Product Service

Choose certainty.
Add value.

Report On

FCC Testing of the Sharp SHV32 Hex-band LTE (B1 / B3 / B5 / B17 / B26 / B28), Dual-band WCDMA (FDD I / V), Quad-band GSM (850/900/1800/1900) & AXGP (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD (NFC,FeliCa) and GPS
In accordance with FCC 47 CFR Part 22 and FCC 47 CFR Part 2 (GSM 850)

COMMERCIAL-IN-CONFIDENCE
FCC ID: APYHRO00218

Document 75929719 Report 18 Issue 4 June 2015

TÜV SÜD Product Service, Octagon House, Concorde Way, Segensworth North,
Fareham, Hampshire, United Kingdom, PO15 5RL
Tel: +44 (0) 1489 558100. Website: www.tuv-sud.co.uk

REPORT ON

FCC Testing of the Sharp SHV32 Hex-band LTE (B1 / B3 / B5 / B17 / B26 / B28), Dual-band WCDMA (FDD I / V), Quad-band GSM (850/900/1800/1900) & AXGP (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD (NFC,FeliCa) and GPS
In accordance with FCC 47 CFR Part 22 and FCC 47 CFR Part 2 (GSM 850)

Document 75929719 Report 18 Issue 4

June 2015

PREPARED FOR

Sharp Communication Compliance Ltd
Inspired
Easthampstead Road
Bracknell
Berkshire
RG12 1NS

PREPARED BY

Natalie Bennett
Senior Administrator, Project Support

APPROVED BY

Simon Bennett
Authorised Signatory

DATED 25 June 2015

This report has been up-issued to Issue 4 to amend the antenna gain.

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC 47 CFR Part 22 and FCC 47 CFR Part 2. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

M Russell J Tuckwell

Product Service

CONTENTS

Product Service

SECTION 1

REPORT SUMMARY

FCC Testing of the
Sharp SHV32 Hex-band LTE (B1 / B3 / B5 / B17 / B26 / B28), Dual-band WCDMA (FDD I / V),
Quad-band GSM (850/900/1800/1900) & AXGP (TDD41) multi mode Smart phone with
Bluetooth, WLAN, SRD (NFC,FeliCa) and GPS
In accordance with FCC 47 CFR Part 22 and FCC 47 CFR Part 2 (GSM 850)

Product Service

1.1 INTRODUCTION

The information contained in this report is intended to show the verification of FCC Testing of the Sharp SHV32 Hex-band LTE (B1 / B3 / B5 / B17 / B26 / B28), Dual-band WCDMA (FDD I / V), Quad-band GSM (850/900/1800/1900) & AXGP (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD (NFC,FeliCa) and GPS to the requirements of FCC 47 CFR Part 22 and FCC 47 CFR Part 2.

Objective	To perform FCC Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	Sharp Corporation
Model Number(s)	SHV32
Serial Number(s)	IMEI 004401115406452 IMEI 004401115406759
Number of Samples Tested	2
Test Specification/Issue/Date	FCC 47 CFR Part 22 (2014) FCC 47 CFR Part 2 (2014)
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	10477 02 March 2015
Start of Test	17 April 2015
Finish of Test	27 April 2015
Name of Engineer(s)	M Russell J Tuckwell
Related Document(s)	ANSI C63.4 (2003) ANSI TIA-603-C (2004)

Product Service

1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 22 and FCC 47 CFR Part 2 is shown below.

Section	Specification Clause		Test Description	Result	Comments/Base Standard
	Part 22	Part 2			
GSM 850					
2.1	22.355	2.1055	Frequency Tolerance	Pass	
2.2	22.905	2.1051	Spurious Emissions at Band Edge	Pass	
2.3	22.913 (a)	2.1046	Maximum Conducted Output Power	Pass	
2.4	22.917	-	Emission Limitations for Cellular Equipment	Pass	
2.5	22.917 (b)	2.1049 (h)	26 dB Bandwidth	Pass	
2.6	-	2.1047 (d)	Modulation Characteristics	-	Customer Declaration

1.3 PRODUCT TECHNICAL DESCRIPTION

Please refer to the SHV32 Model Description Form.

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Sharp SHV32 Hex-band LTE (B1 / B3 / B5 / B17 / B26 / B28), Dual-band WCDMA (FDD I / V), Quad-band GSM (850/900/1800/1900) & AXGP (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD (NFC,FeliCa) and GPS. A full technical description can be found in the manufacturer's documentation.

1.5 TEST CONDITIONS

For all tests the EUT was set up in accordance with the relevant test standard and to represent typical operating conditions. Tests were applied with the EUT situated in a shielded enclosure.

The EUT was powered from a 4.0 V DC supply.

FCC Measurement Facility Registration Number
90987 Octagon House, Fareham Test Laboratory

1.6 DEVIATIONS FROM THE STANDARD

No deviations from the applicable test standard were made during testing

1.7 MODIFICATION RECORD

Modification 0 - No modifications were made to the test sample during testing.

Product Service

SECTION 2

TEST DETAILS

FCC Testing of the
Sharp SHV32 Hex-band LTE (B1 / B3 / B5 / B17 / B26 / B28), Dual-band WCDMA (FDD I / V), Quad-band GSM (850/900/1800/1900) & AXGP (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD (NFC,FeliCa) and GPS
In accordance with FCC 47 CFR Part 22 and FCC 47 CFR Part 2 (GSM 850)

Product Service

2.1 FREQUENCY TOLERANCE

2.1.1 Specification Reference

FCC 47 CFR Part 22, Clause 22.355
FCC 47 CFR Part 2, Clause 2.1055

2.1.2 Equipment Under Test and Modification State

SHV32 S/N: IMEI 004401115406452 - Modification State 0

2.1.3 Date of Test

24 April 2015 & 27 April 2015

2.1.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.1.5 Test Procedure

Using a communication test set, frequency error measurements were made over the range -30°C to +50°C in 10°C steps. At 20°C, the voltage was varied in accordance with FCC 47 CFR Part 2, clause 2.1055 (d).

The communication test set was connected to an external frequency standard to improve measurement accuracy.

2.1.6 Environmental Conditions

Ambient Temperature	22.2 - 22.3°C
Relative Humidity	34.8 - 38.4%

Product Service

2.1.7 Test Results

4.0 V DC Supply

GSM 850, 836.40 MHz, GMSK, Circuit-Switched, Frequency Tolerance Under Temperature Variations Results

Temperature Interval	Fundamental Frequency Deviation (ppm)
-30 ºC	0.018
-20 ºC	0.013
-10 ºC	0.019
0 ºC	0.017
+10 ºC	-0.080
+20 ºC	0.016
+30 ºC	-0.014
+40 ºC	0.018
+50 ºC	-0.022

GSM 850, 836.40 MHz, GMSK, Circuit-Switched, Frequency Tolerance Under Voltage Variations Results

Voltage	Fundamental Frequency Deviation (ppm)
4.0 V DC	0.016
3.7 V DC	0.014

FCC 47 CFR Part 22, Limit Clause 22.355

Frequency Range (MHz)	Base, Fixed (ppm)	Mobile ≤ 3 watts (ppm)	Mobile ≤ 3 watts (ppm)
25 to 50	20	20	50
50 to 450	5	5	50
450 to 512	2.5	5	5
821 to 896	1.5	2.5	2.5
928 to 929	5.0	-	-
929 to 960	1.5	-	-
2110 to 2220	10	-	-

2.2 SPURIOUS EMISSIONS AT BAND EDGE

2.2.1 Specification Reference

FCC 47 CFR Part 22, Clause 22.905
FCC 47 CFR Part 2, Clause 2.1051

2.2.2 Equipment Under Test and Modification State

SHV32 S/N: IMEI 004401115406452 - Modification State 0

2.2.3 Date of Test

23 April 2015

2.2.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.2.5 Test Procedure

This test was performed in accordance with KDB 971168 D01 v02r02, clause 6.

Remarks

The EUT was configured with using a communications test set at maximum output power using circuit switched voice call.

2.2.6 Environmental Conditions

Ambient Temperature	21.8°C
Relative Humidity	35.5%

Product Service

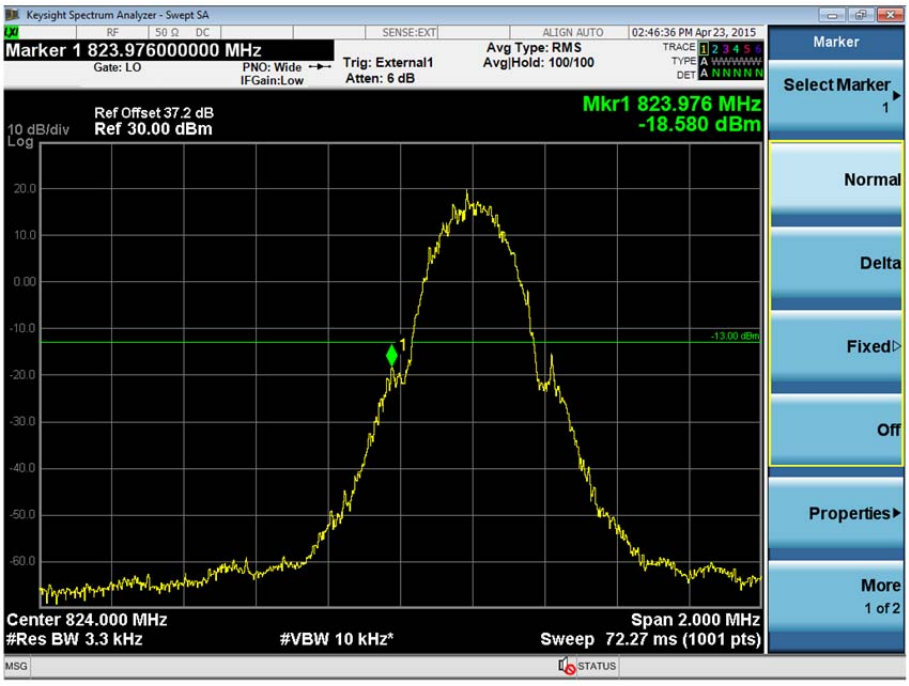
2.2.7 Test Results

4.0 V DC Supply

GSM 850, GMSK, Circuit-Switched, Spurious Emissions at Band Edge Results

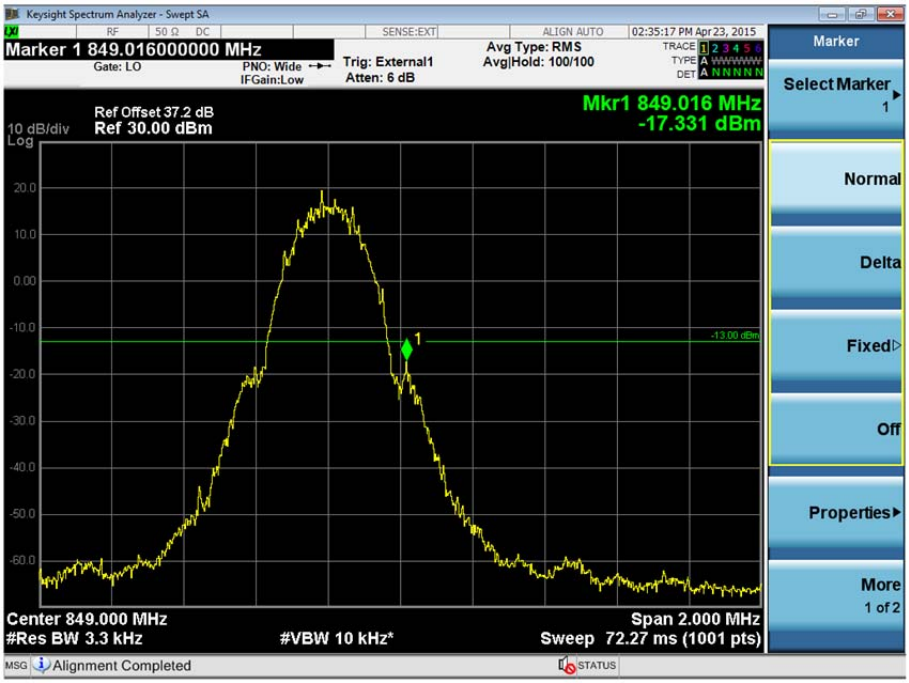
Block Edge	Frequency Block (MHz)	
	A :824.0 MHz – 835.0 MHz	B :846.5 MHz – 849.0 MHz
Lower	Channel: 128 824.2 MHz	-
Upper	-	Channel: 251 848.8 MHz

GSM 850, GMSK, Circuit-Switched, Frequency Block A, Spurious Emissions at Band Edge Plot



Product Service

GSM 850, GMSK, Circuit-Switched, Frequency Block B, Spurious Emissions at Band Edge Plot



FCC 47 CFR Part 22, Limit Clause 22.905 and 22.917

-13 dBm at block edge.

2.3 MAXIMUM CONDUCTED OUTPUT POWER

2.3.1 Specification Reference

FCC 47 CFR Part 22, Clause 22.913 (a)
FCC 47 CFR Part 2, Clause 2.1046

2.3.2 Equipment Under Test and Modification State

SHV32 S/N: IMEI 004401115406452 - Modification State 0

2.3.3 Date of Test

17 April 2015

2.3.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.3.5 Test Procedure

This test was performed in accordance with KDB 971168 D01 v02r02, clause 5.2.3.

Remarks

The EUT was configured with using a communications test set at maximum output power using a circuit switched voice call.

2.3.6 Environmental Conditions

Ambient Temperature	24.9°C
Relative Humidity	28.3%

Product Service

2.3.7 Test Results

4.0 V DC Supply

GSM 850, GMSK, Maximum Peak Conducted Output Power Results

Frequency	Conducted Power (dBm)	Antenna Gain	ERP (dBm)	ERP (W)
824.20 MHz	32.27	2.0 dBi	32.12	1.629
836.40 MHz	32.05	2.0 dBi	31.90	1.549
836.40 MHz	31.86	2.0 dBi	31.71	1.483

FCC 47 CFR Part 22, Limit Clause 22.913 (a)(2)

Mobile Transmitters: 7 W or 38.45 dBm

2.4 EMISSION LIMITATIONS FOR CELLULAR EQUIPMENT

2.4.1 Specification Reference

FCC 47 CFR Part 22, Clause 22.917

2.4.2 Equipment Under Test and Modification State

SHV32 S/N: IMEI 004401115406759 - Modification State 0

2.4.3 Date of Test

22 April 2015

2.4.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.4.5 Test Procedure

The test was performed in accordance with KDB 971168 D01 v02r02, Clause 5.8 and 7 and ANSI TIA-603-C, Clause 2.2.12. The EUT was configured as defined in ANSI C63.4.

2.4.6 Environmental Conditions

Ambient Temperature	19.9°C
Relative Humidity	27.0%

Product Service

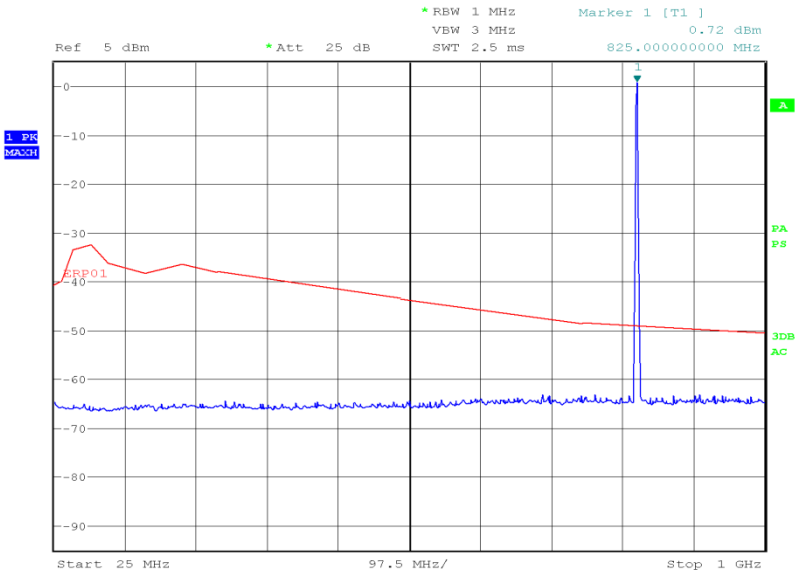
2.4.7 Test Results

GSM 850, 824.20 MHz, Emission Limitations for Cellular Equipment Results

Frequency (MHz)	Emission Results (dBm)
*	

*No emissions were detected within 10 dB of the limit.

GSM 850, 824.20 MHz, 30 MHz to 1 GHz, Emission Limitations for Celluar Equipment Plot

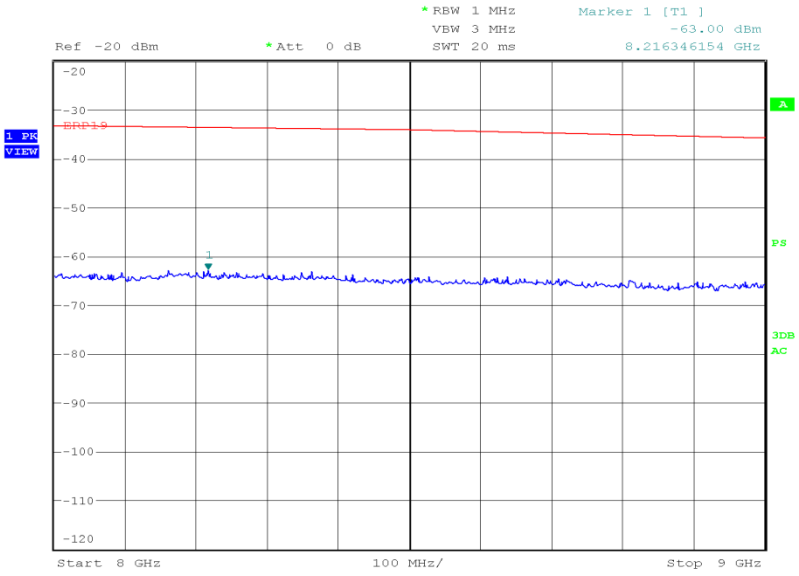


Date: 22.APR.2015 12:01:07

GSM 850, 824.20 MHz, 1 GHz to 8 GHz, Emission Limitations for Celluar Equipment Plot

Date: 22.APR.2015 14:45:42

GSM 850, 824.20 MHz, 8 GHz to 9 GHz, Emission Limitations for Celluar Equipment Plot



Date: 22.APR.2015 15:26:31

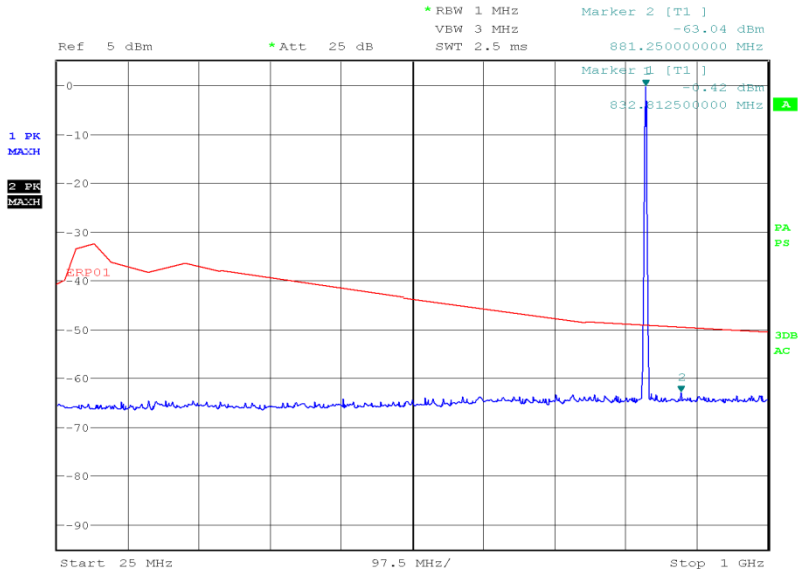
Product Service

GSM 850, 836.40 MHz, Emission Limitations for Cellular Equipment Results

Frequency (MHz)	Emission Results (dBm)
*	

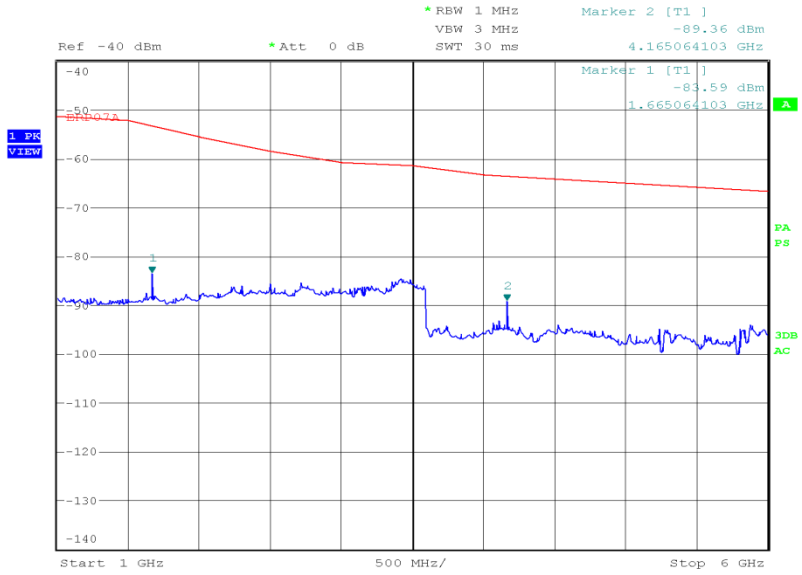
*No emissions were detected within 10 dB of the limit.

GSM 850, 836.40 MHz, 30 MHz to 1 GHz, Emission Limitations for Celluar Equipment Plot



Date: 22.APR.2015 11:57:33

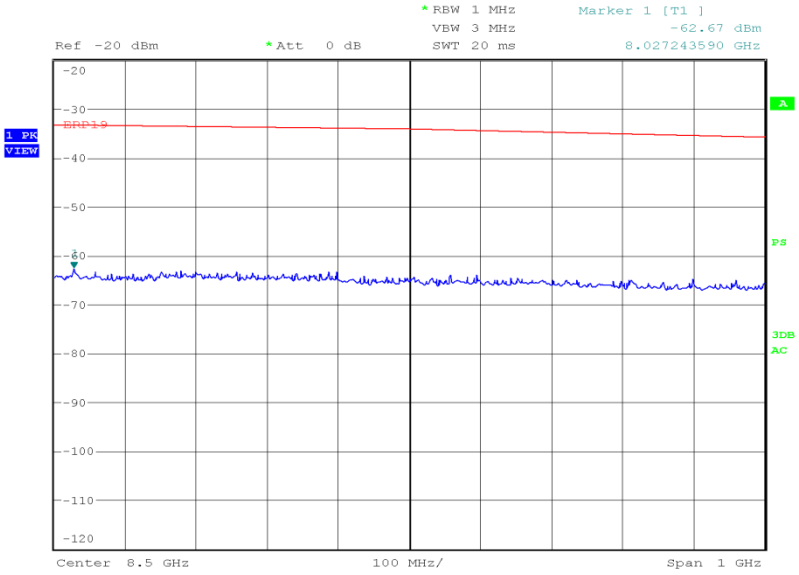
GSM 850, 836.40 MHz, 1 GHz to 8 GHz, Emission Limitations for Celluar Equipment Plot



Date: 22.APR.2015 14:45:42

Product Service

GSM 850, 836.40 MHz, 8 GHz to 9 GHz, Emission Limitations for Celluar Equipment Plot



Date: 22.APR.2015 15:32:43

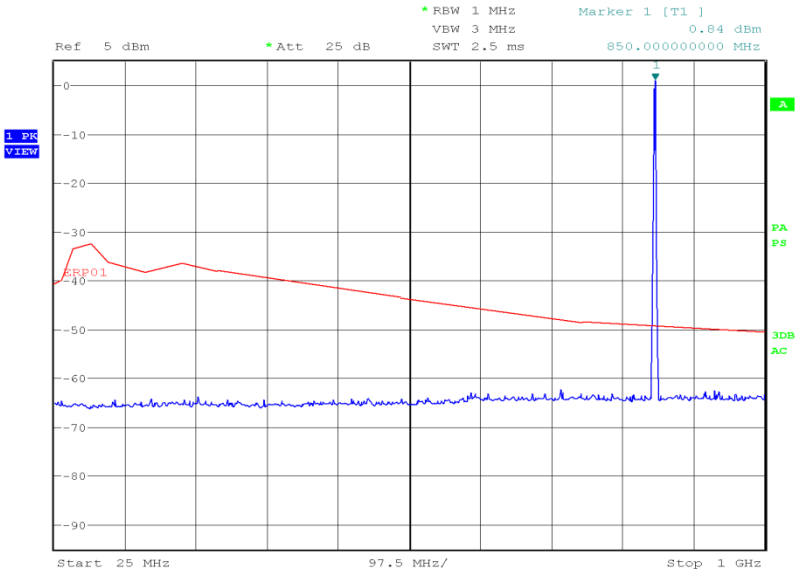
Product Service

GSM 850, 848.80 MHz, Emission Limitations for Cellular Equipment Results

Frequency (MHz)	Emission Results (dBm)
*	

*No emissions were detected within 10 dB of the limit.

GSM 850, 848.80 MHz, 30 MHz to 1 GHz, Emission Limitations for Celluar Equipment Plot

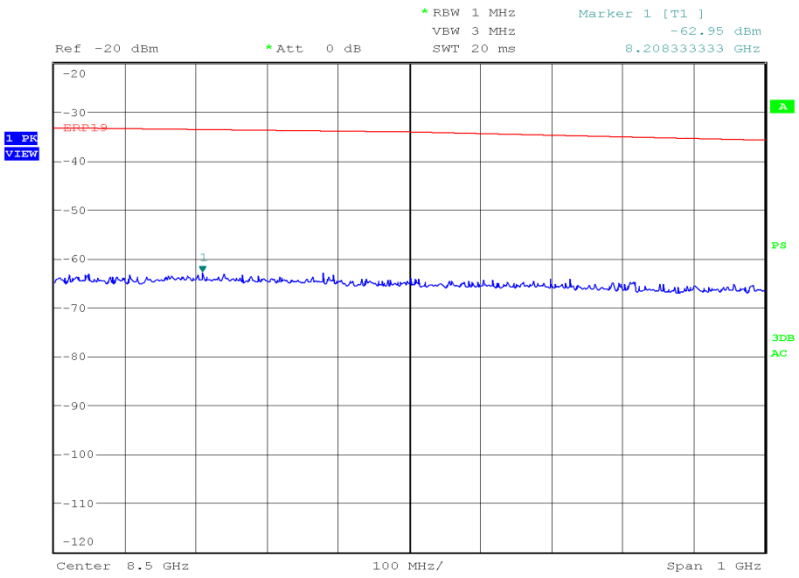


Date: 22.APR.2015 12:12:00

GSM 850, 848.80 MHz, 1 GHz to 8 GHz, Emission Limitations for Celluar Equipment Plot

Date: 22.APR.2015 14:13:27

GSM 850, 848.80 MHz, 8 GHz to 9 GHz, Emission Limitations for Celluar Equipment Plot



Date: 22.APR.2015 15:40:10

FCC 47 CFR Part 22, Limit Clause 22.917 (a)

43+10log(P) or -13 dBm

2.5 26 dB BANDWIDTH

2.5.1 Specification Reference

FCC 47 CFR Part 22, Clause 22.917 (b
FCC 47 CFR Part 2, Clause 2.1049 (h)

2.5.2 Equipment Under Test and Modification State

SHV32 S/N: IMEI 004401115406452 - Modification State 0

2.5.3 Date of Test

23 April 2015

2.5.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.5.5 Test Procedure

This test was performed in accordance with KDB 971168 D01 v02r02, clause 4.1.

Remarks

The EUT was configured with using a communications test set at maximum output power using a circuit-switched voice call.

2.5.6 Environmental Conditions

Ambient Temperature	21.8°C
Relative Humidity	35.5%

Product Service

2.5.7 Test Results

4.0 V DC Supply

GSM 850, GMSK, 26 dB Bandwidth Results

824.20 MHz	836.40 MHz	848.80 MHz
kHz	kHz	kHz
316.0	319.0	321.0

GSM 850, 824.20 MHz, GMSK, 26 dB Bandwidth Plot

Product Service

GSM 850, 836.40 MHz, GMSK, 26 dB Bandwidth Plot

GSM 850, 848.80 MHz, GMSK, 26 dB Bandwidth Plot

FCC 47 CFR Part 22, Limit Clause

None specified.

2.6 MODULATION CHARACTERISTICS

2.6.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1047 (d)

2.6.2 Equipment Under Test

SHV32

2.6.3 Test Results

GSM 850, Modulation Characteristics, Customer Description

The modulation scheme used in GSM is called Gaussian Minimum Shift Keying (GMSK). GMSK facilitates the use of narrow bandwidth and allows for both coherent and non coherent detection capabilities. It is a scheme in which the transitions from One to Zero or Zero to One do not occur quickly, but over a period of time. If pulses are transmitted quickly harmonics are transmitted. The power spectrum for a square wave is rich in harmonics, and the power within the side lobes is wasted, and can be a cause of potential interference.

A method to reduce the harmonics is to round off the edges of the pulses thus lowering the spectral components of the signal. In GSM this is done by using a Gaussian pre-filter which typically has a bandwidth of 81.25kHz. The output from the Gaussian filter then phase modulates the carrier. As there are no dramatic phase transitions of the carrier this gives a constant envelope and low spectral component output from the transmitter.

The spectral efficiency is calculated by

bit rate / Channel bandwidth = 270.83333 kbit/s / 200 kHz = 1.354 bit/s/Hz.

The bandwidth product BT = Bandwidth x bit duration = 81.25 kHz x 3.6923 micros = 0.3

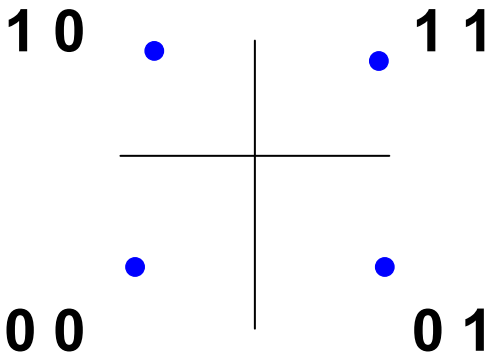
GMSK OVERVIEW

The modulation scheme used for the EUT is GMSK.

A brief overview of how GMSK works is shown below.

GMSK (Gaussian Minimum Shift Keying)

The fundamental principal behind GMSK is Phase shift keying. This splits a data stream into a series of 2-digit phase shifts, using the following phase shifts to represent data pairs.



Therefore for the BIT sequence 0 0 1 1 1 0 0 1 The corresponding phase shift will be used

BIT SEQUENCE		0 0	1 1	1 0	01
PHASE	225º	45º	135º	315º	

This is called QPSK (Quadratic Phase Shift Keying)

However

There is a problem with QPSK: transition from e.g. 00 to 11 gives phase shift of 180° (π radians). This has the effect of inverting the carrier waveform and this can lead to detection errors at the receiver.

Solution: restrict phase changes to ± 90°

1. Split bitstream into 2 streams e.g.

	0 0		1 1		0 1		1 0	
I Stream	0		1		0		1	
Q stream		0		1		1		0

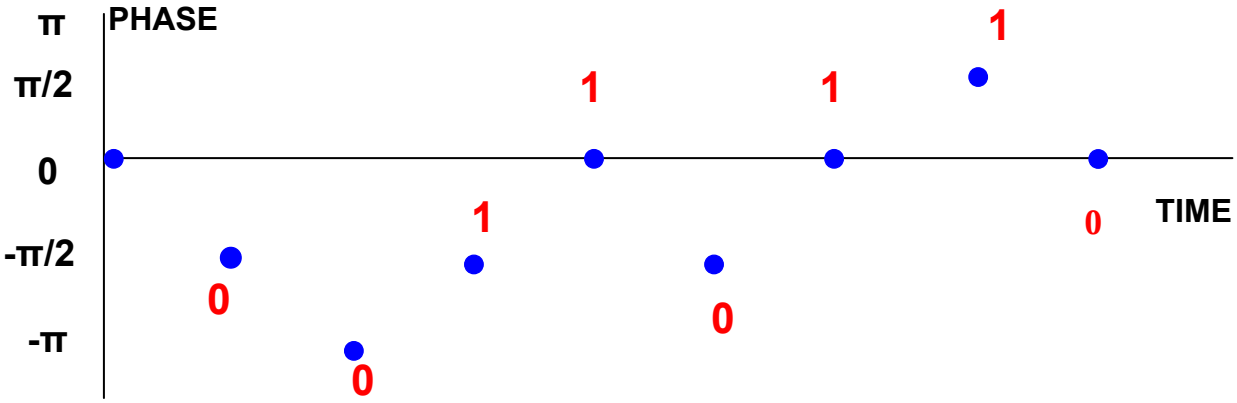
2. Modulate each stream with PSK (1 = 90° or π/2, 0 = -90° or - π/2 phase shift)

I Stream	0		1		0		1	
	-π/2		-π/2		-π/2		π/2	
Q stream		0		1		1		0
		-π/2		π/2		π/2		-π/2

3. Combine (add) the two PSK signals:

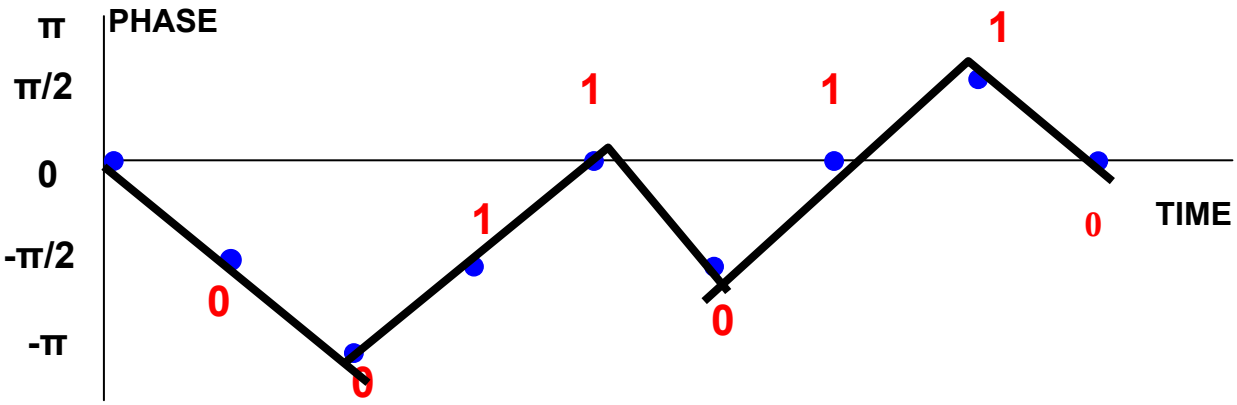
Combined Phase	-π/2	-π	-π/2	0	-π/2	0	π/2	0

Result: offset - QPSK, phase change is restricted to ± π/2 radians:



It would be preferable to have "gradual" changes in place between each pair of bits (Continuous-phase modulation). Replacing each “rectangular” shaped pulse (for 1 or 0) with a sinusoidal pulse can do this:

Result: Minimum Shift Keying (MSK):



Gaussian Minimum Shift Keying

MSK has high sidebands relative to the main lobes in the frequency domain - this can lead to interference with adjacent signals.

If the rectangular pulses corresponding to the bitstream are filtering using a Gaussian-shaped impulse response filter, we get Gaussian MSK (GMSK) - this has low sidelobes compared to MSK.

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
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	28-Jul-2015
GSM Test Set	Rohde & Schwarz	CMU 200	2809	12	30-Jun-2015
Digital Thermometer	Digitron	T208	2831	12	31-Jul-2015
DC - 8 GHz Attenuator	Lucas Weinschel	24-30-33	3963	12	30-Jun-2015
Type T PFA Insulated Thermocouple	TC Limited	Type T	4229	12	28-Jan-2016
Frequency Standard	Spectracom	Secure Sync 1200-0408-0601	4393	6	28-Jul-2015
1 metre N-Type Cable	IW Microwave	NPS-1806LC-394-NPS	4505	12	26-Feb-2016
Section 2.2 - Spurious Emissions at Band Edge					
Power Supply Unit	Hewlett Packard	6253A	441	-	O/P Mon
Attenuator (10dB)	Weinschel	47-10-34	481	12	1-Apr-2016
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	28-Jul-2015
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	20-Jan-2016
Radio Communications Test Set	Rohde & Schwarz	CMU 200	3035	12	6-Nov-2015
Hygrometer	Rotronic	I-1000	3220	12	24-Jul-2015
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	3-Sep-2015
Combiner/Splitter	Weinschel	1506A	3877	12	24-Mar-2016
True RMS Multimeter	Fluke	179	4007	12	31-Jul-2015
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	24-Sep-2015
Frequency Standard	Spectracom	Secure Sync 1200-0408-0601	4393	6	28-Jul-2015

Product Service

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.3 - Maximum Conducted Output Power					
Power Supply Unit	Hewlett Packard	6267B	21	-	TU
Broadband Resistive Power Divider	Weinschel	1506A	601	12	24-Mar-2016
Multimeter	Fluke	79 Series III	611	12	1-Sep-2015
Attenuator (10dB, 50W)	Aeroflex / Weinschel	47-10-34	3166	12	16-Sep-2015
Hygrometer	Rotronic	I-1000	3220	12	24-Jul-2015
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	3-Sep-2015
P-Series Power Meter	Agilent Technologies	N1911A	3981	12	22-Sep-2015
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	24-Sep-2015
PXA Signal Analyser	Agilent Technologies	N9030A PXA	4409	12	16-Feb-2016
1 metre N-Type Cable	IW Microwave	NPS-1806LC-394-NPS	4505	12	26-Feb-2016
1 metre N-Type Cable	IW Microwave	NPS-1806LC-394-NPS	4506	12	26-Feb-2016
Section 2.4 - Emission Limitations for Cellular Equipment					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	2-May-2015
Filter (High Pass)	Lorch	SHP7-7000-SR	566	12	24-Feb-2016
Pre-Amplifier	Phase One	PS04-0086	1533	12	23-Dec-2015
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Sweep Generator	Hewlett Packard	8350B	1904	-	TU
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	27-Oct-2015
Tilt Antenna Mast	maturo Gmbh	TAM 4.0-P	3916	-	TU
Mast Controller	maturo Gmbh	NCD	3917	-	TU
Suspended Substrate Highpass Filter	Advance Power Components	11SH10-3000/X18000-O/O	4412	12	24-Mar-2016

Product Service

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.5 - 26 dB Bandwidth					
Power Supply Unit	Hewlett Packard	6267B	21	-	TU
Power Supply Unit	Hewlett Packard	6253A	441	-	O/P Mon
Attenuator (10dB)	Weinschel	47-10-34	481	12	1-Apr-2016
Broadband Resistive Power Divider	Weinschel	1506A	601	12	24-Mar-2016
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	28-Jul-2015
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	20-Jan-2016
GSM Test Set	Rohde & Schwarz	CMU 200	2809	12	30-Jun-2015
Hygrometer	Rotronic	I-1000	3220	12	24-Jul-2015
Attenuator (10dB, 20W)	Lucas Weinschel	1	3225	12	12-Dec-2015
Signal Analyser	Rohde & Schwarz	FSQ 26	3545	12	6-Aug-2015
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	3-Sep-2015
Combiner/Splitter	Weinschel	1506A	3877	12	24-Mar-2016
DC - 8 GHz Attenuator	Lucas Weinschel	24-30-33	3963	12	30-Jun-2015
DC - 12.4 GHz 10 dB Attenuator	Suhner	6810.17.A	3965	12	22-Oct-2015
True RMS Multimeter	Fluke	179	4007	12	31-Jul-2015
Wideband Radio Communication Tester	Rohde & Schwarz	CMW 500	4144	12	7-Nov-2015
Fan Heater	Master	B 3 EPB	4363	-	TU
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	24-Sep-2015
Frequency Standard	Spectracom	Secure Sync 1200-0408-0601	4393	6	28-Jul-2015
PXA Signal Analyser	Agilent Technologies	N9030A PXA	4409	12	16-Feb-2016
1 metre N-Type Cable	IW Microwave	NPS-1806LC-394-NPS	4504	12	26-Feb-2016
1 metre SMA Cable	IW Microwave	3PS-1806LC-394-3PS	4522	12	29-Jan-2016
Wideband Radio Test Set	Rohde & Schwarz	CMW500	4546	12	23-Jan-2016

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

3.2 MEASUREMENT UNCERTAINTY

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

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

Product Service

SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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).