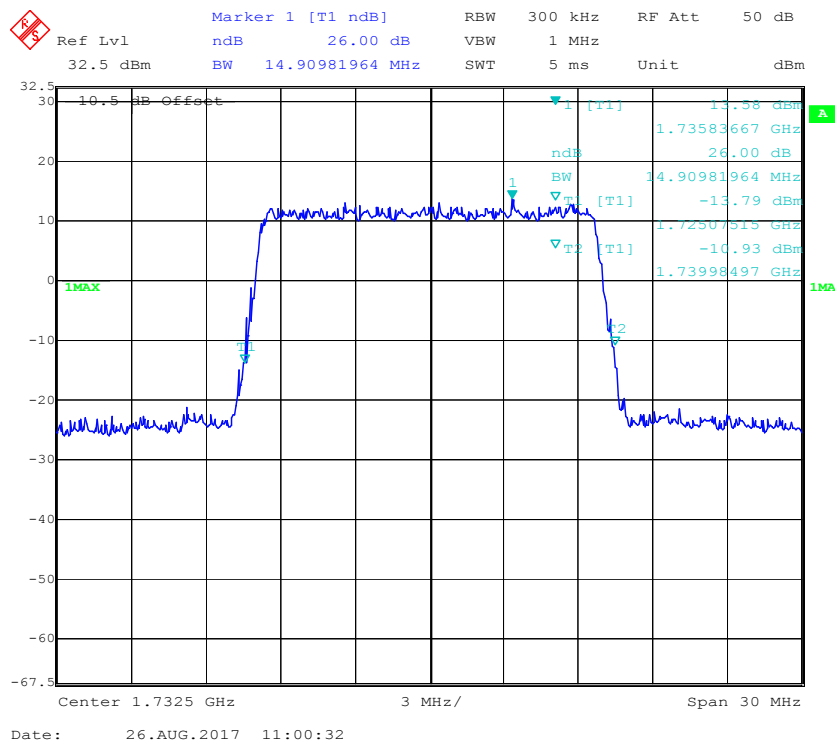
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.105	1.279
	16QAM	1.100	1.279
3.0	QPSK	2.693	2.934
	16QAM	2.693	2.910
5.0	QPSK	4.549	5.010
	16QAM	4.529	5.050
10.0	QPSK	8.978	9.739
	16QAM	8.978	9.780
15.0	QPSK	13.527	14.910
	16QAM	13.527	14.910
20.0	QPSK	18.036	19.479
	16QAM	17.956	19.399

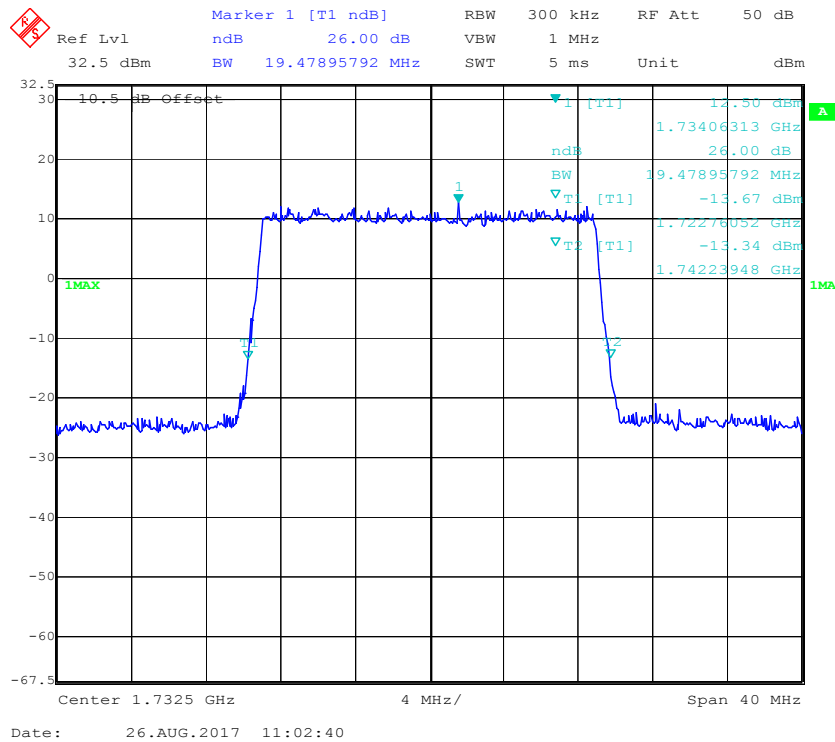
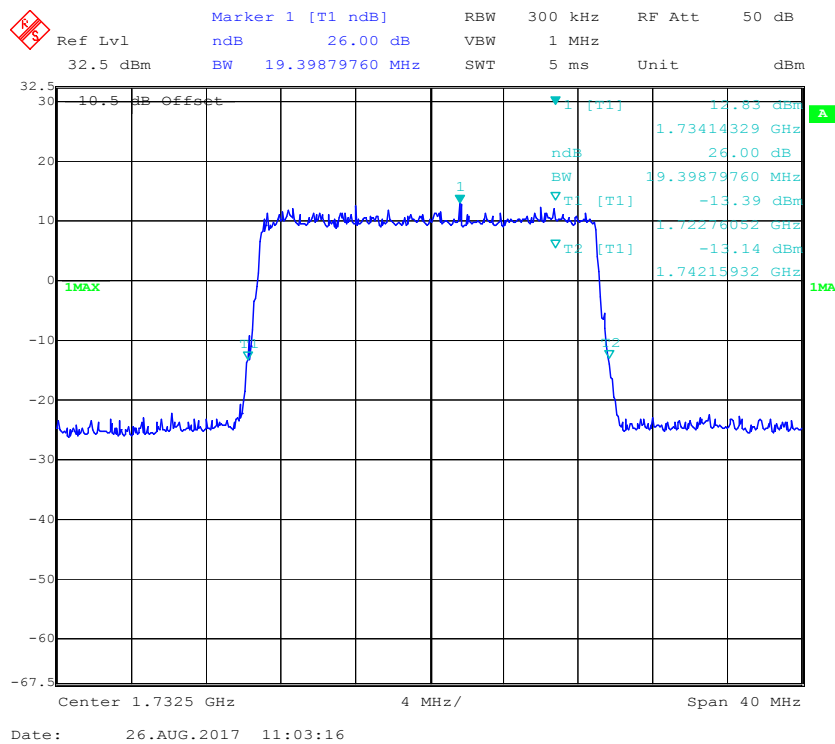
QPSK (1.4 MHz) - 26 dB Emissions Bandwidth, Middle channel**16-QAM (1.4 MHz) - 26 dB Emissions Bandwidth, Middle channel**

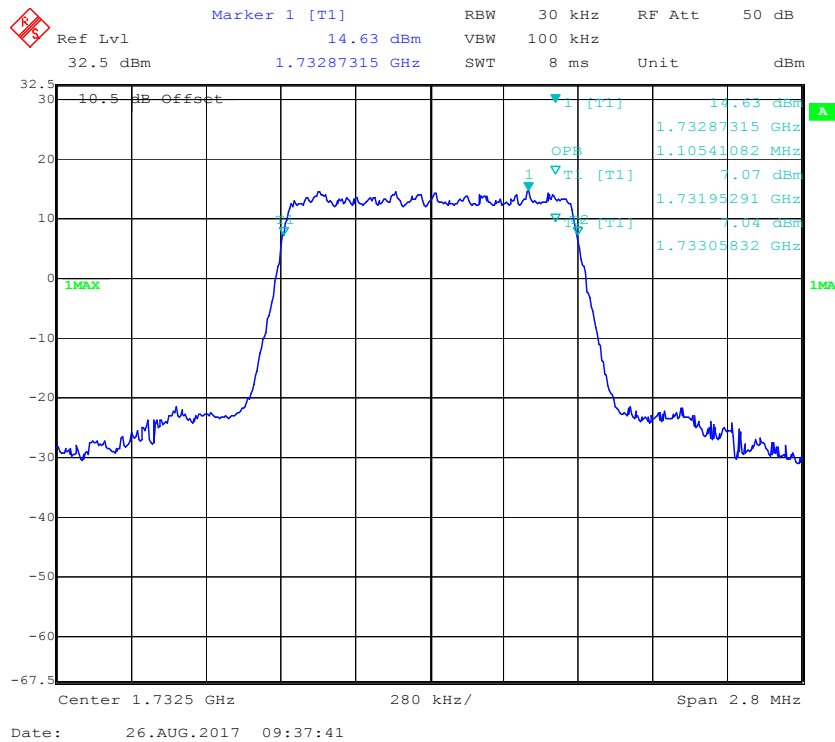
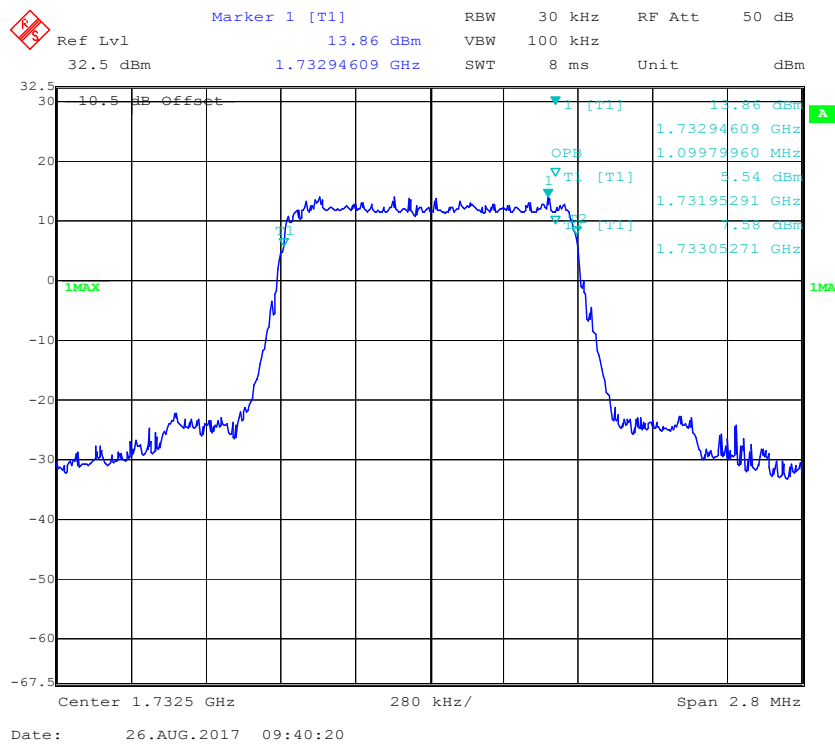
QPSK (3.0 MHz) - 26 dB Emissions Bandwidth, Middle channel**16-QAM (3.0 MHz) - 26 dB Emissions Bandwidth, Middle channel**

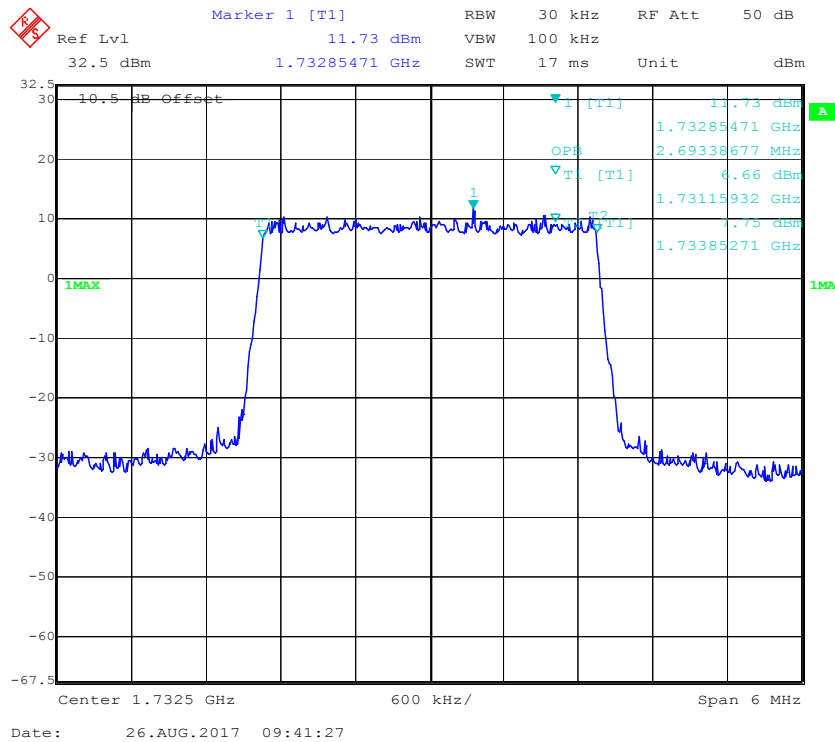
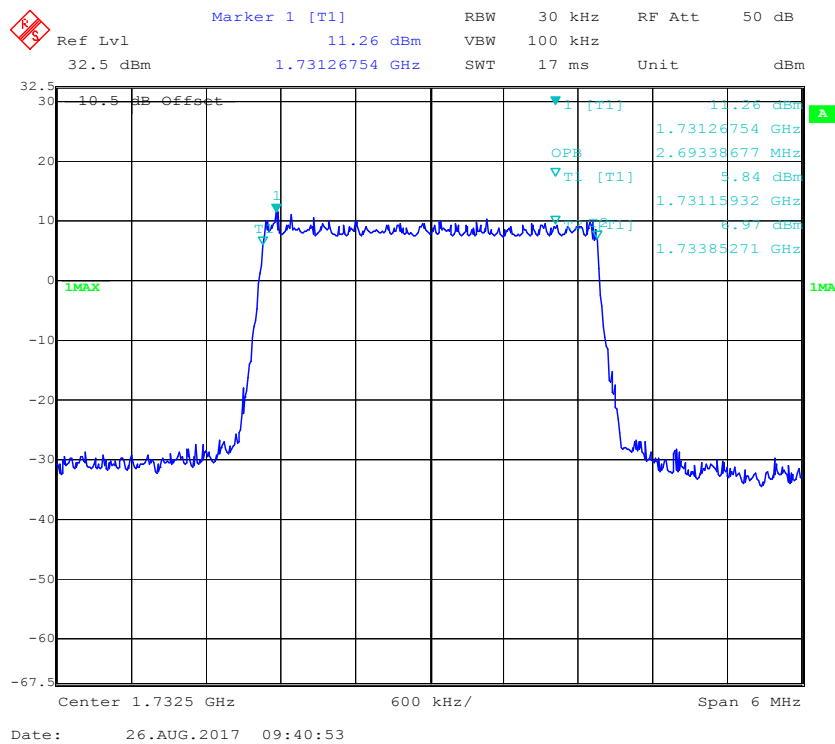
QPSK (5.0 MHz) - 26 dB Emissions Bandwidth, Middle channel**16-QAM (5.0 MHz) - 26 dB Emissions Bandwidth, Middle channel**

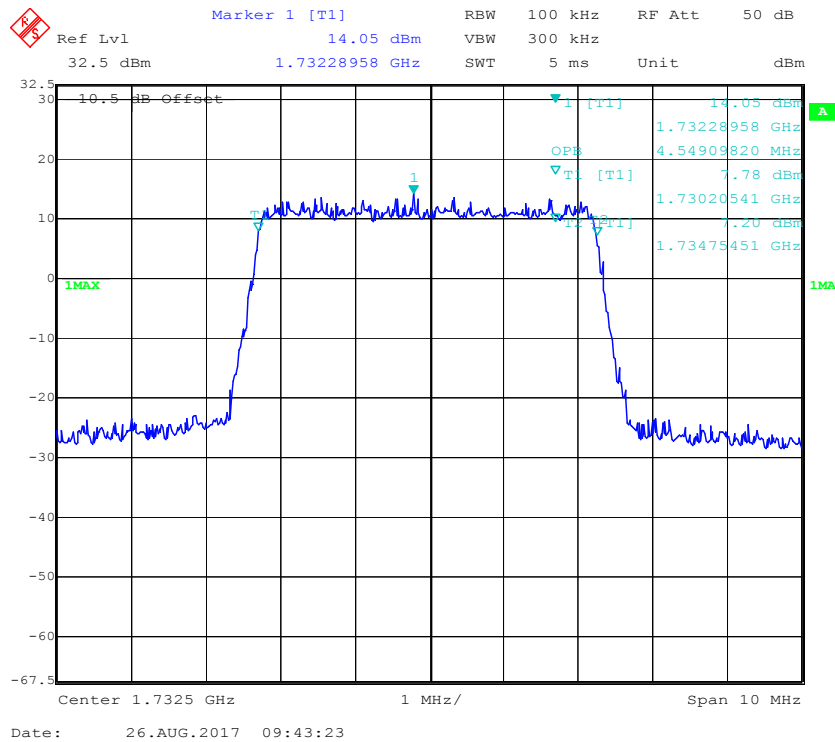
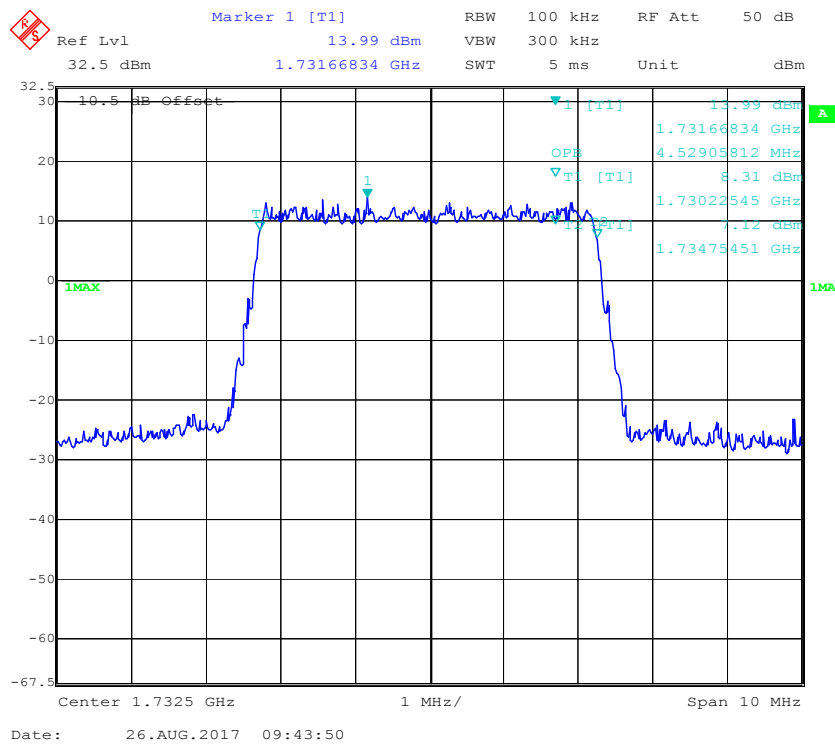
QPSK (10.0 MHz) - 26 dB Emissions Bandwidth, Middle channel**16-QAM (10.0 MHz) - 26 dB Emissions Bandwidth, Middle channel**

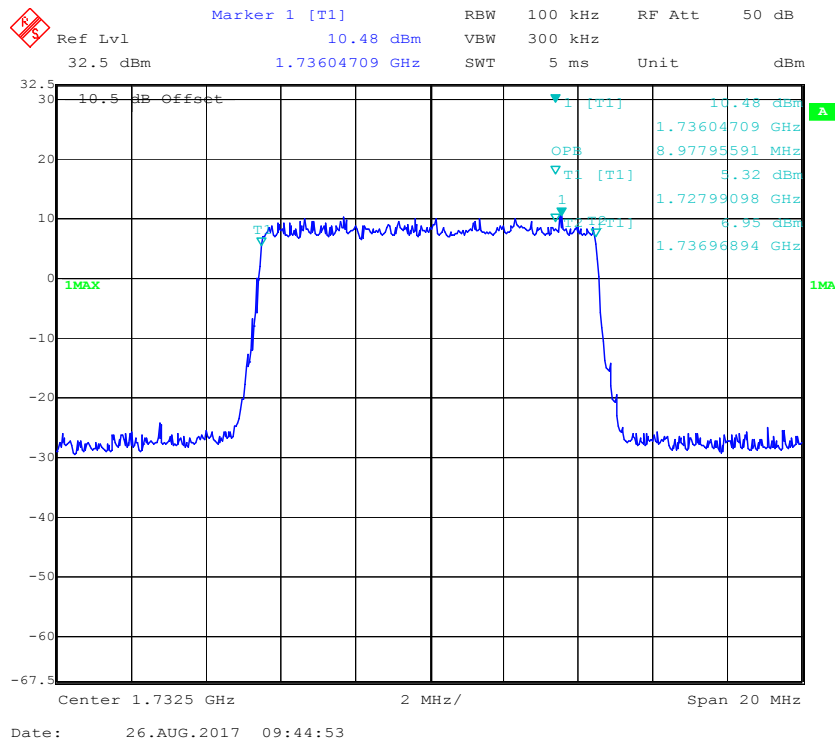
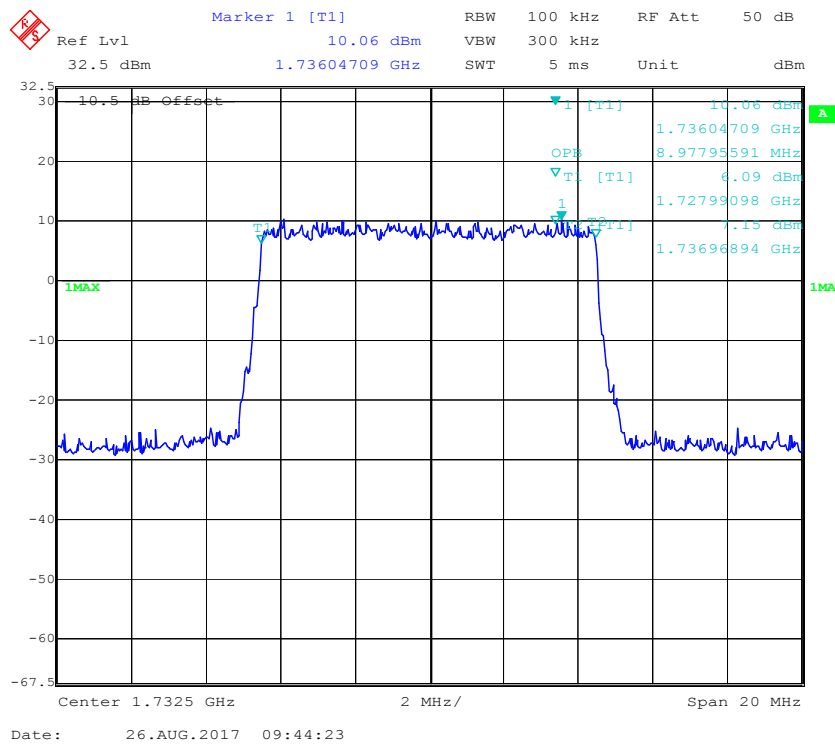
QPSK (15.0 MHz) - 26 dB Emissions Bandwidth, Middle channel**16-QAM (15.0 MHz) - 26 dB Emissions Bandwidth, Middle channel**

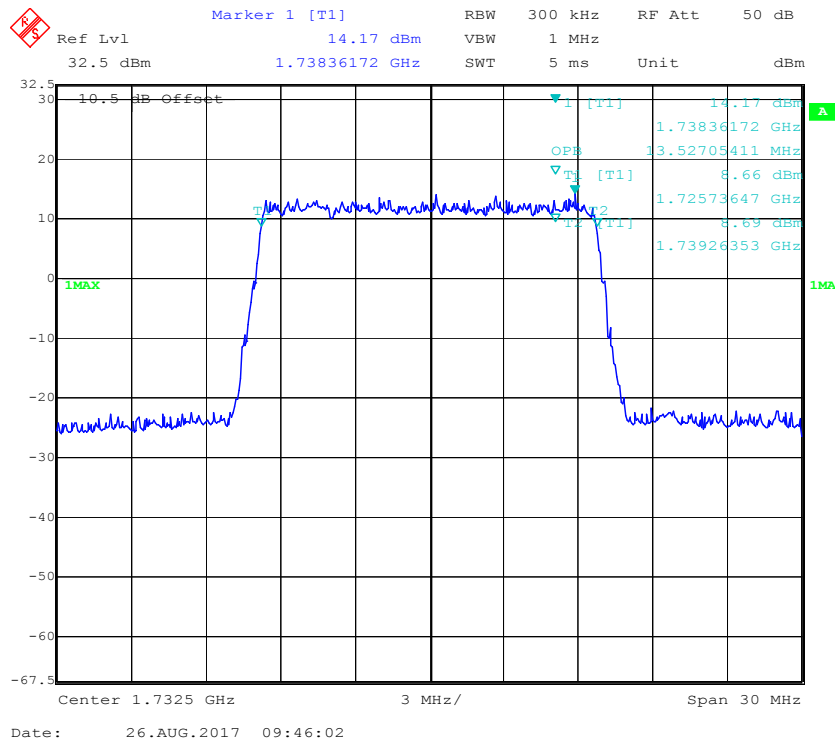
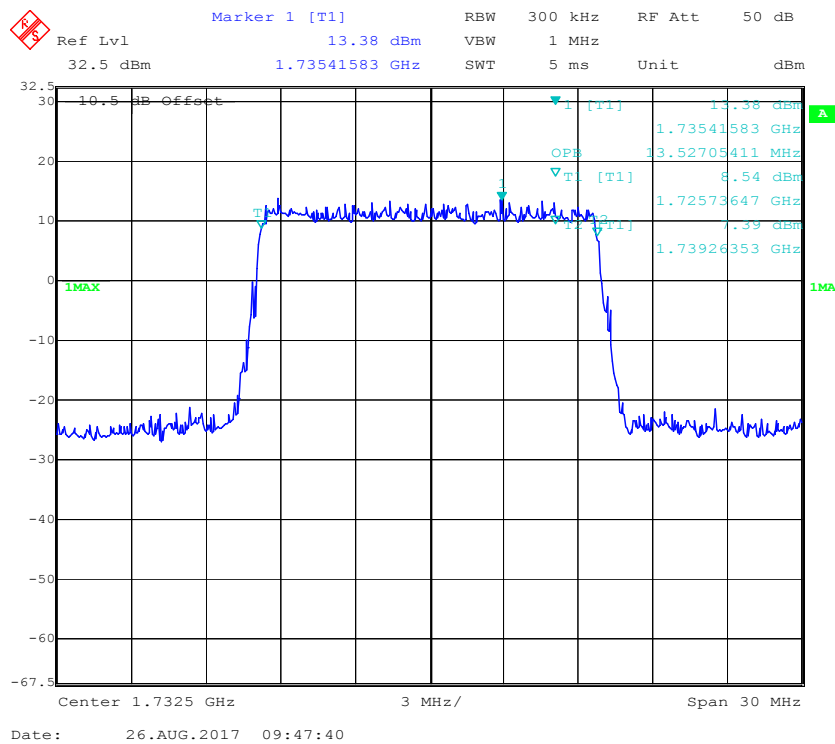
QPSK (20.0 MHz) - 26 dB Emissions Bandwidth, Middle channel**16-QAM (20.0 MHz) - 26 dB Emissions Bandwidth, Middle channel**

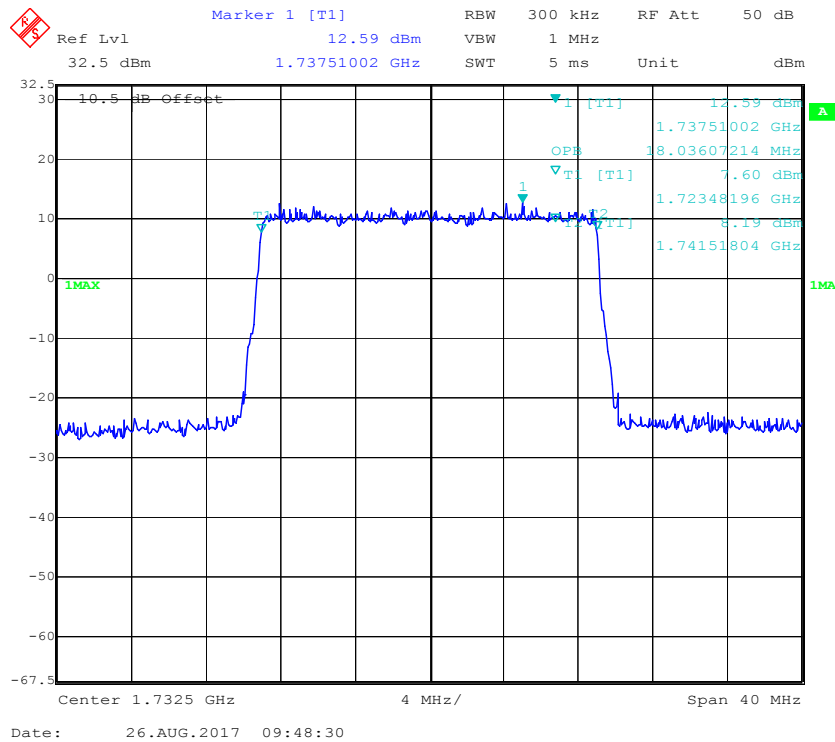
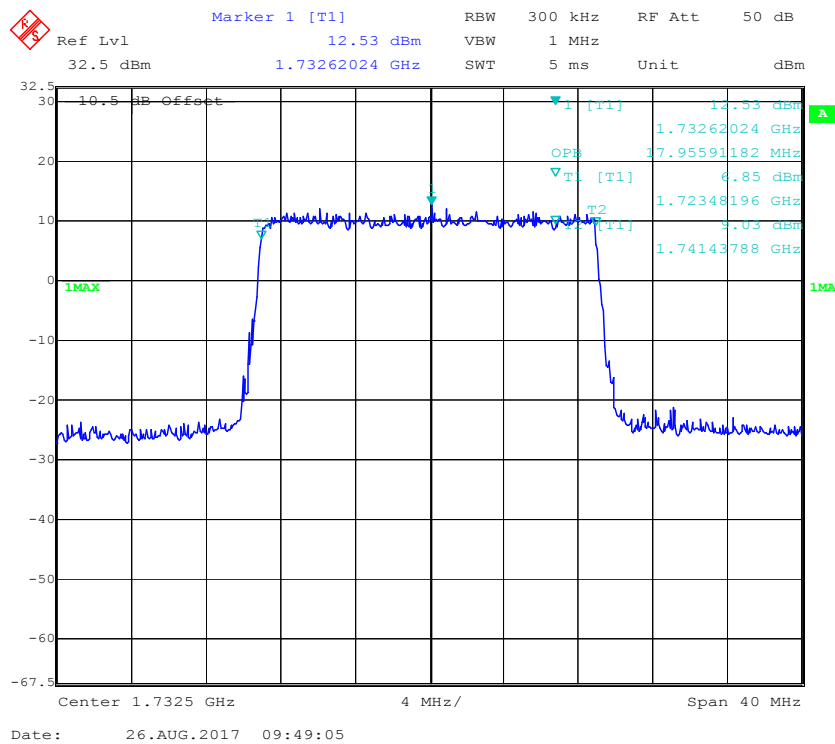
QPSK (1.4 MHz) - 99% Occupied Bandwidth, Middle channel**16-QAM (1.4 MHz) - 99% Occupied Bandwidth, Middle channel**

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**

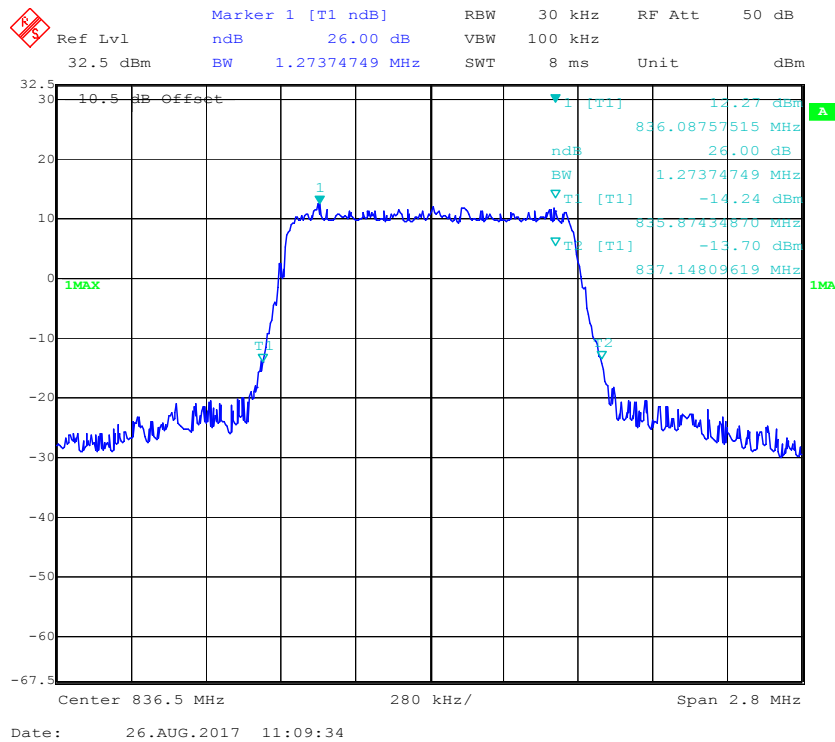
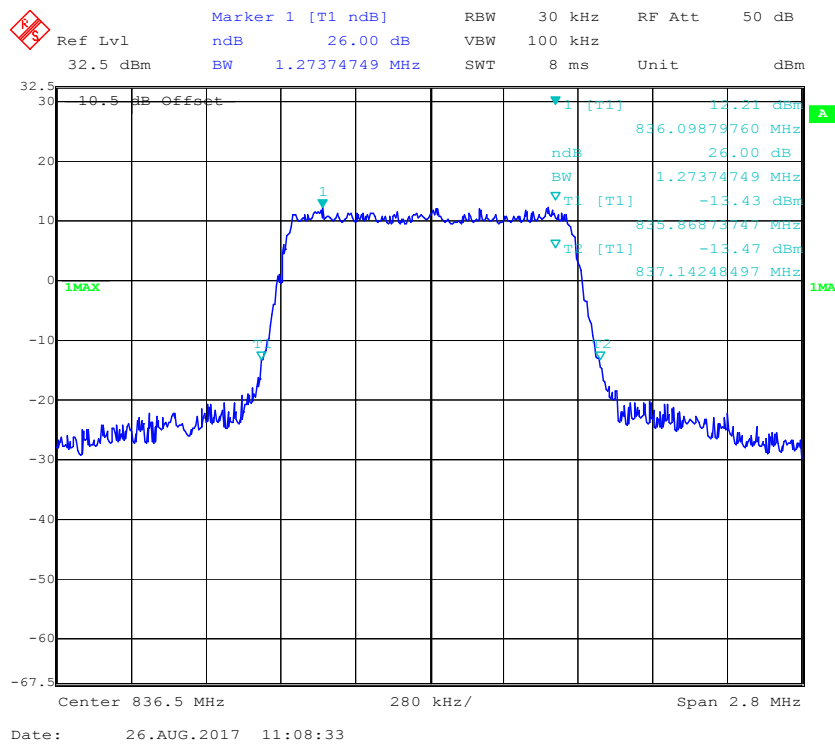
QPSK (10.0 MHz) - 99% Occupied Bandwidth, Middle channel**16-QAM (10.0 MHz) - 99% Occupied Bandwidth, Middle channel**

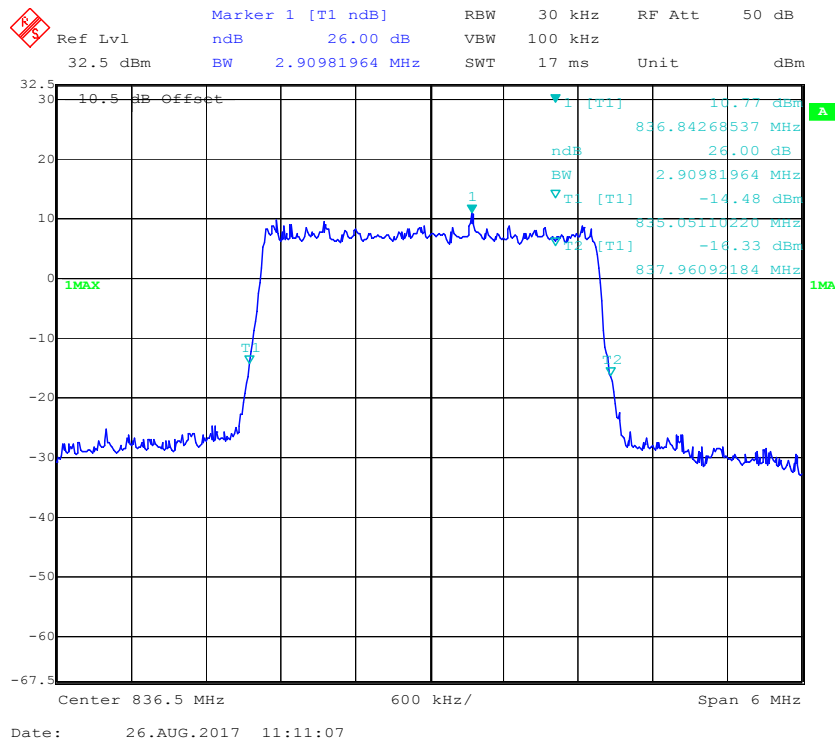
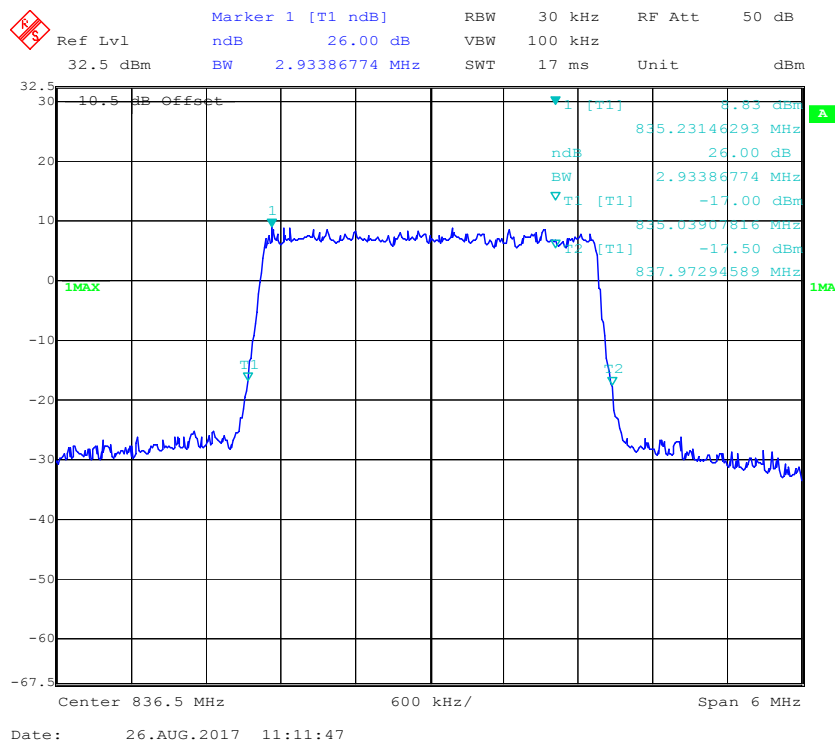
QPSK (15.0 MHz) - 99% Occupied Bandwidth, Middle channel**16-QAM (15.0 MHz) - 99% Occupied Bandwidth, Middle channel**

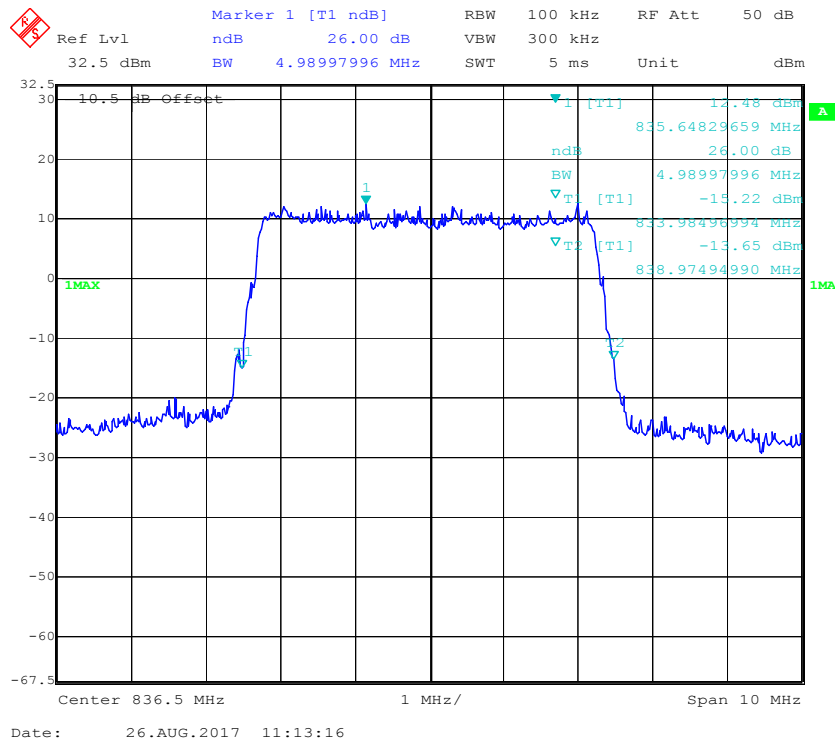
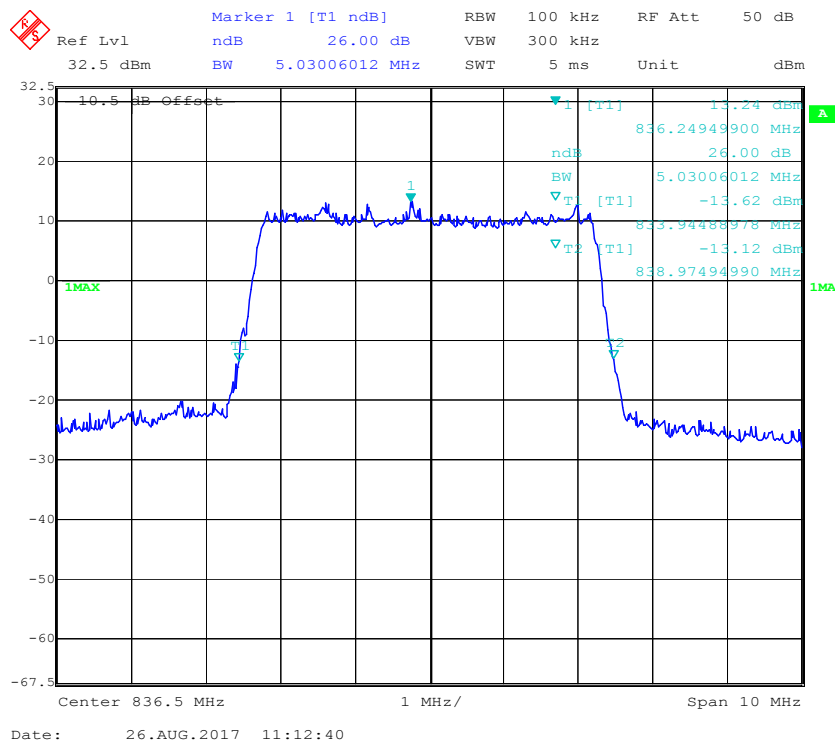
QPSK (20.0 MHz) - 99% Occupied Bandwidth, Middle channel**16-QAM (20.0 MHz) - 99% Occupied Bandwidth, Middle channel**

LTE Band 5: (Middle Channel)

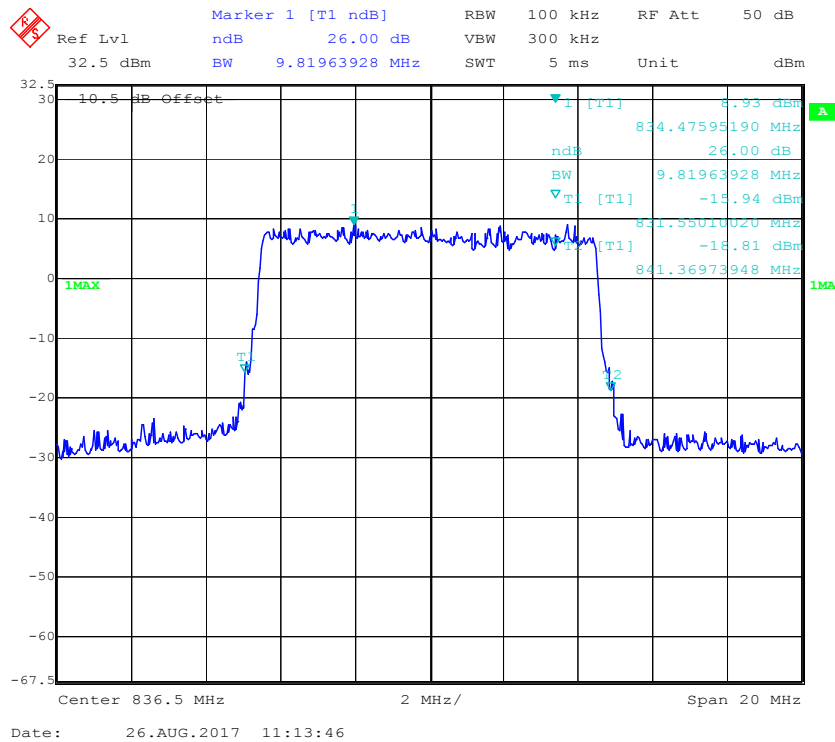
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.089	1.274
	16QAM	1.105	1.274
3.0	QPSK	2.681	2.910
	16QAM	2.693	2.934
5.0	QPSK	4.529	4.990
	16QAM	4.529	5.030
10.0	QPSK	8.978	9.820
	16QAM	8.978	9.780

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

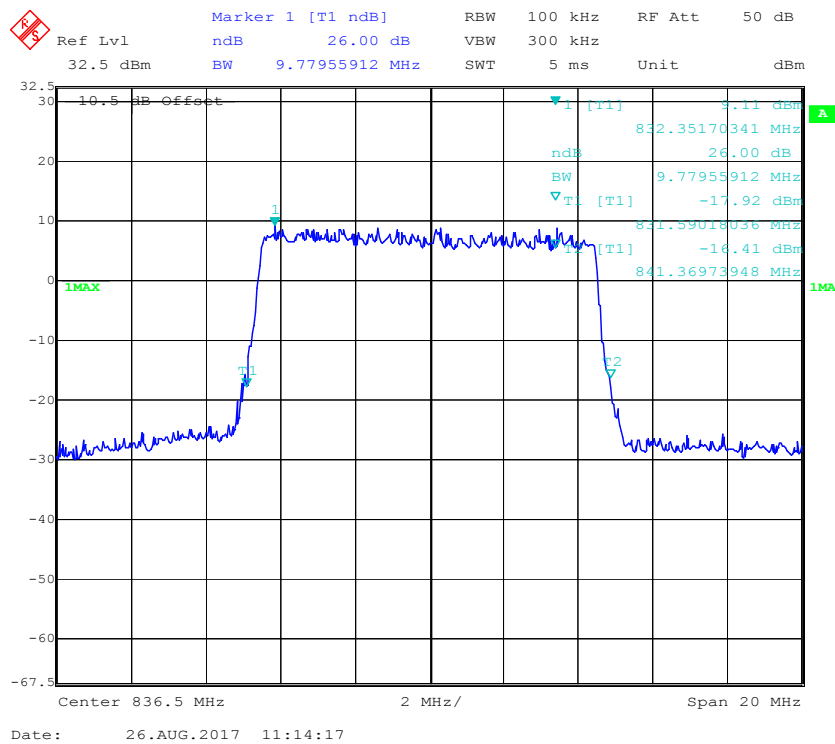
QPSK (3.0 MHz) - 26 dB Emissions Bandwidth, Middle channel**16-QAM (3.0 MHz) - 26 dB Emissions Bandwidth, Middle channel**

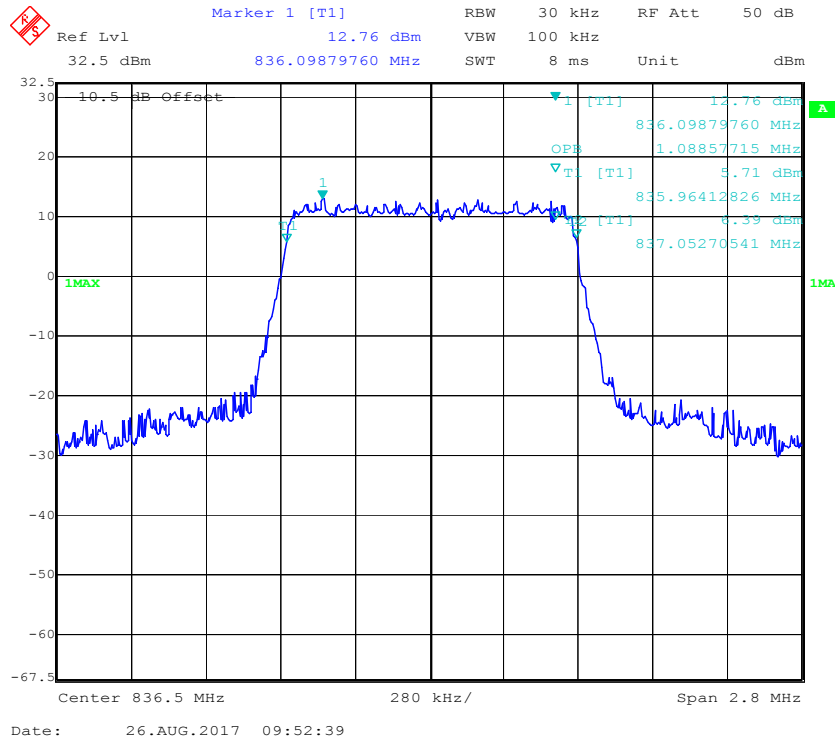
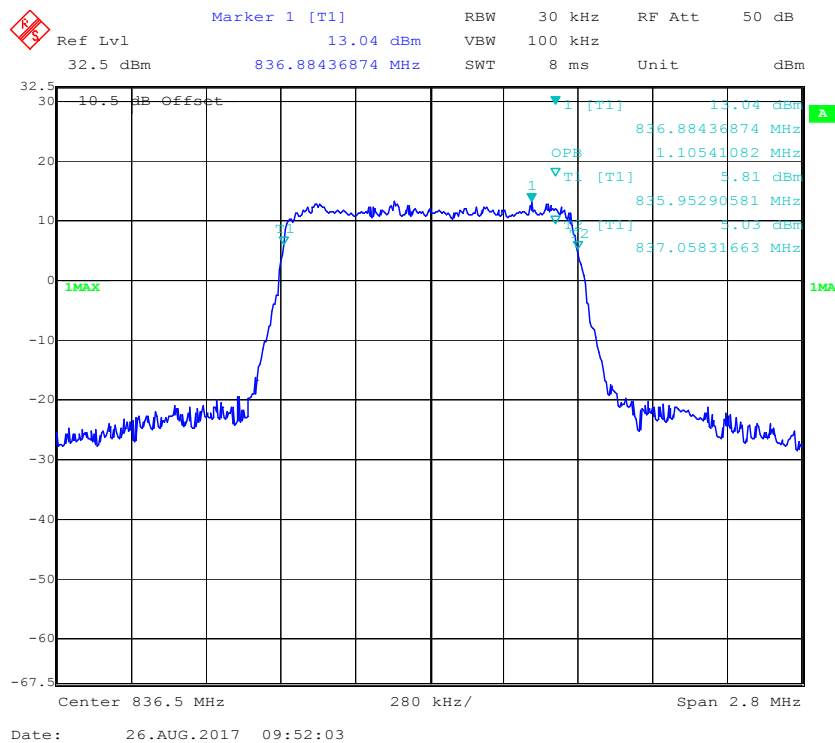
QPSK (5.0 MHz) - 26 dB Emissions Bandwidth, Middle channel**16-QAM (5.0 MHz) - 26 dB Emissions Bandwidth, Middle channel**

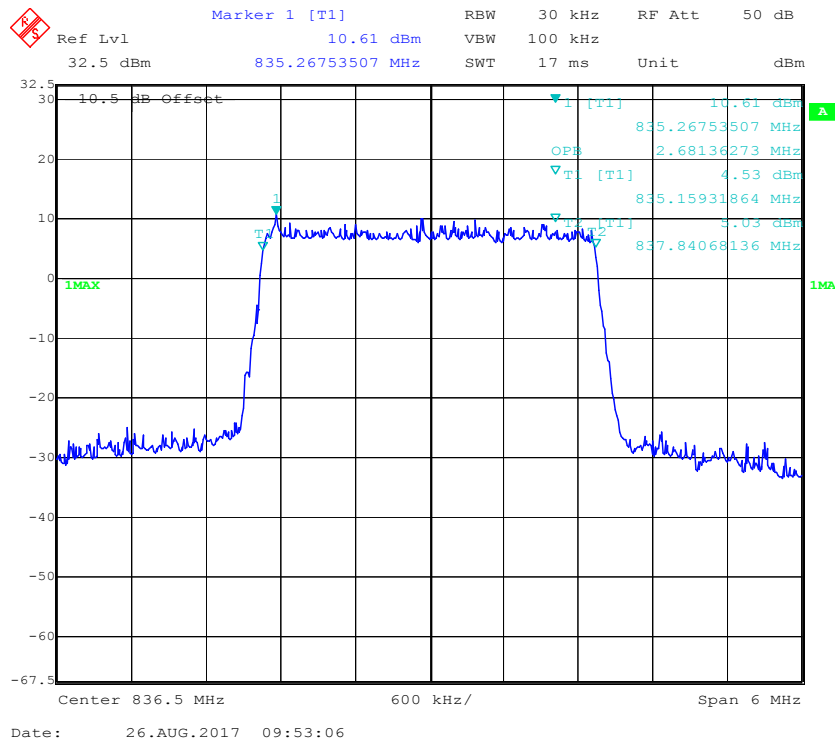
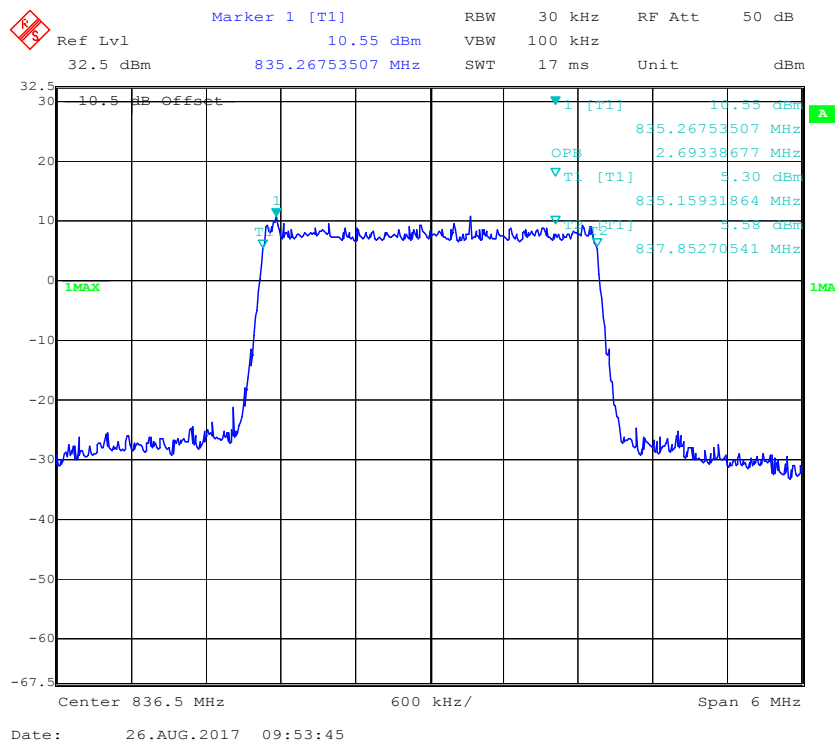
QPSK (10.0 MHz) - 26 dB Emissions Bandwidth, Middle channel

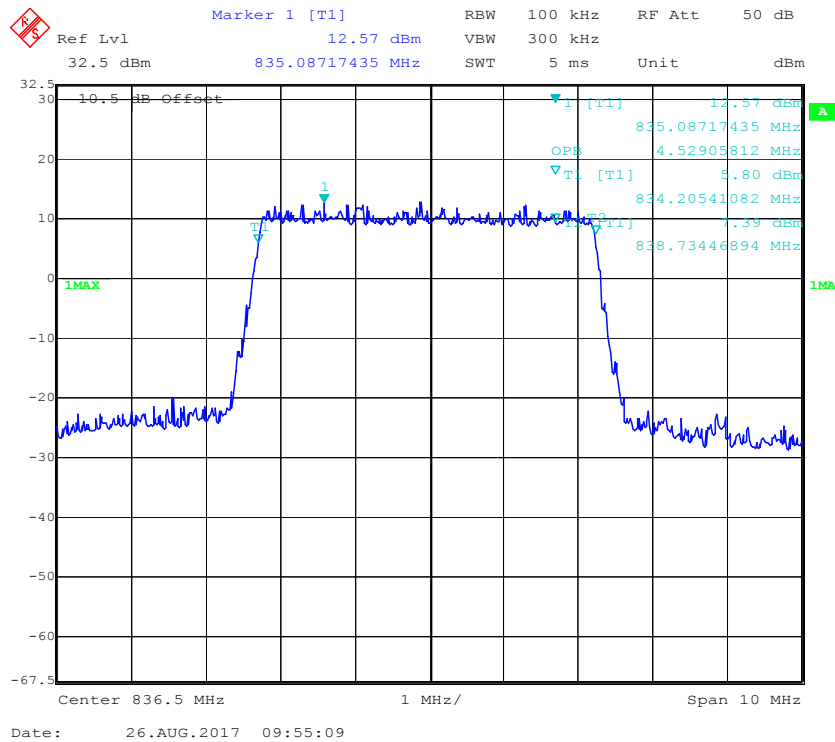
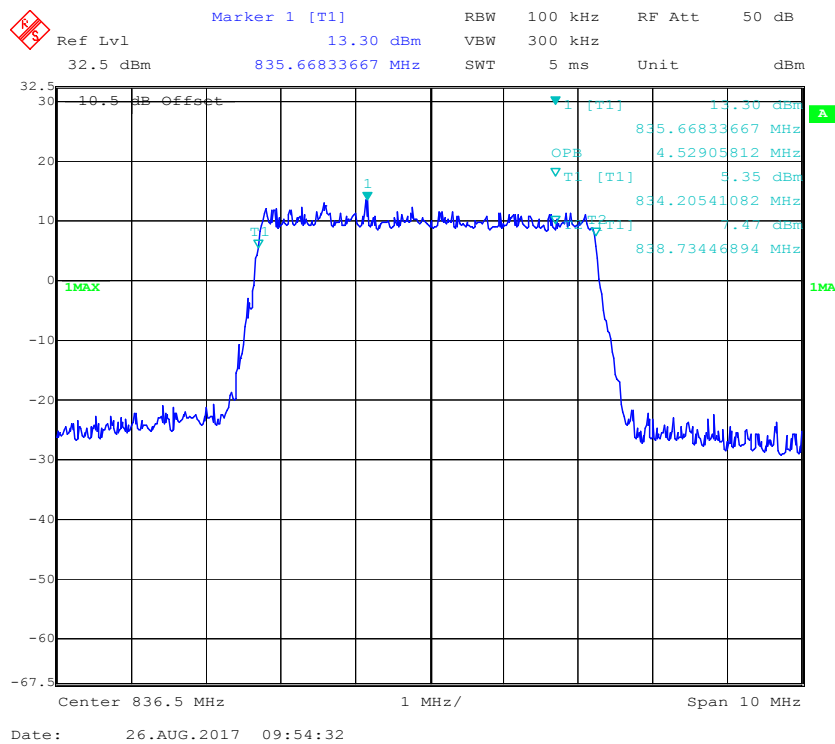


16-QAM (10.0 MHz) - 26 dB Emissions Bandwidth, Middle channel

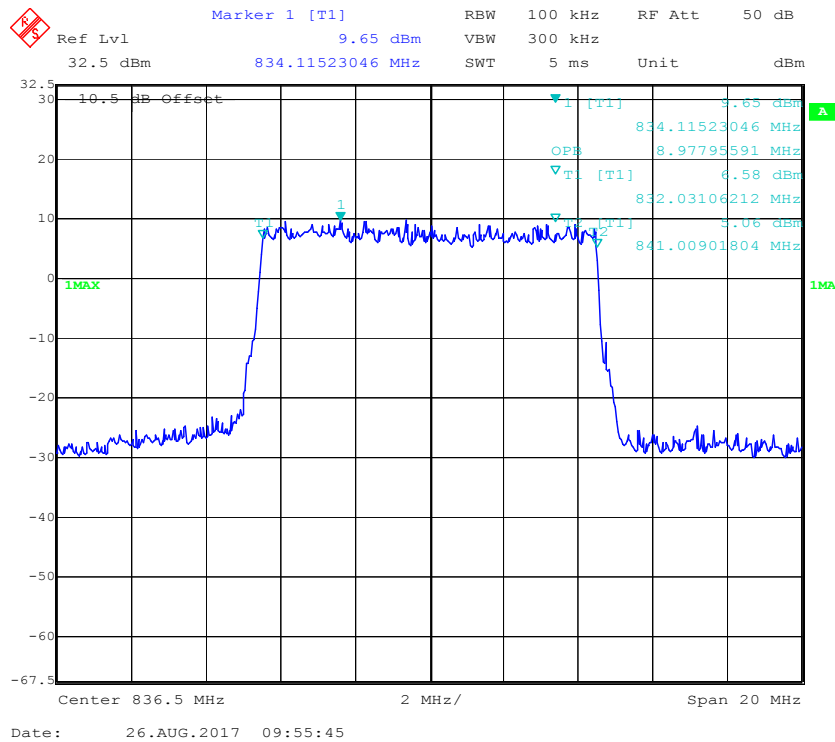


QPSK (1.4 MHz) - 99% Occupied Bandwidth, Middle channel**16-QAM (1.4 MHz) - 99% Occupied Bandwidth, Middle channel**

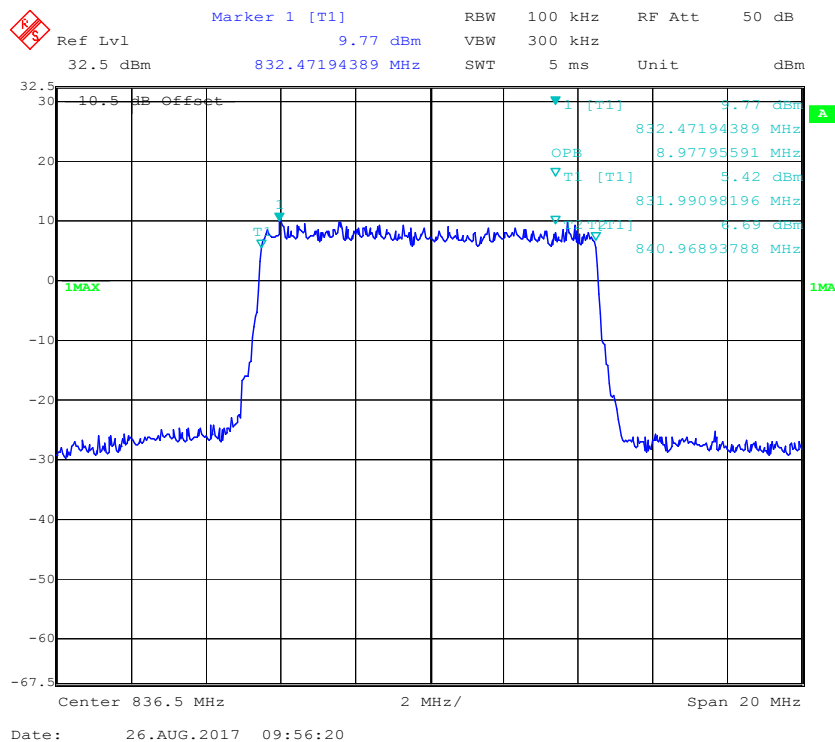
QPSK (3.0 MHz) - 99% Occupied Bandwidth, Middle channel**16-QAM (3.0 MHz) - 99% Occupied Bandwidth, Middle channel**

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

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

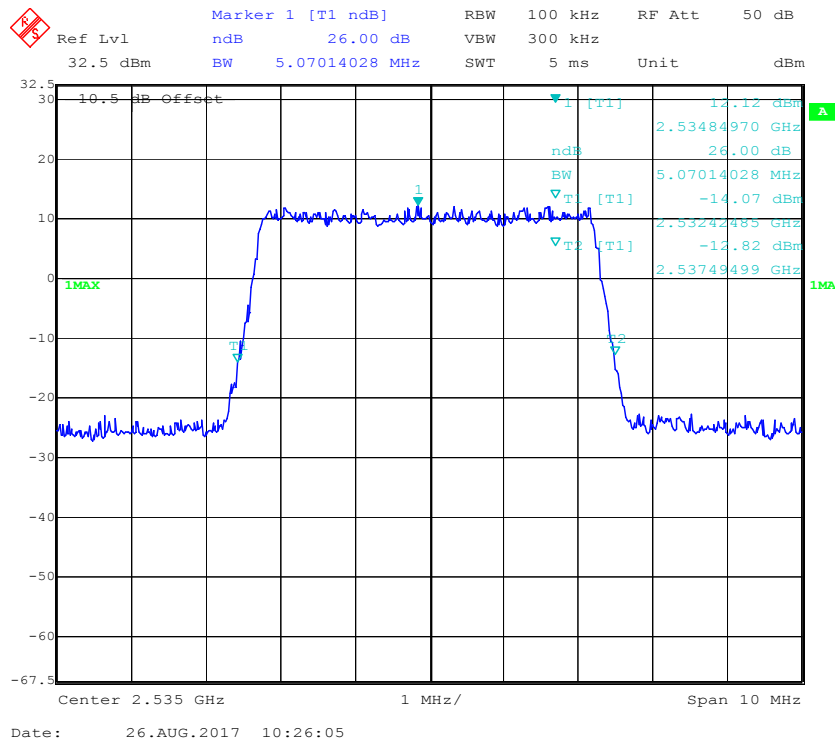
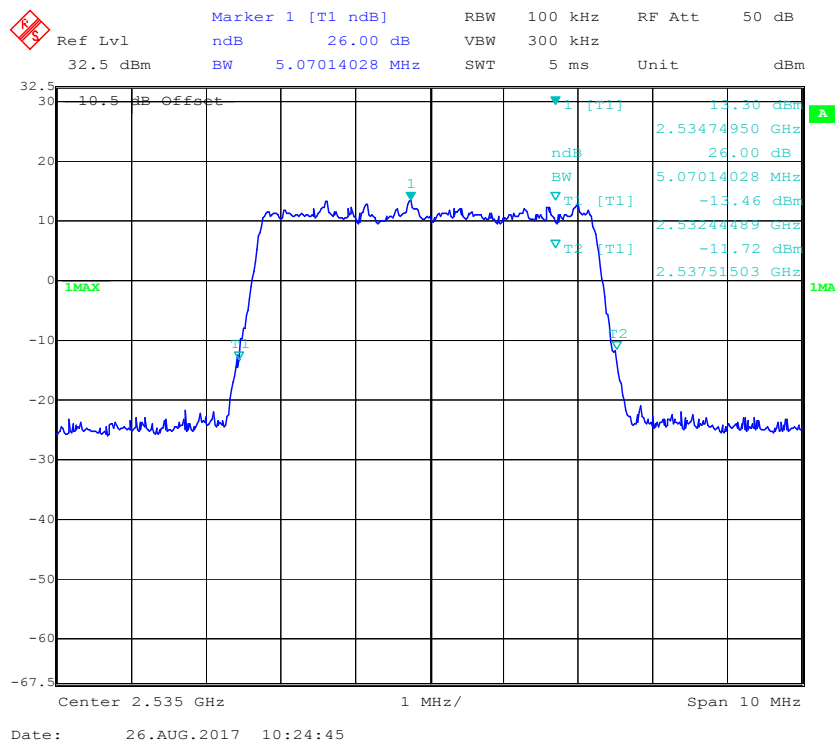


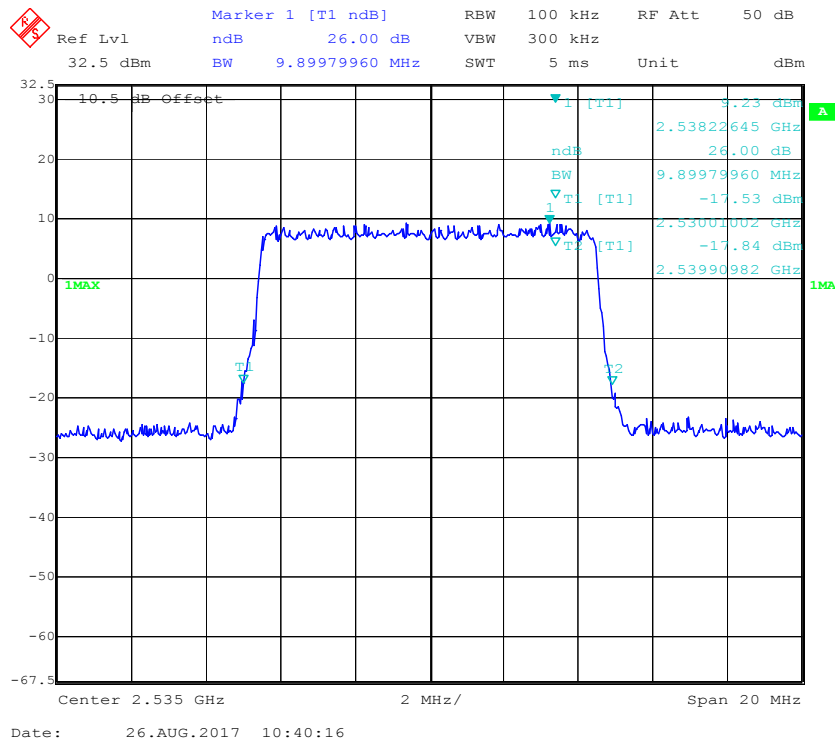
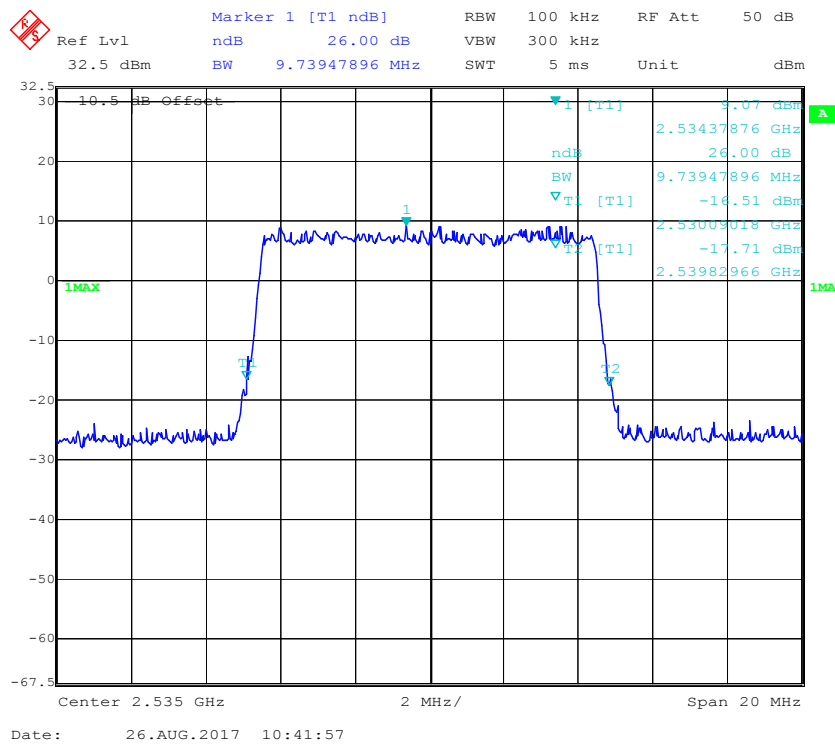
16-QAM (10.0 MHz) - 99% Occupied Bandwidth, Middle channel

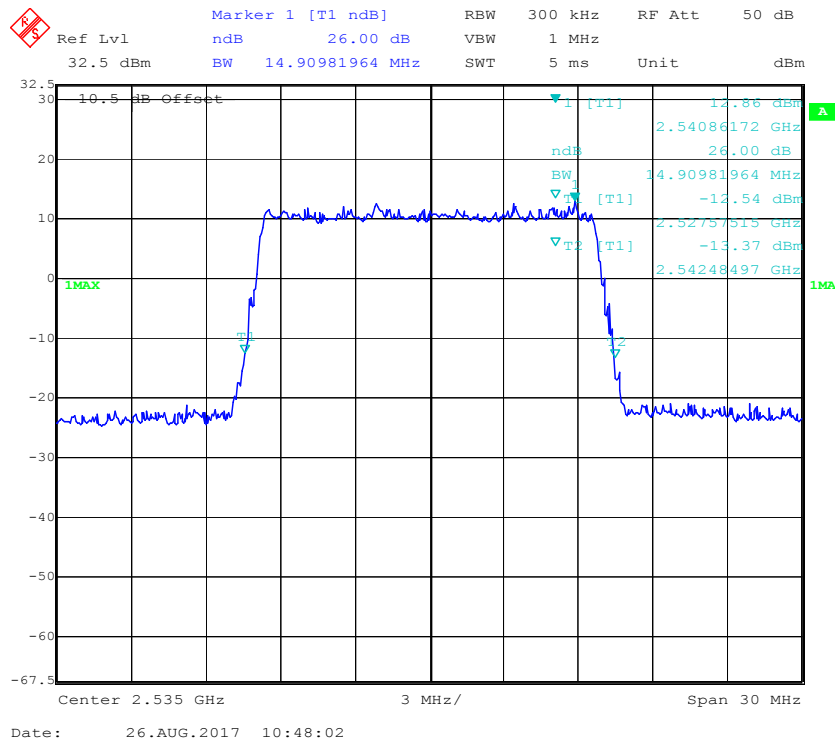
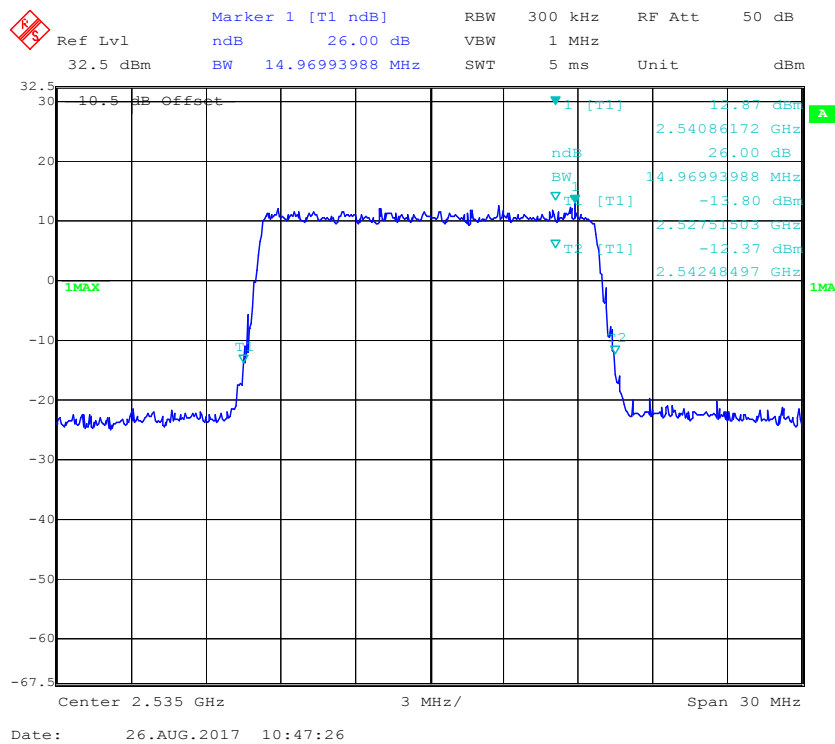


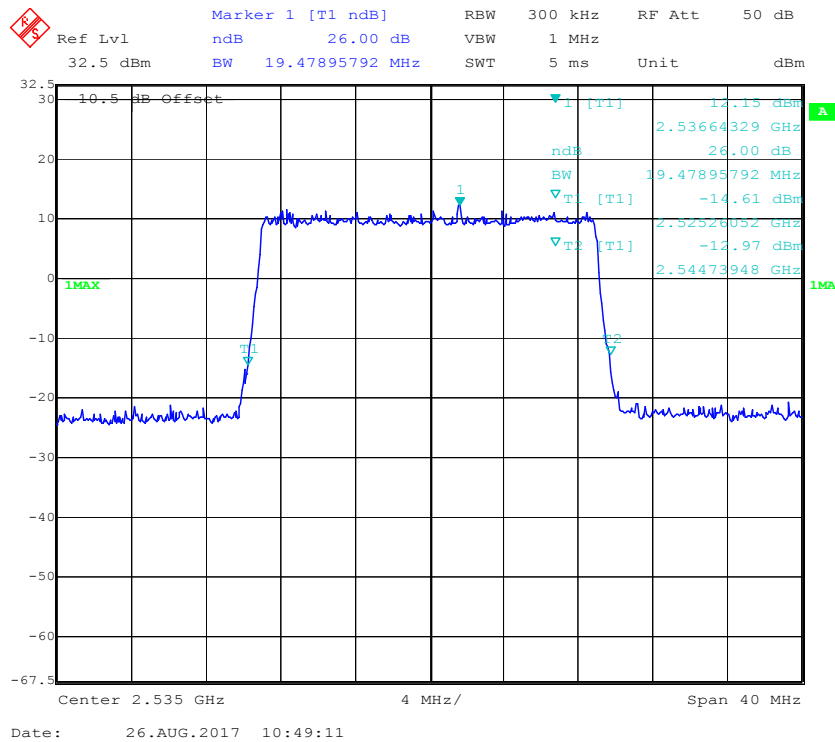
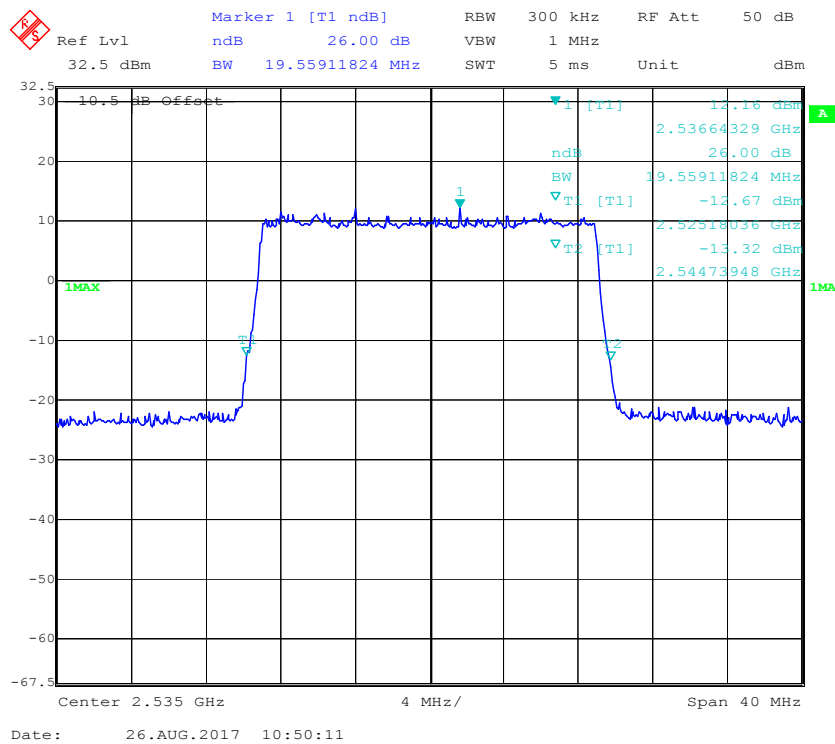
LTE Band 7: (Middle Channel)

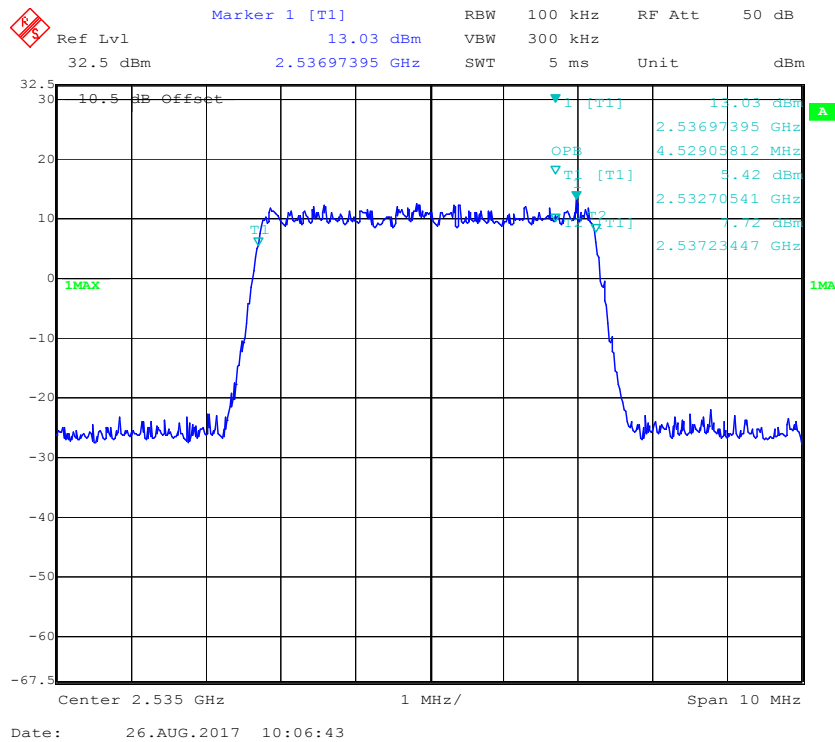
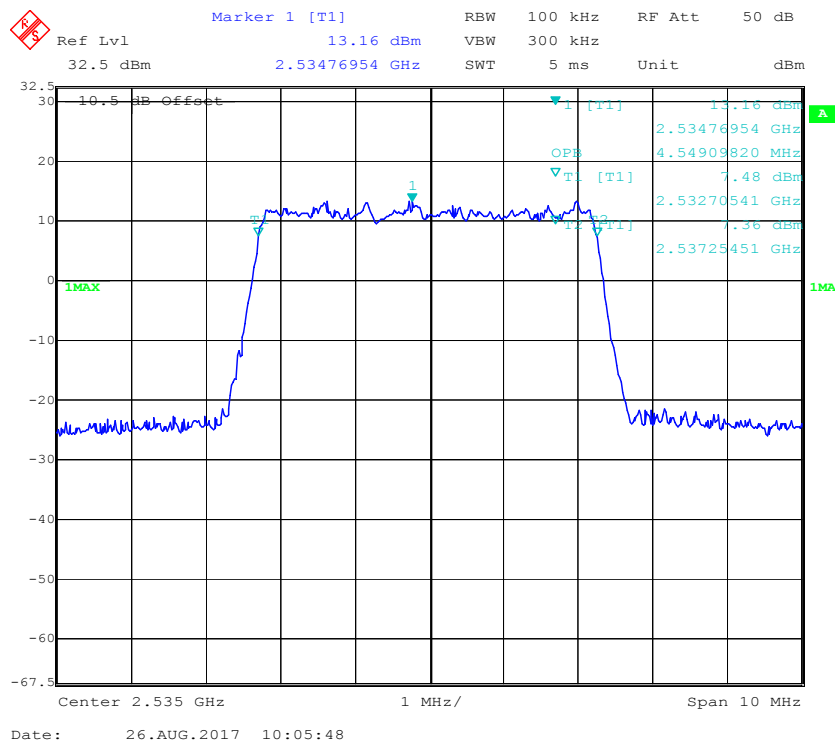
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
5	QPSK	4.529	5.070
	16QAM	4.549	5.070
10	QPSK	8.978	9.900
	16QAM	8.978	9.739
15	QPSK	13.527	14.910
	16QAM	13.527	14.970
20	QPSK	18.036	19.479
	16QAM	17.956	19.559

QPSK (5 MHz) - 26 dB Emissions Bandwidth, Middle channel**16-QAM (5 MHz) - 26 dB Emissions Bandwidth, Middle channel**

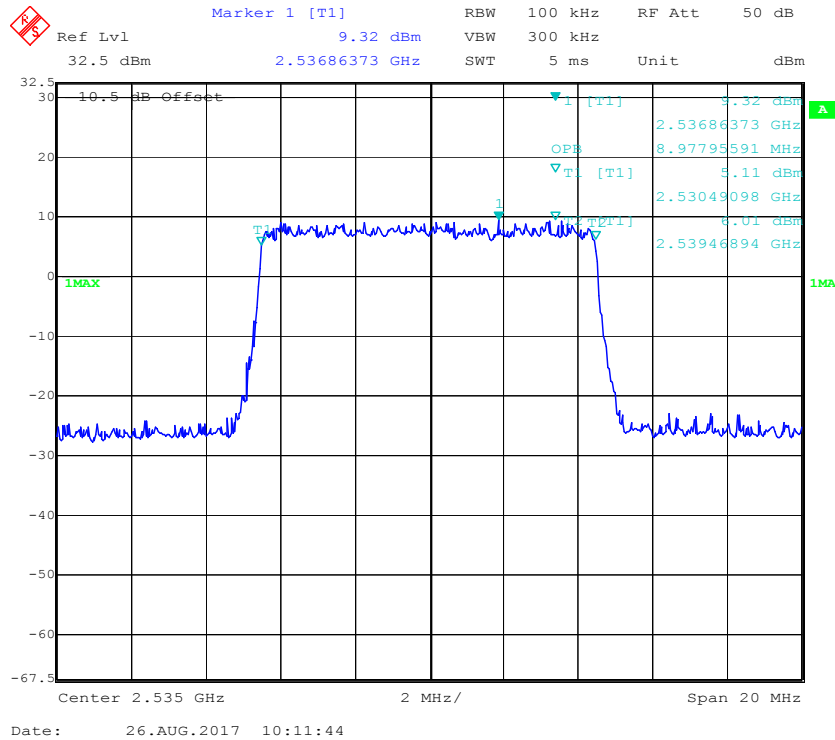
QPSK (10 MHz) - 26 dB Emissions Bandwidth, Middle channel**16-QAM (10MHz) - 26 dB Emissions Bandwidth, Middle channel**

QPSK (15 MHz) - 26 dB Emissions Bandwidth, Middle channel**16-QAM (15 MHz) - 26 dB Emissions Bandwidth, Middle channel**

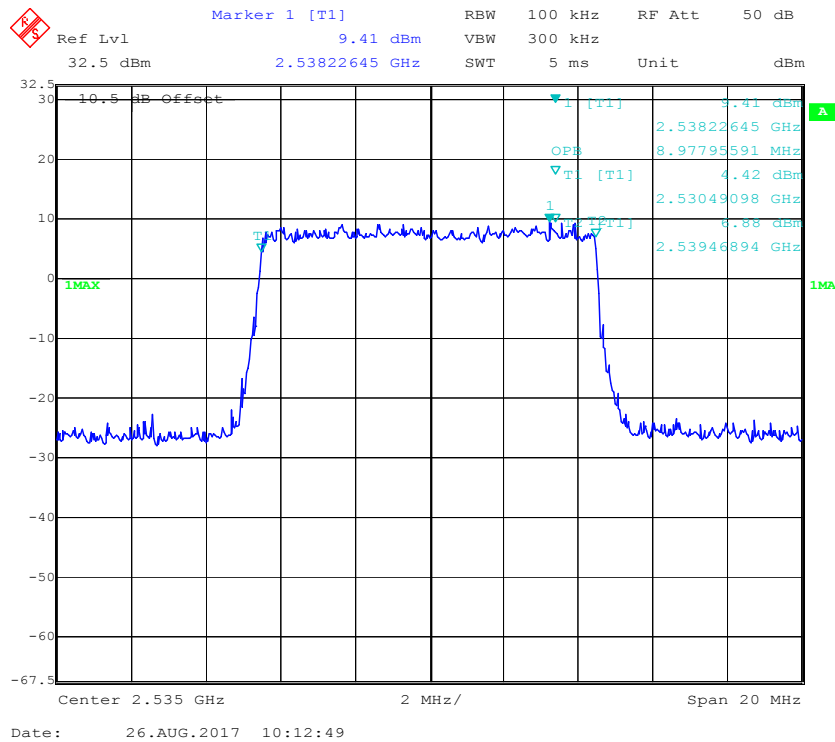
QPSK (20 MHz) - 26 dB Emissions Bandwidth, Middle channel**16-QAM (20 MHz) - 26 dB Emissions Bandwidth, Middle channel**

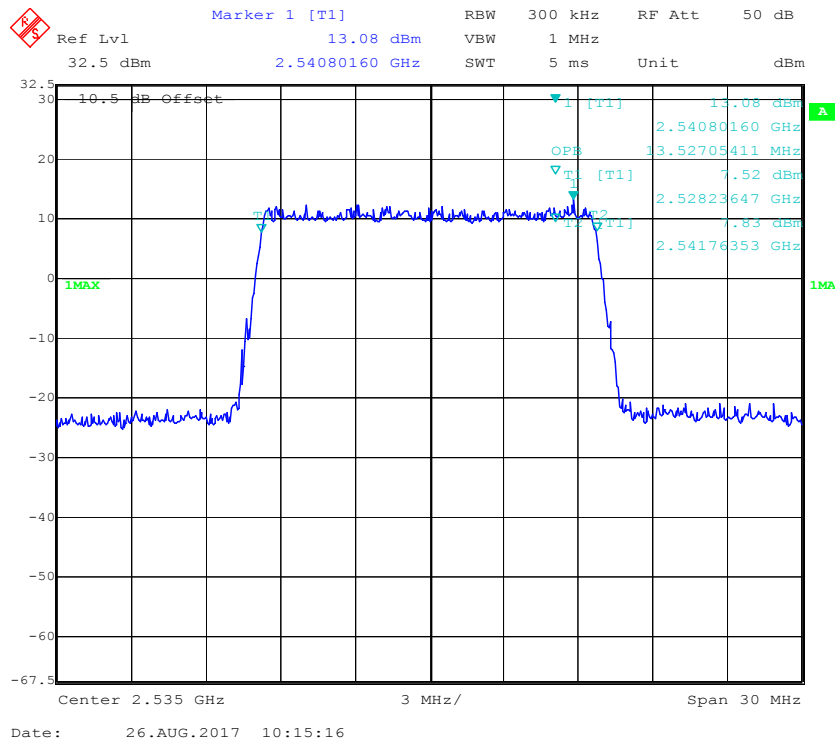
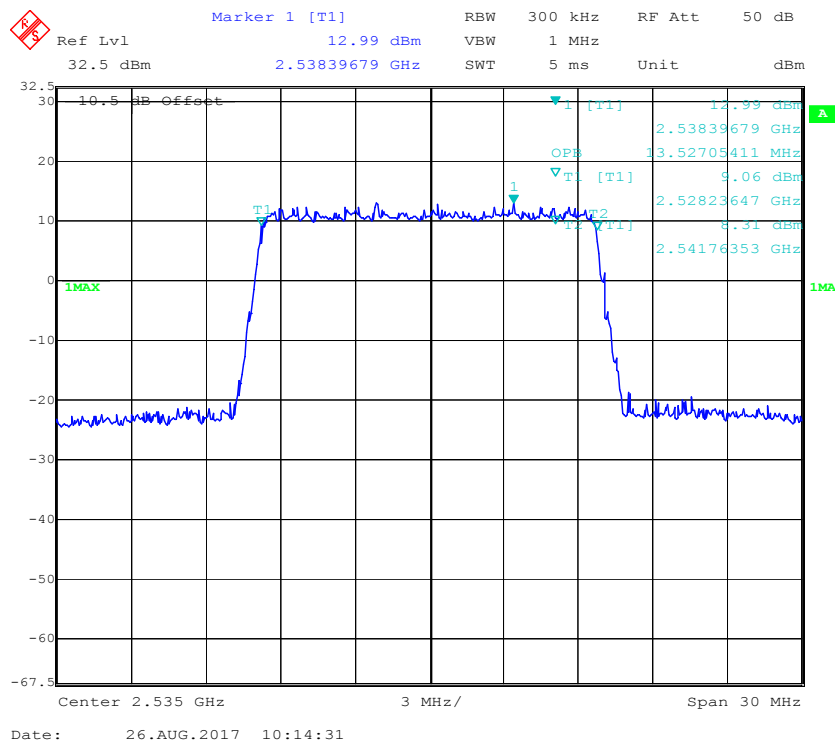
QPSK (5 MHz) - 99% Occupied Bandwidth, Middle channel**16-QAM (5 MHz) - 99% Occupied Bandwidth, Middle channel**

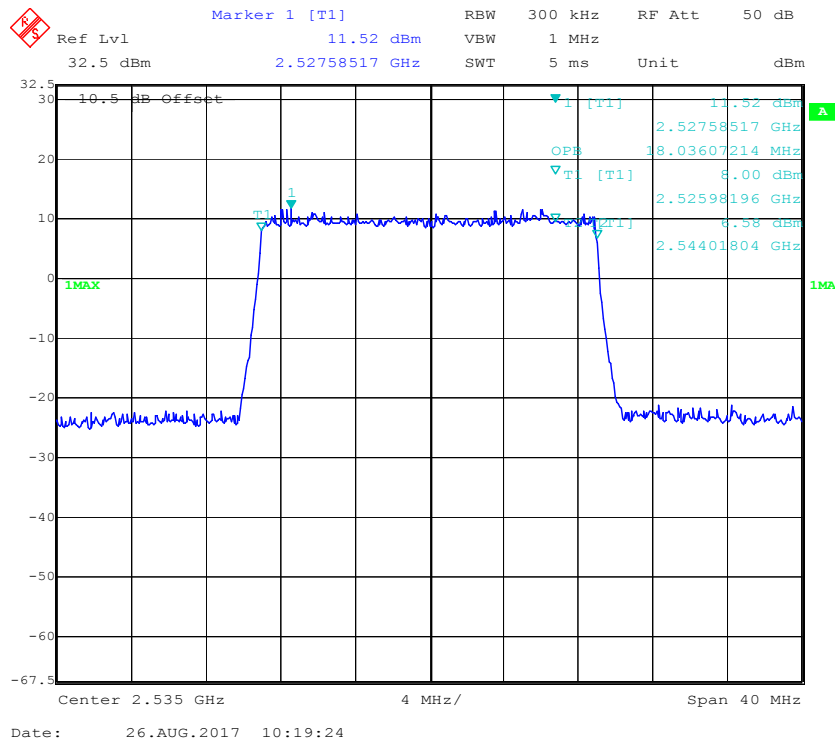
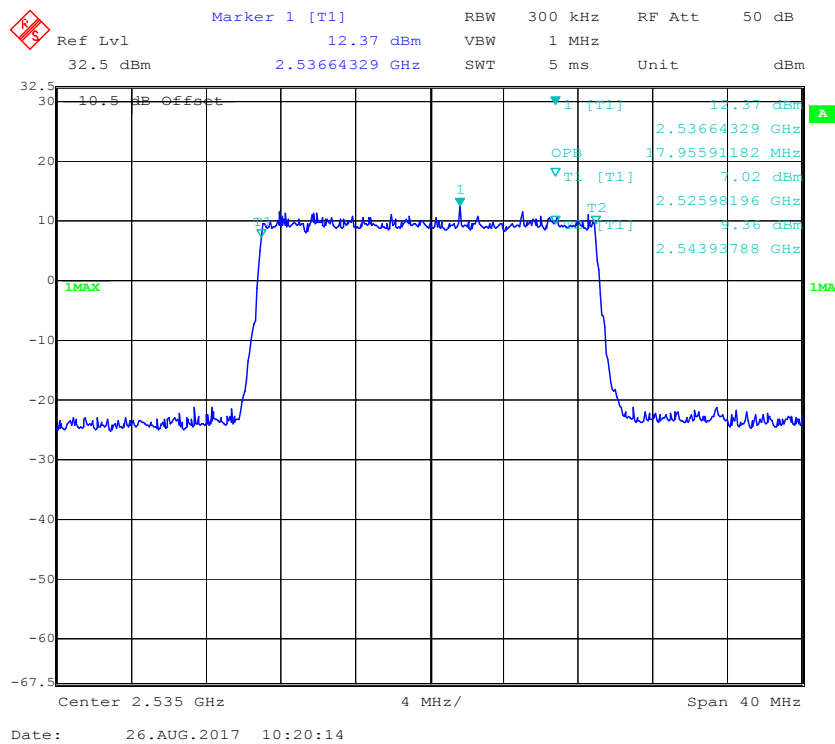
QPSK (10 MHz) - 99% Occupied Bandwidth, Middle channel



16-QAM (10MHz) - 99% Occupied Bandwidth, Middle channel



QPSK (15 MHz) - 99% Occupied Bandwidth, Middle channel**16-QAM (15 MHz) - 99% Occupied Bandwidth, Middle channel**

QPSK (20 MHz) - 99% Occupied Bandwidth, Middle channel**16-QAM (20 MHz) - 99% Occupied Bandwidth, Middle channel**

§ 2.1051; § 22.917 (a); § 24.238 (a); §27.53 (h) (m) SPURIOUS EMISSIONS AT ANTENNA TERMINALS

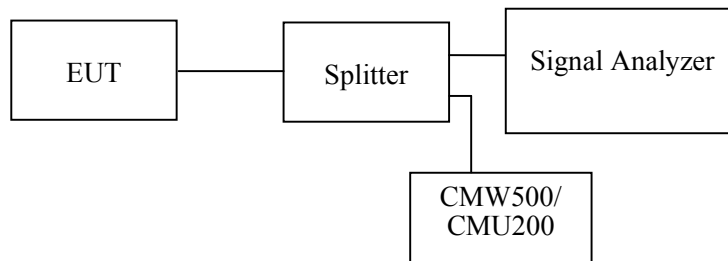
Applicable Standards

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

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 Data

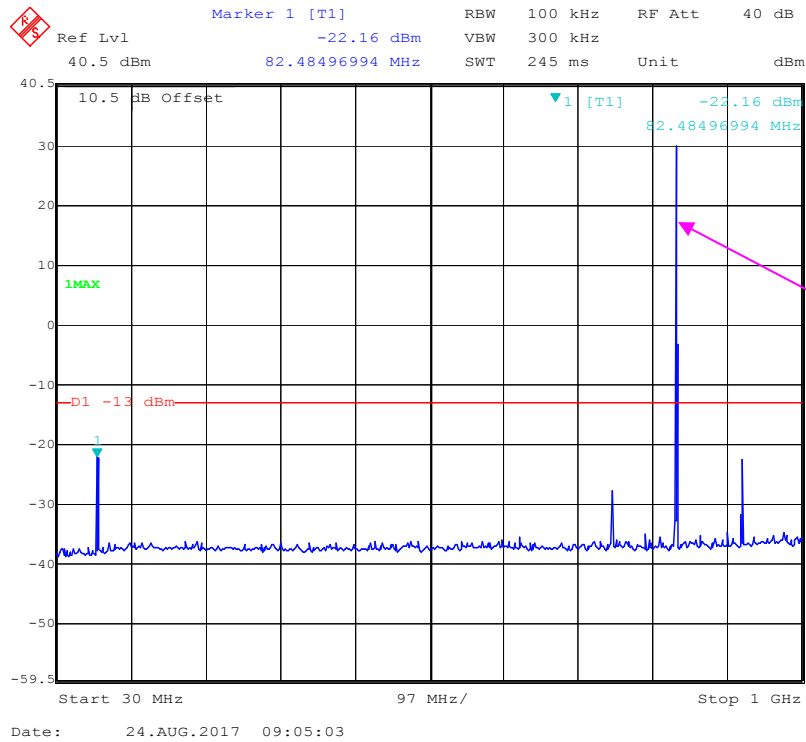
Environmental Conditions

Temperature:	23~25 °C
Relative Humidity:	53~55 %
ATM Pressure:	100.9~101.0 kPa

The testing was performed by Hill He from 2017-08-24 to 2017-08-26.

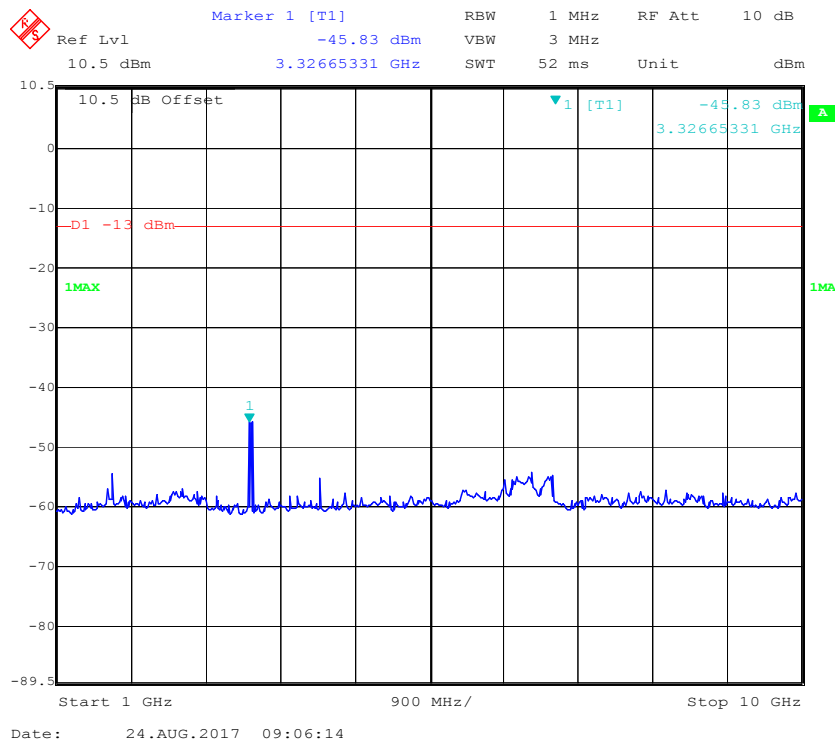
Cellular Band (Part 22H)

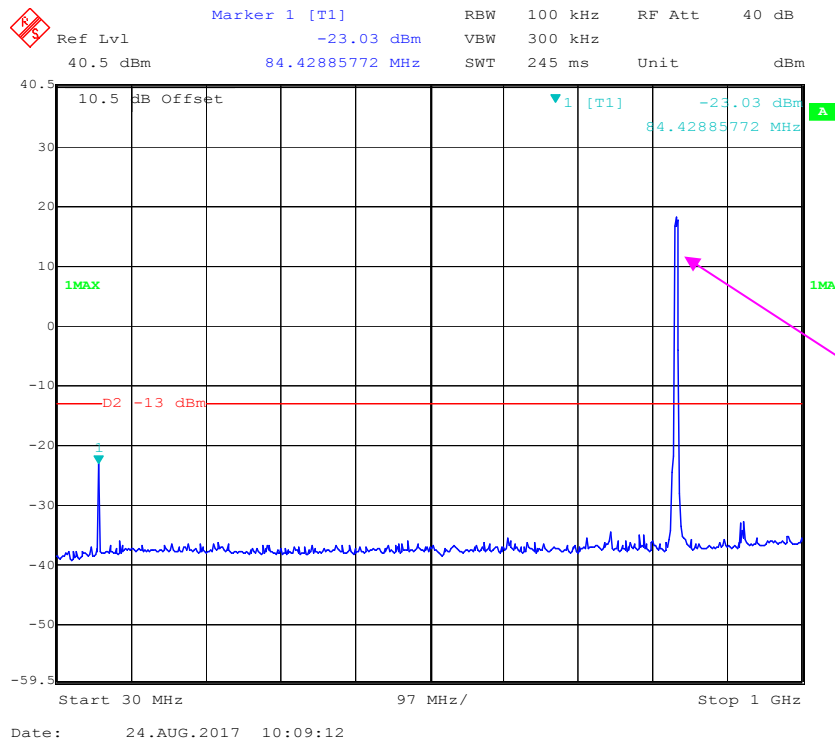
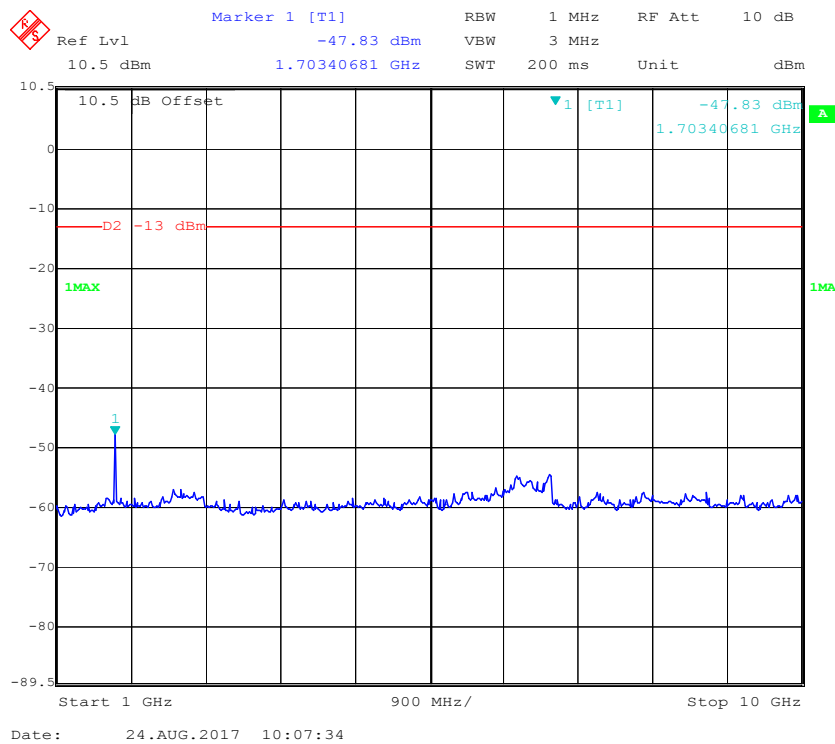
30 MHz – 1 GHz (GSM Mode)



Fundamental test

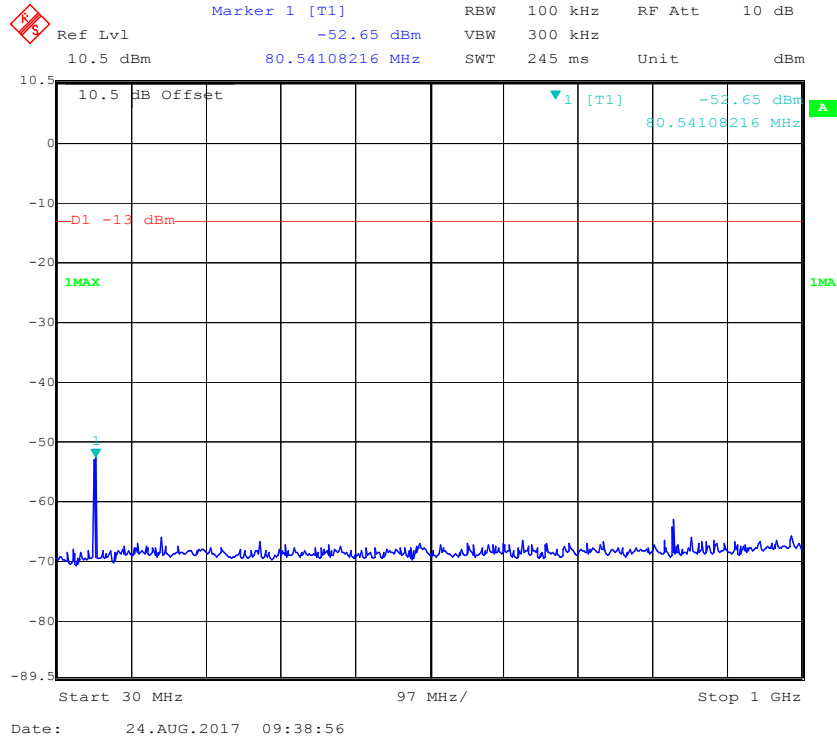
1 GHz – 10 GHz (GSM Mode)



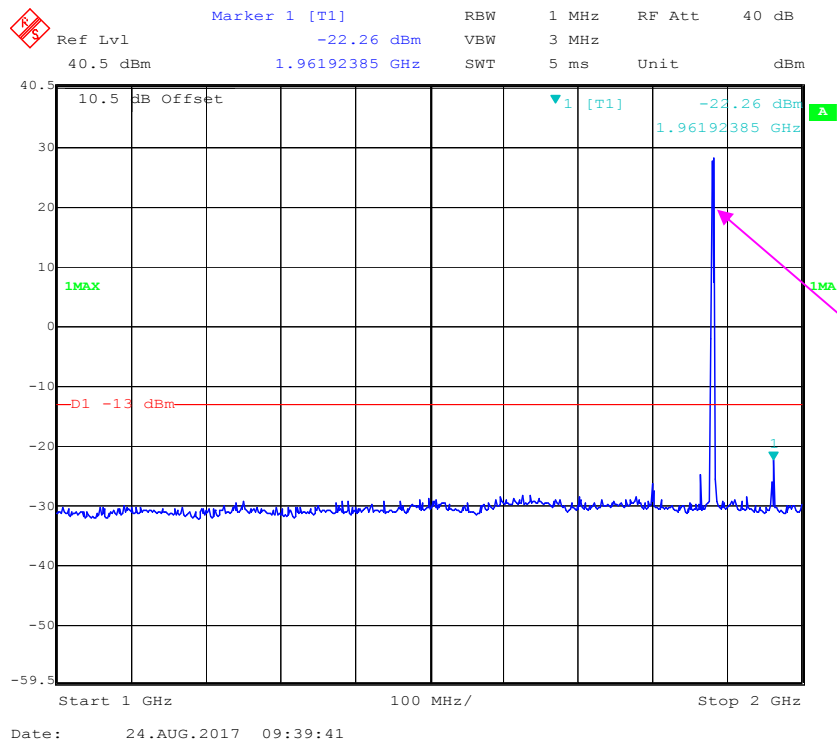
30 MHz – 1 GHz (WCDMA Mode)**1 GHz – 10 GHz (WCDMA Mode)**

PCS Band (Part 24E)

30 MHz – 1 GHz (GSM Mode)



1 GHz – 2 GHz (GSM Mode)



Ref Lvl 10.5 dBm Marker 1 [T1] -38.95 dBm RBW 1 MHz VBW 3 MHz SWT 105 ms RF Att 10 dB Unit dBm

10.5 dB Offset

1 [T1] -38.95 dBm 5.64328657 GHz

D1 -13 dBm

1MAX

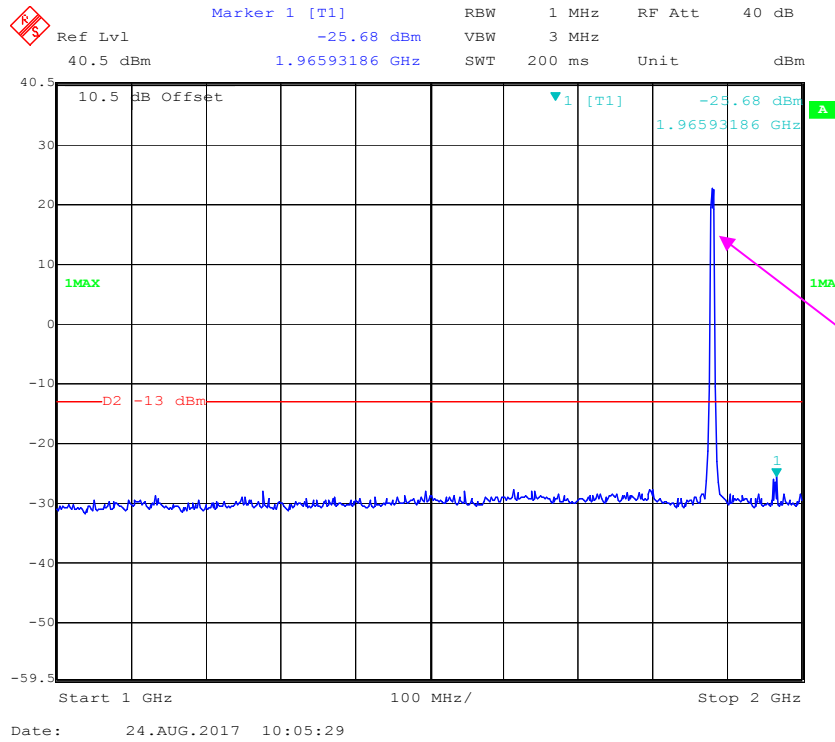
Start 2 GHz 1.8 GHz/ Stop 20 GHz

Date: 24.AUG.2017 09:42:23

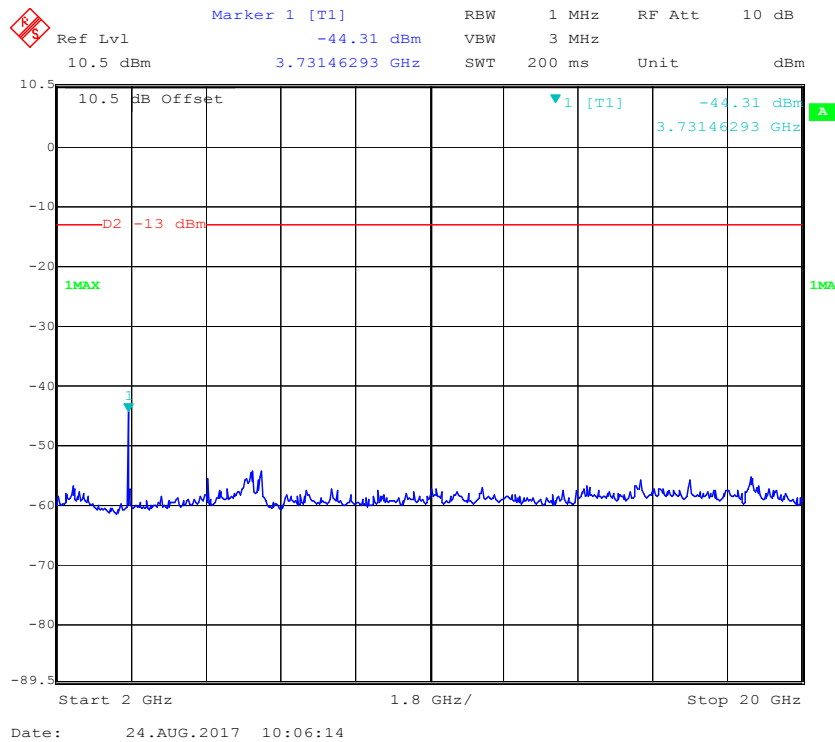
The screenshot shows a Spectrum Analyzer interface with the following details:

- Top Panel:**
 - Ref Lvl: 10.5 dBm
 - Marker 1 [T1]: -53.21 dBm
 - RBW: 100 kHz
 - VBW: 300 kHz
 - SWT: 245 ms
 - RF Att: 10 dB
 - Unit: dBm
- Plot Area:**
 - Y-axis: dB Offset, ranging from -89.5 to 10.5.
 - X-axis: Frequency, ranging from 30 MHz to 97 MHz.
 - Grid: A 10x10 grid is visible.
 - Trace: A blue line shows the signal spectrum, with a prominent peak at 82.48496994 MHz.
 - Marker: A blue triangle marker labeled '1 [T1]' is positioned at the peak of the signal.
 - Reference Line: A red horizontal line is drawn at -13 dBm, labeled 'D1 -13 dBm'.
 - Labels: '1MAX' is visible on the right side of the plot area.
- Bottom Panel:**
 - Date: 24.AUG.2017 11:03:24

1 GHz – 2 GHz (WCDMA Mode)

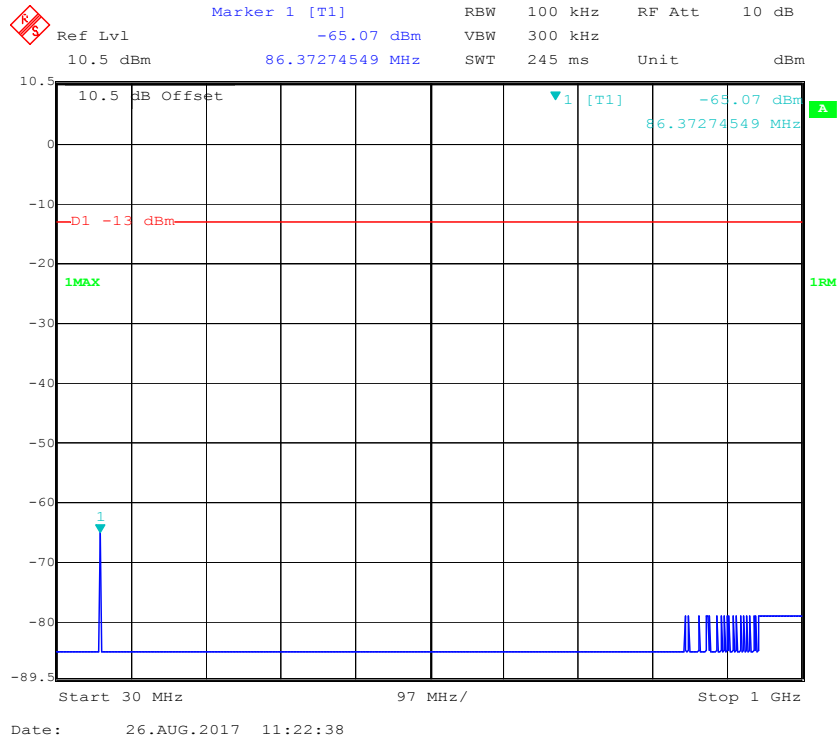


2 GHz – 20 GHz (WCDMA Mode)

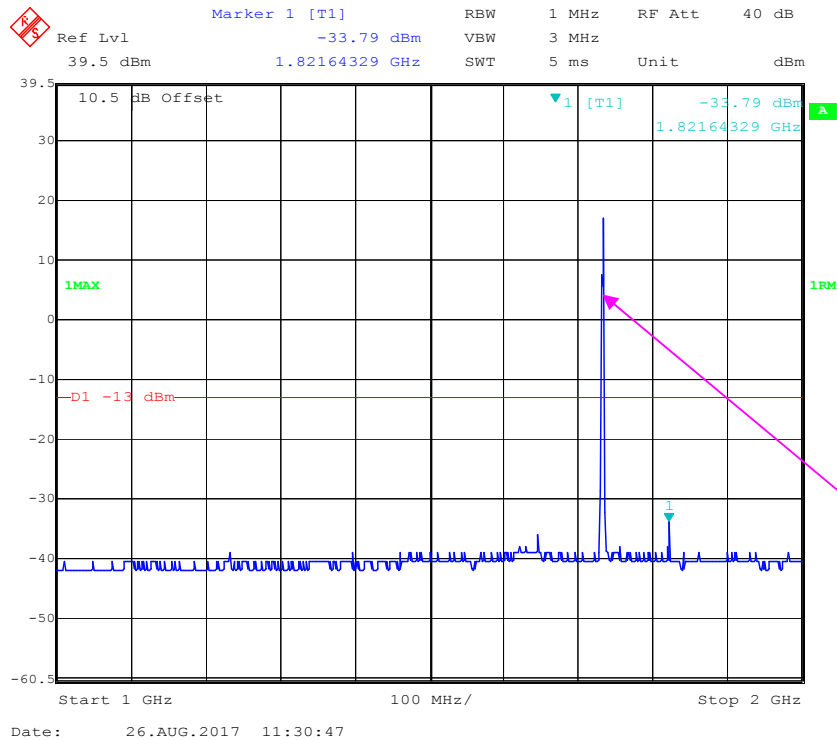


LTE Band 4:

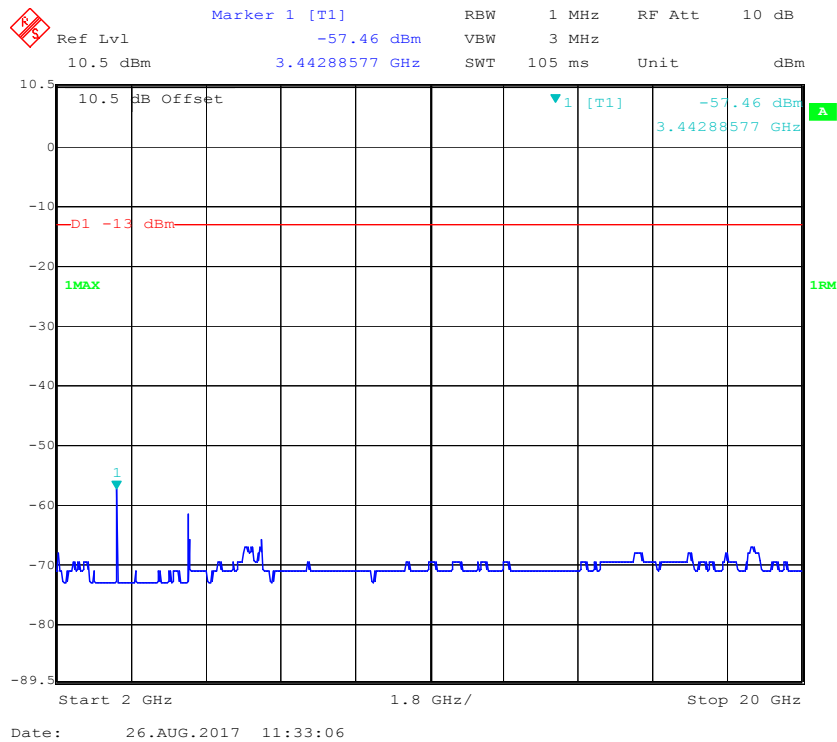
30 MHz - 1 GHz (1.4 MHz, Middle Channel)



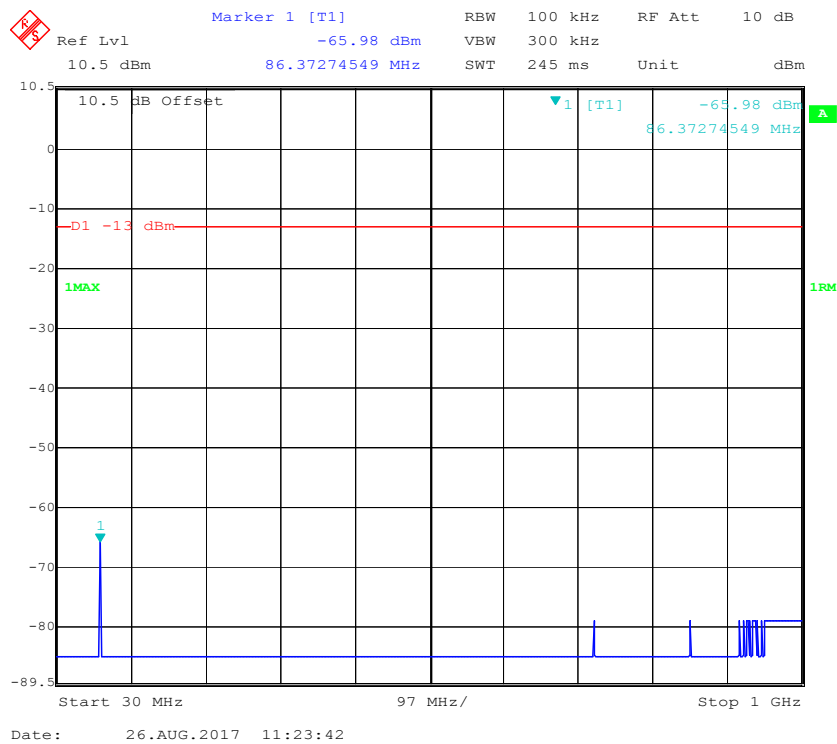
1 GHz - 2 GHz (1.4 MHz, Middle Channel)



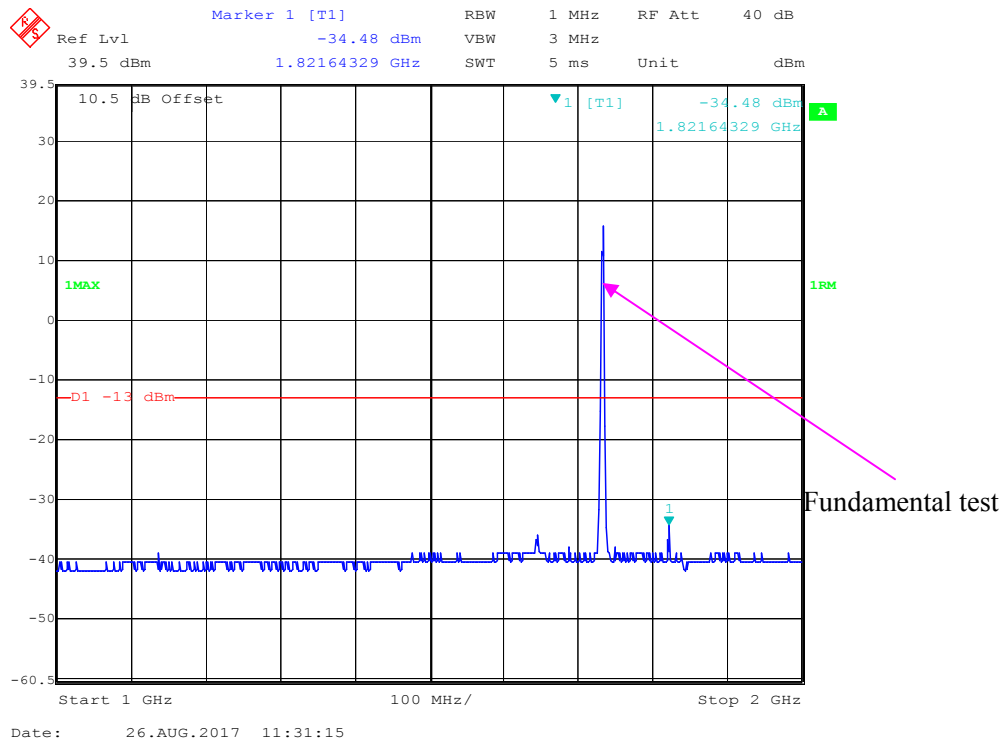
2 GHz – 20 GHz (1.4 MHz, Middle Channel)



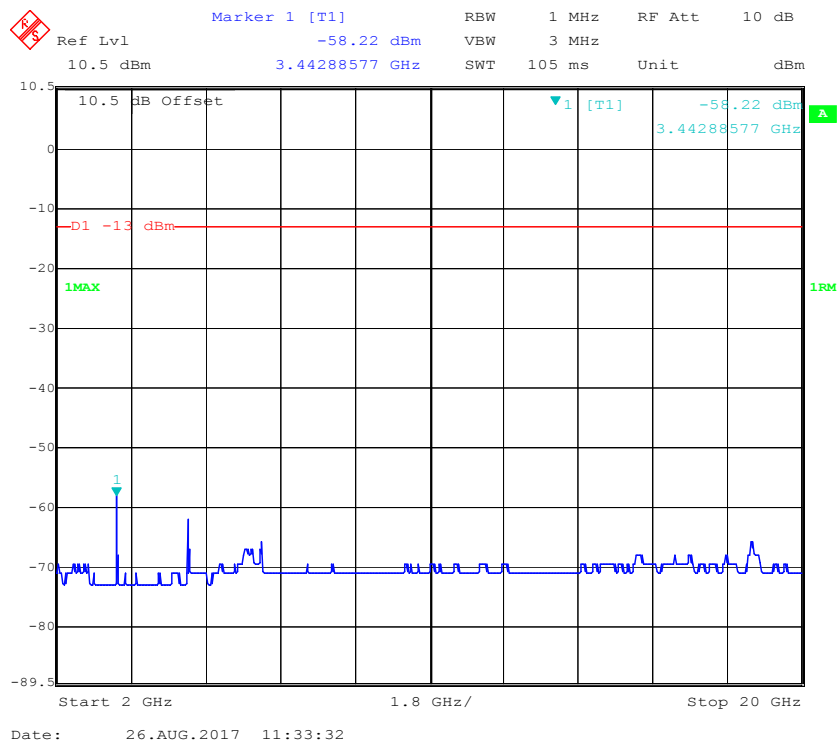
30 MHz - 1 GHz (3.0 MHz, Middle Channel)



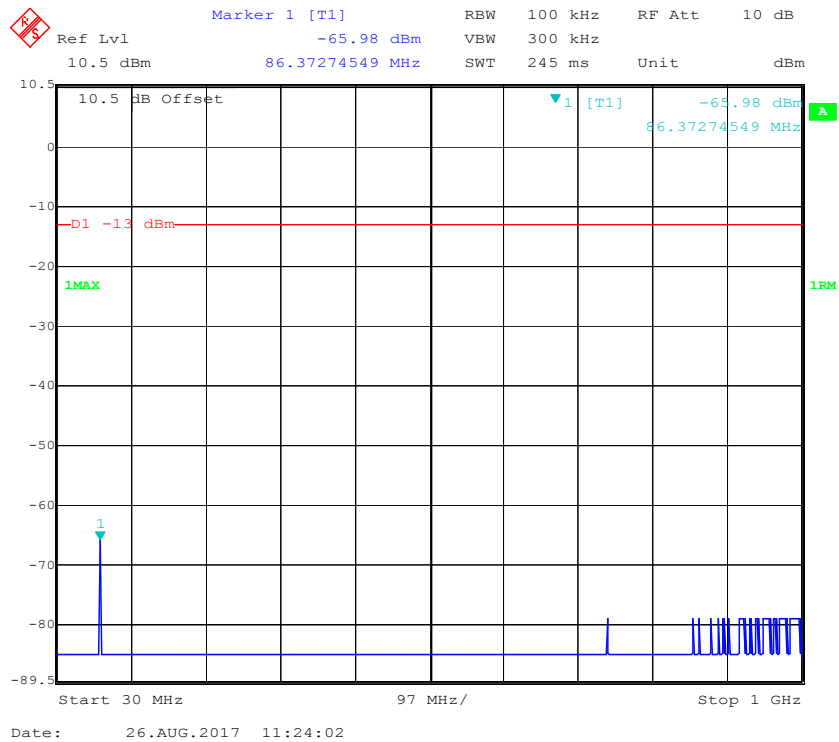
1 GHz – 2 GHz (3.0 MHz, Middle Channel)



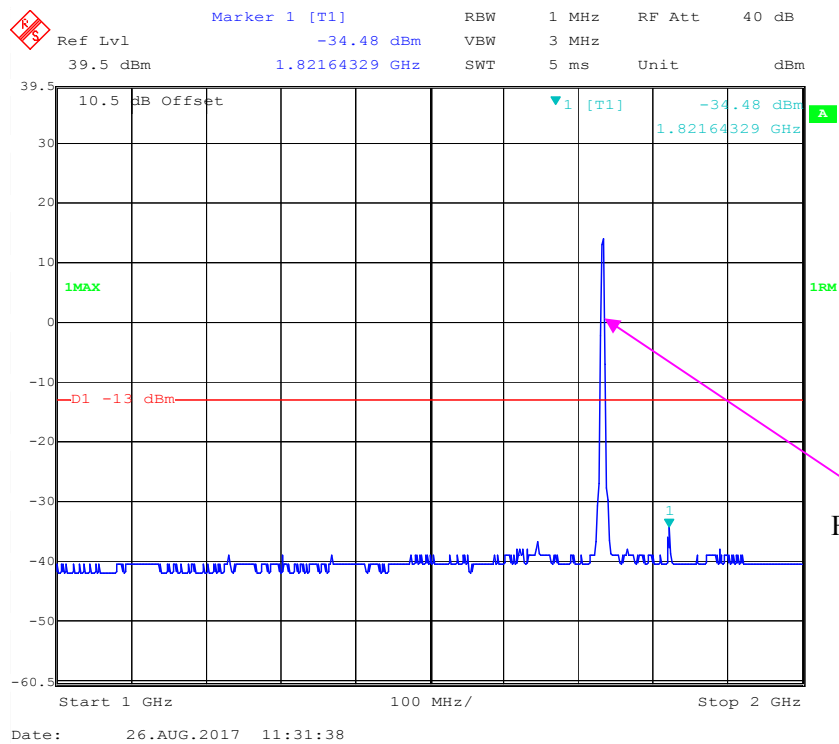
2 GHz – 20 GHz (3.0 MHz, Middle Channel)

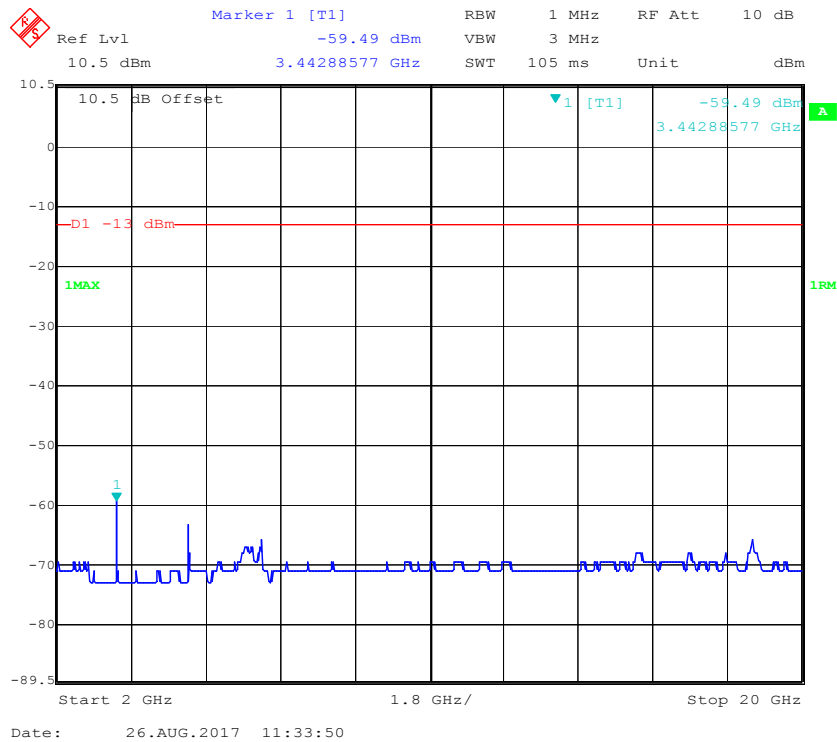
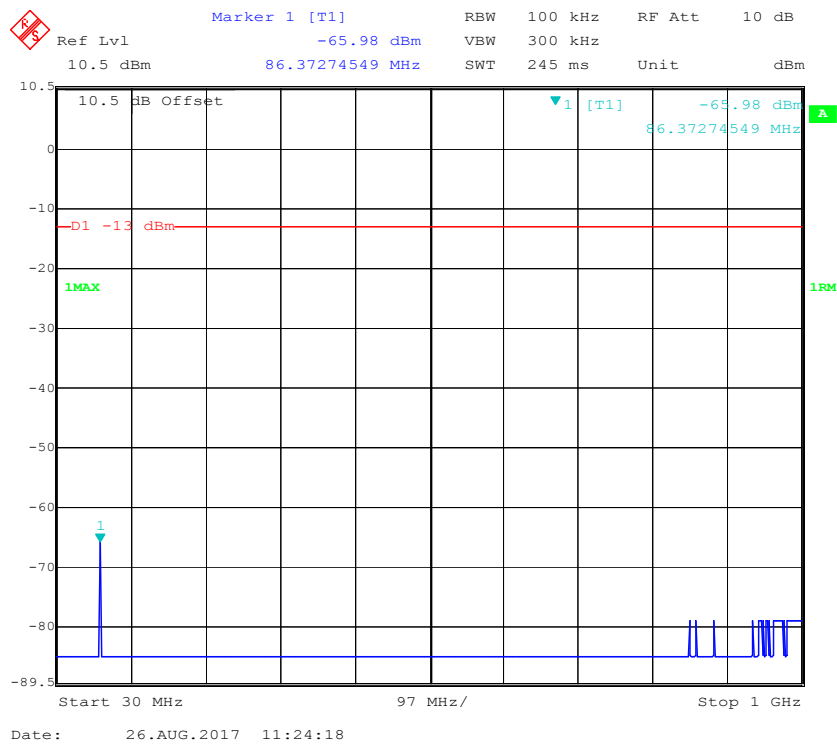


30 MHz - 1 GHz (5.0 MHz, Middle Channel)

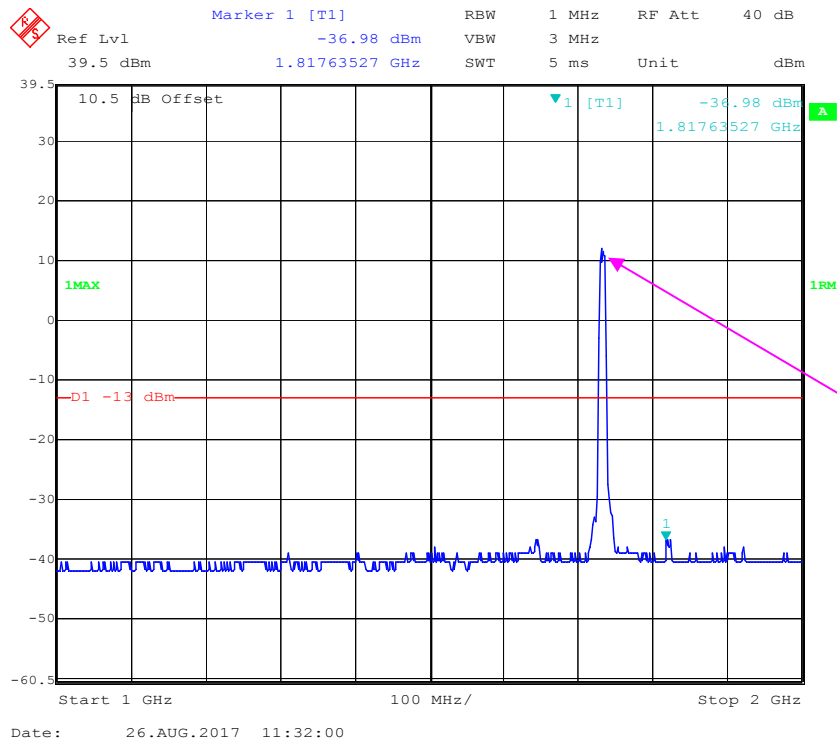


1 GHz - 2 GHz (5.0 MHz, Middle Channel)

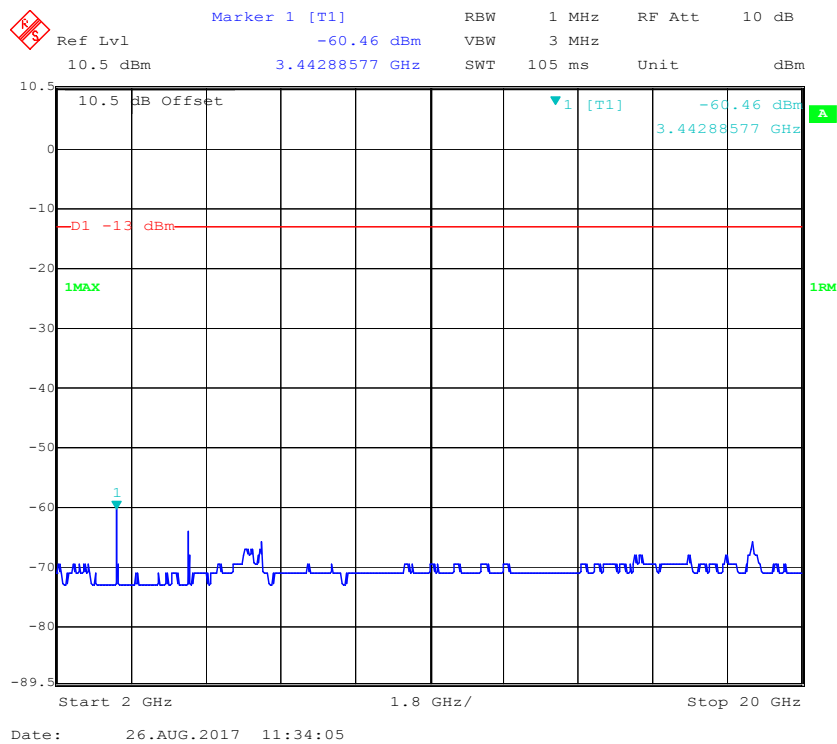


2 GHz – 20 GHz (5.0 MHz, Middle Channel)**30 MHz - 1 GHz (10.0 MHz, Middle Channel)**

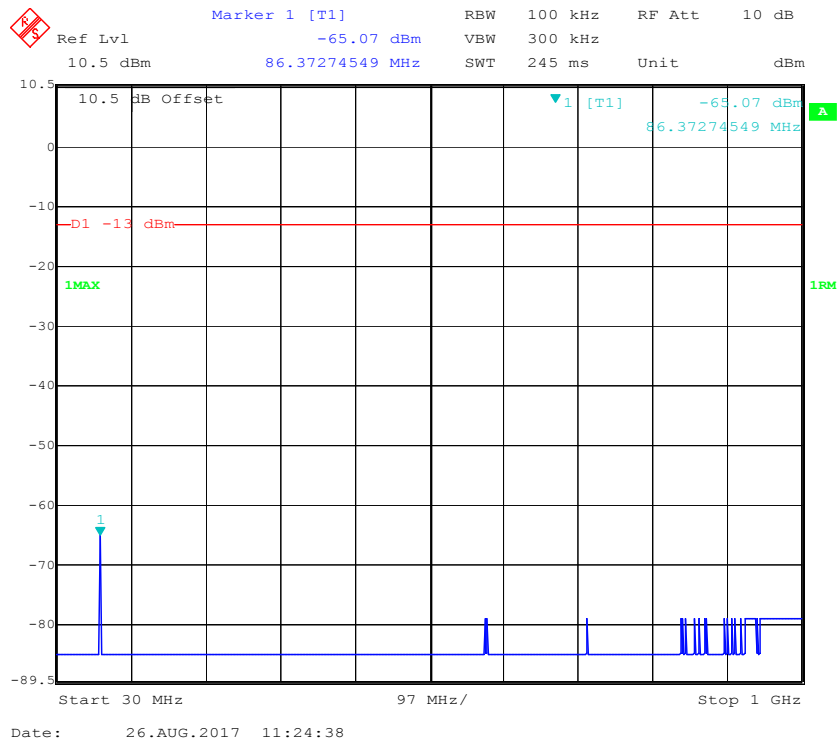
1 GHz – 2 GHz (10.0 MHz, Middle Channel)



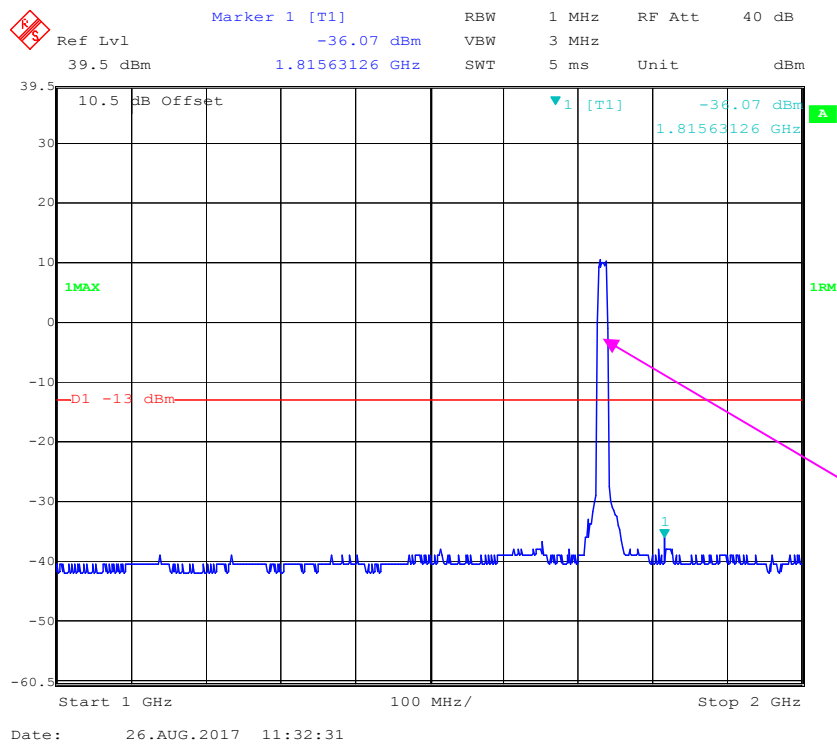
2 GHz – 20 GHz (10.0 MHz, Middle Channel)



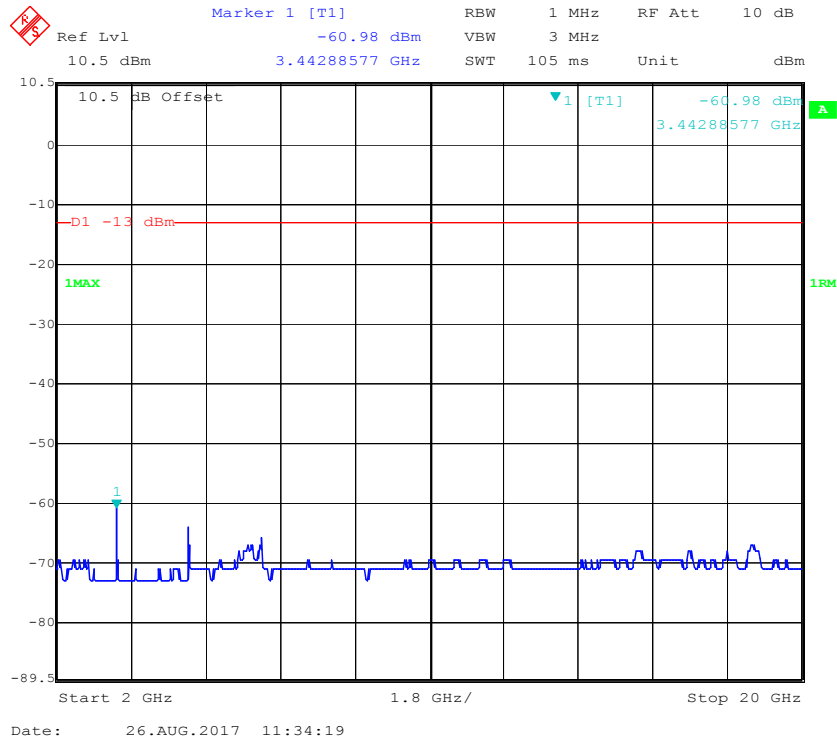
30 MHz - 1 GHz (15.0 MHz, Middle Channel)



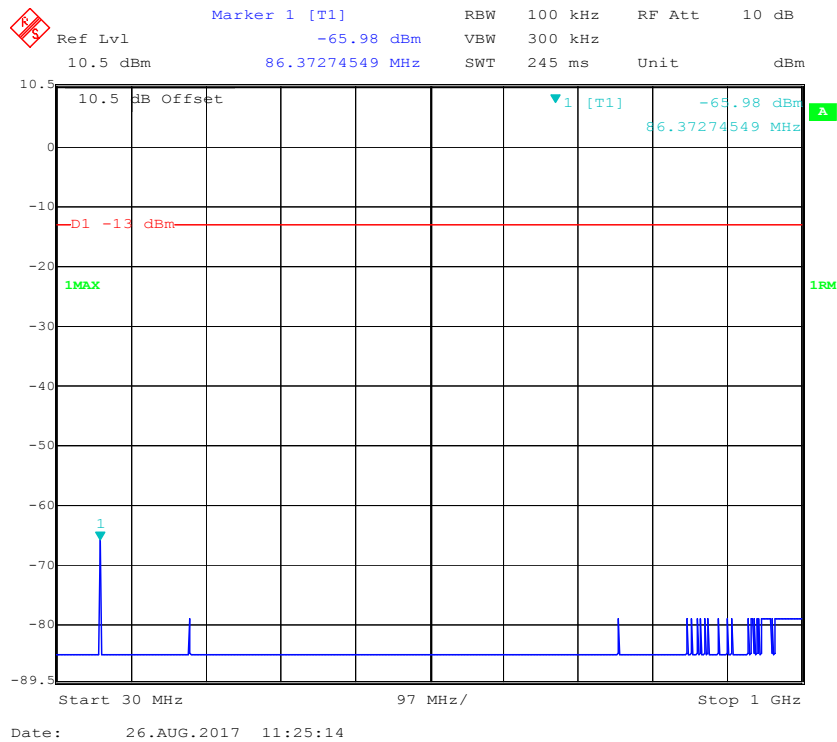
1 GHz - 2 GHz (15.0 MHz, Middle Channel)



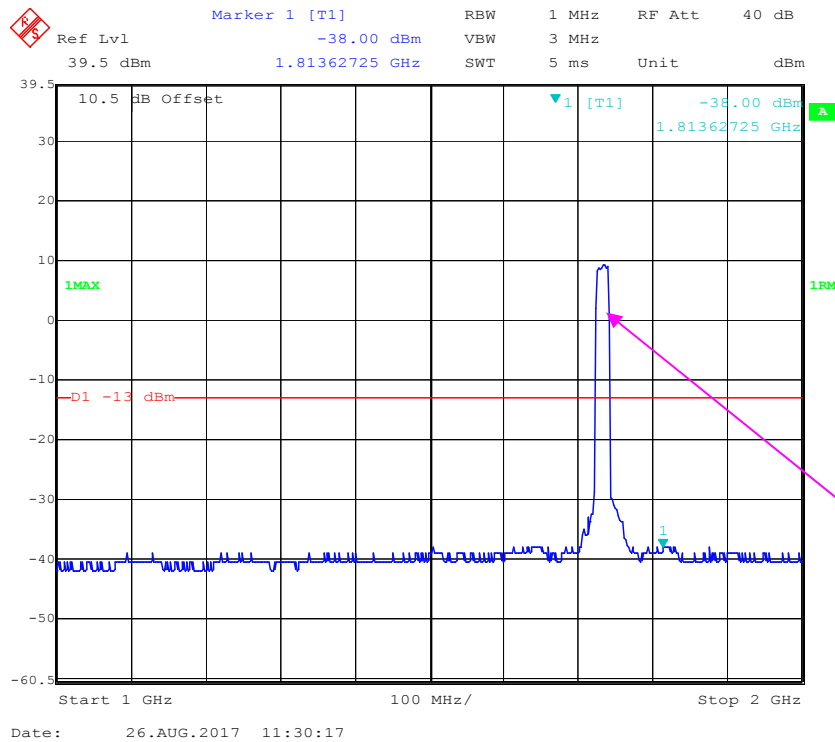
2 GHz – 20 GHz (15.0 MHz, Middle Channel)



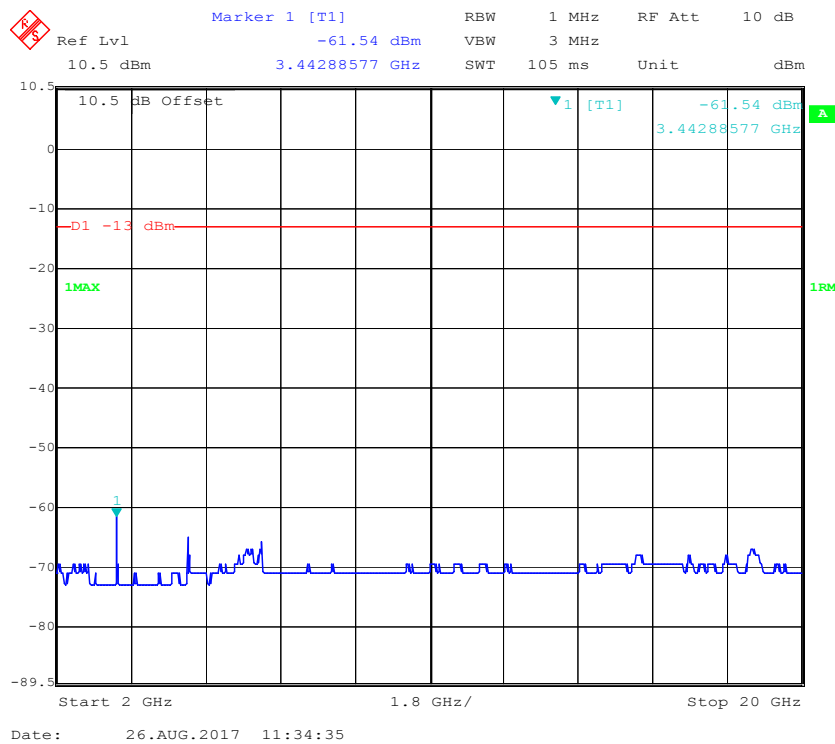
30 MHz - 1 GHz (20.0 MHz, Middle Channel)

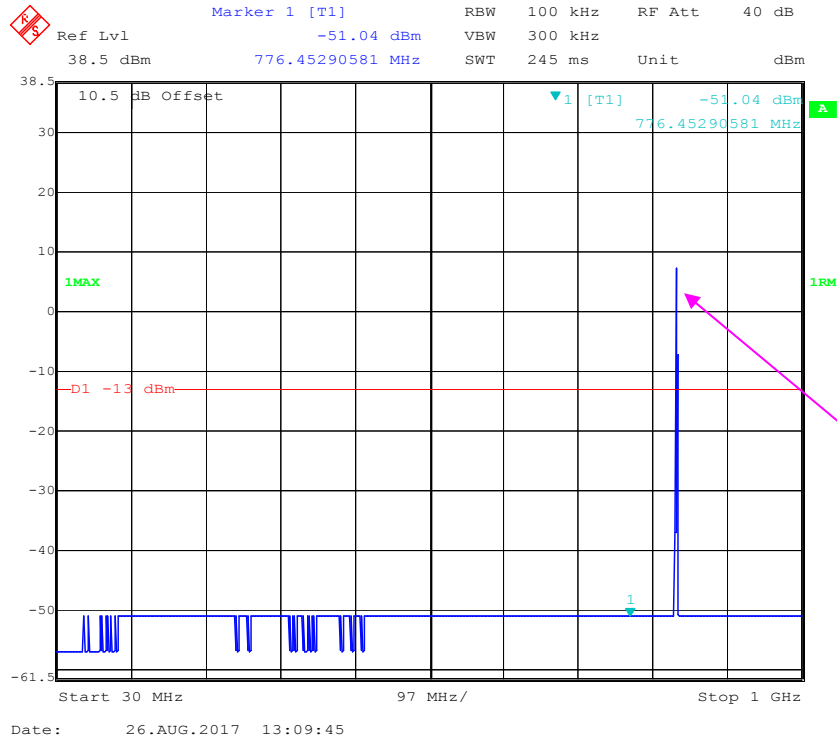
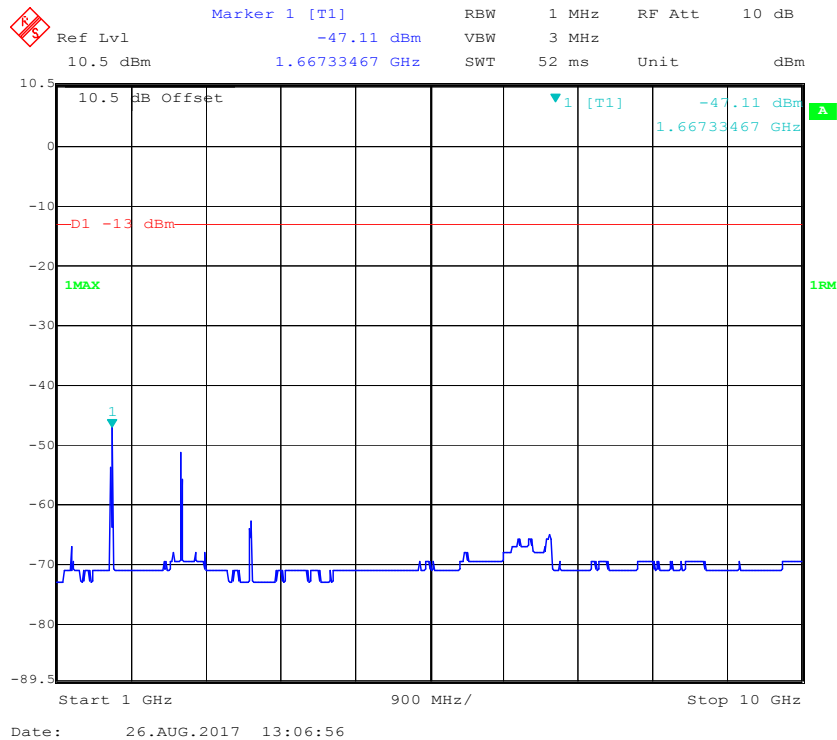


1 GHz – 2 GHz (20.0 MHz, Middle Channel)



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

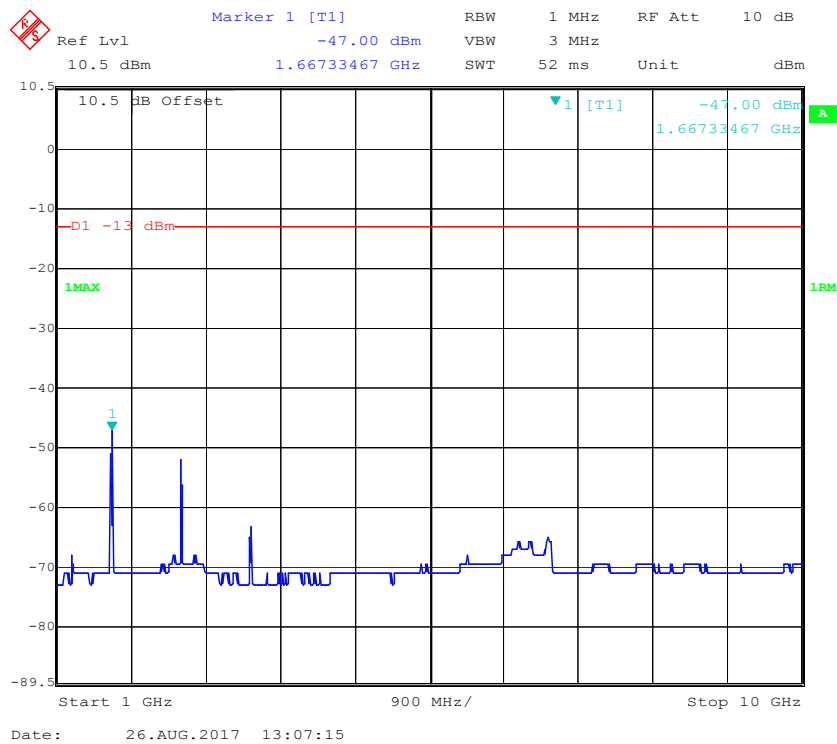


LTE Band 5:**30 MHz - 1 GHz (1.4 MHz, Middle Channel)****1 GHz - 10 GHz (1.4 MHz, Middle Channel)**

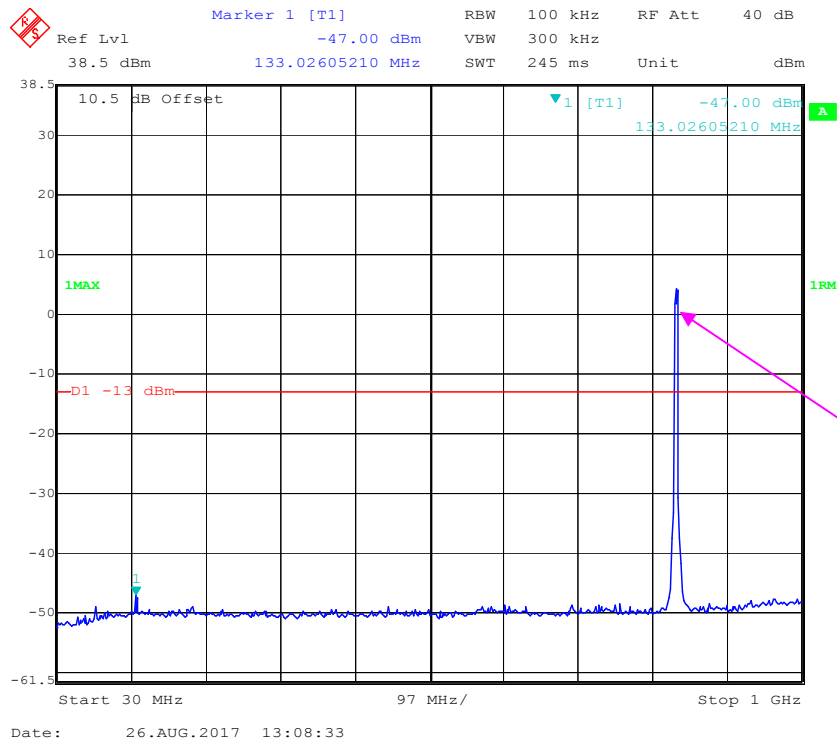
30 MHz - 1 GHz (3.0 MHz, Middle Channel)



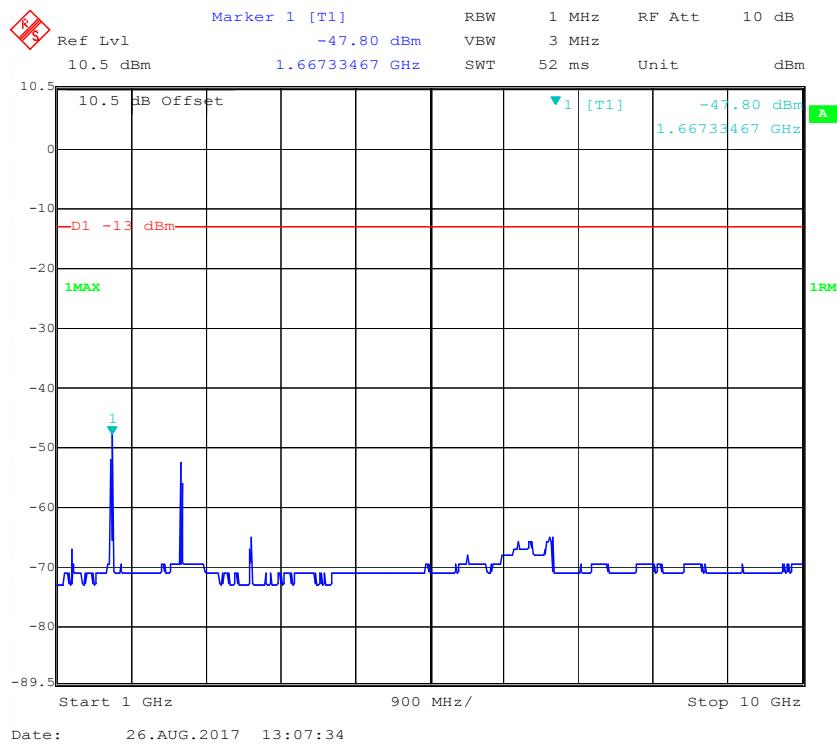
1 GHz – 10 GHz (3.0 MHz, Middle Channel)



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



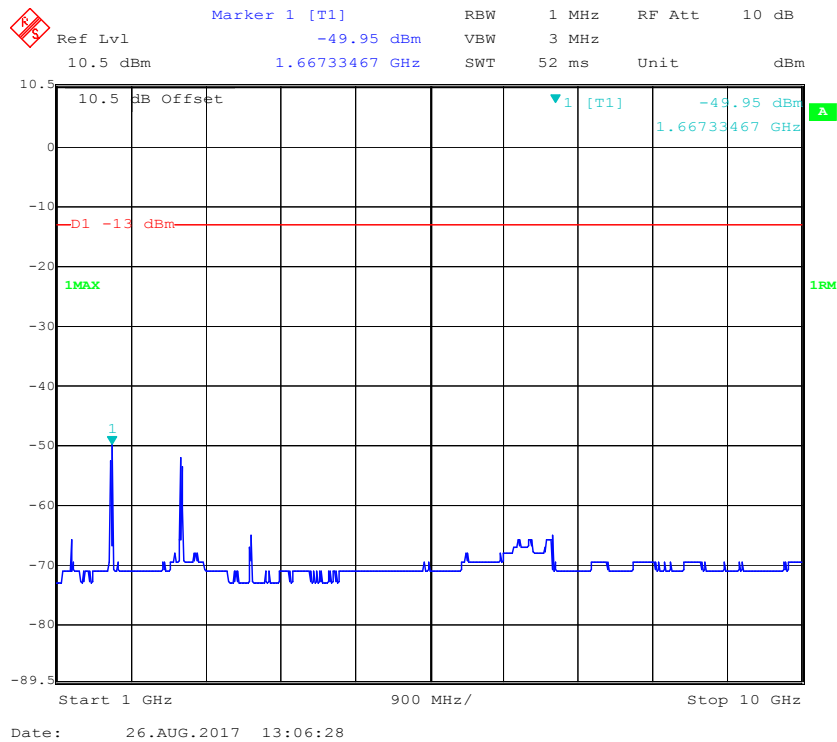
1 GHz – 10 GHz (5.0 MHz, Middle Channel)

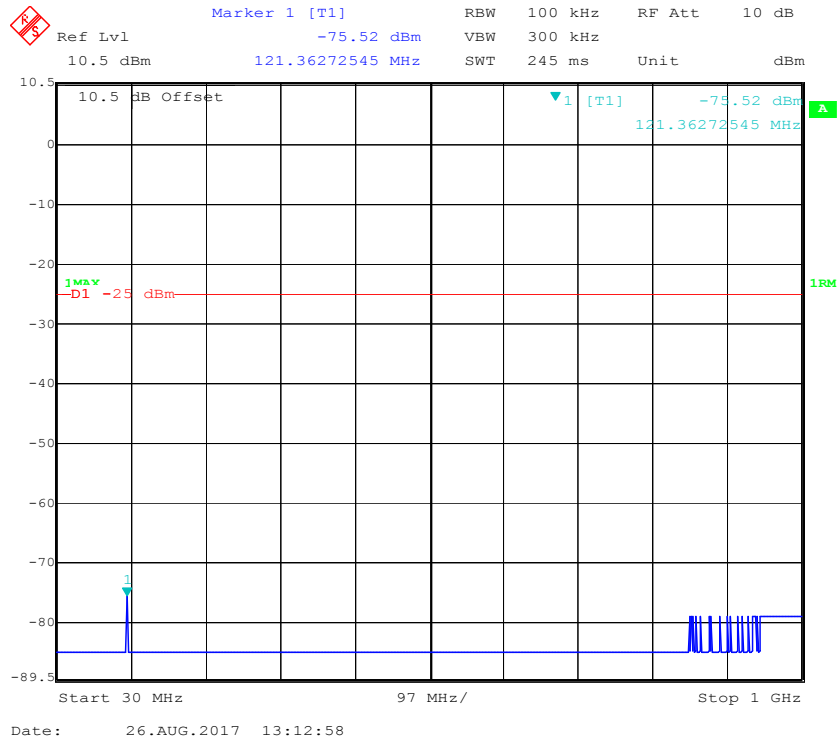
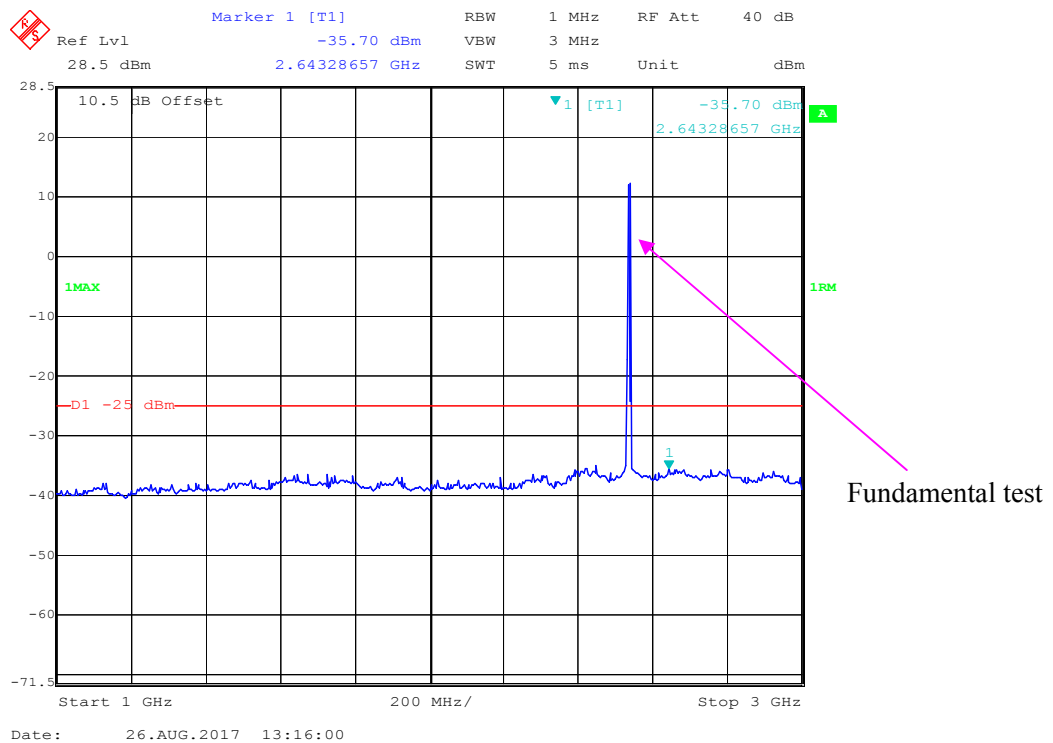


30 MHz - 1 GHz (10.0 MHz, Middle Channel)

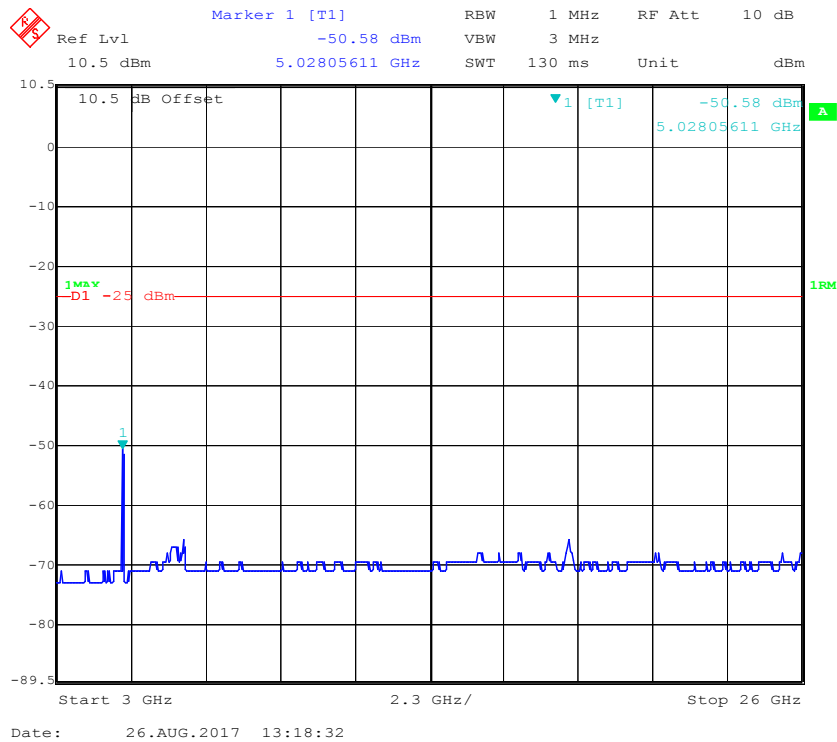


1 GHz – 10 GHz (10.0 MHz, Middle Channel)

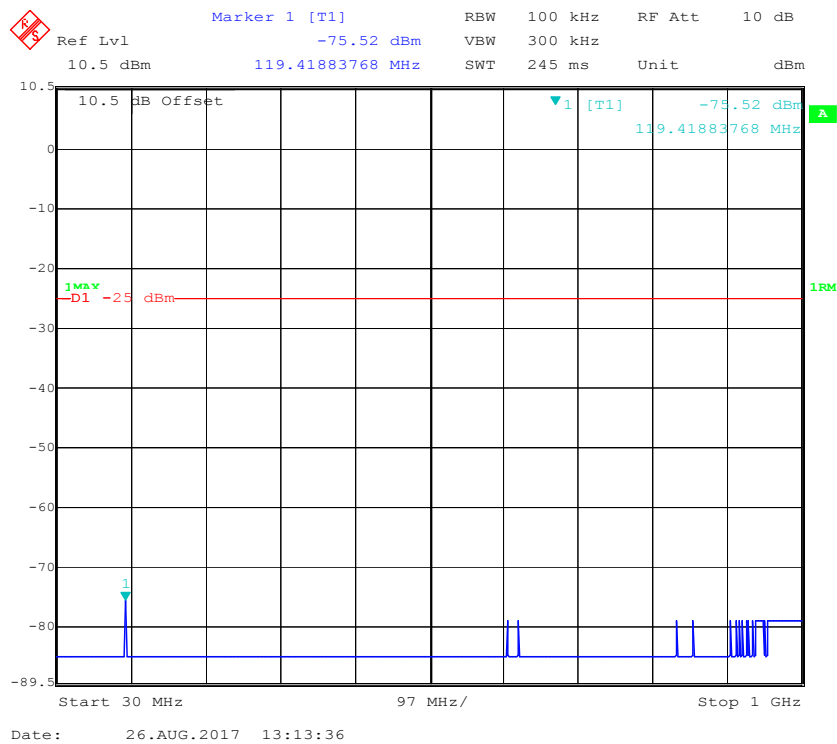


LTE Band 7:**30 MHz – 1 GHz (5.0 MHz, Middle Channel)****1 GHz – 3.0 GHz (5.0 MHz, Middle Channel)**

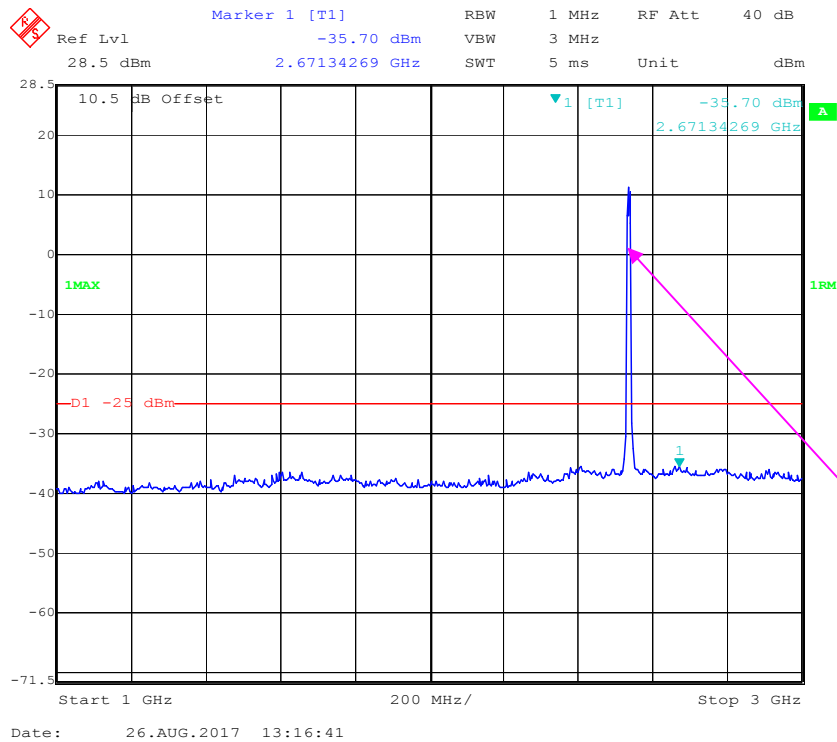
3.0 GHz – 26 GHz (5.0 MHz, Middle Channel)



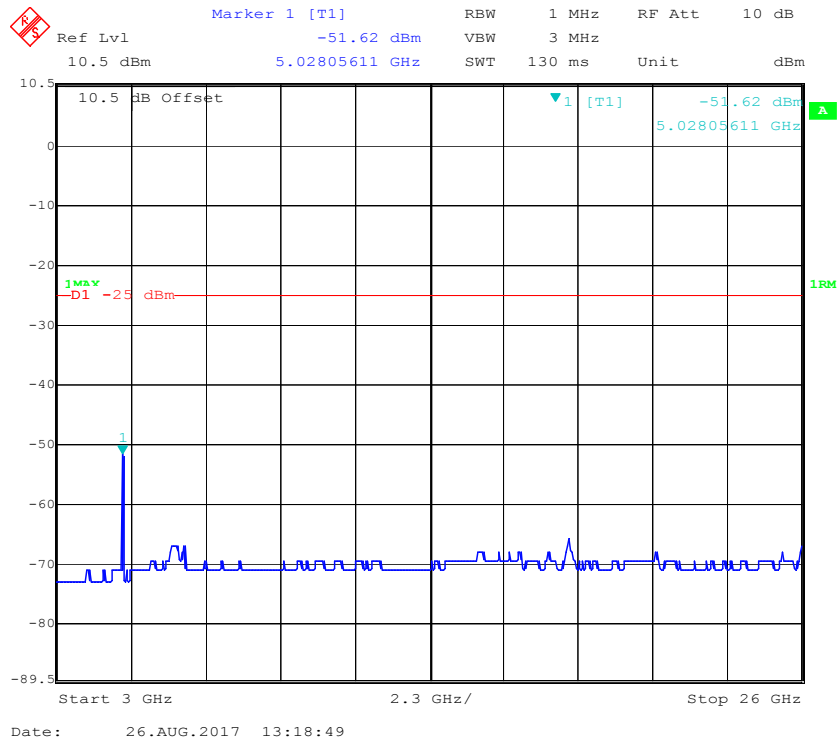
30 MHz – 1.0 GHz (10.0 MHz, Middle Channel)



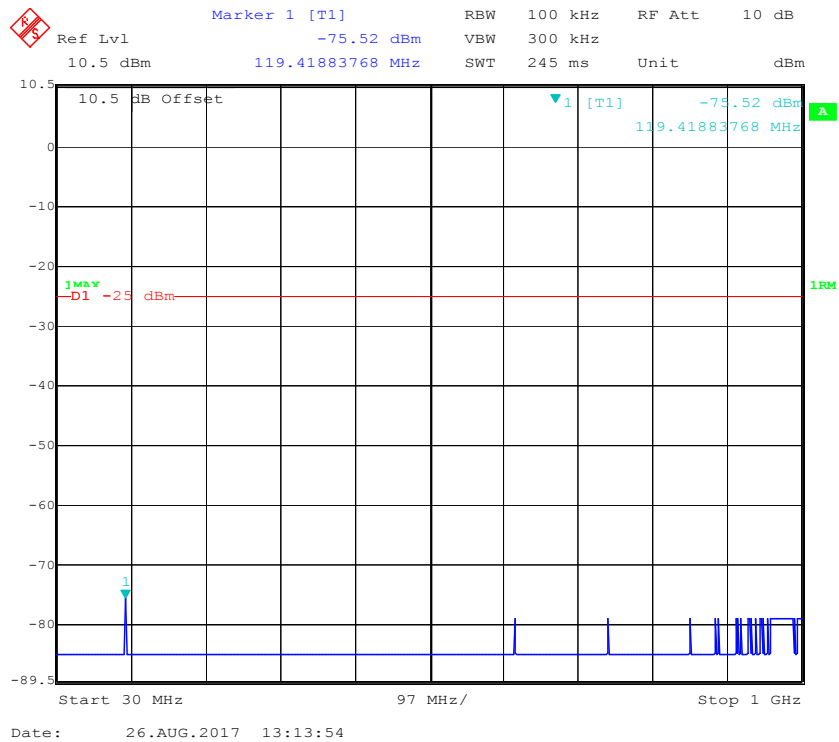
1 GHz – 3 GHz (10.0 MHz, Middle Channel)



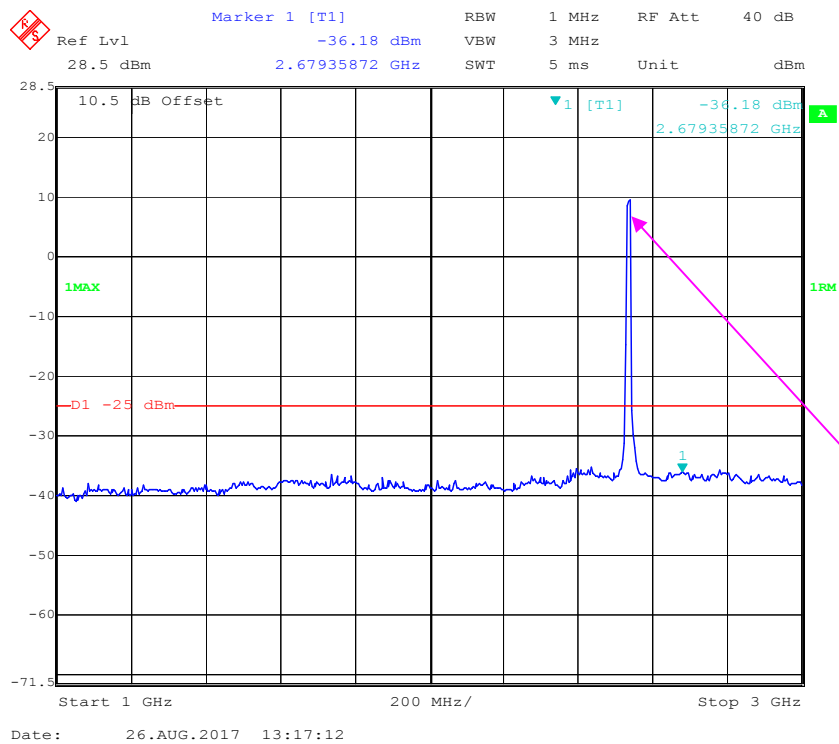
3 GHz – 26 GHz (10.0 MHz, Middle Channel)



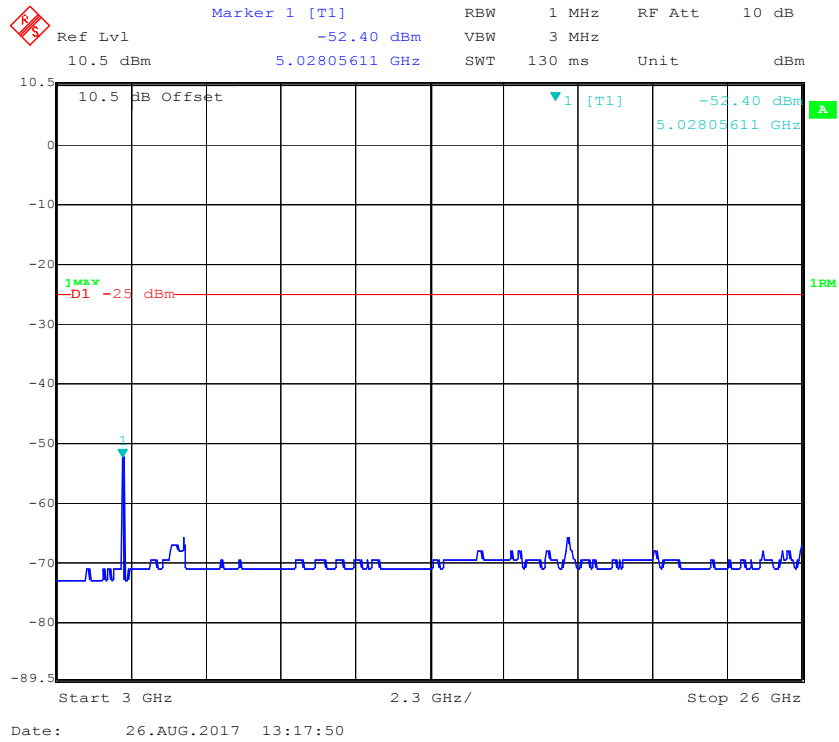
30 MHz – 1 GHz (15.0 MHz, Middle Channel)



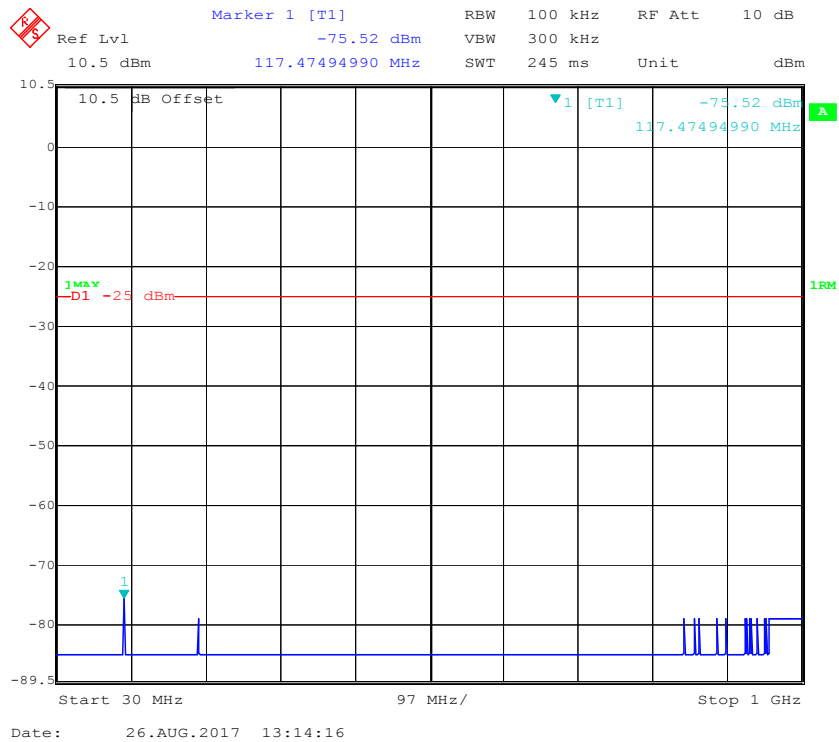
1 GHz – 3 GHz (15.0 MHz, Middle Channel)



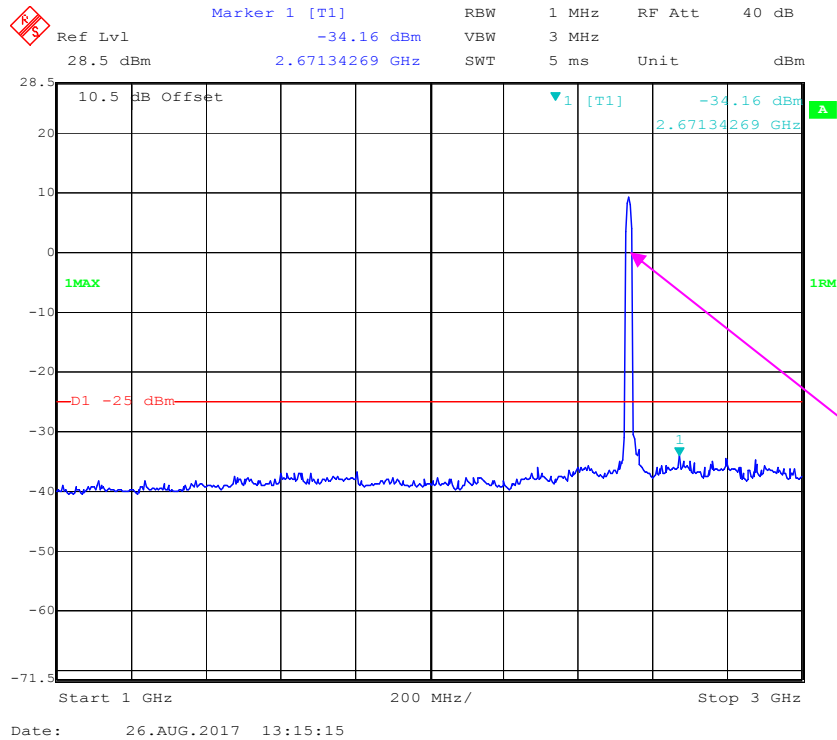
3 GHz – 26 GHz (15.0 MHz, Middle Channel)



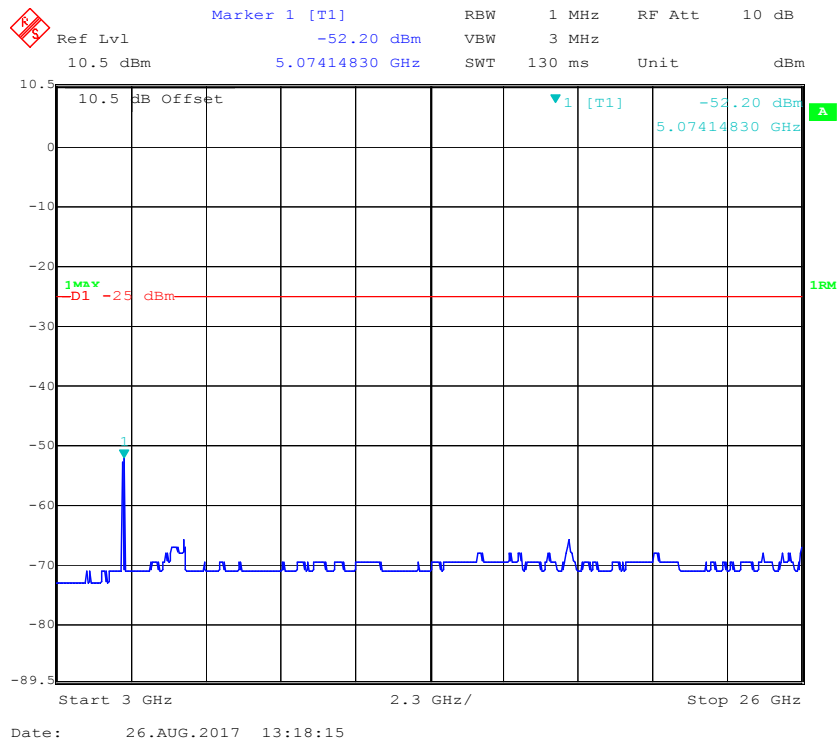
30 MHz – 1 GHz (20.0 MHz, Middle Channel)



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



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



FCC § 2.1053; § 22.917 (a); § 24.238 (a); §27.53 (h) (m) SPURIOUS RADIATED EMISSIONS

Applicable Standards

FCC § 2.1053, §22.917(a) and § 24.238(a) and § 27.53(h)(m)

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 = $43 + 10 \lg_{10} (\text{power out in Watts})$ or,

Spurious attenuation limit in dB = $55 + 10 \lg_{10} (\text{power out in Watts})$

Test Data

Environmental Conditions

Temperature:	26 °C
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Hill He on 2017-08-24.

Test mode: Transmitting

Test mode: Transmitting (Pre-scan with Low, Middle, High channel, and the worse case data as below)

30 MHz ~ 10 GHz:

Cellular Band (Part 22H)

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)			
GSM 850 Mode										
189.78	39.06	217	1.9	H	-57.90	0.29	0	-58.19	-13	45.19
189.78	38.56	214	1.3	V	-58.40	0.29	0	-58.69	-13	45.69
1673.20	58.92	11	1.8	H	-48.2	1.30	9.10	-40.40	-13	27.40
1673.20	55.02	149	1.1	V	-51.5	1.30	9.10	-43.70	-13	30.70
2509.80	54.95	3	1.0	H	-48.6	2.60	9.30	-41.90	-13	28.90
2509.80	55.53	313	1.3	V	-47.4	2.60	9.30	-40.70	-13	27.70
3346.40	48.9	347	2.1	H	-51.4	1.50	9.60	-43.30	-13	30.30
3346.40	45.33	169	1.6	V	-55.0	1.50	9.60	-46.90	-13	33.90
WCDMA 850 Mode										
203.55	39.18	195	1.4	H	-57.80	0.30	0	-58.10	-13	45.10
203.55	38.16	236	1.7	V	-58.80	0.30	0	-59.10	-13	46.10
1673.20	52.45	158	2.2	H	-54.6	1.30	9.10	-46.80	-13	33.80
1673.20	52.27	133	2.3	V	-54.2	1.30	9.10	-46.40	-13	33.40
2509.80	61.16	322	2.0	H	-42.4	2.60	9.30	-35.70	-13	22.70
2509.80	59.86	289	2.0	V	-43.1	2.60	9.30	-36.40	-13	23.40
3346.40	43.99	220	1.1	H	-56.4	1.50	9.60	-48.30	-13	35.30
3346.40	44.46	144	1.3	V	-55.9	1.50	9.60	-47.80	-13	34.80

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

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)			
GSM 1900 Mode										
189.78	38.71	149	1.0	H	-58.3	0.29	0	-58.59	-13	45.59
189.78	38.06	312	2.4	V	-58.9	0.29	0	-59.19	-13	46.19
3760.00	46.02	279	1.1	H	-55.2	1.50	9.70	-47.00	-13	34.00
3760.00	46.14	208	2.4	V	-54.6	1.50	9.70	-46.40	-13	33.40
WCDMA 1900 Mode										
203.55	39.25	327	1.1	H	-57.7	0.30	0	-58.00	-13	45.00
203.55	39.73	166	1.3	V	-57.3	0.30	0	-57.60	-13	44.60
3760.00	47.38	239	1.5	H	-53.8	1.50	9.70	-45.60	-13	32.60
3760.00	49.15	246	1.8	V	-51.6	1.50	9.70	-43.40	-13	30.40

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

Frequency	Receiver	Turntable	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
(MHz)	Reading (dBμV)	Angle Degree	Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)			
Band 4										
Test frequency range:30 MHz ~ 18 GHz										
230.78	39.33	129	1.7	H	-57.70	0.31	0	-58.01	-13	45.01
230.78	38.56	57	2.0	V	-58.40	0.31	0	-58.71	-13	45.71
3465.00	44.51	307	2.1	H	-55.9	1.50	9.70	-47.70	-13	34.70
3465.00	45.68	298	1.5	V	-55.5	1.50	9.70	-47.30	-13	34.30
Band 5										
Test frequency range:30 MHz ~ 10 GHz										
230.78	40.15	261	1.0	H	-56.80	0.31	0	-57.11	-13	44.11
230.78	39.99	136	2.5	V	-57.00	0.31	0	-57.31	-13	44.31
1673.00	47.09	350	1.8	H	-60.0	1.30	9.10	-52.20	-13	39.20
1673.00	46.16	175	1.6	V	-60.3	1.30	9.10	-52.50	-13	39.50
2509.50	44.37	138	1.8	H	-59.2	2.60	9.30	-52.50	-13	39.50
2509.50	45.09	149	2.4	V	-57.8	2.60	9.30	-51.10	-13	38.10
Band 7										
Test frequency range: 30 MHz ~ 26 GHz										
230.78	39.16	126	2.4	H	-57.80	0.31	0	-58.11	-25	33.11
230.78	38.29	24	2.2	V	-58.70	0.31	0	-59.01	-25	34.01
5070.00	45.31	126	2.1	H	-52.6	1.60	11.20	-43.00	-25	18.00
5070.00	46.01	319	2.0	V	-51.9	1.60	11.20	-42.30	-25	17.30

Note:

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

FCC § 22.917 (a); § 24.238 (a); § 27.53 (h)(m) - 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.

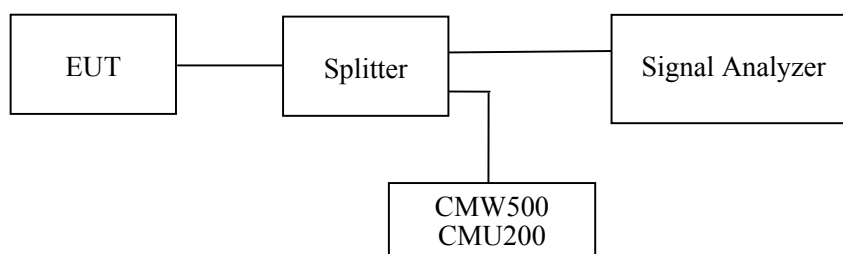
According to FCC § 27.53 (h)(m), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

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 Data

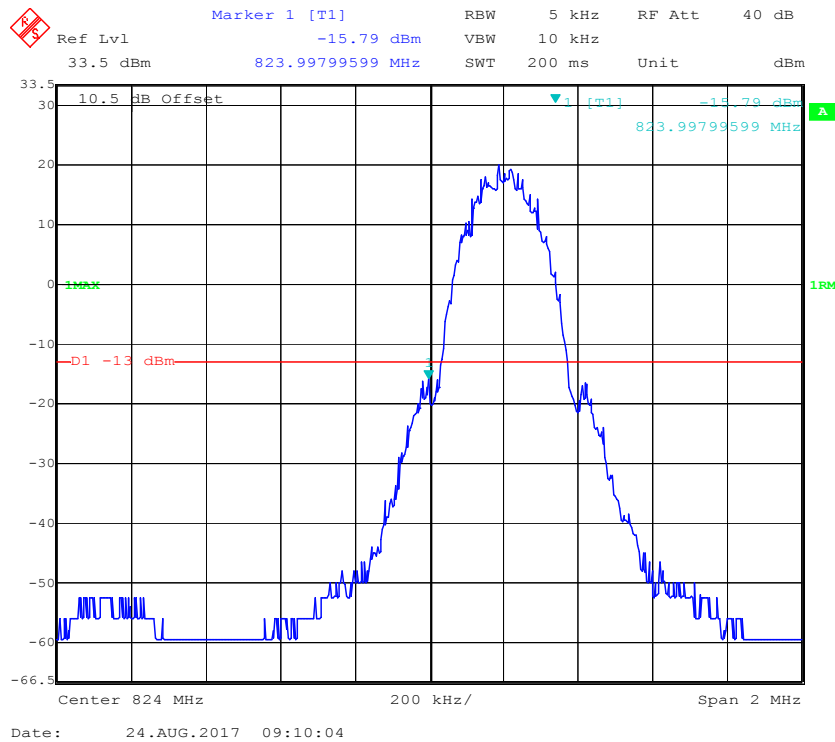
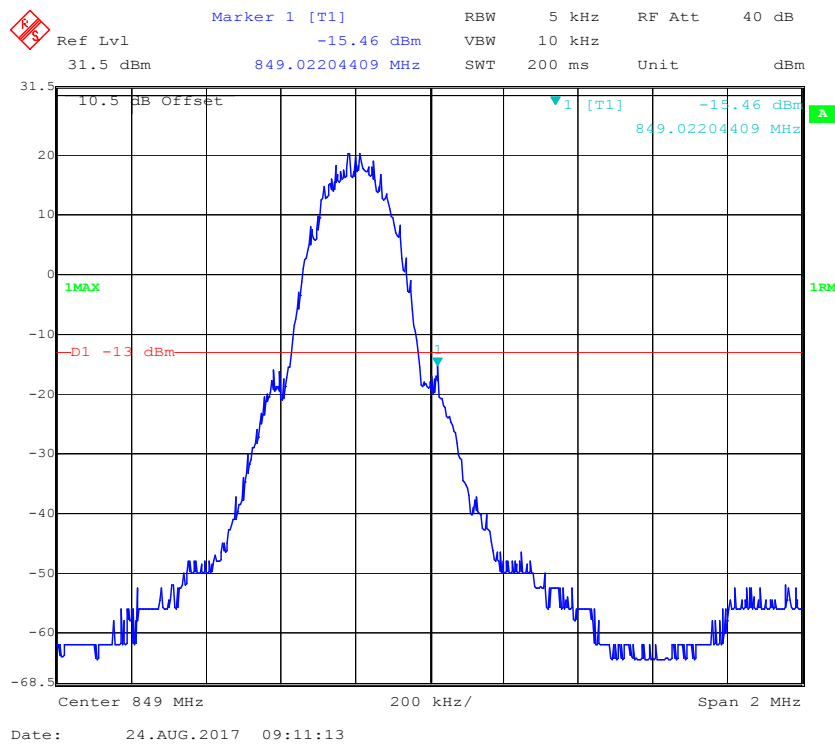
Environmental Conditions

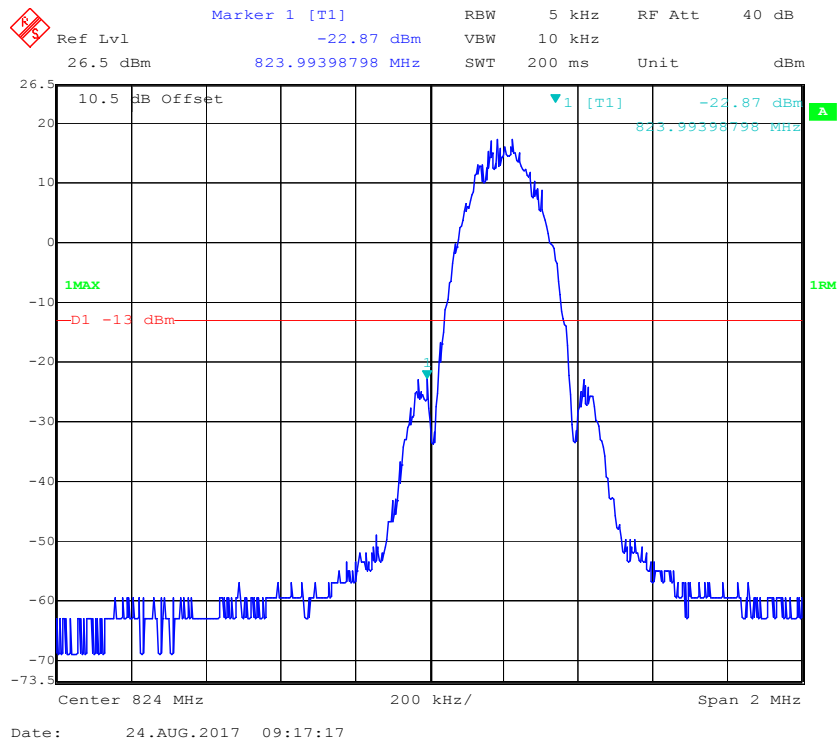
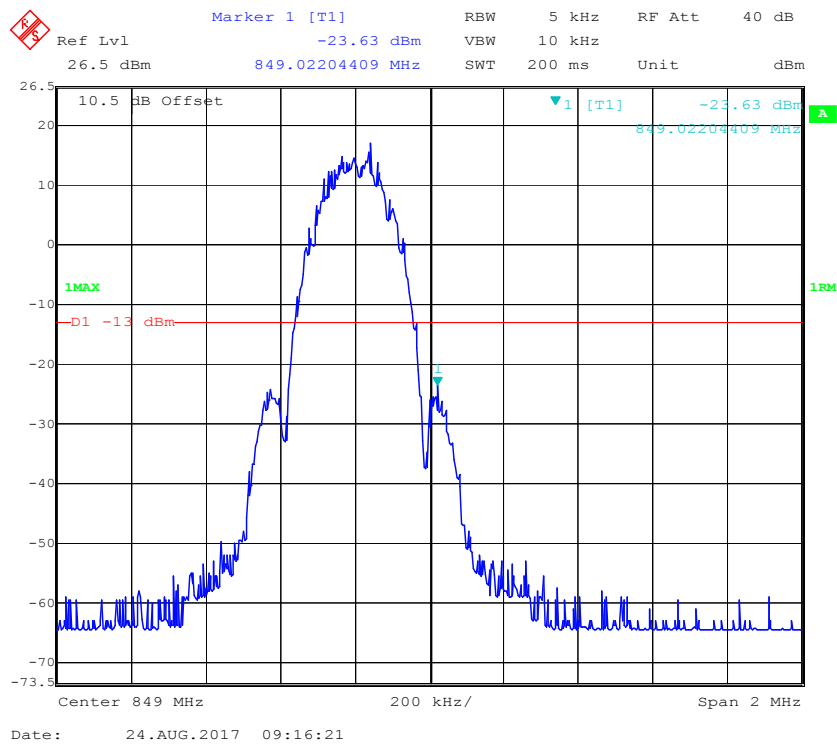
Temperature:	23~25 °C
Relative Humidity:	53~55 %
ATM Pressure:	100.0~101.0 kPa

The testing was performed by Hill He from 2017-08-24 to 2017-08-26.

EUT operation mode: Transmitting

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

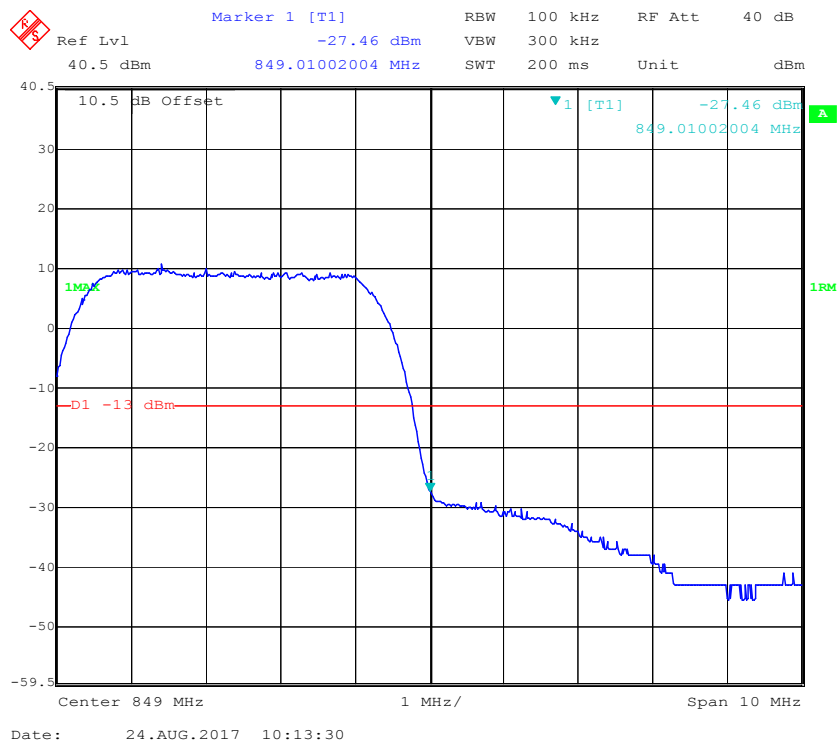
Cellular Band, Left Band Edge for GSM (GMSK) Mode**Cellular Band, Right Band Edge for GSM (GMSK) Mode**

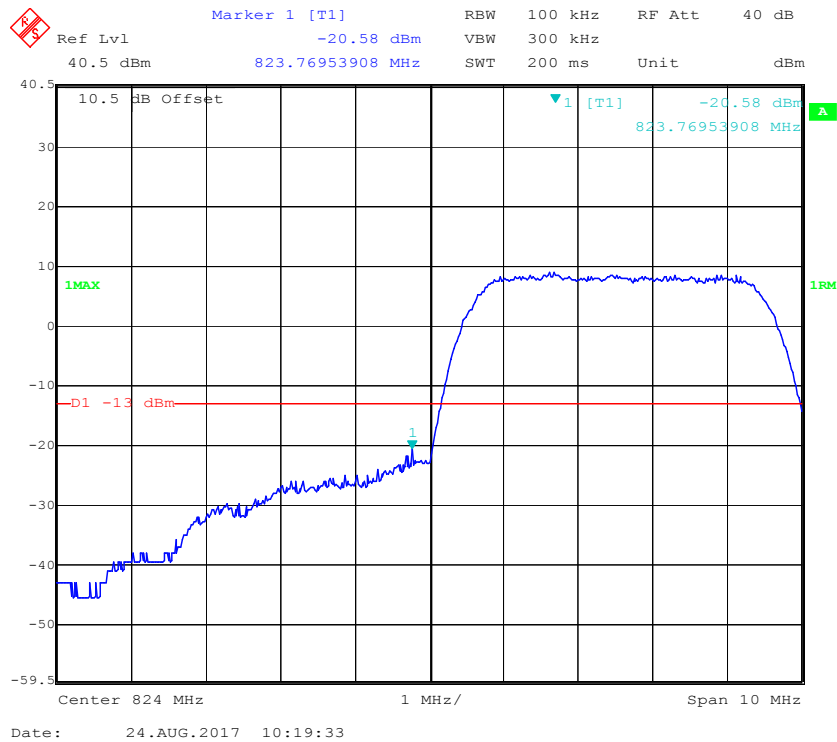
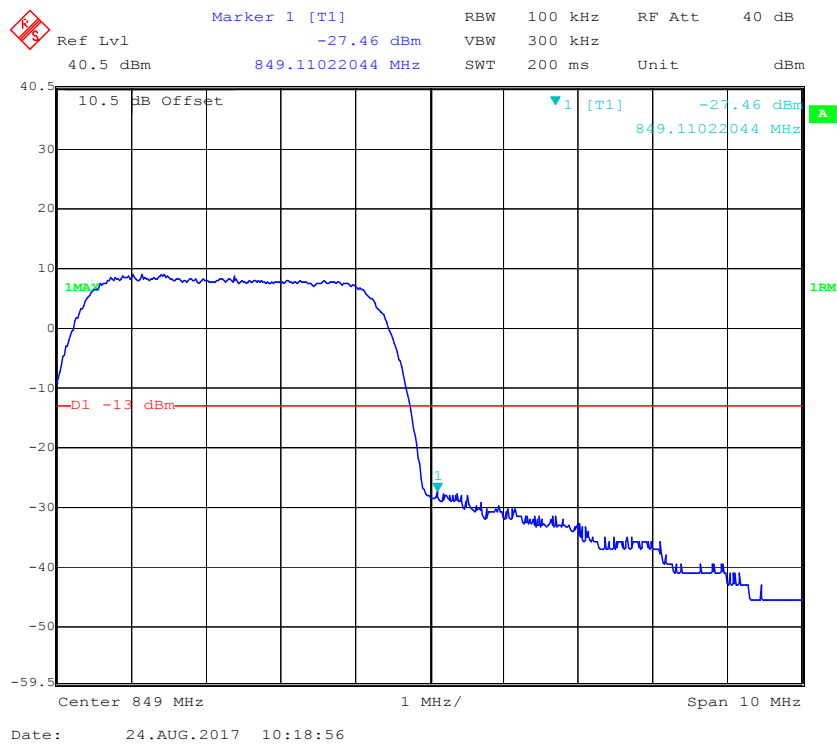
Cellular Band, Left Band Edge for EGPRS Mode**Cellular Band, Right Band Edge for EGPRS Mode**

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

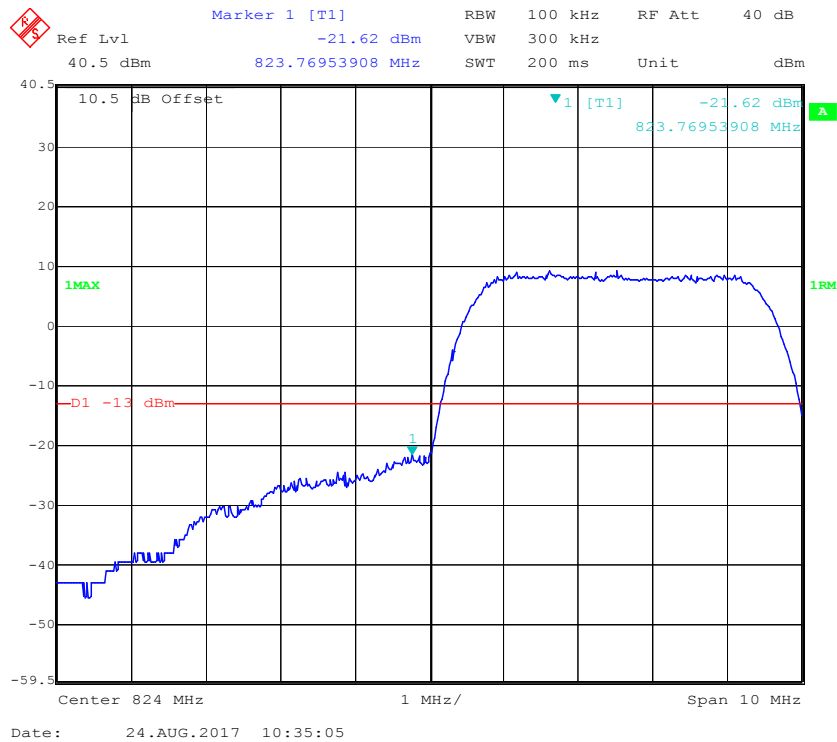


Cellular Band, Right Band Edge for RMC (BPSK) Mode

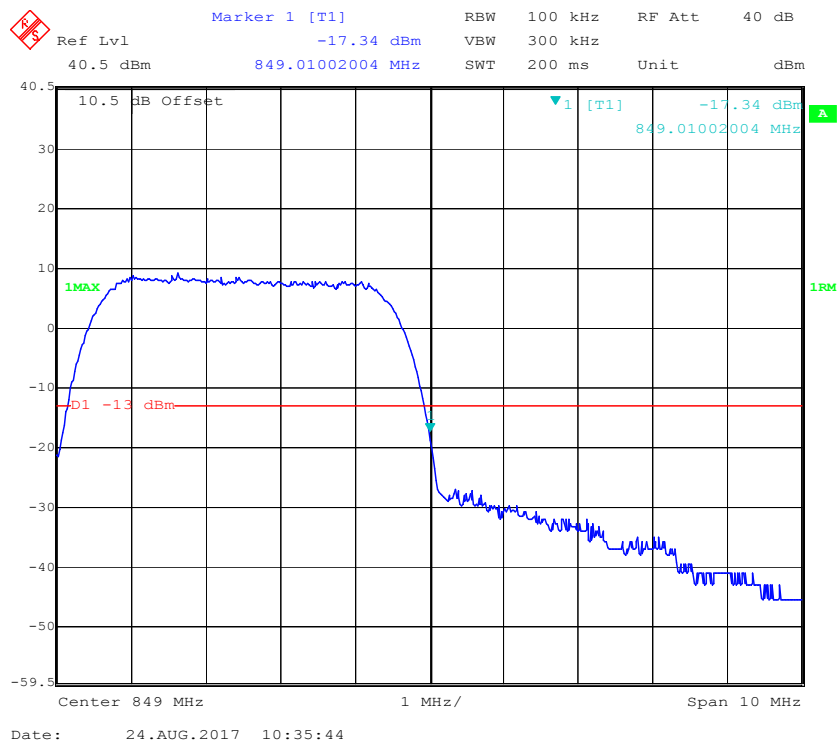


Cellular Band, Left Band Edge for HSDPA (16QAM) Mode**Cellular Band, Right Band Edge for HSDPA (16QAM) Mode**

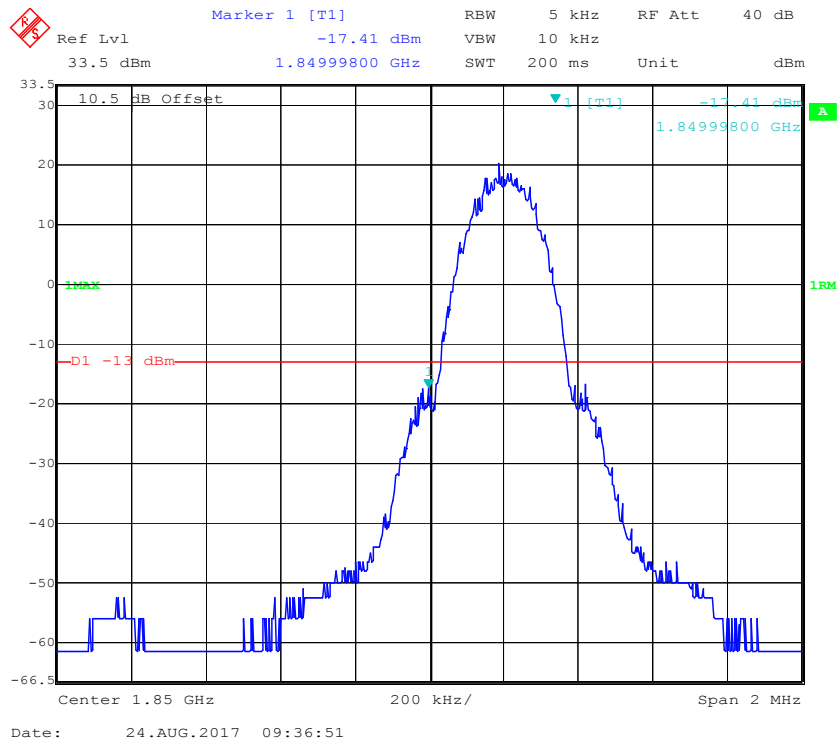
Cellular Band, Left Band Edge for HSUPA (BPSK) Mode



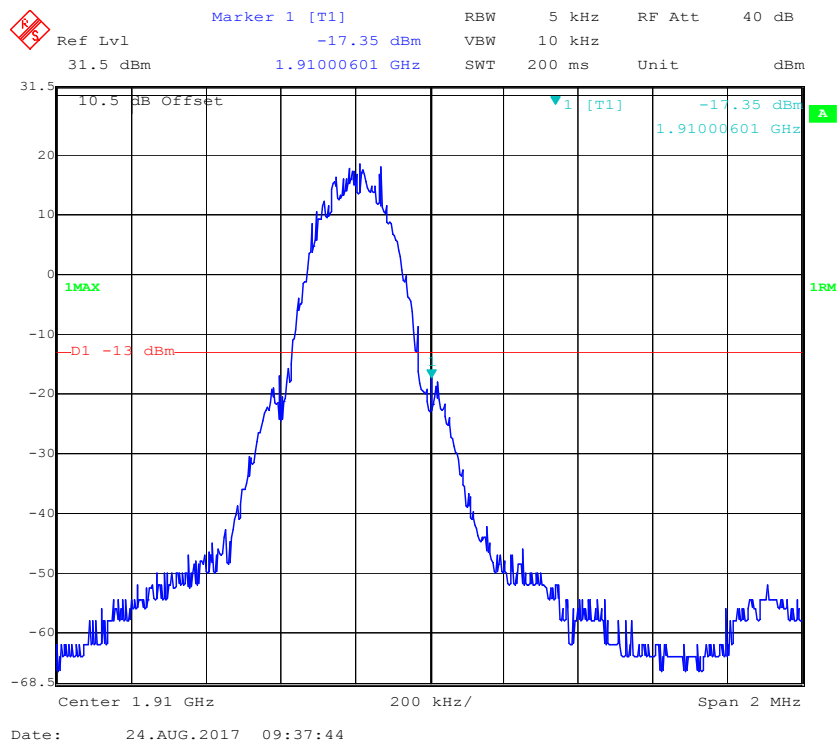
Cellular Band, Right Band Edge for HSUPA (BPSK) Mode



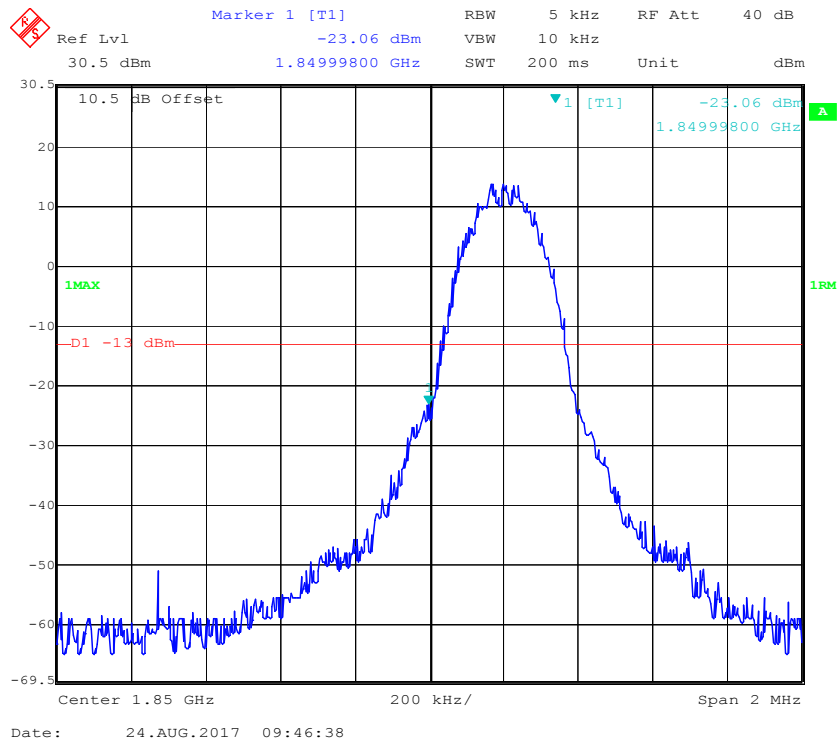
PCS Band, Left Band Edge for GSM (GMSK) Mode



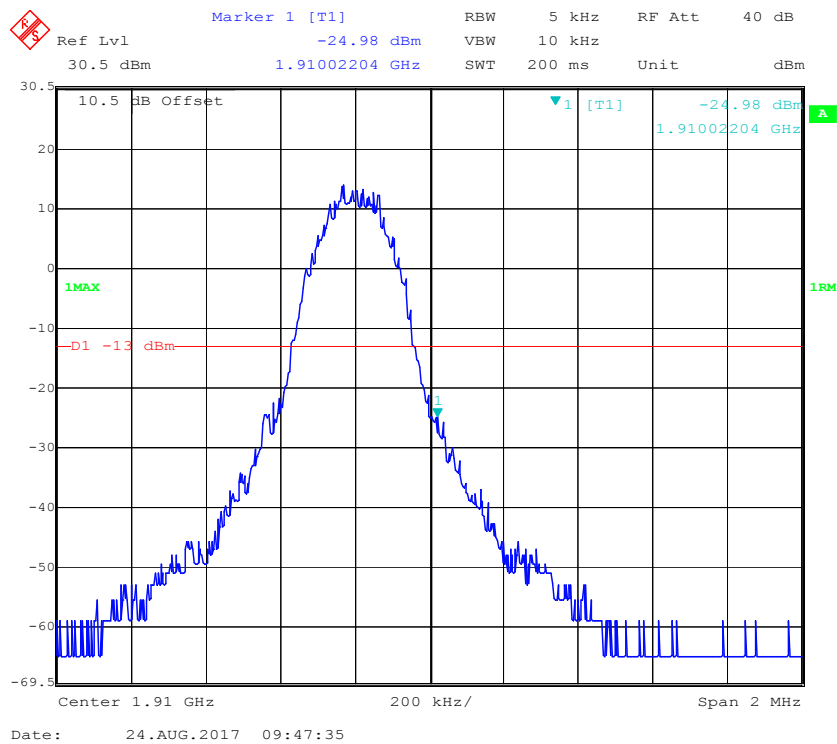
PCS Band, Right Band Edge for GSM (GMSK) Mode



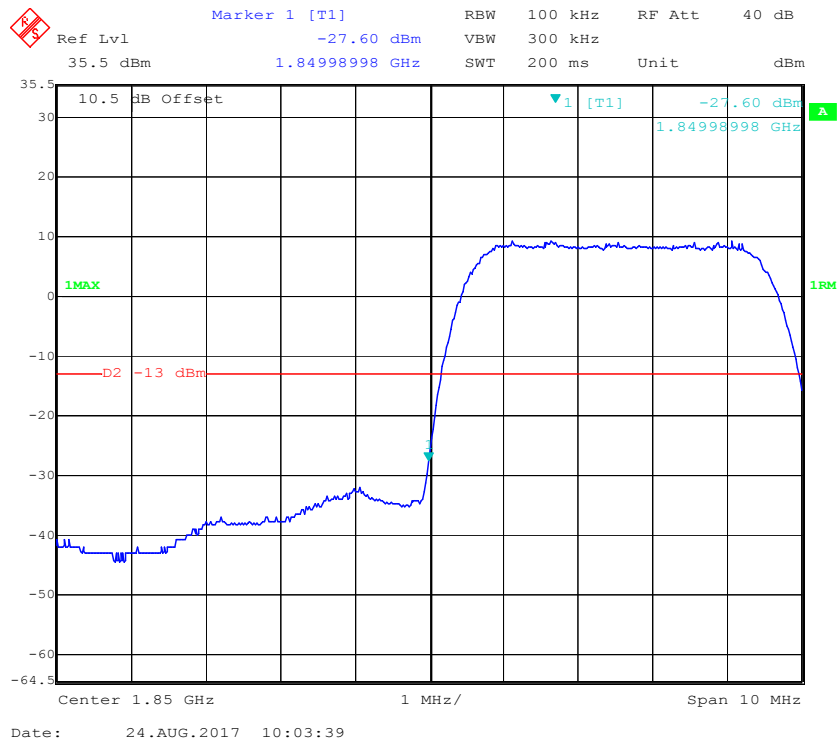
PCS Band, Left Band Edge for EGPRS Mode



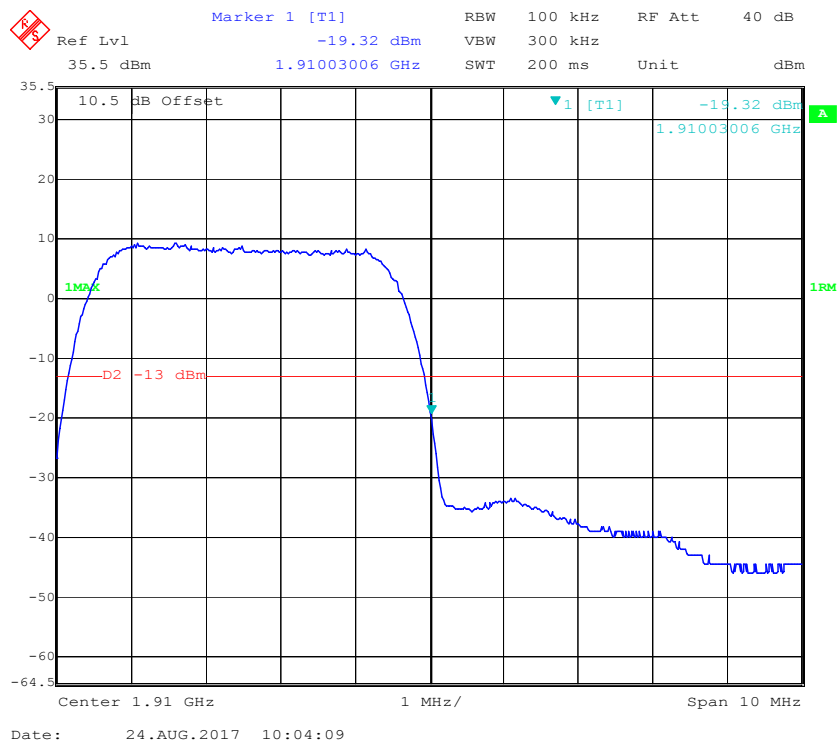
PCS Band, Right Band Edge for EGPRS Mode

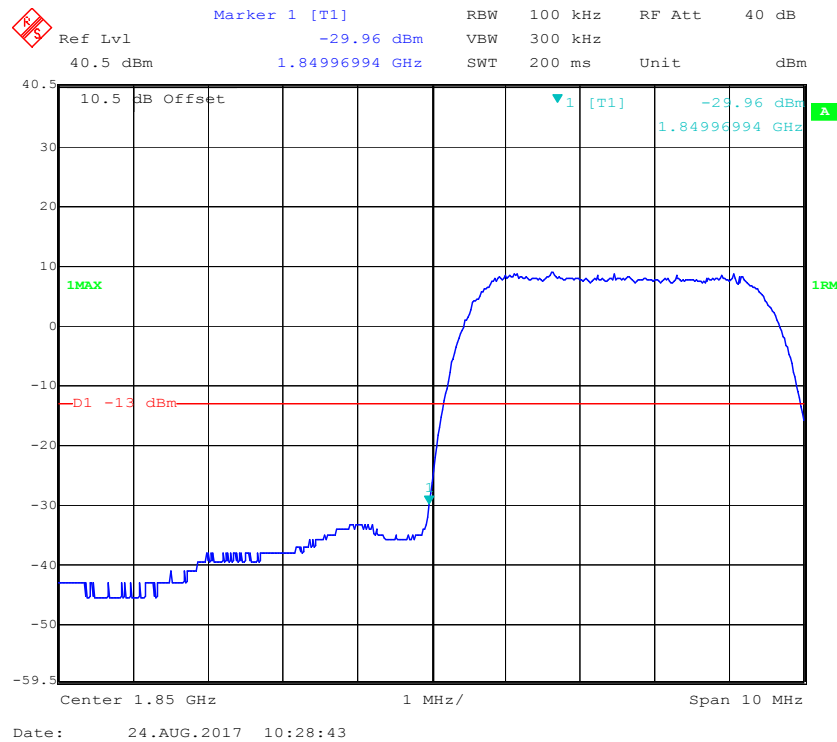
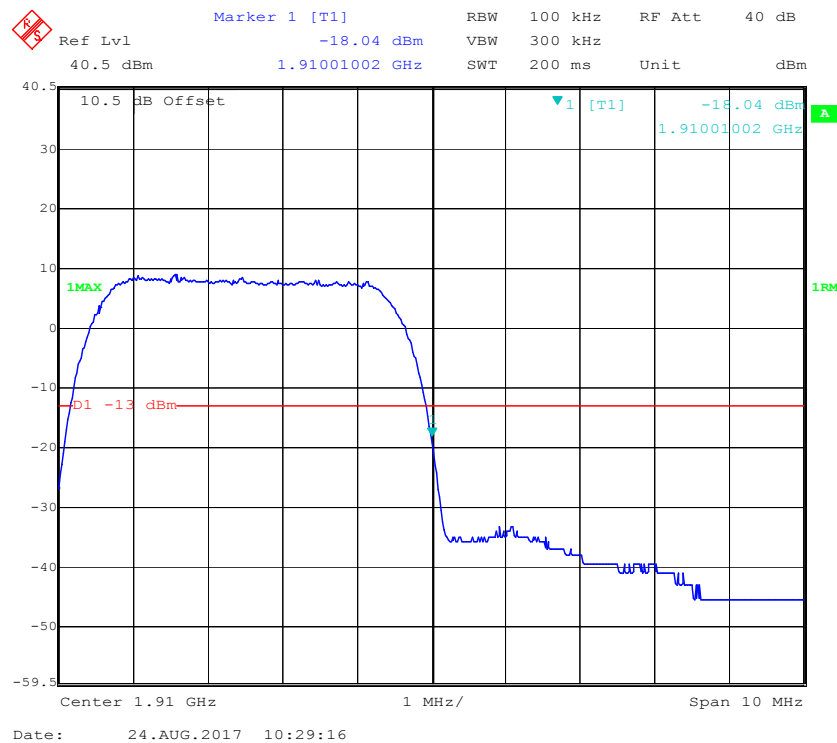


PCS Band, Left Band Edge for RMC (BPSK) Mode

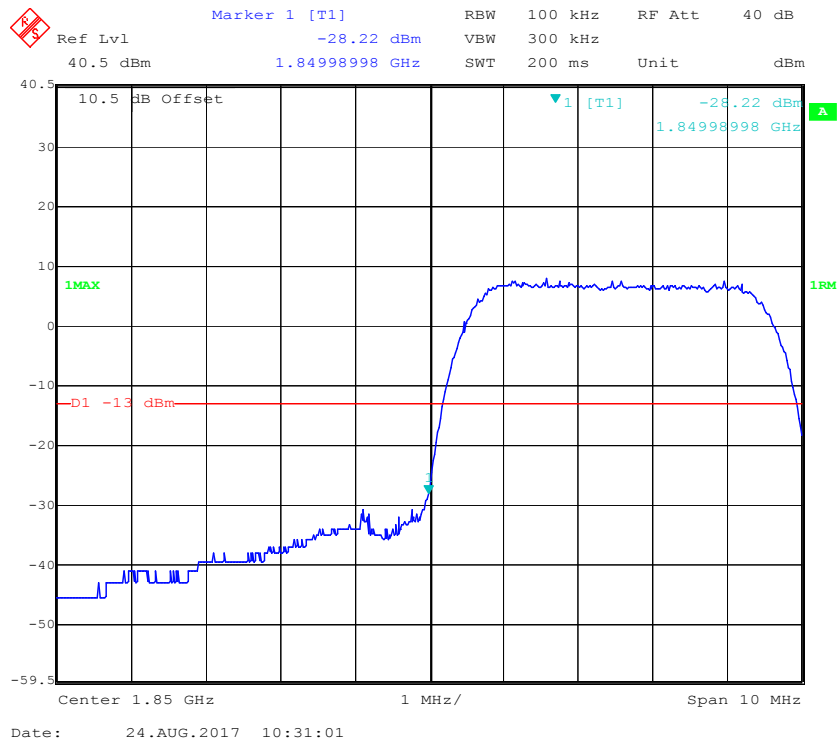


PCS Band, Right Band Edge for RMC (BPSK) Mode

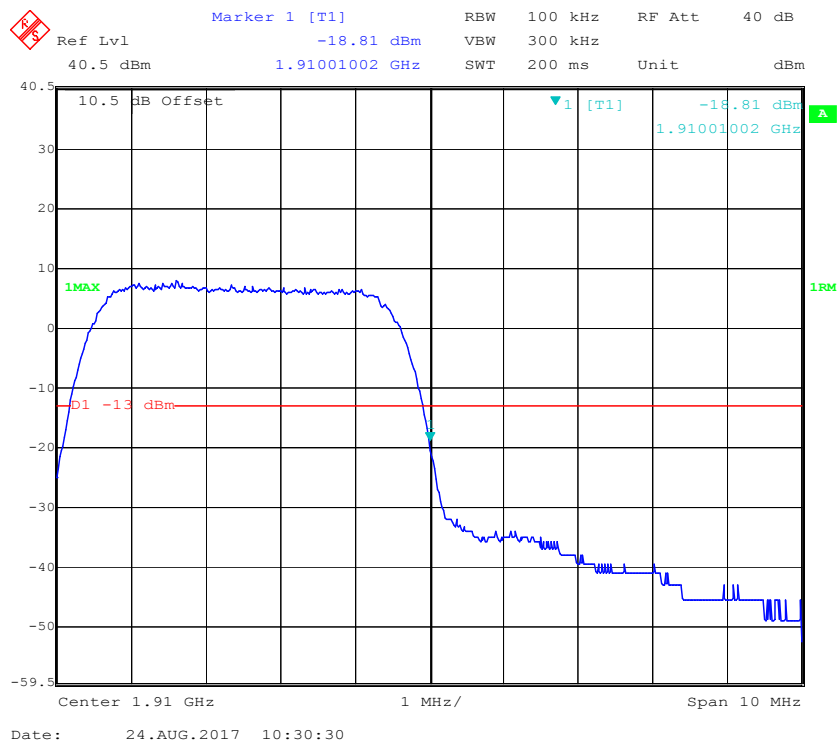


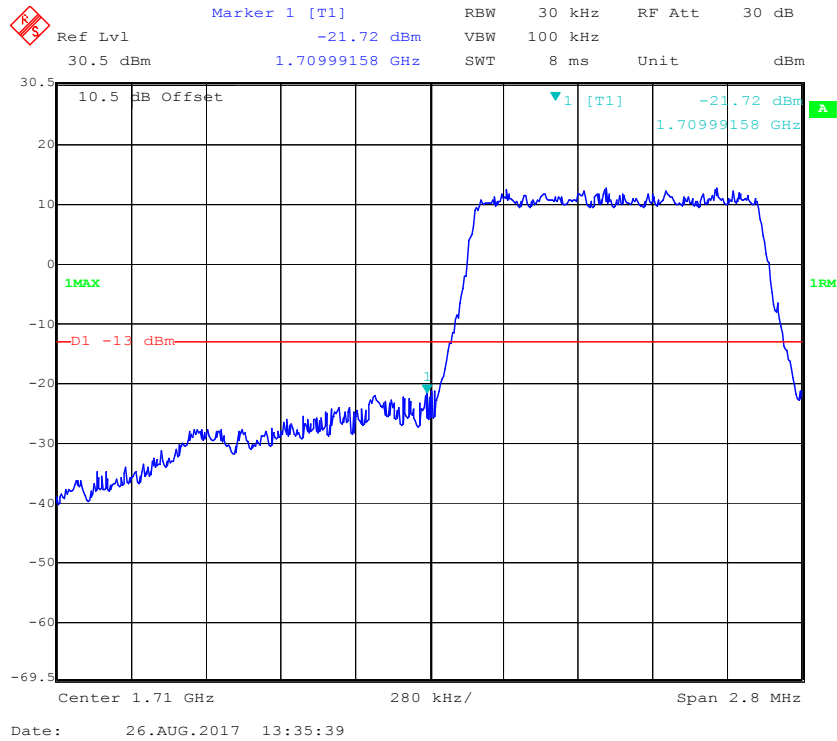
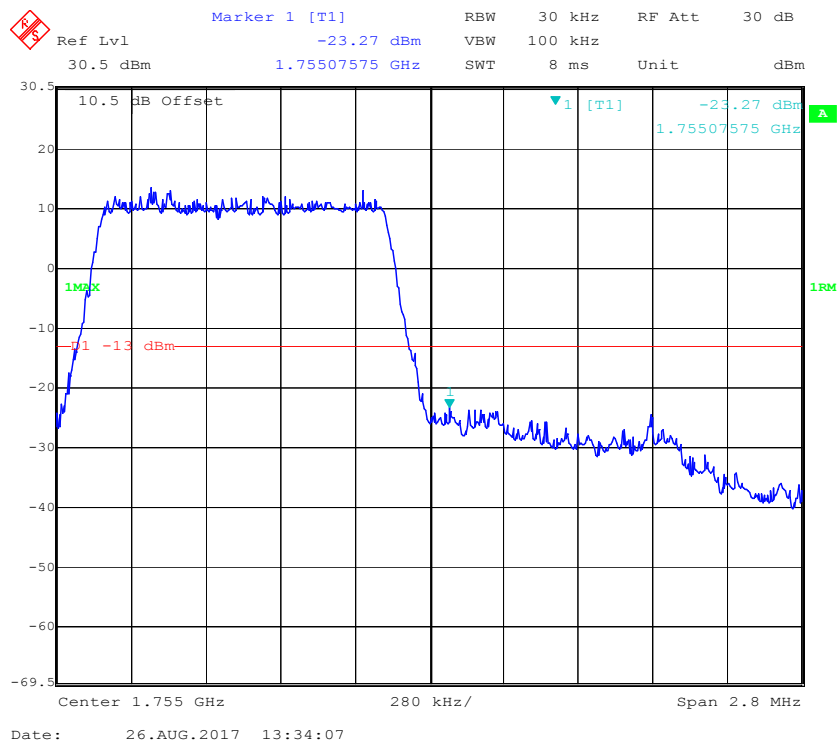
PCS Band, Left Band Edge for HSDPA (16QAM) Mode**PCS Band, Right Band Edge for HSDPA (16QAM) Mode**

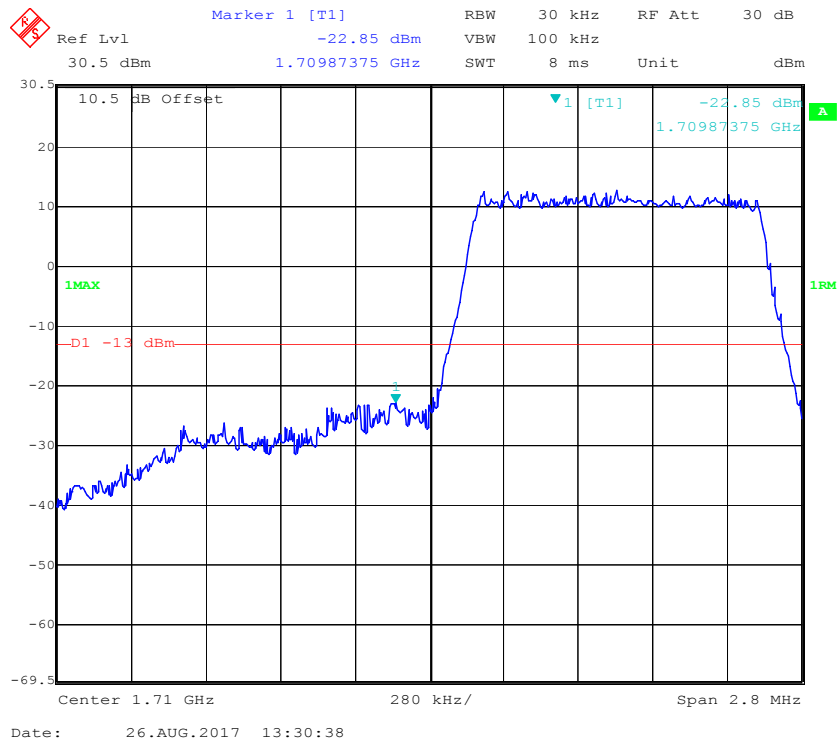
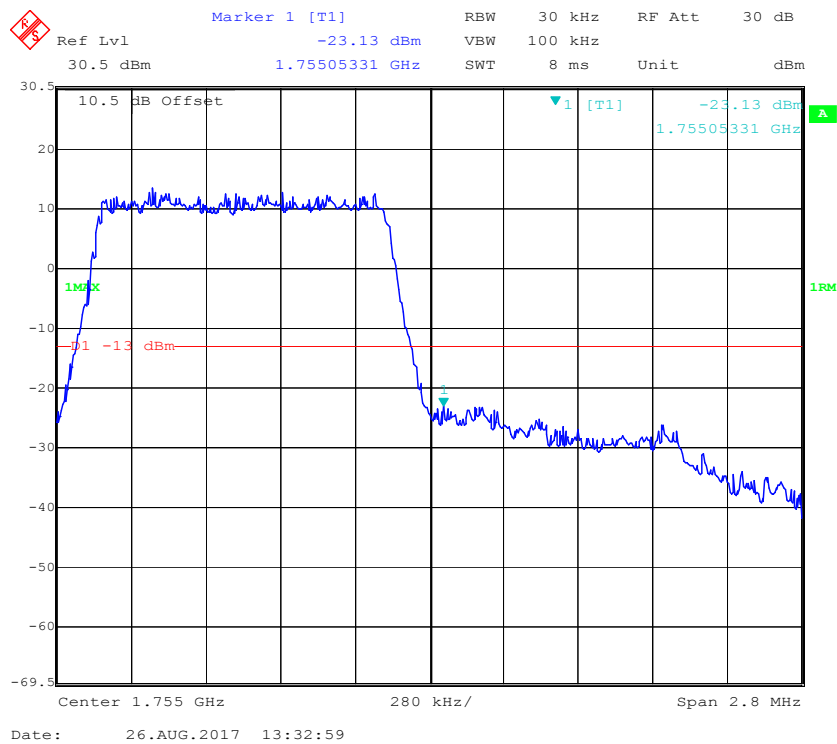
PCS Band, Left Band Edge for HSUPA (BPSK) Mode

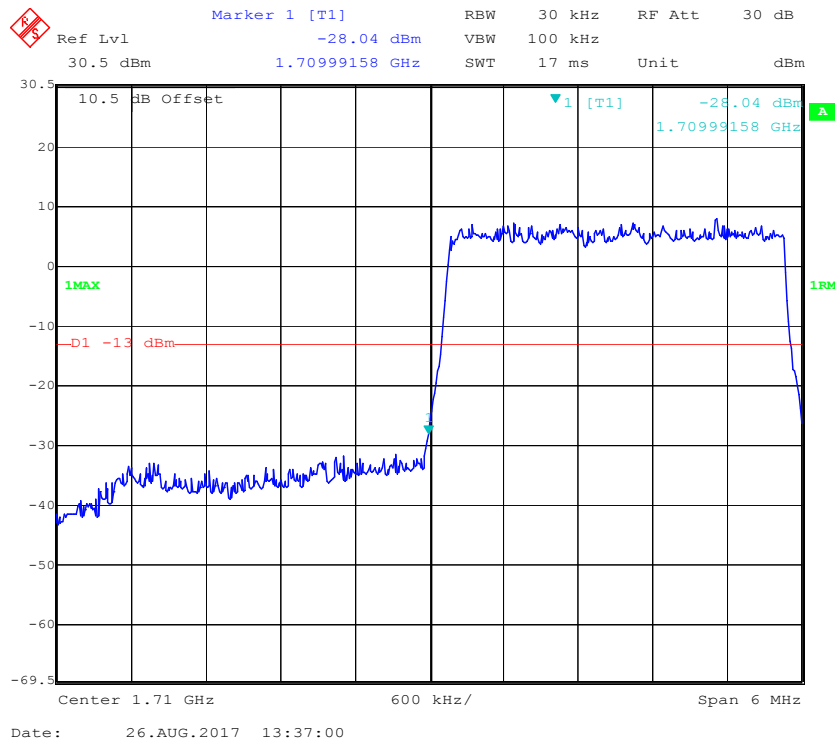
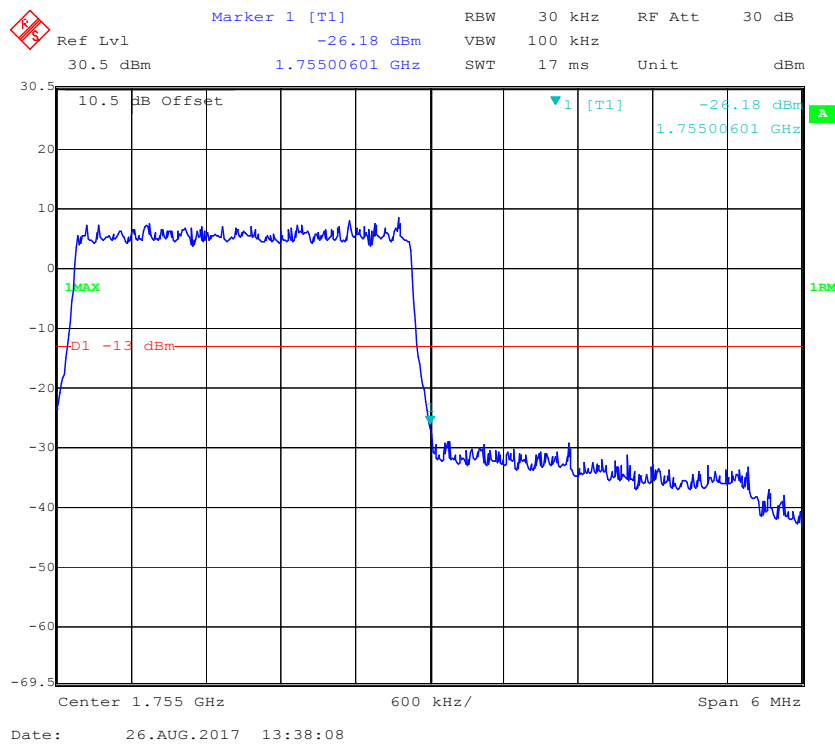


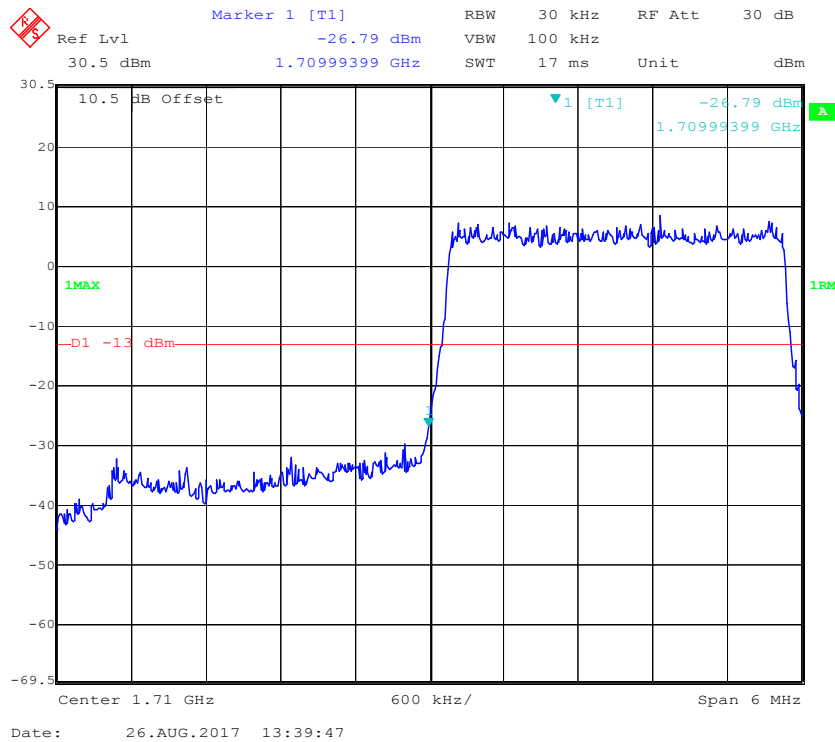
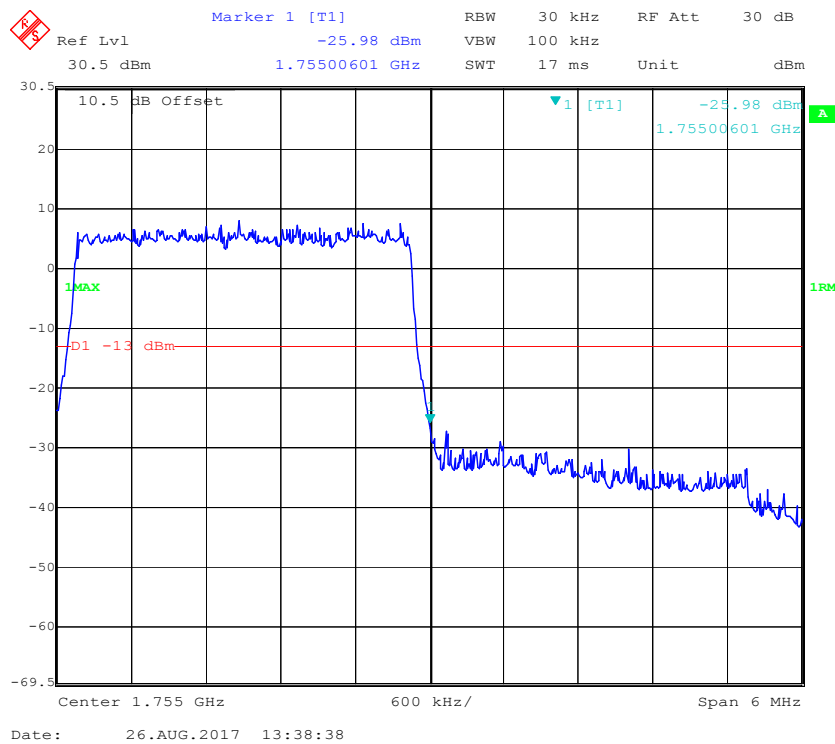
PCS Band, Right Band Edge for HSUPA (BPSK) Mode



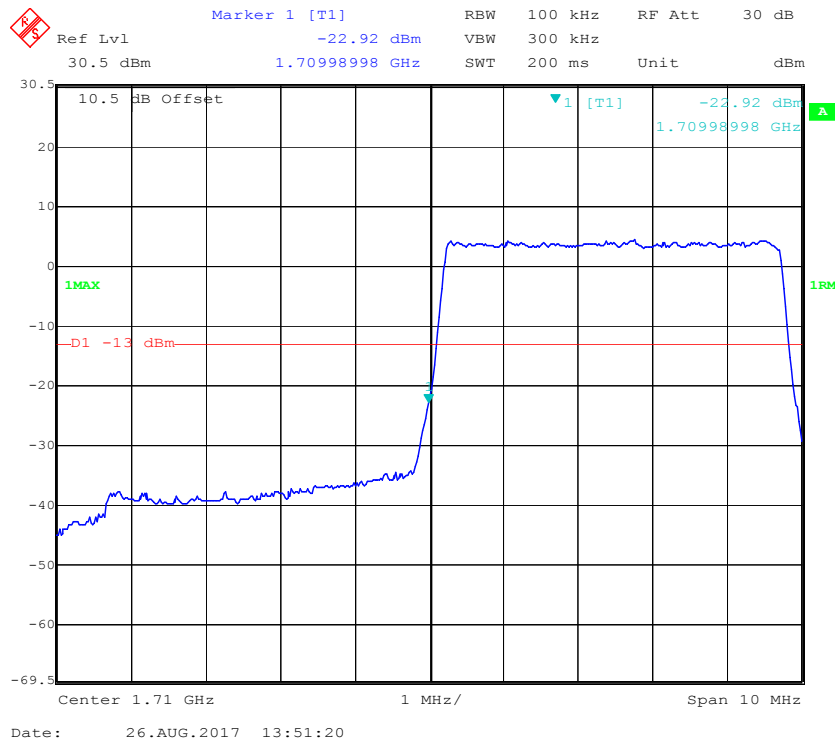
Band 4:**QPSK (1.4 MHz, FULL RB) - Left Band Edge****QPSK (1.4 MHz, FULL RB) - Right Band Edge**

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

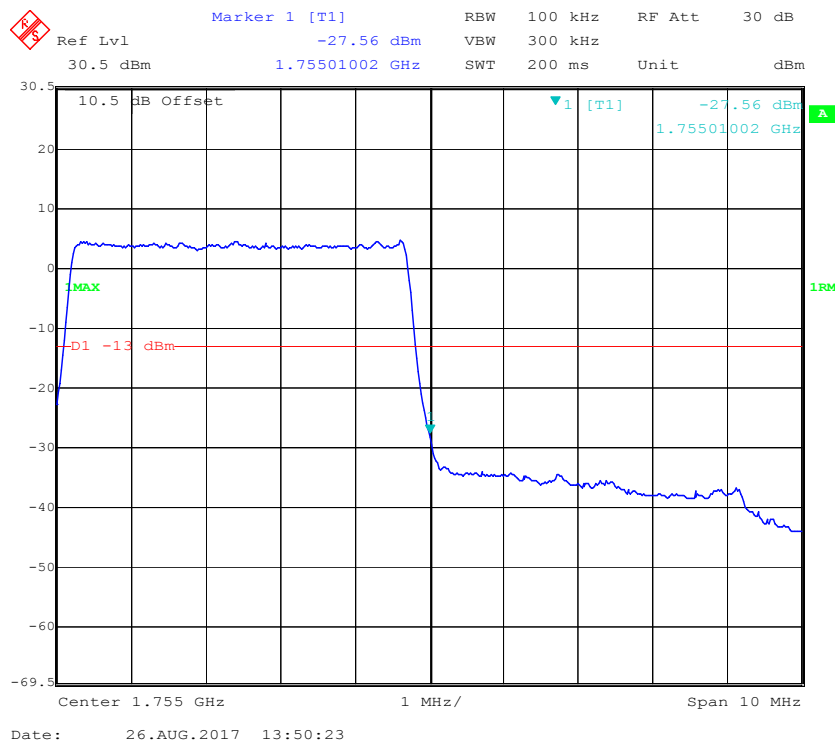
QPSK (3.0 MHz, FULL RB) - Left Band Edge**QPSK (3.0 MHz, FULL RB) - Right Band Edge**

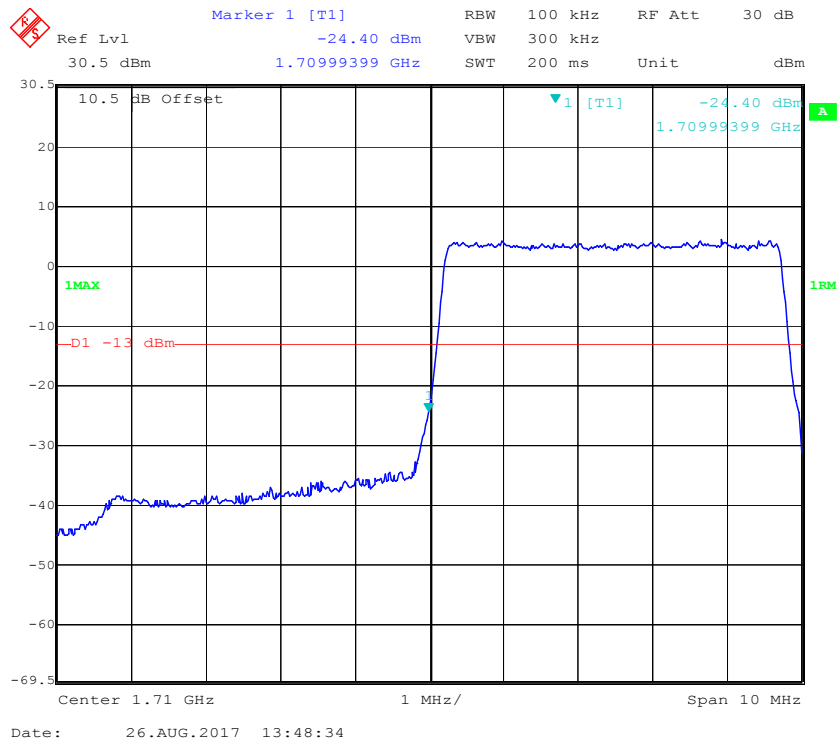
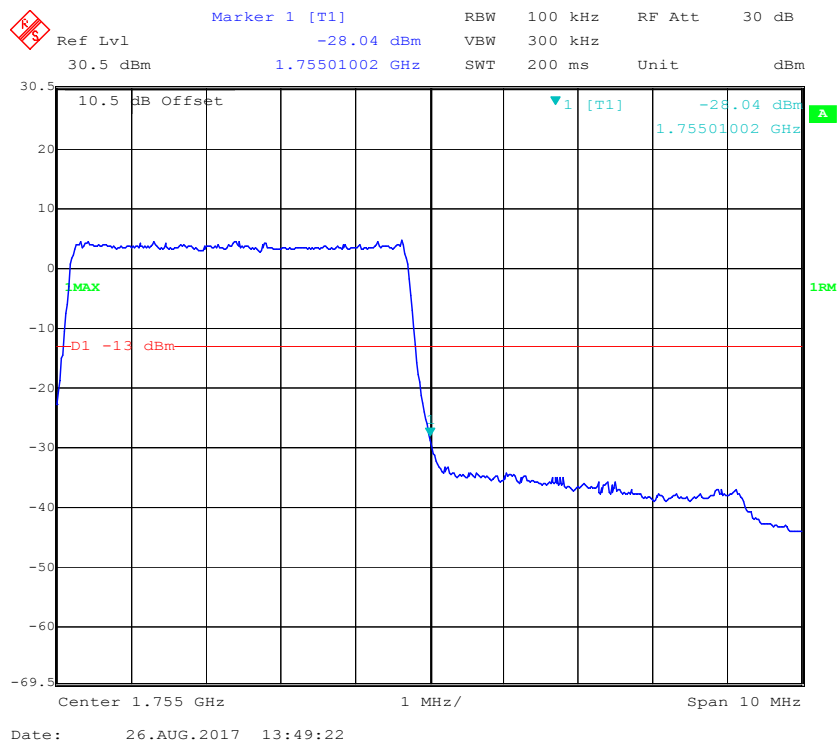
16-QAM (3.0 MHz, FULL RB) - Left Band Edge**16-QAM (3.0 MHz, FULL RB) - Right Band Edge**

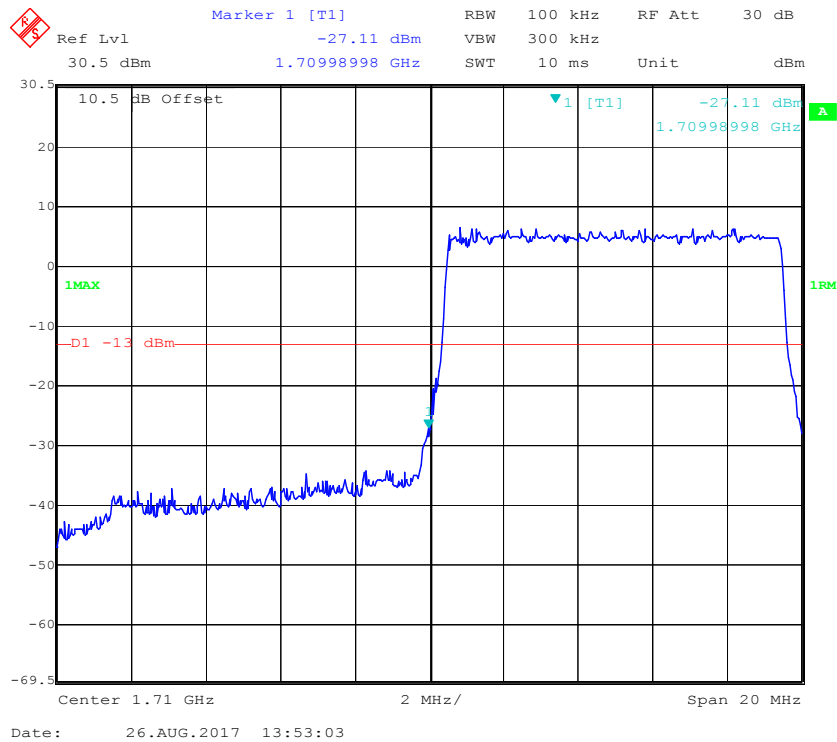
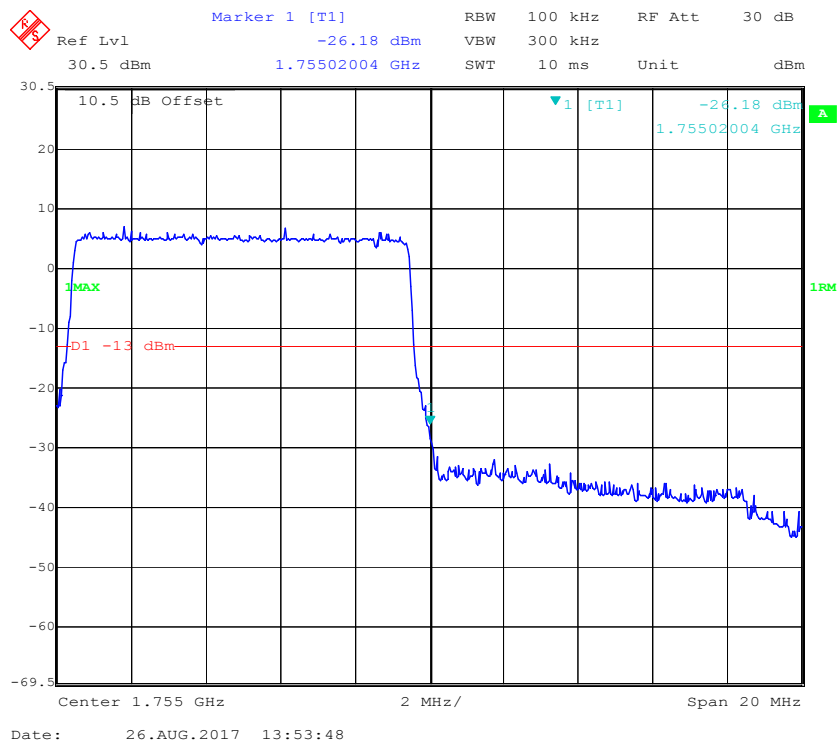
QPSK (5.0 MHz, FULL RB) - Left Band Edge

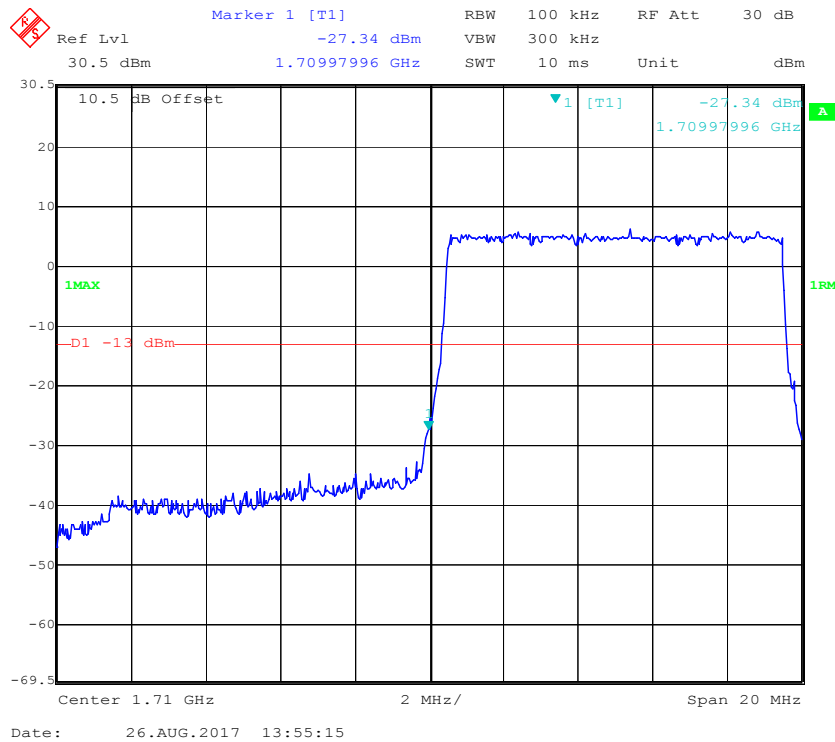
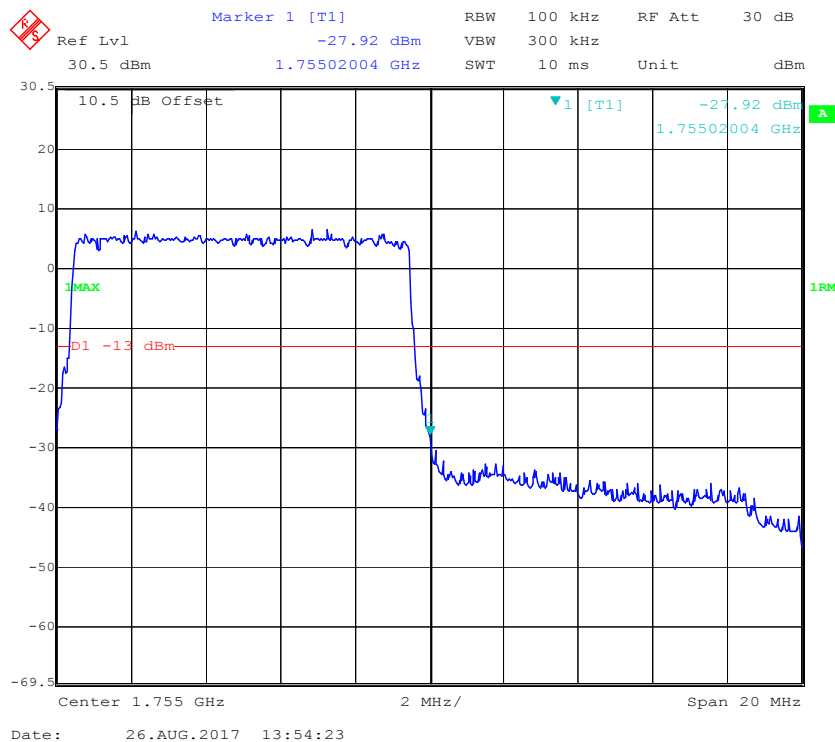


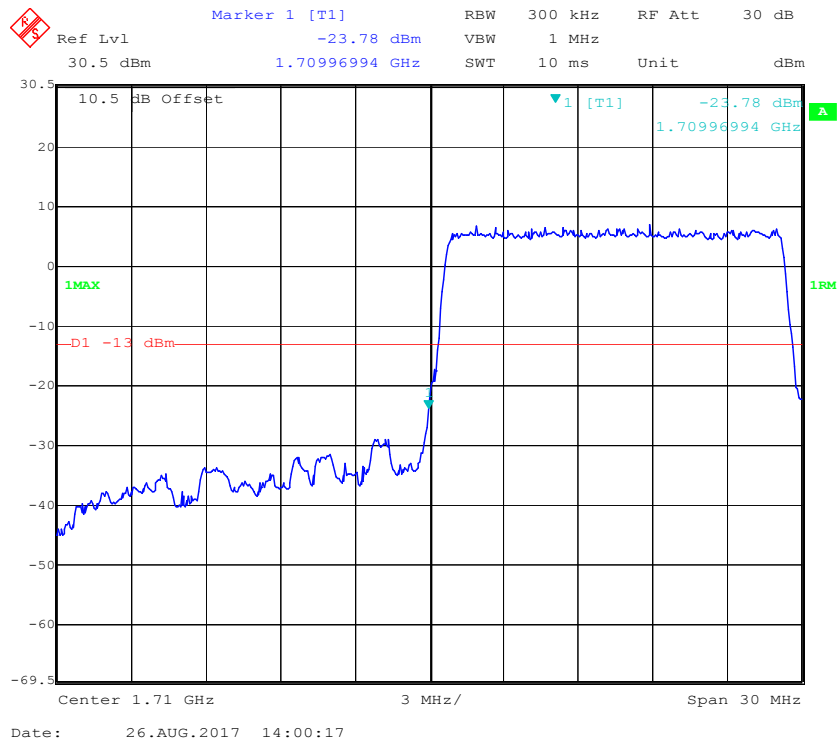
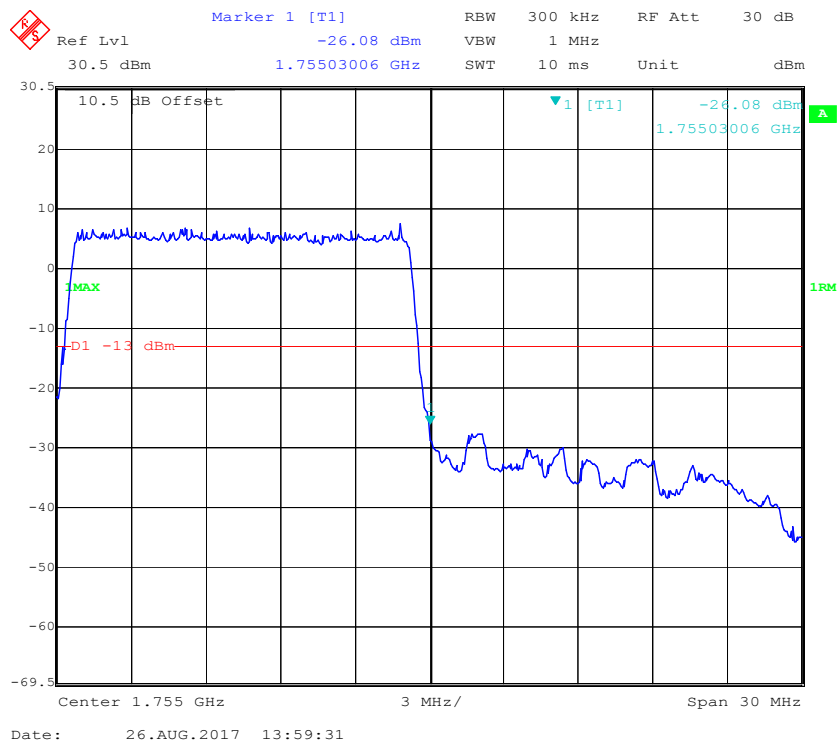
QPSK (5.0 MHz, FULL RB) - Right Band Edge



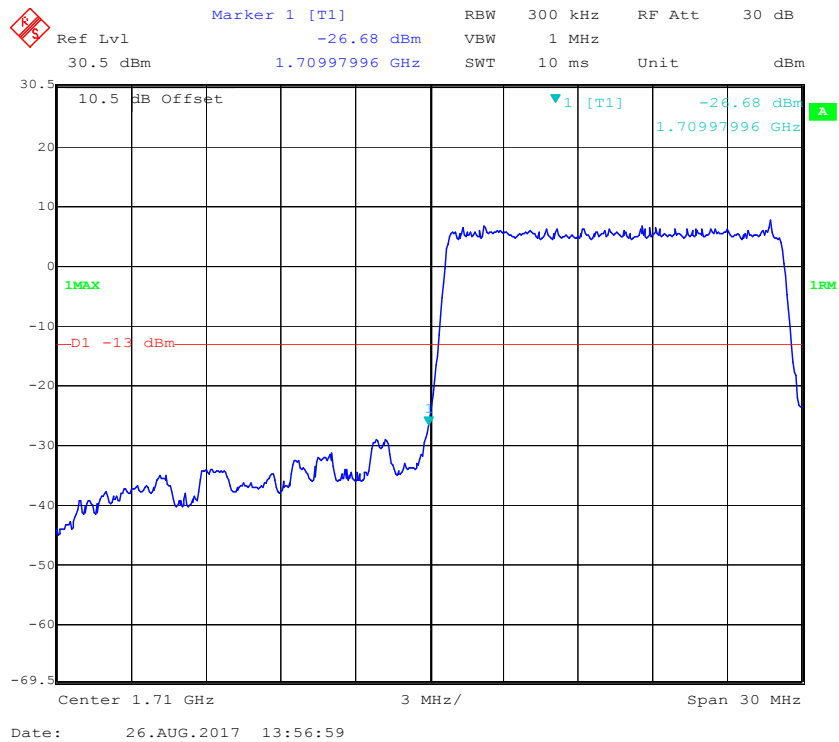
16-QAM (5.0 MHz, FULL RB) - Left Band Edge**16-QAM (5.0 MHz, FULL RB) - Right Band Edge**

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

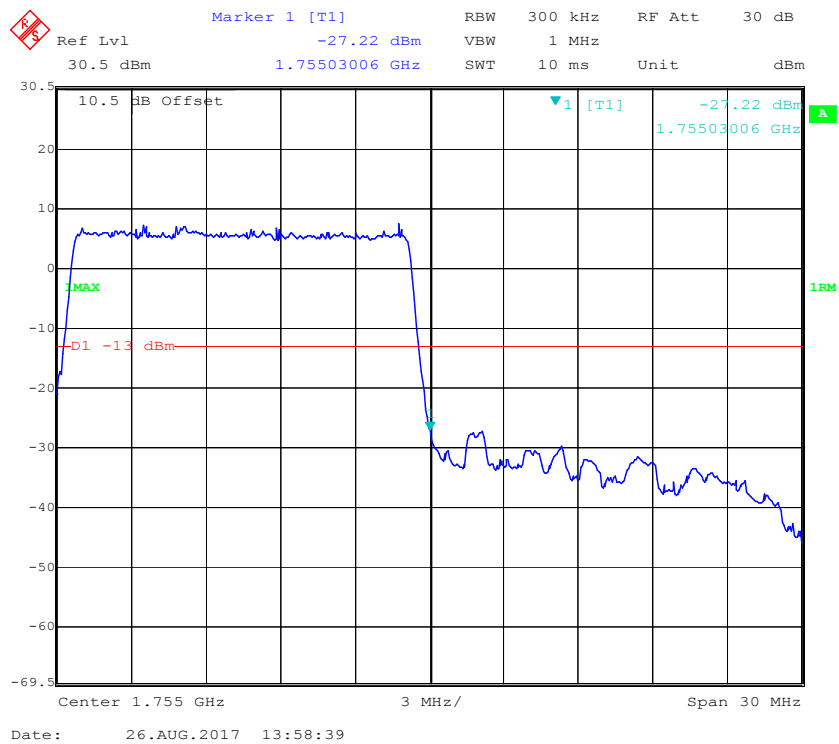
16-QAM (10.0 MHz, FULL RB) - Left Band Edge**16-QAM (10.0 MHz, FULL RB) - Right Band Edge**

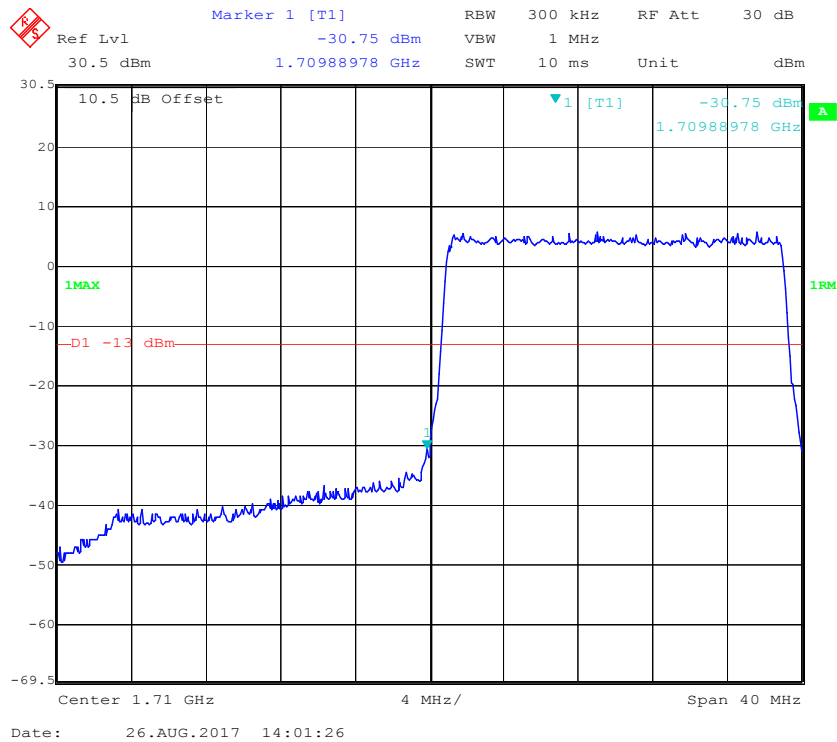
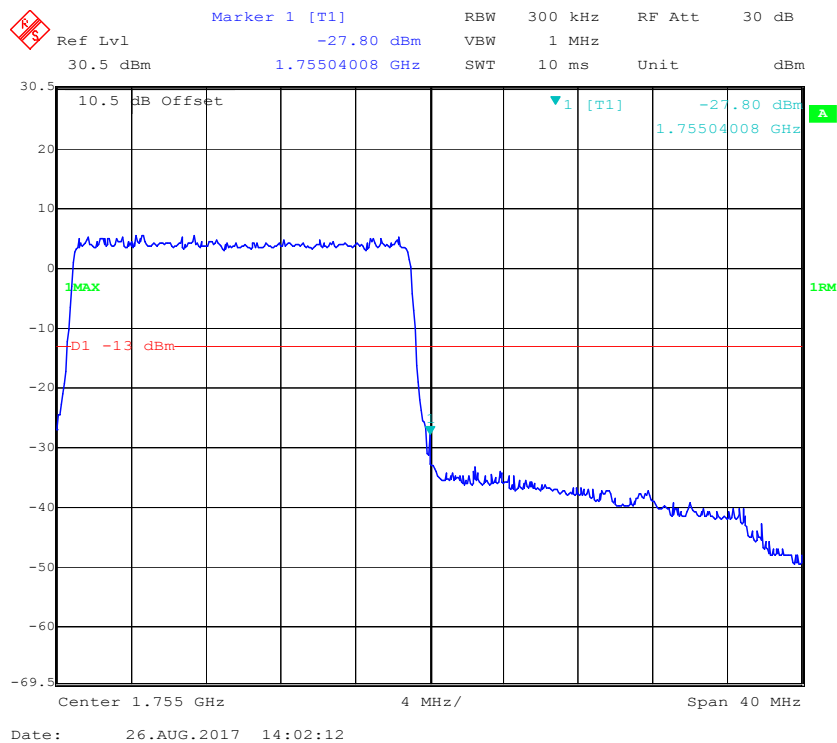
QPSK (15.0 MHz, FULL RB) - Left Band Edge**QPSK (15.0 MHz, FULL RB) - Right Band Edge**

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

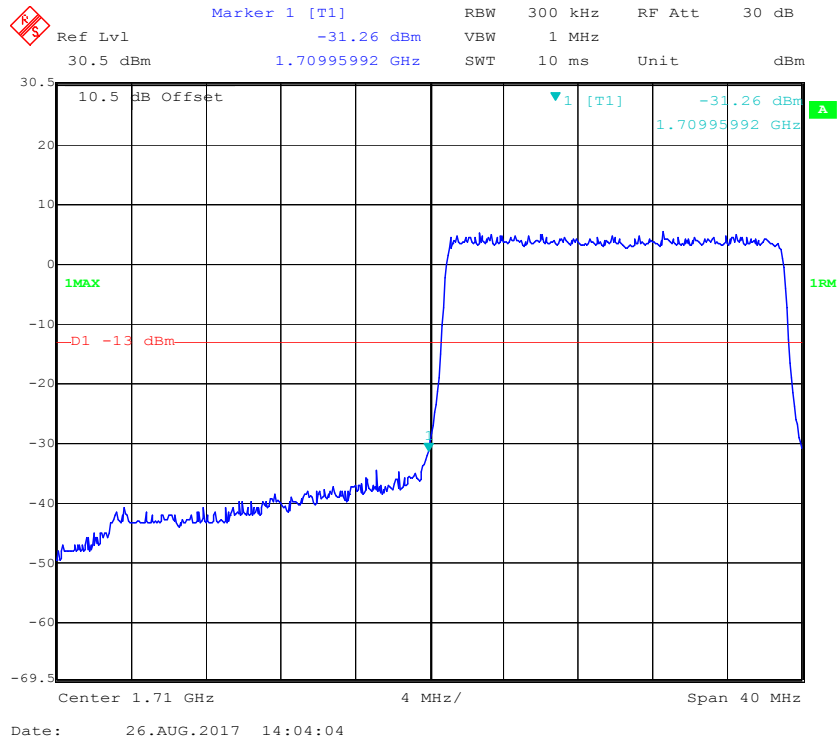


16-QAM (15.0 MHz, FULL RB) - Right Band Edge

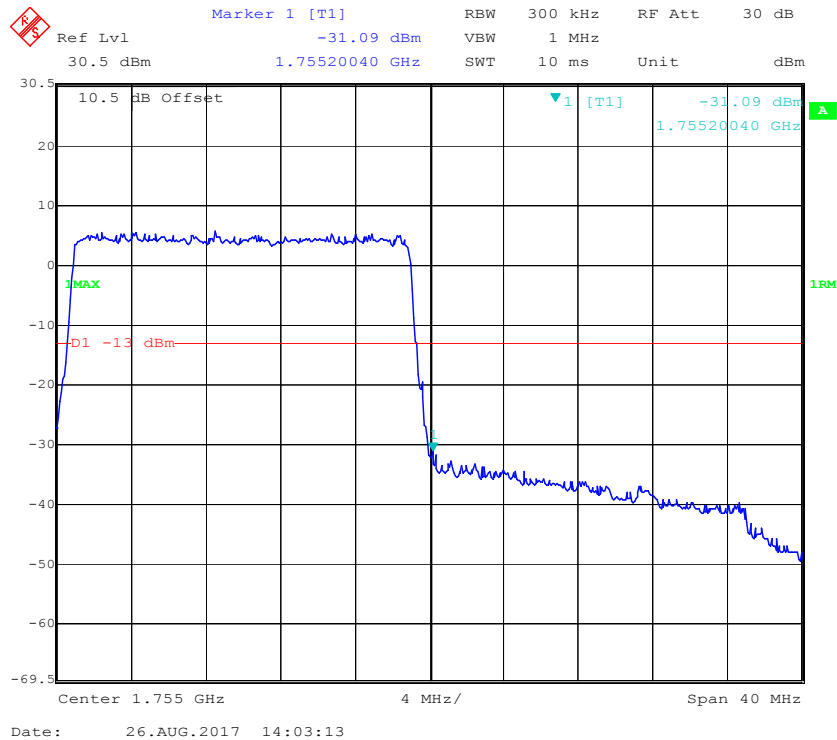


QPSK (20.0 MHz, FULL RB) - Left Band Edge**QPSK (20.0 MHz, FULL RB) - Right Band Edge**

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

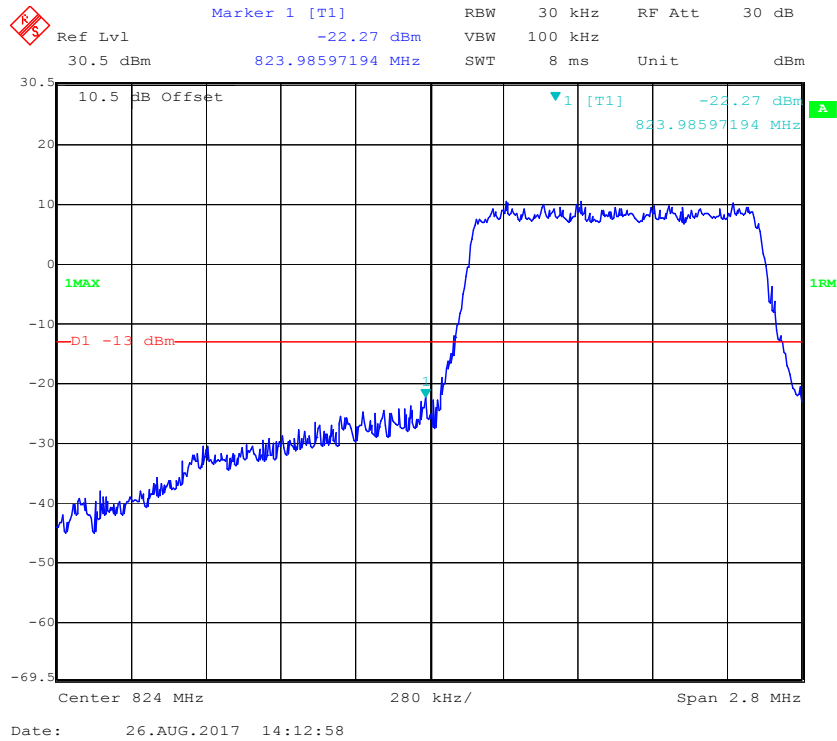


16-QAM (20.0 MHz, FULL RB) - Right Band Edge

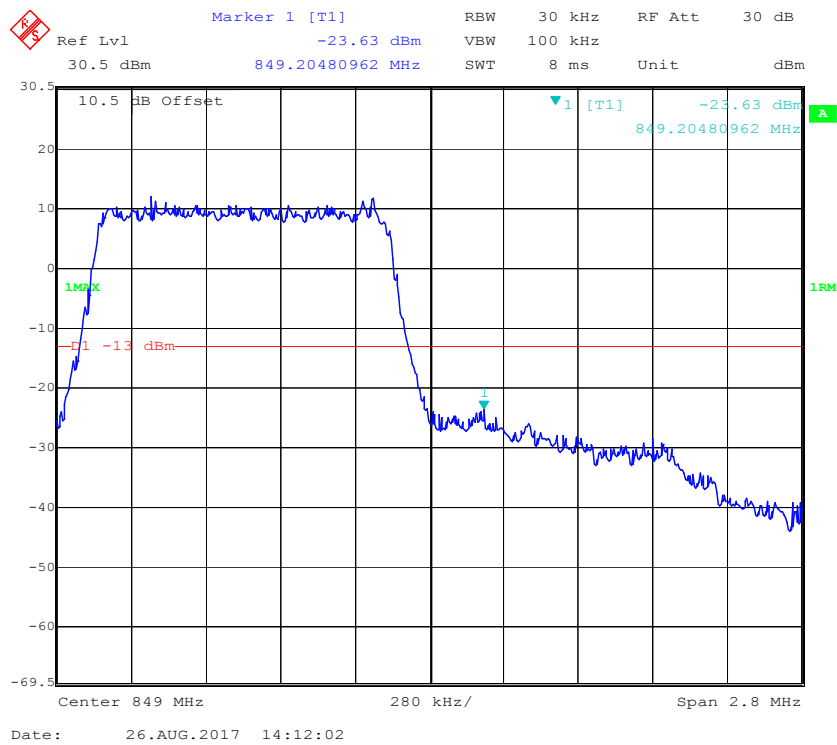


Band 5:

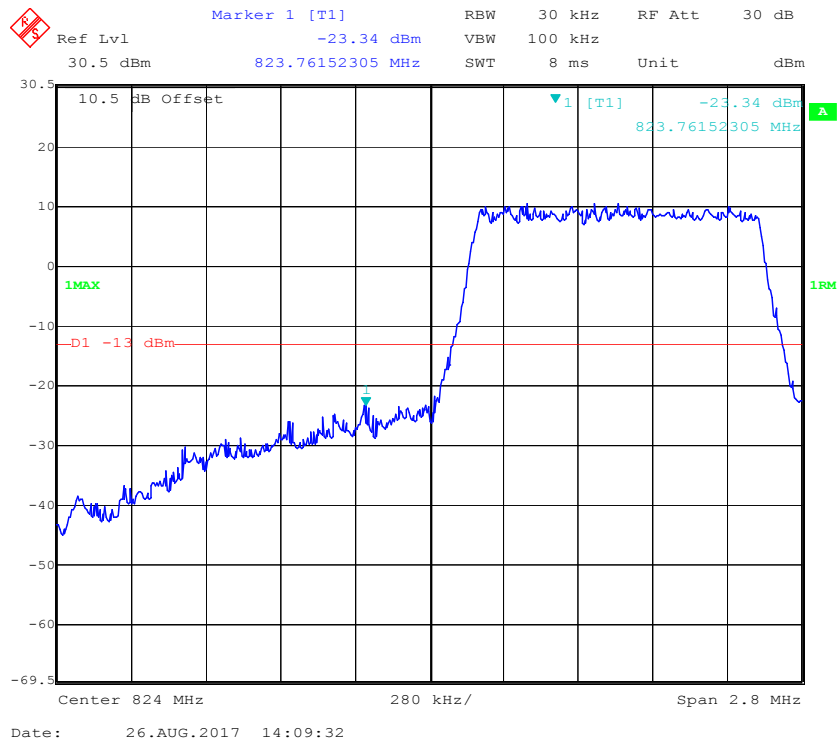
QPSK (1.4 MHz, FULL RB) - Left Band Edge



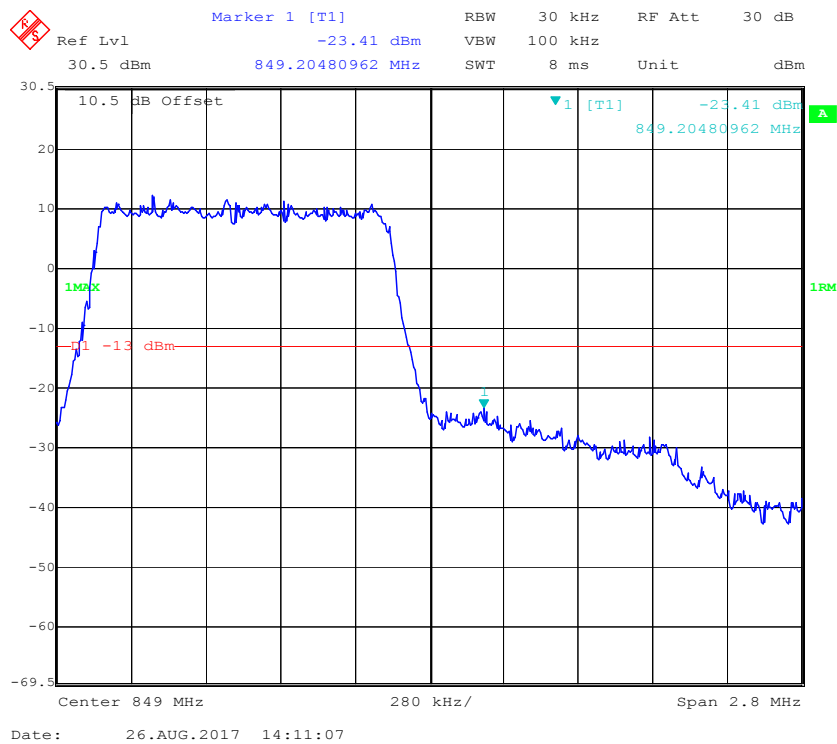
QPSK (1.4 MHz, FULL RB) - Right Band Edge



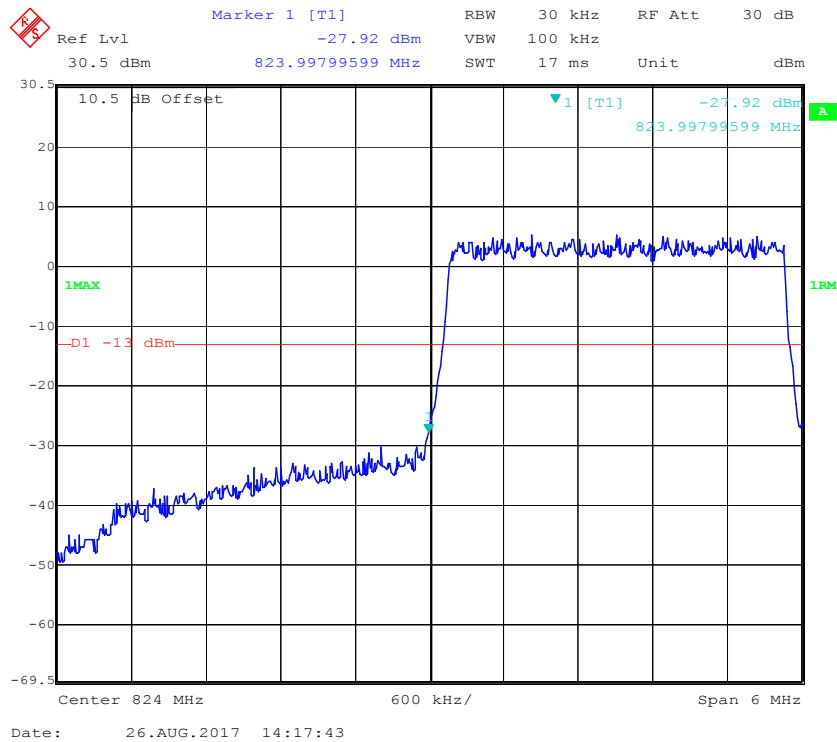
16-QAM (1.4 MHz, FULL RB) - Left Band Edge



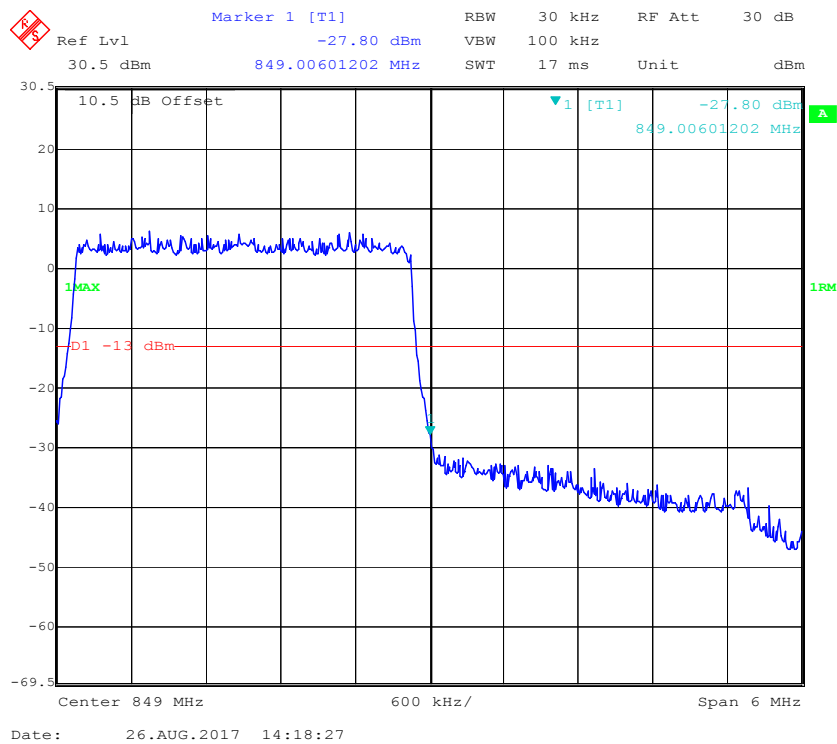
16-QAM (1.4 MHz, FULL RB) - Right Band Edge

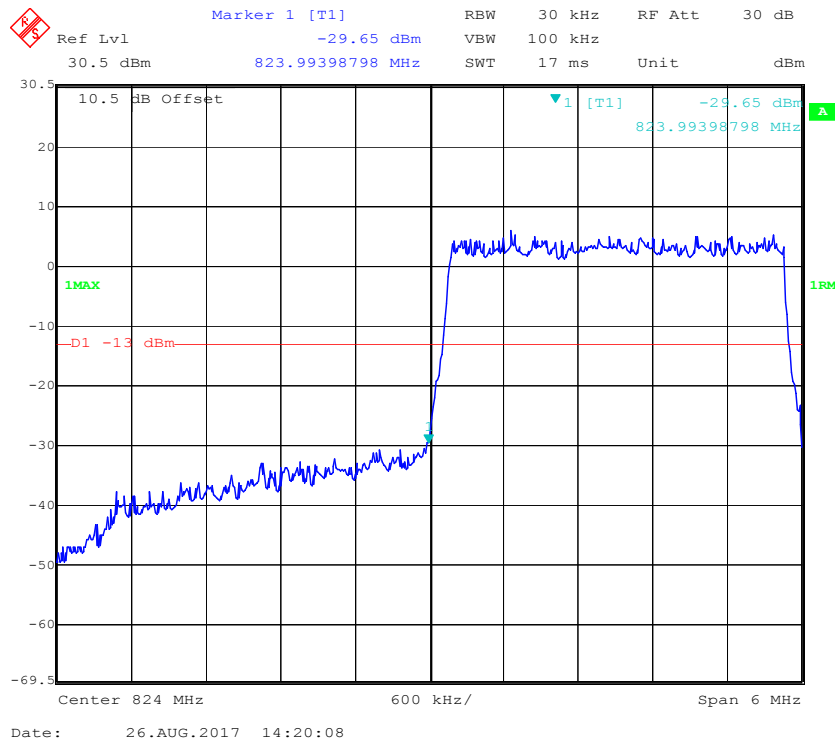
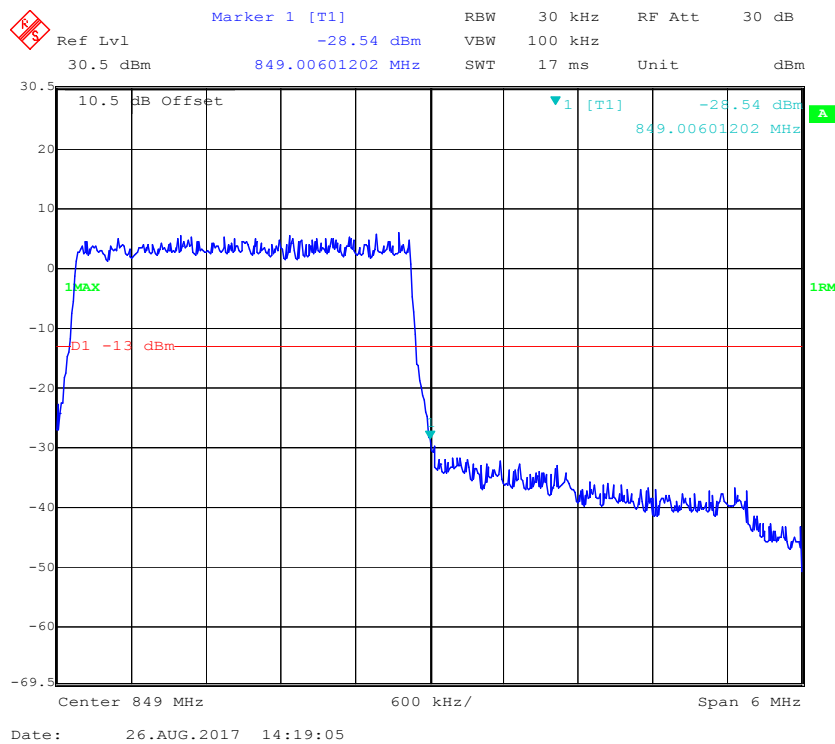


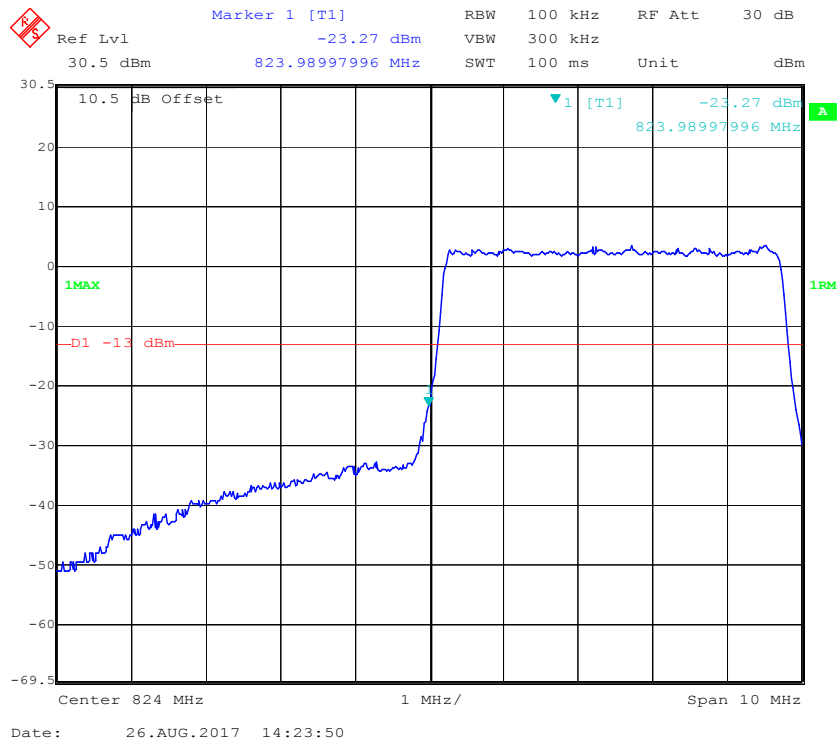
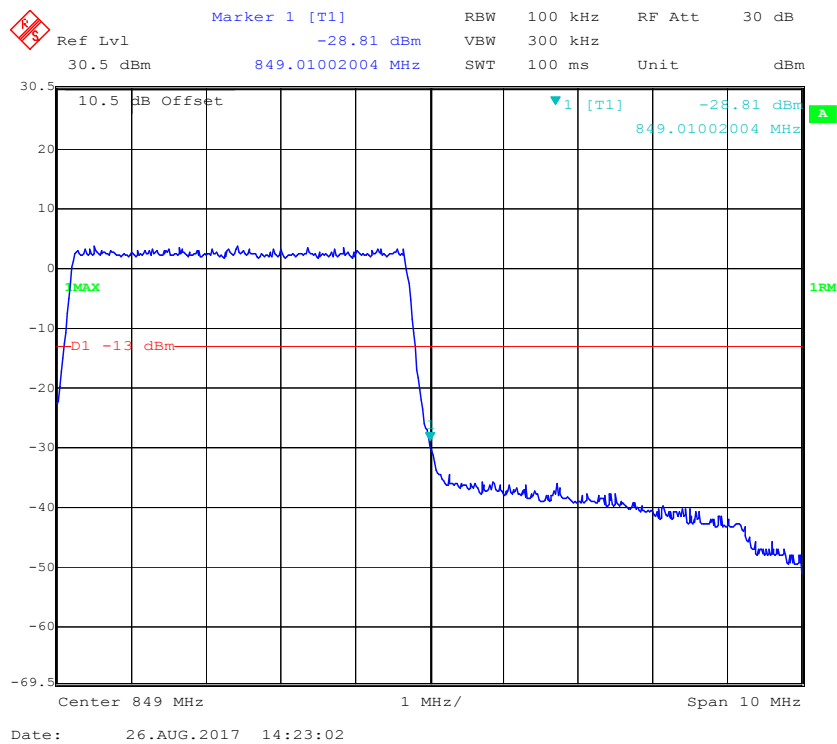
QPSK (3.0 MHz, FULL RB) - Left Band Edge

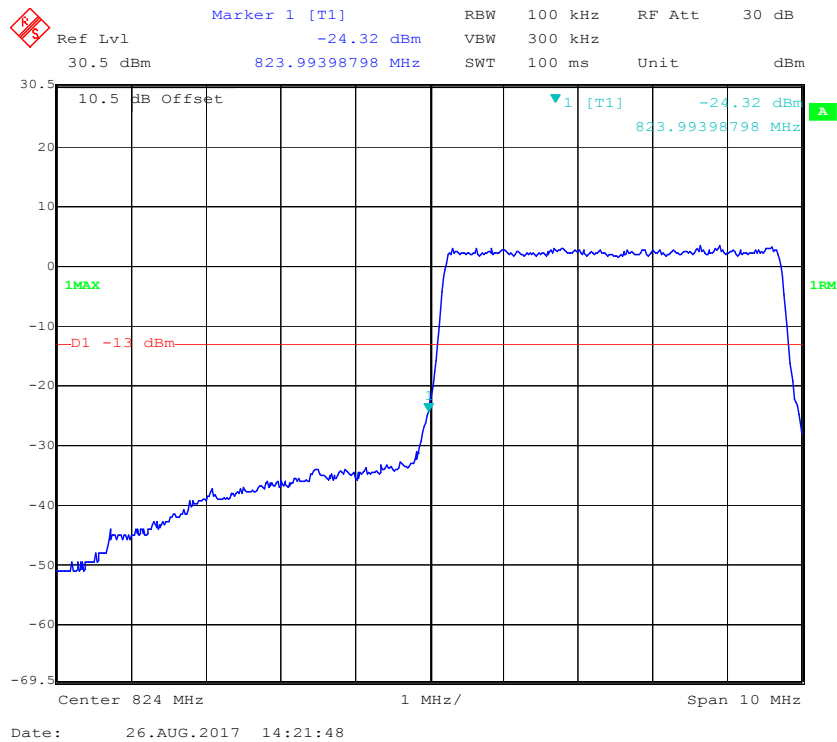
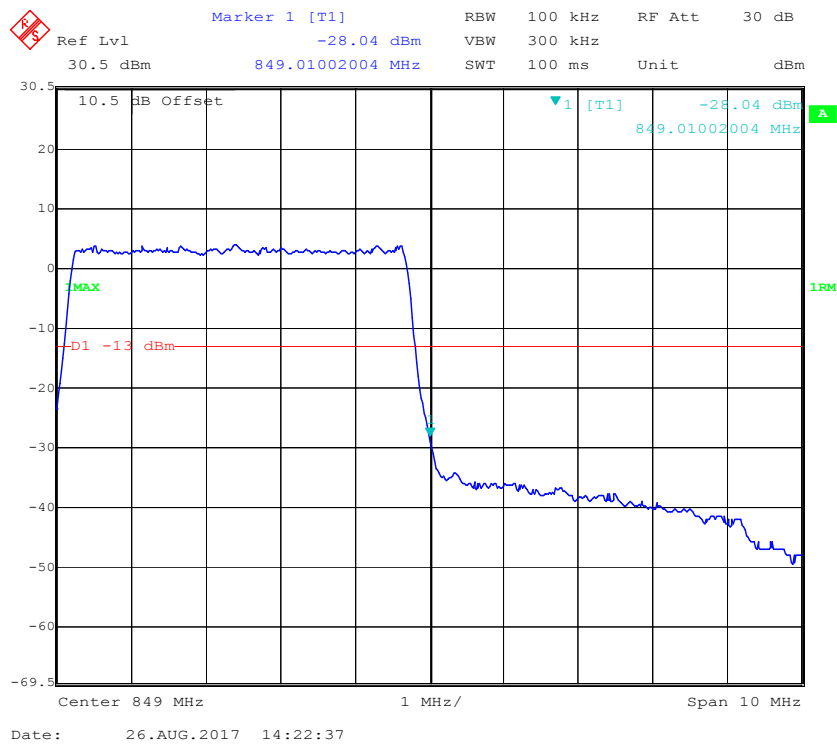


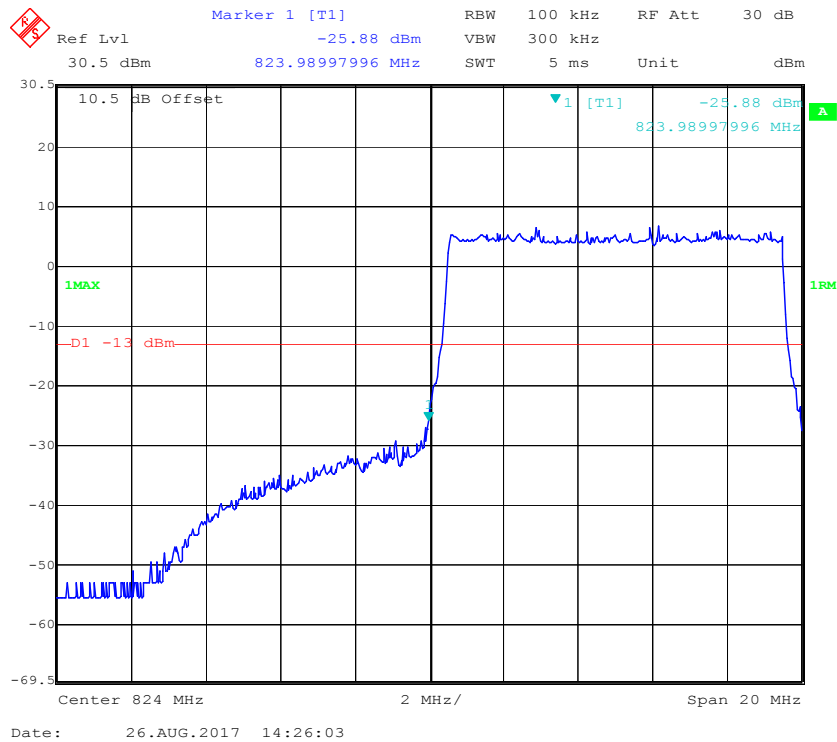
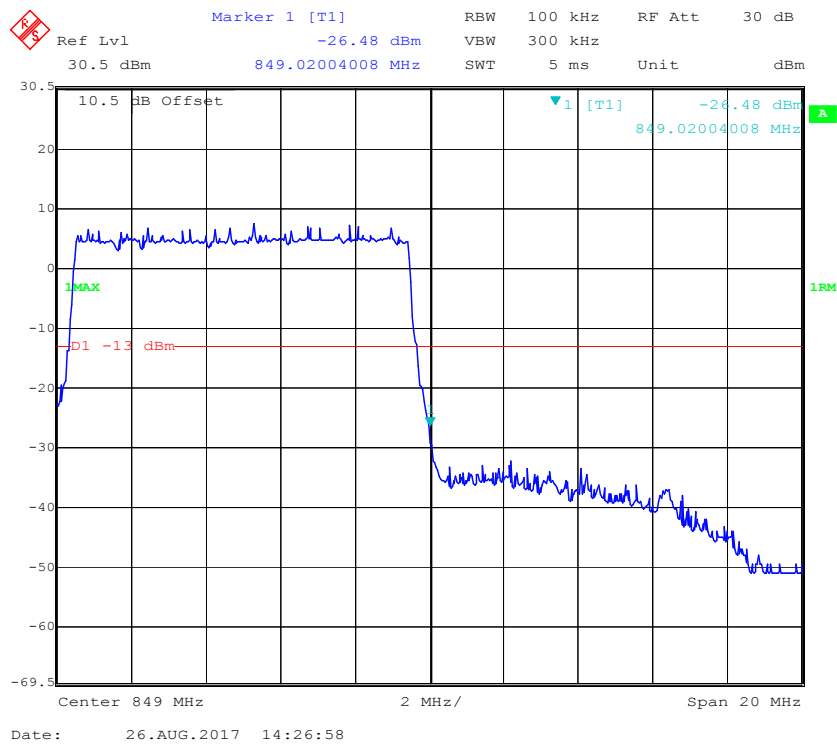
QPSK (3.0 MHz, FULL RB) - Right Band Edge



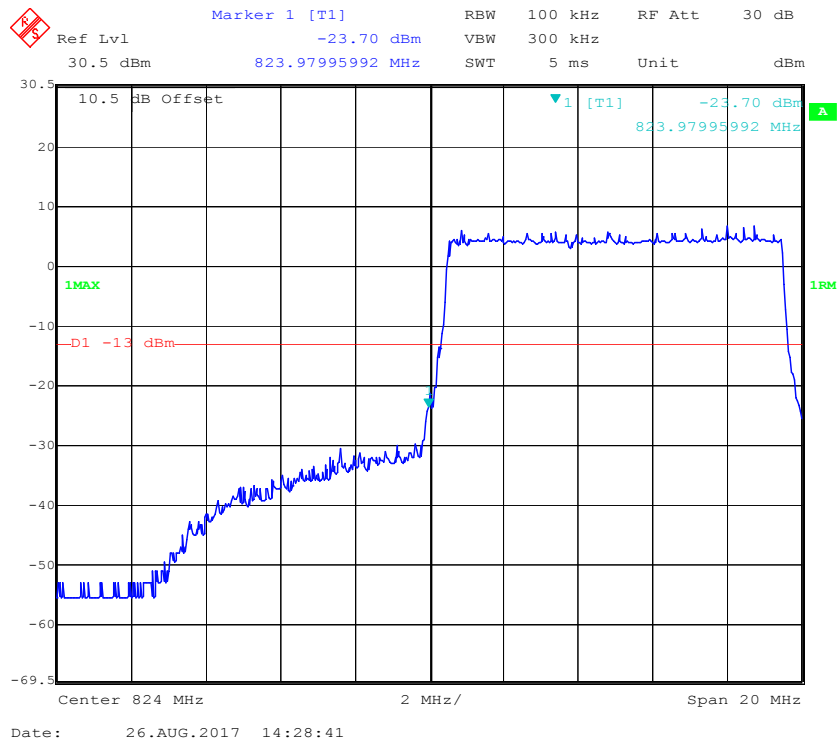
16-QAM (3.0 MHz, FULL RB) - Left Band Edge**16-QAM (3.0 MHz, FULL RB) - Right Band Edge**

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

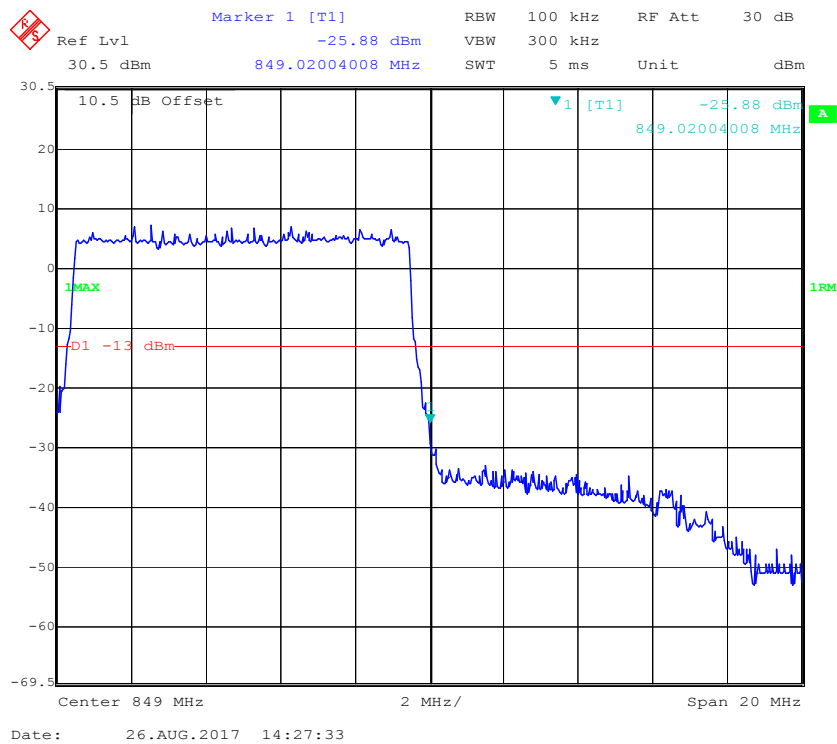
16-QAM (5.0 MHz, FULL RB) - Left Band Edge**16-QAM (5.0 MHz, FULL RB) - Right Band Edge**

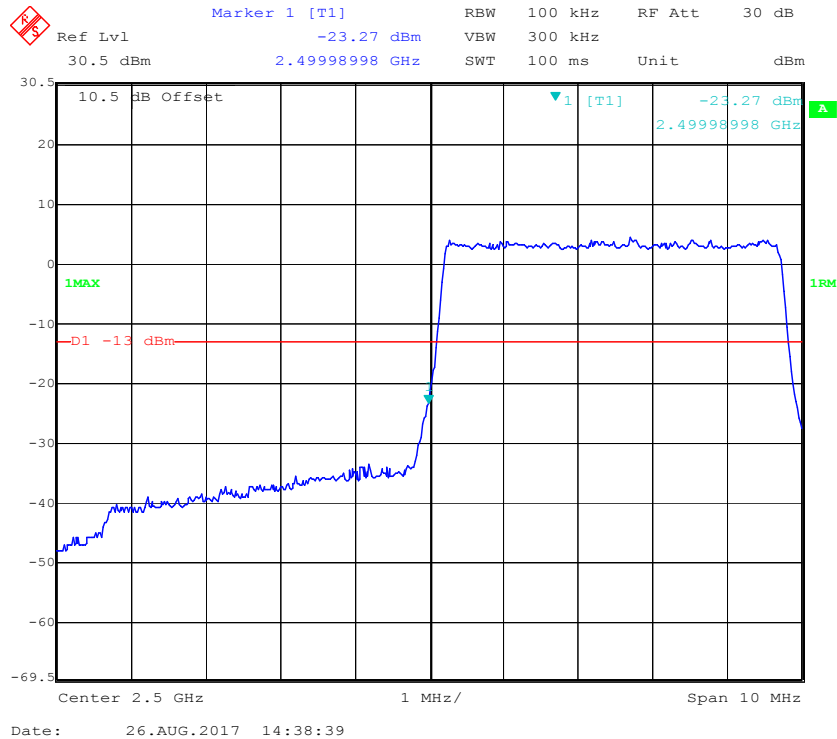
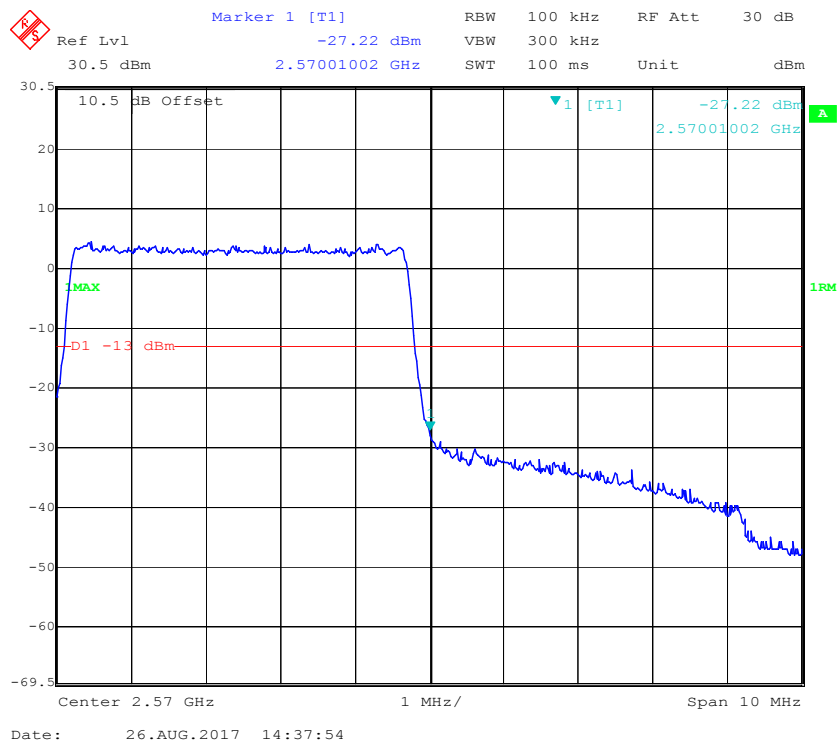
QPSK (10.0 MHz, FULL RB) - Left Band Edge**QPSK (10.0 MHz, FULL RB) - Right Band Edge**

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

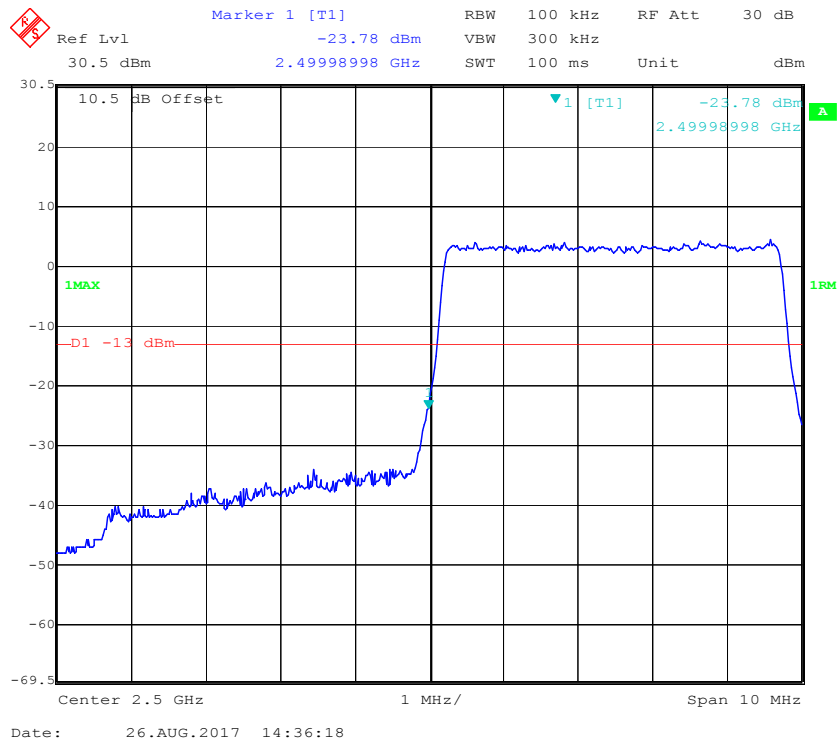


16-QAM (10.0 MHz, FULL RB) - Right Band Edge

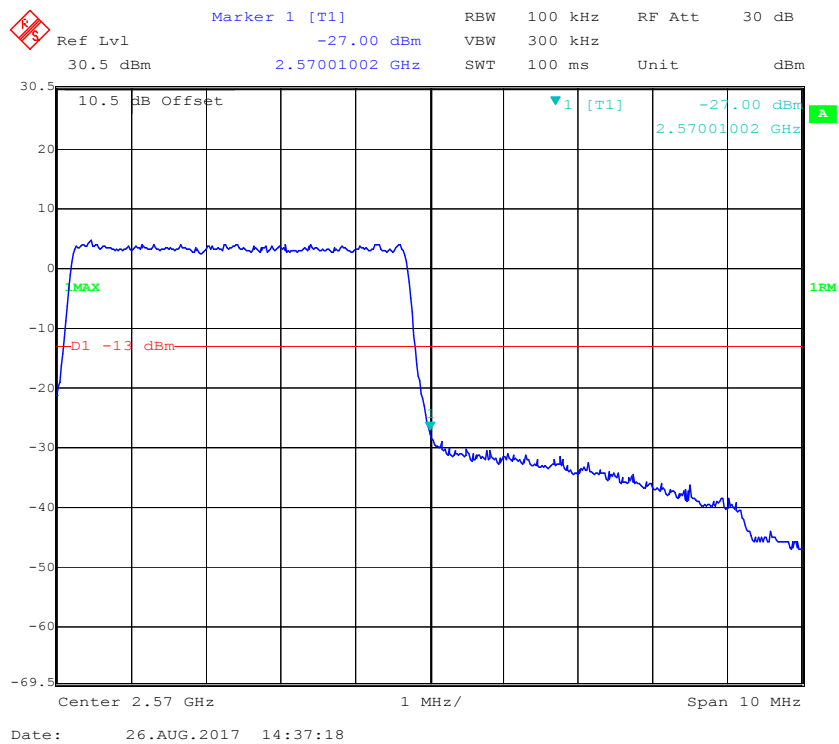


Band 7:**QPSK (5.0 MHz, FULL RB) - Left Band Edge****QPSK (5.0 MHz, FULL RB) - Right Band Edge**

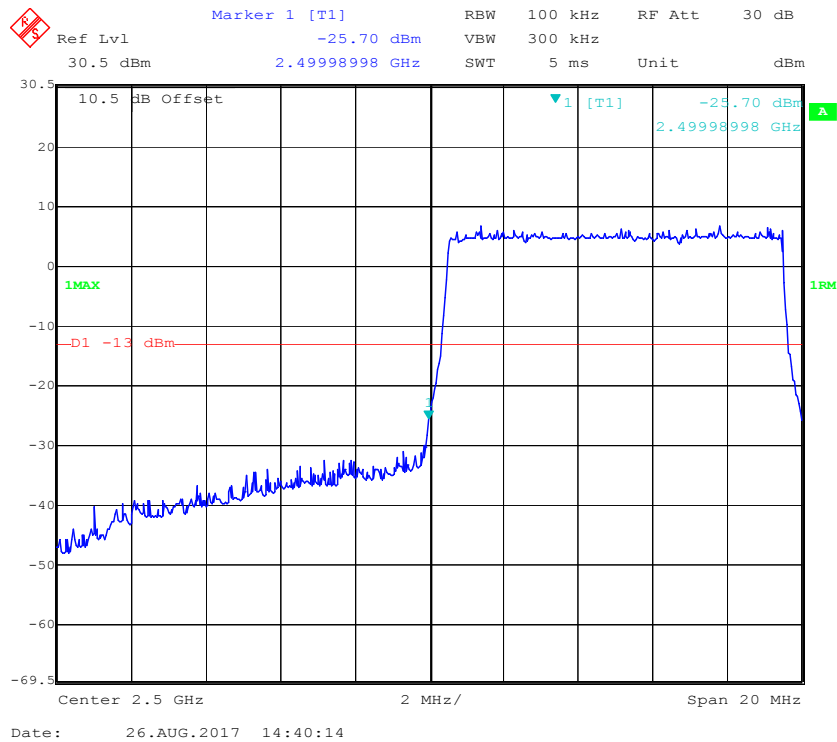
16-QAM (5.0 MHz, FULL RB) - Left Band Edge



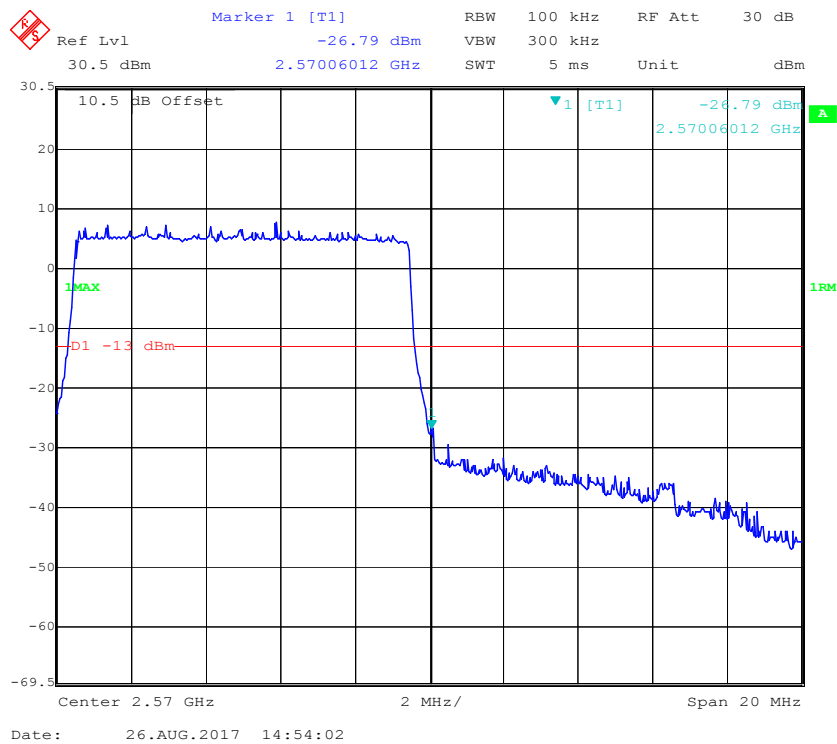
16-QAM (5.0 MHz, FULL RB) - Right Band Edge

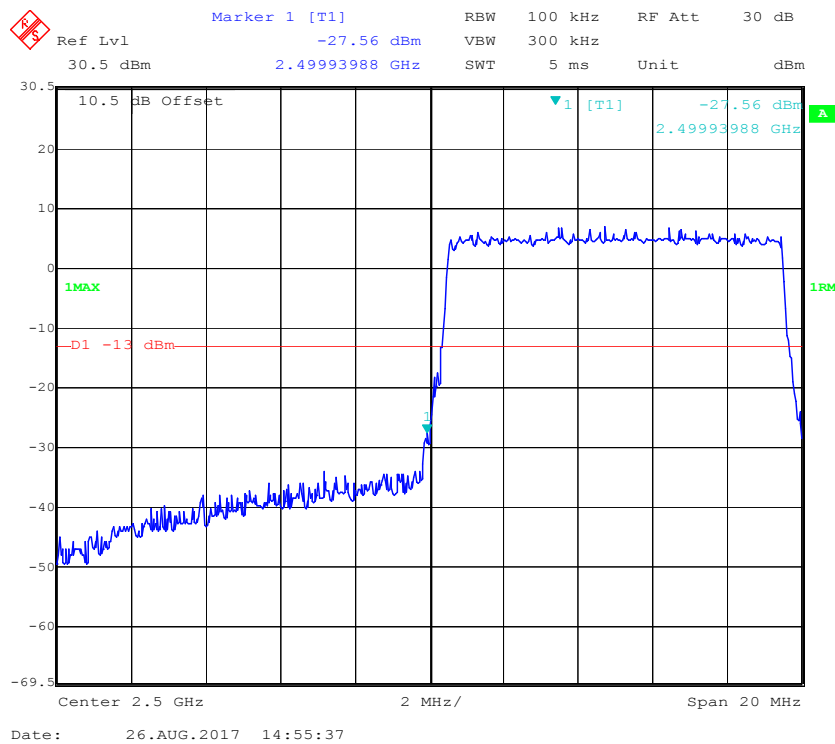
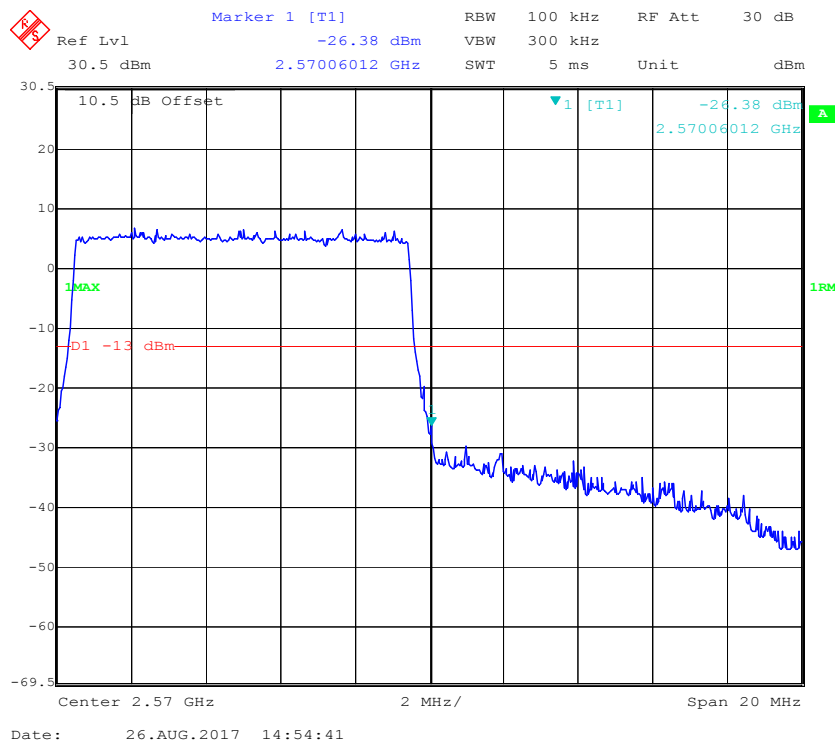


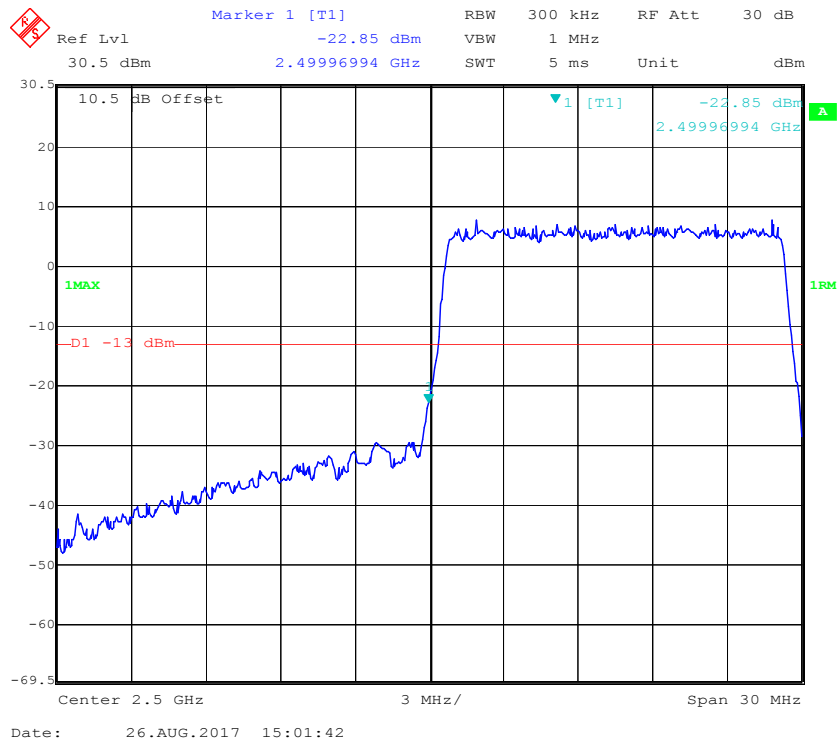
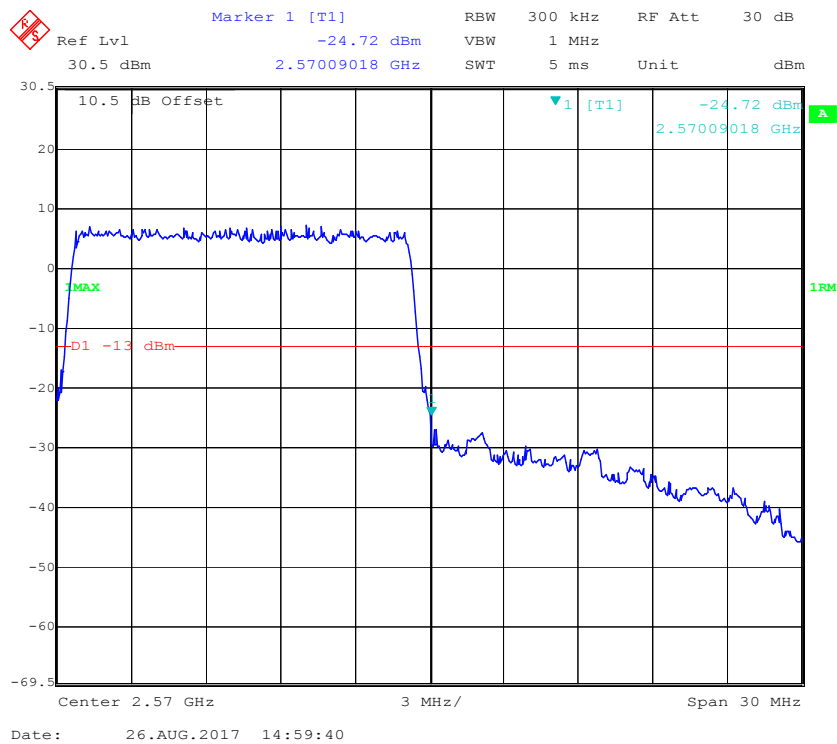
QPSK (10.0 MHz, FULL RB) - Left Band Edge



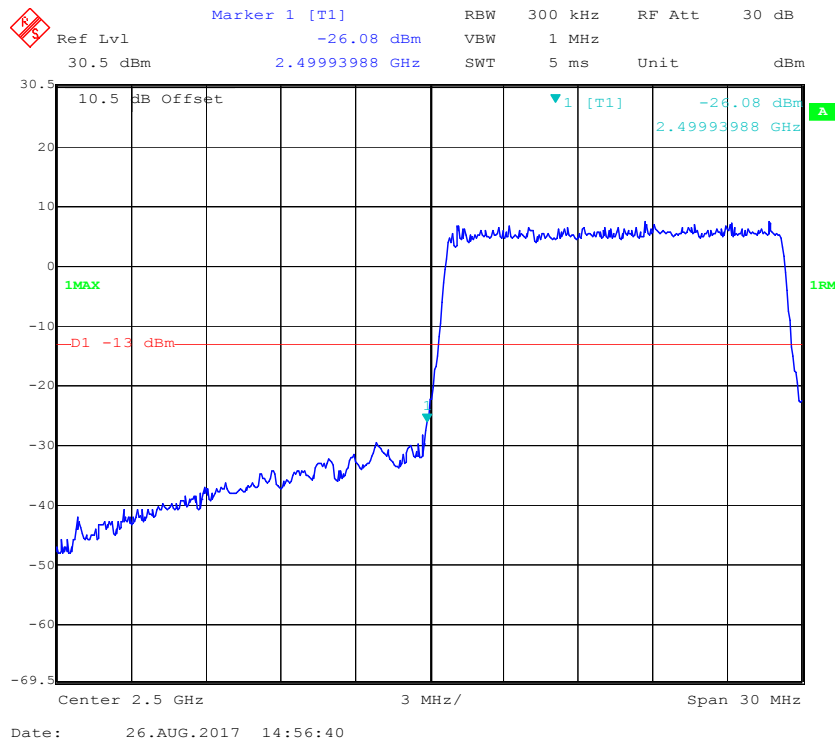
QPSK (10.0 MHz, FULL RB) - Right Band Edge



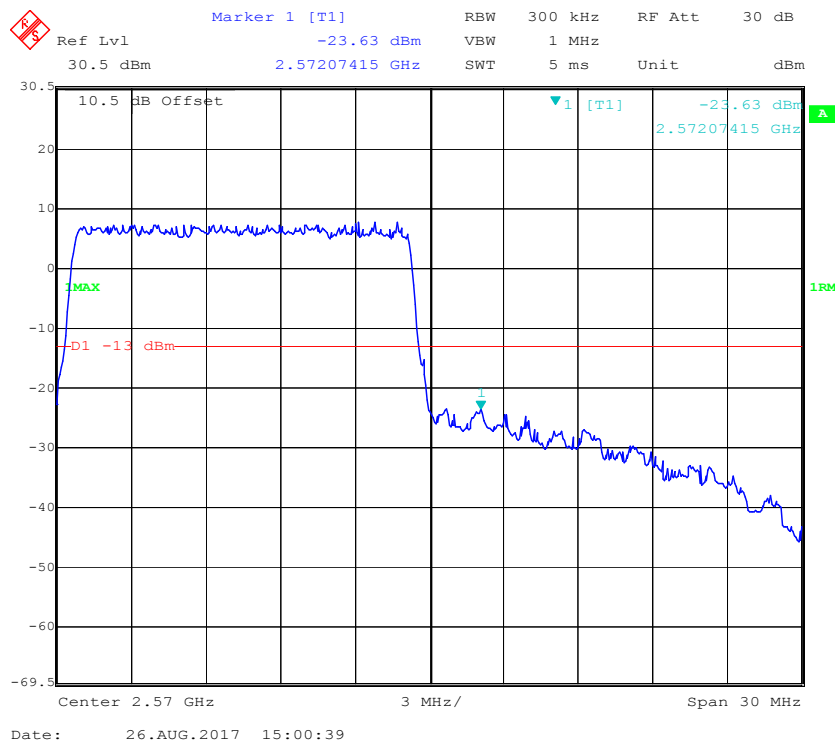
16-QAM (10.0 MHz, FULL RB) - Left Band Edge**16-QAM (10.0 MHz, FULL RB) - Right Band Edge**

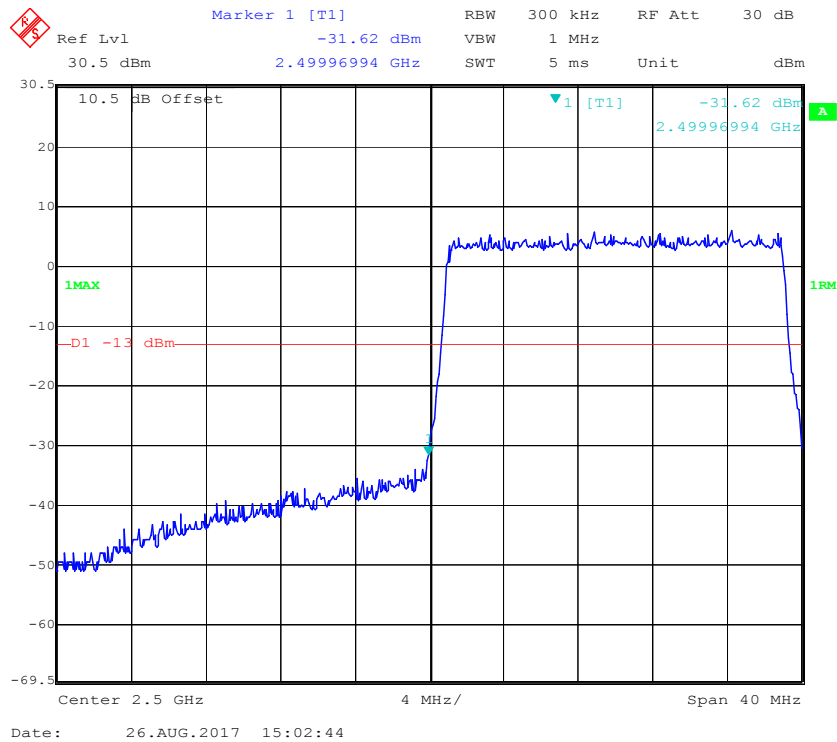
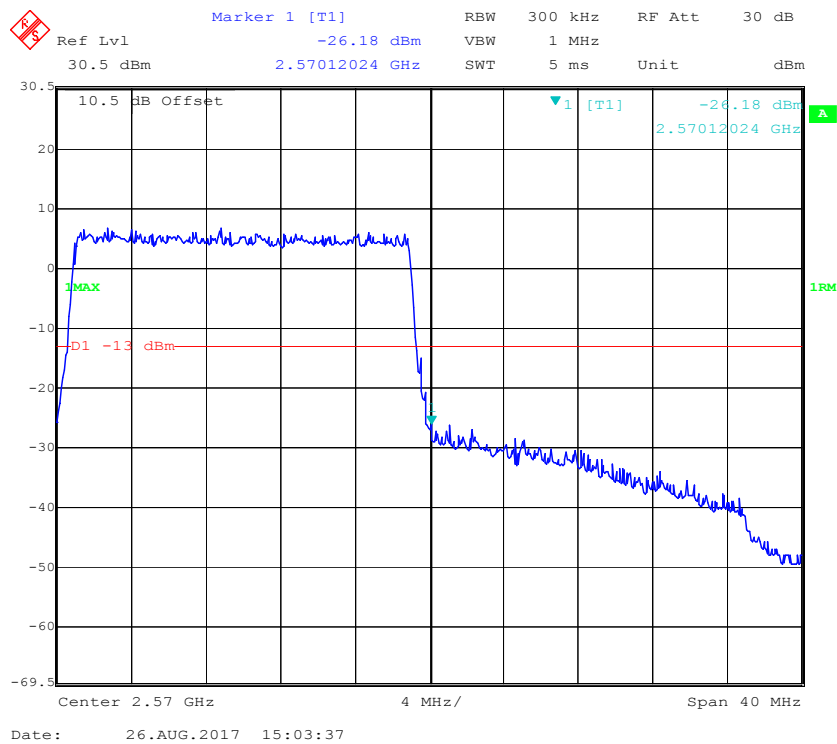
QPSK (15 MHz, FULL RB) - Left Band Edge**QPSK (15 MHz, FULL RB) - Right Band Edge**

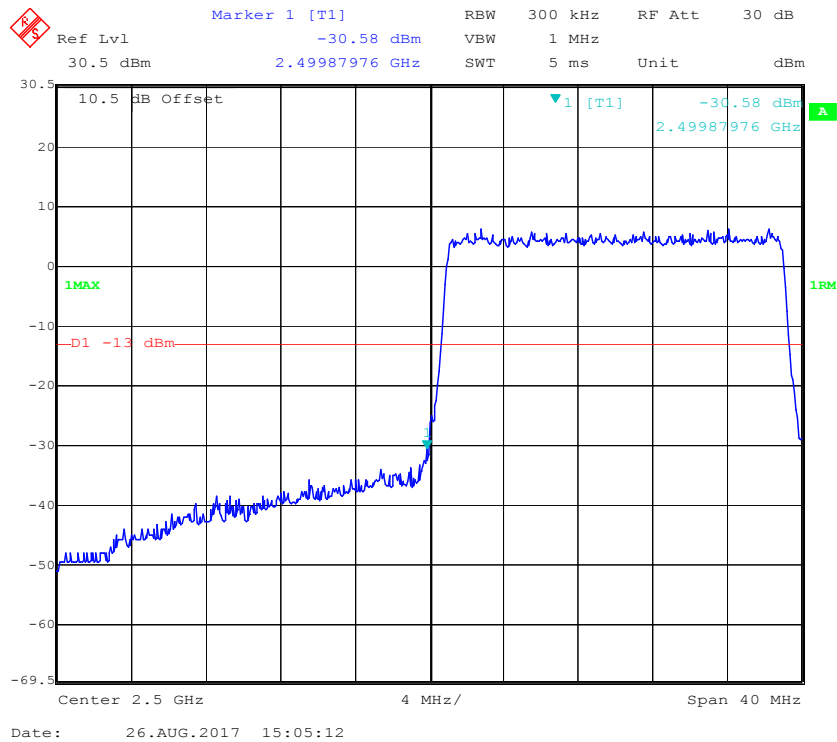
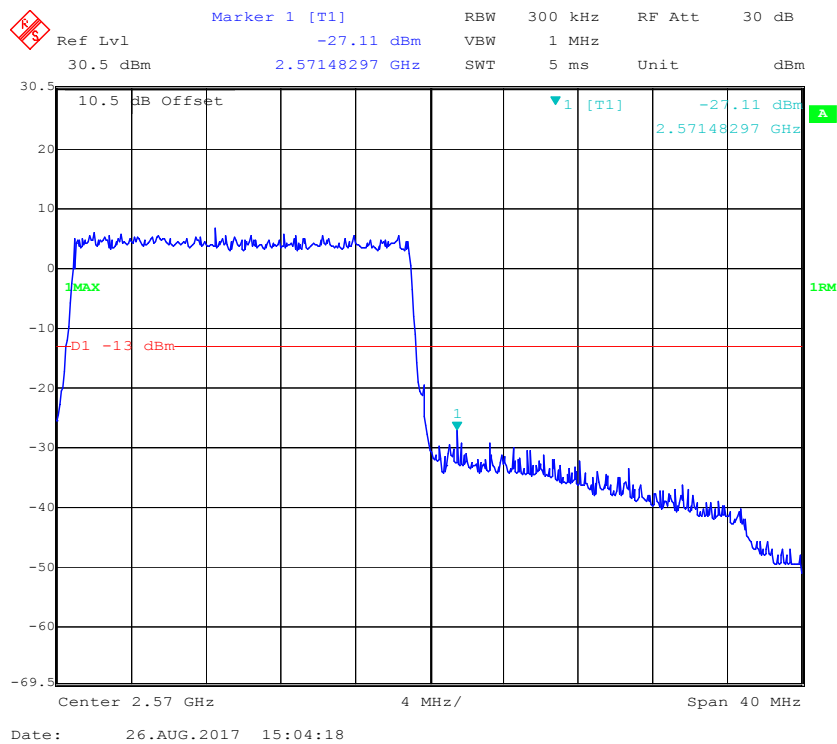
16-QAM (15 MHz, FULL RB) - Left Band Edge



16-QAM (15 MHz, FULL RB) - Right Band Edge



QPSK (20 MHz, FULL RB) - Left Band Edge**QPSK (20 MHz, FULL RB) - Right Band Edge**

16-QAM (20 MHz, FULL RB) - Left Band Edge**16-QAM (20 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

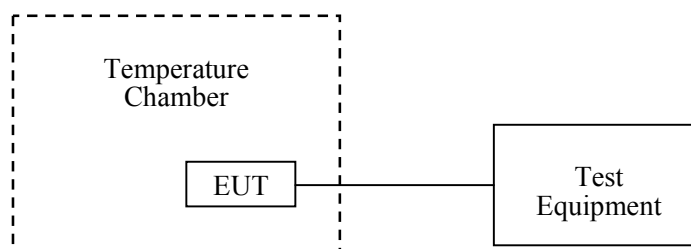
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

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 Data**Environmental Conditions**

Temperature:	26 °C
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Hill He on 2017-08-26.

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	3.7	9	0.010758	2.5
-20		9	0.010758	2.5
-10		6	0.007172	2.5
0		6	0.007172	2.5
10		6	0.007172	2.5
20		5	0.005977	2.5
30		6	0.007172	2.5
40		6	0.007172	2.5
50		8	0.009563	2.5
20	V min.= 3.5	10	0.011953	2.5
	V max.= 4.2	13	0.015539	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	3.7	9	0.010758	2.5
-20		9	0.010758	2.5
-10		9	0.010758	2.5
0		5	0.005977	2.5
10		5	0.005977	2.5
20		4	0.004781	2.5
30		5	0.005977	2.5
40		6	0.007172	2.5
50		8	0.009563	2.5
20	V min.= 3.5	13	0.015539	2.5
	V max.= 4.2	16	0.019125	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	3.7	4	0.004781	2.5
-20		4	0.004781	2.5
-10		2	0.002391	2.5
0		2	0.002391	2.5
10		2	0.002391	2.5
20		1	0.001195	2.5
30		2	0.002391	2.5
40		3	0.003586	2.5
50		4	0.004781	2.5
20	V min.= 3.5	5	0.005977	2.5
	V max.= 4.2	6	0.007172	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	3.7	11	0.005851	pass
-20		11	0.005851	pass
-10		11	0.0005851	pass
0		10	0.005319	pass
10		10	0.005319	pass
20		8	0.004255	pass
30		9	0.004787	pass
40		13	0.006915	pass
50		16	0.008511	pass
20	V min.= 3.5	18	0.009574	pass
	V max.= 4.2	21	0.011170	pass

EDGE Mode

Middle Channel, $f_0 = 1880.0$ MHz				
Temperature (°C)	Power Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.7	8	0.004255	pass
-20		8	0.004255	pass
-10		8	0.004255	pass
0		5	0.002660	pass
10		5	0.002660	pass
20		4	0.002128	pass
30		7	0.003723	pass
40		9	0.004787	pass
50		11	0.005851	pass
20	V min.= 3.5	13	0.006915	pass
	V max.= 4.2	15	0.007979	pass

WCDMA Mode

Middle Channel, $f_0 = 1880.0$ MHz				
Temperature (°C)	Power Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.7	5	0.002660	pass
-20		5	0.002660	pass
-10		2	0.001064	pass
0		2	0.001064	pass
10		2	0.002128	pass
20		1	0.000532	pass
30		3	0.001596	pass
40		5	0.002660	pass
50		6	0.003191	pass
20	V min.= 3.5	7	0.003723	pass
	V max.= 4.2	8	0.004255	pass

QPSK:**LTE Band 4:**

20.0 MHz Middle Channel, $f_0 = 1732.5$ MHz				
Temperature (°C)	Power Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.7	6	0.003463	pass
-20		6	0.003463	pass
-10		6	0.003463	pass
0		4	0.002309	pass
10		4	0.002309	pass
20		2	0.001154	pass
30		4	0.002309	pass
40		6	0.003463	pass
50		8	0.004618	pass
20	V min.= 3.5	12	0.006926	pass
	V max.= 4.2	12	0.006926	pass

LTE Band 5:

10.0 MHz Middle Channel, $f_0 = 836.5$ MHz				
Temperature (°C)	Power Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.7	-4	-0.004782	pass
-20		-4	-0.004782	pass
-10		-4	-0.004782	pass
0		-2	0.002391	pass
10		-2	-0.002391	pass
20		-1	-0.001195	pass
30		-2	-0.002391	pass
40		-3	-0.003586	pass
50		-4	-0.004782	pass
20	V min.= 3.5	-7	-0.008368	pass
	V max.= 4.2	-8	-0.009564	pass

LTE Band 7:

20.0 MHz Middle Channel, $f_o=2535$ MHz				
Temperature (°C)	Power Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.7	6	0.002367	pass
-20		6	0.002367	pass
-10		6	0.002367	pass
0		4	0.001578	pass
10		4	0.001578	pass
20		3	0.001183	pass
30		4	0.001578	pass
40		5	0.001972	pass
50		7	0.002761	pass
20	V min.= 3.5	9	0.003550	pass
	V max.= 4.2	11	0.004339	pass

16-QAM:**LTE Band 4:**

20.0 MHz Middle Channel, $f_0 = 1732.5$ MHz				
Temperature (°C)	Power Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.7	5	0.002886	pass
-20		5	0.002886	pass
-10		5	0.002886	pass
0		3	0.001732	pass
10		3	0.001732	pass
20		2	0.001154	pass
30		3	0.001732	pass
40		4	0.002309	pass
50		5	0.002886	pass
20	V min.= 3.5	9	0.005195	pass
	V max.= 4.2	10	0.005772	pass

LTE Band 5:

10.0 MHz Middle Channel, $f_0 = 836.5$ MHz				
Temperature (°C)	Power Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.7	5	0.019127	pass
-20		5	0.013150	pass
-10		5	0.010759	pass
0		3	0.008368	pass
10		3	0.004782	pass
20		2	0.002390	pass
30		3	0.003586	pass
40		4	0.004782	pass
50		5	0.005977	pass
20	V min.= 3.5	12	0.014345	pass
	V max.= 4.2	13	0.015541	pass

LTE Band 7:

20.0 MHz Middle Channel, $f_o=2535$ MHz				
Temperature (°C)	Power Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.7	6	0.002367	pass
-20		6	0.002367	pass
-10		6	0.002367	pass
0		4	0.001578	pass
10		4	0.001578	pass
20		3	0.001183	pass
30		4	0.001578	pass
40		5	0.001972	pass
50		6	0.002367	pass
20	V min.= 3.5	8	0.003156	pass
	V max.= 4.2	10	0.003945	pass

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