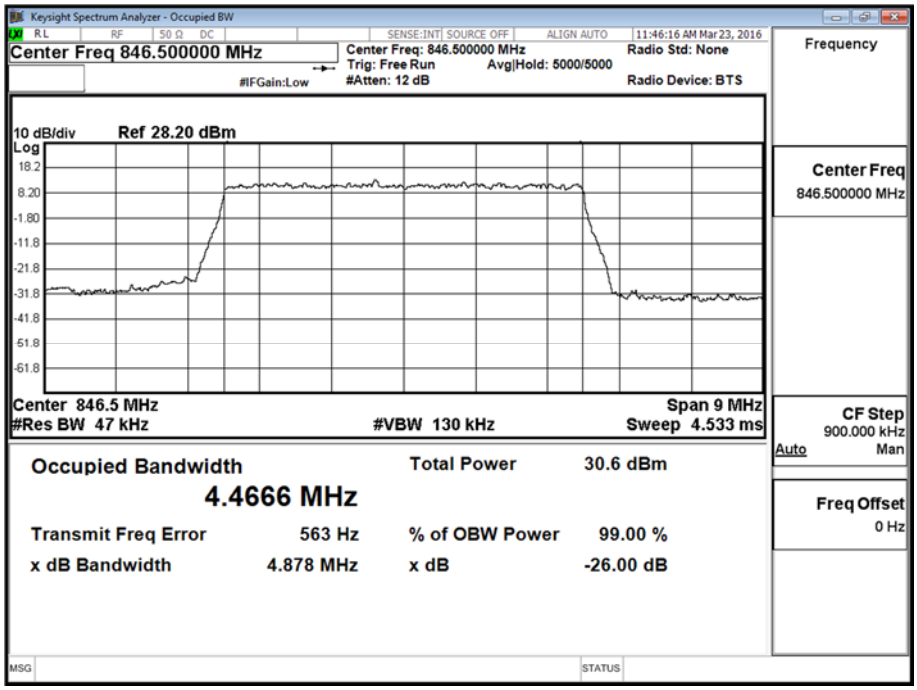
Product Service

846.5 MHz - All Resource Blocks

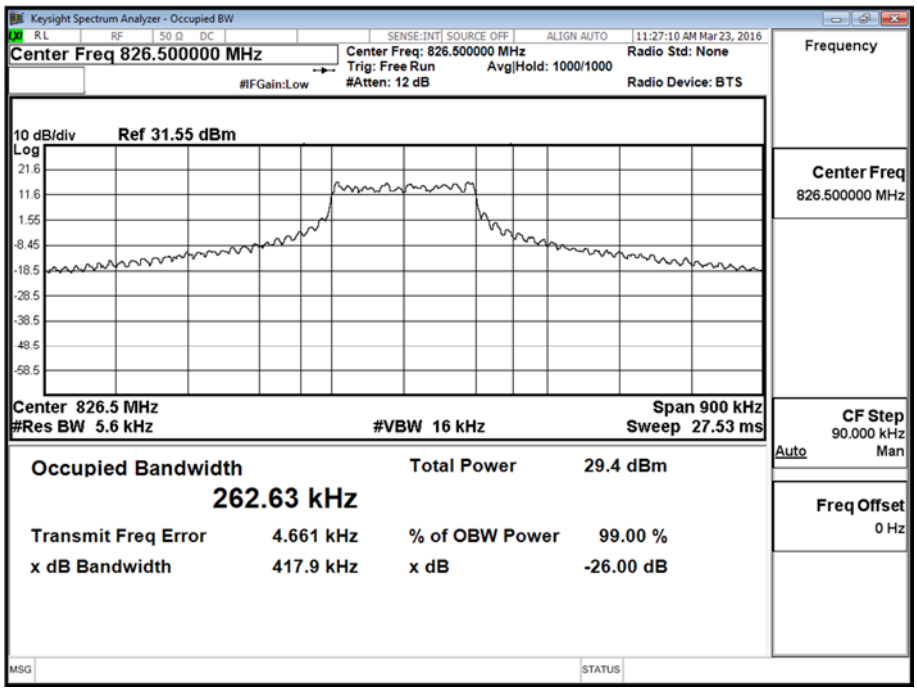


Product Service

5.0 MHz Bandwidth - 16QAM

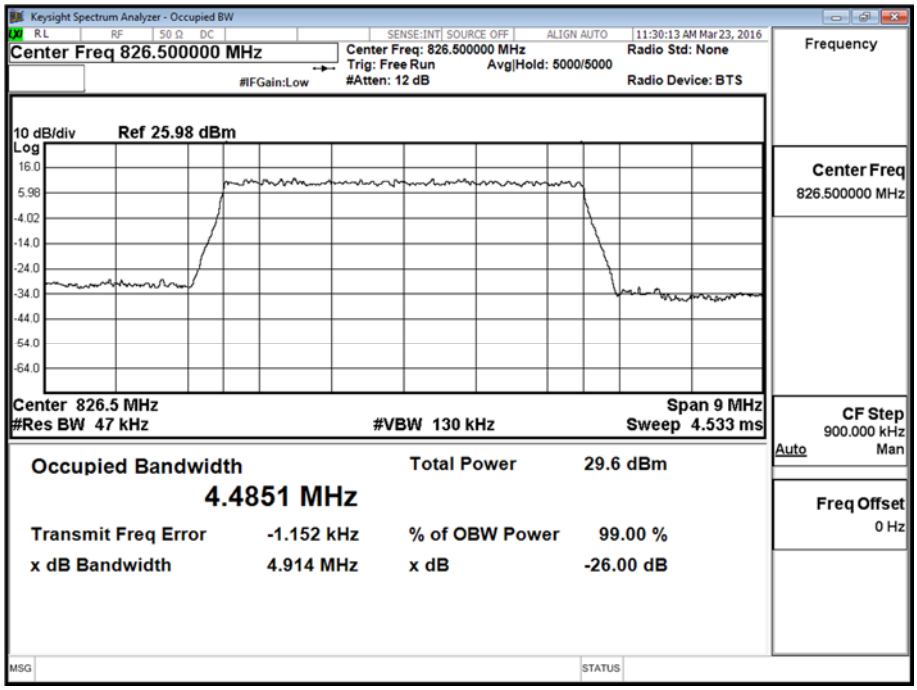
26 dB Bandwidth (kHz)											
826.5 MHz				836.5 MHz				846.5 MHz			
1 Resource Block			All Resource Blocks	1 Resource Block			All Resource Blocks	1 Resource Block			All Resource Blocks
Low	Mid	High		Low	Mid	High		Low	Mid	High	
N/T	417.9	N/T	4914.5	N/T	443.5	N/T	4886.0	N/T	409.3	N/T	4824.5

826.5 MHz - 1 Resource Block - Middle

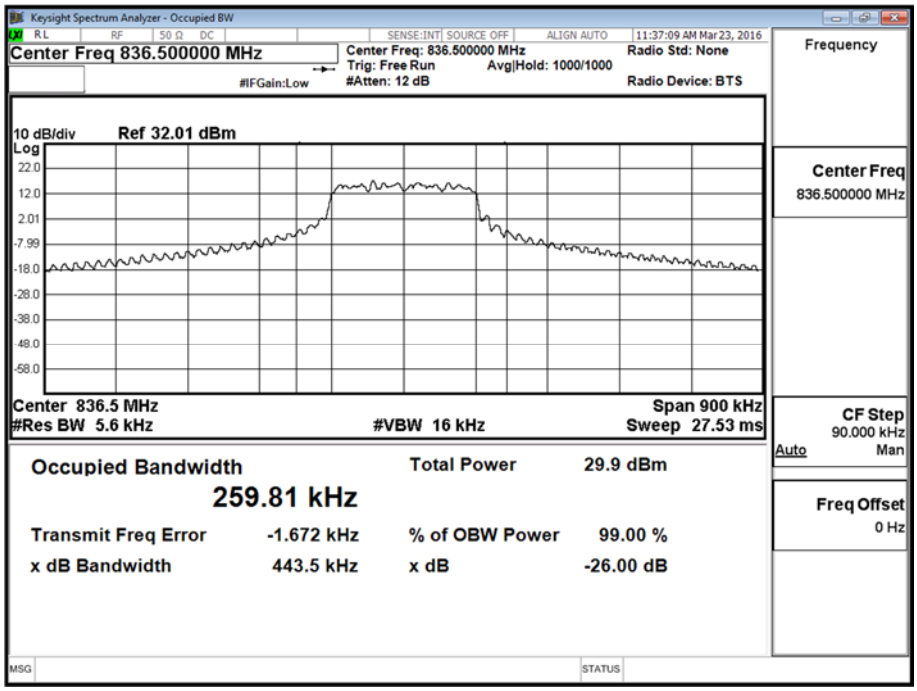


Product Service

826.5 MHz - All Resource Blocks

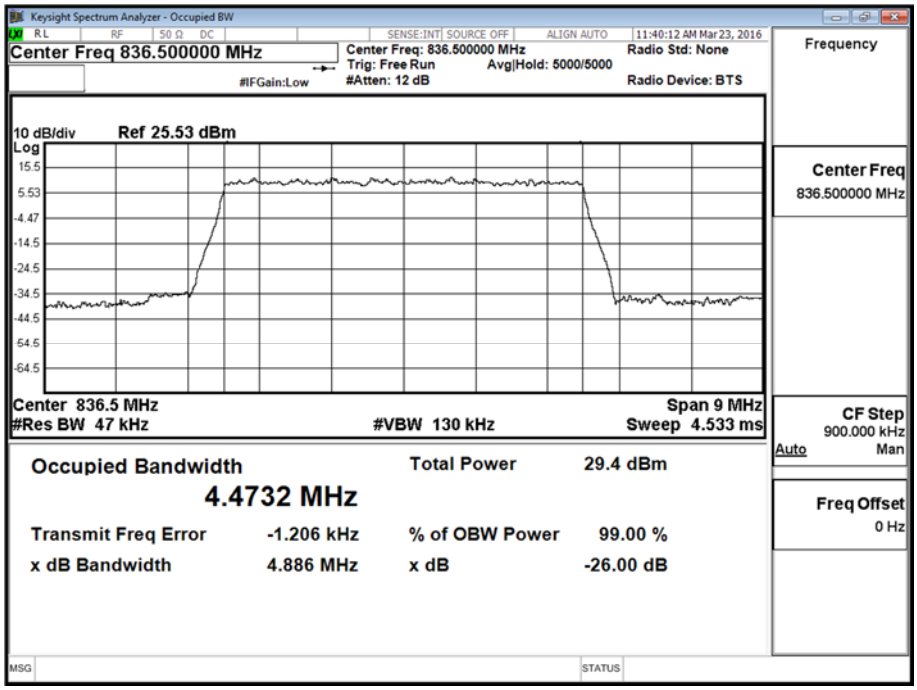


836.5 MHz - 1 Resource Block - Middle

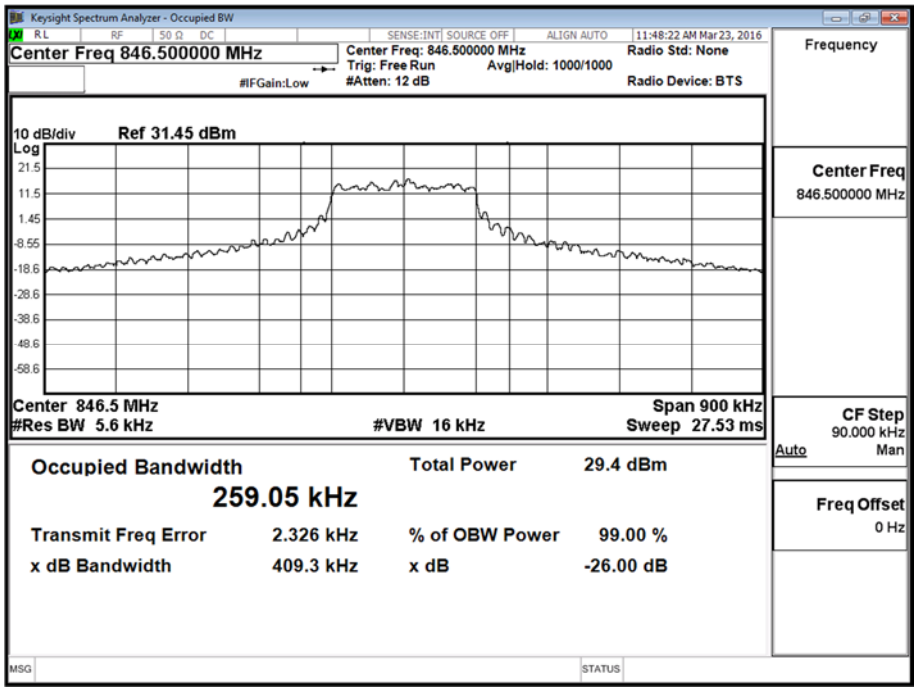


Product Service

836.5 MHz - All Resource Blocks

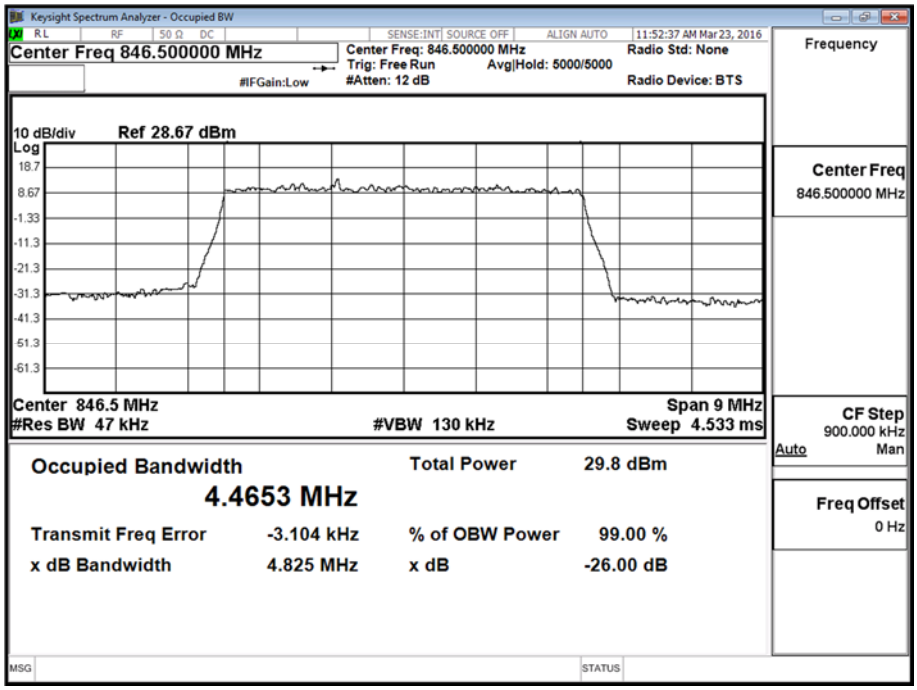


846.5 MHz - 1 Resource Block - Middle



Product Service

846.5 MHz - All Resource Blocks

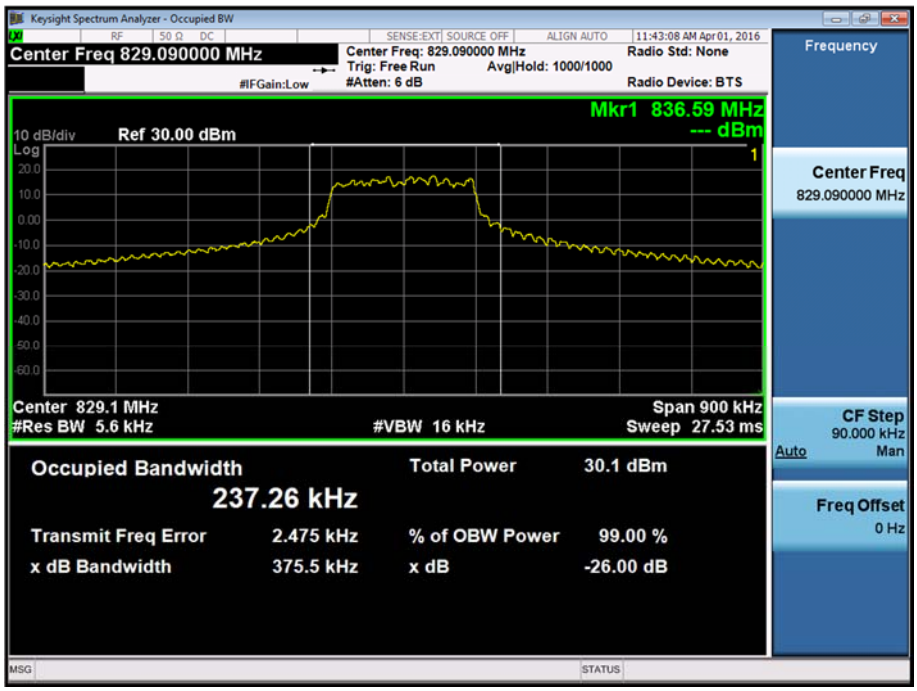


Product Service

10.0 MHz Bandwidth - QPSK

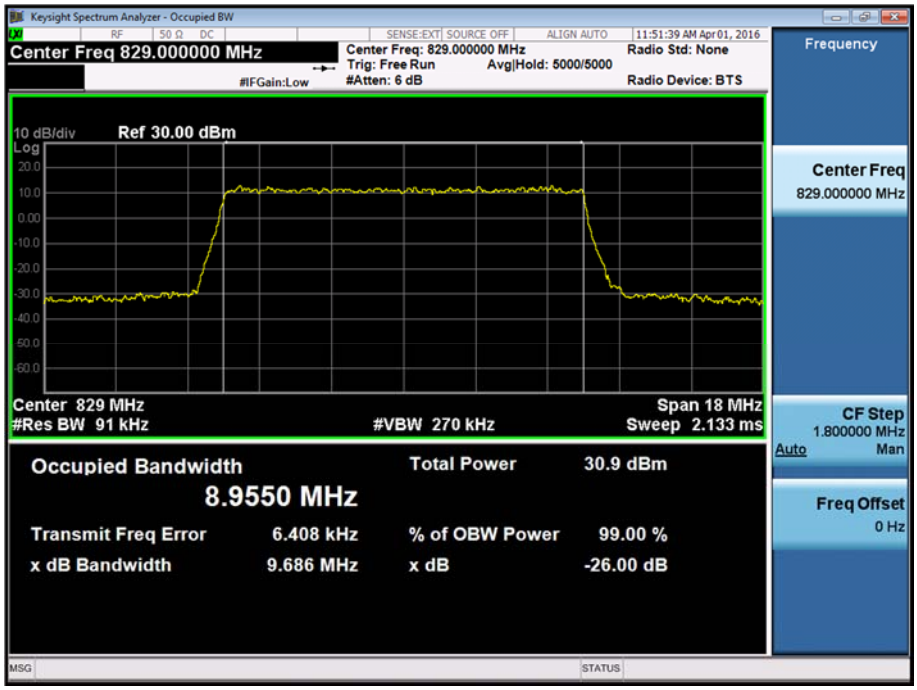
26 dB Bandwidth (kHz)											
829.0 MHz				836.5 MHz				844.0 MHz			
1 Resource Block			All Resource Blocks	1 Resource Block			All Resource Blocks	1 Resource Block			All Resource Blocks
Low	Mid	High		Low	Mid	High		Low	Mid	High	
N/T	375.5	N/T	9686.0	N/T	358.2	N/T	9677.0	N/T	387.0	N/T	9679.0

829.0 MHz - 1 Resource Block - Middle

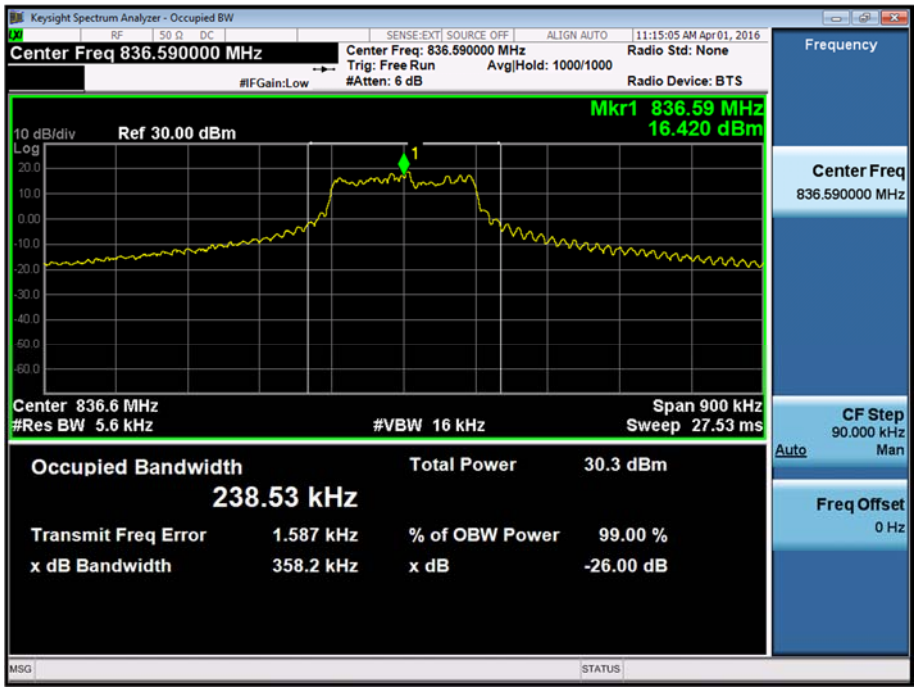


Product Service

829.0 MHz - All Resource Blocks

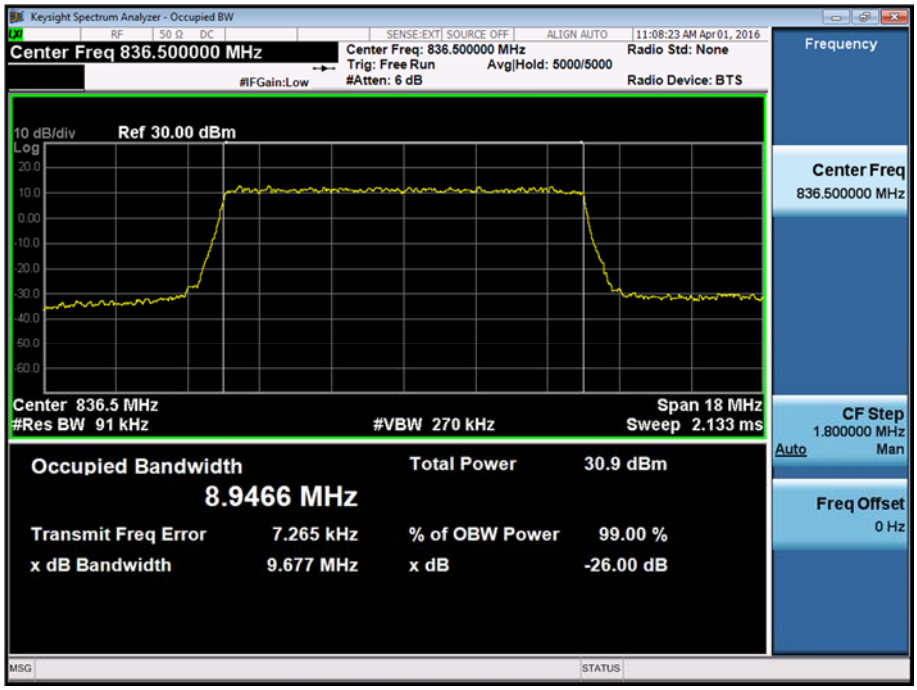


836.5 MHz - 1 Resource Block - Middle

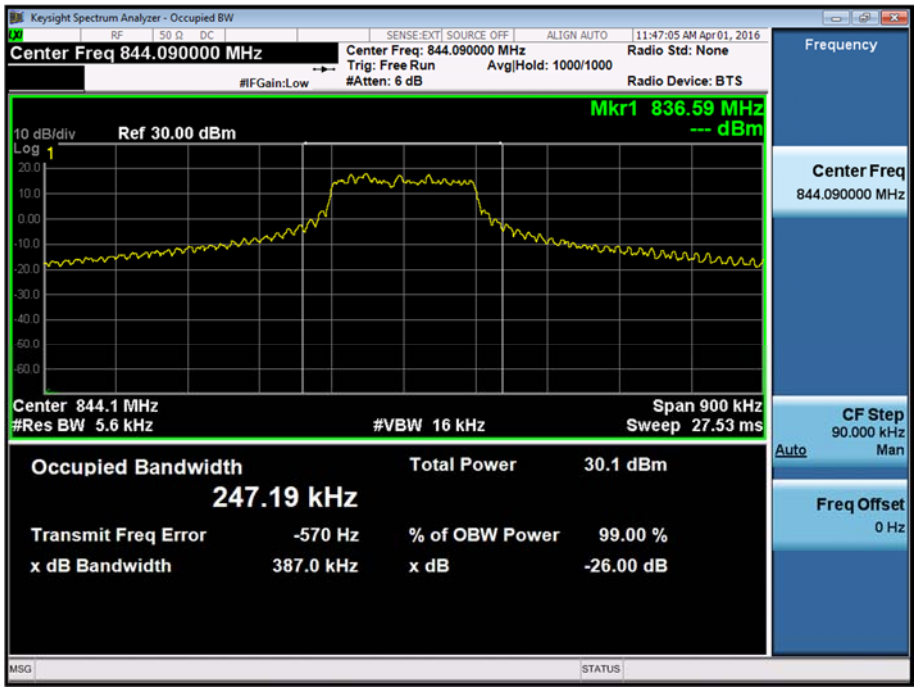


Product Service

836.5 MHz - All Resource Blocks



844.0 MHz - 1 Resource Block - Middle



Product Service

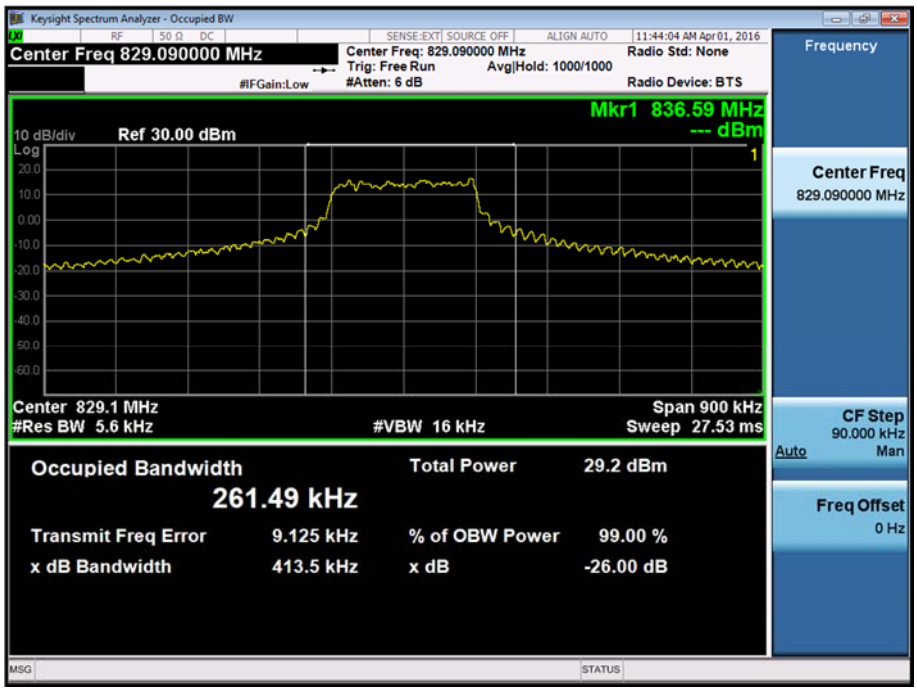
844.0 MHz - All Resource Blocks

Product Service

10.0 MHz Bandwidth - 16QAM

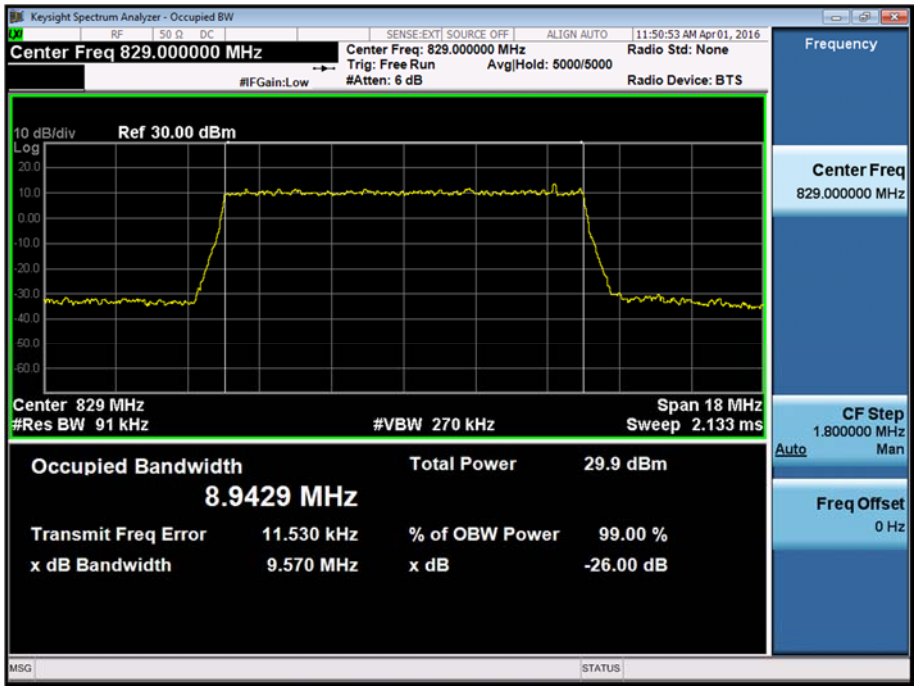
26 dB Bandwidth (kHz)											
829.0 MHz				836.5 MHz				844.0 MHz			
1 Resource Block			All Resource Blocks	1 Resource Block			All Resource Blocks	1 Resource Block			All Resource Blocks
Low	Mid	High		Low	Mid	High		Low	Mid	High	
N/T	413.5	N/T	9570.0	N/T	374.3	N/T	9582.0	N/T	386.8	N/T	9642.0

829.0 MHz - 1 Resource Block - Middle

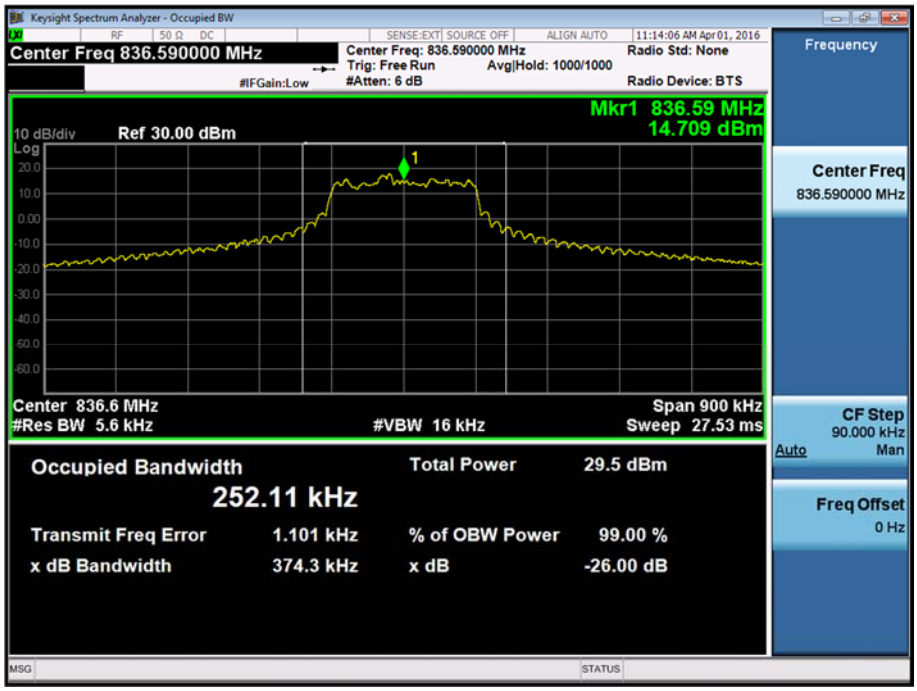


Product Service

829.0 MHz - All Resource Blocks

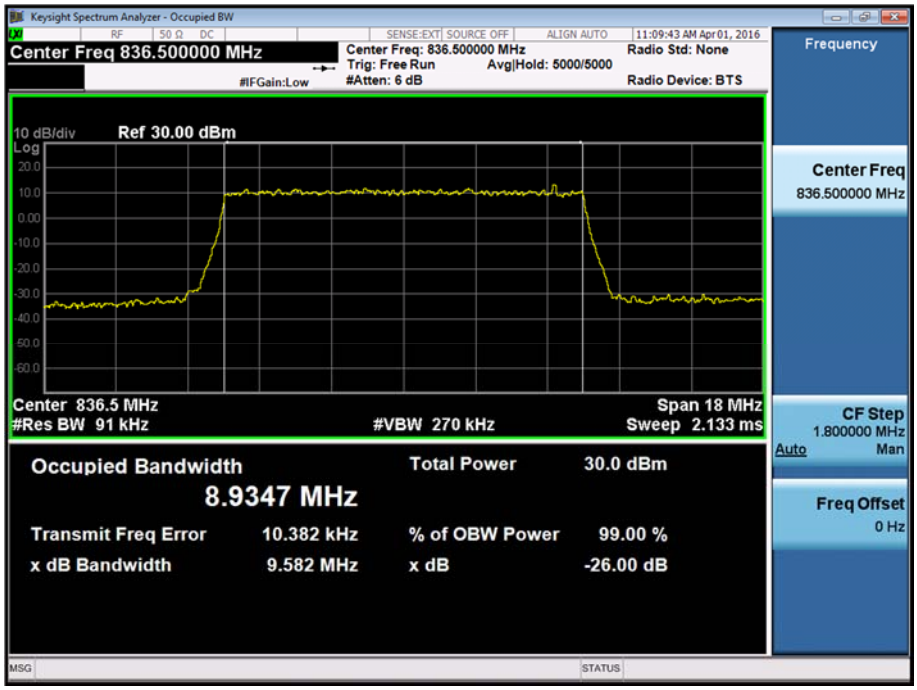


836.5 MHz - 1 Resource Block - Middle

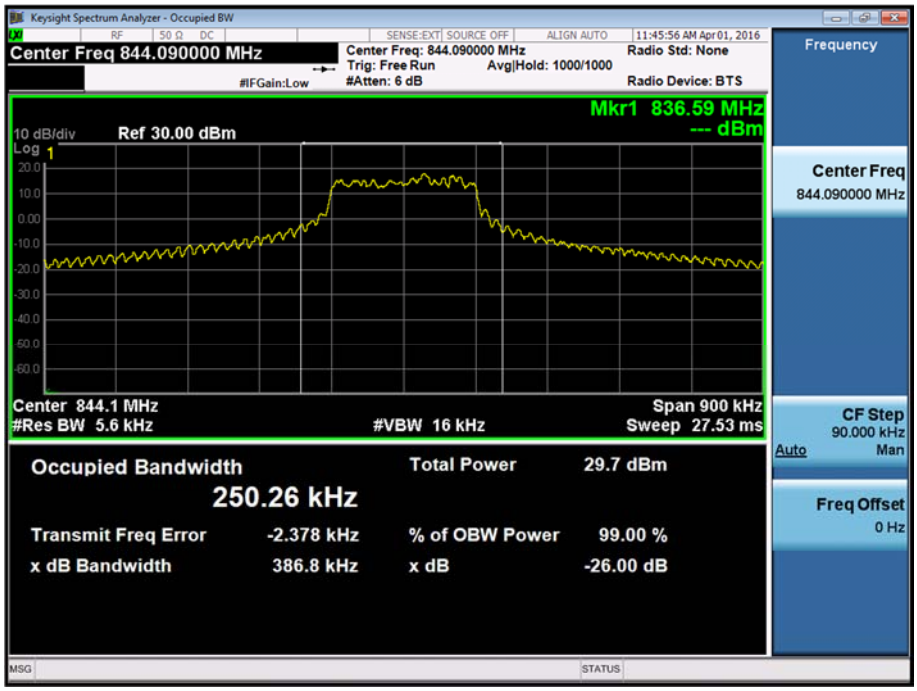


Product Service

836.5 MHz - All Resource Blocks

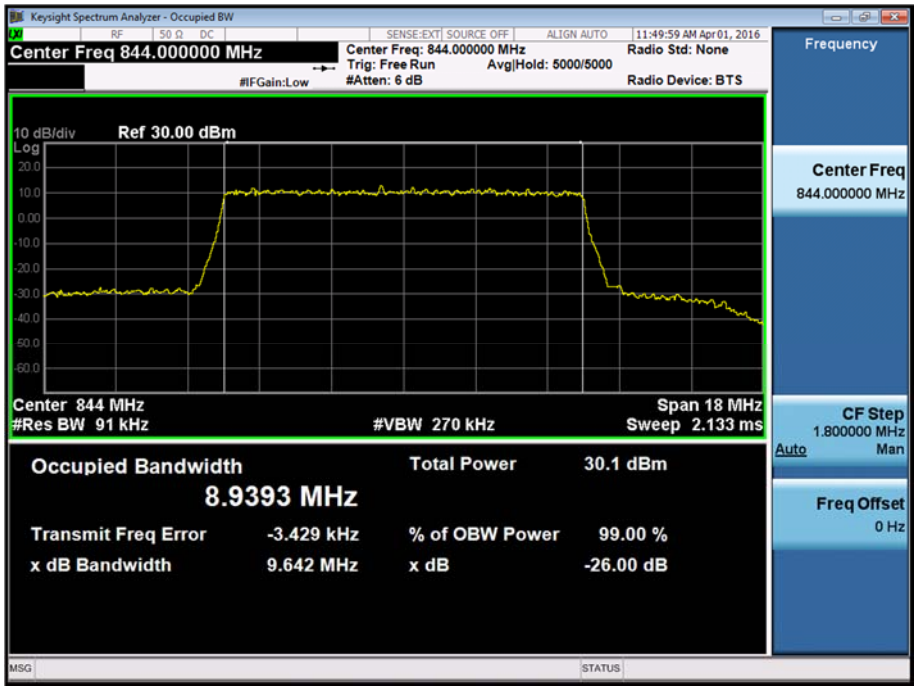


844.0 MHz - 1 Resource Block - Middle



Product Service

844.0 MHz - All Resource Blocks



FCC 47 CFR Part 22, Limit Clause

None specified.

Product Service

2.8 MODULATION CHARACTERISTICS

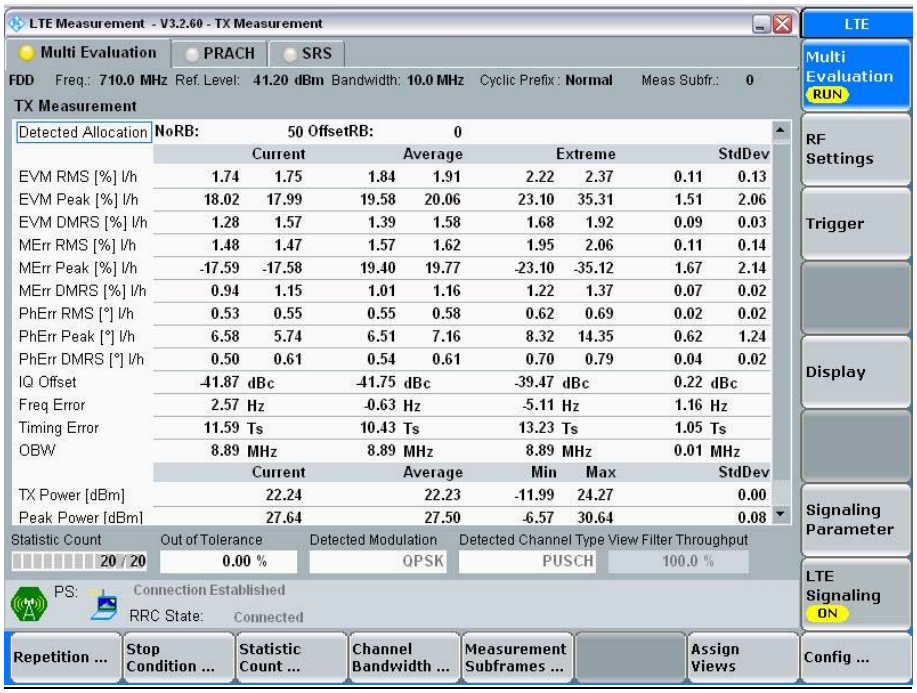
2.8.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1047 (d)

2.8.2 Test Results

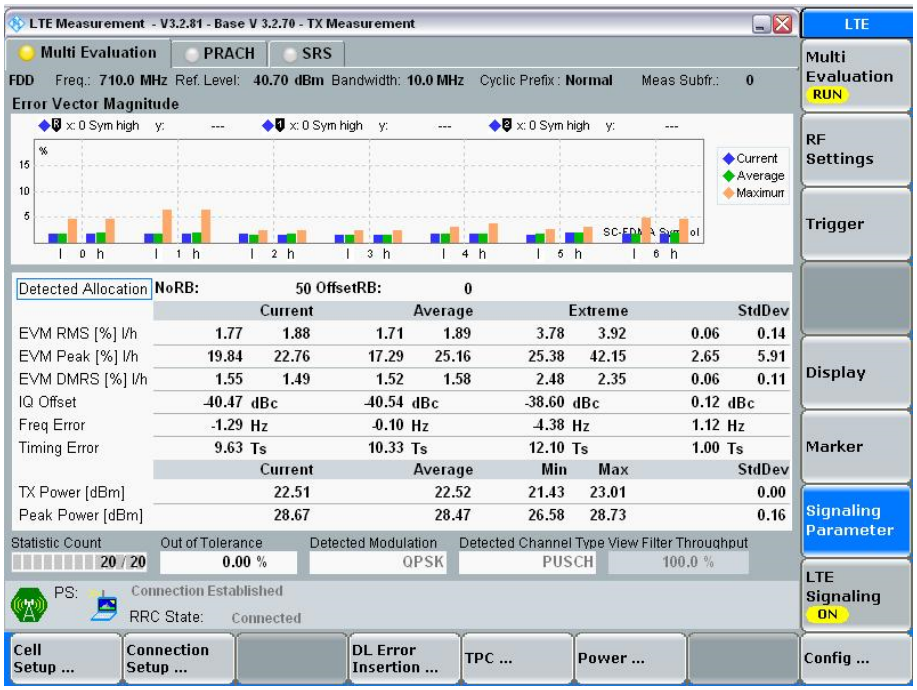
LTE FDD 5, Modulation Characteristics, Customer Description

LTE FDD 5, 10.0 MHz Bandwidth – QPSK, Transmitter Summary, Modulation Characteristics, Plot

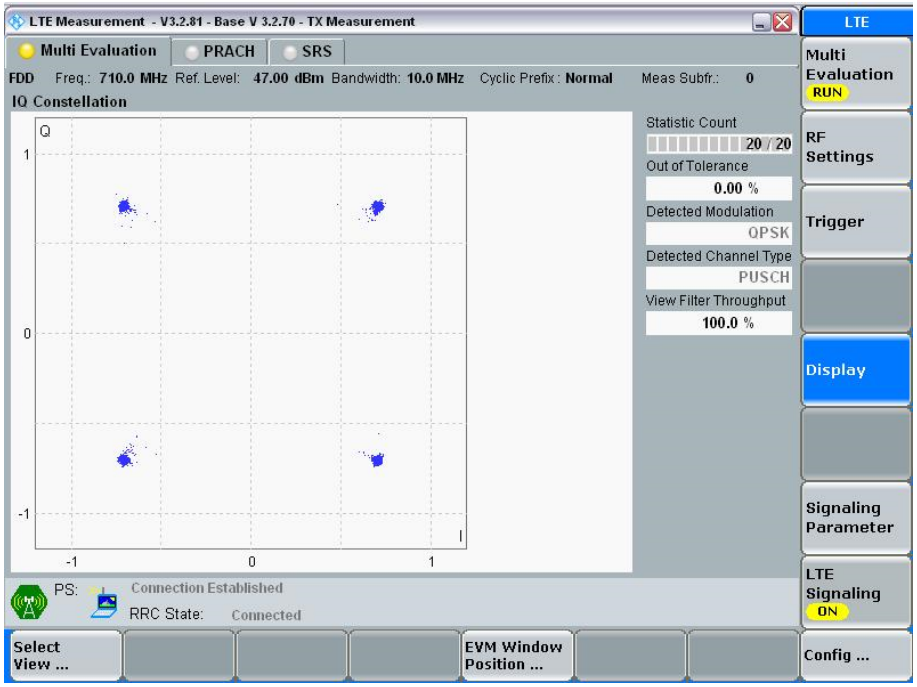


Product Service

LTE FDD 5, 10.0 MHz Bandwidth – QPSK, EVM, Modulation Characteristics Plot

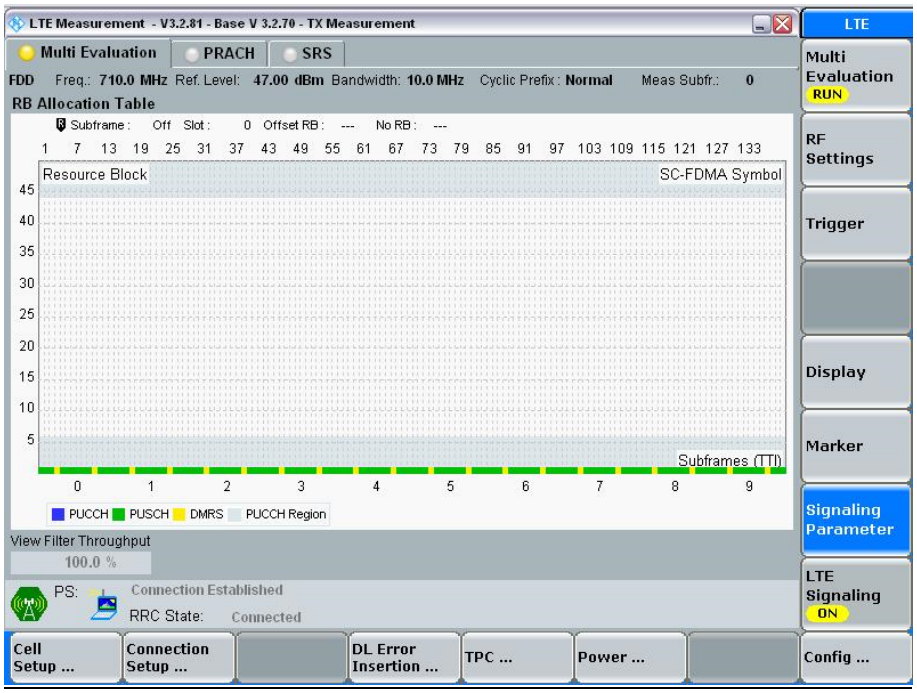


LTE FDD 5, 10.0 MHz Bandwidth – QPSK, IQ Constellation, Modulation Characteristics Plot

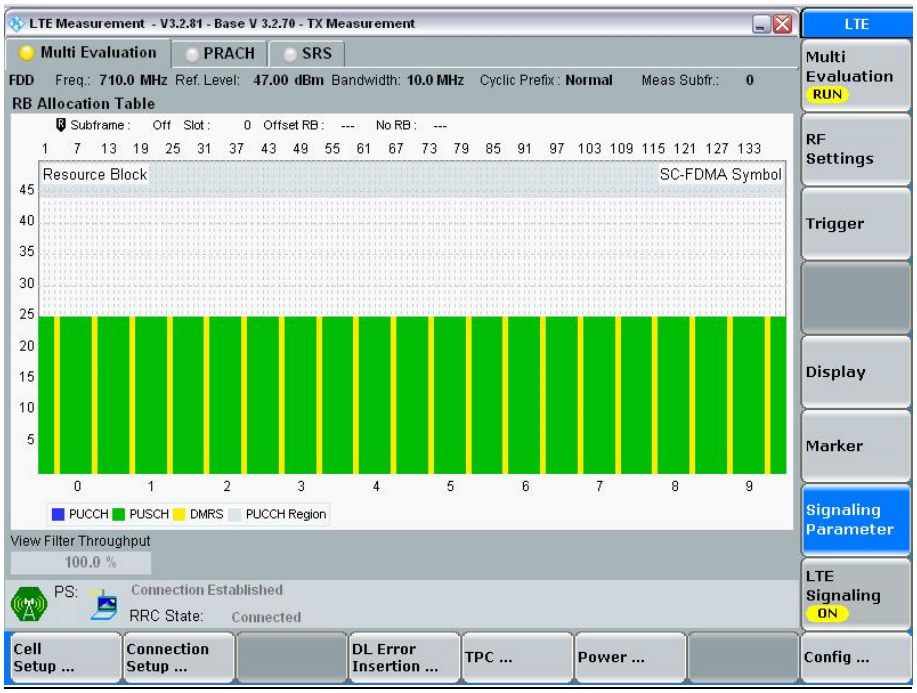


Product Service

LTE FDD 5, 10.0 MHz Bandwidth – QPSK, 1 Resource Block Allocation, Modulation Characteristics Plot

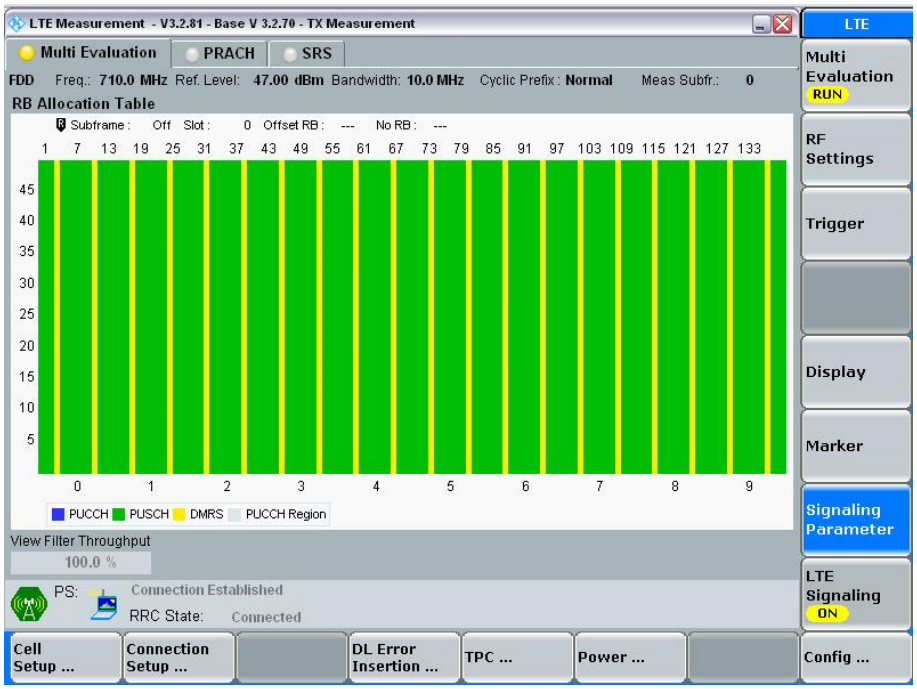


LTE FDD 5, 10.0 MHz Bandwidth – QPSK, 25 Resource Block Allocation, Modulation Characteristics Plot

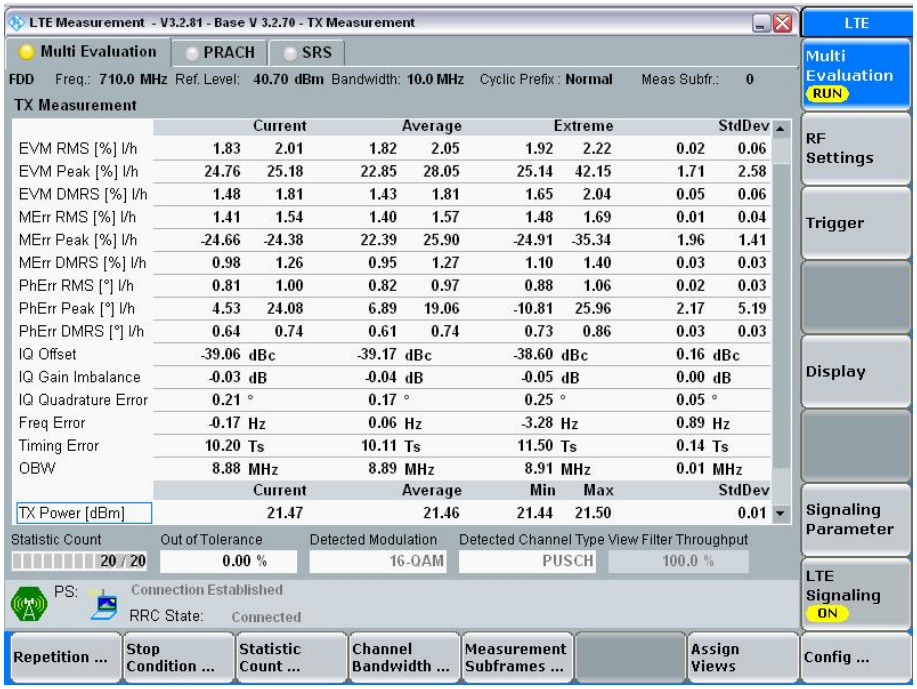


Product Service

LTE FDD 5, 10.0 MHz Bandwidth – QPSK, 50 Resource Block Allocation, Modulation Characteristics Plot

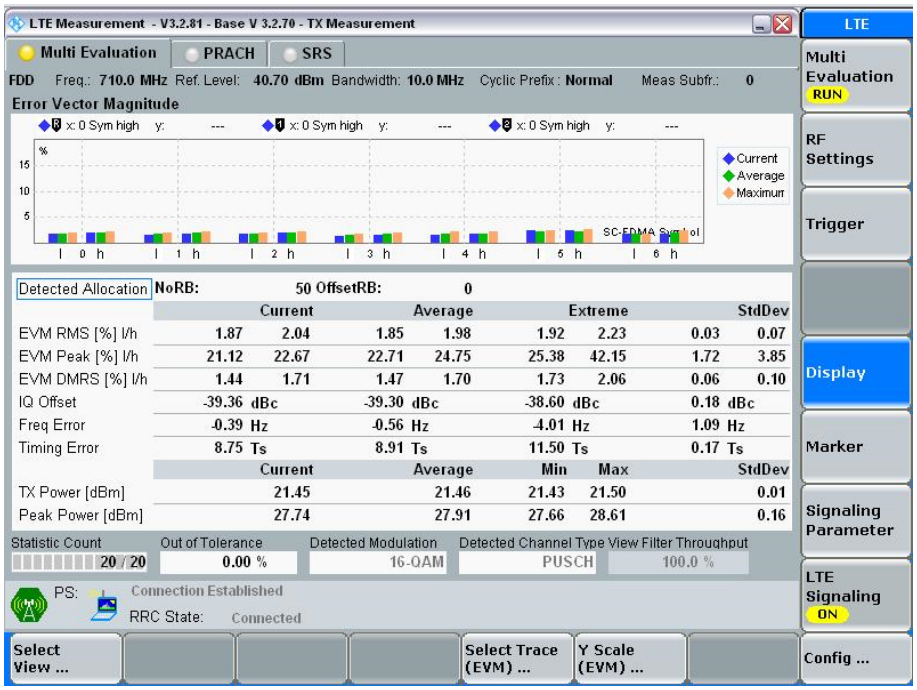


LTE FDD 5, 10.0 MHz Bandwidth - 16-QAM, Transmitter Summary, Modulation Characteristics Plot

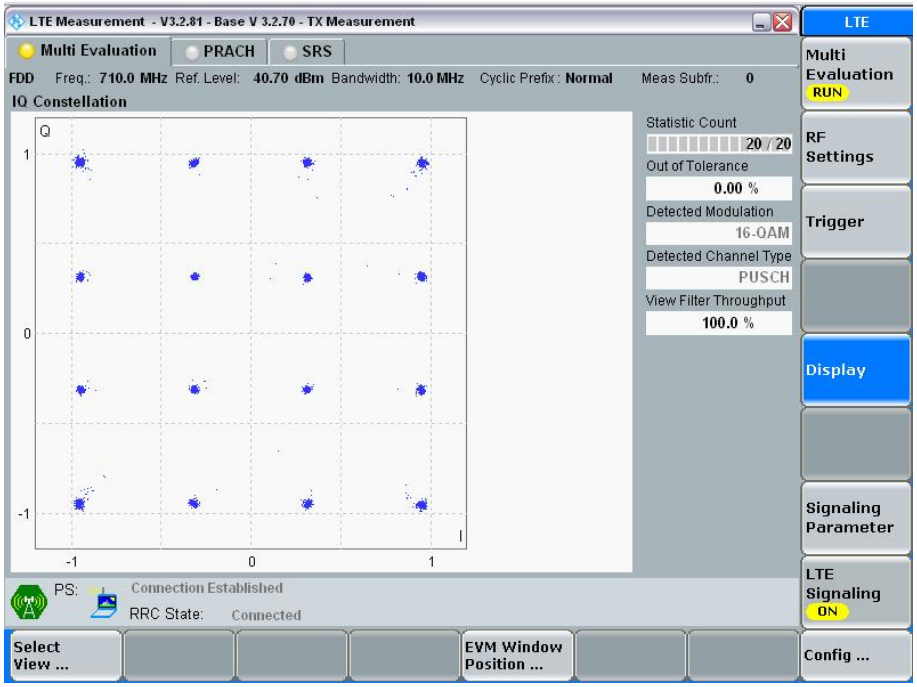


Product Service

LTE FDD 5, 10.0 MHz Bandwidth - 16-QAM, EVM, Modulation Characteristics Plot

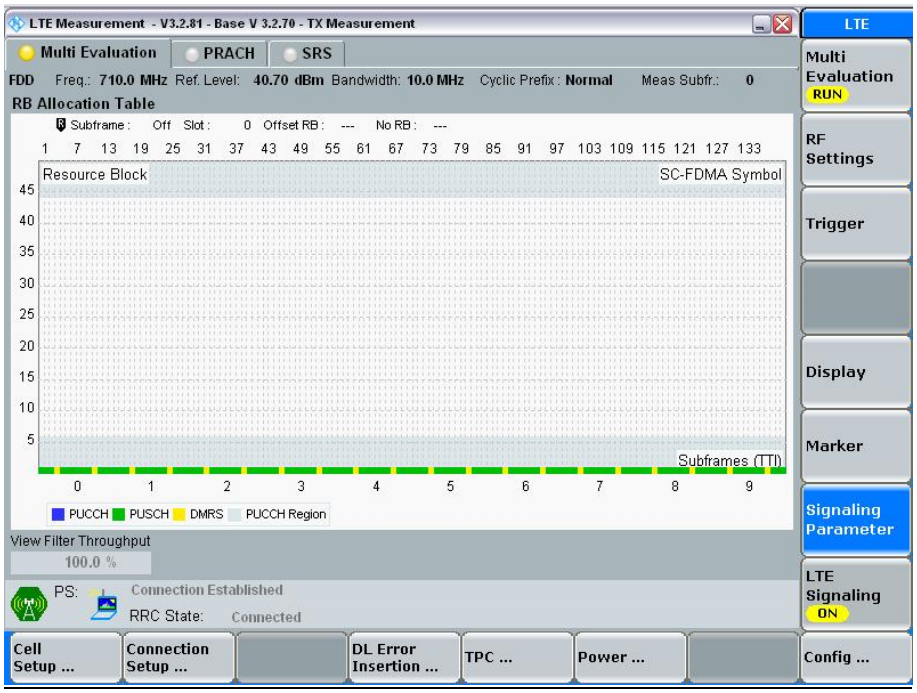


LTE FDD 5, 10.0 MHz Bandwidth - 16-QAM, IQ Constellation, Modulation Characteristics Plot

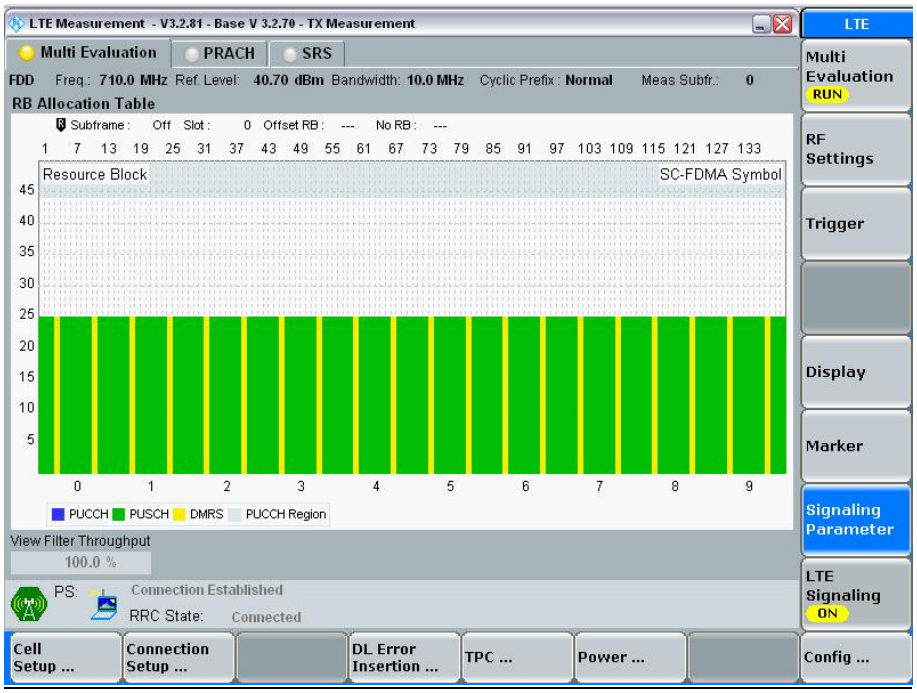


Product Service

LTE FDD 5, 10.0 MHz Bandwidth - 16-QAM, 1 Resource Block Allocation, Modulation Characteristics Plot

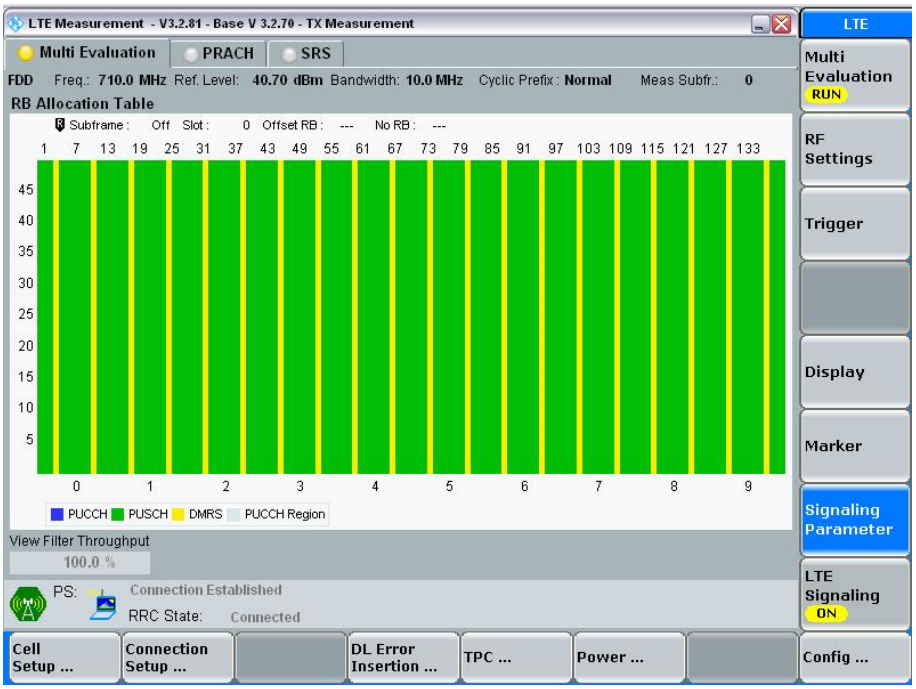


LTE FDD 5, 10.0 MHz Bandwidth - 16-QAM, 25 Resource Block Allocation, Modulation Characteristics Plot



Product Service

LTE FDD 5, 10.0 MHz Bandwidth - 16-QAM, 50 Resource Block Allocation, Modulation Characteristics Plot



FCC 47 CFR Part 2, Limit Clause 2.1047 (d)

A curve or equivalent data which shows that the equipment will meet the modulation requirements of the rules under which the equipment is to be licensed.

Product Service

SECTION 3

TEST EQUIPMENT USED

Product Service

3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.1- Frequency Tolerance					
Climatic Chamber	Votsch	VT4002	161	-	O/P Mon
Attenuator 10dB/25W	Weinschel	46-10-43	400	12	18-Jun-2016
Power Supply Unit	Hewlett Packard	6253A	441	-	O/P Mon
Multimeter	Fluke	75 Mk3	455	12	10-Sep-2016
Hygrometer	Rotronic	I-1000	2882	12	4-Nov-2016
Thermocouple Thermometer	Fluke	51	3174	12	9-Dec-2016
Wideband Radio Communication Tester	Rohde & Schwarz	CMW 500	4144	12	16-Nov-2016
1 metre SMA Cable	Florida Labs	SMS-235SP-39.4-SMS	4513	12	16-Feb-2017
Section 2.2 - Spurious Emissions at Band Edge					
Multimeter	Fluke	75 Mk3	455	12	10-Sep-2016
Attenuator (20dB/ 2W)	Pasternack	PE7004-20	489	12	30-Oct-2016
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	3-Sep-2016
Power Supply	Iso-tech	IPS 2010	2439	-	O/P Mon
Filter	Daden Anthony Ass	MH-1500-7SS	2778	12	5-Feb-2017
Hygrometer	Rotronic	I-1000	3220	12	19-Aug-2016
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	2-Sep-2016
Combiner/Splitter	Weinschel	1506A	3878	12	2-Jun-2016
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	7-Sep-2016
Frequency Standard	Spectracom	Secure Sync 1200-0408-0601	4393	6	3-Sep-2016
1 metre N-Type Cable	Florida Labs	NMS-235SP-39.4-NMS	4511	12	2-Mar-2017
1 metre SMA Cable	Florida Labs	SMS-235SP-39.4-SMS	4512	12	29-Jan-2017
Wideband Radio Test Set	Rohde & Schwarz	CMW500	4546	12	3-Feb-2017
PXA Signal Analyser	Keysight Technologies	N9030A	4654	12	8-Oct-2016
Section 2.3 - Maximum Conducted Output Power					
Multimeter	Fluke	75 Mk3	455	12	10-Sep-2016
Attenuator (20dB/ 2W)	Pasternack	PE7004-20	489	12	30-Oct-2016
Power Supply	Iso-tech	IPS 2010	2439	-	O/P Mon
Hygrometer	Rotronic	I-1000	3220	12	19-Aug-2016
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	2-Sep-2016
Combiner/Splitter	Weinschel	1506A	3878	12	2-Jun-2016
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	7-Sep-2016
1 metre N-Type Cable	Florida Labs	NMS-235SP-39.4-NMS	4511	12	2-Mar-2017
1 metre SMA Cable	Florida Labs	SMS-235SP-39.4-SMS	4512	12	29-Jan-2017
Wideband Radio Test Set	Rohde & Schwarz	CMW500	4546	12	3-Feb-2017
PXA Signal Analyser	Keysight Technologies	N9030A	4654	12	8-Oct-2016

Product Service

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.4 – Peak to Average Ratio					
Multimeter	Fluke	75 Mk3	455	12	10-Sep-2016
Attenuator (20dB/ 2W)	Pasternack	PE7004-20	489	12	30-Oct-2016
Power Supply	Iso-tech	IPS 2010	2439	-	O/P Mon
Hygrometer	Rotronic	I-1000	3220	12	19-Aug-2016
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	2-Sep-2016
Combiner/Splitter	Weinschel	1506A	3878	12	2-Jun-2016
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	7-Sep-2016
1 metre N-Type Cable	Florida Labs	NMS-235SP-39.4-NMS	4511	12	2-Mar-2017
1 metre SMA Cable	Florida Labs	SMS-235SP-39.4-SMS	4512	12	29-Jan-2017
Wideband Radio Test Set	Rohde & Schwarz	CMW500	4546	12	3-Feb-2017
PXA Signal Analyser	Keysight Technologies	N9030A	4654	12	8-Oct-2016
Section 2.5 - Emission Limitations for Cellular Equipment					
Dual Power Supply Unit	Thurlby	PL320	288	-	TU
Antenna 18-40GHz (Double Ridge Guide)	Q-Par Angus Ltd	QSH 180K	1511	24	27-Nov-2016
Pre-Amplifier	Phase One	PS04-0086	1533	12	30-Jul-2016
18GHz - 40GHz Pre-Amplifier	Phase One	PSO4-0087	1534	12	23-Dec-2016
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Antenna (Bilog)	Chase	CBL6143	2904	24	11-Jun-2017
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	12	28-Sep-2016
High Pass Filter (3GHz)	RLC Electronics	F-100-3000-5-R	3349	12	28-May-2016
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	2-Nov-2016
Tilt Antenna Mast	maturo Gmbh	TAM 4.0-P	3916	-	TU
Mast Controller	maturo Gmbh	NCD	3917	-	TU
Wideband Radio Communication Tester	Rohde & Schwarz	CMW 500	4144	12	16-Nov-2016
Double Ridged Waveguide Horn Antenna	ETS-Lindgren	3117	4722	12	29-Dec-2016
Section 2.6 - Spurious Emissions at Antenna Terminals					
Multimeter	White Gold	WG022	190	12	24-Nov-2016
Multimeter	Fluke	75 Mk3	455	12	10-Sep-2016
Attenuator (20dB/ 2W)	Pasternack	PE7004-20	489	12	30-Oct-2016
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	3-Sep-2016
Programmable Power Supply	Iso-tech	IPS 2010	2437	-	O/P Mon
Filter	Daden Anthony Ass	MH-1500-7SS	2778	12	5-Feb-2017
Hygrometer	Rotronic	I-1000	3220	12	19-Aug-2016
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	2-Sep-2016
Combiner/Splitter	Weinschel	1506A	3878	12	2-Jun-2016
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	7-Sep-2016
Frequency Standard	Spectracom	Secure Sync 1200-0408-0601	4393	6	3-Sep-2016
1 metre SMA Cable	Florida Labs	SMS-235SP-39.4-SMS	4514	12	16-Feb-2017
2 metre SMA Cable	Florida Labs	SMS-235SP-78.8-SMS	4517	12	16-Feb-2017
Wideband Radio Test Set	Rohde & Schwarz	CMW500	4546	12	3-Feb-2017
PXA Signal Analyser	Keysight Technologies	N9030A	4653	12	8-Oct-2016
PXA Signal Analyser	Keysight Technologies	N9030A	4654	12	8-Oct-2016

Product Service

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.7 - 26 dB Bandwidth					
Multimeter	Fluke	75 Mk3	455	12	10-Sep-2016
Multimeter	Iso-tech	IDM-101	466	12	11-Sep-2016
Attenuator (20dB/ 2W)	Pasternack	PE7004-20	489	12	30-Oct-2016
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	3-Sep-2016
Programmable Power Supply	Iso-tech	IPS 2010	2435	-	O/P Mon
Hygrometer	Rotronic	I-1000	3220	12	19-Aug-2016
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	2-Sep-2016
Combiner/Splitter	Weinschel	1506A	3878	12	2-Jun-2016
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	7-Sep-2016
Frequency Standard	Spectracom	Secure Sync 1200-0408-0601	4393	6	3-Sep-2016
1 metre N-Type Cable	Florida Labs	NMS-235SP-39.4-NMS	4511	12	2-Mar-2017
1 metre SMA Cable	Florida Labs	SMS-235SP-39.4-SMS	4512	12	29-Jan-2017
Wideband Radio Test Set	Rohde & Schwarz	CMW500	4546	12	3-Feb-2017
PXA Signal Analyser	Keysight Technologies	N9030A	4654	12	8-Oct-2016
1 metre SMA Cable	IW Microwave	3PS-1806LC-394-3PS	4662	12	6-Nov-2016

TU – Traceability Unscheduled
O/P MON – Output Monitored with Calibrated Equipment

Product Service

3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:-

Test Discipline	MU
Frequency Tolerance	± 46.70 Hz
Peak to Average Ratio	± 0.70 dB
Modulation Characteristics	-
Maximum Conducted Output Power	± 0.70 dB
Spurious Emissions at Antenna Terminals	± 3.454 dB
Emission Limitations for Cellular Equipment	30 MHz to 1 GHz: ± 5.1 dB 1 GHz to 40 GHz: ± 6.3 dB
26 dB Bandwidth	± 16.74 kHz
Spurious Emissions at Band Edge	30 MHz to 1 GHz: ± 5.1 dB 1 GHz to 40 GHz: ± 6.3 dB

SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

Product Service

4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

This report relates only to the actual item/items tested.

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation.

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA (Not UKAS Accredited).